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# ANTÆUS

*Communicationes ex Instituto Archaeologico*

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*Sigel: Antaeus*



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37

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## ABBREVIATIONS

ActaArchHung	Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)
ActaEthnHung	Acta Ethnographica Academiae Scientiarum Hungaricae (Budapest)
ActaOrHung	Acta Orientalia Academiae Scientiarum Hungaricae (Budapest)
ActaMusPapensis	Acta Musei Papensis. A Pápai Múzeum Értesítője (Pápa)
Agria	Agria. Az Egri Múzeum Évkönyve (Eger)
AH	Archaeologia Historica (Brno)
AHN	Acta Historica Neolosiensia (Banská Bystrica)
AJMK	Arany János Múzeum Közleményei (Nagykőrös)
AKorr	Archäologisches Korrespondenzblatt (Mainz)
Alba Regia	Alba Regia. Annales Musei Stephani Regis (Székesfehérvár)
AnalCis	Analecta Cisterciensia (Roma)
AnnHN	Annales Historico-Naturales Musei Nationalis Hungarici (Budapest)
Antaeus	Antaeus. Communicationes ex Instituto Archaeologico (Budapest)
Antiquity	Antiquity. A Review of World Archaeology (Durham)
AR	Archeologické Rozhledy (Praha)
ArchA	Archaeologia Austriaca (Wien)
ArchÉrt	Archaeologiai Értesítő (Budapest)
ArchHung	Archaeologia Hungarica (Budapest)
ArchLit	Archaeologia Lituana (Vilnius)
ArhSof	Археология. Орган на Националния археологически институт с музей – БАН (Sofia)
ARR	Arheološki Radovi i Rasprave (Zagreb)
Arrabona	Arrabona. A Győri Xantus János Múzeum Évkönyve (Győr)
AV	Arheološki Vestnik (Ljubljana)
Balcanoslavica	Balcanoslavica (Prilep)
BÁMÉ	A Béri Balogh Ádám Múzeum Évkönyve (Szekszárd)
BAR	British Archaeological Reports (Oxford)
BMÖ	Beiträge zur Mittelalterarchäologie in Österreich (Wien)
BudRég	Budapest Régiségei (Budapest)
Castrum	Castrum. A Castrum Bene Egyesület folyóirata (Budapest)
CommArchHung	Communicationes Archaeologicae Hungariae (Budapest)
Cumania	Cumania. A Bács-Kiskun Megyei Múzeumok Közleményei (Kecskemét)
DBW	Denkmalpflege Baden-Württemberg (Stuttgart)
EMÉ	Az Egri Múzeum Évkönyve (Eger)
EurAnt	Eurasia Antiqua. Zeitschrift für Archäologie Eurasiens (Bonn)
FolArch	Folia Archaeologica (Budapest)
FontArchHung	Fontes Archaeologici Hungariae (Budapest)
GMSB	Годишник на музеите от Северна България (Варна)
GZM	Glasnik Zemaljskog muzeja Bosne i Hercegovine u Sarajevu (Sarajevo)
GZMS	Glasnik Hrvatskih Zemaljskih Muzeja u Sarajevu (Sarajevo)
HAH	Hereditas Archaeologica Hungariae (Budapest)

Hesperia	Hesperia. Journal of the American School of Classical Studies at Athens (Princeton)
História	História. A Magyar Történelmi Társulat, majd a História Alapítvány folyóirata (Budapest)
HOMÉ	A Herman Ottó Múzeum Évkönyve (Miskolc)
INMVarna	Известия на Народния музей – Варна (Varna)
IstMitt	Istanbuler Mitteilungen (Tübingen)
JAMÉ	A nyíregyházi Jósa András Múzeum Évkönyve (Nyíregyháza)
Jászkunság	Jászkunság. Az MTA Jász-Nagykun-Szolnok Megyei Tudományos Egyesület folyóirata (Szolnok)
JbAC	Jahrbuch für Antike und Christentum (Bonn)
JPMÉ	A Janus Pannonius Múzeum Évkönyve (Pécs)
KMMK	Komárom-Esztergom Megyei Múzeumok Közleményei (Tata)
LK	Levéltári Közlemények (Budapest)
MAA	Monumenta Avarorum Archaeologica (Budapest)
MacAA	Macedoniae Acta Archaeologica (Skopje)
MAG	Mitteilungen der Anthropologischen Gesellschaft (Wien)
MBV	Münchener Beiträge zur Vor- und Frühgeschichte (München)
MHKÁS	Magyarország honfoglalás és kora Árpád-kori sírleletei (Budapest)
MittArchInst	Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften (Budapest)
MFME	A Móra Ferenc Múzeum Évkönyve (Szeged)
MFME StudArch	A Móra Ferenc Múzeum Évkönyve – Studia Archaeologica (Szeged)
MMMK	A Magyar Mezőgazdasági Múzeum Közleményei (Budapest)
MŰÉ	Művészettörténeti Értesítő (Budapest)
MŰT	Művészettörténeti Tanulmányok. Művészettörténeti Dokumentációs Központ Évkönyve (Budapest)
NÉrt	Néprajzi Értesítő (Budapest)
NMMÉ	Nógrád Megyei Múzeumok Évkönyve (Salgótarján)
OA	Opvsclva Archaeologica (Zagreb)
Offa	Offa. Berichte und Mitteilungen des Museums Vorgeschichtliche Altertümer in Kiel (Neumünster)
PA	Památky Archeologické (Praha)
Prilozi	Prilozi Instituta za povijesne znanosti Sveučilišta u Zagrebu (Zagreb)
PrzA	Przegląd Archeologiczny (Wrocław)
PtujZb	Ptujski Zbornik (Ptuj)
PV	Přehled výzkumů (Brno)
PZ	Prähistorische Zeitschrift (Berlin)
RégFüz	Régészeti Füzetek (Budapest)
RGA	Reallexikon der Germanischen Altertumskunde (Berlin)
RT	Transylvanian Review / Revue de Transylvanie (Cluj)
RVM	Rad Vojvođanskih muzeja (Novi Sad)
SbNMP	Sborník Národního muzea v Praze (Praha)
Scripta Mercaturae	Scripta Mercaturae. Zeitschrift für Wirtschafts- und Sozialgeschichte Gutenberg)
SHP	Starohrvatska Prosvjeta (Zagreb)
SlA	Slovenská Archeológia (Bratislava)
SlAnt	Slavia Antiqua (Poznan)

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SIS	Slovanské štúdie (Bratislava)
SMK	Somogyi Múzeumok Közleményei (Kaposvár)
StComit	Studia Comitatus. A Ferenczy Múzeum Évkönyve (Szentendre)
StH	Studia Historica Academiae Scientiarum Hungaricae (Budapest)
StSl	Studia Slavica Academiae Scientiarum Hungaricae (Budapest)
StudArch	Studia Archaeologica (Budapest)
Századok	Századok. A Magyar Történelmi Társulat folyóirata (Budapest)
TBM	Tanulmányok Budapest Múltjából (Budapest)
Tisicum	Tisicum. A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve (Szolnok)
USML	Utrecht Studies in Medieval Literacy (Turnhout)
VAH	Varia Archeologica Hungarica (Budapest)
VAMZ	Vjesnik Arheološkog muzeja u Zagrebu (Zagreb)
VMMK	A Veszprém Megyei Múzeumok Közleményei (Veszprém)
WiA	Wiadomości Archeologiczne (Warszawa)
WMMÉ	A Wosinsky Mór Múzeum Évkönyve (Szekszárd)
ZalaiMúz	Zalai Múzeum (Zalaegerszeg)
Zborník FFUK, Musaica	Zborník Filozofickej Fakulty Univerzity Komenského. Musaica (Bratislava)
ZbSNM	Zborník Slovenského Národného Múzea. História (Bratislava)
ZfAM	Zeitschrift für Archäologie des Mittelalters (Köln)
ZHVSt	Zeitschrift des Historischen Vereins für Steiermark (Graz)
Ziegelei-Museum	Ziegelei-Museum. Bericht der Stiftung Ziegelei-Museum (Cham)
ZRNM	Zbornik Radova Narodnog Muzeja (Beograd)

ISTVÁN KONCZ – ÁDÁM BOLLÓK

**ELEPHANT IVORY ARTEFACTS IN THE CARPATHIAN BASIN  
DURING THE 6TH AND 7TH CENTURIES:  
CHRONOLOGY, DISTRIBUTION, AND CULTURAL CONTEXT**

**Zusammenfassung:** Im vorliegenden Beitrag wurden vierzehn langobarden- bzw. awarenzeitliche Elfenbeinobjekte aus fünf Gräbern des Karpatenbeckens nebst weiteren langobardenzeitlichen Elfenbeinfunden aus Mähren zusammengestellt und analysiert. Im Lichte von den bekannten römerzeitlich-spätantiken Preisangaben und den erhalten gebliebenen Funden aus dem Mittelmeerraum und Europa kann man darauf schließen, dass die Elfenbeinartefakte, trotz der gewöhnlichen Aussage der archäologischen Fachliteratur, zumindest im spätantiken Mittelmeerraum ganz bis zu der Mitte des 7. Jahrhunderts nicht als unbezahlbaren Luxusgüter eingestuft werden sollen. Die Seltenheit der Elfenbeinartefakte im Karpatenbecken des 6.–7. Jh. könnte vielmehr mit kulturellen Faktoren erklärt werden. Im Gegensatz zu Edelmetall war Elfenbein für Thesaurierungszwecke in barbarischen Gesellschaften wenig geeignet, da es im Bedarfsfall nicht einfach eingeschmolzen und als Kapital mobilisiert werden könnte. Im Grunde genommen war es weder für Umarbeitung nach dem Geschmack der Barbarenelite noch für Reparatur bei Beschädigung besonders angemessen.

**Keywords:** long-distance contacts, elephant ivory and its value, Carpathian Basin, Langobard period, Avar period, pouch ring, gaming piece

Although the office-holders and military commanders of Republican Rome oft-times entertained the city's population by parading exotic beasts and holding games displaying these creatures from the 2nd century BC onward,<sup>1</sup> the Romans gathering to witness the games held on the occasion of the dedication of the temple of Venus Victrix by Cnaeus Pompeius Magnus, the consul of the year 55 BC, beheld a combat few had seen before: this was perhaps the very first occasion when *venatores* were pitted against elephants.<sup>2</sup> The people of the *Urbs* had seen elephants before in the *Circus*. The four war elephants captured in 275 BC in the victorious battle at Beneventum won over Pyrrhus, ruler of Epirus, were brought to Rome by Manius Curius Dentatus for his triumphal procession, just like Lucius Caecilius Metellus paraded a hundred elephants for the amusement of the Roman *populus* after his victory over the Carthaginians in the Battle of Palermo in 250 BC.<sup>3</sup> Nevertheless, the Romans first saw elephants fighting in the *Circus* in 99 BC, as Pliny the Elder mentions citing the Roman historian Fenestella, although he fails to describe whether they had fought against *venatores*. He does add that twenty years later, an elephant was pitted against bulls.<sup>4</sup>

<sup>1</sup> Toynbee <sup>2</sup>2013 17–18, cf. Jennison 1937 42–48; Bomgardner 2000 34–35.

<sup>2</sup> Sen., *De brev. vit.* XIII.6, Latin text and English translation: Basore 1932 328–329.

<sup>3</sup> Sen., *De brev. vit.* XIII.3, Latin text and English translation: Basore 1932 328–329; cf. Jennison 1937 44.

<sup>4</sup> Plin., *Nat. hist.* VIII.7(19–20), Latin text and English translation: Rackham 1967 14–15. For the early *venationes*, some of which did involve the massacre of the exotic beast, while on others they were merely paraded for all to see, but were not hunted, cf. Bomgardner 2000 34–35. It is therefore possible that, as Livy records, elephants had appeared during a *venatio* held in 169 BC (*Ab urbe cond.* XLIV.18.8: Latin text and English translation: Schlesinger 1951 148–149), but their first “combat” only took place several decades later.

Yet, the slaughter of Pompey's elephants (whose number is variously specified as seventeen, eighteen or twenty in the sources) aroused rarely seen emotions in the spectators. Pliny and Cassius Dio, the two later authors who described the event in detail, both mention that the elephants, who fought bravely and won the admiration of the onlookers, gave out most unusual sounds – interpreted as cries for help by those present – after seeing the futility of their fight, and raising their trunks to the sky, they circled the arena. This provoked a rarely seen sympathy in the crowd and instead of demanding that the animals be killed, they blamed Pompey for the merciless slaughter of the noble beasts and beseeched him to spare the surviving animals.<sup>5</sup> This is also confirmed by Cicero, who had witnessed the event, and the famed orator also added that the onlookers apparently became convinced that there was some degree of kinship between elephants and men.<sup>6</sup> Yet, some fifty years later, the *Res Gestae Divi Augusti* records that 3500 African beasts, perhaps also elephants among them, were massacred during the 26 *venationes* staged by Augustus.<sup>7</sup> These noble creatures were regularly included, even if not in great numbers, in the games put on by later emperors, and in fact the emperors reared their own elephant herds in Italy.<sup>8</sup> Although these beasts, regarded as exclusively befitting rulers,<sup>9</sup> most often entertained spectators with the tricks they had been taught,<sup>10</sup> their massacre was a fairly regularly recurring event in the most spectacular Roman *venationes*; however, we do not hear of similar emotional outbursts as in 55 BC in later times.

A long road led from the four exotic beasts captured from Pyrrhus, creatures never before seen by the population of the *Urbs*, to the elephants fairly routinely appearing in the games put on by the emperors. Its main milestones outline the process whereby the Romans, first acquiring their hold over Italy and then over the entire Mediterranean Basin, first became familiar with and then gradually assumed control over the many different resources, the wildlife among them, of the Mediterranean world during their strive for hegemony. In addition to many other wild beasts, elephants too became recurring actors, even if not too frequently, of the social display of the emperor and the most wealthy aristocracy. Additionally, being an excellent raw material in view of its colour, hardness, and good workability as well as an expensive commodity that was hard to obtain, elephant tusks became virtually synonymous with power, wealth, and luxury. Pliny the Elder ranked elephant ivory among the most valuable natural materials and regularly discusses them in the same context as precious stones, gold, and electrum.<sup>11</sup> Growing into an empire with her conquest of north-western Africa, the Near East, and Egypt, the greatest obstacle to obtaining elephant ivory in Rome was probably personal affluence. According to Pliny, the demand for ivory was so immense that even elephant bones began to be used.<sup>12</sup>

The appearance and growing number of various articles carved from elephant ivory in the northern provinces lying far from the Mediterranean heartland was enabled by their integration

<sup>5</sup> Plin., *Nat. hist.* VIII.7(20–22), Latin text and English translation: *Rackham 1967* 14–17; Dio, *Hist. Rom.* XXXIX.38, Greek text and English translation: *Cary – Foster 1914* 360–363.

<sup>6</sup> Cic., *Ep. ad famil.* VII.1.3, Latin text and English translation: *Williams 1952* 6–7.

<sup>7</sup> *Mon. Ancy.* IV.22.3, Latin text and English translation: *Brunt – Moor 1967* 30–31. *Jenisson 1937* 45–46, 63–64, highlights that the inscription's *Africanæ bestiae*, although usually designating African big cats such as lions and panthers, probably referred to the beasts arriving from distant lands, mainly from Africa, in Augustus's text.

<sup>8</sup> *Jenisson 1937* 65–66, 68–70, 74, 78, 84, 87–91.

<sup>9</sup> *Jenisson 1937* 93; *Bomgardner 2000* 103.

<sup>10</sup> *Jenisson 1937* 65–66.

<sup>11</sup> Plin., *Nat. hist.* XXXIII.23(81) (referring to the age of Homer), XXXIII.54(152) (speaking of the ornate silver and elephant ivory sword hilts), XXXVI.2(5) (speaking of the secular use of elephant ivory in everyday contexts), Latin text and English translation: *Rackham 1959* 62–63, 112–113; *Eichholz 1959* 6–7.

<sup>12</sup> Plin., *Nat. hist.* VIII.4(5), Latin text and English translation: *Rackham 1967* 6–7.

into the Roman social, economic, and commercial system. Thus, even though access to elephant ivory as a raw material and to the various objects made from it was not restricted to the regions that were part of the Roman world, the number of ivory articles found in a particular region provides intriguing insights into the economic prosperity of a given area and its relation to the empire. In a certain sense, this is also true of the centuries of Late Antiquity and of regions that no longer remained under direct Roman control in the wake of the transformations brought on by the Migration period. The present study focuses on one of these regions and periods. Our goal is to compile a list of the currently known elephant ivory objects in the 6th–7th-century material record of the Carpathian Basin and their assessment, and thereby to address certain aspects of the diplomatic, commercial, and cultural connections between the late antique and early medieval population of the Carpathian Basin and the Mediterranean world through the study of a discrete group of artefact types that has hitherto not been examined in this context.

### *Elephant Ivory as a Raw Material*

In archaeological contexts, ivory generally designates the tusk of African and Indian elephants, while less often it refers to the teeth of hippopotamus,<sup>13</sup> walrus,<sup>14</sup> and even narwhal,<sup>15</sup> and in certain cases to the teeth of sperm whales.<sup>16</sup> In the international archaeological literature, the different ivory types are distinguished – when and if necessary – by specifying the name of the species from which it originates (elephant ivory, hippopotamus ivory, etc.). In this sense, elephant ivory designates the tusks of elephants, the modified upper incisors which undergo continuous growth during the animal's life. In contrast to the English-language academic literature, the word used for designating articles made of elephant tusk in other languages in itself evokes the animal. In Hungarian, for example, *elefántcsont* specifically refers to a certain species<sup>17</sup> or, to be more precise, to an animal family, the Elephantidae. Although less obvious at first sight, the German designation, *Elfenbein*, from Old High German *helfantbein*, goes back to ancient Greek *ἐλέφας* and Latin *elephantus*, which in all likelihood initially meant the raw material and the articles made from it rather than the animal itself.<sup>18</sup> Similarly to the German term, Old English *elpenband* had a similar etymological background, but was replaced during the Middle Ages by ivory, which can most likely be derived from Latin *eboreus* meaning “of elephant bone/of elephant” (*ebur* + *eus*).<sup>19</sup> Although the word clearly contains a reference to elephants, the term itself has by now become more neutral and can denote objects made from the tooth or tusk of several different animals.<sup>20</sup>

The identification of ivories from different sources is aided by the clearly identifiable structure and distinctive traits of elephant, hippopotamus, walrus, and other tusks that are visible to the naked eye.<sup>21</sup> For example, intersecting lines forming chevrons (the so-called Schreger lines) can

<sup>13</sup> Moorey 1994 115; Insoll 1995.

<sup>14</sup> MacGregor 1985 41; Pierce 2009; Seaver 2009.

<sup>15</sup> Laufer – Pelliot 1913; Whitridge 1999.

<sup>16</sup> Lane 2015 324–325.

<sup>17</sup> Of the animals simply called elephants in common parlance, the African and Indian elephants are perhaps the best known, even though there were several other members of the Elephantidae aside from these two species such as forest elephant and mammoths.

<sup>18</sup> DWDS: <https://www.dwds.de/wb/Elfenbein> (last accessed April 6, 2020).

<sup>19</sup> Douglas Harper Online Etymology Dictionary: <https://www.etymonline.com/search?q=ivory> (last accessed March 18, 2020).

<sup>20</sup> Although less relevant for European/Mediterranean archaeology, the artefacts carved from the beak of helmeted hornbills native to Indonesia are also designated as ivory (“red ivory”). Today, objects made from artificially produced, synthetic ivory are also available, although their value is obviously far inferior to that of original elephant ivory.

<sup>21</sup> Locke 2008.

be seen in the cross-section of tusks from the Elephantidae family and the various species are distinguished based on the angles of these chevrons.<sup>22</sup>

Depending on the geographic region and the chronological period, the raw materials mentioned in the above occur with varying frequencies, and in many cases, their importance eclipsed that of elephant ivory. In addition to their rareness and restricted accessibility, the value of these ivories was enhanced by their excellent workability and their colour, ranging from white to brown. In Northern Europe, particularly in the British Isles and Scandinavia, elephant tusk was in part substituted by walrus tusk (*Odobenus rosmarus* Linnaeus 1758) in the early Middle Ages, which could be procured from geographically closer sources and played a leading role from the 9th to the 13th–14th centuries.<sup>23</sup> The value of walrus tusk and the demand for this commodity played a major role in the foundation and subsequent flourishing of the Viking settlements in Greenland, to the extent that it has even been suggested that one reason for their final abandonment in the 16th century was the decline in the price of African elephant tusk.<sup>24</sup> The renowned Lewis chessmen dating from the 12th century were for the greater part carved from walrus tusk,<sup>25</sup> although a few were made from the teeth of sperm whale (*Physeter macrocephalus* Linnaeus 1758).<sup>26</sup> The use of less valuable, but locally available raw material can be noted in the case of less costly and simpler objects: the bulk of the gaming pieces from the Salme ship burial dating from the late Vendel period (early 8th century) was made from whale bones, the by-product of whale hunting.<sup>27</sup> In the Near East, hippopotamus tusk (*Hippopotamus amphibius* Linnaeus 1758), much harder and whiter than elephant tusk, was always highly valued, especially for its latter trait latter trait,<sup>28</sup> and it is therefore hardly surprising that it was used as a substitute when elephant tusks were scarce;<sup>29</sup> moreover, given its greater hardness, it was downright preferred for the production of certain objects.<sup>30</sup> It was a trade commodity in its own right,<sup>31</sup> with a distribution principally covering the eastern Mediterranean. Its importance is underscored by the fact that the majority of Late Bronze Age objects described as having been made of elephant ivory had in fact been carved from hippopotamus tusk.<sup>32</sup> The above examples accentuate how the reliable determination of the raw material of artefacts simply designated as ivory – which is still in its infancy in many regions and in the case of several periods – provides an overall picture with a wealth of finer details in the case of a material hitherto treated rather uniformly.

Thus, due to its excellent workability and hardness, the materials designated as ivory, the enlarged teeth of various terrestrial and aquatic mammals, were used for the manufacture of the most diverse range of objects. Suffice it here to cite but a few examples, without any pretence at completeness. During the late antique and early medieval centuries, ivory was the raw material of diptychs, book covers, rectangular and round caskets, casket mounts and casket inlays, various furniture elements, staff ends, combs, hair and dress pins, buttons, beads, belt buckles,

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<sup>22</sup> Locke 2008 430–441.

<sup>23</sup> Roesdahl 2003; Roesdahl 2005.

<sup>24</sup> Roesdahl 1995; Roesdahl 1998. For a more detailed discussion of the reasons that led to the abandonment of the Greenland colonies, without challenging the importance of the trade in walrus tusk, cf. Seaver 2009.

<sup>25</sup> Robinson 2004.

<sup>26</sup> Tate et al. 2011 253.

<sup>27</sup> Kónsa et al. 2009 58; Peets et al. 2013 5.

<sup>28</sup> Penniman 1952 23.

<sup>29</sup> Krzyszkowska 1990 21.

<sup>30</sup> Moorey 1994 115.

<sup>31</sup> The perhaps best illustration is the cargo of the Uluburum shipwreck (TR): the bulk of what was thought to be “elephant ivory” actually turned out to be hippopotamus teeth. For a discussion, including the results of the archaeometric analyses, cf. Lafrenz 2004.

<sup>32</sup> Krzyszkowska 1990; Reese 1998 142.

strap-ends, bracelets, and writing accessories, alongside gaming pieces and gaming figures as well as decorative elements of musical instruments and weapons. In the case of various utilitarian objects made of ivory, they were prized perhaps less for the quality of their craftsmanship than for their raw material.

*Elephant Ivory Artefacts of the Carpathian Basin from the 6th and 7th Centuries,  
with a Brief Look at the Neighbouring Regions*

Ivory does not occur naturally in the Carpathian Basin or in its immediate neighbourhood, either in the classical (i.e. elephant ivory) or in the broader sense of the word as used in English,<sup>33</sup> and thus the appearance of objects made from this raw material can quite obviously be explained with the long-distance contacts of the region's communities, which, depending on their type, can equally point towards Africa, the Near East, India, or even Northern Europe.

Various objects carved of elephant ivory arrived to Pannonia from the empire's inner regions regularly during the centuries of Roman rule, even if in low numbers owing to the high value of the raw material. Most of these were beauty accessories such as dress and hair pins, small rods for applying perfume, and the like. This tendency is visible in the distribution of the worked bone finds from Aquincum, where items carved of elephant ivory accounted for no more than 1% of the assemblage (11 out of 942 artefacts).<sup>34</sup>

With the end of the Roman rule over the western third of the Carpathian Basin in the 430s, this situation changed profoundly. On the one hand, the procurement of elephant ivory articles became severely restricted following the transformation of the connections with the empire's inner, Mediterranean provinces, previously ultimately determined by market conditions. On the other, the continuous demand for Roman luxury commodities among the successive Barbarian groups occupying the region meant that elephant ivory objects continued to reach this particular corner of the world through the peaceful (diplomatic and trade) connections maintained with the empire or, conversely, in the wake of military events. Their number, as is apparent from the list below, could not have been particularly high – at least judging from the pieces deposited in burials. In order to survey the range of the finds in question and to assess the nature, the direction, and the intensity of these connections, we chose the material record of a post-Roman period in Barbarian-Roman connections that is known to have been quite intense from various other sources, namely of the early Avar period as well as of the preceding Langobard period. In parallel with the latter, we also surveyed the archaeological legacy of the Gepids living east of the Danube, enlarging thereby the source material serving as the springboard for our conclusions.

*Elephant Ivory Artefacts in the Carpathian Basin and the Neighbouring Regions*

While surveying the material record for the catalogue, we identified fourteen elephant ivory artefacts originating from the burials of five different sites. These are presented in the catalogue of finds below.

Catalogue

1. Hauskirchen (Bezirk Gänserndorf, Niederösterreich, Austria), Grave 8  
Annular elephant ivory ring (*fig. 1*) (outer diam.: 10.8–11.7 cm; inner diam.: 8.5–9.4 cm; Th.: 1.4–1.6 cm), recovered from the burial of an adult female, in which it lay between the two

<sup>33</sup> One exception being the accidentally found mammoth tusks (*Mammuthus primogenius* Blumenbach 1799), which, however, can be clearly distinguished from the tusks of historical elephants (*Loxodonta africana* Blumenbach 1797; *Elephas maximus* Linnaeus 1758) based on the Schreger lines. *Drauschke – Banerjee 2007* 115–118.

<sup>34</sup> *Choyke 2012* 44–46, 50–51, figs 17–18.





Fig. 1. Elephant ivory pouch ring with a copper-alloy decorative disc, Hauskirchen, Grave 8 (Photo: ©Alice Schumacher, ©Naturhistorisches Museum Wien/Natural History Museum Vienna)



Fig. 2. Set of elephant ivory gaming pieces, Mosonszentjános, Grave 12 (after Koncz – Tóth 2016 fig. 2)

thigh bones and was probably part of a pouch. The lavishly furnished burial was one of the graves in a small cemetery containing twenty burials, dated to the middle third of the 6th century.<sup>35</sup>

2. Jánossomorja, formerly called Mosonszentjános<sup>36</sup> (Győr-Moson-Sopron county, Hungary), Grave 12 Ten elephant ivory gaming pieces of a set (*fig. 2*).<sup>37</sup> The eight larger pieces have a diameter of 2.6–2.8 cm and a height of 1.3–1.4 cm, while the two smaller pieces a diameter of 2 cm and a height of 1.2–1.3 cm. The grave was disturbed and thus the original number of gaming pieces remains unknown: only some of the pieces lay *in situ* beside the right leg of an adult male. The richly outfitted male burial was part of a grave cluster made up of one animal and two human burials, which can be assigned to the middle/final third of the 6th century.
3. Kölked-Feketekapu (Baranya county, Hungary), Cemetery A, Grave 539  
A raised, conical disc with a perforation in its centre, tentatively identified as a gaming piece by Attila Kiss, the site's excavator (diam.: 3.5 cm, H 1.8 cm, diam. of the central borehole: 0.6 cm) (*fig. 3*), found in the region of the right thigh in an adult burial.<sup>38</sup> Given its parallels, it could equally well have been a spindle whorl,<sup>39</sup> especially in view of the central perforation. The grave lay in the south-western half of Cemetery A and can be dated to its Phase 5, corresponding to the mid-7th century.<sup>40</sup> The artefact's aspecific form and the many pre-Avar-period "antiques" found on the body's left and right side, probably kept in a pouch attached to the belt, suggest that the perforated conical disc might equally well have been one of the articles collected from an earlier, Roman-period context.
4. Makó-Mikócsa halom (Csongrád county, Hungary), Grave 127  
Elongated pouch toggle clasp decorated with ring-and-dot motifs made of elephant ivory (L.: 8 cm, W.: 1.5 cm). This object was found in the burial of an elderly male laid to rest with his horse and a rich array of grave goods. The harness ornaments and the belt mounts assign the burial to the first third of the 7th century in the cemetery whose use spanned the last third of the 6th century and the 7th century.<sup>41</sup>
5. Szólád-Kertek mögött (Somogy county, Hungary), Grave 38  
Slightly elliptical ring made of elephant ivory (diam.: 11.5–13.6 cm, Th.: 1.5 cm; *fig. 4*).<sup>42</sup> The ring was made in one piece.<sup>43</sup> It came to light from a girl's richly furnished burial in which it lay beside the left lower leg, suggesting that it had probably been robustly kept in her pouch. The grave lay in a cemetery with 45 graves that can be dated to the middle third of the 6th century.

All of the objects listed in the above were made of elephant ivory. No other objects carved from raw material that can be identified as ivory in the broader sense of the word is currently known to us from the 6th–7th-century Carpathian Basin. A belt buckle from Hódmezővásárhely-Dilinka,

<sup>35</sup> *Stadler 2008* 267–270.

<sup>36</sup> The site is known as Mosonszentjános in the archaeological literature, even though the settlement officially became part of Jánossomorja in 1970. We will retain the better-known name of Mosonszentjános for the site in this study.

<sup>37</sup> *Koncz – Tóth 2016*. The raw material was identified by Zsuzsanna Tóth.

<sup>38</sup> *Kiss 1996* 142–143, Taf. 95. 11. The raw material was identified by István Vörös.

<sup>39</sup> We are greatly indebted to Andrea Vaday for raising this suggestion.

<sup>40</sup> *Hajnal 2012* 630.

<sup>41</sup> The grave is still unpublished and we did not have the opportunity to personally examine the finds. The data listed here were kindly provided by the excavator Csilla Balogh (İstanbul Medeniyet Üniversitesi Sanat Tarihi Bölümü), whom we wish to thank for sharing this information with us.

<sup>42</sup> *von Freeden 2008* 405–407. We are grateful to Tivadar Vida (Institute of Archaeological Sciences, Eötvös Loránd University) for kindly providing the data on the ring's dimensions and for his permission to publish its photo.

<sup>43</sup> *Becker – Vogel 2008* 200–203.

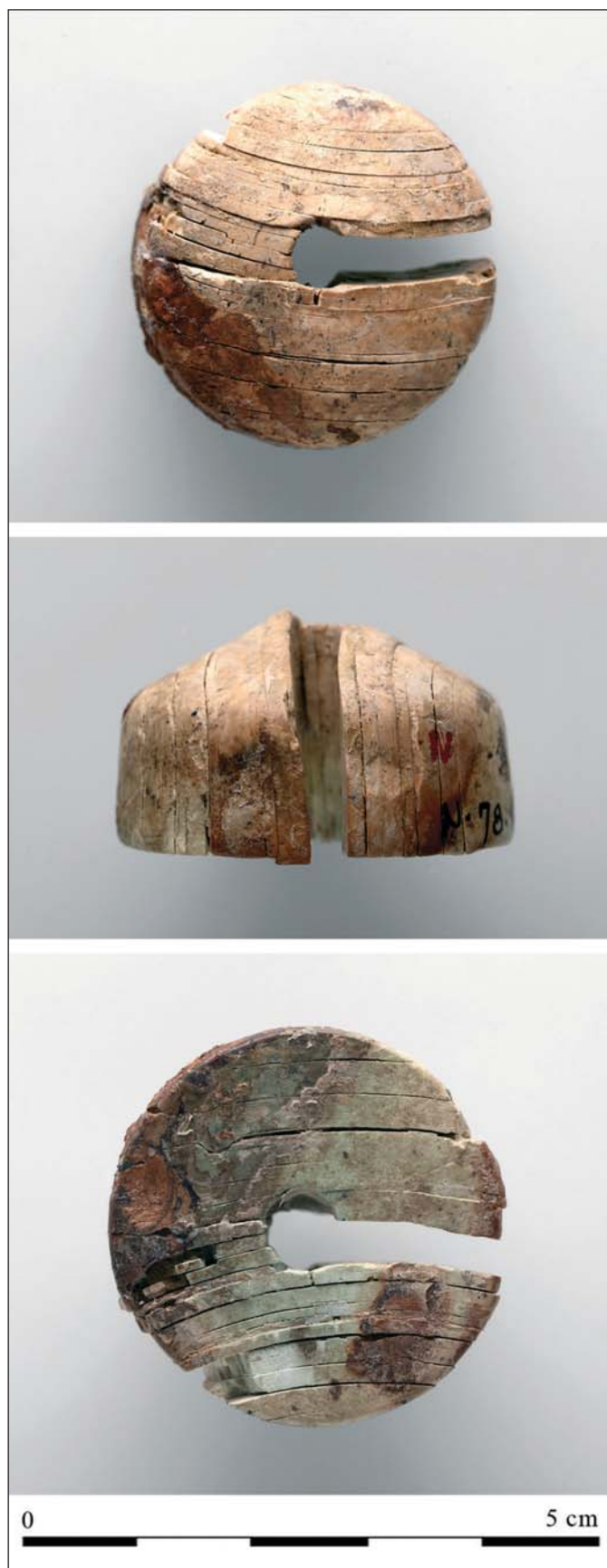


Fig. 3. Elephant ivory spindle whorl or gaming piece, Kölked-Feketekapu A, Grave 539  
(Photo: ©Hungarian National Museum, Budapest)

Franciszti téglagyár (Csongrád county, Hungary)<sup>44</sup> whose raw material was initially identified as elephant ivory, turned out to have been made from soapstone after its microscopic examination.<sup>45</sup>

Before discussing the insights that can be drawn at first glance from the above list, a brief detour to the neighbouring regions seems in order. The goal of this digression is obviously not to draw the elephant ivory objects from the regions bordering on the Carpathian Basin into the analysis, which would in any case be near-impossible, given the vagaries of publication in the northern Balkans. Additionally, since the latter territories – even if with shifting boundaries – remained under the control of the Eastern Roman Empire until the close of the 6th century, it is not always possible to determine whether the elephant ivory items found there should be interpreted within the context of Barbarian-Roman relations. The main reason for including the few finds presented below is that the pieces from the 6th-century Carpathian Basin should not be seen as isolated finds in a historic milieu when the rule of the Langobards occupying the western third of the Carpathian Basin in part also extended to the regions farther to the north and west. The list of these finds is not too long: our catalogue can be enlarged with three objects from two sites:

6. Lužice (okres Hodonín, Jihomoravský kraj, Czech Republik), Grave 94  
Large, poorly preserved ring (diam.: ca. 12.5–13.37 cm, Th.: ca. 1–1.2 cm<sup>46</sup>) made of “bone”, of which about one-quarter is missing (fig. 5. 2).<sup>47</sup> It was reinforced with thin strips of copper-alloy in three spots. Found beside the left knee in the disturbed burial of a young woman (fig. 5. 1), whose burial had probably been richly furnished.
7. Lužice (okres Hodonín, Jihomoravský kraj, Czech Republik), Grave 119  
Poorly preserved “bone” ring (diam.: ca. 1.2 cm).<sup>48</sup> Found beside the left knee in the disturbed burial of a young woman interred with a rich array of grave goods.
8. Žuráň (okres Brno-venkov, Jihomoravský kraj, Czech Republik), Grave II  
Conjoining fragments of a pyxis made from elephant ivory decorated with at least four human figures, of which two could be almost completely reconstructed. The better preserved figure of a seated, short-haired, beardless man is portrayed wearing a tunic and a chimation, and holding a book tucked under his arm with his left hand. The other male figure has long hair and a long beard, he is also clad in a tunic and chimation, whose end is draped over his left hand holding a processional cross (*Stabkreuz*).<sup>49</sup> Only the outline remains of the figure to his left. While several studies have addressed the iconography of the pyxis, most of which agree regarding its obvious Christian content, different interpretations were proposed regarding its details.<sup>50</sup> The pyxis was earlier assigned to the 6th century,<sup>51</sup> but this is strongly contradicted by the dating of the burial’s associated finds.<sup>52</sup> Given that the grave was heavily looted and that

<sup>44</sup> Nagy 2005 102. Dezső Csallány erroneously described the buckle in question as having been made of bronze: Csallány 1961 125, Taf. 230. 14.

<sup>45</sup> Identified by Zsuzsanna Tóth. The artefacts examined and analysed by her will be discussed in another study, currently under preparation.

<sup>46</sup> The publication does not specify the exact measurements, which we determined from the scale accompanying the illustration.

<sup>47</sup> Klanica – Klanicová 2011 287–288, Taf. 72. 15. It is described as having been made of bone in the publication; however, its type, size, and form suggest that the ring was in fact made of elephant ivory, even though this cannot be conclusively claimed in the lack of an archaeozoological examination.

<sup>48</sup> Klanica – Klanicová 2011 307–309, Taf. 85. It is described as having been made of bone in the publication; however, its type, size, and form suggest that the ring was in fact made of elephant ivory, even though this cannot be conclusively claimed in the lack of an archaeozoological examination.

<sup>49</sup> Poulik 1995 71–73, Abb. 49–51a, Abb. A.

<sup>50</sup> For an overview, cf. Poulik 1995 71–75.

<sup>51</sup> Cf. Poulik 1995 71–75.

<sup>52</sup> For a comprehensive survey, cf. Mastykova 2017 329–332.



Fig. 4. Elephant ivory pouch ring, Szólád, Grave 38  
(Photo: ©Péter Skriba, ©Tivadar Vida, ©Rippl-Rónai Museum, Kaposvár)

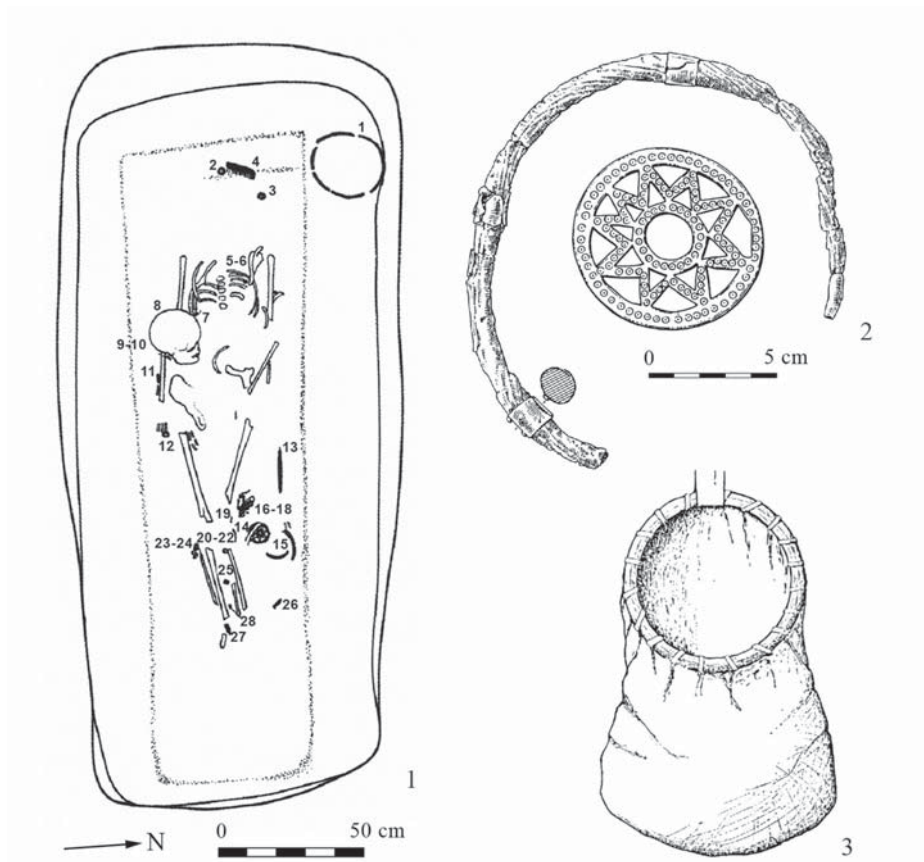


Fig. 5. Elephant ivory pouch ring, Lužice, Grave 94: 1. the disturbed female burial and the location of the pouch ring in the grave; 2. the pouch ring and the copper-alloy decorative disc; 3. alternative conjectural reconstruction of how pouch rings may have been used (1–2. after *Klanica – Klanicová 2011* Abb. 40 and Taf. 72; 3. after *MacGregor 1968* fig. 62c)

the fragments of the pyxis were found in the backfilled soil layer, Jaroslav Tejral suggested that the finds dating from the late 4th–early 5th century had originally been the grave goods of an earlier burial disturbed during the construction of Grave II.<sup>53</sup>

Excursus: The pyxis from Čierne Kľačany (Feketekelecsény, Okres Zlaté Moravce, Nitriansky kraj, Slovakia)

Yet another circular-bodied container similar to the Žuraň pyxis was discovered at Čierne Kľačany in the north-western part of the Carpathian Basin.<sup>54</sup> Dated to the 6th century on stylistic grounds in a recent study,<sup>55</sup> the date of its deposition and of when it reached the Carpathian Basin nevertheless remains uncertain. The pieces of the fragmented pyxis were discovered on a site strongly disturbed during the laying of water pipes, where the settlement features of a prehistoric and early medieval 10th–12th-century settlement as well as the burials of a 9th-century cemetery (Moravian period) were disturbed.<sup>56</sup> Slovakian archaeological scholarship associated the pyxis with the 9th-century, rather modest burials.<sup>57</sup> Obviously, there is no reason to exclude a 6th-century carving reaching the Moravian lands in the 9th century, particularly since we know that most of the late antique elephant ivory carvings survived the centuries of the early medieval period to the Middle Ages after passing into ecclesiastic usage, and thus a 6th-century pyxis could equally well have reached the population of the Carpathian Basin and Moravia from the Carolingian realm or Byzantium.

Although the number of objects from the two centuries discussed here is rather meagre and thus unsuitable for any statistical assessment, the two find lists do offer several chronological, regional, and cultural insights (*fig. 6*):

- (1) The ivory objects from the region are exclusively made of elephant ivory.
- (2) Not one single artefact that can be identified as having been made from elephant ivory is known from the 6th-century Gepidic material of the Hungarian Plain.
- (3) The finds from the burials of Transdanubia, Lower Austria, and Moravia, all regions under the political control of the Langobards during the greater part of this century (cat. nos 1–2, 5, 6–8) can, with the possible exception of Grave II of Žuráň, be dated between the middle and the final third of the 6th century on the testimony of their context and the associated finds.<sup>58</sup>
- (4) The number of elephant ivory objects declined by the 7th century and no more than a single piece each is known from Transdanubia and the region east of the Danube: one from a burial of Kölked-Feketekapu, Cemetery A (cat. no. 3),<sup>59</sup> the other from Makó-Mikócsa halom (cat. no. 4), the latter being the single elephant ivory object known to us from the Hungarian Plain.

Given their raw material, the connection with the Mediterranean is self-evident in the case of elephant ivory objects; nevertheless, a closer look at the artefact types as finished products provides a considerably more intriguing picture. The pieces dating from the 6th century on the testimony of their contexts can be divided into three larger groups in terms of their cultural connections:

<sup>53</sup> Mastykova 2017 329.

<sup>54</sup> Kolník – Veliačik 1983 18, 20, 16–30, fig. 3. 8–11.

<sup>55</sup> Vančo 2006.

<sup>56</sup> Kolník – Veliačik 1983 17.

<sup>57</sup> Kolník – Veliačik 1983 18–22, fig. 4.

<sup>58</sup> For the dating of the burials, see the literature cited in the Catalogue.

<sup>59</sup> Given the form of the piece from Kölked and the associated finds, we cannot dismiss the possibility that it was deposited in the grave as an “antique” (*Altstück*); its exact date of manufacture can only be established with archaeometric analyses.



Fig. 6. Distribution of the 6th–7th-century elephant ivory objects discussed in the study (map: ©Zsolt Réti; source: ©OpenStreetMap, <https://maps-for-free.com/#close>, <http://openstreetmap.org/>)

- (1) The largest group is made up of pouch or bag rings, known from the Szólád, the Hauskirchen, and the Lužice cemeteries (cat. nos 1, 5–7). These mark the easternmost occurrences of this distinctive type of the Western and Central European material record of the Merovingian period. Used from the early 5th to the 7th century, these rings are generally found in the waist region of female burials. The rings used in themselves or combined with copper-alloy decorative discs (*fig. 1*) were simple affairs in terms of their manufacturing technique. The elephant tusk was cut transversally near the root where the diameter of the pulp cavity was the largest and the dentine the thinnest, and the rings were then made in one piece<sup>60</sup> from these slices.<sup>61</sup> The craftsmen manufacturing these articles did not invest too much energy into the careful working of this raw material, more valuable than bone, despite the fact that these rings were more costly owing to their imported raw material. In view of their widespread distribution in Western Europe, it seems likely that the pieces from Transdanubia, Lower Austria, and Moravia had not been made locally, but were imports from the West, and thus they do not necessarily indicate direct contact with the Mediterranean. However, given that it has also been suggested that the rings had perhaps been manufactured in Italy,<sup>62</sup> this issue is not as straightforward as it would appear and we shall return to it below.

<sup>60</sup> In the case of the ring from Grave 94 of Lužice, the metal strips served to reinforce the ring and do not imply that it had been made from several pieces. A ring repaired in a similar manner is known from the Marktoberdorf cemetery: *Christlein 1966*.

<sup>61</sup> *MacGregor 1985 110; Drauschke 2011a 40*. For a discussion of the similar use of tusks, cf. *von Barga 1994 53, and 51, Abb. 3. 1*.

<sup>62</sup> Cf. *Drauschke 2011b 125*.

- (2) In contrast to the pouch rings, the gaming pieces from Mosonszentjános, Grave 12 (cat. no. 2), reflect direct Mediterranean connections. While their closest formal analogies come from Lyminge in southern England, similar sets of gaming pieces are known from several sites in Cividale in northern Italy such as Grave 24 of Santo Stefano ‘in Pertica’ and Grave A of ‘Gallo’, the latter also made of elephant ivory. Their manufacture was a fairly intricate process. First, the nerve channel was concealed by plugging or by gluing delicate ivory plaques over it, after which the gaming pieces attained their final form by turning on a lathe (*fig. 7*).<sup>63</sup> Although gaming pieces are not among the period’s most finely crafted items, their identical sizes and the patches of pigment surviving on their surface<sup>64</sup> nevertheless offer an insight into the technical skills and sophistication that went into their making. They were in all likelihood made in a Mediterranean workshop, most probably in the western Mediterranean, possibly somewhere in Italy, at least judging from the geographic distribution of their parallels.
- (3) Elaborate craftsmanship is especially true of the pyxis recovered from the burial of an elite woman (?) at Žuráň, even if there is still no scholarly consensus regarding its chronological position or the geographic location of the workshop where it was made. It seems likely that the small containers of this type, described as boxes in the late antique sources<sup>65</sup> and called pyxides in modern scholarship, were produced in several different ivory workshops of the Mediterranean world. At present, roughly seventy such circular boxes are known;<sup>66</sup> their production outlived Late Antiquity and continued into the centuries of the Middle Ages. Similarly to the pouch rings, their basic form – a round tusk segment resembling a pyxis – was created from the tusk sections with the pulp cavity, which was next turned on a lathe and then decorated with carving.<sup>67</sup> Despite their relatively expensive raw material, these containers were made in larger series and were used for holding a wide variety of articles (jewellery, coins, perfumes, spices and, in the case of Christian pieces, the Eucharist).<sup>68</sup>

In contrast to a part of the objects dated to the 6th century, both 7th-century elephant ivory items were less expensive pieces. The object tentatively identified as a gaming piece or, alternatively, as spindle whorl from Grave 539 of the Kölked-Feketekapu A cemetery is much simpler than the gaming pieces from Mosonszentjános. The conical disc, perforated through its centre, was made in one piece and is formally close to the hemispherical gaming counters known from the Mediterranean to Scandinavia. Thus, disregarding its raw material, if its function is determined as a gaming counter and not as a spindle whorl, it does not conclusively attest to the direction of long-distance connections. On the other hand, the pouch toggle clasp from Makó-Mikócsa represents a type used widely by the Avar-period population<sup>69</sup> and it could therefore easily be transplanted into the local cultural schema, even if its owner was unaware of the piece’s raw material.

In the light of the above brief overview, it can be safely asserted that the number of ivory objects reaching the 6th–7th-century population of the Carpathian Basin was strikingly low, at least judging from the pieces deposited in burials. A part of these probably arrived directly from the Mediterranean, while the origin of another portion – the pouch rings – is less obvious and does not necessarily signal direct contact with the Mediterranean region; their origin and place of manufacture is equally well conceivable north of the Alps. The chronological concentration of the

<sup>63</sup> For a detailed description and discussion of the manufacturing technique, cf. *Koncz – Tóth 2016* 163–166.

<sup>64</sup> *Koncz – Tóth 2016* 170, fig. 9.

<sup>65</sup> *Duffy – Vikan 1983*.

<sup>66</sup> Cf. *Volbach 1970; von Barga 1994* 45, note 2.

<sup>67</sup> For the manufacturing technique, cf. *von Barga 1994*.

<sup>68</sup> *Cutler 1987* 452–453.

<sup>69</sup> Cf. *Tobias 2011*.



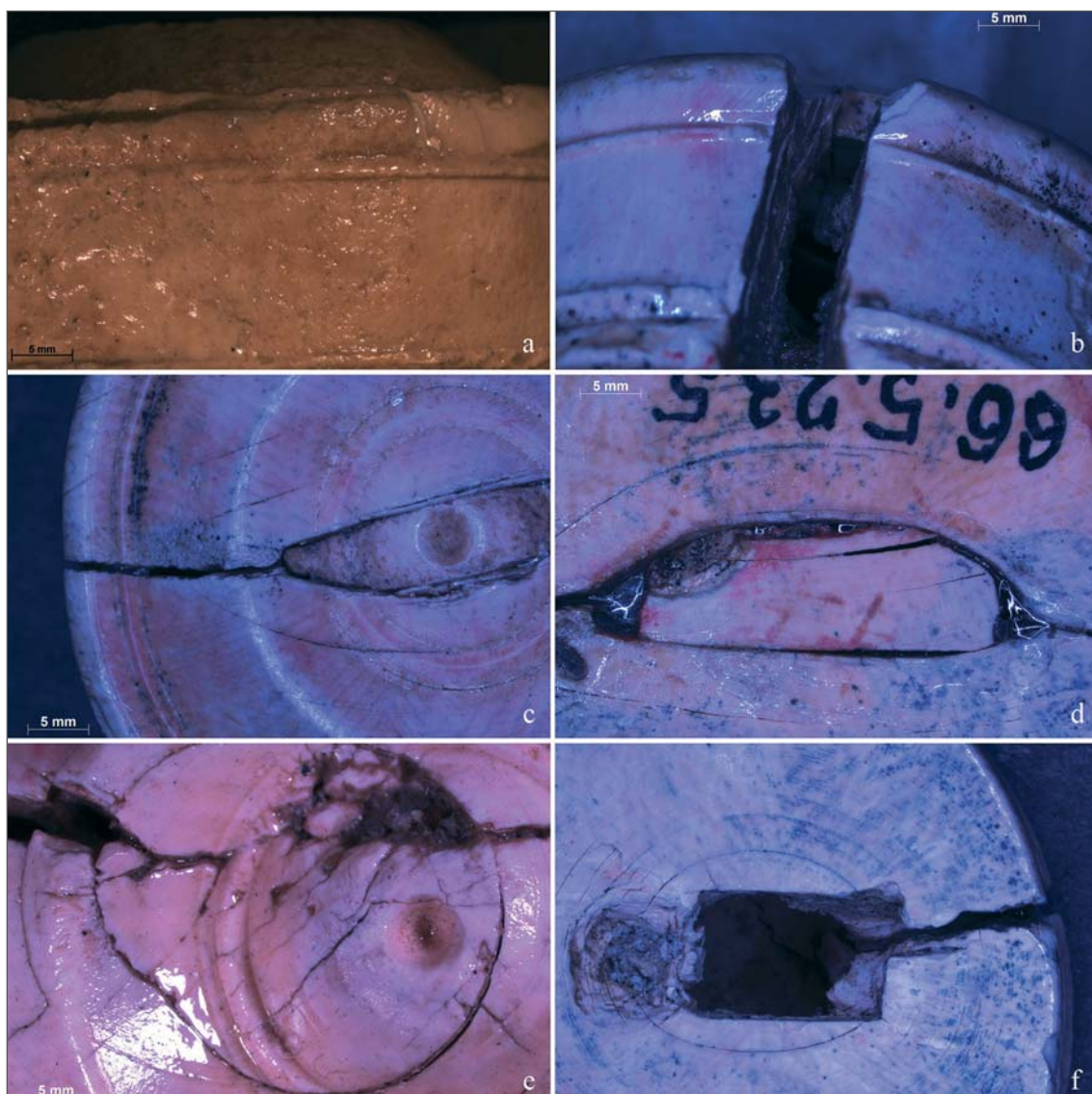


Fig. 7. Detail photos of the gaming pieces from Mosonszentjános: the flawed edge; b–f. the pulp cavity and its concealment (after *Koncz – Tóth 2016* fig. 4)

few elephant ivory artefacts in the mid-6th century is essentially determined by the distribution of pouch rings in the Carpathian Basin, which on the testimony of the current evidence arrived to this region through the Langobards' connections with the western Merovingian world. Similarly to other artefact types arriving along similar routes, neither did these reach the Hungarian Plain.<sup>70</sup> This would explain why elephant ivory articles are solely known from Transdanubia, even though the number of relics of Mediterranean origin in the 5th–6th-century material east of the Danube exceeds by far the amount of articles of similar origin in the Langobard-period archaeological record of Transdanubia.<sup>71</sup> In fact, this correlates well with what we know about the direction of the commercial and cultural connections of the Langobard-period population in the western Carpathian Basin.<sup>72</sup>

<sup>70</sup> Cf. *Koncz 2019*.

<sup>71</sup> For the Mediterranean connections of the Gepidic- and Langobard-period material (with the earlier literature), cf. *Bollók – Koncz in preparation*.

<sup>72</sup> *Koncz 2019*.

In the final third of the 6th century, possibly in the wake of the Langobards' migration to Italy, direct contact between Transdanubia and the western Mediterranean became more intense.<sup>73</sup> It seems possible that the set of gaming pieces from the Mosonszentjános burial reached the region through these dynamic connections. It is therefore all the more striking that in contrast to the Langobards, no elephant ivory artefacts had reached either the Gepids, despite their more vibrant contacts with the Eastern Roman Empire, or the Avar-period population, whose dynamic relations with Byzantium and Italy were much more dynamic, at least judging from the archaeological record of these peoples. Although in the late 6th century the Emperor Maurice (r. 582–602) sent a live elephant when the khagan specifically requested one,<sup>74</sup> curiously enough there are no more than two artefacts made of elephant ivory in the immense number of early and middle Avar-period grave inventories (cat. nos 3–4),<sup>75</sup> despite the famously dynamic Avar-Byzantine and Avar-Italian connections of the 6th and 7th centuries.<sup>76</sup> Obviously, it is possible that there are unidentified or yet unpublished elephant ivory articles among both the published finds and the material still awaiting publication, and some finds may possibly have escaped our notice when surveying the archaeological record. Yet, this does not, in itself, seem a convincing explanation for the low number of elephant ivory finds. Similarly, arguments invoking the possibility that few of the valuable gifts received in, or sent from, Byzantium<sup>77</sup> had been deposited in burials whence they made their way into museum collections, are conjectural at best, the implication being that even if these gifts did include elephant ivory objects, they had either played a minor role in the elite's mortuary display, or the pieces that had been placed in burials have not been found yet or have not reached a museum.

The above assertions regarding the 6th–7th-century elephant ivory artefacts call for an explanation, particularly for the early Avar period. From the 550s onward until at least the 620s, there were regular diplomatic missions, which continued, albeit much less intensely, until the 680s, which involved ritualised gift exchanges as well as “shopping sprees” in the Eastern Roman Empire,<sup>78</sup> alongside the annual tribute sent regularly until 626 and the successive military campaigns, all of which provided ample opportunities for the Avar-period population to acquire elephant ivory articles. The following potential explanations can be invoked for their lack:

- (1) Owing to the high price of elephant ivory, the articles made of this raw material were too expensive and did not reach the Carpathian Basin;
- (2) Chronological factors: at the time the Avars established themselves in the Carpathian Basin, elephant ivory became less accessible or was more rarely worked in the Mediterranean and the number of newly-made pieces declined drastically;
- (3) Cultural factor:
  - (a) they were not deposited in burials in the Carpathian Basin;
  - (b) there was no demand for these articles: the Avar-period population had no interest in them, which is why they did not reach the region.

<sup>73</sup> *Koncz 2015 333–334; Vida 2018a; Bálint 2019.*

<sup>74</sup> Theoph. Sim., *Hist.* I.3.8–10, English translation: *Whitby – Whitby 1986 24*; cf. *Bollók – Koncz 2020 52.*

<sup>75</sup> According to the classical chronology pegged to the date of 568, the Mosonszentjános grave can be dated to the early Avar period; however, the burial itself can only be contextualised within the framework of the connections established during the earlier 6th century.

<sup>76</sup> *Garam 2001; Daim 2003; Daim 2012; Vida 2016; Vida 2018b; Bálint 2019; Bollók 2019; Blay 2020; Samu 2020.*

<sup>77</sup> Cf. *Pohl 2018; Bollók 2019 233–237.*

<sup>78</sup> For a recent discussion, cf. *Bollók 2019.*

*Potential Sources and Value of Elephant Ivory as a Raw Material*

In order to make an informed choice among the options outlined in the above, we must first address the issue of the contemporaneous availability and value of elephant ivory as a raw material.<sup>79</sup> Another intriguing question which calls for an explanation is why elephant ivory articles that still reached the western half of the Carpathian Basin during the later 6th century, even if not *en masse*, but nevertheless in considerable numbers, are virtually unattested in the 7th century. The first two points made above should be examined together because these indicate the availability and accessibility of the raw material and the Roman-Mediterranean aspect of the problem, and are in this sense strongly intertwined; the same holds true for the two sub-points of the third point, which shall be discussed in the last section of the present study.

We covered the potential sources of elephant ivory as a raw material in the late antique Mediterranean and in the written sources as well as in the material record providing insights on its price in another study, in which we reviewed the source material known to us.<sup>80</sup> In the following, we shall therefore only accentuate those points that are highly relevant to the assessment of the 6th–7th-century conditions in the Carpathian Basin.

Our overview of the written sources and the material record indicated that elephant ivory arrived to the Mediterranean markets from three main regions during the late antique centuries. Of these, elephant ivory from eastern Africa, transported to the Mediterranean through Egypt, has the longest tradition that can be underpinned by the sources. The amount of tusks arriving from the Somalian-Eritrean region and from sources even farther to the south grew substantially in the 3rd–1st centuries BC, during the reign of the Ptolemids, leading to a major decline in their price.<sup>81</sup> In the long term, however, over-hunting led to the depletion of the elephant population south of Egypt. The *Periplus Maris Erythraei*, written in the middle third of the 1st century AD, records that the availability of elephant tusks on the Red Sea markets was rather restricted and that abundant stocks were to be found in the Axum region, particularly in Adulis, its marine port, and in the ports of the Swahilian coast extending from southern Somalia to northern Tanzania.<sup>82</sup> It would appear that the elephant population of the Red Sea region recovered from the over-hunting in the course of a few centuries since the sources from between the 4th and mid-6th centuries AD again mention large elephant herds in the region. In all likelihood, the trade routes leading southward as far as the tip of Africa, along which elephant tusks reached Egypt and were thence transported farther north, contributed to the renewed upswing in the trade in eastern African elephant ivory trade during Late Antiquity.<sup>83</sup>

Far less is known about the contemporaneous availability of elephant ivory from north-western Africa.<sup>84</sup> In a speech delivered in 370 AD, Themistius, the famed Constantinopolitan orator, mentions that there were still elephants living in the Maghreb at the time.<sup>85</sup> Given the general consensus in the period's scholarship that this species only became extinct in the 6th century,<sup>86</sup> it seems reasonable to assume that their tusks were used for making various carvings during the Roman period and Late Antiquity. Even though there are no direct references to, and relics made

<sup>79</sup> Given that only elephant ivory objects are known from the region discussed here, we shall solely focus on the potential sources of these articles.

<sup>80</sup> *Bollók – Koncz 2020*.

<sup>81</sup> *Tarn 1928* 258.

<sup>82</sup> *Per. Mar. Eryth.* 3<sub>17</sub>, 4<sub>4–13</sub>, 6<sub>4</sub>, 7<sub>18–21</sub>, 10<sub>12–13</sub>, 16<sub>5</sub>, 17<sub>18–19</sub>, Greek text and English translation: *Casson 1989* 50–57, 60–61.

<sup>83</sup> For a comprehensive survey of the sources, cf. *Bollók – Koncz 2020*, 41–46, 48–50.

<sup>84</sup> For a detailed discussion, cf. *Bollók – Koncz 2020*, 45–46, 50.

<sup>85</sup> *Them., Or.* 10, English translation: *Heather – Matthews 1991* 44.

<sup>86</sup> *Zeuner 1963*; *Cutler 1987* 442.

of, elephant ivory that can be securely associated with western Africa, with the region of Mali, Burkina Faso, Guinea, and the Ivory Coast, it may nevertheless be theoretically considered as a potential source of the elephant ivory reaching the markets of the Mediterranean along the trans-Saharan trade routes, given that this commodity had been procured from the region during the classical Islamic period.<sup>87</sup>

Similarly to the elephant ivory transported north from eastern Africa through Egypt, several sources mention elephant ivory reaching the Roman markets from the Indian subcontinent, particularly from its westerly regions. The upswing in the trade in elephant tusks to the Mediterranean, earlier probably conducted through Persia, but increasingly more often as part of the Indian Ocean trade during the Hellenistic period, can in all likelihood be explained by the depletion of the elephant herds in the broader Red Sea region owing to over-hunting. It would appear that the diminishing volume of tusks from north-eastern Africa could largely be replaced from Indian sources following Augustus's conquest of Egypt and the dynamic growth of Indian Ocean trade in its wake, much more intense than ever previously. The *Periplus* lists elephant ivory among the major commodities of the markets along both the north-western and the south-western Indian coast.<sup>88</sup> A papyrus from the mid-2nd century AD, the so-called Muziris Papyrus (*P. Vindob G 40822*), records that the *Hermapollon*, one of the period's larger ships plying the seas, carried almost 4 tons of elephant ivory from India to Egypt.<sup>89</sup> Obviously, we have no way of knowing to what extent the *Hermapollon*'s cargo, of which elephant ivory accounted for less than 1%, can be regarded as the norm; nevertheless, it seems more than likely that several similar shipments were made to the Red Sea ports annually during this prospering period of Roman Indian Ocean trade, lasting up to the early decades of the 3rd century.<sup>90</sup> Trade in Indian elephant ivory did not cease during the later centuries of the Roman Indian Ocean trade; at the same time, we also know that in the earlier 6th century, some of the eastern African elephant ivory was transported in the exact opposite direction, to the markets of India and the Sasanian Empire.<sup>91</sup>

To the enormous good fortune of modern scholarship, the Muziris Papyrus allows an insight not only into the volume of the imported raw material, but also its price. On the testimony of the papyrus, trimmed tusk weighing 1 kg was valued at roughly 35 silver *denarii* or 1.4 *aurei* when calculating the import duty. The price for the same amount of intact tusk was 50 *denarii* or 2 *aurei*.<sup>92</sup> It therefore comes as somewhat of a surprise that roughly one and a half centuries later, the *Edict on Maximum Prices* issued by Diocletian (r. 284–305) fixed the price of ivory even lower, specifying a value of 150 *denarii* for a (Roman) pound of ivory (*ca.* 320–330 g), which was less than half an *aureus* per kilogram, even taking into account that the period's *aureus* was lighter by 2 g than the mid-2nd-century *aureus* and that the exact conversion rate between the *denarius* and the *aureus* remains a matter of controversy.<sup>93</sup> Although there are no comparable data from the later periods of the 4th to 6th centuries, this strikingly low price compared to silver and silk<sup>94</sup> could be taken to imply an abundance of elephant ivory, as does the number, size, and craftsmanship of the late antique ivory carvings. The written sources and the finished products thus both indicate that elephant ivory was copiously available in the eastern and central

<sup>87</sup> Cf. the data compiled in *Bollók – Koncz 2020*, 45.

<sup>88</sup> *Per. Mar. Eryth.* 49<sub>29</sub>, 56<sub>247</sub>. Greek text and English translation: *Casson 1989* 80–81, 85–86.

<sup>89</sup> *De Romanis 2012*.

<sup>90</sup> The papyrus and its broader context are analysed in *De Romanis 2020*.

<sup>91</sup> *Cosm. Ind., Top. christ.* XI.23, Greek text and English translation: *Wolska-Conus 1973* 354–355, English translation: *McCrinkle 2010* 372.

<sup>92</sup> Cf. *Bollók – Koncz 2020*, 46, for the calculations based on the table in *De Romanis 2012* 101.

<sup>93</sup> For the detailed calculations and the market value of the calculated price, cf. *Bollók – Koncz 2020*, 46–47.

<sup>94</sup> Cf. *Cutler 1987* 434.

Mediterranean up to the later 6th century and that its procurement was expressly cheap compared to other historic periods.<sup>95</sup>

This situation changed profoundly sometime in the later 6th century. The drastic decline in the number of securely datable carvings in the Byzantine lands is generally dated to the final decades of the 6th century.<sup>96</sup> However, given that the number of pouch rings made of elephant ivory did not decline significantly until the middle third of the 7th century in the burials of the Merovingian West,<sup>97</sup> the growing scarcity of the raw material can more likely be dated to the early decades of the 7th century. It would appear that the significant decline in the availability of elephant ivory in the Mediterranean Basin and in the regions to its north can be attributed to a complex interplay of political elements. One of these was the political instability and uncertainty of the western Indian region and the perceptible decline in the volume of Roman Indian Ocean trade in its wake during the earlier 6th century, which in turn led to internal and external shifts in the southern Arabian and north-eastern African polities involved in this trade. In the 570s, the Sasanian army occupied some of the key regions of the southern Arabian trade routes, and then extended its sway over the Near Eastern and Egyptian provinces of the Eastern Roman Empire in the 610s–620s.<sup>98</sup> And even though the Sasanian conquest proved to be short-lived, the new Arab conquerors arriving in the 630s–640s came to stay for long centuries in the eastern provinces of Byzantium, retaining their control over Egypt and her capital Alexandria, a major gateway for eastern African and Indian elephant ivory to the Mediterranean markets. These political changes effectively cut off the supply of elephant ivory to the lands still ruled by Christian sovereigns for some two centuries, even if ivory carvings continued to be produced in Alexandria or, more broadly, in the north African and Greater Syrian regions during the reign of the Umayyad caliphs during the 8th century, although not with the same intensity as during the 4th to 6th centuries, at least judging from the surviving relics.<sup>99</sup>

#### *The Role of Elephant Ivory Artefacts in the 6th–7th-century Carpathian Basin*

It is our hope that the above, very brief overview has highlighted the point that the value of elephant ivory as a raw material was not constant during the centuries of Late Antiquity and the Early Middle Ages. Neither do the data gathered and reviewed in the above support the widely held belief that only the rich and wealthy had the possibility and/or the means to access elephant ivory at all times and in all places. At first glance, the claim that access to the raw material in the late 6th century became exceedingly restricted – a claim which in any case needs to be revisited in the light of the Merovingian-period finds – seems a logical enough explanation for the striking scarcity of elephant ivory carvings in the early Avar period. However, this is, at most, merely one component of the possible reasons in the light of the available information on the price and

<sup>95</sup> *Cutler 1987; Bollók – Koncz 2020*. Even though a comparison with 20th-century prices offers little information that would be relevant for Late Antiquity and the early medieval period, it is nevertheless noteworthy that in the 1950s–1960s, the price of elephant ivory per kilogram was less than \$6. Following the ban on trade in elephant ivory in 1990, prices skyrocketed. In 2009, when China again permitted trade in elephant ivory, its price was around \$1000 or higher, which after peaking in 2016, began to drop in the wake of co-ordinated international measures, and by 2017, it dropped to \$600–700. According to wildlife activists working in Kenya, the locals received only a fraction of this sum, around \$40 per kilogram on the average. Cf. <https://www.forthegiants.info/information/elfenbeinpreise/> (last accessed: April 9, 2020). The price of elephant ivory tends to change rapidly and drastically: *Sosnowski et al. 2019*.

<sup>96</sup> *Cutler – Niewöhner 2016*.

<sup>97</sup> *Drauschke 2011b* 119, 122, Abb. 53.

<sup>98</sup> For a comprehensive overview, cf. *Power 2012*.

<sup>99</sup> Cf. *Bollók – Koncz 2020* 59, for the cited data and the literature.

availability of elephant ivory during the Roman period and Late Antiquity.<sup>100</sup> A convincing case could hardly be made for the conjecture that had the Avar elite and its envoys shown any particular interest in elephant ivory objects, the Constantinopolitan court would have been reluctant or unable to provide any. Suffice it here to recall that in order to win the Avar khagan's goodwill – or, to put in another way, to pay the requested price for peace – the Byzantines were quite willing to fulfil his wish and send him one of their elephants captured from the Persians, even if the khagan was not overwhelmed by the same sentiments as the Roman *populus* or by the feeling that there was some special bond between men and elephants, as recorded by Cicero. In fact, the khagan was not even particularly pleased that his whim had been indulged. Neither is it mere chance that elephant ivory carvings do not appear on the exceptionally well documented list of Byzantine gifts and various forms of tribute sent to the Avars, nor did they apparently demand any.<sup>101</sup> True enough, neither do the diplomatic gifts given and received by the Byzantines in other cases include elephant ivory in the form of finished products, as can be seen from Ekaterina Nechaeva's exhaustive survey based on the information contained in the late antique sources.<sup>102</sup> This, then, is perhaps no coincidence.

It is noteworthy that the number and nature of elephant ivory carvings from the Mediterranean reaching Western Europe and deposited in burials does not seem to reflect any major demand for this type of commodity.<sup>103</sup> The reason for this may have been less that the articles carved of elephant ivory were not seen as particularly precious exotic goods or gifts owing to the relatively low price of the raw material – the countless pouch rings belie any explanation invoking an overall lack of interest. It seems more reasonable to assume that a part of the carvings in their finished form – such as diptychs, one of the “type fossils” of late antique Mediterranean carvings – could not be put to any practical use either in the post-Roman West, or in the 6<sup>th</sup>–7<sup>th</sup>-century Carpathian Basin. Another group – such as pyxides, caskets, and furniture – were rarely deposited in burials, even if Barbarian populations could use them for their own purposes. The pieces that were placed in the grave – for example combs, buckles, spindle whorls, pouch toggle clasps, palettes, gaming pieces, and the like – were mostly artefact types that were in any case more or less regular elements of their burials; however, these articles generally fell into the less valuable range of Mediterranean products. And while some carvings were doubtless less expensive than various precious metal articles, they also had a major disadvantage: their value could not be mobilised in times of need and neither could their raw material be melted down and re-used. If damaged, their repair ran into major difficulties. As a result, unlike silver and various precious stones, elephant ivory was only suited to hoarding in societies whose values, as coded into their cultural traditions, appreciated the carvings on their own merit. Moreover, the bulk of the pieces made in the late antique Mediterranean world bore the figures of Graeco-Roman mythology or a Christian imagery, and thus its value as a medium of social display was principally or exclusively derived from its distant origin and place of manufacture. These considerations probably appeared differentially among the groups with diverse cultural backgrounds living in a particular region. In the strongly Romanised urban communities of the former Roman provinces, as for example in certain regions of Gaul, the Church and the aristocracy of Roman ancestry in all probability attached entirely different values to Roman-type elephant ivory carvings even after the Empire's dissolution than the rural population with a Barbarian background.

In the lack of surviving finds, it would be far too bold to take a definite stand on whether the gifts and other forms of tribute given to the Avars by the lords of Byzantium, or the commodities purchased by the Avar envoys in the Roman lands had included any elephant ivory items. Yet,

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<sup>100</sup> *Bollók – Koncz 2020*.

<sup>101</sup> The relevant sources and the relevant literature were most recently covered by *Bollók 2019*.

<sup>102</sup> Cf. *Nechaeva 2014*.

<sup>103</sup> *Drauschke 2011b* 119–122.

knowing that the Constantinopolitan court had a many centuries long experience of the Roman commodities preferred and valued by the Barbarians, drawn both from carefully kept records and personal observations,<sup>104</sup> it seems more likely that had there been any, they would have accounted for an insignificant portion of the Byzantine products reaching them. The fact that the currently known grave assemblages of the Avar-period elite do not include any objects of this type is a clear indication that even if they had laid their hands on Roman articles made of elephant ivory, these did not become mediums of social display in their culture – or were not included in the range of artefacts selected for deposition in burials. Although one or another piece may have been set aside and kept in treasuries, which perhaps became a source of inspiration for locally made articles,<sup>105</sup> it would nevertheless appear that these pieces never became integral to displays of power. Interestingly enough, a similar phenomenon can be noted in the case of the ancient Hungarians. Several sources record and describe the campaigns conducted by the ancient Hungarians against Western Europe, Italy, and Byzantium during the 10th century, and yet there are no elephant ivory articles among the western and Byzantine objects they had acquired and deposited in their burials, despite the fact that those places where a major portion of the period's elephant ivory objects could be found, namely various church institutions, were one of the main targets of their raids.<sup>106</sup> Even knowing that the price of elephant ivory was much higher both in 9th–11th-century Byzantium and Western Europe than in Late Antiquity, the reason for its apparent lack again seems to lie in the strongly restricted role of elephant ivory in wealth accumulation rather than its expensiveness, as already noted in the above.

The elephant ivory articles brought to light from Avar-period burials were without exception pieces with a low value. One of these, the elongated pouch toggle clasp was a type enjoying widespread use among the Avar-period population and, given its identical function, could thus be seamlessly fitted into the recipient culture. As we have already pointed out, its owner may not even have been aware of its raw material, but merely of its divergence from the usual pieces. Another piece, identified as a gaming piece or a spindle whorl, was found in the burial ground of a community that maintained lively contact with the northerly regions of the Mediterranean during the 6th and 7th centuries, and thus the simple, lathe-turned gaming piece – or perhaps even an entire set – or spindle whorl could easily have been acquired as an article of trade.

The lack of ivory objects in the material record of the Gepids attests to a more or less similar tendency as in the Avar period, and the barely more than half a dozen finds in the Langobard-period material record allow but only partially differing conclusions. The rings from Hauskirchen, Lužice, and Szólád reflect the connections of the Langobard-period population with the west – with Italy and the Merovingian lands – and are imprints of the trade network of a period when, owing to the relatively low market price of this raw material, elephant ivory reached distant regions without any serious obstacles, either through direct contacts with the Mediterranean world, or through indirectly maintained connections. Aside from easy accessibility, another important element was that the pouch ring of the Merovingian world, an artefact type that did not hark back to antique antecedents, was strongly linked to elephant ivory as a raw material. Being an integral part of the female costume, it seems quite likely that these widely used pouch rings remained available as late as the initial third of the 7th century exactly because of their popularity and had reached the Carpathian Basin as imports in the mid-6th century. One indication of their value is that they are principally found in more richly furnished burials.<sup>107</sup> That these rings were highly cherished and

<sup>104</sup> Cf. *Bollók 2019* 232.

<sup>105</sup> As argued by *Szente 2013* 153–154, 162.

<sup>106</sup> For the booty from the military ventures to the West and what survived of it, as well as for the dangers threatening church institutions, cf. *Bollók 2014*.

<sup>107</sup> All three burials listed in the catalogue rank among the cemeteries' wealthy burials; this is especially true of Grave 38 of the Szólád cemetery, one of the most lavishly furnished 6th-century child burials of the Carpathian Basin.

perhaps less easily replaced is shown by the traces of repair on the damaged pieces: for example, the ring from Grave 94 of the Lužice cemetery (cat. no. 6) was reinforced with strips of bronze in three spots where it had become cracked (*fig. 5. 2*).

The set of gaming pieces from Mosonszentjános reflects closer and more direct connections with the Mediterranean. They were no doubt more valuable than the pouch rings, even if the production of the lathe-turned gaming pieces,<sup>108</sup> repaired and restored in several spots,<sup>109</sup> was more in the nature of items produced in larger series than of individual pieces with an aesthetic value commissioned by a patron. Although the exact price of the raw material in the 6th century, at the time the set was made, is not known, their weight of a few dozen grams and their small size would suggest that they were hardly expensive products.<sup>110</sup> Nevertheless, the value of the raw material itself is shown by that even though the decorative motif on the upper edge was misplaced on one piece (*fig. 7a*), it was not discarded.<sup>111</sup> Their owner could equally well have acquired them as a traded commodity or as a gift from the envoys regularly arriving to the region from the Byzantine and Merovingian world in the middle third of the 6th century. Neither can we exclude the possibility that one of the soldiers fighting in Justinian I's army against the Goths<sup>112</sup> had taken the set back to his homeland. Nevertheless, the chronology of its context and its formal analogies would rather suggest that the set had reached the region in the last third of the 6th century in the wake of the more intense connections with Italy following the Langobards' migration to that land.

The elephant ivory carving most closely connected to the Mediterranean world is doubtless the Žuráň pyxis, whose contextualisation is bedevilled by the controversies surrounding its date and the context of the burial(s). What seems certain is that the object, which on the testimony of its surviving iconography undoubtedly originated from a Christian milieu, was adapted to another use in its new Barbarian home. Obviously, we have no way of knowing what exactly it was used for: it was perhaps a container for cosmetics or for the wealthy woman's jewellery, or perhaps it had contained some very special and rare food offering when deposited in the grave. In this case, its value principally lay in its origin from a distant land or perhaps the unusualness of its ornamentation, the imprint of an unknown and unfamiliar world. Its new owner, perhaps one of the buried woman's (?) male relatives, could equally well have acquired it as a gift or as part of the booty during one of the military expeditions against the Roman world. Similarly as in the case of the gaming pieces from Mosonszentjános, the richness of the other grave goods from the burial(s) again underscores the validity of the oft-noted tendency for elephant ivory articles, too, namely that closer contact with the Mediterranean world was principally maintained by the wealthier and higher-ranking members of the post-Roman Barbarian communities. The first steps in overcoming cultural distances were taken on this level, even if we can only speak of a genuine cultural transfer – no matter on how low a level – in the case of the gaming pieces from Mosonszentjános, and perhaps from Kőlked, insofar as the contemporaneity of the latter is confirmed by future archaeometric analyses and if its function does not turn out to be a spindle whorl.<sup>113</sup>

<sup>108</sup> For lathe-turned elephant ivory articles as an indication of production in larger series during Antiquity, cf. *Cutler 1987* 435.

<sup>109</sup> *Koncz – Tóth 2016*.

<sup>110</sup> *Bollók – Koncz 2020* 59–60.

<sup>111</sup> *Koncz – Tóth 2016* 165–166. This flaw, although visible to the naked eye, is not too conspicuous and neither is it a unique occurrence among pieces produced in large series, for example among pyxides, as noted by *Cutler 1987* 452–453.

<sup>112</sup> The Langobards are repeatedly mentioned in relation to Narses's Italian campaign, and the text leaves no doubt that they did not return empty-handed: *Proc., Bell. Goth.* IV.26.12–13, 19, 30.18, 31.5, 33.2–3; Greek text and English translation: *Dewing 1928* 330–333, 366–367, 370–371, 388–391.

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## WRITTEN SOURCES

- Cic., *Ep. ad famil* Marcus Tullius Cicero, *Epistulae ad Familiares*
- Williams 1952* W. G. Williams (ed. and transl.): Cicero, The Letters to His Friends in Three Volumes, Vol. II. The Loeb Classical Library 216. London – Cambridge 1952.
- Cosm. Ind., *Top. Christ.* Cosmas Indicopleustes, *Topographia Christiana*
- McCrinkle 2010* J. W. McCrinkle (transl. and comm.): The Christian Topography of Cosmas, an Egyptian Monk Translated from the Greek, and Edited with Notes and Introduction. London 1897, repr.: Cambridge 2010.
- Wolska-Conus 1973* W. Wolska-Conus (éd. et trad.): Cosmas Indicopleustès: Topographie chrétienne, vol. 3: Livres 6–12. Index. Sources Chrétiennes 197. Paris 1973.
- Dio, *Hist. Rom.* Dio Cassius, *Historia Romana*
- Cary – Foster 1914* E. Cary (ed.) – H. B. Foster (transl.): Dio's Roman History in Nine Volumes, Vol. III: Books XXXVI–XL. The Loeb Classical Library 53. London – New York 1914.
- Liv., *Ab urbe cond.* Titus Livius, *Ab urbe condita*
- Schlesinger 1951* A. C. Schlesinger (ed. and transl.): Livy, with an English Translation in Fourteen Volumes: Vol. XIII: Books XLIII–XLV. The Loeb Classical Library 396. Cambridge, Mass. 1951.
- Mon. Ancy.* Augustus, *Res gestae divi Augusti / Monumentum Ancyranum*
- Brunt – Moor 1967* P. A. Brunt – J. M. Moore (eds and transl.): Res Gestae Divi Augusti: The Achievements of the Divine Augustus, with an Introduction and Commentary. Oxford 1967.
- Per. Mar. Eryth.* *Periplus Maris Erythraei*
- Casson 1989* L. Casson (ed., transl. and comm.): The *Periplus Maris Erythraei*: Text with Introduction, Translation, and Commentary. Princeton 1989.
- Plin., *Nat. hist.* Plinius Maior, *Naturalis historia*
- Eichholz 1959* D. E. Eichholz (ed. and transl.): Pliny, Natural History in Ten Volumes, Vol. X: Libri XXXVI–XXXVIII. The Loeb Classical Library 419. Cambridge – London 1959.
- Rackham 1959* H. Rackham (ed. and transl.): Pliny, Natural History in Ten Volumes, Vol. IX: Libri XXXIII–XXXV. The Loeb Classical Library 394. Cambridge – London 1959.
- Rackham 1967* H. Rackham (ed. and transl.): Pliny, Natural History in Ten Volumes, Vol. III: Libri VIII–IX. The Loeb Classical Library 353. Cambridge – London 1967.
- Proc., *Bell. Goth.* Procopius Caesariensis, *De bello Gothico*
- Dewing 1928* H. B. Dewing (ed. and transl.): Procopius with an English Translation, in Seven Volumes, Vol. V: History of the Wars, Book VII (continued) and VIII. The Loeb Classical Library 217. London – New York 1928.

- Sen., *De brev. vit.* Lucius Annaeus Seneca, *De brevitate vitae*
- Basore 1932* J. W. Basore (ed. and transl.): Seneca: Moral Essays, in Three Volumes: Vol. II: De Consolatione ad Marciam. De Vita Beata. De Otio. De Tranquillitate Animi. De Brevitate Vitae. De Consolatione ad Polybium. De Consolatione ad Helviam. The Loeb Classical Library 254. Cambridge, MA 1932, 286–355.
- Them., *Or.* 10 Themistius, *Oratio* 10
- Heather – Matthews 1991* P. Heather – J. Matthews (transl. and comm.): The Goths in the Fourth Century. Translated Texts for Historians 11. Liverpool 1991.
- Theoph. Sym., *Hist.* Theophylactus Symocatta, *Historiae*
- Whitby – Whitby 1986* M. Whitby – M. Whitby (transl.): The History of Theophylact Simocatta: An English Translation with Introduction and Notes. Oxford 1986.

## REFERENCES

- Bálint 2019* Cs. Bálint: The Avars, Byzantium and Italy: A Study in Chorology and Cultural History. VAH 31. Budapest 2019.
- von Bargaen 1994* F. von Bargaen: Zur Materialkunde und Form spätantiker Elfenbeinpyxiden. JbAC 37 (1994) 45–63.
- Becker – Vogel 2008* H. Becker – R. Vogel: Zwei Gräber aus Szólád. Ein Einblick in der Arbeit der Restauratoren, in: *Hegewisch 2008* 194–203.
- Blay 2020* A. K. Blay: Die Beziehungen zwischen dem Karpatenbecken und dem Mediterraneum von der 2. Hälfte des 6. bis zum 8. Jahrhundert n. Chr. anhand Schmuckstücken und Kleidungszubehör. PhD Thesis at the Eötvös Loránd University, Budapest. Manuscript. Budapest 2020.
- Bollók 2014* Á. Bollók: From Carolingian Europe to Its Periphery and Back Again. A Brief Contribution to the Study of the Last Phases of Carolingian Metalwork and the Western European Booty of the Ancient Hungarians. ZfAM 42 (2014) 77–116.
- Bollók 2019* Á. Bollók: A bizánci diplomácia és az avar elit a 6–7. században (Byzantine diplomacy and the Avar elite in the sixth-seventh centuries. An essay in interpretation), in: Cs. Balogh – J. Szentpéteri – E. Wicker (eds): Hatalmi központok az Avar Kaganátusban. Power Centres of the Avar Khaganate. Kecskemét 2019, 211–248.
- Bollók – Koncz 2020* Á. Bollók – I. Koncz: Sixth- and Seventh-Century Elephant Ivory Finds from the Carpathian Basin: The Sources, Circulation, and Value of Ivory in Late Antiquity and the Early Middle Ages. ArchÉrt 145 (2020) 39–68.
- Bollók – Koncz in preparation* Á. Bollók – I. Koncz: Rapporti commerciali tra longobardi, gepidi e bizantini, in: G. Archetti: Liutprando. Re dei Longobardi (in preparation).

- Bomgardner 2000* D. E. Bomgardner: The Story of the Roman Amphitheatre. London – New York 2000.
- Choyke 2012* A. M. Choyke: Az állati vázrészek mint alapanyagok – Skeletal elements from animals as raw materials, in: M. T. Biró – A. M. Choyke – L. Vass – Á. Vecsey: Aquincumi csonttárgyak – Bone Objects in Aquincum. Az Aquincumi Múzeum Gyűjteménye 2. Budapest 2012, 43–53.
- Christlein 1966* R. Christlein: Das alamannische Reihengräberfeld von Marktoberdorf im Allgäu. Materialhefte zur bayerischen Vorgeschichte 21. Kallmünz/Opf. Lassleben 1966.
- Cutler 1987* A. Cutler: Prolegomena to the craft of ivory carving in late Antiquity and the early Middle Ages, in: X. Barral Altet (ed.): Artistes, artisans et production artistique au Moyen Age: Colloque international. Centre National de la Recherche Scientifique. Université de Rennes II, Haute-Bretagne, 2–6 mai 1983, vol. 2. Paris 1987, 431–475.
- Cutler – Niewöhner 2016* A. Cutler – Ph. Niewöhner: Towards a history of Byzantine ivory carving from the late 6th to the late 9th century. Travaux et Mémoires 20/2 (2016) 89–106.
- Csallány 1961* D. Csallány: Archäologische Denkmäler der Gepiden im Mitteldonaubecken (454–568 u.Z.). ArchHung 38. Budapest 1961.
- Daim 2003* F. Daim: Avars and Avar Archaeology. An Introduction, in: H.-W. Goetz – J. Jarnut – W. Pohl (eds): Regna and Gentes. The Relationship between Late Antique and Early Medieval Peoples and Kingdoms in the Transformation of the Roman World. Transformation of the Roman World 13. Leiden 2003, 463–570.
- Daim 2012* F. Daim: Des Kaisers ungeliebte Söhne. Die Awaren und das Byzantinische Reich. EurAnt 17 (2012) 1–20.
- De Romanis 2012* F. De Romanis: Playing Sudoku on the Verso of the “Muziris Papyrus”: Pepper, Malabathron and Tortoise Shell in the Cargo of the Hermapollon. Journal of Ancient Indian History 27 (2012) 75–101.
- De Romanis 2020* F. De Romanis: The Indo-Roman Pepper Trade and the Muziris Papyrus. Oxford Studies on the Roman Economy. Oxford 2020.
- Drauschke 2011a* J. Drauschke: Naturwissenschaftliche Analysen an elfenbeinernen Ringen des 6. und 7. Jahrhunderts aus dem östlichen Merowingerreich, in: A. Banerjee – Ch. Eckmann (Hrsg.): Elfenbein und Archäologie. INCENTIVS-Tagungsbeiträge 2004–2007. RGZM Tagungen 7. Mainz 2011, 35–42.
- Drauschke 2011b* J. Drauschke: Zwischen Handel und Geschenk: Studien zur Distribution von Waren aus dem Orient, aus Byzanz und Mitteleuropa im östlichen Merowingerreich. Freiburger Beiträge zur Archäologie und Geschichte des ersten Jahrtausends 14. Rahden/Westfalen 2011.
- Drauschke–Banerjee 2007* J. Drauschke – A. Banerjee: Zur Identifikation, Herkunft und Verarbeitung von Elfenbein in der Merowingerzeit. AKorr 37/1 (2007) 109–128.

- Duffy – Vikan 1983* J. M. Duffy – G. Vikan: A Small Box in John Moschus. *Greek, Roman, and Byzantine Studies* 24 (1983) 93–99.
- von Freeden 2008* U. von Freeden: Ausgewählte Befunde aus dem langobardenzeitlichen Gräberfeld von Szólád, Komitat Somogy, Ungarn, in: *Hegewisch 2008* 399–414.
- Garam 2001* É. Garam: Funde byzantinischer Herkunft in der Awarenzeit vom Ende des 6. bis zum Ende des 7. Jahrhunderts. MAA 5. Budapest 2001.
- Hajnal 2012* Zs. Hajnal: A Kölked-feketekapui ‘A’ és ‘B’ temetők együttes értékelése (Die zusammenfassende Auswertung der Gräberfelder ‘A’ und ‘B’ von Kölked-Feketekapu), in: T. Vida (ed.): *Thesaurus Avarorum. Régészeti tanulmányok Garam Éva tiszteletére. Archaeological Studies in Honour of Éva Garam*. Budapest 2012, 607–642.
- Hegewisch 2008* M. Hegewisch (Hrsg.): Die Langobarden. Das Ende der Völkerwanderung. Katalog zur Ausstellung im Rheinischen LandesMuseum Bonn 22.8.2008–11.1.2009. Darmstadt 2008.
- Insoll 1995* Th. Insoll: A cache of hippopotamus ivory at Gao, Mali; and a hypothesis of its use. *Antiquity* 69 Issue 263 (1995) 327–336.
- Jennison 1937* G. Jennison: *Animals for Show and Pleasure in Ancient Rome*. Manchester 1937.
- Kiss 1996* A. Kiss: Das awarenzeitlich gepidische Gräberfeld von Kölked-Feketekapu A. *Monographien zur Frühgeschichte und Mittelalterarchäologie* 2. Innsbruck 1996.
- Klanica – Klanicová 2011* Z. Klanica – S. Klanicová: Das langobardische Gräberfeld von Lužice (Bez. Hodonín), in: J. Tejral – S. Stuchlík – M. Čížmař – Z. Klanica – S. Klanicová (Hrsg.): *Langobardische Gräberfelder in Mähren I. Spisy Archeologického ústavu AV ČR Brno* 39. Brno 2011, 225–312.
- Kolník – Veliáčik 1983* T. Kolník – L. Veliáčik: Neskoroantická pyxida z Čiernych Kl’áčian (Ikonografia, datovanie a vzťahy k Velk’ej Morave) (Spätantike Pyxis aus Čierne Kl’áčany. Ikonographie, Datierung und Beziehung zu Großmähren). *SIA* 31 (1983) 17–84.
- Koncz 2015* I. Koncz: 568 – A historical date and its archaeological consequences. *ActaArchHung* 66 (2015) 315–340.
- Koncz 2019* I. Koncz: Action and interaction between the Gepids and the Langobards in the sixth century, in: T. Vida – D. Quast – Zs. Rácz – I. Koncz (Hrsg.): *Kollaps – Neuordnung – Kontinuität. Gepiden nach dem Untergang des Hunnenreiches. Tagungsakten der Internationalen Konferenz an der Eötvös Loránd Universität, Budapest, 14.-15. Dezember 2015*. Budapest 2019, 409–430.
- Koncz – Tóth 2016* I. Koncz – Zs. Tóth: 6th-century ivory game pieces from Mosonszentjános. *Dissertationes Archaeologicae ex Instituto Archaeologico Universitatis de Rolando Eötvös Nominatae* 3/4 (2016) 161–178.

- Konsa et al. 2009* M. Konsa – J. Vassiljev – R. Allmäe – L. Maldre: Rescue excavations of a Vendel era boat-grave in Salme, Saaremaa. *Archaeological Fieldwork in Estonia 2008* (2009) 53–64.
- Krzyszowska 1990* O. Krzyszowska: Ivory and Related Materials: An Illustrated Guide. *Classical Handbook 3. Bulletin Supplement 59*. London 1990.
- Lafrenz 2004* K. A. Lafrenz: Tracing the Source of the Elephant and Hippopotamus Ivory from the 14th century B. C. Uluburun Shipwreck: The Archaeological, Historical and Isotopic Evidence. MA Thesis at the University of South Florida. Tampa 2004. Available online at <https://scholarcommons.usf.edu/etd/112>
- Lane 2015* P. J. Lane: Introduction: archaeological ivories in a global perspective. *World Archaeology* 47 (2015) 317–332.
- Laufer – Pelliot 1913* B. Laufer – P. Pelliot: Arabic and Chinese Trade in Walrus and Narwhal Ivory. *T'oung Pao* 14 (1913) 315–370.
- Locke 2008* M. Locke: The Structure of Ivory. *Journal of Morphology* 269 (2008) 423–450.
- MacGregor 1985* A. MacGregor: Bone, Antler, Ivory and Horn: The Technology of Skeletal Materials Since the Roman Period. *Routledge Library Editions: Archaeology*. Totowa 1985.
- Mastykova 2017* A. Mastykova: The Dating of Beads from the ‘Royal’ Barrow of Žuráň, in: *Na hranicích impéria. Extra fines imperii: Jaroslavu Tejralovi k 80. narozeninám*. Brno 2017, 327–334.
- Moorey 1994* P. R. S. Moorey: *Ancient Mesopotamian Materials and Industries. The Archaeological Evidence*. Oxford 1994.
- Nagy 2005* M. Nagy: Kora népvándorlás kori gyermeksír amulettekkel Mártélyről (Csongrád megye) (5th century child grave with amulets and iron bell from Mártély [Csongrád County]). *ZalaiMúz* 14 (2005) 97–127.
- Nechaeva 2014* E. Nechaeva: *Embassies – Negotiations – Gifts. Systems of East Roman Diplomacy in Late Antiquity*. *Geographica Historica*. Stuttgart 2014.
- Peets et al. 2013* J. Peets – R. Allmäe – L. Maldre – R. Saage – T. Tomek – L. Lõugas: Research Results of the Salme Ship Burials in 2011–2012. *Archaeological Fieldwork in Estonia 2012* (2013) 43–60.
- Penniman 1952* T. K. Penniman: Pictures of Ivory and other Animal Teeth, Bone and Antler: With a brief commentary on their use in identification. *Occasional Papers on Technology* 5. Oxford 1952.
- Pierce 2009* E. Pierce: Walrus Hunting and the Ivory Trade in Early Iceland. *Archaeologica Islandica* 7 (2009) 55–63.
- Pohl 2018* W. Pohl: *The Avars: A Steppe Empire in Central Europe, 567–822*. Ithaca – London 2018.
- Poulik 1995* J. Poulik: Žuráň in der Geschichte Mitteleuropas. *SIA* 43 (1995) 27–109.

- Power 2012* T. Power: The Red Sea from Byzantium to the Caliphate, AD 500–1000. Cairo – New York 2012.
- Reese 1998* D. S. Reese: Appendix III: A Hippopotamus Tooth from Hala Sultan Tekke, in: P. Åström (ed.): The Wells. Hala Sultan Tekke 10. Studies in Mediterranean Archaeology 45. Philadelphia 1998, 140–145.
- Robinson 2004* J. Robinson: The Lewis Chessmen. Objects in Focus. London 2004.
- Roesdahl 1995* E. Roesdahl: Hvalrostand, elfenben og nordboerne i Grønland. Odense 1995.
- Roesdahl 1998* E. Roesdahl: L'ivoire de morse et les colonies norroises du Groenland. Proxima Thule: Revue d'Études Nordiques 3 (1998) 9–48.
- Roesdahl 2003* E. Roesdahl: Walrus ivory and other northern luxuries: their importance for Norse voyages and settlements in Greenland and America, in: S. Lewis-Simpson (ed.): Vinland Revisited: The Norse World at the Turn of the First Millenium. Selected Papers from the Viking Millennium International Symposium, 15–24 September 2000. Newfoundland 2003, 145–152.
- Roesdahl 2005* E. Roesdahl: Walrus Ivory – Demand, Supply, Workshops, and Greenland, in: A. Mortensen – S. V. Arge (eds): Viking and Norse in the North Atlantic. Select Papers from the Proceedings of the Fourteenth Viking Congress, Tórshavn, 19–30 July 2001. Annales Societatis Faeroensis Supplementum 44. Tórshavn 2005, 182–191.
- Samu 2020* L. Samu: Die mediterranen Kontakte des Karpatenbeckens in der Früh- und Mittelawarenzeit im Lichte der Männerkleidung: Gürtelschnallen und Gürtelgarnituren. PhD Thesis at the Eötvös Loránd University, Budapest. Manuscript. Budapest 2020.
- Seaver 2009* K. A. Seaver: Desirable Teeth: The Medieval Trade in Arctic and African Ivory. Journal of Global History 4/2 (2009) 271–292.
- Sosnowski et al. 2019* M. C. Sosnowski – T. G. Knowles – T. Takahashi – N. J. Rooney: Global ivory market prices since the 1989 CITES ban. Biological Conservation 237 (2019) 392–399.
- Stadler 2008* P. Stadler: Hauskirchen, in: *Hegewisch 2008* 267–274.
- Szenthe 2013* G. Szenthe: Antique Meaning – Avar Significance. Complex Iconographic Schemes on Early Medieval Small Objects. ActaArchHung 64 (2013) 139–172.
- Tarn 1928* W. W. Tarn: Ptolemy II. The Journal of Egyptian Archaeology 14 (1928) 246–260.
- Tate et al. 2011* J. Tate – I. Reiche – F. Pinzari – J. Clark – D. Caldwell: History and Surface Condition of the Lewis Chessmen in the Collection of the National Museums Scotland (Hebrides, late 12th-early 13th centuries). ArchoSciences: Revue d'archéométrie 35 (2011) 249–258.
- Tobias 2011* B. Tobias: Avar kori tarsolyzárók a Kárpát-medencében (Awarenzeitliche Taschenverschlüsse in Karpatenbecken). MFMÉ StudArch 12 (2011) 277–312.

- Toynbee 2013* J. M. C. Toynbee: *Animals in Roman Life and Art*. London 1973; repr. South Yorkshire 2013.
- Vančo 2006* M. Vančo: Ivory Pyxis from Čierne Kl'áčany and the problem of its provenance, in: J. M. Gálik – T. Štefanovičová (eds): *Trade, Journeys, Inter- and Intracultural Communication in East and West (up to 1250)*. Papers Presented at the International Workshop (Humboldt-Kolleg) Dolná Krupá, Slovak Republic, June 2–6, 2004. Bratislava 2006, 78–86.
- Vida 2016* T. Vida: *Late Antique Metal Vessels in the Carpathian Basin: Luxury and Power in the Early Middle Ages*. HAH 1. Budapest 2016.
- Vida 2018a* T. Vida: Pannonia and the Alpine-Adriatic Region in Late Antiquity, in: C. Giostra (ed.): *Migrazioni, clan, culture: archeologia, genetica e isotopi stabili*. Atti del III Incontro per l'Archeologia barbarica Milano, 18 maggio 2018. *Archeologia barbarica* 3. Milano 2018, 125–138.
- Vida 2018b* T. Vida: A sztyeppei, a bizánci és a Meroving birodalmak között. Kulturális változások a Kárpát-medence nyugati felén Kr. u. 6–7. században [Between the Steppean, Byzantine and Merovingian Empires: Cultural Changes in the Western Half of the Sixth- to Seventh-century Carpathian Basin]. DSc Thesis. Manuscript. Budapest 2018.
- Volbach 1970* W. F. Volbach: *Elfenbeinarbeiten der Spätantike und des frühen Mittelalters*. Römisch-Germanisches Zentralmuseum, Mainz: Katalog 7. Mainz 1970.
- Whitridge 1999* P. Whitridge: The Prehistory of Inuit and Yupik Whale Use. *Revista de Arqueología Americana* 16 (1999) 99–154.
- Zeuner 1963* F. E. Zeuner: *A History of Domesticated Animals*. London 1963.

