ANTÆUS 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	Münchner 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)
MFMÉ	A Móra Ferenc Múzeum Évkönyve (Szeged)
MFMÉ 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	Opvscvla 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)

SlSt	Slovanské štúdie (Bratislava)
SMK	Somogyi Múzeumok Közleményei (Kaposvár)
StComit	Studia Comitatensia. 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)

IN MEMORIAM

LÁSZLÓ TÖRÖK
(1941–2020)

László Török, former editor-in-chief of *Antaeus*, passed away on September 17, 2020.

It seems a curious twist of fate that his obituary appears in the issue principally dedicated to the archaeological exploration of the medieval Kingdom of Hungary. Although it is not common knowledge even among his colleagues who are unfamiliar with the very beginning of his career, Török began his scholarly activity in the mid-1960s as a student of Hungarian medieval art and architecture. Both the beginning and the abrupt end of this phase of his career were shaped by decisive coincidences, profoundly influenced by the overall milieu of socialism in Hungary in which young scholars coming from a "class enemy" background found themselves.

While Török had set his heart on studying art history, he had virtually no chance of enrolling at any faculty of humanities in the Hungary of the 1950s and 1960s, owing to the "class enemy" status of his family. He was therefore advised to study architecture at the Budapest University of Technology. Although less than fond of this discipline, the courses given by his professor of architectural history offered him a hidden path, no matter how narrow, to what had been denied to him on ideological grounds by the socialist regime: the much-desired study of art history. His would not be a genuine East-Central European story had this secret path led straight to the desired destination. While his professor of architectural history intended to employ the young László Török as his assistant, the decision was not his to make. In order to save the talent he clearly sensed in his student, he suggested to László Gerevich, then director of the Archaeological Research Group of the Hungarian Academy of Sciences, that he employ Török as a member of the institute's staff. In the 1960s, Gerevich, an art historian and archaeologist specialising in the research of medieval Hungarian art and architecture, was engaged in the study of the finds brought to light during the excavations conducted in the medieval royal court of Buda in the wake of the destruction brought on by World War 2. It therefore came as no surprise that Gerevich gladly employed an architect with the task of assisting him with his specialised technical knowledge that was beyond the reach of an art historian of the period. Török thus started to work as a young architect in the Archaeological Research Group in 1964 and was expected to support Gerevich's research with his special skills. However, the young researcher turned his creative energies to another research topic. He embarked on a doctoral project on an early Árpádian-period sculpted stone ornament group decorated with distinctive palmette motifs. Unfortunately, Gerevich himself was keen to write up this material, which led to tension between the two. As was to be expected, the by then acclaimed scholar and director was in a far better position to influence the course of events and, at one point, Török even handed in his resignation. He was saved from the fateful consequences of this rash act by the helping hand offered to Török by László Castiglione, then deputy director of the Institute of Archaeology, who invited Török to join him in creating a research team specialising in classical archaeology with a special focus on Hellenistic and Roman-period Egypt, and who suggested that he spend some time in Egypt to familiarise himself with the history and archaeology of the Nile Valley.

"Had his director been more considerate and supportive of his young colleague, we would be standing here to take our farewells of an outstanding expert of medieval Hungarian art and architecture", is how the memory of these years was evoked by Elek Benkő, director of the Institute of Archaeology – as well as a good friend and colleague of Török – in his eulogy delivered at Török's burial service. Set against the outpour of Török's erudite publications on

Hellenistic to late antique Egyptian art, the completed elements of a scholarly agenda thwarted well before reaching fruition due to a series unfortunate circumstances duly demonstrate the loss suffered by medieval Hungarian archaeology and art history by losing a brilliant scholar to another discipline.

Glimpses into Török's research agenda on early Árpádian-period sculpted stone ornaments can mainly be gained from his doctoral dissertation, authored and defended despite his director's disapproval, as well as from a paper published in 1970 in Hungarian on the interpretation of a key sculpted stone ornament discovered at Szekszárd. The offprints of a few barely known reviews of monographs on medieval architecture and architectural ornament appearing at the time, some of which were found carefully packed away in his office when going through his papers after his death, are an indication of how determinedly he chose to terminate this part of his career after choosing a different path, and likewise reflect his ambition to set the interpretation of the subject against the widest possible background. Ironically enough, while the tension between Gerevich and Török resulted in the latter's abandonment of the topic of Árpádian-period sculpture, Gerevich ultimately wrote no more than a few papers on these sculpted stone pieces.

Upon returning from his first visit to Egypt, Török set out to work on two major topics, both of which exercised a long-lasting impact on his scholarly career. While in Egypt, he started to immerse himself in the study of late antique Egyptian sculpture, which was in the 1960s – and is still often today – generally, although erroneously, called Coptic, a research topic which was hardly unfamiliar to him due to his previous work on Mediterranean-style sculpted architectural stone ornaments. His papers covering late antique Egyptian stone sculpture written at the time were merely the first in a long series of studies addressing various aspects of the development of arts and crafts in late antique Egypt, a research direction culminating in the birth of a monograph on Egyptian art between the third and seventh centuries AD, published in 2005 to accompany a major exhibition, "*After the Pharaohs: Treasures of Coptic Art from Egyptian Collections*", curated by him in Budapest.

The other major research topic to which he committed himself from the 1960s, one with which he remained engaged until his death, was the study of ancient and late antique Nubia. At Castiglione's invitation, he joined the research team, based at the Institute of Archaeology, set up to publish the results of the excavation carried out by members of the Institute at Abdallah Nirqi as part of UNESCO's international campaign to rescue as much of the Nile Valley's cultural heritage as possible, at the time endangered by the construction of the great Aswan Dam. From then on, Török immersed himself ever more deeply in Nubia's past in the course of his exceptionally rich scholarly career spanning more than half a century.

Unlike his colleagues participating in the excavation, Török did not abandon Nubian studies with the final publication of the late antique village excavated at Abdallah Nirqi. However, the process of discovering Egyptian and Nubian studies for himself gradually distanced him from the main research directions pursued by the majority of his colleagues at the Institute of Archaeology. While there was nothing objectionable in this state of affairs in his home institution in the last third of the twentieth century, he was nevertheless expected to participate in the Institute's life. As a fortunate coincidence, he was appointed editor-in-chief of the Institute's yearbook, published from 1968 onward under the name *Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften*. In this capacity, Török could make good use of his exceptional language skills, a less than common faculty among East-Central European archaeologists, from which his institution profited immensely throughout his editorship. His ambitious approach to improving the journal's quality both in terms of the academic and linguistic standards of the papers accepted for publication was a great gain for *Mitteilungen*.

Even a cursory glance at the volumes published under his editorial auspices attests to a certain degree of experimentation. The original concept for *Mitteilungen* was to provide an overview of

the main research directions and projects pursued within the walls of the Institute of Archaeology. In accordance with this idea, the first eleven volumes, edited by Castiglione with the single exception of Volume 10/11 (1980/1981), mainly published brief preliminary and intermediary reports of the excavations undertaken by the Institute's members and of their research projects, alongside very brief excavation reports and bibliographies of the Institute's staff. The limited research scope and focus of these papers destined the journal to be underrated as a scholarly forum, despite the fact that it was one of the few Hungarian archaeological periodicals entirely made up of English-, German-, and French-language contributions. While other reasons were also in play, Török, in his capacity as editor-in-chief between the early 1980s and the mid-1990s, that is between Volumes 12/13 (1982/1983) and 23 (1996), introduced a new publication policy and overall mission for the yearbook. From Volume 15 (1986) onward, the name *Mitteilungen* was changed to *Antaeus*, and the journal transformed its overall profile to publishing monographs and monograph-length collections of studies on given projects of the Institute. Although he remained editor-in-chief until the mid-1990s, the late 1980s and the earlier 1990s were an especially intense and productive period in his scholarly life, which saw him authoring and publishing roughly ten monographs within a decade, which with the passing of the time by necessity turned his attention away from his editorial tasks, in which he was greatly assisted by Miklós Béla Szőke, with whom he cultivated a close friendship in private life as well. Despite gradually taking up other academic challenges, Török remained a member of the editorial board of *Antaeus* until the end of his life.

While his successors in the journal's editorship were compelled to introduce further changes and adjustments in terms of its format, contents, scope and overall mission in the wake of the changes brought on by the political transition and the collapse of the socialist regime as well as the overall transformation of academic research and scholarship in the decades around the turn of the new millennium, the years Török spent with editing *Antaues* were decisive in both his and the journal's life. The journal's agenda was tailored to the needs and expectations of a scholarly periodical of the later twentieth century, while Török himself grew into an acclaimed leading expert in his chosen fields, the latter perfectly illustrated by his many books published by the most prestigious academic publishers from the 1990s onward, providing the opportunity to reach an international academic readership after the fall of the Iron Curtain – an opportunity open to many, but one that could only be seized by the most talented few, one of whom was László Török.

The changes introduced by him to the journal's life were motivated and governed by the very same principles that assured his rise to prominence in international scholarship: his brilliant mind, his intellectual powers, his critical sense, and his uncompromising strive for high-quality scholarly work. He always felt the urge to familiarise his friends and colleagues with the most current and promising methodological approaches developed in the field of ancient studies of the western world as well as to encourage and help them to make use of these methods in their own research. Although his colleagues were not always open to following his suggestions in these matters, Török was always ready to help those who turned to him for guidance and assistance with good advice, literature, and last, but by no means least, with perfectly framed questions.

However unique or, better said, "exotic" his chosen disciplines were regarded in Hungarian archaeology, the Institute of Archaeology provided a safe haven and a solid institutional background throughout his career between the 1960s and the 2010s. While he often felt that his work was somewhat underappreciated even by his most immediate colleagues, he never ceased to be grateful for his Institute's support by providing the means whereby he could achieve success in the scholarly enterprises he had chosen and attain the goals he had set himself. This high level of freedom, nowadays rarely encountered even in academic institutions, which tend to have a narrow focus on research tasks, was essential to such a prolific and innovative scholar like Török. As a token of gratitude for the freedom he was granted, he was keen on making every possible effort to improve the quality of *Antaeus*, entrusted to him for one and a half decades, and to

provide support to his colleagues in his home institution and beyond. Those who did not know him well enough sometimes found it difficult to approach him because it was well-known how he felt about mediocre and low-quality scholarship, but if one was persistent and courageous enough to breach the mental barrier of awe, one experienced his charming personality, his impeccable taste in all matters, and the brilliance of his mind. Those who passed this test and were fortunate to enjoy his company and learn from him will always remember him for the brilliant scholar and the true gentleman he was and be grateful to him for the many things he passed on to them.

Ádám Bollók

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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, trotzt 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,[1] 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.[2] 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.[3] 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.[4]

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1 *Toynbee ²2013* 17–18, cf. *Jennison 1937* 42–48; *Bomgradner 2000* 34–35.

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

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

4 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.[5] 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.[6] 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.[7] 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.[8] Although these beasts, regarded as exclusively befitting rulers,[9] most often entertained spectators with the tricks they had been taught,[10] 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.[11] 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.[12]

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

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5 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.

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

7 *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 *Africanae 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.

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

9 *Jenisson 1937* 93; *Bomgardner 2000* 103.

10 *Jenisson 1937* 65–66.

11 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), XXXXVI.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.

12 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,[13] walrus,[14] and even narwhal,[15] and in certain cases to the teeth of sperm whales.[16] 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[17] 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.[18] 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)*.[19] 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.[20]

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.[21] For example, intersecting lines forming chevrons (the so-called Schreger lines) can

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[13] *Moorey 1994* 115; *Insoll 1995.*

[14] *MacGregor 1985* 41; *Pierce 2009; Seaver 2009.*

[15] *Laufer – Pelliot 1913; Whitridge 1999.*

[16] *Lane 2015* 324–325.

[17] 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.

[18] DWDS: https://www.dwds.de/wb/Elfenbein (last accessed April 6, 2020).

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

[20] 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.

[21] *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.[22]

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.[23] 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.[24] The renowned Lewis chessmen dating from the 12th century were for the greater part carved from walrus tusk,[25] although a few were made from the teeth of sperm whale (*Physeter macrocephalus* Linnaeus 1758).[26] 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.[27] In the Near East, hippopotamus tusk (*Hippopotamus amphibius* Linnaeus 1758), much harder and whiter than elephant tusk, was always highly valued, especially for for its latter trait latter trait,[28] and it is therefore hardly surprising that it was used as a substitute when elephant tusks were scarce;[29] moreover, given its greater hardness, it was downright preferred for the production of certain objects.[30] It was a trade commodity in its own right,[31] 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.[32] 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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22 *Locke 2008* 430–441.

23 *Roesdahl 2003; Roesdahl 2005.*

24 *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.*

25 *Robinson 2004.*

26 *Tate et al. 2011* 253.

27 *Konsa et al. 2009* 58; *Peets et al. 2013* 5.

28 *Penniman 1952* 23.

29 *Krzyszkowska 1990* 21.

30 *Moorey 1994* 115.

31 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.*

32 *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,[33] 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).[34]

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

[33] 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.

[34] *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.[35]

2. Jánossomorja, formerly called Mosonszentjános[36] (Győr-Moson-Sopron county, Hungary), Grave 12 Ten elephant ivory gaming pieces of a set *(fig. 2)*.[37] 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.[38] Given its parallels, it could equally well have been a spindle whorl,[39] 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.[40] 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.[41]
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*).[42] The ring was made in one piece.[43] 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 robably been 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,

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35 *Stadler 2008* 267–270.

36 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.

37 *Koncz – Tóth 2016*. The raw material was identified by Zsuzsanna Tóth.

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

39 We are greatly indebted to Andrea Vaday for raising this suggestion.

40 *Hajnal 2012* 630.

41 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.

42 *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.

43 *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)[44] whose raw material was initially identified as elephant ivory, turned out to have been made from soapstone after its microscopic examination.[45]

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[46]) made of "bone", of which about one-quarter is missing *(fig. 5. 2)*.[47] 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).[48] 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)*.[49] 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.[50] The pyxis was earlier assigned to the 6th century,[51] but this is strongly contradicted by the dating of the burial's associated finds.[52] Given that the grave was heavily looted and that

[44] *Nagy 2005* 102. Dezső Csallány erroneously described the buckle in question as having been made of bronze: *Csallány 1961* 125, Taf. 230. 14.

[45] Identified by Zsuzsanna Tóth. The artefacts examined and analysed by her will be discussed in another study, currently under preparation.

[46] The publication does not specify the exact measurements, which we determined from the scale accompanying the illustration.

[47] *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.

[48] *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.

[49] *Poulík 1995* 71–73, Abb. 49–51a, Abb. A.

[50] For an overview, cf. *Poulík 1995* 71–75.

[51] Cf. *Poulík 1995* 71–75.

[52] 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)

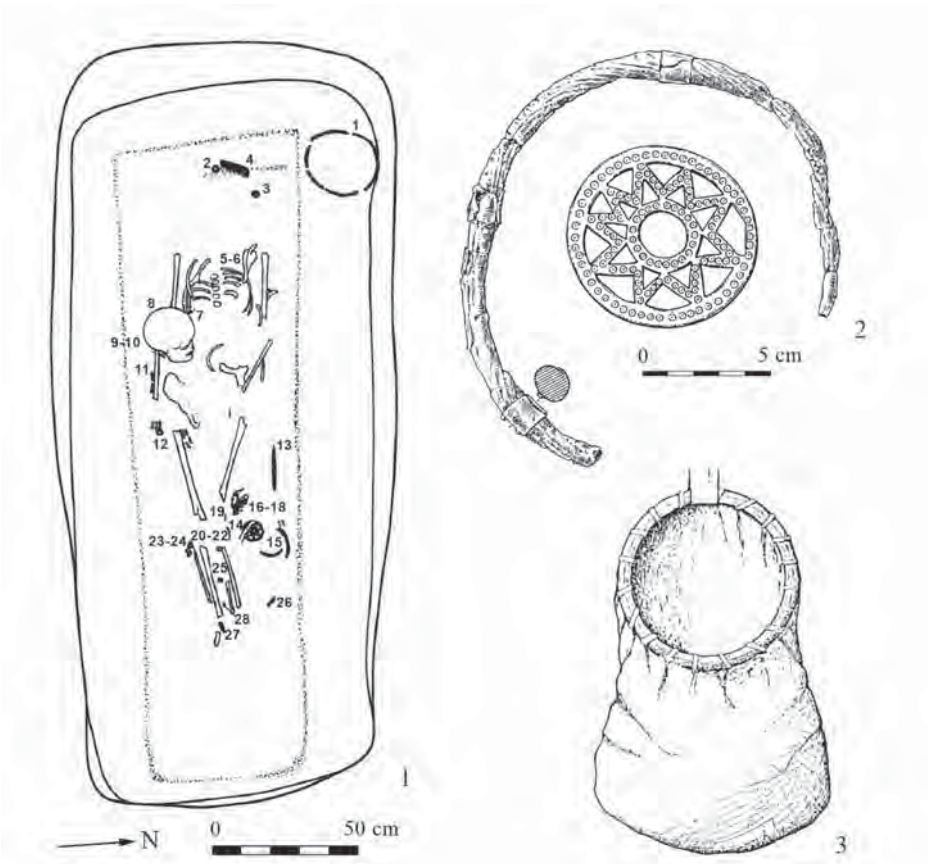

Fig. 5. Elephant ivory pouch ring, Lužice, Grave 94: 1. the disturbed female burial and the location of the pouch ring in the grave; 2. the pouch ring and the copper-alloy decorative disc; 3. alternative conjectural reconstruction of how pouch rings may have been used
(1–2. after *Klanica – Klanicová 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.[53]

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.[54] Dated to the 6th century on stylistic grounds in a recent study,[55] 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.[56] Slovakian archaeological scholarship associated the pyxis with the 9th-century, rather modest burials.[57] 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.[58]
(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),[59] 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:

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[53] *Mastykova 2017* 329.
[54] *Kolník – Veliačik 1983* 18, 20, 16–30, fig. 3. 8–11.
[55] *Vančo 2006*.
[56] *Kolník – Veliačik 1983* 17.
[57] *Kolník – Veliačik 1983* 18–22, fig. 4.
[58] For the dating of the burials, see the literature cited in the Catalogue.
[59] 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[60] from these slices.[61] 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,[62] this issue is not as straightforward as it would appear and we shall return to it below.

[60] 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*.

[61] *MacGregor 1985* 110; *Drauschke 2011a* 40. For a discussion of the similar use of tusks, cf. *von Bargen 1994* 53, and 51, Abb. 3. 1.

[62] 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)*.[63] 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[64] 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[65] 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;[66] 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.[67] 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).[68]

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[69] 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

[63] For a detailed description and discussion of the manufacturing technique, cf. *Koncz – Tóth 2016* 163–166.
[64] *Koncz – Tóth 2016* 170, fig. 9.
[65] *Duffy – Vikan 1983.*
[66] Cf. *Volbach 1970; von Bargen 1994* 45, note 2.
[67] For the manufacturing technique, cf. *von Bargen 1994.*
[68] *Cutler 1987* 452–453.
[69] Cf. *Tobias 2011.*

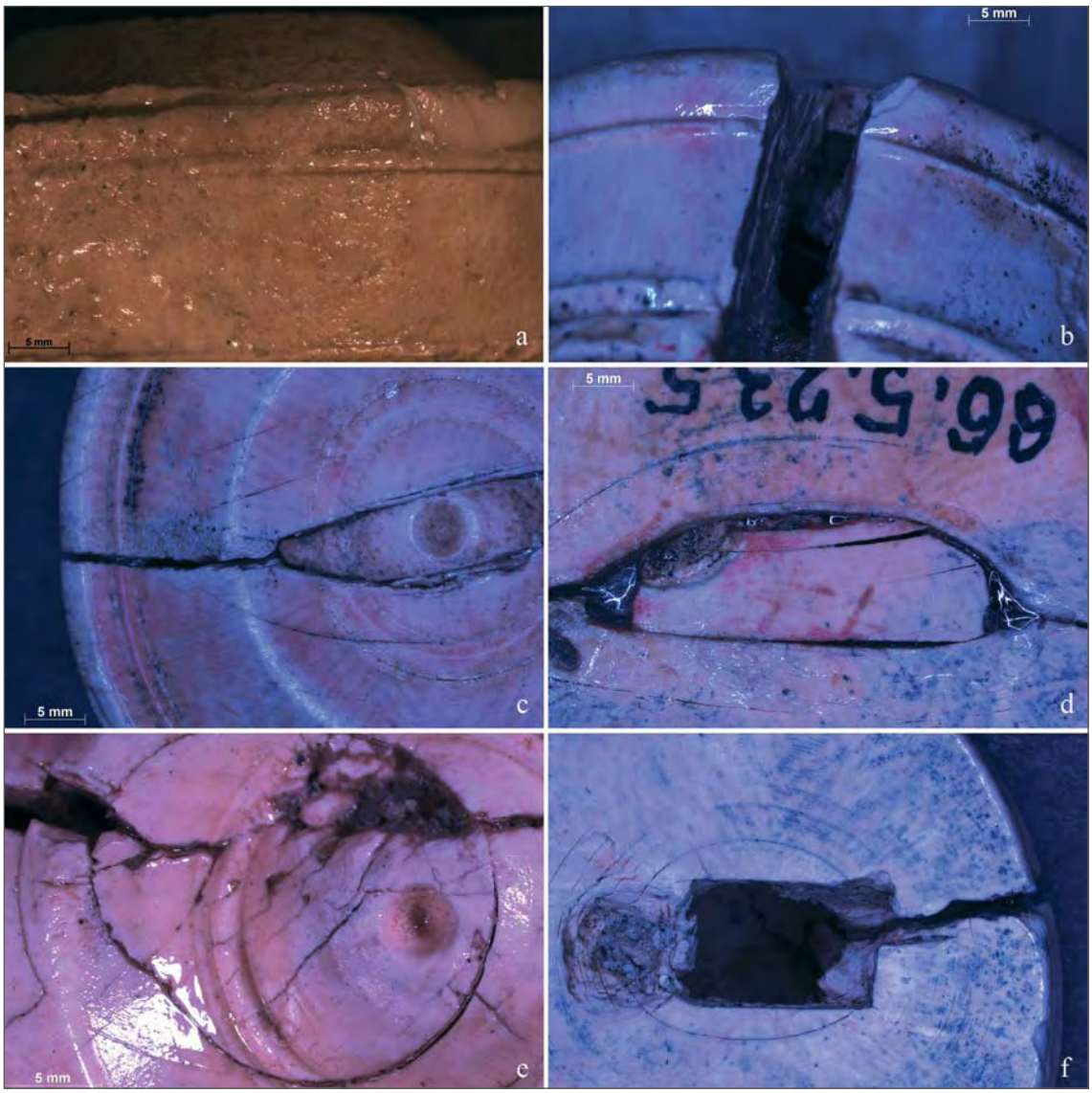

Fig. 7. Detail photos of the gaming pieces from Mosonszentjános: the flawed edge; b–f. the pulp cavity and its concealment (after *Koncz – Tóth 2016* fig. 4)

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.[70] 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.[71] 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.[72]

[70] Cf. *Koncz 2019.*

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

[72] *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.[73] 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 wre 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,[74] 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),[75] despite the famously dynamic Avar-Byzantine and Avar-Italian connections of the 6th and 7th centuries.[76] 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[77] 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,[78] 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.

[73] *Koncz 2015* 333–334; *Vida 2018a; Bálint 2019.*
[74] Theoph. Sim., *Hist*. I.3.8–10, English translation: *Whitby – Whitby 1986* 24; cf. *Bollók – Koncz 2020* 52.
[75] 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.
[76] *Garam 2001; Daim 2003; Daim 2012; Vida 2016; Vida 2018b; Bálint 2019; Bollók 2019; Blay 2020; Samu 2020.*
[77] Cf. *Pohl 2018; Bollók 2019* 233–237.
[78] 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.[79] 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.[80] 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.[81] 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.[82] 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.[83]

Far less is known about the contemporaneous availability of elephant ivory from north-western Africa.[84] 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.[85] Given the general consensus in the period's scholarship that this species only became extinct in the 6th century,[86] 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

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

[80] *Bollók – Koncz 2020.*

[81] *Tarn 1928* 258.

[82] *Per. Mar. Eryth.* 3_{17}, $4_{4–13}$, 6_{4}, $7_{18–21}$, $10_{12–13}$, 16_{5}, $17_{18–19}$, Greek text and English translation: *Casson 1989* 50–57, 60–61.

[83] For a comprehensive survey of the sources, cf. *Bollók – Koncz 2020,* 41–46, 48–50..

[84] For a detailed discussion, cf. *Bollók – Koncz 2020,* 45–46, 50.

[85] Them., *Or.* 10, English translation: *Heather – Matthews 1991* 44.

[86] *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.[87]

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.[88] 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.[89] 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.[90] 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.[91]

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*.[92] 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.[93] 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[94] 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

[87] Cf. the data compiled in *Bollók – Koncz 2020*, 45.
[88] *Per. Mar. Eryth*. 49_{29}, 56_{24}, Greek text and English translation: *Casson 1989* 80–81, 85–86.
[89] *De Romanis 2012*.
[90] The papyrus and its broader context are analysed in *De Romanis 2020*.
[91] Cosm. Ind., *Top. christ*. XI.23, Greek text and English translation: *Wolska-Conus 1973* 354–355, English translation: *McCrindle* ^{2}*2010* 372.
[92] Cf. *Bollók – Koncz 2020*, 46, for the calculations based on the table in *De Romanis 2012* 101.
[93] For the detailed calculations and the market value of the calculated price, cf. *Bollók – Koncz 2020*, 46–47.
[94] Cf. *Cutler 1987* 434.

Mediterranean up to the later 6th century and that its procurement was expressly cheap compared to other historic periods.[95]

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.[96] 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,[97] 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.[98] 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.[99]

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

[95] *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.*

[96] *Cutler – Niewöhner 2016*.

[97] *Drauschke 2011b* 119, 122, Abb. 53.

[98] For a comprehensive overview, cf. *Power 2012*.

[99] Cf. *Bollók – Koncz 2020* 59, for the cited data and the literature.

availability of elephant ivory during the Roman period and Late Antiquity.[100] 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.[101] 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.[102] 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.[103] 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 6th–7th-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,

[100] *Bollók – Koncz 2020.*
[101] The relevant sources and the relevant literature were most recently covered by *Bollók 2019.*
[102] Cf. *Nechaeva 2014.*
[103] *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,[104] 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,[105] 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.[106] 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.[107] That these rings were highly cherished and

[104] Cf. *Bollók 2019* 232.

[105] As argued by *Szenthe 2013* 153–154, 162.

[106] 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*.

[107] 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,[108] repaired and restored in several spots,[109] 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.[110] 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.[111] 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[112] 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 Kölked, 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.[113]

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

[109] *Koncz – Tóth 2016*.

[110] *Bollók – Koncz 2020* 59–60.

[111] *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.

[112] 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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MIKLÓS TAKÁCS

EINIGE SIEDLUNGSARCHÄOLOGISCHE ÜBERLEGUNGEN ZUM INHALT DER BEGRIFFE „DORF“ UND „WEILER“ IM KONTEXT DES KARPATENBECKENS DES 10.–11. JAHRHUNDERTS – ZUR GRÄBERFELDTYPOLOGIE VON LÁSZLÓ KOVÁCS

Abstract: The aim of our study is to present and critically evaluate the thesis of László Kovács concerning the classification of the graveyards of the Carpathian Basin in the 10th and 11th centuries AD into chronological types. Our study has three main parts: after a brief history of previous investigations, we present the thesis of László Kovács, as well as the modifications to it, proposed by us. Since the thesis was published only in Hungarian, its parts and argumentation are discussed here in detail. The third part of our study analyses the hypothesis of László Kovács driven from his classification according to which the small and only temporarily used graveyards are to be interpreted as traces of little, farmstead-like settlements. In contrast, the cemeteries with a large number of graves must have belonged to villages. According to our opinion, this hypothesis, though it sounds very reasonable, will wholly be confirmed only when settlement archaeology of the given era will also yield a series of evidences, i.e. settlements firmly dated not only to the period of the 10th and 11th centuries, but also to the 10th century within that.

Stichwörter: Gräberfeldtypologie, Siedlungstypen, 10.–11. Jahrhundert, Karpatenbecken

Den konkreten Anlass für diese Analyse geben die neuen Arbeiten von László Kovács über die Zuordnung der Gräberfelder des Karpatenbeckens des 10.–11. Jahrhunderts zu zwei mit siedlungsarchäologischen Begriffen geprägten Gruppen.[1] Die Formulierung einer neuen These zur Klassifikation der betreffenden Gräberfelder sowie die Schaffung der Begriffe „Dorffriedhof“ und „Weilerfriedhof“ scheinen nämlich viele Probleme der früheren gräberfeldtypologischen Klassifikation zu lösen. Mehrere neue und heute noch schwer lösbare Fragen sollten aber eben wegen der Formulierung dieser neuen These und der darin eingeführten beiden neuen Begriffe gestellt werden. Der Standpunkt unserer Analyse ist ausdrücklich siedlungsarchäologisch. Die Betrachtung des Phänomens Siedlungsarchäologie[2] ist – von unserem Stadtpunkt aus – im Kontext der These von László Kovács unumgehbar. Deswegen möchten wir den Inhalt der beiden Begriffe nicht nur mit weiteren Untersuchungsaspekten zum Fundgut oder zur Bestattungszahl der Gräberfelder des betreffenden Zeitalters konfrontieren, sondern auch mit jenen Argumenten, die anhand einer Analyse der Siedlungen des 10.–11. Jahrhunderts formuliert werden können. Die Angemessenheit unserer siedlungsarchäologischen Herangehensweise kann nicht nur durch Kovács’ Begriffsbildungsmethode unterstützt werden, wo siedlungsarchäologische Kategorien für die Beschreibung von Gräberfeldtypen verwendet wurden, sondern selbst durch die Besiedlungsstruktur im 10.–11. Jahrhundert. Letztendlich waren zu dieser Zeit auch die Gräberfelder schon Teile des Siedlungsbildes der einzelnen Mikroregionen.

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1 Die erste Fassung seiner These siehe *Kovács 2013* 511–604. Es gibt auch eine zweite, kürzere Fassung, die aber kaum zitiert wird, *Kovács 2014* 180–184.

2 Zum Inhalt dieses *Terminus* siehe *Jankuhn 1977;* sowie *Scholkmann – Kenzler – Schreg 2016* 183–193, unter dem Begriff „Landschafts- und Umweltarchäologie.“

Forschungsgeschichte

Vor einer Analyse der These und der beiden neuen Begriffe der Gräberfeldtypologie ist es unverzichtbar, eine kurze Übersicht der Forschungsgeschichte zu geben. Zwei Schlussfolgerungen sind an diesem Punkt zu formulieren: Erstens die Argumente von László Kovács, mit denen er die These auf baute und die zwei neuen Begriffe schuf, sind nur in Kenntnis der Forschungsgeschichte der Gräberfelder des Karpatenbeckens im 10.–11. Jahrhundert zu verstehen. Zweitens soll auch berücksichtigt werden, dass die Diskussion über die Problematik der Aufstellung von Gräberfeldtypen in der ungarischen Archäologie größtenteils in ungarischer Sprache geführt wurde, so dass sie für alle Kollegen, die das Ungarische nicht beherrschen, schwer nachvollziehbar ist. Es liegen zwar mehrere gute Zusammenfassungen zur Ausarbeitung der Gräberfeldtypologie einschließlich einer Terminologie vor, diese sind jedoch, weil sie ebenfalls auf Ungarisch verfasst worden sind, ohne entsprechende Sprachkenntnis schwer zugänglich. Ein Überblick des besagten Diskurses in deutscher Sprache scheint allein schon deswegen kaum verzichtbar. Gleichzeitig sollte eine Literaturübersicht kurz und gut zusammengefasst werden, um damit der Analyse den größtmöglichen Raum zu geben.

József Hampels Tätigkeit soll im Forschungsüberblick an erster Stelle stehen, weil er als Erster eine Typologie für die Gräberfelder des 10.–11. Jahrhunderts ausgearbeitet hat. Um die Wende des 19. zum 20. Jahrhundert veröffentlichte er mehrmals seine Auffassung bezüglich der Gräberfeldtypen, und zwar mit teilweise unterschiedlichem Inhalt.[3] Er teilte die Gräberfelder mal in zwei, mal in drei Gruppen ein.[4] Bei der Typologisierung ging er allerdings stets von einer in seinem Zeitalter allgemein akzeptierten – wenn auch nur vermuteten – scharfen ethnischen Gliederung der Gräberfelder des 10.–11. Jahrhunderts aus. Wegen dieses Ansatzes identifizierte Hampel die kleinen Gräberfelder mit reichen Bestattungen in seiner Zweigliederung als Friedhöfe der Altungarn und die Gräberfelder mit einer großen Anzahl von ärmlichen Bestattungen als slawische Ruhestätten. Diese Gräberfeldtypen wurden mit den Buchstaben A bzw. B bezeichnet, und diese Benennung kommt auch heutzutage noch in der Fachliteratur vor.[5] Hampels dreigliedrige Klassifizierung unterschied sich von der beschriebenen zweigliedrigen durch die Einführung einer weiteren, dritten Gruppe C, die Gräberfelder umfasst, in denen sowohl Altungarn als auch Slawen ihre Toten bestatten haben sollen. Die spätere Forschung in Ungarn akzeptierte die Zweigliederung, während die dreigliedrige Aufteilung lediglich manchmal als Grundlage für weitere Analysen herangezogen wurde.[6] Auf der internationalen Ebene entwickelte sich die Idee der ethnischen Deutung der Gräberfelder des Karpatenbeckens im 10.–11. Jahrhundert eigenartig weiter. Sie wurde in der Regel als die Gräberfeldtypologie von Lubor Niederle und Jan Eisner bezeichnet.[7] Es steht zweifelsohne fest, dass Niederle – gleichzeitig mit Hampel – die großen Gräberfelder mit spärlichen Beigaben auch bezüglich des 10.–11. Jahrhunderts als slawisch beurteilte.[8] Tatsache ist auch, dass Eisner für derartige Gräberfelder den Begriff Bijelo Brdo-Kultur prägte.[9] Genau so wenig lässt sich aber bestreiten, dass Hampel zu gleicher Zeit wie Niederle ebenfalls eine Gräberfeldtypologie mit identischen Kategorien ausarbeitete.

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[3] *Hampel 1905* 819; *Hampel 1907* 9.

[4] Péter Langó hat sich mit dem Meinungsbildungsvorgang József Hampels mehrfach gründlich auseinandergesetzt, *Langó 2005* 220, Anm. 322; *Langó 2007* 142–145; *Langó 2017* 40–42, 46–48.

[5] *Hampel 1907* 9.

[6] *Fehér 1957* 7–58; *Fehér 1958* 269–318.

[7] *Niederle 1911–1927; Niederle 1923–1926; Niederle 1931; Eisner 1933* 260–282; *Eisner 1947* 136–140; *Eisner 1960* 189–210.

[8] *Niederle 1911–1927; Niederle 1923–1926; Niederle 1931.*

[9] Jan Eisner hat sich mehrmals zu dieser Thematik geäußert, *Eisner 1933* 260–282; *Eisner 1947* 136–140; *Eisner 1960* 189–210.

Bis 1962 war die Aufteilung der Gräberfelder des 10.–11. Jahrhunderts auf einer vermuteten ethnischen Basis die einzige verwendbare Gräberfeldtypologie. Seit diesem Zeitpunkt gibt es eine Möglichkeit der Wahl, da Béla Szőke ein ganz anderes, nämlich auf der sozialgeschichtlichen Rekonstruktion der betreffenden Gesellschaft basiertes System für die Kategorisierung der Gräberfelder des 10.–11. Jahrhunderts veröffentlichte.[10] Szőkes Klassifikation umfasste ebenfalls drei Kategorien: Gräberfelder der Führerschicht, der Mittelschicht bzw. des Gemeinvolkes. Das dreiteilige System verwandelte sich jedoch sozusagen gerade in der Praxis in eine zweiteilige Klassifikation. Da man äußerst selten die Gelegenheit hatte, Gräber der Führerschicht zu identifizieren, wurde das Einstufungssystem von Béla Szőke als eine Dichotomie – Gräberfelder der Mittelschicht vs. des gemeinen Volkes – dargestellt. Szőkes Klassifikationssystem fand in der internationalen Rezeption eindeutig Ablehnung. Es gibt fast keinen Forscher außerhalb Ungarns, der eine Gräberfeldtypologie auf sozialer Basis für die Analyse des Fundmaterials des 10.–11. Jahrhunderts angewandt hätte. Möglicherweise kann sich diese Situation zum Teil auch aus einem Missverständnis ergeben haben. Die Anhänger der ethnischen Deutung haben die Kategorie „Gemeinvolk“ von Béla Szőke so verstanden, als hätte Szőke für eine ungarische ethnische Interpretation der sog. Bijelo Brdo-Kultur plädiert.[11] Diese Möglichkeit des Missverständnisses wurde sogar dadurch verstärkt, dass Szőkes Monographie ausschließlich auf Ungarisch und ohne fremdsprachiges Resümee erschien.

1981 versuchte Jochen Giesler einen weiteren Aspekt in der zweiteiligen Klassifikation der Gräberfelder des 10.–11. Jahrhunderts durchzusetzen.[12] Seine Gräberfeldtypologie war sozusagen eine Bereicherung der ethnisch basierten, zweiteiligen Einstufung der Friedhöfe um einen chronologischen Aspekt zu Beginn des 20. Jahrhunderts. So wurden die kleinen Gräberfelder mit reichen Beigaben, die von Giesler als „altmagyarisch“ bezeichnet wurden, im Großen und Ganzen bis zu Beginn des 11. Jahrhunderts datiert, während für die Erscheinungszeit der großen Gräberfelder – bei Giesler die sog. Bijelo Brdo-Kultur – das dritte Drittel des 10. Jahrhunderts angesetzt wurde. Im Jahre 2020, fast vier Jahrzehnte nach dem Erscheinen der Gieslers Dissertation, kann man schon genau erfassen, welchen Beitrag die betonte Einbeziehung des chronologischen Aspekts in die zweiteilige ethnische Einstufung der Gräberfelder des 10.–11. Jahrhunderts zum besseren Verständnis des Phänomens geleistet hat. Für uns scheint es am wichtigsten, dass nur ein einziger Forscher, Željko Tomičić aus Kroatien, in seinen Analysen immer wieder auf die Postulate der Dissertation von Giesler Bezug nimmt.[13] Vielleicht auch wegen des Umstandes, dass die Reihengräberfelder, d.h. die sog. Bijelo Brdo-Kultur, in Slawonien chronologisch wirklich ab dem Beginn des 11. Jahrhunderts anzusetzen sind. Was die Forschungen in den anderen Ländern des Karpatenbeckens und besonders in der Slowakei betrifft, blieb die sozusagen klassische Form der Einstufung “altmagyarisch – Bijelo Brdo-Kultur“ auch nach dem Erscheinen der Dissertation im Gebrauch,[14] und zwar mit der Überzeugung, dass diese Gräberfeldtypologie nur und ausschließlich von Niederle und Eisner entworfen worden sei.

Was die Forschungen der letzten Jahrzehnte in Ungarn betrifft, sollen einige teilweise schon erwähnte Tatsachen ein wenig ausführlicher erörtert werden. Die sozialgeschichtlich geprägte Gräberfeldtypologie wurde von der überwiegenden Mehrheit der Forscher akzeptiert, die sich

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[10] *Szőke 1962* 27–84.

[11] Das markanteste Beispiel für dieses sozusagen weiterinterpretierte Verständnis der These von Béla Szőke stellt die Argumentation von Zdenko Vinski dar, *Vinski 1970* 45–92.

[12] *Giesler 1981* 3–167.

[13] Siehe z. B. *Tomičić 1990a* 85–105; *Tomičić 1990b* 111–189.

[14] Als Einzelbeispiel sei hier an einige wichtige Studien von Anton Točík erinnert, *Točík 1968; Točík 1971* 135–276; *Točík 1973* 351–356; *Točík 1979* 68–88.

mit der Analyse der Friedhöfe des 10.–11. Jahrhunderts beschäftigten.[15] Diese Tatsache ist schon allein anhand der „Akzeptanzquote“ der Terminologie von Szőke leicht wahrnehmbar. Die Analysen der konkreten Fundorte ergaben aber oft Resultate, die mit Szőkes Argumentation nur begrenzt vergleichbar waren. Es gab zu viele Sonderfälle und Ausnahmen. In den kleinen Gräberfeldern der Mittelschicht waren oft auch beigabenlose Gräber zu finden,[16] und demgegenüber enthielten die großen Friedhöfe des Gemeinvolkes oft auch Gräber mit einer beträchtlichen Menge von Beigaben: Schmuckstücken, Waffen oder aber Pferdegeschirr, die nach der Argumentation von Béla Szőke mit der gesellschaftlichen Mittelschicht zu verknüpfen waren.[17] Ferner wurde die Interpretation der Ausnahmen und Sonderfälle durch eine Erkenntnis der modernen mitteleuropäischen Gräberfeldanalysen erschwert: Die minutiöse Analyse mehrerer frühmittelalterlicher Gräberfelder in Deutschland, Österreich und der Schweiz wies darauf hin, dass es übertrieben ist, einen direkten Zusammenhang zwischen der Menge und dem Edelmetallgehalt der Beigaben sowie dem konkreten sozialen Status des Verstorbenen anzunehmen.[18] Die aufgezählten Faktoren haben in der ersten bzw. zweiten Dekade des 21. Jahrhunderts zu einer Erosion der Authentizität der Gräberfeldtypologie Béla Szőkes beigetragen.

Das war der forschungsgeschichtliche Stand am Anfang der 2010er Jahre, als László Kovács begann, eine umfangreiche Analyse der Chronologie der Gräberfelder des 10.–11. Jahrhunderts vorzunehmen. Sein Ziel bestand nicht nur in der Datierung einzelner Beigaben oder der Überprüfung des chronologischen Rahmens der „Friedhofsarchäologie“ der betreffenden Epoche, sondern auch in der Bestimmung der absoluten Zeitgrenzen für die Benutzung der einzelnen Gräberfelder,[19] und zwar unter Einbeziehung von Fundorten, wo diese Daten aufgrund der schon datierbaren Grabbeigaben genauer festzustellen waren. Seine Analysen ergaben nicht nur eine, sondern gleich zwei typologische Zuordnungen der Gräberfelder des 10.–11. Jahrhunderts. Im ersten Schritt teilte Kovács die Gräberfelder anhand der absoluten Daten ihrer Benutzung in acht chronologische Kategorien ein, und im zweiten Schritt stellte er aus diesen acht Typen zwei große Einheiten auf.[20] Der Ausgangspunkt zur Abgrenzung der beiden großen Einheiten war die Erkenntnis, dass sich die Gräberfelder anhand ihrer Benutzungsdauer zwei großen Kategorien zuordnen lassen. Demnach gibt es einerseits Gräberfelder mit einer kürzeren und andererseits Gräberfelder mit einer längeren Benutzungszeit. Kovács versuchte diese Dualität mit den Besonderheiten der Besiedlung im 10.–11. Jahrhundert zu erklären. In seiner Argumentation gibt es eine direkte Verbindung zwischen der Benutzungsdauer des Friedhofes und der Bestehensdauer der Siedlung der jeweiligen Population. Deswegen interpretiert er die kleinen Gräberfelder als Friedhöfe von kurzlebigen Weilern und die Gräberfelder mit größerer Gräberzahl als Friedhöfe langlebiger Dörfer. Mit dieser Argumentation wurde statt des ethnischen und sozialen Aspekts ein drittes, chronologisches Merkmal als Anhaltspunkt zur Einordnung der Gräberfelder des 10.–11. Jahrhunderts in zwei Gruppen eingeführt.

Die Veröffentlichung der These von Kovács und ganz konkret die neue, siedlungsgeschichtliche Deutung der zweiteiligen Kategorisierung der Gräberfelder des 10.–11. Jahrhunderts regten eine lebhafte Diskussion in der Archäologie der ungarischen Landnahmezeit an. Die Mehrheit der Diskutierenden äußerte sich im positiven Sinne zu einer siedlungsgeschichtlich orientierten Deutung der Diskrepanz zwischen den kleinen und großen Gräberfeldern des 10.–11.

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15 Siehe z. B. *Dienes 1972; Kiss 1975* 73–84; *Mesterházy 1983* 143–151; *Mesterházy 1981* 275–276; *Bálint 1976* 225–251; *Fodor 1984* 124–125; *Bálint 1991; Fodor 1996* usw.

16 *Révész 2008* 435–455; *Révész 2018* 57, 146, 179. usw.

17 *Szőke 1962* 27–84.

18 Die Entstehung einer neuen Denkweise zur sozusagen sozialgeschichtlichen Auswertung von Beigaben und insbesondere von Goldbeigaben wurde 1974 von Georg Kossak geprägt, *Kossak 1974* 3–33.

19 *Kovács 2013* 511–604, insbesondere 520–532.

20 *Kovács 2013* 511–604.

Jahrhunderts.[21] Es gab nur eine einzige wirklich scharfe Kritik, die aber nicht die These in ihrem ganzen Umfang, sondern lediglich ein einziges Element der Terminologie, die Benutzung des ungarischen *Terminus technicus* „Weilerfriedhof" (ung. *szállástemető*), betraf.[22] László Révész äußerte sich in seiner 2018 verfassten und 2019 verteidigten DSc-Dissertation an mehreren Stellen und detailliert zur These von Kovács.[23] Auch László Révész' Meinung zeigt eine positive Einstellung, selbst wenn er einige Änderungen in der Argumentation vorschlägt. So verwendet Révész zum Beispiel die Begriffe ‚Dorf- bzw. Weilerfriedhof', er versucht aber auch einige Elemente aus Béla Szőkes sozialgeschichtlichem Ansatz in diese siedlungsgeschichtlich konzipierte Gräberfeldkategorisierung zu integrieren.[24]

Analyse

Als Einführung unserer Analyse soll erneut ein Hinweis formuliert werden. Bei der Analyse soll der Siedlungsarchäologie ein besonderes Gewicht zukommen. Unsere Herangehensweise wird – hier soll es nochmals wiederholt werden – durch die These von Kovács selbst verifiziert. Die These enthält nämlich eine siedlungsgeschichtliche Schlussfolgerung, die aber aufgrund der chronologischen Analyse der Grabfunde und nicht anhand einer Analyse der Siedlungsfunde formuliert wurde.

Fragestellungen der Gräberfeldanalysen

Im ersten Schritt der Analyse soll kurz auf die Forschungsmethode von Kovács Bezug genommen werden. Seiner Argumentation liegt die chronologische Analyse einiger ausgewählter, gut datierbarer Gräberfelder zugrunde.[25] Es steht außer Zweifel, dass die kurze bzw. lange Benutzungsdauer der Gräberfelder bei den ausgewählten Beispielen gut beobachtet werden kann. Trotzdem stellt sich unumgänglich die Frage, ob sich die von Kovács beschriebene chronologische Situation auch an einem breiteren Datenbestand nachweisen lässt. Den Umfang einer zukünftigen Analyse zur Beantwortung dieser Frage ermöglicht die gründliche und in seiner DSc-Dissertation publizierte Materialsammlung von László Révész. Révész stützte sich in seiner Analyse von landnahmezeitlichen Gräberfeldern bzw. Gräberfeldteilen aus dem zentralen und östlichen Drittel des Karpatenbeckens auf die Daten aus 878 mit archäologischen Methoden irgendwie erforschten Fundorten.[26] Auf den ersten Blick scheinen diese Daten imposant zu sein. Wenn man aber die Zahl der vollständig ausgegrabenen und gut publizierten Gräberfelder bzw. Gräberfeldteile betrachtet, kommt man zu einem frustrierenden Ergebnis: Die Zahl der archäologisch vollständig ausgegrabenen und umfassend publizierten Gräberfelder ist in den zentralen und östlichen Teilen des Karpatenbeckens, wiederum Révész' Dissertation zufolge, nicht größer als 32. Das heißt, dass nur 3,64 Prozent der Gräberfelder für eine chronologische Analyse im Sinne der von Kovács formulierten Fragestellung wirklich geeignet sind. Diese Zahl kann vielleicht um einige Prozente erhöht werden, indem man das westliche Drittel des Karpatenbeckens mit einbezieht, da die Erschließung und Veröffentlichung der Gräberfelder

[21] Siehe z. B. *Oláh 2017* 107–128; sowie *Takács im Druck*.

[22] *Fodor 2015* 287–292. Es ist unseres Erachtens zwecklos, darüber zu diskutieren, wer Welches der zwei Synonymen ungarischen Wörter zur Benennung des Weilers („*szállás*" oder aber „*tanya*") mehr oder weniger sympathisch findet.

[23] *Révész 2018* 67–105, 650–688.

[24] *Révész 2018* 67–105, 650–688. Seltsamerweise findet man die kürzeste Beschreibung der Methode von László Révész in seiner Antwort auf die Gutachten der Opponenten seiner DSc-Dissertation, *Révész 2019* 2.

[25] *Kovács 2013* 511–604, insbesondere 520–532.

[26] *Révész 2018* 650.

des 10.–11. Jahrhunderts in der Slowakei sozusagen traditionell gut vorangeschritten ist.[27] Es ist aber kaum zu erwarten, dass das endgültige Ergebnis für das ganze Karpatenbecken mehr als 4,5-5 Prozent der Gesamtzahl der Fundorte, d. h. der archäologisch schon irgendwie erfassten Gräberfelder des 10.–11. Jahrhunderts, überschreiten könnte. Es ist sozusagen schon eine Frage des Forschungsoptimismus, ob man den Ergebnissen einer nur einen geringen prozentualen Anteil des Fundgutes umfassenden Analyse beschränkte Geltung zuweist oder aber – mit dem Zusatz „trotz aller Hindernisse" – Anerkennung entgegenbringt. Letztendlich gibt es viele andere, stichhaltige archäologische Analysen, die ebenfalls auf der Auswertung eines geringen Anteils der Funde oder Fundorte beruhen.

Für uns scheint deswegen nicht die relativ kleine prozentuale Anzahl der Daten mit der erforderlichen Qualität als größtes Hindernis, sondern die Art und Weise, wie Kovács in seiner Analyse der Benutzungsdauer der einzelnen Friedhöfe auf die nur ungenau datierbaren Fundorte reflektiert.[28] Er nimmt an, dass die geringe Zahl der Gräber an sich ein absoluter Indikator sei, der auch ohne chronologische Anhaltspunkte mit Sicherheit auf eine kurze Benutzungsdauer des Friedhofes schließen lässt. Damit rückte die geringe Gräberzahl zu einem chronologischen Merkmal auf, das man letztendlich sogar bei den archäologisch nicht vollständig erforschten Gräberfeldteilen einsetzen darf. Man sollte, unserer Meinung nach, zuerst alle vollständig ausgegrabenen Gräberfelder chronologisch auswerten, um eine solche These als Postulat zu formulieren. Bis dahin bleibt der hier untersuchte Gedanke lediglich eine Arbeitshypothese, die zwar genial konzipiert, aber trotzdem nur als Arbeitshypothese einzustufen ist, und zwar mit dem Vermerk, dass die genaue Erfassung der Zeitgrenzen der kleinen bzw. großen Gräberfelder noch weitere Arbeit erfordert, und dies nicht nur, weil bei der bisherigen Ausarbeitung dieser Zahlen auch die unvollständig ausgegrabenen Friedhöfe einbezogen worden sind, sondern vielmehr wegen einer gut nachvollziehbaren Unsicherheit der Zahlengröße. László Kovács ordnet die kleinen Gräberfelder seiner Gruppe IV. (*„magyar 10. századi szállási temetők"*, was am ehesten als „Weilerfriedhöfe der Ungarn des 10. Jahrhunderts" zu übersetzen ist) zu und gibt ihre Gräberzahl mit „gering, 25-50-70 Gräber" an.[29] Schon allein eine derart große Diskrepanz sollte darauf hinweisen, dass diese Gruppe auch an sich heterogen sein könnte. Das heißt, dass die Aufteilung in mehrere reale Gruppen als sinnvoll einzustufen ist.

Weitere schwer lösbare chronologische Probleme birgt eine Möglichkeit, die von Révész in seiner DSc-Dissertation mehrmals und akzentuiert behandelt wurde. Bei der chronologischen Auswertung der einzelnen Friedhöfe des 10.–11. Jahrhunderts muss man ständig vor Augen haben, dass sie nicht in einer, sondern in mehreren chronologisch voneinander getrennten Etappen benutzt wurden.[30] Was nicht nur damit erklärt werden kann, dass bei gewissen Gräberfeldern zwischen den einzelnen Etappen der Benutzung sogar mehrere Jahrzehnte ohne Bestattungen verstrichen sein können, sondern auch damit, dass in den verschiedenen Etappen der Friedhofsbenutzung Gräberfeldteile von sehr verschiedener Größe entstanden sein dürften. Daraus ergibt sich, dass ein „Gräberfeldkonglomerat" verschiedene Bestandsteile umfasst, die mal als Weiler-, mal aber als Dorffriedhöfe charakterisiert werden könnten – freilich nur, wenn sie isoliert, d. h. nicht im Kontext der übrigen chronologischen Phasen des Fundortes, entstanden wären.

Nach der Schilderung all dieser Einwände wollen wir mal unter die Lupe nehmen, ob und inwiefern die Daten der Gräberfelder für oder gegen die Authentizität der These von László

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[27] Das zeigt die Tatsache, dass die ersten Gräberfeldkataloge schon vor fünfzig Jahren publiziert wurden, *Točík 1968; Točík 1971* 135–276.

[28] *Kovács 2013* 520–532.

[29] *Kovács 2013* 520.

[30] Zuerst in der Auswertung von verschiedenen Fundorten so z. B. des Gräberfeldes von Oroszlámos-Vasútállomás, *Révész 2018* 146–147, dann auch zusammenfassend 677.

Kovács verwendbar sind. Hierfür wenden wir uns wiederum der DSc-Dissertation von László Révész zu. Révész benutzte, wie bereits dargelegt, die Kategorien Weiler- bzw. Dorffriedhof für die Analyse von 878 archäologisch erfassten, landnahmezeitlichen Gräberfeldern – d. h. Gräberfeldern aus dem 10. Jahrhundert – im zentralen bzw. östlichen Drittel des Karpatenbeckens, und neigte auch dazu, Elemente des sozialgeschichtlichen Ansatzes von Szőke in seine Analyse zu übernehmen. Seine Schlussfolgerung war trotz aller Hindernisse, die sich aus der unvollständigen Erschließung der einzelnen archäologisch erfassten Gräberfelder ergeben, eindeutig. Révész' Argumentation zufolge könne man in der ersten Hälfte des 10. Jahrhunderts bei den landnehmenden Ungarn vorwiegend mit Weilerfriedhöfen und demzufolge vorwiegend mit Weilern rechnen.[31] Die überwiegende Mehrheit der landnehmenden Ungarn soll also in der besagten Zeit in kleinen mobilen Weilern gelebt haben. Wegen dieser Dominanz der Weiler seien die landnehmenden Ungarn als eine relativ kleine und mobile *Ethnos* zu betrachten, die in erster Linie kleine und temporäre Siedlungen errichtet haben dürfte. Diese Schlussfolgerung ist unserer Meinung nach, so plausibel sie auch erscheint, zurzeit eine Arbeitshypothese, die es künftig noch mit weiteren Beweisen zu untermauern gilt. Erstens sollte man nicht vergessen, dass dieses sieldungsgeschichtliche Ergebnis auf einer Analyse beruht, die sich in erster Linie auf Friedhofsteile stützte und eine Methodologie anwandte, die für die Auswertung von vollständig ausgegrabenen Gräberfeldern ausgearbeitet worden war. Die zukünftigen Analysen sowohl von weiteren, archäologisch voll erschlossenen Gräberfeldern als auch von gut datierten Siedlungen sollen die Frage beantworten, ob dieser methodologische Einwand die Aussagekraft der Schlussfolgerung von Révész verringert oder nicht.

Ein großes Hindernis stellt auch der Mangel an Ergebnissen von Siedlungsgrabungen dar, der infolge einer negativen Überzeugung bezüglich der geringen Aussagekraft von Siedlungsgrabungen entstanden ist. Révész akzeptierte nämlich die Datierung in das 10. Jahrhundert nur für eine einzige Siedlungsgrabung seines Untersuchungsgebietes, für die Burg bei Edelény-Borsod.[32] Dieser Fundort[33] ist aber selbst in unvollständig ausgegrabenem Zustand viel größer als ein Weiler und widerspricht schon alleine deswegen der hier untersuchten These!

Siedlungsarchäologische Fragestellungen bezüglich der Problematik der Siedlungsgröße

Wie oben schon mehrmals hingewiesen, legt Kovács der Interpretation seiner Gräberfeldklassifikation siedlungsgeschichtliche Faktoren zugrunde. Deswegen muss seine These unbedingt mit den Ergebnissen der Siedlungsarchäologie konfrontiert werden. Es steht außer Zweifel, dass in erster Linie die Analyse der Siedlungsgrabungen und die Auswertung der Gräberfelder erst an zweiter Stelle zur Beantwortung der Fragen der Besiedlung im Allgemeinen und auch bezüglich des 10.–11. Jahrhunderts geeignet ist. Durch die wichtige Rolle, die die Erfassung der genauen chronologischen Endpunkte der einzelnen Fundorte in der These von Kovács spielt, wird allerdings die Siedlungsarchäologie unter den verwendbaren Datenbasen an die zweite Stelle hinter der Gräberfeldarchäologie verwiesen. Das Hauptargument der These von Kovács ist nämlich die Kontextualisierung der zeitlichen Diskrepanz zwischen der vermuteten kurzen Existenz der kleinen, in der These temporären und der größeren, in der These schon gewissermaßen ständigen Besiedlungsformen unter der Voraussetzung, dass die kleinen Siedlungen wahrscheinlich nur einige Jahrzehnte lang existierten. Man sollte also die archäologisch erfassten Siedlungen bzw. Siedlungsteile mit einer Genauigkeit von einigen Jahrzehnten datieren können, um den Wahrheitsgehalt der hier behandelten These mit Argumenten untermauert zu beurteilen. Wir müssen zugeben, dass die Siedlungsarchäologie des frühen Mittelalters weder in Ungarn noch

[31] *Révész 2018* 675, 679–680, 681–683.
[32] *Révész 2018* 439.
[33] Von den zahlreichen Publikationen zu der Siedlung siehe *Wolf 2008* 8–36; *Wolf 2019* Taf. 2.

in allen Nachbarstaaten des Karpatenbeckens in der Lage ist, eine derartige Fragestellung mit Argumenten untermauert zu beantworten.[34] Das vermag sie nicht einmal in der Slowakei, wo die mittelalterliche Siedlungsarchäologie zu den bevorzugtesten Bereichen der Archäologie gehört.[35] Es ist nämlich kaum zu leugnen, dass die diversen Kategorien der sog. Kleinfunde verschiedene Datierungsmöglichkeiten zulassen. Es gibt, wie allgemein bekannt, chronologisch „sensitive" oder aber „nicht sensitive" Fundtypen. Die Bruchstücke einer Keramik sind bezüglich des Frühmittelalters in der Regel nur für eine Datierung in einem breiten Zeitraum von anderthalb bis zu zwei Jahrhunderten geeignet,[36] mit der Anmerkung, dass es über den Datierungswert von speziellen Gefäßtypen auf „nur" ein Jahrhundert rege diskutiert und manchmal sogar debattiert wird.[37] Einen günstigen Fall stellen Metall- oder Knochenfunde als Teile von Gegenständen, Geräten, Schmuckstücken oder Waffen dar. Diese Funde ermöglichen bekanntlich die Übernahme des betreffenden Segments der „Grabchronologie". Man sollte aber nicht vergessen, dass in diesen Fällen nicht die ganze Siedlung, sondern nur ein einziges Objekt eine genauere („feinere") Chronologie bekommen kann, und ferner dass in den Siedlungen des 10.–11. Jahrhunderts äußerst selten Metallobjekte vorkommen.[38]

Die Siedlungsarchäologie der ungarischen Landnahmezeit wird aber meistens nur in den beiläufigen Konversationen erwähnt und als etwas Unwichtiges bezeichnet, da die Siedlungsarchäologen nur breite, rahmenhafte Datierungen für die Siedlungserscheinungen des 10.–11. Jahrhunderts erarbeiten können. Révész vertrat sogar in seiner Antwort auf die Opponentengutachten zu seiner Dissertation einen ähnlichen Standpunkt.[39] Jede Kritik enthält natürlich eine Spur Wahrheit, die Frage ist nur, wie groß diese ist. Die Aussagekraft des besagten Gutachtens wird durch den Umstand verringert, dass es in den letzten Jahren mehrere gründliche Analysen des Fundgutes auch der Siedlungsgrabungen des 10.–11. Jahrhunderts gab,[40] mit der leider nur begrenzt optimistischen Schlussfolgerung, dass sich Keramik nur auf einer regionalen Basis genauer datieren lässt. Demzufolge sollten für die vielen einzelnen Regionen jeweils separate genauere chronologische Schemen ausgearbeitet werden. Die ungarische Siedlungsarchäologie begab sich mit diesen Ergebnissen bezüglich ihrer Datierungsmöglichkeiten auf den Weg, auf dem sich die Datierungsproblematik der tschechischen und polnischen Siedlungsarchäologie gerade befindet.[41] In diesen beiden ostmitteleuropäischen Ländern, in denen die archäologische Analyse von Siedlungen traditionell sehr entwickelt ist, werden Keramiken im überregionalen Ansatz nur rahmenhaft und mit einer Genauigkeit von anderthalb bzw. zwei Jahrhunderten datiert. Es gibt allerdings auch Mikroregionen mit mehreren ausgegrabenen und ausgewerteten Siedlungsüberresten, wo die Kriterien für eine genauere Datierung schon ausgearbeitet vorliegen.

Die neuen Analysen zur Siedlungskeramik des 10.–11. Jahrhundert sind ein Zeugnis dafür, dass die negative Beurteilung der Siedlungsarchäologie in der Forschung der Landnahmezeit einseitig und deswegen verfehlt ist. Obwohl die Daten der Siedlungsgrabungen aufgrund der bisherigen Analysen wegen ihrer rahmenhaften Datierungen für die Beurteilung der These von László Kovács zurzeit nicht verwendbar sind, ist es nicht sinnvoll, eine zukünftige Möglichkeit der Benutzung dieser Datenbasis auszuklammern. Es gibt nämlich eine Möglichkeit zur

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[34] *Takács 2012a* 145–166.

[35] Als einziges Beispiel führen wir die folgende Studie an, *Ruttkay 1992* 176–184.

[36] Siehe dazu *Takács 2012a* 145–166.

[37] Die typologische Gliederung der Keramik des 10.–11. Jahrhunderts, sowie die Darstellung einiger Diskussionen, *Takács 1997* 205–223; *Takács 2012b* 405–500; *Merva 2011* 179–243.

[38] *Langó 2010* 257–285.

[39] *Révész 2019* 5.

[40] Kurze Darstellung unseres Forschungsprojektes zur Analyse der siedlungsarchäologischen Funde aus dem 8.–11. Jahrhundert, *Takács 2019* 255–269.

[41] *Čapek – Holata 2017* 267–320, insbesondere 271.

zukünftigen Verwendung der naturwissenschaftlichen Datierungsmethoden, die vielleicht eine Datierung auf konkrete Jahrzehnte ermöglichen könnten.[42] Man sollte im ersten Schritt ganz gezielt die Daten jener Siedlungsgrabungen sammeln, wo landnahmezeitliche Kleinsiedlungen in ihrem ganzen Umfang archäologisch erschlossen wurden, und wo es auch organische Überreste – z. B. Tierknochen – gibt, die für eine Radiokarbon-Analyse geeignet sind. Diese Arbeit wird durch den Umstand massiv beschleunigt, dass die großflächigen Notgrabungen des letzten Jahrhunderts zur Auffindung und vollständigen Erschließung von mehreren kleinen Siedlungen des 10.–11. Jahrhunderts führten.

Es lohnt sich zu prüfen, inwieweit sich die These von László Kovács mit der Siedlungsarchäologie des 10.–11. Jahrhunderts und insbesondere mit den Siedlungsstruktur-Rekonstruktionen vergleichen lässt. Die ersten Schritte hat schon István Méri, der Begründer der mittelalterlichen Siedlungsarchäologie im modernen Sinne des Wortes, am Anfang der 1950er Jahre getan.[43] Während der Geländebegehungen bei Tiszalök, wo er die größte siedlungsorientierte Notgrabung seiner Epoche durchführte, erkannte er, dass die archäologischen Spuren der árpádenzeitlichen Siedlungen zwei unterschiedlichen Größenstufen angehören.[44] Die Siedlungsarchäologen der 1950er bis 80er Jahre erweiterten Méris Ausgangspunkt um zahlreiche Details.[45] Die Auswertung der Geländebegehungen bot gleichzeitig eine Möglichkeit zur Untersuchung der Strukturen der landnahmenzeitlichen Besiedlung. Das Forschungsprogramm des Archäologischen Instituts der UAW zur archäologischen Erforschung von mehreren Mikroregionen des Komitates Békés trug besonders viel dazu bei, nicht nur neue Daten, sondern auch neue Gesichtspunkte in die Diskussion einzubeziehen. Dénes B. Jankovich nahm in einer zusammenfassenden Auswertung auch für die frühe Periode der Árpádenzeit (nach seinem Datierungssystem also für das 10.–11. Jahrhundert) eine massive Existenz von kleinen, weilerartigen Siedlungen an.[46] Die Bedeutung der kleinen Siedlungen nahm auch dadurch zu, dass Ilona Valter in ihrer Analyse der Ergebnisse der Geländebegehungen in der Region Bodrogköz den kleinen Siedlungen eine wichtige Rolle beigemessen hatte.[47] Sie plädierte nämlich dafür, dass es vor dem Ende des 13. Jahrhunderts in der Region keine „richtigen Dörfer“, sondern ausschließlich kleine, weilerartige Siedlungen gab. Es war eine gemeinsame Schwachstelle der Analysen, dass die Siedlungsgröße, d. h. die Zahl der Siedlungsobjekte, nur anhand der Oberflächenfunde ermittelt wurde, was natürlich eine gewisse prozentuale Ungenauigkeit in sich birgt.

Die großflächigen Rettungsgrabungen boten eine Gelegenheit, diese Kontroverse zu überwinden. József Laszlovszky war der erste, der die kleinen, weilerartigen Siedlungen schon im mittleren Drittel der 1980er Jahre nicht nur anhand ihrer Oberflächenfunde, sondern auch anhand der ausgegrabenen Objekte untersuchen konnte.[48] Das Ergebnis seiner auch mit naturwissenschaftlichen Methoden unterstützten Analyse ist auch heutzutage noch eindeutig und stichhaltig. Die Viehzucht muss eine existentielle Rolle im Leben dieser kleinen Siedlungen gespielt haben. Die Analysen der Fundorte in der Gemarkung haben aber ein auch heute noch unumgängliches Problem der archäologischen Erschließung der kleinen, árpádenzeitlichen Siedlungen gezeigt. In den Siedlungen dieses Typs wurde stets nur eine geringe Anzahl von sog. Kleinfunden, in der Regel Keramik, gefunden. Die kleinen Siedlungen kann man deswegen

[42] Der Erfolg des Einsatzes von C14-Daten zur Datierung von frühmittelalterlichen Siedlungsgrabungen in Kroatien und Slowenien sollte wegweisend sein, *Kerman 2008* 79–88; *Minichreiter – Marković 2012* 172.

[43] *Méri 1952* 58, sowie 57, Abb. 1.

[44] Um auf die Möglichkeit von Fehlinterpretationen hinzuweisen, soll hier betont werden, dass die Datierung „árpádenzeitlich“ im chronologischen System Méris für das 11.–13. Jahrhundert steht.

[45] Siehe z. B. *Kovalovszki 1957* 33.

[46] *Jankovich – Szatmári 2013* 632, 637–639; *Jankovich 1985* 286; *Jankovich 2010* 888–889.

[47] *Valter 1964 131–141.*

[48] *Laszlovszky 1986a* 227–257; *Laszlovszky 1986b* 131–153.

oft noch schwieriger datieren als die größeren „dorfartigen“ Siedlungen. 1993 äußerte sich auch der Verfasser dieser Studie in seiner CSc-Dissertation zur Problematik der árpádenzeitlichen Siedlungsstruktur in der westungarischen Region der Kleinen Tiefebene.[49] Den wichtigsten Teil der Datenbasis unserer Analyse stellten die Notgrabungen an der Autobahn M1 dar. Wir haben aufgrund der Kartierungen der Siedlungserscheinungen der einzelnen Fundorte ein dreiteiliges Siedlungssystem rekonstruiert. Es gab nämlich nicht nur Grabungen, bei denen Siedlungen mit Dutzenden von Siedlungsobjekten entdeckt wurden, oder aber solche, wo nur einige Siedlungserscheinungen dokumentiert werden konnten, sondern es gab auch einen dritten Typ: Siedlungsgrabungen mit Objektanzahlen, die zwischen denen der beiden vorgenannten Kategorien liegen. Es gab nur eine offene Frage in der rekonstruierten dreiteiligen Siedlungsstruktur, die aus dorfähnlichen bzw. weilerähnlichen Siedlungen sowie Weilergruppen bestand. Da die Siedlungen der zweiten und dritten Siedlungskategorie in das 12.–13. zu datieren waren, blieb die Frage offen, ob die drei Siedlungstypen schon im 10.–11. Jahrhundert in der untersuchten Region vorhanden waren oder nicht. Aus dem frühesten Abschnitt der Árpádenzeit haben wir zwei Siedlungen ausgegraben, wo schon allein die Zahl der Siedlungsobjekte die Größenordnung eines Weilers überschreitet. Die weiteren Analysen der Siedlung von Ménfőcsanak-Szeles-dűlő[50] zeigten, dass es sich um eine Siedlung handelt, die ab dem 11. Jahrhundert zu datieren ist und dass der Horizont des 10. Jahrhunderts leider nicht vorhanden ist. Demgegenüber war die Siedlung am Fundort Lébény-Bille-domb langlebiger, da ihre verschiedenen Horizonte vom 9. bis ins 11. Jahrhundert datiert werden konnten.[51]

Bezüglich der Daten aus den Nachbarländern sollen hier die Resultate von drei Rettungsgrabungen kurz zusammengefasst werden. Bei den Rettungsgrabungen an der Autobahn „Slavonica“ in Nordostkroatien wurde in der Gemarkung des Dorfes Beketinc/Beketinci (Kroatien) auch eine kleine, weilerartige Siedlung erschlossen, die nur aus drei Siedlungsobjekten bestand und aufgrund der C14-Analysen an die Wende des 10.–11. Jahrhunderts datierbar war.[52] Es ist ferner zu bemerken, dass sowohl die Keramik dieser Siedlung als auch die der nächsten zu erwähnenden Siedlungsgrabung aus dem Murgebiet in die Richtung der zentralen Teile des Karpatenbeckens zeigen.[53] Es wurde nämlich aus Alsólendva/Lendava-Nova tabla 2 (Slowenien) die Keramik, aber auch der Grundriss einer árpádenzeitlichen Siedlung publiziert,[54] und zwar mit einer Phase aus dem frühen Abschnitt der betreffenden Epoche. Es wurden auch hier C14-Analysen durchgeführt, und eines der Ergebnisse weist auf das 10. Jahrhundert hin. Wegen dieser Daten soll mit besonders hervorgehoben werden, dass die bloße Zahl der Siedlungserscheinungen dieses Fundortes auf eine Siedlung hinweist, die den Umfang eines Weilers sicherlich überschreitet.

In Bajcs/Bajč, Fundstätte Medzi kanalmi, hat das Team von Matej Ruttkay einen großen Siedlungskomplex aus dem frühen Mittelalter ausgegraben.[55] Sein Horizont IV. wurde zwischen der zweiten Hälfte des 9. und dem 11. Jahrhundert datiert. Obwohl diese Rahmendatierung für die Beurteilung der im vorliegenden Beitrag untersuchten Problematik natürlich viel zu breit ist, erweisen sich manche Schlussfolgerungen trotzdem als aufschlussreich. In dieser Phase ist

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[49] *Takács 1993*. Die Ergebnisse der Dissertation bezüglich der Siedlungsstrukturen wurden in den folgenden Abhandlungen resümiert: *Takács 1996* 197–217; *Takács 1998* 181–191; *Takács 2000* 240–251; *Takács 2005* 279–280.

[50] *Merva 2018* 3.

[51] *Takács 1996* 197–217; *Takács 1998* 181–189.

[52] *Minichreiter – Marković 2012* 159–173, die nicht nummerierte Tabelle mit den C14-Resultaten auf Seite 172.

[53] So wurde z. B. in Beketinci ein Tonkesselfragment gefunden, *Minichreiter – Marković 2012* 165, Abb. 102.

[54] *Kerman 2008* 79–88.

[55] *Ruttkay 2003* 245–322.

eine Verringerung des besiedelten Areals zu beobachten.[56] Nur am nördlichen, erhöhten Teil des Fundortes waren Siedlungserscheinungen aus diesem Zeitraum auffindbar. Sie bilden zwei Gruppen, die von Matej Ruttkay als zwei kleine Weiler gedeutet wurden. Zwischen diesen Weilern konnte man aber selbständige Lehmöfen bzw. Vorratsgruben beobachten, was am wahrscheinlichsten damit zu erklären ist, dass die zwei Siedlungsstätten ein gemeinsames Areal für die Lagerung der Vorräte bzw. fürs Kochen hatten. Demzufolge sollten die zwei weilerartigen Siedlungen als Teile einer größeren Siedlung interpretiert werden.[57]

Eine ganz neue Klassifikation der Siedlungstypen der Árpádenzeit hat unlängst Tibor Ákos Rácz in seiner 2016 verteidigten PhD-Dissertation ausgearbeitet.[58] Er stützte sich in seiner Analyse hauptsächlich auf die Siedlungsgrabungen im südöstlichen Abschnitt der Autobahn M0. In der südlichen Gemarkung der östlichen Hälfte der Stadt Budapest wurden auch die Árpádenzeit betreffend mehrere, außerordentlich großflächige Siedlungsgrabungen durchgeführt, die auch ein gutes Datenmaterial für die Analyse der Problematik der árpádenzeitlichen Siedlungstypen lieferten. Im Falle dieses Datenmaterials war es sehr günstig, dass der Horizont des 10., des 11.–12. beziehungsweise des 13.–14. Jahrhunderts chronologisch gut abgegrenzt werden konnte. Tibor Ákos Rácz nimmt für die Siedlungsstruktur dieser drei Zeitabschnitte eine eigenartige, wachsende Konzentration der Gruppen von Siedlungsobjekten als Hauptmerkmal an, die erst im 13.–14. Jahrhundert die Entstehung von „richtigen“ Dörfern ergab. Rácz interpretiert diese Fundgruppen als Einzelhöfe. Die Lage der Siedlungsorte des 10. Jahrhunderts in der Gemarkung von Maglód und Ecser weist gemäß dieser Interpretation auf Streusiedlungen hin, wobei es kaum zu entscheiden ist, ob die Teile der weilerartigen Besiedlungen allein, d. h. als Einzelhofsiedlungen, oder aber als Teile von größeren Siedlungseinheiten zu betrachten sind. Für das 11.–12. Jahrhundert ist schon eine größere Konzentration dieser „Siedlungskerne“ charakteristisch, und diese Konzentration von weilerartigen Siedlungen mündete – wie schon hingewiesen – in die Entstehung von richtigen Dörfern. Damit entstand ein klares Modell für die Deutung der „Siedlungsentwicklung“ der Árpádenzeit. Trotz einer erfolgreichen Behandlung der Problematik aufgrund der verarbeiteten Quellenbasis stellt sich die Frage, ob und inwieweit sich das beschriebene Modell verallgemeinern lässt. Ein gewisses Misstrauen erweckt schon das behandelte Fundmaterial selbst. Rácz untersuchte auch den Fundort Vecsés 67, wo – laut seiner eigenen Befundinterpretation – eine kleinere Konzentration von Siedlungsobjekten bereits im 10. Jahrhundert dokumentiert wurde.[59] Gleichzeitig waren auch Spuren von weilerartigen Behausungen in der weiteren Umgebung dieses als Schmiede interpretierten Gebäudeüberrestes und seiner Nebenbauten zu beobachten. Rácz selbst beschrieb das Vorkommen als einen intensiv bewohnten „Siedlungskern“. Die Ausnahmen dieser Art sprechen – selbst aufgrund von Daten aus dem Untersuchungsgebiet des Verfassers der betreffenden These – eher gegen als für eine Allgemeingültigkeit von leicht deutbaren, linearen Modellen.

Einen weiteren fraglichen Aspekt der Analyse von Rácz stellt für uns ein bestimmter Punkt seiner Terminologie dar. Er verwendet ganz richtig die *Termini* „weilerartig“ und „dorfartig“ für die Beschreibung der analysierten kleineren oder größeren Siedlungseinheiten. Seiner Meinung nach sind aber alle *Termini technici* dieser Art im Begriff Dorf summierbar, da letztendlich alle ländlichen Siedlungen sogar in schriftlichen Quellen der Árpádenzeit unter dem Begriff Dorf (lat. *villa*) vorkommen.[60]

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[56] *Ruttkay 2003* 299.

[57] *Ruttkay 2003* 299.

[58] Es ist sehr erfreulich, dass die Dissertation innerhalb kurzer Zeit als Monographie erschienen ist, *Rácz 2019*. Man kann seine Thesen auch in einem separaten Beitrag finden, *Rácz 2014* 161–269.

[59] *Rácz 2014* 165; *Rácz 2019* 42–48.

[60] *Rácz 2014* 167–167; *Rácz 2019* 138–144.

An diesem Punkt unserer Betrachtung ist es unentbehrlich, einige Daten und Deutungen der historischen Analysen des Phänomens „mittelalterliches Dorf“ kurz darzustellen, wobei wir uns nur auf jene Studien konzentrieren, die als Anhaltspunkte für eine Auseinandersetzung mit der These von László Kovács geeignet sind. Tibor Ákos Rácz beruft sich bei der Erarbeitung seiner Nomenklatur auf die synthetisierenden Werke von István Szabó.[61] Szabós zwei Monographien gehören in Ungarn wirklich zu den wichtigsten Werken der anhand schriftlicher Quellen erfolgenden Erforschung mittelalterlicher Dörfer. Es lohnt sich, hier einige Elemente der Beweisführung in den Analysen von Szabó kurz zusammenzufassen, und zwar auch deswegen, weil diese nur und ausschließlich in ungarischer Sprache erschienen und somit auf internationaler Ebene – für Forscher, die das Ungarische nicht beherrschen – unzugänglich sind. Nach dieser Auffassung führten die Ungarn zur Zeit ihrer Landnahme eine sog. halbnomadische Lebensweise, wo die mobile Viehhaltung schon mehrere Elemente des Ackerbaus und dadurch einer sesshaften Lebensweise integrierte.[62] Eines dieser Elemente sollen auch saisonal benützte, weilerartige Siedlungen sein, die regelmäßig in der Umgebung von verschiedenen Gewässern errichtet wurden. Diese kleinen, weilerartigen Siedlungssplitter sollen, ebenfalls nach der These von Szabó, die Kerne des späteren Dorfsystems repräsentieren.[63] Man kann also sagen, dass sich die Argumentation von Rácz in umfassender Weise auf die These von Szabó stützt. Der einzige große Unterschied ist die Verwendung jeweils andersartiger Datenbasen: Für Szabó stellten die Urkunden des 11. Jahrhunderts, für Rácz dagegen die Daten der Siedlungsgrabungen am südlichen Abschnitt der Autobahn M0 die zur Formulierung der betreffenden These geeigneten Quellen dar. Die Untersuchungen der beiden Forscher lassen sich in der folgenden Aussage resümieren: Es gab eine klar definierbare Richtung in der „Dorfentwicklung“ (aus dem Blickwinkel der beiden Forscher wäre es gerechtfertigt, diesen *Terminus* ohne Anführungszeichen zu verwenden). Am Anfang dieser Entwicklung standen weilerartige Siedlungen, die aus zerstreuten Einzelhöfen bestanden.

Die Allgemeingültigkeit der These ist mit einem Hinweis auf die Problematik der Ausnahmen zu beurteilen. István Szabó sammelte in den sehr spärlichen Urkunden und sonstigen schriftlichen Quellen des 11. Jahrhunderts Beispiele für ländliche Siedlungen, in denen die Zahl der Bevölkerung die Größe eines Weilers überschritt.[64] Zwei Fragen sind hier sozusagen unausweichlich: Erstens ob und inwiefern sich dieses Datenmaterial verallgemeinern lässt – unter Berücksichtigung des Umstandes, dass die Mehrheit der Daten über größere ländliche Siedlungen aus den Gründungsurkunden von Klöstern des 11. Jahrhunderts stammt. Zweitens stellt sich die Frage, ob die Existenz dieser größeren Siedlungen auch auf die Verhältnisse des 10. Jahrhunderts zurückbezogen werden kann. Es ist sinnvoll, an diesem Punkt das archäologische Fundmaterial wieder ins Blickfeld der Analyse zu rücken und kurz an die oben schon erwähnten Ausnahmen zu erinnern. Wie bereits hingewiesen, hat die Grabung von Edelény-Borsod-vára[65] einen Siedlungsteil mit einer Ausdehnung ergeben, die selbst in der ersten Grabungsphase die Größe eines Weilers weit überschreitet, wobei gut die Hälfte des Fundortes noch nicht einmal erforscht ist. Es muss auch vermerkt werden, dass es sich hier um eine Siedlungsgrabung handelt, deren erste Phase auch nach der Ansicht von Kollegen in das 10. Jahrhundert zu datieren ist, die die Möglichkeit, eine Siedlung chronologisch in das 10. Jahrhundert zu setzen, äußerst kritisch

[61] *Szabó 1966; Szabó 1969.*

[62] *Szabó 1966* 11–13.

[63] *Szabó 1966* 14–35.

[64] Da die Urkunden des 11. Jahrhunderts nur die Zahl der männlichen Dienstleute der einzelnen Siedlungen angeben, stellt diese Angabe den einzigen Ausgangspunkt für die Rekonstruktion der Bewohnerzahlen und dadurch der Größe der Siedlungen dar, *Szabó 1966* 190–193.

[65] Von den zahlreichen Publikationen zu der Siedlung siehe *Wolf 2008* 8–36; *Wolf 2019* Taf. 2.

behandeln. Ferner hat, wie bereits erwähnt, auch Ákos Tibor Rácz selbst einen „Dorfkern“ aus dem 10. Jahrhundert, den Fundort „Vecsés 67“, analysiert.[66]

Wegen dieser Ausnahmen scheint es sinnvoll, die oben dargelegte These der Dorfentwicklung um Elemente zu erweitern, die den Gedanken einer einzigen, sozusagen „linearen“ Dorfentwicklung mit divergenten Elementen ergänzen. Die Existenz von größeren, sozusagen dorfartigen Siedlungen schon im 10. oder 11. Jahrhundert wirft die Möglichkeit auf, dass schon seit der ungarischen Landnahme nicht nur ein, sondern gleich zwei Siedlungstypen vorhanden waren. Es änderte sich „lediglich“ ihre proportionale Verteilung: Die größere, dorfartige Variante war in den frühen Zeiten aller Wahrscheinlichkeit nach ein seltener Siedlungstyp, der erst im 12. Jahrhundert öfter aufzutauchen begann. Es ist nahezu schon symptomatisch, dass György Györffy in seiner großzügigen Zusammenfassung über Stephan I. (den Heiligen) und seine Zeit gleich zwei ländliche Siedlungstypen: „Weiler“ und „Dorf“ erwähnt.[67] Györffys Untersuchungen sind dafür bekannt, dass in der Meinungsbildung dieses berühmten Historikers neben der Datenanalyse auch die Intuition eine große Rolle spielte. Auf jeden Fall treffen seine aufgrund von intuitiven Prämissen formulierten Ideen seltsamerweise ziemlich oft zu. Die Annahme von mehreren Arten ländlicher Siedlungen gehört aller Wahrscheinlichkeit nach in diese Gruppe.

Wegen der oben angeführten Ausnahmen sowie der historischen Analysen, die mit zwei Siedlungstypen rechnen, scheint es für uns nicht sinnvoll, alle ländlichen Siedlungen unter einem einzigen Fachbegriff zu behandeln, das heißt ausschließlich als Dorf zu bezeichnen. Der Wortgebrauch der Urkunden widerspiegelt bei der Bezeichnung der ländlichen Siedlungen die Sichtweise des Besitzers. István Szabó machte die Siedlungsforscher darauf aufmerksam, dass es bei detaillierteren Beschreibungen, in denen nicht nur die einzelnen Dienstleute bestimmter ländlicher Siedlungen aufgezählt waren, regelmäßig auch die äußeren Grenzen ihrer Wohnorte angegeben wurden.[68] Im 11. Jahrhundert wurden nämlich in der Regel Dienstleute verschenkt, und für die Besitzer war es wichtig, ihren Aufenthalt zu kennen. Da das Siedlungsbild zu dieser Zeit noch sozusagen fließend war und die Möglichkeit der raschen Herausbildung oder des Umzugs kleiner Siedlungselemente einschloss,[69] bot die Bestimmung der äußeren Grenzen der einzelnen Siedlungseinheiten die beste Methode zur topographischen Lokalisierung dieser Dienstleute, unabhängig davon, ob sie in einer oder mehreren Siedlungseinheiten innerhalb der jeweiligen Außengrenzen lebten. Für die Erforscher der Siedlungsstruktur könnten Informationen über die Zahl, Größe und Struktur dieser Siedlungseinheiten von großer Bedeutung sein, deshalb ist es zweckmäßig, bei ihrer Benennung nicht nur einen einzigen, alles ausgleichenden Terminus technicus zu verwenden. Weil die beiden *Termini*, die für die Beschreibung der kleineren bzw. größeren Siedlungseinheiten in den späteren Epochen des Mittelalters zur Benennung von Siedlungstypen mit ganz konkreten Parametern benützt wurden, und weil diese Parameter bezüglich des 10.–11. Jahrhunderts äußerst fraglich nachzuweisen sind, scheint es vernünftiger, die Begriffe „weilerartige“ bzw. „dorfartige“ Siedlung zu verwenden.

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[66] *Rácz 2014* 165; *Rácz 2019* 42–48.

[67] *Györffy 1983a* 397–409, und insbesondere die nicht nummerierte Tabelle auf Seite 401. Dieselbe Argumentation in deutscher Sprache, *Györffy 1983b*.

[68] *Szabó 1966* 28–29.

[69] *Szabó 1966* 30–33.

Fazit und Schlussfolgerungen

Wie bereits mehrmals hervorgehoben, formulierte László Kovács am Anfang der 2010er Jahre ein neues Deutungssystem für die Klassifikation der Gräberfelder des 10.–11. Jahrhunderts,[70] das wie seine Vorgänger letztendlich aus zwei Kategorien bestand, die schon in ihren Namen „Weilerfriedhof“ bzw. „Dorffriedhof“ auf eine siedlungsorientierte Interpretation hinweisen. Die Formulierung eines zweiteiligen Systems war eigentlich das Endergebnis einer Analyse, die zunächst acht Kategorien für die Klassifizierung der Gräberfelder aufgrund der Chronologie ihrer Benutzung aufstellte. Die Veröffentlichung der These und besonders der Deutung der zweigliedrigen Kategorisierung erweckte eine rege Diskussion, und die Mehrheit der Fachleute äußerte sich positiv zu diesem Forschungsergebnis. Kovács' These ist auch unserer Meinung nach genial, aber trotzdem bloß als Arbeitshypothese einzustufen. Diese Einstufung resultiert daraus, dass sich nur ein geringer Teil, ca. 5 bis 6 Prozent der Gräberfelder des 10.–11. Jahrhunderts, für die exakte Bestimmung von Zeitdaten zum Beginn bzw. Ende der Bestattungen eignet. Kovács untersuchte jedoch nicht alle Gräberfelder dieser ca. 5 Prozent ausmachenden Gruppe, sondern nur einige ausgewählte Beispiele. Für eine Verifizierung seiner These wäre es unentbehrlich, alle Gräberfelder des 10.–11. Jahrhunderts mit gut datierbaren Zeitgrenzen ihrer Benutzung systematisch zu erforschen.

Zweitens steht es zweifelsohne fest, dass sich Kovács in der zweifachen Darstellung seiner These nur minimal auf die Ergebnisse der siedlungsarchäologischen Forschungen beruft, obwohl die betreffende These die unterschiedliche Größenordnung (Gräberzahl) der Gräberfelder des 10.–11. Jahrhunderts mit Siedlungstypen unterschiedlicher Größe zu erklären sucht. Aus diesem Grund mussten einige Aspekte dieser Forschungen in unserer Studie unbedingt kurz zusammengefasst werden. Tatsache ist, dass die archäologischen Untersuchungen der Siedlungsgröße bzw. der Siedlungsstruktur der ländlichen Siedlungen der Árpádenzeit seit Anfang der 1950er Jahre, d. h. seit dem Beginn der siedlungsarchäologischen Grabungen, mit modernen Grabungstechnologien betrieben werden. Die außerordentlich großflächigen Rettungsgrabungen boten eine neue Möglichkeit für die einschlägigen Untersuchungen an, da an diesen Grabungsorten nicht nur die Oberflächenfunde, sondern auch die erschlossenen Siedlungsobjekte ausgewertet werden können. Die Analysen der jeweiligen Phasen der großen Rettungsgrabungen zum 10.–11. Jahrhundert zeigten eine deutliche Dominanz der kleinen, weilerartigen Siedlungen, obwohl man schon für das 10. Jahrhundert mit Sicherheit die Existenz von größeren dorfartigen Siedlungen annehmen kann. Es gibt also einen Grund dafür, siedlungsgeschichtliche Kategorien für die Deutung der verschiedenen Größen der Gräberfelder auszuarbeiten. Weitere Aussagen dazu werden freilich erst in der Zukunft aufgrund von siedlungsarchäologischen Funden bei Vorliegen einer präziseren Chronologie möglich sein. Es muss allerdings deutlich genug gesagt werden, dass die Ausarbeitung einer derartigen Chronologie durch weitere Analysen der verschiedenen Befundtypen und besonders der Keramik kaum zu erwarten ist. Die „durchschnittlichen“ Funde der Siedlungsgrabungen sind in der Regel nur rahmenhaft datierbar. Mit einem in der Siedlungsarchäologie der deutschsprachigen Länder verbreiteten Ausdruck heißt das: Sie sind chronologisch nicht sensitiv. Es gibt aber naturwissenschaftliche Methoden, die die Grenzen unseres Wissens vielleicht auch bezüglich der Feinchronologie der frühárpádenzeitlichen Siedlungen erweitern könnten.

Am Ende der Schlussfolgerungen darf eine Frage keinesfalls unerwähnt bleiben: Ist es überhaupt sinnvoll, eine Gräberfeldtypologie auszuarbeiten, die nur zwei Kategorien enthält? Wie oben schon hingewiesen: Auch József Hampel hat in einer der frühen Fassungen seiner

[70] Die erste Fassung dieser These, *Kovács 2013* 511–604. Es gibt auch eine zweite, kürzere Fassung, die aber kaum zitiert wird, *Kovács 2014* 180–184.

Gräberfeldtypologie drei Kategorien ausgearbeitet.[71] Darüber hinaus bestand auch die gräberfeldtypologische Klassifikation von Béla Szőke aus drei Kategorien,[72] und „nur“ die Praxis reduzierte diese Klassifikation auf eine zweiteilige Einstufung. Schließlich stellte László Kovács zuerst acht Kategorien für die Klassifizierung der Gräberfelder aufgrund der Chronologie ihrer Benutzung auf, und erst in einem zweiten Schritt erarbeitete er seine beiden siedlungsgeschichtlichen Kategorien. Ob die Aufstellung von zwei Kategorien gerechtfertigt ist, wurde auch von László Révész in Frage gestellt, als er die acht Kategorien von Kovács auf vier reduzierte.[73] Diese neue Klassifikation wurde aber auch von ihm selbst nur in einem begrenzten Umfang verwendet, da er in seiner Dissertation von Weiler- bzw. Dorffriedhöfen sprach,[74] und eben diese von Kovács ausgearbeiteten Kategorien schaffen die Grundlagen für die These über die landnehmenden Ungarn als eine relativ kleine und mobile *Ethnos*, die nur kleine temporäre Siedlungen errichtet haben soll.

Auch unserer Meinung nach ist eine Umarbeitung der von Kovács vorgelegten Tabelle angebracht. Schon allein weil seine acht Typen eigentlich neun Kategorien enthalten. Der dritte Typ von Kovács umfasst nämlich zwei Subgruppen und wurde deshalb als Typ IIIa–b beschrieben. Unserer Meinung nach sollte diese Tabelle aus sieben Kategorien bestehen *(Abb. 1)*:

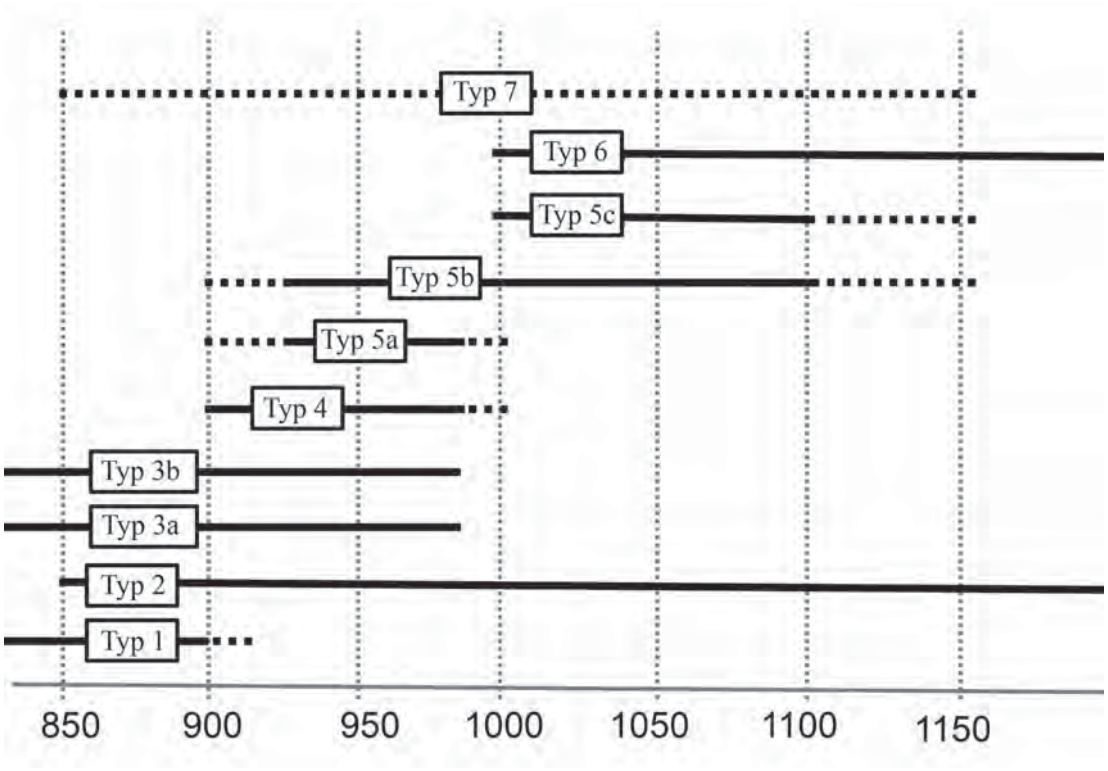

Abb. 1. Graphische Darstellung der revidierten Fassung der Gräberfeldtypologie von László Kovács

[71] *Hampel 1908* 119–120.
[72] *Szőke 1962* 27–84.
[73] *Révész 2019* 2.
[74] Siehe z. B. für Weilerfriedhöfe *Révész 2018* 446, 448, 473, 494, 496. usw., für Dorffriedhöfe *Révész 2018* 448, 449, 450, 473 und 504.

Typ 1: im 9. Jahrhundert eröffnete und kurz nach der ungarischen Landnahme verlassene Gräberfelder
Dieser Gräberfeldtyp ist identisch mit dem Typ I von László Kovács.

Typ 2: im 9. Jahrhundert in der Umgebung von Kirchen eröffnete Gräberfelder, die auch in den Zeiten nach der ungarischen Landnahme benutzt wurden
Dieser Gräberfeldtyp ist identisch mit dem Typ II von Kovács. Nach Kovács' Argumentation sollte man auch in den nordwestlichen Teilen des Karpatenbeckens mit Gräberfeldern rechnen, die über eine derartige Chronologie verfügen. Als Beispielfall gab László Kovács in seiner Analyse das Gräberfeld von Ducó/Ducové[75] (Slowakei) an.

Typ 3: im 7.–8. oder im 9. Jahrhundert eröffnete und auch in den Zeiten nach der ungarischen Landnahme weiterbenutzte Reihengräberfelder
Dieser Gräberfeldtyp ist identisch mit dem Typ IIIa–b von László Kovács. Er unterteilt die Gräberfelder dieses Typs in zwei Gruppen und betrachtet die Gräberfelder im westlichen Karpatenbecken als Subtyp IIIa und die in den zentralen bzw. östlichen Teilen des Karpatenbeckens als Subtyp IIIb.[76] Für uns scheint es zur Zeit fraglich, ob diese Unterteilung des Typs sinnvoll ist. Wir lassen deswegen offen, ob die Subtypen 3a oder 3b eingeführt werden sollten. Als Beispielfall für diesen Gräberfeldtyp nennt Kovács das Gräberfeld von Csekej/Čakajovce[77] (Slowakei).

Typ 4: Gräberfelder mit kleiner Gräberzahl aus dem 10. Jahrhundert
Dieser Gräberfeldtyp ist identisch mit der Gruppe Hampel A, mit den Gräberfeldern der Mittelschicht bei Béla Szőke sowie mit dem Typ IV oder mit den Weilerfriedhöfennach der Typologie von Kovács. Eine kleine Gräberzahl soll, nach der Argumentation von Kovács, 52, 50 bzw. 75 Gräber bedeuten. Weitere Untersuchungen sollen zeigen, ob es sinnvoll wäre, drei Subkategorien für diese Zahlen einzuführen.

Typ 5: Reihengräberfelder mit großer Gräberzahl
Dieser Gräberfeldtyp ist identisch mit der Gruppe Hampel B, mit den Gräberfeldern des Gemeinvolkes von Béla Szőke sowie mit den Typen V–VII oder den Dorffriedhöfen nach der Typologie von Kovács. Er hat diese Gräberfelder je nach der Chronologie ihrer Benutzung in drei Typen unterteilt. Für uns scheinen es aber eher Subkategorien zu sein, die übrigens in der Mehrheit der Beispiele wegen der unvollständigen Erschließung des jeweiligen Fundortes sehr schwierig zu präzisieren sind. Diese in der Zukunft vielleicht doch verwendbar werdenden Subkategorien sind: a) Gräberfelder, wo die Bestattungen nur bis Ende des 10. Jahrhunderts zu datieren sind. b) Gräberfelder mit größerer Gräberzahl, die am Ende des 10. Jahrhunderts eröffnet wurden und mindestens bis Ende des 11. Jahrhunderts bestanden. c) Gräberfelder mit größerer Gräberzahl, die am Anfang des 10. Jahrhunderts eröffnet wurden und mindestens bis Ende des 11. Jahrhunderts bestanden.

Typ 6: Kirchenfriedhöfe, die ab der Wende des 10.–11. Jahrhunderts datierbar sind
Dieser Gräberfeldtyp ist identisch mit dem Typ VIII von Kovács. Der nordwestliche Teil des Karpatenbeckens ist als Ausnahmegebiet anzusehen, da die hiesigen Gräberfelder schon früher einer selbständigen Kategorie (Typ 2) zugeordnet wurden.

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[75] *Ruttkay 1996* 391–408.

[76] Der Vollständigkeit halber sei angemerkt, dass László Kovács diejenige Unterteilung des Typs III erst in der zweiten Fassung seiner Gräberfeldtypologie vorlegte, *Kovács 2014* 183. In der ersten Fassung der Gräberfeldtypologie ist Typ IIIa mit jenen im 9. Jahrhundert eröffneten Gräberfeldern verknüpft, die im 10. Jahrhundert, also schon bald nach der ungarischen Landnahme, wieder geschlossen wurden. Ferner bezeichnet Typ IIIb jene Gräberfelder der Awarenzeit, in denen man auch nach der Landnahme Tote bestattete.

[77] *Rejholcová 1995a; Rejholcová 1995b.*

Typ 7: unsicher typologisierbare Grabgruppen oder Gräberfelder
Dieser Gräberfeldtyp ist in der Typologie von Kovács nicht vorhanden. Es ist aber trotzdem sinnvoll, eine selbständige Kategorie für nicht bestimmbare Fälle einzuführen, schon allein weil die überwiegende Mehrheit der Fundorte unvollständig oder nur zum geringen Teil ausgegraben ist.

Letztlich sollen einige Bemerkungen zu den einzelnen Gräberfeldtypen kurz zusammengefasst werden. Wir müssen an erster Stelle darauf aufmerksam machen, dass die einzelnen Typen in der revidierten Typologie mit arabischen Ziffern gekennzeichnet sind, womit eine auch visuelle Unterscheidung von den Typen von Kovács bezweckt wird. Zweitens kann schon hier gerechtfertigterweise festgestellt werden, dass die von uns revidierte Fassung der Typologie sich kaum von der Revision von László Révész unterscheidet. Der wichtigste Unterschied ist – soweit wir sehen –, dass seine Kategorisierung die vor der ungarischen Landnahme eröffneten Gräberfelder nicht einschließt.

Aus der Beschreibung ist ersichtlich, dass die einzelnen Kategorien der längeren Gliederung von Kovács sowohl in ihrer ursprünglichen als auch in der revidierten Form sozusagen neutral sind. Sie werden weder auf ethnischer noch auf sozialgeschichtlicher oder siedlungsgeschichtlicher Basis interpretiert. Vielleicht wäre es besser, im ersten Schritt einen Beschreibungsversuch zur Typologie der Gräberfelder des 10.–11. Jahrhunderts anhand einer mehrteiligen „neutralen“ Kategorisierung zu unternehmen. Die zweiteilige, siedlungsgeschichtliche Kategorisierung soll bis zu einem Zeitpunkt beibehalten werden, zu dem ihre Überprüfung an einer größeren und dazu geeigneten Datenmenge schon erfolgt ist. Unabhängig davon, wie genial diese siedlungsgeschichtlich orientierte Kategorisierung auch scheint.[78]

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LÁSZLÓ KOVÁCS

REFLEXIONEN AUF DIE ABHANDLUNG VON MIKLÓS TAKÁCS

Abstract: At the request of the editors for submitting a paper to the present annual, I wrote a study in German in which I interpreted the Hungarian archaeological term *szállási temető* [i.e. a cemetery of a short-lived settlement]. Earlier, I expressed the view[1] that the archaeological analysis of cemeteries and burials belonging to the Conquest Period should be preceded by the chronological classification of cemeteries – based on the number of graves belonging to the fully excavated cemeteries. The distinction between burials of the local population found in the Carpathian Basin and the great cemeteries of the settled Hungarians that were in use for various periods from the 9th to the 12th centuries seemed acceptable (village cemetery types I–III and V–VIII). The difficulty of interpretation arose in connection with the small 10th-century cemeteries of the Hungarians (referred to as *szállási temető* by me in Hungarian). The existence of this type of cemetery cannot be questioned. They can be characterized with the typical burial customs of the conquering Hungarians as well as grave goods made of the most valuable materials placed in graves in a large quantity, which can be dated with foreign coins. These finds form extremely diverse assemblages. From their short use lasting a few decades (?), István Fodor and Ákos Tibor Rácz inferred that, with this, I wanted to demonstrate the nomadic way of life led by communities using the cemeteries above. However, I did not state anything like that, as the hydrographic, phytogeographical, and climatic features of the Carpathian Basin would not have made possible typical nomadic farming in the first place. Moreover, I factually refute this assumption with the finds of this type of cemetery, such as pig, hen, and goose bones, as well as eggs, which are not suggestive of nomadic animal husbandry at all.[2] I did not study the relationship between cemetery types and contemporary settlements. The possibility of examining the relations between them was reviewed by Miklós Takács, an expert on this question, in his study of fundamental importance evoking debate.

Stichwörter: Weilergräberfelder, Beziehung zwischen Siedlungsstuktur und Gräberfelderstruktur 10. Jahrhundert, Karpatenbecken

Der Aufforderung der Redaktion, die wesentlichen Züge meiner bisher lediglich auf Ungarisch erschienenen Arbeit,[3] die Indikatoren ihrer Akzeptanz, bzw. die Ergebnisse der wichtigen Studie Miklós Takács' auf Deutsch zu erörtern, kam ich mit Freuden nach. Als anerkannter Experte des Themas erklärte er sich nämlich bereit dazu, den Hintergrund meines typologischen Systems hinsichtlich der Gräberfeldtypen im 10.–11. Jahrhundert, den ich im Glauben unergründbarer Beziehungen bewusst außer Acht gelassen hatte, anhand neuester Ergebnisse siedlungsgeschichtlicher Forschungen zu erläutern. Im Kapitel der Forschungsgeschichte leitete er den falschen ungarischen und slawischen Ursprung der Fundgruppe A–B, den József Hampel 1907 am eindeutigsten formuliert[4] und selbst Lubor Niederle akzeptiert hatte, bzw. der sporadisch bis zum heutigen Tage auftaucht, realistisch ab. Der Gruppe B verlieh Jan Eisner den Begriff

1 *Kovács 2013a* 519–530.
2 *Kovács 2018; Kovács 2020.*
3 *Kovács 2013a*.
4 *Hampel 1907.*

der Bijelo Brdo-Kultur, der als unfehlbar galt.[5] Béla Szőke, der 1962 die fehlerhafte, ethnische Gliederung korrigieren wollte,[6] schlug eine gesellschaftsgeschichtliche Kategorisierung mit drei Klassen (Ober- und Mittelschicht, gemeines Volk) vor,[7] und obwohl sie bis zum heutigen Tage in Gebrauch ist, warf man ihm ihre chronologischen und ethnischen Nachteile umgehend vor.[8] Jochen Giesler ging in seinem 1981 erschienenen Buch davon aus, dass die spätestens bis zum Anfang des 11. Jahrhunderts verwendeten, „altmagyarischen" Gräberfelder mit geringer Grabanzahl und die späteren Gräberfelder der Bijelo Brdo-Kultur mit großer Grabanzahl, die die vorigen auf landesweiter Ebene abwechselten und vom letzten Drittel des 10. Jahrhunderts bis zum Anfang des 12. Jahrhunderts genutzt wurden, einander folgten. Diese Annahme wurde jedoch nicht allgemein anerkannt.[9] Die Vorgeschichte meiner eigenen Analyse hatte István Dienes 1965, im Rahmen der Rezension von Béla Szőkes Arbeit, praktisch bereits vorgestellt: „Die chronologischen und ethnischen Fragen der Gräberfelder sind noch nicht ganz geklärt. Abgesehen von der Urbevölkerung könnten sich vermutlich auch die Gräber der aus fernen Regionen verschleppten Gefangenen hier befinden, womit ein Teil der Gräberfelder zweifelsohne verschiedene Ethnien birgt. Der Umstand, dass sich unsere Sprache erhalten hat, zeugt davon, dass in der Mehrheit der Gräber Vertreter der ungarischsprachigen Bevölkerung ruhen. Bei der Altersbestimmung der Gräberfelder müssen wir die zu unterschiedlichen Zeitpunkten und in erster Linie während der Staatsgründung vollzogenen Ansiedlungen und deren Auswirkungen auf das Gesamtbild der Gräberfelder in Betracht ziehen. Einige Gräberfelder wurden aufgelassen, anderenorts legte man neue an, und diese Prozesse müssen bei jedem Gräberfeld separat unter die Lupe genommen werden."[10] Miklós Takács ging kompetent auf die bis ungefähr 2010 klar gewordene und die von mir damals vermutete Widersprüchlichkeit der Gräberfeldforschung ein. Ich war der Ansicht, dass im Zwang der Anforderung archäologischer Bereinigung, die Bestimmung der Benutzungszeit der Gräberfelder der ethnischen, gesellschaftlichen und historischen Untersuchung der bestatteten Gruppen vorausgehen sollte. Der erste Schritt in diese Richtung war die Auswahl der vollständig aufgedeckten Gräberfelder, da sie anhand ihrer vergleichbaren Grabanzahl und dem Fundmaterial nur auf diese Weise authentisch differenzierbar waren. Das Ergebnis meiner Untersuchung, die sich in erster Linie auf Münzfunde ruhte, offenbarte, dass die ansässige Bevölkerung, die die ungarische Landnahme des Karpatenbeckens unterschiedlich

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5 Vgl. *Kovács 2013a* Anm. 4. Nicht nur die ethnische Bestimmung der Kultur, sondern auch ihr Name war im Sinne der archäologischen Namensgebung falsch. Das erste Gräberfeld der „Bijelo Brdo-Kultur" war nämlich nicht der Friedhofsabschnitt in der Velika Venecija Straße von Bijelo Brdo (Burgkomitat Veröcze; Osječko-baranjska *županija*, Kroatien), den man zwischen November 1895 und April 1897, im Rahmen von vier Ausgrabungssaisons und unter der Leitung von Károly Nuber, Josip Purić und Josip Brunšmid bis zu Grab 208, bzw. 1907, während der fünften Saison, unter der Leitung von Viktor Hoffiller bis zu den Gräbern 215–236 aufdeckte, worüber Brunšmid bereits 1903/1904 publizierte und der anhand der Denare von Peter Orseolo (1038–1041, 1044–1046), Andreas I. (1046–1060) und Béla I. (1060–1063) datiert worden war, *Brunšmid 1904*. Nein, das erste war der 1879 gestörte und später bis zum 30. Grab freigelegte Friedhof von Gerendás-Grjecs-halom (Komitat Békés), den man mithilfe der Denare von Stephan I. (1000–1038), Peter Orseolo (1038–1041, 1044–1046) und Andreas I. (1046–1060) datiert hatte, vgl. *Zsilinszky 1879*. Die einschlägige, deutschsprachige Abhandlung erschien leider erst 1905, *Hampel 1905* I: 842, II: 855–856, III: Taf. 509–510 und wurde ehrlich gesagt nie in den Fachkanon übernommen.

6 *Szőke 1962*.

7 In *Kovács 2013a* 532–536 wird auf die Arbeit von Géza Fehér als vorausgehende Forschung zu Béla Szőkes, bzw. auf die Arbeit von Attila Kiss in diesem Thema als Konsequenz der vorigen eingegangen.

8 Vgl. *Kovács 2013a* Anm. 146–149. Auch Miklós Takács wies darauf hin, dass sich im System nach Béla Szőke mit der Zeit Gegensätze zeigten: *Takács in diesem Band* Anm. 16–18.

9 Vgl. *Kovács 2013a* 536–538. Miklós Takács begründete, warum Željko Tomičić einzig die Hypothese von Jochen Giesler verwendete: *Takács in diesem Band* Anm. 13.

10 *Dienes 1965* 87, in: *Kovács 2013a* Anm. 148.

lang überdauerte, in drei/vier Gräberfeldkategorien gegliedert werden konnte: dörfliche Gräberfelder des 9.–12. Jahrhunderts (I), die Kirchhöfe des 9.–10. Jahrhunderts (II) und die bis zum Anfang des 9.–10. Jahrhunderts verwendeten, dörflichen Gräberfelder (IIIA–B). Ich bin der Ansicht, dass die Ungarn im 10. Jahrhundert Gräberfelder mit wenigen Bestattungen nutzten, die ich Weilergräberfeld nenne (IV). Darüber hinaus wurden Gräberfelder mit unterschiedlicher Belegungsdauer benutzt: Dorffriedhöfe mit einer Nutzungszeit im 10. Jahrhundert (V), im 10.–11./12. Jahrhundert (VI), bzw. mit zahlreichen Gräbern nur im 11. Jahrhundert (VII), und schließlich, ab dem 11. Jahrhundert angelegte und ab Mitte des 12. Jahrhunderts ausschließlich genutzte Kirchhöfe (VIII).[11] 22 unterschiedlich große Gräberfelder konnte ich schon bereits am Anfang nicht entsprechend einordnen.[12] Jedoch war ich erfreut zu sehen, dass Miklós Takács zufolge die betroffenen Fachkollegen meine Gräberfeldtypologie seit ihrem Erscheinen im Allgemeinen akzeptieren und anwenden. Auch Kritiken bezogen sich nicht auf die Existenz des Typs oder die Merkmale der Weilergräberfelder, sondern lediglich auf ihre Bezeichnung.

Als Einführung der Abhandlung über die von mir dargelegten Gräberfeldtypen schrieb ich: „Als Weilergräberfelder bezeichnete ich Ruhestätten der landnehmenden Ungarn (Typ IV), die nur über kurze Zeit, wenige Jahrzehnte bewohnte Siedlungen, mit wenigen Gräbern versorgten, womöglich auch bereits schon nach der Landnahme. Dorffriedhöfe sind meiner Auffassung nach Gräberfelder, die dem Anschein nach zu längerfristig bewohnten Siedlungen gehörten, sich voneinander zwar grundsätzlich unterschieden, doch im Allgemeinen weitaus mehr Gräber beherbergten, als Weilergräberfelder [Typen V–VII].“[13] Die Kategorie der „Dorfgräberfelder“ schien akzeptabel, die der „Weilergräberfelder“ umso weniger. István Fodor meinte, der *Terminus* „Weilerfriedhöfe“ wäre bereits für die Kategorie der kumanischen Friedhöfe des 13. Jahrhunderts reserviert, bedachte jedoch nicht, dass es im Ungarischen zwei sich sehr ähnelnde Bezeichnungen gibt, „*szállástemető* – Siedlungsfriedhof“ und „*szállási temető* – Weilerfriedhof“, somit waren seine Bedenken unberechtigt.[14] Außerdem ging er aufgrund meines Wortgebrauchs davon aus, dass meiner Ansicht nach dieser Gräberfeldtyp von nomadischen Viehhaltergemeinschaften ins Leben gerufen worden war.[15] Letztere Annahme konnte ich mithilfe von Schweine-, Hühner- und Gänseknochen, bzw. Funden von Eiern der Gräber von Weilerfriedhöfen, die auf sesshafte Umstände hindeuteten, faktisch widerlegen.[16] Das Verhältnis der konkreten Gräberfelder und Siedlungen habe ich aufgrund ihrer Unvereinbarkeit überhaupt nicht analysiert.[17] Miklós Takács ließ

[11] *Kovács 2013a* 515–545. Meine Abhandlung ist leider nur auf Ungarisch erschienen. Für die beste, deutschsprachige Darlegung der Friedhofstypen, siehe: *Révész 2017* Anm. 2.

[12] *Kovács 2013a* 511–514, 546–551, Tabelle 1; vgl. *Türk – Lőrinczy 2015* 45.

[13] *Kovács 2013a* 520.

[14] Diese Diskussion war auch Miklós Takács zufolge sinnlos: *Takács in diesem Band* Anm. 23.

[15] *Fodor 2015* 288–290; Zusammenfassung seiner Ansichten: *Kovács 2018* 629–630; *Kovács 2020*.

[16] Über die erwähnten Gräber mit Knochen- und Eierfunden siehe: *Kovács 2018; Kovács 2019* 480–485; nur über die Gräber mit Eierfunden: *Kovács im Druck*.

[17] „Das Verhältnis zwischen diesen Gräberfeldern und den Siedlungen der Gemeinschaften, die sie nutzten, besteht lediglich theoretisch, da es schwierig ist, einzelne Siedlungen entsprechenden Friedhöfen zuzuordnen. Selbst wenn sie sich in der Nähe offenbarten, legte man sie im Allgemeinen nur partiell frei, und somit ist eine Datierung, der parallel zum Friedhof existierenden Siedlung, auch nur bis auf das Jahrzehnt genau, schier undenkbar. Somit habe ich anhand der von mir vorgeschlagenen Friedhofstypen bewusst keine Schlussfolgerungen hinsichtlich der Differenzierung wirtschaftlicher Tätigkeiten abgeleitet, denen man in den ihnen zugeordneten Siedlungen nachging, da es vielleicht gar nicht möglich ist.“, *Kovács 2013a* 521. Tibor Ákos Rácz war anderer Meinung, er sagte, Kovács hätte „während des Entwurfs dieser Kategorie, wie seinen Anmerkungen zu entnehmen war, die einschlägigen Ergebnisse der Siedlungsforschung nur oberflächlich in Betracht gezogen und sich praktisch nur auf die Zusammenfassungen der historischen Forschung gestützt.“, *Rácz 2014* 169, Anm. 56; wiederholt: *Rácz 2019* Anm. 39.

die frühere, ablehnende Stellungnahme von Tibor Ákos Rácz in derselben Benennungsfrage außer Acht,[18] doch da er diesen Absatz in erweiterter Form in die Veröffentlichung seiner Dissertation übernahm, reichte es aus, lediglich auf den letzteren Punkt einzugehen. Während Rácz also Takács' Vorschlag für die Differenzierbarkeit dreier árpádenzeitlicher Siedlungstypen, des Weilers, der Streusiedlung und des Dorfes, wegen der Einführung der Kategorie „Weiler"[19] kritisierte, betonte er, dass sie nicht derselben Begriffsklasse angehörten und sie anhand ihrer Befundanzahl nicht unterschieden werden können. Danach behauptete er, dass dasselbe auch für die Gliederung von László Kovács gilt, „der die frühárpádenzeitlichen Friedhöfe anhand der Individuenzahl [ihrer Gräber! – L. K.] und Belegungsdauer den Weiler- und Dorffriedhöfen zuordnete und damit diesen nicht unproblematischen *Terminus* der Siedlungsforschung zur Grundkategorie einer neuen Klassifizierung ernannte. Im Verlauf der Erstellung dieser Kategorie hat er, wie seinen Andeutungen zu entnehmen war, die einschlägigen Ergebnisse der Siedlungsforschung nur oberflächlich beachtet und sich fast ausschließlich auf die Zusammenfassungen der historischen Forschung gestützt. Seiner Argumentation zufolge erscheinen auf den als „Weilerfriedhöfe" kategorisierten Gräberfeldern die charakteristischen Bestattungssitten der landnehmenden Ungarn und die aus den wertvollsten Materialien gefertigten, am öftesten beigefügten und mit fremden Münzen am genauesten datierten Gegenstände. Damit beschreibt er mehr oder weniger die früher bereits unter diversen Namen bekannte (Hampel A, geschlechtliche Stammesaristokratie, bewaffnetes Gefolge) und in breiterem Sinne verstandene Elite. Auf Streusiedlungen und Gehöften lebten jedoch nicht die Elite, sondern das gemeine Volk und die Mittelschicht, praktisch alle, die von der Landwirtschaft lebten und die dem wirtschaftlichen Zwang des Landwechselbaus ausgesetzt waren. Die Siedlungsarchäologie hat bisher noch keine provisorisch gedachte, kleine Niederlassung der Elite gefunden, die man mit anderen und sich von denen des Dorfs markant unterscheidenden Merkmalen beschreiben könnte. Weiler sind der traditionellen Terminologie zufolge den Nomaden zuzuordnen, damit deutet László Kovács die Nomadisierung des landnahmezeitlichen Adels an. Bei der Stellungnahme neben einer in wissenschaftlicher Hinsicht so ausschlaggebenden Frage wäre allerdings eine detailliertere Erörterung der landnahmezeitlichen Wirtschaft vonnöten gewesen. Natürlich kann es kein Zufall sein, dass die Gräberfeldforschung des 10.–11. Jahrhunderts *quasi* seit den ersten Kategorisierungsversuchen ebenfalls mit den Tücken der Gruppierung anhand unterschiedlicher (ethnischer, gesellschaftlicher, wirtschaftlicher) Kriterien und der Nomenklatur zu kämpfen hat. Die Problematik der Siedlungen und der Friedhöfe kann nicht separat voneinander behandelt werden, da es sich bei beiden um das Vermächtnis derselben Bevölkerung handelt. Die typologische Systematisierung und Erstellung einer entsprechenden Terminologie árpádenzeitlicher Siedlungen wird erst nach der Veröffentlichung weiterer großflächiger Ausgrabungen möglich, nach der Bestimmung regionaler Eigenschaften und allgemein gültiger Merkmale. Momentan sind wir noch nicht so weit und unter anderem ist es auch deshalb unangebracht, diese Kategorie unbegründet ihrem Kontext zu entnehmen, um sie in Verbindung mit den Friedhöfen zu verwenden."[20] Wenn wir uns die Argumente von Rácz nacheinander ansehen,

[18] *Rácz 2014* Anm. 56.

[19] „Weiler, bzw. weilerartige Siedlungen und das lateinische Äquivalent *descensus* können mit nomadischen oder halbnomadischen Lebensumständen von Hirten, bzw. provisorischen Siedlungsformen in Verbindung gebracht werden. Der Gebrauch des Begriffs wäre lediglich in Verbindung mit den Streusiedlungsphänomenen des 10. Jahrhunderts gerechtfertigt, und auch nur dann, wenn man beweisen könnte, dass die sich im Karpatenbecken niederlassenden Ungarn ihre nomadische oder halbnomadische Lebensweise fortgesetzt hatten. Die Ergebnisse unserer Ausgrabungen im Komitat Pest bestärken jedoch die Annahme, dass die Lebensumstände der im 10. Jahrhundert erscheinenden Siedler der endgültigen Sesshaftigkeit näher standen, als irgendeiner Form des Nomadentums.", *Rácz 2019* Anm. 36–37.

[20] *Rácz 2019* Anm. 39.

fällt auf, dass sich seine Einwände, ebenso, wie im Falle István Fodors,[21] auf meine Kategorie der Weilerfriedhöfe beziehen und da sie den einschlägigen, archäologischen Inhalt nicht betreffen, wären sie im Falle einer anderen Definition überflüssig gewesen. Während der Verfassung meiner Studie war es mir nämlich wichtig, die Friedhofskategorien mit ihrer Benutzungszeit und einem einfach gebräuchlichen, unkomplizierten Namen zu unterscheiden, somit fiel meine Entscheidung auf diesen Begriff. Hätte ich den mir unzugänglichen und daher fiktiven Siedlungshintergrund jedes einzelnen Friedhofstyps, ohne Differenzierung schlichtweg „Dorf" genannt,[22] hätte das für einen einzelnen Typen verwendete Weiler-Attribut folgendermaßen weggelassen werden können: kurzfristig verwendete Dorffriedhöfe des 10. Jahrhunderts (Typ IV), längerfristig verwendete Dorffriedhöfe des 9.–10. Jahrhunderts (Typen III und V), langfristig verwendete Dorffriedhöfe des 9./10.–12. Jahrhunderts (Typen I, VI–VII), bzw. Friedhöfe des 9.–12. Jahrhunderts in Kirchennähe (Typen II und VIII).[23] Diese Lösung hätte außerdem den Vorteil, dass verschiedene Gräberfelder selbst mit ähnlichem Siedlungshintergrund vorstellbar wären, da höhere Gräberzahlen, auch bis über eintausend, in erster Linie eine längere Nutzungszeit und einen ausgedehnteren Wohnort voraussetzten. Gleichzeitig könnte man nicht ausschließen, dass die Bewohner einer verstreut gegliederten Siedlung über kürzere oder längere Zeit hinweg ihre Bestattungen an einem gemeinsamen Ort durchführten.[24] Ich stimme lediglich einer der Anmerkungen von Rácz zu, nämlich, dass man auf den Friedhöfen, die meiner Terminologie zufolge Weilerfriedhöfe heißen (Typ IV), die Elite mit der breitesten Palette an Beigaben bestattete. Von den Weilerfriedhöfen unterschieden sich die Dorffriedhöfen des 10. Jahrhunderts anhand ihrer höheren Grabanzahl und der zwar auf dieselben Wurzeln zurückführbaren, jedoch simpleren Bestattungssitten und der Beigabenauswahl. Somit habe ich also Weilerfriedhöfe nicht aufgrund ethnischer, wirtschaftlicher oder gesellschaftshistorischer Mutmaßungen differenziert, sondern ausschließlich anhand ihrer Nutzungsdauer, die sich aus ihrer niedrigen Grabanzahl ergab. Die Grabanzahl der Weilerfriedhöfe ist allerdings nicht einmal zur Durchschnittsberechnung der Nutzungszeit zu gebrauchen, da bei vermutlich identischen Morbiditätsumständen die Bewohner einer kleineren Siedlung mehr und die einer größeren weniger Zeit zur Aushebung derselben Grabanzahl brauchten. Daraus folgt, das Rácz' weitere, willkürliche Behauptungen, Gemeinschaften, die sich Weilerfriedhöfen bedienten, lebten in kleinen, provisorischen und sich in ihren Merkmalen markant vom Dorf unterscheidenden Siedlungen nomadischer Art, jeglicher Grundlage entbehren.

Danach stellte Miklós Takács am Anfang seines Kapitels *Analysen* die Frage, ob die im Rahmen meiner Sammlung[25] beobachteten Unterschiede der Nutzungszeiten der Gräberfelder

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[21] „Auch István Fodor kritisierte die Terminologie von László Kovács stark, der das provisorische Wesen der Weiler betonte und wiederholt darauf hinwies, dass die Wirtschaft der landnahmezeitlichen Ungarn nicht mit den Merkmalen der östlichen Nomadisierung beschrieben werden kann. Somit konnte der Weiler, der unter das Stichwort Nomadisierung fällt, keiner ihrer Wohnorte gewesen sein, weshalb ihre Bestattungen auch auf keinem „Weilerfriedhof" vorgenommen worden sein können", *Rácz 2019* Anm. 39.

[22] „Es ist notwendig..., dass auch Streusiedlungen in die archäologisch bestimmte Definition des Dorfes integriert werden", *Rácz 2014* 171. Der Begriff der *villa*, der schon in den Gesetzestexten einheitlich verwendet wurde, „mag bereits in der frühesten Epoche sowohl für das Zentrum, als auch den Randbereich des Dorfes gestanden haben, also das komplette Gebiet innerhalb der Dorfgrenzen, so könnten der konzentriert angelegte Siedlungskern und die verstreuten Siedlungsspuren gemeinsam die Siedlung dargestellt haben", *Rácz 2019* 139.

[23] Irma Oláh vereinfachte meine typologischen Termini genau in dieser Weise: „kurzfristig verwendete Friedhöfe" (Typ IV) und „langfristig verwendete Friedhöfe" (Typen VI–VIII), *Oláh 2018* 41–44.

[24] *Bollók 2013; Rácz 2019* 144, Anm. 52.

[25] Typ I: 3 Fundorte, Typ II: 5 Fundorte, Typ IIIA: 17 Fundorte, Typ IIIB: 16 Fundorte, Typ IV: 37 Fundorte, Typ V: 15 Fundorte, Typ VI: 25 Fundorte, Typ VII: 39 Fundorte: *Kovács 2013a* 552–569. Typ VIII: Die kirchennahen Friedhöfe, die laut Münzfunden bereits im 11. Jahrhundert angelegt wurden: *Kovács 2013b* 253–269: 119 Fundorte.

wohl auch in weitaus breiterem Kreis nachweisbar wären. Ich bin der Ansicht, dass es infolge der zwangsläufigen Beschaffenheit der mehr als hundertfünfzig Jahre andauernden archäologischen Forschung momentan keinen weitaus breiteren Kreis gibt, während ich auf die unumgänglichen Mängel meiner eigenen Materialsammlung mit dem Untertitel „Entwurf" verwiesen habe. Inzwischen gibt es immer mehr komplett freigelegte Friedhöfe, die ihre Bearbeiter mit der entsprechenden Typologie versehen,[26] allerdings konnte man im Interesse der Klarheit versuchen, die ewig in der Überzahl bleibenden, partiell aufgedeckten Friedhöfe anhand subjektiver Merkmale – geschätzte Grabanzahl, Bestattungssitten, charakteristische Funde, wie Waffen, Gegenstände, die auf den Rang schließen lassen, Kleidungszier, Schmuck, Münzen usw. – dennoch einzuordnen.[27] So eine Bewertung hat László Révész durchgeführt, worauf ich hier natürlich nicht zu sprechen komme, da er hier ebenfalls im Rahmen einer redaktionellen Anfrage persönlich auf das Thema eingehen wird.

Anschließend wies Miklós Takács darauf hin, dass man mithilfe des Vergleichs der zeitlichen Grenzen, die den einzelnen, besprochenen Friedhofstypen zugewiesen wurden, keine allgemeine Datierung freigelegter Siedlungen, bzw. Siedlungsteile erstellen kann, sondern lediglich jene Befunde, in denen sich einigermaßen epochenbestimmende Objekte offenbarten. In Zukunft wird man sich wohl zunehmend auf die Anwendung von naturwissenschaftlichen Methoden verlassen, gleichzeitig muss sich die Forschung noch auf die Sammlung analysierbarer Funde konzentrieren. Hinsichtlich der Siedlungskonstruktionen sind die Umstände besser, Dénes Jankovich Bésán hat nämlich im Rahmen einer Geländebegehung im Komitat Békés beobachtete und mithilfe der Siedlungsaufdeckung analysierte Fundorte eines Dorfes und eines Weilers aus dem 10.–11. Jahrhundert (bei Takács: kleine, weilerartige Siedlungen) differenzieren können. Seiner Meinung nach könne sogar „der Großteil der freigelegten und nicht freigelegten, árpádenzeitlichen Siedlungen in die letztere Kategorie" gezählt werden.[28] Ilona Walter beobachtete dies während ihrer Geländebegehungen im Bodrogköz und József Laszlovszky machte außerdem darauf aufmerksam, dass sich in diesen Siedlungen grundsätzlich wenige Kleinfunde offenbaren, was ihre Datierung erschwert. Miklós Takács legte im Rahmen seiner Dissertation die dreiteilige Siedlungsstruktur dar, die er während seiner Ausgrabungen auf der Kleinen Tiefebene observierte: eine dreiteilige Siedlungsstruktur, die aus dorfähnlichen, weilerähnlichen Siedlungen und Gruppen von Weilern bestand.[29] Fraglich blieb lediglich, ob sie wohl alle bereits im 10. Jahrhundert existierten. Takács ging auf die Beobachtungen von Tibor Ákos Rácz ein, die er im Verlauf der vorangegangenen Ausgrabungen der Autobahn M0, über die Differenzierbarkeit der Siedlungen des 10., des 11.–12., bzw. des 13.–14. Jahrhunderts angestellt hatte, wo die Zunahme der Konzentration der aus eigenständigen Haushalten bestehenden, weilerartigen Kleinsiedlungen des 10. Jahrhunderts erst im letzten Abschnitt den Zustand eines wahren Dorfes erreichte. Takács hielt es für zweifelhaft, ob diese Art der Entwicklung als allgemein gültig betrachtet, bzw. ob sowohl die weilerartigen, als auch die dorfartigen Siedlungen dem Oberbegriff Dorf zugeordnet werden können. Seiner Ansicht nach vollzog sich die Dorfentwicklung nicht entlang des linearen Prozesses, den Rácz vorgeschlagen hatte, er meinte, es hätte bereits im 10.–11. Jahrhundert größere, dorfartige Siedlungen gegeben. Hier offenbart sich, dass die beiden Auffassungen nicht

[26] Vgl. *Takács in diesem Band* Anm. 21; *Horváth 2014* 58, 175; *Kovács 2015* 28, 30, 31, 43, 44, 91–220; der Dorffriedhof von Tiszalúc-Sarkad aus dem 11. Jahrhundert: 197, 225, 246, 257, 260–262; *Türk – Lőrinczy 2015* 45; *Gallina – Varga 2016* 52, 176, 283, 321, 322; *Balogh 2016* 391–421; *Révész 2016* 562, 588; *Horváth 2019* 137, 147, 149, 160, 172, 242, 245–246; *Oláh 2018* 41–44; *Kovács 2019* 237–263; Weilerfriedhof von Magyarhomorog-Kónya-domb aus dem 10. Jahrhundert: *Kovács 2019* 264–486; Dorffriedhof von Magyarhomorog-Kónya-domb: *Kovács 2019* 487–496.

[27] *Révész 2020* 72.

[28] *Jankovich 2013* 638.

[29] Ungarisch: *‚faluszerű, szállásszerű és szállások csoportjából álló'*.

einander gegenübergestellt werden können: Die zwei grundlegenden Kategorien nach Rácz sind „das Dorf und die Kleinsiedlung, die ich Gehöft, statt Weiler nenne.“[30] Nun, wenn es etwas gibt, was nicht mit dem, von mir Weiler genannten Wohnort der ungarischen, nicht mittelständischen Bevölkerung übereinstimmt, der Friedhöfe des Typs IV anlegte und nutzte, jedoch hinsichtlich seiner Merkmale nicht analysierbar war, ist es das von Rácz folgendermaßen definierte Gehöft: „Schauplatz der individuellen Sesshaftigkeit. Kriterium seiner Differenzierbarkeit sind grundsätzlich die wesentliche Entfernung zu anderen Siedlungsspuren und Beweise der selbstständigen Bewirtschaftung.“[31] Solche Kriterien sind in der Friedhofsforschung nutzlos, was die Glaubens- und Beigabenvielfalt der von mir beschriebenen 37 Friedhöfe noch bestärkt.[32]

Ich bin der Ansicht, dass Miklós Takács' gedankenreicher Überblick die Situation der ungarischen Siedlungsforschung, mit ausländischen Beispielen unterstützt, veranschaulicht hat, deren allgemein akzeptierte Nomenklatur für Siedlungstypen des 9.–12. Jahrhunderts man unmöglich für die Bestimmung von konkreten Typen komplett aufgedeckter Friedhöfe und dazugehörigen Siedlungen hervorheben könnte. Tibor Ákos Rácz lag richtig, als er betonte, dass „ein grundsätzlicher Mangel der archäologischen Forschung darin besteht, dass man noch nicht versucht hat, die Daten der Friedhofsforschung des 10.–11. Jahrhunderts mit denen der Siedlungsforschung abzustimmen“.[33] Gleichzeitig ist klar, dass dieses Experiment im erwähnten Thema eindeutig misslungen ist. Daraus folgt, dass man die von Takács formulierten Schlussfolgerung ebenfalls nicht annehmen muss, weil sie auf der Fehlinterpretation der von mir vorgeschlagenen Friedhofstypologie beruht: die acht Typen (IIIA–B zusammengerechnet) basieren nicht auf zwei siedlungsgeschichtlichen Kategorien, sondern auf den Analysen von insgesamt 157, vollständig aufgedeckten Gräberfeldern, abgesehen von den Friedhöfen, die um die Kirchen herum lagen und von der Diskussion nicht betroffen waren. Die Siedlungen der „Betreiber“ besagter 157 Friedhöfe hätte ich in meiner Ableitung einfachheitshalber und fiktiv gesehen Dörfer nennen können, doch im Falle der kurzfristigen Gräberfelder (Typ IV), die sich von den übrigen unterschieden, fand ich es angebrachter, willkürlich vorzugehen und sie mit dem eigenen Namen „Weilerfriedhof“ zu versehen. Die ungeklärte Diskussion handelte im Endeffekt nur davon. Dass es sich im Falle meiner Typologie lediglich um einen Entwurf handelt, bewies László Révész mithilfe seiner Änderungsvorschläge, die er diesmal persönlich erörterte. In Angesicht dessen finde ich allerdings die Proposition von Miklós Takács, hinsichtlich einer Umstrukturierung überflüssig, die im Grunde genommen in meinem System verblieben ist, gleichzeitig schloss er die Möglichkeit zahlreicher, zukünftiger Erweiterungen nicht aus, wobei ich ihm auch absolut zustimme.[34] Und da es sich bei meiner Typologie nicht um ein logisches Konstrukt handelte, sondern um ein System, das auf der Analyse von 157 vollständig aufgedeckten Friedhöfen basiert, verweist es innerhalb des chronologischen Rahmens, trotz der niedrigen Fallzahlen in landesweitem Verhältnis, dennoch auf reelle Bevölkerungsbewegungen. Somit lebten die Nutzer der in Oberungarn (Felvidék, Slowakei) registrierten Dorffriedhöfe des Typs I im 9.–12. Jahrhundert durchgehend vor Ort, ähnlich, wie die der kirchennahen Gräberfelder des Typs II, ebenfalls in Oberungarn und Transdanubien, wo sich allerdings auch Spuren offenbarten, die auf eine unterbrochene Nutzung verwiesen. Die Friedhöfe des Typs IIIA von Oberungarn und Transdanubien legte man im Verlauf des 9. Jahrhunderts an, zu Anfang des 10. Jahrhunderts stellte man die Bestattungen dort ein. Auf der Großen Tiefebene erlebten selbst

[30] *Rácz 2019* 142.
[31] *Rácz 2019* 143.
[32] *Kovács 2013a* 519–530, Tabelle 3.
[33] *Rácz 2019* 143. Darstellung der Auswahl an deutschen und englischen Begriffen für Siedlungen, die kleiner als ein Dorf waren, *Rácz 2019* Anm. 50.
[34] Meine Typen mit römischen Zahlen, die von Takács mit arabischen: I = 1, II = 2, III(A–B) = 3, IV = 4, V–VII = 5, VIII = 6, und 7: die nicht einzuordnenden Friedhöfe.

einige Gräberfelder der spätawarenzeitlichen Bevölkerung das 10. Jahrhundert. Die Dorffriedhöfe (?) des Typs IIIB waren gleichzeitig verlassen worden, allerdings lagerten sich auf ihrem Gebiet im 10.–11. Jahrhundert ungarische Siedler ab. Weilerfriedhöfe vom Typ IV offenbarten sich in erster Linie auf der Großen Tiefebene, in Oberungarn vor allen Dingen auf der kleinen Tiefebene, bzw. in Nord-Transdanubien und in der Südregion des Plattensees, deren Nutzer vermutlich nach einigen Jahrzehnten der Verwendung weiterzogen, im Verlauf des 10. Jahrhunderts vielleicht sogar mehrmals.[35] Die Nutzung der Dorffriedhöfe des Typs V stellten sie in den späten Jahrzehnten des 10. Jahrhunderts ein. Einen Teil der Friedhöfe des Typs IV und V müssen sie bereits nach 895 angelegt haben. Einen Teil der Friedhöfe des Typs VI könnten sie nach 895 bereits eröffnet haben, den Rest im Verlauf des 10. Jahrhunderts. Vorgänger könnten Friedhöfe vom Typ IIIA oder V, mit übersiedelten Nutzern gewesen sein. Vor Ort wurden sie bis zum Ende des 11. Jahrhunderts permanent genutzt, die spätesten Bestattungen erfolgten vor 1141. Dorffriedhöfe des Typs VII legten die Übersiedler, die die Friedhöfe des Typs IV oder V aufgegeben hatten, gegen Ende des 10. oder Anfang des 11. Jahrhunderts an. Die zurückgelassenen Felder ähnelten den Gräberfeldern des Typs VI.[36] Die Dorffriedhöfe des Typs V–VII verbreiteten sich landesweit ebenso, wie die zwischendurch im 11. Jahrhundert erschienen Friedhöfe, die um die Kirche herum lagen und um die Jahrhundertwende des 11./12. Jahrhunderts bereits in der Überzahl waren und ab der Mitte des 12. Jahrhunderts ausschließlich genutzt wurden.

Meiner Meinung nach erläuterte Miklós Takács in seiner von mir hochgeschätzten Arbeit, dass die Harmonisierung der Ergebnisse, die die Friedhofs- und Siedlungsforschung dem 9./10.–11./12. Jahrhundert entlocken konnten – inklusive der Nomenklatur – grundsätzlich eine Aufgabe der Zukunft sein wird. Anstatt der umstrittenen Bezeichnung der Weilerfriedhöfe für die Friedhöfe des Typs IV sollten die Siedlungsforscher, falls irgend möglich, einen für beide Fachgebiete akzeptableren *Terminus* entwerfen.

LITERATUR

A honfoglalás kor kutatásának legújabb eredményei 2013 — L. Révész – M. Wolf (eds): A honfoglalás kor kutatásának legújabb eredményei. Tanulmányok Kovács László 70. születésnapjára. Monográfiák a Szegedi Tudományegyetem Régészeti Tanszékéről 3. Szeged 2013.

Balogh 2016 — Cs. Balogh: Kora Árpád-kori szállási temető Makó-Igási-Járandóban, in: *Népek és kultúrák 2016* 391–421.

[35] Takács umging die terminologische Diskussion hinsichtlich der „Weilerfrage“, indem er diese Friedhöfe „Gräberfelder aus dem 10. Jahrhundert mit kleiner Grabanzahl“ nannte und als Leitsatz die Differenzierung von Subkategorien mit 25–50–75 Gräbern vorschlug. Solche gibt es jedoch nicht, die Grabanzahlen der nach István Bóna erläuterten 37 Fundorte gestalten sich nämlich wie folgt: 4, 5/zweimal, 6/zweimal, 7/zweimal, 8/dreimal, 10, 11/zweimal, 12, 13/dreimal, 16, 18, 19/dreimal, 20/zweimal, 20–30?, 23, 24, 25/zweimal, 26/dreimal, 34, 57, 73, 74, 83 Gräber: *Kovács 2013a* Tabelle 3. Inzwischen hat sich herausgestellt, dass auch ein Friedhof von Makó-Igási-Járandó mit 10 Gräbern aus dem 11. Jahrhundert, der mit einem Peter-Denar (1038–1041, 1044–1046) datiert wurde, dem neuen Kriterium des Weilerfriedhofs entspricht, *Balogh 2016*. Im Übrigen verfügt die Forschung bereits über Beweise zur Darstellung von sippenhaften und nicht sippenhaften Verhältnissen in den einzelnen Friedhöfen, auf diese ging ich allerdings bewusst nicht ein.

[36] Die lediglich einzeln zu analysierenden, zeitlichen Anfangs- und Endpunkte der zu den Typen V–VII gehörenden Dorffriedhöfe sind Abdrücke der Dynamik der ungarischen Bevölkerung, die sowohl historischen, als auch wirtschaftlichen Umständen ausgesetzt war. Sie mechanisch als Subkategorien des 5 Typs abzustempeln, wäre falsch.

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LÁSZLÓ RÉVÉSZ

FRIEDHÖFE UND SIEDLUNGEN IM KARPATENBECKEN DES 10.–11. JAHRHUNDERTS: EINIGE ANMERKUNGEN ZUR ABHANDLUNG VON MIKLÓS TAKÁCS

Abstract: The collection and examination of cemeteries and parts of cemeteries excavated in the territory of the Carpathian Basin sheds light on their diversity and multifariousness in the country from the beginning of the 10th century to the first third of the 12th century. The view that previously associated the individual cemeteries with a particular stratum of society or ethnicity is already outdated both in its methodology and approach. More recent research focuses on the characteristics and period of use of sites found in a smaller area with the help of regional analyses. This offers a more accurate picture of the internal population movements, social transformation, as well as the spatial and temporal changes of the population in each region in the 10th and 11th centuries. The research results also shed light on the relations between the conquering Hungarians and the local peoples, as well as on the connections made with the neighbouring peoples. The time span of the use of each cemetery can now be determined with a few decades of accuracy. Today, these results are still difficult to synchronize with settlements that can be dated with much broader time limits. Linking individual cemeteries to specific settlement remains can be problematic and even misleading. In the field of settlement archaeology, I see the way ahead in the intensification of regional research. Within a given region, it is worth observing the tendencies, as well as changes and peculiarities indicated by cemeteries and settlement remains, then comparing them with each other.

Stichwörter: Gräberfelder, Siedlungen, Regionalforschungen, 10.–11. Jahrhundert, Karpatenbecken

Eine der dringlichsten Aufgaben der archäologischen Forschung im Karpatenbecken ist die Klärung der Chronologie der Gräberfelder des 10.–11. Jahrhunderts. Ohne deutliche Übersicht der Daten können nämlich die Details über Verhältnis, Anzahl und Zusammenleben der gegen Ende des 9. Jahrhunderts hier angetroffenen, und dem von Stammesfürst Árpád geleiteten, neu angekommenen Bevölkerung nicht erläutert werden, was jede weitere Form handfester Forschung unmöglich macht. Die Bevölkerungsverhältnisse des ungarischen Fürstentums im 10. Jahrhundert und ab der Jahrtausendwende des Königtums, praktisch des gesamten Karpatenbeckens, können und müssen ausschließlich in ihrem komplexen Wesen und ihrer Vollständigkeit untersucht werden. In dieser Hinsicht gilt die Arbeit von László Kovács mit ihrer neuen Ansätzen als sehr fortschrittlich.[1] Einer ihrer Vorteile ist, dass sie voll und ganz mit der

[1] *Kovács 2013* 511–604.

Tradition der auf ethnischer,[2] bzw. gesellschaftlicher Gliederung[3] basierenden Annäherungen bricht, die grundsätzlich in einer Sackgasse endeten. Diese Betrachtungsweisen sind nämlich mit archäologischen Mitteln nur schwer analysierbar und das Fehlerrisiko ist hoch, sie sollten unter keinen Umständen den Ausgangspunkt einer umfassenden Analyse bilden. In Wahrheit ist es genau umgekehrt: nach den von Kovács vorgeschlagenen Untersuchungen und in Kenntnis ihrer Ergebnisse, kann man – sehr vorsichtig – einige Hypothesen hinsichtlich der Abstammung und gesellschaftlichen Gliederung jener Bevölkerung riskieren, die die einzelnen Gräberfelder benutzte und in den Mikroregionen anzufinden war. Damit dieses Modell auch funktioniert, stehen uns jene Informationen zur Verfügung, die zur annähernden Datierung – wobei eine Toleranzgrenze von wenigen Jahrzehnten ist mit einkalkuliert – der Fundorte der behandelten Zeitperiode benötigt sind; zur Verfolgung der Tendenzen reichen sie jedenfalls aus.

Moderne, gut dokumentierte Ausgrabungen der vergangenen 50-60 Jahre mit ganzheitlichem Ansatz offenbarten der Wissenschaft zahlreiche neue und gut analysierbare Gräberfelder aus dem 10.–11. Jahrhundert. Ein Großteil davon liegt heute bereits publiziert und abrufbar vor. Auch auf dem Gebiet kritischer Veröffentlichungen über frühere Fundorte (19., bzw. erste Hälfte des 20. Jahrhunderts), die nur fragmentarisch und nicht den gegenwärtigen Anforderungen entsprechend aufgedeckt wurden, sind wesentliche Fortschritte zu verzeichnen.[4] Somit ist die Zeit reif für eine neue Zusammenfassung. Meiner Ansicht nach könnte der nächste Schritt auf der Ebene der Methodik innerhalb der Forschung des Zeitalters, die Untersuchung, Bewertung und vergleichende Analyse von Mikro-, Mezo- und Makroregionen sein. Im Rahmen dieses Vorhabens widmen wir uns nur den gleichaltrigen Gräbern oder Grabgruppen der verschiedenen Fundorte (innerhalb von 40-60 Jahre langen Perioden). Die so erhaltenen Ergebnisse liefern uns Antworten auf die Frage, wie sich die Benutzungszeit der Gräberfelder in einzelnen Gegenden gestaltete: löste man sie während einer gewissen Periode des 10. Jahrhunderts auf oder nutzte man sie weiter bis zur Jahrtausendwende oder gar bis zum Ende des 11. Jahrhunderts? Gab es auf den permanent belegten Gräberfeldern nur Bestattungen von einer bestimmten Bevölkerung oder tauchten nebenbei/an ihrer statt neue Elemente auf? Wo und wann wurden neue Gräberfelder angelegt? Welche Gräberfeldtypen sind überhaupt für welche Region und Epoche charakteristisch? In meiner Monografie versuchte ich diese Fragen zu beantworten, während ich mich auf die zwischen den Ostkarpaten und der Donau aufgedeckten Gräberfelder und Gräberfeldteile konzentrierte. Dabei untersuchte ich außerdem, anhand welcher Merkmale diverse regionale Gruppen differenziert werden können.[5] Der zeitliche Rahmen der analysierten Periode umfasst den Zeitraum ab Anfang des 10. bis zum ersten Drittel des 12. Jahrhunderts, der Beendigung von Bestattungen auf sog. Reihengräberfelder. So bekommen wir ein genaueres Bild über die interne Bevölkerungsmobilität und gesellschaftlichen Umstrukturierungen des 10.–11. Jahrhunderts, in einer Zeit, deren erste Hälfte nicht von inneren, schriftlichen Quellen beleuchtet

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2 *Hampel 1907; Niederle 1894* 39–55; *Váňa 1954* 51–97.

3 *Szőke 1962*. Die gesellschaftliche Kategorisierung einzelner Friedhöfe ist äußerst problematisch. Die bereits als klassisch angesehene und auf das komplette, ungarische Siedlungsgebiet des 10.–11. Jahrhunderts gültig betrachtete Gliederung (Stammes- und Sippenaristokratie – Mittelschicht – gemeines Volk) ist offensichtlich nicht mehr vertretbar, die uns heute bekannten Gräberfelder können nicht als eindeutige, archäologische Abdrücke dieser Schichten angesehen werden. Außerdem sind diese Kategorien auch einzeln bereits kontrovers. Identischem Status oder derselben Gesellschaftsschicht angehörende Familien oder größere Gemeinschaften konnten sich nämlich in Hinsicht auf ihre Erscheinung und ihr Vermächtnis, materiell und wirtschaftlich gesehen, grundlegend voneinander unterscheiden, somit gab es bezüglich ihrer archäologischen Manifestation wesentliche Differenzen zwischen ihnen, siehe *Brather 2004*. Auch in Hinsicht auf eine Differenzierung auf ethnischer Basis ist die Lage ähnlich, siehe *Bálint 2006*.

4 *Kovács 2015* 989–1037.

5 *Révész 2020*.

wurde. Die Phasen der Inbesitznahme des Gebiets nach der ungarischen Landnahme können in groben Zügen mitverfolgt werden, außerdem die Umsiedlungen, die mit der Staatsplanung einhergingen, bzw. die Besiedelungsprozesse der Randgebiete. Darüber hinaus kommen wir auch einer Antwort auf die Frage näher, wie sich das Verhältnis zwischen landnehmenden Ungarn und den ortsansässigen Awaren, Slawen, Bulgaren und karolingerzeitlichen Bewohnern entwickelte und wie es zur kulturellen Vereinheitlichung dieser vielschichtigen ethnischen Grundlage kam.

Die archäologische Forschung der Gräberfelder im Karpatenbecken des 10.-11. Jahrhunderts wird durch die geringfügige und fragmentarische Quellenbasis außergewöhnlich erschwert. Im Rahmen meiner Materialsammlung stellte ich die Angaben zu 21.482 Gräbern von 878 Fundorten des 10.-11. Jahrhunderts zusammen, die sich auf dem Gebiet zwischen den Ostkarpaten und der Donau erstrecken. Meinen methodologischen Grundprinzipien treu bleibend, behandelte ich einen Fundort im Falle von Streufunden nur dann als Gräberfeld oder Gräberfeldrest, wenn es anhand der zur Verfügung stehenden Daten eindeutig begründet war, dass sie aus Gräbern stammten.

Lediglich 3349 Gräber von 41 Gräberfeldern der insgesamt 878 untersuchten Fundorte befinden sich auf vollständig freigelegten Gräberfeldern. Somit erreicht dieser Wert nicht einmal die 5%-Grenze der Fundorte. Außerdem sind davon 1108 Gräber aus 9 Fundorten, die bisher nicht veröffentlicht worden und so keine oder nur kaum einschlägige Daten uns vorliegen, was die Situation weiter erschwert. Dazu können weitere 37 Fundorte mit insgesamt 3291 Gräbern – mit 1013 Gräbern auf 6 Fundorten ohne Veröffentlichung – gerechnet werden, die den Ausgräbern zufolge zu mindestens 70-75% aufgedeckt sind. Die übrigen 14.842 Gräber von 793 Fundorten stammen aus teilweise freigelegten und auf mehr oder weniger professionellem Niveau geretteten und dokumentierten Gräberfeldabschnitten, weshalb sie als Quellen nur geringfügig geeignet sind. Weder die Zeitstellung ihrer Errichtung, noch ihrer Auflassung ist uns bekannt, weshalb ihr Quellenwert viel niedriger ist, als der vor ihnen aufgezählten.

Unter solchen Umständen wäre es jedoch vermessen, den Bedarf zu verlautbaren, die Geschichte einer Region im 10.–11. Jahrhundert verfassen zu wollen. Meiner Ansicht nach können wir uns in der gegenwärtigen Situation einer einzigen Methode bedienen: wir entwerfen anhand der uns zur Verfügung stehenden, archäologischen Funde ein Modell. Für die Modellierung müssen wir all jenes Wissen verwerten, das 170 Jahre an archäologischer Forschung auf dem Gebiet der Landnahmezeit erbracht hat. Auf diese Ergebnisse – die gegebenenfalls weiter präzisiert werden sollen – basierend, können wir ein Bild des gegenwärtigen Forschungsstands über die Gräberfelder der einschlägigen Region im 10.–11. Jahrhundert, bzw. den materiellen Nachlass jener Bevölkerung auf dem Gräberfeld, ihren Glauben und ihre gesellschaftliche Gliederung anfertigen. Das Endergebnis wird weit entfernt von der einstigen Realität sein und spiegeln lediglich unser momentanes Wissen über den Themenbereich wider. Die vorliegenden Informationen müssen wir in ihrem aktuellen Zustand behandeln und uns hinsichtlich der fehlenden Details nicht zu Mutmaßungen verleiten lassen. Um ein konkretes Beispiel zu nennen: wenn wir die Gräber eines uns ungefähr zur Hälfte oder noch geringer bekannten Gräberfeldes, anhand unseres gegenwärtigen Wissensstands auf die Zeit zwischen das letzte Viertel des 10. und die Mitte des 11. Jahrhunderts datieren können, ist es während der Analyse zielführend, davon auszugehen, dass der komplette Fundort aus jener Epoche stammt, und nicht ratsam, sich in Spekulationen über die „womöglich vernichteten“, „früheren“ oder „späteren“ Teile des Gräberfeldes zu ergehen, auch dann nicht, wenn solche Abschnitte wahrhaftig existiert haben könnten. Mit Daten können wir nämlich nur die Analyse des bekannten Abschnitts unterstützen, die uns Unbekannten bleiben jedoch Vermutungen. Natürlich muss ich zugeben, dass diese Methode bereits von Anfang an ein gewisses Fehlerrisiko in sich trägt, da sie kein Abbild der einstigen Realität des Fundortes darstellt, sondern nur dessen, was wir über den Ort wissen. Diesen Faktor kann man jedoch leider nicht umgehen. Ein weiterer Nachteil der von mir vorgeschlagenen Methode ist, dass sie anhand der aus haltbarem Material gefertigten und in die Gräber gelegten Gegenstände, bzw. der identifizierten, rituellen Merkmale versucht, zu kategorisieren. Die Realität

der damaligen Epoche war selbstverständlich unvergleichbar vielfältiger. Die Archäologie kann allerdings nur mit Funden arbeiten, darin liegen ihre Stärke, aber auch gleichzeitig ihre Grenzen.

Für die weiterführende Analyse des Kulturerbes der Epoche, halte ich weder die von József Hampel empfohlene ethnische Kategorie,[6] noch die von Béla Szőke eingeführte Differenzierung anhand gesellschaftlicher und chronologischer Kategorien[7] für geeignet. Meiner Auffassung steht das von László Kovács formulierte System am nächsten,[8] dessen Grundlage die Grabanzahl und die Nutzungszeit der Gräberfelder bilden. In seiner ursprünglichen Form konnte ich es allerdings ebenso wenig anwenden. Dessen Hauptgrund war, dass Kovács' Methode in erster Linie für die Deutung von vollständig oder größtenteils aufgedeckten Gräberfeldern geeignet ist, und bedauerlicherweise handelt es sich bei mindestens 95% der uns zur Verfügung stehenden Fundorte um solche, die nicht dieser Gruppe angehören.[9] Dementsprechend habe ich den Tendenzen entsprechend, die sich während meiner Materialsammlung abzeichneten, die Fundorte in vier chronologische Kategorien unterteilt, um damit auch zu betonen, dass ich im Gegensatz zu László Kovács die Grabanzahl der einzelnen Gräberfelder für keinen wesentlichen Faktor für die Differenzierung halte:

Der *Kategorie I* gehören jene an, die unseres Wissens auf das 10. Jahrhundert und innerhalb dessen vermutlich auf die ersten sieben-acht Jahrzehnte datiert werden. Ihr Fundbestand umfasst sog. „klassische" Artefakte der Landnahmezeit, ohne Varianten, die in den ersten Jahrzehnten der Jahrtausendwende auftauchten. Als Grundlage sah ich das vollständige Fundmaterial und das damit einhergehende Bild an.

Der *Kategorie II* gehören jene Fundorte an, die anhand ihrer Funde (trapezförmige Steigbügel, zweischneidige Schwerter, Beile und Äxte mit Schaftlochtlappen, Ohrringe mit Traubenanhängern, birnenförmige Haarringe und Haarringe mit eingerolltem Ende, Haarringe mit „frühem" S-Ende, dünne, gedrehte Hals- und Armreife, Armreife mit Tierköpfen, Ohrringe mit Spiralanhängern, Gegenstände des Typs Köttlach II usw.) von der Mitte des 10. bis ins Ende des ersten Drittels des 11. Jahrhundert datiert werden können. Es fehlen allerdings Münzen der Herrscher nach Stephan I. (dem Heiligen, 997/1000–1038), bzw. Funde, die typisch für die spätere Periode des 11. Jahrhunderts waren.

Der *Kategorie III* gehören jene Fundorte an, die Fundmaterial des 10. und bis zum Ende des 11., bzw. Anfang des 12. Jahrhunderts, sowie Münzen der ungarischen Árpáden-Herrscher aufwiesen.

Von den Gräberfeldern der *Kategorie IV* liegen uns lediglich Funde aus dem 11. Jahrhundert vor: Haarringe mit rippenverziertem S-Ende, Glasperlen mit Folien aus Edelmetall, Glasperlen mit quadratisch gegliederter Oberfläche und Fluoritperlen, sowie die Münzen der Könige zwischen 1038 und 1141.

Mit der ethnischen Beurteilung hielt ich mich, mit Ausnahme weniger charakteristischer Fälle – wo ich die Möglichkeit einer solchen Bewertung erwog – zurück, auch von einer gesellschaftlichen Klassifikation sah ich ab. Nur im Falle einiger besonders prunkvollen Gräber zog ich die Möglichkeit der Zuordnung zur Stammesaristokratie vorsichtig in Betracht aber behielt dabei im Hinterkopf, dass selbst diese verhaltenen Andeutungen angreifbar sind. Als Ergebnis der Forschung gelang es mir, anhand der Zusammensetzung des Fundmaterials, der Gräberfeldstruktur und ihrer Nutzungszeit, jene Tendenzen zu veranschaulichen, welche siedlungsgeschichtlichen Abläufe sich in welchem Zeitabschnitt und in welcher Region des Gebiets zwischen den Ostkarpaten und der Donau vollzogen. Aus Platzgründen kann ich auf die

[6] *Hampel 1907.*
[7] *Szőke 1962.*
[8] *Kovács 2013* 511–604.
[9] Detaillierter über das Thema siehe *Révész 2020* 60–65.

Einzelheiten dieser Prozesse in dieser Arbeit nicht eingehen.[10] Als allgemein gültige Tendenz zeichnet sich jedoch folgendes Bild ab:

Die Anzahl jener Gräberfelder, deren Nutzung sich auf das 10. Jahrhundert beschränkte *(Kategorie I)*, ist an sich bereits mehr als doppelt so groß, wie die Anzahl der Gräberfelder, die ab der zweiten Hälfte des 10. Jahrhunderts – größtenteils eher ab dem letzten Drittel – bis zum ersten Drittel des 11. Jahrhunderts *(Kategorie II)*, oder im 10.–11. Jahrhundert durchgehend *(Kategorie III)*, bzw. die nur im 11. Jahrhundert – eventuell noch im ersten Drittel des 12. Jahrhunderts – für Bestattungen in Anspruch genommen wurden *(Kategorie IV)*. Wenn wir außerdem noch die Einzelgräber dazurechnen, verschiebt sich das Verhältnis noch wesentlicher. Die Mehrheit der Fundorte, die auf die ersten zwei Drittel des 10. Jahrhunderts datiert werden, beherbergte eine niedrige Anzahl (2–26) an Gräbern. Ein Teil der Gräberfelder umfasst 31–90 Gräber und nur sehr wenige verfügten über 105–115 Bestattungen. Das Gräberfeld von Sárrétudvari-Hízóföld zählte mit seinen 262 Gräbern nicht nur auf dem untersuchten Gebiet, sondern im ganzen Karpatenbecken als einzigartige Ausnahme unter den im 10. Jahrhundert genutzten Gräberfeldern. Die größeren Gräberfelder mit 31–90, bzw. 105–144 Bestattungen lassen längerfristig bewohnte, dorfähnliche Siedlungen vermuten, was allerdings nicht zwangsläufig bedeutet, dass es sich um viel größere Gemeinschaften, als die vorangegangenen handelte. Eine höhere Anzahl an Bestattungen könnte nämlich auch auf die längere Zeit zurückgeführt werden, die man an ein und demselben Ort verbracht hatte, bzw. auf das eigentümliche Verwaltungsprinzip der Gemeinschaften in gewissen Regionen.

Anhand der Lage der Fundorte hat es den Anschein, dass die Ungarn der Landnahmezeit nicht das komplette Gebiet des ihnen zum alltäglichen Leben geeigneten Terrains besiedelt hatten. Typisch für das erste Drittel des 10. Jahrhunderts sind – von der Region abhängend – Einzelgräber und Gräberfelder mit niedriger Grabanzahl,[11] bzw. Gräberfelder mit einer Grabmenge im Zehnerbereich. Fundorte mit 100–150 Gräbern sind selten und das bei Sárrétudvari-Hízóföld aufgedecktes Gräberfeld, das bis zum Ende des Jahrhunderts genutzt wurde, gilt eigentlich schon als extrem groß. Allerdings beschränkte sich die Benutzung kleinerer Gräberfelder nicht nur auf diese Epoche, auch um die Jahrtausendwende und selbst im 11. Jahrhundert finden wir noch Gräberfelder in dieser Größenordnung. Dem Anschein nach lebte der Großteil der zeitgenössischen Bevölkerung in kleinen, aus wenigen Familien bestehenden Weilern. Diese Gemeinschaften legten jedoch in der Anfangszeit in diversen Regionen einzigartige Gräberfeldtypen an: Solche Bestattungseinheiten kamen zum Beispiel in Nordost-Ungarn, auf dem Gebiet zwischen Tiszaeszlár – Karos – Rétközberencs mit 13–73 Gräbern aus derselben Epoche ab dem Ende des 9. bis zur Mitte des 10. Jahrhunderts vor, die nur einige hundert Meter voneinander entfernt lagen.[12] In Südungarn gibt es die Gebietseinheit von Nagyősz – Algyő – Balotaszállás, hier liegen Bestattungen ebenfalls wenige hundert und in vereinzelten Fällen nur 10 Meter voneinander entfernt, darunter befinden sich „einsame“ Gräber und kleine Gräberfelder mit höchstens 10–15 Gräbern, die vom Ende des 9. Jahrhunderts bis zum Ende des zweiten Drittels des 10. Jahrhunderts genutzt wurden.[13] In anderen Regionen, wie z. B. am Rande Sárrétudvar, im Trans-Theiß-Gebiet, offenbarten sich zeitgleiche,

[10] Detaillierte Erläuterung der erwähnten Abläufe siehe *Révész 2020* 428–460.

[11] Meist weniger als 30 Bestattungen.

[12] *Révész 2020* 198–246. Die markante Überzahl an Männern, ihre wertvolle Bewaffnung und zahlreiche Gegenstände mit Rangabzeichen lassen vermuten, dass hier die Anführer und Mitglieder des fürstlichen Gefolges ruhten. Interessantes Detail hinsichtlich ihrer Anordnung war, dass in den Gräbern der Anführer, die zu einer Einheit der Grabgruppe gehörten und auf den 100-150 m voneinander entfernten Gräberfeldern Karos II und III lagen, DNS-Analysen zufolge, Brüder ruhten, die denselben Vater und dieselbe Mutter hatten. Darüber hinaus konnten allerdings keine weiteren, genetischen Kontakte zwischen den Toten der einzelnen Gräberfelder nachgewiesen werden, siehe *Neparáczki 2017*.

[13] *Türk – Lőrinczy – Marcsik 2015* 43–45; *Révész 2020* 414–419.

allerdings sehr unterschiedlich reichhaltige Gräberfelder. Einer davon überdauerte das gesamte 10. Jahrhundert (Sárrétudvari-Hízóföld, 262 Gräber), andere nutzte man zwar teils zur selben Zeit, im Verlauf des 10. Jahrhunderts jedoch kurzfristiger (Sárrétudvari-Őrhalom: 5 Gräber, Sárrétudvari-Poroshalom: 17 Gräber, beide partiell aufgedeckt). Diese Gräberfelder geben eine zukünftige Forschungsrichtung an, deren Fokus die Beziehung dieser Fundorte zueinander und die Aufklärung ihrer Hierarchie sein sollte.[14]

In der zweiten Hälfte des 10. Jahrhunderts stellte man die Benutzung der meisten, gegen Anfang des Jahrhunderts angelegten Gräberfelder ein. Zur selben Zeit, teils offensichtlich infolge gezielter Besiedlungen, nehmen neuere Gruppen in mehreren Wellen, einerseits die bis dahin unbewohnten Gebiete, andererseits die von der früheren Bevölkerung verlassenen Gegenden in Besitz. Ähnliche Migrationsbewegungen vollzogen sich auch in der ersten Hälfte des 11. Jahrhunderts. Nur in wenigen Regionen wurden Gräberfelder ab dem 10. Jahrhundert bis zur Wende des 11.-12. Jahrhunderts nachweisbar durchgehend genutzt. Derselben Periode kann auch die Umsiedelung der vor Ort angetroffenen und bis dahin unberührten Bevölkerung durch die Ungarn zugeordnet werden. Die sich miteinander vermischenden Gruppen unterschiedlicher Herkunft, die gemeinsame Gräberfelder (und offensichtlich auch gemeinsame Dörfer) nutzten, hatten einen immer einheitlicher werdenden Fundhorizont zur Folge. Davon zeugten in erster Linie die verschiedenen Ohrringtypen, außerdem nahm die Zahl der für die früheren Jahrzehnte charakteristischen Gegenstände in ihrem Kulturerbe immer weiter ab. Dieser Prozess markiert meiner Ansicht nach den Ausbau der Alleinherrschaft der vorherrschenden Dynastie der Árpáden, und des christlichen Königreichs. Die Grabanzahl der Gräberfelder nimmt ständig zu, aus dem 11. Jahrhundert liegen uns bereits Fundorte mit mehreren hundert Gräbern vor. In manchen Fällen lagen sie recht nah beieinander, was auf eine hohe Bevölkerungskonzentration schließen lässt.

So sieht ungefähr die Forschungsgrundlage aus, anhand derer Gräberfelder und unterschiedlich große Gräberfeldteile mit den Ausgrabungsergebnissen der Siedlungen in Einklang gebracht werden müssten.

Ich stimme Miklós Takács zu, dass es zur Darstellung der Siedlungsgeschichte verschiedener Regionen wirklich unerlässlich ist, die Ergebnisse von Gräberfeldern, Siedlungs- und Landschaftsarchäologie gemeinsam auszuwerten.[15] Momentan ist das allerdings nur sehr schwer realisierbar. Zuerst muss ein System der Ergebnisse der Gräberfeld-, Siedlungs- und der landschaftsarchäologischen Analysen anhand der gegenwärtigen Forschungslage entworfen werden. Im Fall der Gräberfelder liegen uns bereits auswertbare und diskussionswürdige Ergebnisse vor.[16] Zur Auseinandersetzung von Gräberfeldern und Siedlungen wäre es sehr nützlich, ein Fundortkataster zu erstellen, das die Siedlungen beinhalten würde. Die Siedlungsforschung verzeichnet infolge topografischer Bemühungen der vergangenen Jahrzehnte und vorangegangener Ausgrabungen, die auf großen Gebieten durchgeführt wurden, ebenfalls riesige Fortschritte.[17] Dennoch gibt es nur sehr wenige Siedlungen, die vollständig oder zumindest größtenteils freigelegt und auch publiziert worden sind.[18] Der Begriff des „Dorfes“ muss momentan noch in theoretischer und methodologischer Hinsicht geklärt werden, bzw. was man darunter in den einzelnen Epochen

[14] *Nepper 2002* 296–403; *Révész 2020* 433–434.

[15] *Takács 2014* 137; *Jankuhn 1977* 1–8.

[16] *Kovács 2013*, seine Ergebnisse entwickelte der Autor weiter in die Richtung regionaler Forschungen, siehe: *Révész 2020*.

[17] *Bálint et al. 2003* 383–388; *Takács 2010a* 907–917*; Rácz 2019* 136–152.

[18] Miklós Takács ist in seiner Arbeit, die in diesem Band erschienen ist, der Ansicht, dass die von mir, auf dem Gebiet zwischen den Ostkarpaten, der Donau und dem Ipeľ gesammelten 41 + 37 Gräberfelder, welche Zahl wird nach Beendigung der auf das ganze Karpatenbecken ausgeweiteten Sammlung vermutlich auf über 100 ansteigen, nicht, bzw. nur zur Aufstellung einer Hypothese ausreichen, doch ist diese Anzahl immer noch ein Vielfaches der ähnlich bewertbaren Siedlungen.

des Zeitabschnitts zwischen Anfang des 10. und Ende des 13. Jahrhunderts versteht. Es bezieht sich besonders auf die regionale Ebene mit – infolge zahlreicher Faktoren – voneinander eindeutig abweichenden Erscheinungsformen. In dieser Hinsicht wurden zwar verschiedene Hypothesen erstellt, doch bilden sie bis dato noch kein kohärentes System.[19] Das größte Problem stellen allerdings die Abgrenzungen der Befundgruppen dar, die im Rahmen von Geländebegehungen und Ausgrabungen beobachtet werden konnten: welche Befunde zur selben Siedlung gehören und welche bereits zur benachbarten Gemeinschaft gezählt werden können, ist in den meisten Fällen überhaupt nicht oder nur hypothetisch festzustellen. Die Grenzen der einzelnen Siedlungen liegen uns weder aus dem 10. noch aus dem 11. Jahrhundert vor und die später entstandenen Urkunden können nicht automatisch auf die früheren Jahrhunderte rückwirkend gültig gemacht werden. Der Grund dafür stellte sich gerade während der Analyse von Gräberfeldern heraus, nämlich, dass es während dieser beiden Jahrhunderte, in den verschiedenen Regionen des Karpatenbeckens, mehrmals zu Migrationsbewegungen und (Zwangs)Umsiedlungen kam. Somit können wir in den meisten Regionen auch nicht von Kontinuität der Siedlungen, ihrer Grenzen und ihrer Namen ausgehen. Abgesehen davon, dass es für einen Archäologen riskant ist, ohne spezielle Kenntnisse in sprachgeschichtlichen und toponomastischen Fragen Stellung zu beziehen, birgt ein anderer Faktor noch weitere Gefahren. Bei archäologischen Fundorten – unabhängig davon, ob Dorf oder Gräberfeld – ist es immer gewagt, den Fundort mit Ortsnamen benachbarter Ortschaften in Verbindung zu bringen, die in den meisten Fällen erst in Jahrhunderte später entstandenen Quellen erwähnt wurden.[20] Einerseits ist es nämlich schwierig, bzw. in der überwiegenden Mehrheit der Fälle unmöglich, zu beweisen, dass zwischen den beiden überhaupt eine echte Kausalität besteht, andererseits werden verknüpfte Daten anhand unzulänglicher Belege oft Ausgangspunkt zahlreicher falscher Schlussfolgerungen, da sie den Eindruck vermitteln, auf mehreren Ebenen bewiesen worden zu sein.[21]

Ein weiteres, momentan unüberwindbares Hindernis stellt die Frage der Chronologie dar. Im Rahmen der Gräberfeldforschung sind wir bereits dort angelangt, sie ungefähr 60-70 Jahre umfassenden Perioden zuordnen zu können. Die Keramikforschung allerdings, die sich der Mehrheit des Fundmaterials der Siedlungen widmet, hat noch keine ähnliche Datierungsgenauigkeit erreicht.[22] Die Vermischung der Daten mit unterschiedlichen Aussagekraft kann allerdings leicht dazu führen, dass wir die voneinander abweichenden Zeithorizonte der Gräberfelder und Siedlungen nebeneinander stellen und somit unvermeidbar falsche Schlussfolgerungen ableiten. Hier möchte ich erneut darauf hinweisen, dass die Einrichtung und Auflassung von Gräberfeldern im Karpatenbecken des 10.–11. Jahrhunderts ein dynamischer und darüber hinaus regional verschiedener Ablauf war, der offensichtlich eng mit der Gründung und Aufgabe der entsprechenden Siedlungen zusammenhing.[23]

Dort, wo man von Seiten der Siedlungsforscher – in den letzten Jahren immer öfter – über Siedlungen des 9.–10., 9.–11. oder gar 8.–11. Jahrhunderts liest, ist der Widerspruch besonders vehement. Östlich der Donau liegen uns, womöglich mit der Ausnahme der Gegend um Gyulafehérvár, keine Informationen über Gräberfelder mit dieser Datierung vor. Die zeitliche Obergrenze der awarenzeitlichen Gräberfelder in dieser Region wird meistens im Zeitabschnitt

[19] *Takács 2010b* 1–67; *Šalkovský 2011* 419–420; *Jankovich – Szatmári 2013* 637–644; *Rácz 2019* 138–144; *Wolf 2020* 161–166.

[20] *Laszlovszky 1986* 239–240; *Takács 2000* 240; *Ringer – Szörényi 2011* 515–516.

[21] *Bálint 1978* 264–265. Die gut fundierten und gedankenanregenden Argumente von Csanád Bálint hinsichtlich dieses Themas haben nichts an ihrer Gültigkeit eingebüßt.

[22] Über die Datierungsschwierigkeiten von Keramik, siehe *Takács 2012* 145–148; *Takács 2014* 140*; Rácz 2019* 49–50, 136; *Wolf 2020* 45–119.

[23] Ich bin der Ansicht, dass auch jene sprachgeschichtlichen und toponomastischen Hypothesen, die aufgrund späterer Daten rückwirkend auf das 10. Jahrhundert angestellt wurden, überdacht werden sollten.

des ersten Drittels des 9. Jahrhunderts festgelegt.[24] Auch wenn wir die Überlegungen von Béla Miklós Szőke akzeptierten, dass diverse landnehmende Bevölkerungsgruppen bereits in den 860-er Jahren eingewandert waren, würde sie das Problem nicht aus der Welt schaffen, da selbst dann noch ein 40-60 Jahre langer Hiatus zwischen den beiden Gräberfeldhorizonten bestünde.[25] Ich persönlich halte es auch für sehr wahrscheinlich, dass zahlreiche Awarengemeinschaften die ungarische Landnahme noch erlebten, nur sehe ich auf diesem Gebiet vorerst keine massenhaften, archäologischen Beweise dafür.

Ein weiteres Problem stellt der Umstand dar, dass man mithilfe archäologischer Mittel momentan jene Phänomene nicht nachweisen kann, mit deren Existenz wir in dieser Epoche allerdings eindeutig rechnen müssen: damit meine ich, dass diverse Familien einer Siedlung am Rand der Ortschaft gleichzeitig, nah beieinander gelegene, jedoch separate, kleine Gräberfelder angelegt haben können, oder umgekehrt, dass die Bewohner kleinerer Siedlungen ihre Toten auf einem gemeinsamen Gräberfeld zur ewigen Ruhe betteten. Daraus folgt, dass Grabanzahl und Nutzungszeit der Gräberfelder kein zwangsläufig realistisches Abbild der Einwohnerzahl jener Gemeinschaften (Siedlungen) darstellen. Natürlich wissen wir auch nicht, wie viele unentdeckte Gräberfelder sich noch in der Erde verstecken.[26] Im Endeffekt kann man bereits bekannte Gräberfelder, im Sinne der aufgezählten Argumente, auch in einer relativ kleinen Region, höchstens hypothetisch mit Siedlungsphänomenen in Verbindung bringen.

Die nächsten, notwendigen Schritte auf dem Gebiet der Siedlungsarchäologie sehe ich in der Intensivierung der Regionalforschung. Da es zurzeit, von seltenen Ausnahmen abgesehen, noch nicht möglich ist, konkrete Gräberfelder mit Siedlungen zu verknüpfen, würde es sich lohnen, innerhalb einzelner, bestimmter Regionen, Tendenzen, Veränderungen und Merkmale, die sich anhand von Gräberfeldern und Siedlungsüberresten abzeichneten, zu analysieren und miteinander zu vergleichen. Auf diesem Gebiet gibt es nämlich bereits vielversprechende Ergebnisse.[27]

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[24] *Szőke 2019* 19–131, neben Aufarbeitung der kompletten, einschlägigen Fachliteratur.

[25] *Szőke 2019* 269–293; *Révész 2020* 35–48.

[26] Die Chance, Siedlungen durch nicht-invasiven Methoden zu entdecken, ist weitaus groß.

[27] Die für das Pester Flachland typischen Einzelgräber des 10. Jahrhunderts und die kleinen Gräberfelder mit 2-4-8-21 Gräbern zum Beispiel können gut mit den dort gefundenen, kleinen Siedlungen verglichen werden, siehe *Révész 2020* 363–368; *Rácz 2019* 136–144. Irma Oláh stellte ähnliche Vergleiche im Zusammenhang von Gräberfeldern und Siedlungen des 10.–11. Jahrhunderts im Komitat Békés an, siehe *Oláh 2018* 41–47.

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NOTES ON THE 10TH–11TH-CENTURY RELATIONS OF FEMALE JEWELLERY FOUND IN THE CARPATHIAN BASIN WITH SOUTH-EASTERN EUROPE REFLECTED BY TWO TYPES OF JEWELLERY[1]

Zusammenfassung: Die ungarische archäologische Forschung widmet sich in artefaktischer Hinsicht seit knapp 60 Jahren eingehend den südosteuropäischen Beziehungen des Ungarntums im 10. Jahrhundert. Béla Szőke ging in seiner programmatischen Zusammenfassung als Erster detailliert auf diese Quellengruppe ein, Károly Mesterházy fasste 30 Jahre später die neueren Ergebnisse zusammen. Ziel des vorliegenden Aufsatzes ist, die neuesten Ergebnisse der seit letzterer Publikation vergangenen weiteren drei Jahrzehnte in Verbindung mit diversen Schmucktypen zu erläutern. Die Erweiterung des Fundmaterials im Karpatenbecken – gering, hinsichtlich der Bewertung der Gegenstandsart, dennoch maßgeblich – bzw. die neuen Ergebnisse breiter angelegter, regionaler Forschungen ermöglichen nicht nur eine umfassendere Bewertung der jeweiligen Denkmalgruppen, sondern auch die Analyse grundlegender Fragen, die zu einem vollständigeren Bild der Beziehungen zwischen dem Karpatenbecken des 10. Jahrhunderts und Südosteuropas führen können.

Keywords: Byzantine/Balkan earrings, Eastern Alpine finding horizon, 10th–11th-century artefacts, Carpathian Basin

From the aspect of material culture, the relations of 10th-century Magyars with South-Eastern Europe has been at the forefront of Hungarian archaeological research for sixty years. Béla Szőke was the first to refer to this group of sources in detail when discussing the goals of future research,[2] and thirty years later Károly Mesterházy summarised the new results.[3] This paper aims to present the research results in terms of some jewellery types during the three decades that passed since the latter author's work. The discovery of new artefacts in the Carpathian Basin – that are few but of cardinal importance for the analysis of this type of object – as well as the recent results of investigations in the wider region allow not only a more general interpretation of the assemblages in question, but also make possible the investigation of such general issues that may contribute to a better understanding of the connections between the Carpathian Basin and South-Eastern Europe in the 10th century.

[1] I received a lot of help from colleagues in writing the present study. I owe a debt of gratitude to Edit Király, Zita Léhner, Maja Petrinec, László Révész, Ágnes Ritoók, Rita Soós, Perica Špehar, Béla Miklós Szőke, Miklós Takács, and Attila Türk. I am grateful to Zsóka Varga for the drawings. The research project was supported by the National Research, Development and Innovation Office (NKFIH K 132030).

[2] *Szőke 1962*.

[3] *Mesterházy 1990; Mesterházy 1991; Mesterházy 1993; Mesterházy 1994.*

1. Pendants and earrings decorated with a crescent on their inner arch

1.1. Items from the Carpathian Basin

The pieces of jewellery decorated with a crescent on their inner arch are relatively rare in the Carpathian Basin.[4] Béla Szőke had information about one, and Mesterházy knew two pairs of such artefacts,[5] which can be complemented with two more pieces in light of recent publications.[6] One of the three pairs of earrings was found in Székesfehérvár *(fig. 1. 1–3)*, the other two were discovered at the site Szeged *(fig. 1. 4–6)*. One of the more recently discovered items comes from Gyula *(fig. 1. 7)*, and the other was found at Himód *(fig. 1. 8)*. At all four sites *(fig. 2)*, the artefacts were unearthed from burials. Before their analysis, however, it is worth presenting each item in more detail, describing their characteristics and physical properties.

Székesfehérvár-Demkóhegy (Fejér county), grave no. 36. The first reference to the 10th-century cemetery in the area of the sand quarry dates from 1878. Beginning with the last decade of the 19th century, following the discovery of several other finds, excavations were conducted at the site on numerous occasions.[7] During these, nearly half of the cemetery (43 graves) – that must have once comprised seventy to one hundred burials – could be observed and the associated finds were recorded.[8] The burial in which the earrings were discovered also yielded two silver wire earrings of round cross-section.[9]

The cast silver earrings (current location and inventory number: Hungarian National Museum, Budapest 106/1903.51–52) are well preserved *(fig. 1. 1–3)*.[10] The size of the earrings: height: 3.95–3.96 cm, width: 2.5–2.56 cm. The width of the upper arch: 0.13–0.16 cm. Dimensions of the lower arch: width: 0.29–0.3 cm, thickness: 0.14–0.15 cm. Dimensions of the grape-cluster attached to the lower arch: length: 1–1.15 cm, width: 0.45 cm, thickness: 0.45 cm. Dimensions of the crescent-shaped decorative element: height: 1.38–1.41 cm, thickness: 0.14–0.16 cm. The distance between the two tips of the crescent: 0.76 cm. The length of the tag joined to the *lunula* decoration: 0.21–0.24 cm. Dimensions of the decorative elements separating the upper and lower arches: height: 0.35–0.37 cm, width: 0.25–0.3 cm. The weight of the artefacts: 3.7–4 g.

The earrings cast as one piece have two main parts. The upper arch is a wire of round cross-section separated from the lower arch by a bead. The lower arch has a rectangular cross-section and widens in the middle. In the line of the vertical central axis, a pendant imitating a bunch of grapes is attached to the lower arch, while on the inner side of the lower arch, there is a crescent-shaped decorative element. The jewellery is not corroded, but the casting is quite crude. The manufacturers did not shape the bunch of grapes very carefully, so the element imitating granulation is a bit schematic. The frame on the rim of the *lunula* – certainly imitating a filigree wire – also lacks elaboration *(fig. 1. 3)*. The upper arch is joined to the lower arch on one side only. The artefact is open on the other side. This part was formed in this way during the casting. In other words, the missing piece was not cut out subsequently. This observation is also supported by the two terminals of the interrupted arch. There is clearly no trace of cutting or finishing after cutting. The manufacturers did not even pay attention to properly rasp or cut off the remainder of the wire connected to the globular ornament, where the lower and upper arches meet. The plane

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4 The rarity of these objects in the Hungarian archaeological material has already been noted by Béla Szőke in his fundamental summary, *Szőke 1962* 49–50.

5 *Szőke 1962* 49–50; *Mesterházy 1991* 107.

6 *Medgyesi 2015* 83; *Tomka 2010* 200–203.

7 As shown by the data collected by Kornél Bakay, further finds were discovered at the site in 1929, *Bakay 1966* 55; *Petkes 2012* 91–92, No. 55.

8 *Acsádi – Nemeskéri 1958* 508–509; *Bakay 1966* 44–50.

9 *Bakay 1966* 53.

10 The description by Bakay also says that the artefacts were made of silver, *Bakay 1966* 53.

Fig. 1. Pendants and earrings decorated with a crescent on their inner arch from the Carpathian Basin. 1–2. Székesfehérvár-Demkóhegy; 3. Detail photo of the crescent on one of the pieces from Székesfehérvár; 4–5. Szeged-Öthalom; 6. Detail photo of the neck of one of the pieces from Szeged; 7. Gyula-Téglagyár; 8. Himód-Káposztás-kertek (Photographs: ©Péter Langó)

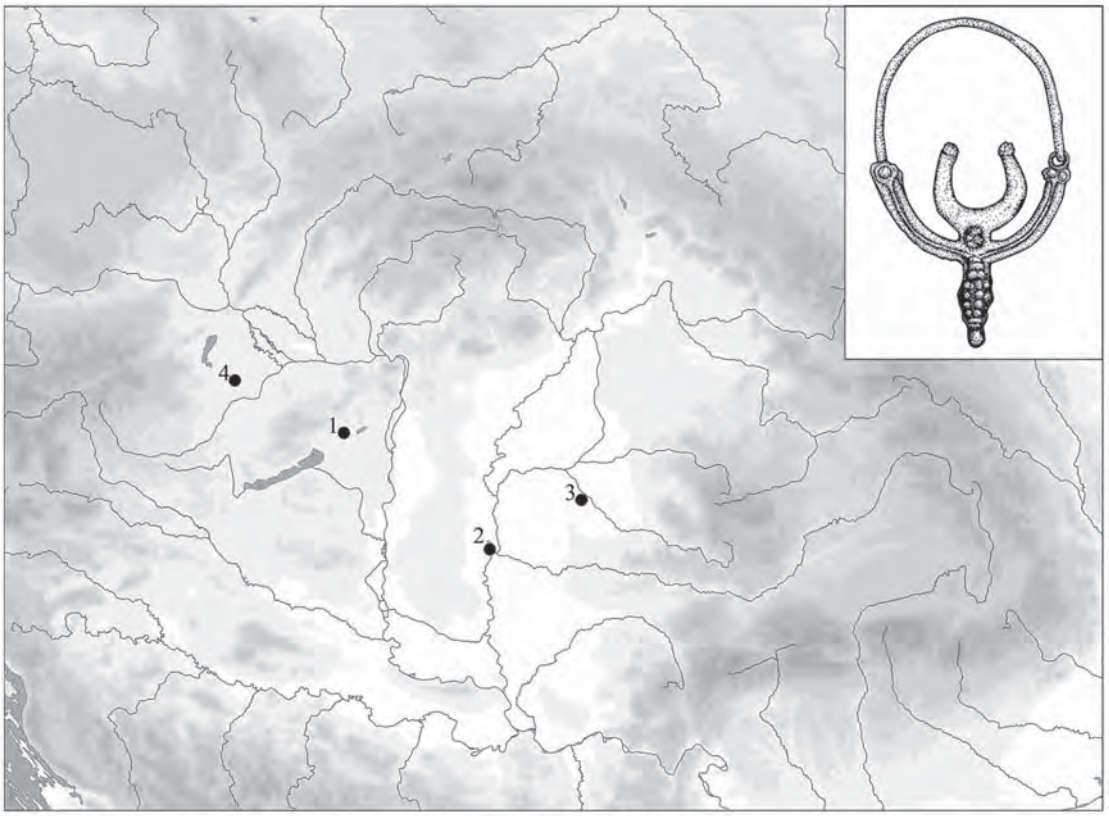

Fig. 2. Distribution of the pendants and earrings decorated with a crescent on their inner arch from the Carpathian Basin. 1. Székesfehérvár-Demkóhegy; 2. Szeged-Öthalom; 3. Gyula-Téglagyár; 4. Himód-Káposztás-kertek

of one of the pieces of jewellery is not perpendicular: the crescent-shaped ornament bent during use. The technical standard of the castings is also demonstrated by the fact that several inclusions can be seen in one of the objects. These minor defects due to casting were not removed by subsequent rasping nor were they engraved, which also shows that they were pieces of jewellery with simple finishing.[11]

Szeged-Öthalom (Csongrád county), grave no. 13/1950.[12] The pair of earrings were discovered in a part of a cemetery comprising thirteen graves, in 1950. They belonged to a female burial and

[11] *Ćorović-Ljubinković 1951; Mesterházy 1991.*

[12] In my paper, the numbering of the graves differs from what was used by previous researchers. Csanád Bálint, publishing the results of the 1950 excavation and assuming that the graves discovered in 1879 and excavated in 1950 belonged to the same cemetery, suggested that the numbering of the burials should be continuous and the original grave numbers (from 1879 and 1950) should be indicated in brackets. Afterwards, researchers employed the continuous numbering of the graves proposed by Bálint, interpreting the burials discovered there as parts of the same cemetery (see, for example, *Kovács 1989* 61; *Kovács 2011* 145). Although recent research has clarified the relationship of the parts of the cemetery, it is still controversial whether they can be interpreted as one cemetery or as independent sites. It is not the objective of the present paper to explore this question, but until it is decided, we think it is worth keeping the *grave number/year* format in brackets as given by Bálint, and to call attention to the fact that the differing grave numbers in the previous literature can be explained by the state of research mentioned above.

were found according to the position of wearing, on either side of the skull.[13] Additionally, the burial contained a string of beads, two bronze wire bracelets with a rounded cross-section and pointed terminals, as well as an iron arrowhead.[14]

Ehe cast silver earrings (current location and inventory number: Móra Ferenc Museum, Szeged 53.4555.23) are preserved in a poor condition *(fig. 1. 4–6)*.[15] One of the items of broken, the other is intact.[16] The size of the earrings: height: 4.48–4.53 cm, width: 2.6–2.69 cm. The thickness of the upper arches: 0.13 cm. Dimensions of the lower arches: width: 0.31–0.31 cm, thickness: 0.13–0.15 cm. Dimensions of the grape-cluster attached to the lower arch: length: 1.16–1.23 cm, width: 0.36–0.48 cm, thickness: 0.46 cm. Dimensions of the crescent-shaped decorative element: height: 1.37–1.43 cm, width: 1.17 cm. The weight of the artefacts: 3.2 g.

The earrings are cast as one piece and have two main parts. The upper arch is made of a wire of a round cross-section, which is separated from the lower arch on each side by a decorative element reduced into a ribbed bead. The finds have a hook-and-eye catch. The eye part is found on the lower arch in both pieces.[17] The lower arch has a rectangular cross-section, which is divided into two parts along its midline by a rib imitating a semi-circular wire ornament. On the vertical central axis of the artefacts, a decorative element imitating a bunch of grapes is attached to the outer edge of the lower arch, while on the inner side of it, there is a crescent-shaped decorative element. The object is not corroded, the bunch of grapes is carefully finished; it is interrupted at the semi-circular protrusion on the lower arch, and then continues above the rib *(fig. 1. 6)*.

[13] The location of the site and its association with the 10th-century graves excavated at Szeged-Öthalom in 1879 *(Varázséji 1881; Lenhossék 1882)* was debated for a long time, *Párducz 1960; Bálint 1968; Bálint 1991* 251, Nr. 249a; *Vörös 1990; Kürti 1983* 249–250; *Kürti 1994*. In connection with another cemetery fragment at Öthalom, Attila Türk and Gábor Lőrinczy successfully identified the sites of previous excavations and their relationship to each other, *Türk – Lőrinczy 2015* 41–42. The results of their investigations were also confirmed by the research carried out by Csaba Szalontai, *Szalontai 2016; Szalontai 2019* 179; *Révész 2020* 378–379. When interpreting the results of the 2009 excavations, the question and evaluation of these burials or groups of burials located at a distance of a few hundred metres emerged anew. A starting point for a new forward-looking approach to the question was offered by the excavations at Öthalom themselves, *Türk – Lőrinczy 2015* 44–45. Türk and Lőrinczy suggested the use of the term "burial area" instead of "cemetery", which has already brought many new results regarding the study of 10th-century sites in other Carpathian Basin regions, as well, *Langó 2019* 131–132; *Révész 2020* 389–392, 411, 417–422, 434–441. However, the relationship of the sites at Öthalom remained unsolved. The aforementioned investigations have demonstrated that there may have been at least three different sites in the Öthalom part of Szeged in the 10th century. The issue was further clarified by the assessment of the 2009 cemetery fragment based on radiocarbon dating and archaeological analysis. Based on the analysis carried out by Türk and Lőrinczy, the burials discovered in 2009 can also be divided into at least two phases belonging to different periods. The early ones can be dated to the end of the 9th century, while the graves of another community buried here must have been made in the second third of the 10th century, *Türk – Lőrinczy 2015* 98–99. Accepting the definition of "burial area", László Révész arrived at a completely different conclusion. He classified not only the finds discovered at a considerable distance from each other in 2009 under the concept of the "Öthalom burial area", but also the burials unearthed during the excavations conducted in 1879 and 1950. Consequently, he believed that the finds discovered in 2009 could also be interpreted in this context. It is, therefore, unnecessary to divide the finds discovered then into two periods. Instead, we can say that this burial area was used from the beginning of the 10th century to the second third of the same century, *Révész 2020* 378–379, 411, 426–427. The 10th-century finds discovered in the area can be interpreted satisfactorily after further detailed analysis.

[14] *Bálint 1968* 62–64.

[15] Csanád Bálint described the objects as bronze finds, *Bálint 1968* 62. Based on their current cleaned state, the finds must have been made of some silver alloy, but their actual composition could only be determined exactly after carrying out an archaeometric analysis on them.

[16] At the time of their discovery, the objects were still intact as is shown by *Bálint 1968* 67, Pl. X. 1–2.

[17] Currently, the hook part is glued to the loop, so its diameter cannot be measured in itself.

The surface of the crescent-shaped decorative element is smooth, its points end in spheres. The surface of the pieces of jewellery is worn. They bear no sign of subsequent engraving.

From a burial – of unknown number – of the cemetery unearthed at the archaeological site Gyula-Téglagyár (Békés county). József Impolom excavated 94 burials of the cemetery – estimated to have comprised 170 graves – that was discovered in 1941.[18] However, no record has remained of a significant part of the burials and the position of the finds. In the case of individual finds, including the earring to be studied here, the circumstances of discovery cannot be determined more precisely.[19] The piece of jewellery has currently the same inventory number as two other earring fragments that differ in terms of design from the earring explored in our study.[20]

The cast bronze earring (current location and inventory number: Erkel Ferenc Museum, Gyula 66.32.144) is a fragmentary piece preserved in a poor condition *(fig. 1. 7)*. The size of the earring: height: 2.51 cm, width: 2.67 cm. The thickness of the upper arch: 0.09 cm. Dimensions of the lower arch: width: 0.28 cm, thickness: 0.28 cm. Dimensions of the crescent-shaped ornament: height: 1.33 cm, width: 1.32 cm, thickness: 0.15 cm. Dimensions of the sphere ornament separating the lower and upper arches: height: 0.65 cm, width: 0.62 cm, thickness: 0.05 cm. The weight of the artefact: 2.5 g.

This is a badly preserved, heavily corroded, damaged item. Only the fragmentary lower arch and the two stubs of the upper arch starting from the lower arch have remained of it. One of the spheres of sheet metal on the lower arch has been preserved fragmentarily, the other one is missing. One of the ornaments joining the vertical axis of the heavily corroded and damaged lower arch is missing. The crescent-shaped element is damaged (or defectively cast?), and badly preserved. The stubs of the upper arch are made of wires of a round cross-section. The lower arch is oval in its cross-section, much thicker than the upper arch, and damaged. Its sides were once decorated with cast beaded wires imitating granulation (three cast beaded wires placed at equal distances from each other: the first running on the outer edge of the arch, the second on the inner edge, and the third between the two; the ornament in the middle imitated a twisted wire), the traces of which are still visible. The crescent-shaped ornament has several holes in it. However, it cannot be determined whether these holes were casting deficiencies or this item of poor quality was originally intact at the time of its use and these defects only appeared after excavation. The remaining conical sphere is made of two sheets of metal soldered together and is broken in many places.

Himód-Káposztás-kertek (Győr-Moson-Sopron county), grave no. 118. In 2000, Ildikó Egry and Péter Tomka unearthed a part of a cemetery along a gas pipeline crossing the site. The 152 burials unearthed by them were dated between the 9th and 11th centuries. Grave no. 118 belonged to the 10th/11th-century part of the cemetery lying on the northern slope of the hillside.[21] In addition to the earrings, the burial contained the remains of a twisted neck-ring with a loop-and-eye catch broken into three pieces.

The cast silver earring (current location: Xantus János Museum, Győr) is a well-preserved, restored piece *(fig. 1. 8)*. The size of the artefact: height: 4.96 cm, width: 2.5 cm. The thickness of the upper arch: 0-13 cm. Dimensions of the lower arch: width: 0.28 cm, thickness: 0.28 cm.

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[18] *Bakay 1978* 174–180; *Szatmári 1995* 223; *Révész 2020* 129.

[19] *Medgyesi 2015* 70.

[20] One fragment is the remnant of a silver earring with a beaded pendant (for its photo, *Medgyesi 2015* 81, the fragment on the right), and the other is the fragment of a silver earring with granulation decoration originating from South-Eastern Europe. The latter was published by Pál Medgyesi together with the earring also discussed by us, *Medgyesi 2015* 83. However, the two fragments differ not only in their material but also in their design. The fragment, interpreted as an upper arch in the book by Medgyesi, was, in fact, the lower arch of an earring. Unlike the item described here, it was decorated with real granulations and could have been made of silver (instead of a copper-based) alloy.

[21] *Egry – Tomka 2000* 148; *Tomka 2010* 201.

Dimensions of the crescent-shaped ornament: height: 1.08 cm, width: 0.94 cm, thickness: 0.25 cm. Dimensions of the grape-cluster ornament joining the lower arch: length: 1.28 cm, width: 0.46 cm, thickness: 0.4 cm. The weight of the artefact: 4.3 g.

It is a well-preserved, restored, adhesive-bonded item. The earring is cast as one piece and has two main parts. The upper arch is a wire of round cross-section separated from the lower arch on each side by a decorative element simplified into a ribbed bead. The piece of jewellery has a hook-and-eye catch. In both pieces, the loop part is found on the lower arch. The lower arch has an oval cross-section, and an articulated rib ornament runs along the midline of the arch on each side. On the inner edge of the arch, there is a crescent-shaped ornament with an oval hole in the middle. The two tips of the *lunula* part terminate in beads. On the outer edge of the lower arch, on the central axis of the object, there is a grape-cluster ornament. The ribbed segmentation imitating a bunch of grapes is crude. No sign of wear or trace of subsequent engraving can be seen on the surface of the earring.

The finds from Székesfehérvár, Szeged, and Himód have a similar design in many respects. The lower arches of the earrings discovered in Szeged and Székesfehérvár are similar, and the imitation of the wire ornaments on the lower arches bears a close resemblance, as well. However, there are also several minor differences between these pairs of jewellery. The finds from Szeged were prepared with much greater care than the items from the Székesfehérvár-Demkóhegy site. In the case of the Szeged items, even the locks of the earrings are carefully formed; additionally, the imitated wire ornaments on the lower arches are more sculpted, and the cast imitations of granulation are also less schematic. The crescent-shaped elements of the Szeged-Öthalom antiquities are also framed by a thickened, even rim, whereas in the case of the jewellery from Székesfehérvár-Demkóhegy, this part also seems to be rough-and-ready *(fig. 1. 3)*. The imitation of granulation on the tips of the crescent horns is also carefully formed in the items from Szeged, while on the items from Székesfehérvár, this element can only be suspected. On the Szeged earrings, the tags of the crescent-shaped ornaments are decorated with two pieces of false granulation each *(fig. 1. 6)*. In contrast, the earrings from Székesfehérvár have no such decorations. Regarding the design of the *lunula*, the find from Himód shows a divergence from the other pieces *(fig. 1. 8)*. The item from Gyula is significantly different from other artefacts found in the Carpathian Basin, both in terms of its raw material and the design of the jewellery *(fig. 1. 7)*. In the case of the latter artefact, the remnant of the conical sphere made of sheet metal and attached to one end of the lower arch is different, just as the form of the crescent-shaped ornament and the decoration of the wire on the lower arch. Based on this, it differs from the earrings discovered at the other sites even more than those from one another.

The southern connections of this type of artefact were already recognised by Béla Szőke,[22] but Vojislav Jovanović was the first to investigate them in detail in connection with the finds from Kosovo Field (Kosovo).[23] The position of these types of jewellery in the contemporary Hungarian material culture was later presented by Csanád Bálint,[24] next by Jochen Giesler,[25] and finally by Károly Mesterházy[26] in a broad perspective. The current analysis is made possible by the fact that, in addition to a few new finds discovered in the Carpathian Basin, 62 more items

[22] The discovery made by Béla Szőke is also worth highlighting in relation to the object type because its South-Eastern European background was still not unanimously accepted in Central European research when his work was published. This is well demonstrated by Bořivoj Dostál's approach (*Dostál 1965* 385), who described these pieces "*als direkte Importe aus Mähren*". On the background of the mistakes made by the Moravian researcher see *Mesterházy 1990* 107.

[23] *Jovanović 1976* 135.

[24] *Bálint 1991* 191–193.

[25] *Giesler 1981* 97–99.

[26] *Mesterházy 1990* 107–108.

from 25 sites[27] mainly belonging to present-day Croatia, Bosnia, Macedonia, Greece, and Bulgaria could be collected from scholarly literature *(Table 1).* This number allows us to divide the finds into groups on the basis of their manufacturing and design and thus classify the archaeological material, in light of which the artefacts from the Carpathian Basin can also be evaluated.

1.2. Classification of the types of earrings and pendants

During previous research, the analysis of this type of artefact in terms of design was mainly carried out in the narrower geographical context. Although individual researchers tried to involve regional parallels in the evaluation of the material as much as possible, they normally employed classifications where these artefacts were interpreted as sub-types of finds that showed some similar characteristic features.[28] Conversely, new studies interpreted earrings and pendants with a crescent-shaped ornament on the inner side of the lower arch as an independent type everywhere.[29] Jochen Giesler,[30] – and more recently – Maja Petrinec, and Béla Miklós Szőke have drawn attention to another important aspect. Based on the items found in the Dalmatian archaeological material, the Croatian expert referred to these artefacts as "jewellery of the head" altogether.[31] In his latest summary, Béla Miklós Szőke presented how this item of wear transformed in 9th-century Central Europe.[32] The subtle distinction they suggested to be made between earrings and pendants is easy to understand if we take into account the size and manufacturing properties of the items discovered in Croatia. The items found there were less likely to be worn in the earlobes. They must have been rather pendants attached to the headgear, or a band, or perhaps a ribbon adorning the hair.[33] The pair of jewellery found in grave no. 46 of the site Matičane-Berg were also worn in this way. Based on the drawing made of the grave, the artefacts were found on the right side of the body, at some distance from the skull. Based on their position, they must have been pendants rather than earrings *(fig. 5. 3).*[34] Similar items belonging to the same assemblage, for example, the four such finds discovered on Mount Čečan in Kosovo *(fig. 5. 1),*[35] as well as the observations made in the Ptuj cemeteries[36] *(fig. 10. 2)* and

[27] In addition to the twenty-five sites, I was able to collect several stray finds from Bulgaria the provenance of which can only be connected to a wider region. Furthermore, there were two pieces of jewellery – perhaps one of the most elaborately finished pairs belonging to this type – the provenance of which could not be identified at all.

[28] The type of artefact was fundamentally interpreted in this way by *Jovanović 1976* 135; *Važarova 1976* 358–361; *Dončeva-Petkova – Ninov – Parušev 1999* 100. Such a division was used by *Dostál 1965* 385–387; *Giesler 1981* 98–102. More recently: *Sokol 2016* 175–186.

[29] *Mesterházy 1990* 107–108; *Mesterházy 1991* 166; *Grigorov 2007* 40; *Petrinec 2009* 254–256.

[30] *Giesler 1981* 94–103.

[31] *Petrinec 2009* 254–256. The term "jewellery of the head" was introduced by Béla Szőke in Hungarian archaeological terminology, *Szőke 1962* 35.

[32] *Szőke 2020* 445.

[33] The possibility of this is supported by the find-circumstances presented by Elica Maneva in connection with grave no. 4 of the site Krstevi in Macedonia *(Table 1. 18),* where the researcher also managed to observe the silk remains of the veil corroded to the earrings, *Maneva 2000* 87. Maja Petrinec (e.g., *Petrinec 2003*) and researchers in Croatian in general differentiate between pendants *(sljepoočničarke)* and earrings *(naušnica).* See, for example, *Filipec 2003; Tomičić 2003; Piteša 2014; Sokol 2016.*

[34] *Jovanović – Vuksanović 1981* Y 247.

[35] *Jovanović 1976.*

[36] Grave no. 104 of the cemetery excavated in the vicinity of the Ptuj Castle yielded two such finds together with two crescent-shaped pendants, while grave no. 296 of the same cemetery contained several other pieces of jewellery decorated with bunches of grapes. In both cases, these finds were discovered on both sides of the skull, along with other pendants and rings, *Korošec 1999* 58. In grave no. 2 of the cemetery excavated at the Spodnija Hajdina site, the item found together with pieces of S-terminalled ring jewelry was on the right side of the skull, *J. Korošec 1947* 29.

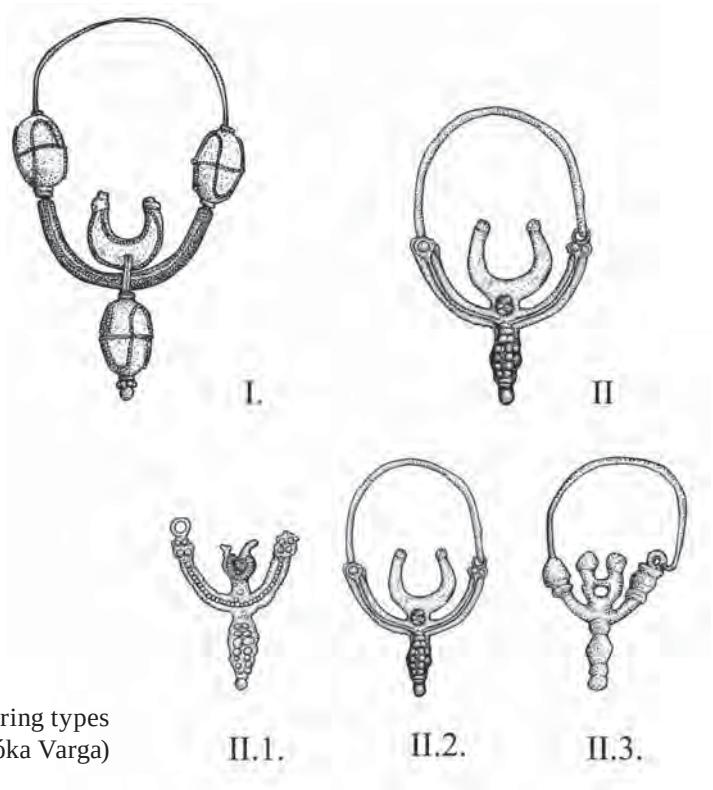

Fig. 3. Classification of earring types
(Drawings: ©Zsóka Varga)

the burials excavated in Gomjenica[37] *(fig. 9. 2, fig. 10. 1)* also suggest that these objects were more likely to be used as pendants.[38] Those pieces of jewellery to which textile remains have corroded can probably be interpreted as pendants, as well. Such finds were discovered in grave no. 4 of the Krstevi cemetery[39] and in Aerino *(fig. 6. 6–7, fig. 10. 7–8).* At the latter site, the traces of textile have been preserved on the upper arch of one of the finds, as it can be seen on its image *(fig 10. 7).*[40]

However, most researchers still regard these types of artefacts as earrings. In the case of a significant proportion of the finds, it is not possible to decide whether they were used as pendants or earrings,[41] as they were discovered in the graves (whether we want to interpret the individual finds as either earrings or pendants) in very similar positions. Often, the size of the objects does not help to differentiate them, either. Even in the case of authentically unearthed and observed finds, often only one piece of jewellery was discovered on each side of the skull, and there was no ring jewellery to help decide whether the artefacts or pairs of artefacts were pendants.[42]

This type of object can fundamentally be divided into two groups. Type I comprises those pieces that were made of several parts and held together by soldering. Their cast imitations (and simpler versions) constitute Type II. There are also transitional items, where spheres of sheet metal typical of Type I were soldered to the cast pieces (as in the cases of the artefacts from Gyula and Odarci) *(fig. 1. 7, fig. 9. 9),* but these finds are principally cast pieces, so they should be classified as Type II *(fig. 3).*

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[37] The items found in Gomjenica, similar to the Ptuj find, were discovered on both sides of the skull along with several other types of pendants, *Miletić 1967* 85, 101–102.

[38] *Korošec 1999* 58.

[39] *Maneva 2000* 87.

[40] *Bosselmann-Ruickbie 2011* 255.

[41] *Sokol 2016* 175–186.

[42] The different viewpoints expressed in research regarding the terminology of earrings, hoop jewellery, and pendants, as well as the questions related to the wearing of the objects are summarised by *Rjabceva 2005; Grigorov 2007* 11–12.

In connection with the classification of this type of object, it is worth presenting the individual approaches according to which other researchers have grouped these finds. Two representative approaches are worth mentioning here. Valeri Grigorov, who relied on archaeological material from Bulgaria, grouped the pieces of jewellery according to the decoration found on the lower arch of the earrings. The distinction was based on differences in the design of the ornament found on the outer edge of the lower arch, along the central vertical axis of the pieces of jewellery. Accordingly, this type of jewellery was divided into three groups. In the case of Type 1, a pierced ornament cast as one piece was placed on the lower arch and the wire was led through that. Type 2 comprises pieces decorated with a bunch of grapes, while in the case of Type 3 the lower arch is separated from the upper arch by two ball-shaped decorations, and the outer edge of the lower arch is closed by an additional globular or conical ornament *(fig. 12. 3)*.[43]

A different logic was followed by Károly Mesterházy, who classified the various pieces of jewellery (aptly described by another researcher as Ψ-shaped earrings/pendants)[44] according to the decoration of their lower arch.[45] He was also the one who called attention to some important features of contemporary jewellery-making practices in South-Eastern Europe. In this period, "hybrid" items were quite common, which had the characteristics of several different types of earrings.[46]

Taking these approaches into account, Type II can be subdivided into three groups based on the design of the lower arch *(fig. 3)*. Sub-Type 1 includes those cast items where an imitation of granulation can be still observed on the lower arch. Sub-Type 2 comprises items that bear a decorative element imitating a plain wire strand on each longitudinal side of the lower arch having a rectangular cross-section. The lower and upper arches are separated by a disc-shaped element on each side. Finally, the lower arch of the pendants classified as Sub-Type 3 is unadorned. It is important to emphasise, however, that this classification is exclusively based on design. According to the present collection of data, those finds that belong to the individual sub-groups of Type II do not form different groups either in terms of chronology or geography. The sub-division rather reflects the stages of some theoretical transformation and still does not make possible the determination of chronological and geographical groups.

According to the classification above, the three sites in Hungary belong to Type II. The piece from Gyula belongs to Sub-Type II.1 because the cast piece of jewellery with the imitation of beaded wire has the characteristic features described in the classification. The pieces of jewellery from Székesfehérvár and Szeged, on the other hand, belong to Sub-Type II.2. In the case of both pairs of artefacts, we can observe the emphatic decoration imitating wire strands on the two longitudinal sides of the lower arches with a rectangular cross-section *(fig. 1)*.

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[43] *Grigorov 2007* 40. If we try to apply the division described by the Bulgarian specialist more widely, we might face several difficulties. The solution he proposes takes into account with similar weight the different manufacturing techniques (equally classifying to Sub-Type 1 those pieces where the ornament on the central axis is a separate casting, those items that were cast as one piece, and the objects that were soldered together from individual parts) and decorations of different shapes (that is the types of ornaments appearing on the outer edge of the lower arch: classifying the ornaments shaped like a bunch of grapes as Sub-Type 2 and the globular ornaments as Sub-Type 3) observed on the jewellery. Probably, this approach is the reason why Valeri Grigorov also classified the piece from Szeged presented above as Sub-Type 3, although, in my opinion, it belongs to Sub-Type 2. Another problem is that there are pieces (from Agia Triada, Azoros, Čean, Gyula, etc.) where the ornaments connected to the lower arch broke off (*Jovanović 1976* 127), so it is difficult to associate them with any of the groups established by him.

[44] *Bosselmann-Ruickbie 2012* 101.

[45] *Mesterházy 1991* 148.

[46] *Mesterházy 1991* 148. For the combinations of the individual types, also *Petrinec 2003* 530–531.

Nevertheless, before evaluating the items discovered in the Carpathian Basin, it is worth reviewing the general characteristics of each group of artefacts.[47]

1.3. The characteristics of Type I

A significant part of the artefacts that I collected from scholarly literature belongs to Type I.[48] The finds that I could classify here were made of silver without exception.[49] During the manufacturing of the lower arch, in addition to filigree strands and beaded wires soldered to the arch, hoops holding further thin pieces of wire were also soldered to some items.[50] The element placed on the outer edge of the lower arch, along the vertical axis of the jewellery, was in most cases a conical or globular,[51] or sometimes, an openwork ornament.[52] Less often, a decorative element in the shape of a bunch of grapes is found at this part of the jewellery.[53] Spherical ornaments are usually joined to the lower arch by a short tag, which is often accentuated by granules, whereas in the case of the grape-cluster decoration, the ornament made up of granules is soldered directly to the lower arch. In the case of the more carefully finished items, the tag connected to the sphere could be decorated in various ways: it was often composed of a series of large granules,[54] but sometimes several rows of smaller granules were used.[55] In some of the objects, the tag attached to the lower arch is not cylindrical but truncated cone-shaped,[56] and there are also finds where the cylindrical tag is pierced in the shape of a cross.[57] The spherical ornaments were also further embellished:

[47] I have provided the serial numbers of the sites indicated in *Table 1* as a reference in the footnotes related to the text. I did not include in the table those pieces from the Carpathian Basin that are described in the text in detail. I referred to them directly in the text. For literature on the individual finds, see the table.

[48] Type I comprises 39 such finds, while Type II has 25 items together with the finds discovered in the Carpathian Basin.

[49] *Table 1. 5–7, 9–11, 16–20, 23–24, 30–31, 33–35.*

[50] *Table 1. 34–35.* Beads were often placed on the wire. There are many 10th-century examples of this solution. It can be observed on some pieces of the Cretan and Preslav Treasures and other unique assemblages, *Coche de la Ferté 1957; Totev 1982; Totev 1993; Gorny und Mosch 145* no. 122; *Langó 2010; Stanilov 2019; Bosselmann-Ruickbie 2011* 210–216, 245–248, 254. This practice was not novel in the 10th century, it evolved much earlier (in the late 5th century), *Cat. Bonn 2010* 179; *Gorny und Mosch 145* no. 121. In the case of the items I examined, no such beading remained, so it cannot be decided whether this feature is merely an imitation or, these thin pieces of wire were torn off from the jewellery earlier, during use.

[51] *Table 1. 5–7, 10–11, 16, 18, 23–24, 30–31, 35.* The stray item kept in the Museum of Targovište must have also had a globular ornament *(Table 1. 30)*, which is suggested by the fragment of pendant preserved together with this item. I would like to thank Bojan Totev for allowing me to study the items.

[52] *Table 1. 32.* Conical and globular ornaments are usually made of two pieces of thin sheet metal soldered together along the central horizontal axis, similar to, for example, ball buttons or globular ornaments of earrings with beaded pendants. Unfortunately, there are some Macedonian items *(Table 1. 16)* where it hard to decide whether the lower arch was made of several pieces or cast as one piece. *Maneva 1992* 53.

[53] *Table 1. 17, 19–20.*

[54] *Table 1. 11, 18.*

[55] *Table 1. 10, 23–24.* With regard to the tag, it is also worth noting that the tag parts of the items found in grave no. 4 of the Krstevi site *(fig. 6. 6–10)* and the stray pair of earrings preserved in the Bulgarian National Museum *(fig. 8. 6–7)* were designed similarly. A tag element like this cannot be observed in other finds, so it is plausible that this solution was a feature typical of a minor region/workshop/master (?).

[56] *Table 1. 10.*

[57] *Table 1. 16.* In the case of the jewellery found in Demir Kapija, the different sources of information about the objects showed a different picture *(fig. 6. 1–2)*. In the drawings, the thick tag was represented as decorated only with granulations *(Aleksova 1966)*, while the photograph of one of the objects shows that the tag may have been pierced in the shape of a cross, *Aleksova 1970* 98. However, the question cannot be decided on the basis of the literature available (as shown by the data at no. 15 in *Table 1* and the note to this).

most frequently, two pieces of beaded wire were soldered close to each other at the joint of the two hemispheres,[58] but occasionally several plain wires could be soldered to it, as well.[59] There are also examples where even the surface of the globular ornament was accentuated by granulation,[60] or beaded wires were soldered to the vertical arch of the globular ornaments.[61] In cases where the ball-shaped ornament at the bottom of the jewellery was decorated as described above, the small balls separating the upper and lower arches were adorned likewise.[62]

The design of the crescent-shaped ornament soldered to the inner edge of the lower arch has several variations, as well. There are two major differences. Crescent-shaped ornaments are sometimes pierced,[63] but in most cases, they are not.[64] Generally, this part was also further decorated. In items with openwork, the *lunula* is frequently framed by a beaded wire,[65] which is also found in most of the unperforated items,[66] but less often a plain filigree strand was used.[67] A common decoration is granulation and globular ornaments soldered to the three[68] or two ends of the crescent.[69] Generally, there was one granule soldered to each spherical ornament placed on the tips of the crescent,[70] but sometimes three granules were soldered on the tips in the shape of a pyramid.[71] The inner surface of the crescent-shaped part was occasionally decorated with granulation,[72] and sometimes with a filigree wire.[73]

The locks of the pendants are similar to those of other contemporary earring types: they are sometimes socketed,[74] but in most of the cases they have hook-and-eye catches.[75] At the joint of the lower and upper arches, a conical or regular ball-shaped ornament can be usually seen, the design and decoration of which are generally similar to the globular ornaments on the outer edge of the lower arch. In the case of items with a decorative element imitating a bunch of grapes, the parts between the lower and upper arches were not decorated with such balls of

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58 *Table 1. 7, 10–11.*

59 *Table 1. 18, 31.*

60 *Table 1. 35.*

61 *Table 1. 7.*

62 *Table 1. 6, 11, 13–14.*

63 *Table 1. 17, 19–20, 24.* It is worth noting here that the crescent-shaped ornament with openwork decoration appears not only in the case of Type I, but also in Type II *(Table 1. 3–4, 8, 13, 32).* It cannot be decided from the photograph taken of the object found in Demir Kapija (*Aleksova 1970* 98, fig. 6. 3) whether the crescent-shaped ornament was originally pierced or the holes in thin metal sheet were caused by corrosion.

64 *Table 1. 5–7, 9–11, 18, 23, 30–31, 33–35.*

65 *Table 1. 17, 24.*

66 *Table 1. 5–7, 9–11.*

67 *Table 1. 19–20, 23, 30.* It is worth mentioning the pair of pendants found in grave no. 4 of the Krstevi site in this respect, as well. One of the items is framed with a simple filigree wire, while the other is framed with a twisted one, *Maneva 2000* 55. See *fig. 6. 6–10.*

68 *Table 1. 33–34.*

69 *Table 1. 6, 10–11, 16–20, 23–24, 30–31, 34–35.*

70 *Table 1. 6, 11, 18.*

71 *Table 1. 6, 10, 30, 35.*

72 *Table 1. 10, 31, 33–35.* In some cases, however, the decoration could be seen only on one side or on one of the pieces *(Table 1. 10), Jovanović – Vuksanović 1981* Y 245; *Tasić 1998* no. 363.

73 *Table 1. 18.*

74 *Table 1. 6–7.*

75 *Table 1. 5, 9–11, 16–20, 23–24, 30–31, 33–35.*

sheet metal. Instead, discs framed with beads were used there.[76] The latter ones were less, while the former ones were more fragile parts of the jewellery. Accordingly, the globular ornaments made of thin sheet metal – like the pieces attached to the lower arches – often remained only in a fragmented form.

Due to their design, the pieces of jewellery could easily become damaged.[77] One of the pieces jewellery found in grave no. 84 of the cemetery excavated at the site Matičane-Berg was also fragmented: only its lower globular ornament remained of it *(fig. 5. 2)*.[78] In the case of the item preserved in the Targovište Museum, on the other hand, the crescent piece cracked *(fig. 6. 6)*.[79] The object found in grave no. 4 of the Krstevi cemetery showed traces of contemporary repair following the damage *(fig. 8. 9)*.[80] The spheres at the bottom were the elements that broke off most frequently.[81] Less frequently, the crescent-shaped ornament could also get damaged.[82] Nevertheless, fragmentary objects were often used even after this, which can also be considered a common practice in those times.

Finds belonging to Type I were, therefore, discovered throughout the Balkans *(fig. 11)*. The westernmost point of the distribution area is Podgrađe,[83] and the use of these items extended to the central part of Greece in the south,[84] and to Dobrudja in the south-east.[85] Croatian and Serbian researchers dated these artefacts between the 9th and 11th centuries,[86] while the fashion of the Bulgarian and Macedonian items is believed to have lasted until the 12th century.[87] In some regions, the fashion of this type of object was more concentrated in some regions, such as Dalmatia, Northern Kosovo, Macedonia, Northern Bulgaria, and the central part of Greek Byzantine territories.[88]

1.4. The characteristics of Type II

The antiquities belonging to Type II were made of silver alloy[89] or bronze.[90] The decorative elements found on the outer edge of the lower arch comprised both conical spheres[91] and

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[76] *Table 1. 17, 19–20.* In the case of intact pieces classified as Type I, it can be observed that the objects decorated on the lower arch with a sheet metal sphere or an element resembling a bunch of grapes had such ornaments at the joint of the lower and upper arches that matched the character of the decorative pendant. In other words, if the pendant was a globular ornament, the arches were also separated by globular decorations, and if the pendant was an ornament shaped like a bunch of grapes, the arches were divided by granules soldered together. Based on these – as it can also be observed in the classification set up by Valeri Grigorov – the individual variants of ornaments seem to be distinguishable from each other. In my paper, however, I do not follow this system, because in the case of Type II *(Table 1. 3, 21–22, 25)* it is not possible to differentiate the decorations in this way, *Aleksova 1966* Pl. XXIII. 24. If, in the future, additional data on intact objects can be added to the database available, it will certainly become easier to decide whether there is indeed a tendency suggesting such a system of different decorations.

[77] *Maneva 2000* 55.

[78] *Jovanović – Vuksanović 1981* Y 247.

[79] *Table 1. 30.*

[80] From this, Elica Maneva inferred to a long use of the object, *Maneva 2000* 55.

[81] *Table 1. 5, 7, 16, 33, 35.*

[82] *Table 1. 30, 33.*

[83] *Petrinec 2009* 617.

[84] *Deriziotis – Kougioumtzoglou 2005* 156.

[85] *Dončeva-Petkova – Ninov – Parušev 1999* 100–101.

[86] *Jovanović 1976; Tasić 1998; Petrinec 2009* 254–256; *Bikić 2010* 47.

[87] *Jovanović 1976; Tasić 1998; Petrinec 2009* 254–256; *Bikić 2010* 47.

[88] *Deriziotis – Kougioumtzoglou 2005* 156.

[89] The items from Székesfehérvár and Szeged were also similar. See also *Table 1. 1–4, 14–15.*

[90] *Table 1. 12, 21, 27.*

[91] *Table 1. 27–28.*

ornaments resembling a bunch of grapes.[92] However, some of the decorations were simplified to such an extent that it is difficult to determine what kind of ornament they go back to.[93] There are also some "hybrid" versions, such as the artefact yielded by grave no. 55 in Sten'e-Golem grad, Macedonia,[94] where the elements of the clustered ornament imitating a bunch of grapes are reminiscent of conical spheres *(fig. 9. 5–6)*. Based on the crescent-shaped decoration, these finds can be divided into two clearly distinct groups. In some of the finds, this crescent-shaped ornament is well-formed,[95] while in many pieces it is highly simplified.[96] In the case of more carefully formed artefacts, the ornament imitating granulation can also be observed at the points of the crescents.[97] It is worth noting, however, that such imitations can even be observed in the cases of items of poorer quality.[98] The rounded points of the crescent-shaped ornaments on the pieces of jewellery from Székesfehérvár and Szeged *(fig. 1. 1–2, 4–5)* are suggestive of such decorations. The *lunula* has a framed decoration in some cases *(fig. 1. 3)*,[99] yet – as it is exemplified by the pair of earrings from Szeged *(fig. 1. 4–5)* – this is not common.

In the case of finds of lower quality, it can be frequently observed that a hole was made in the middle of the crescent-shaped ornament. This hole must be an imitation of the openwork decoration of crescent-shaped ornaments mentioned above in connection with Type I. A better imitation is known from Prahovo *(fig. 9. 7)*,[100] a poor-quality analogue was found in Aerino *(fig. 10. 7–8)*,[101] and completely schematic versions came from Gomjenica *(fig. 9. 1, 3)* and the territory of present-day Slovenia.[102]

The cylindrical pieces separating the lower and upper arches were generally less carefully finished. In some cases, they are reminiscent of the globular ornaments of items belonging to Type I,[103] but imitations of discs decorated with granulation also exist.[104] Quite often, this decoration is merely signalled *(fig. 1. 1–3)*.[105]

The catches of the earrings had both the hook-and-eye[106] and the socketed[107] variants. The latter often appeared merely in an imitated form,[108] and in some cases it was simplified to such

[92] *Table 1. 2–4, 8, 12, 14–15, 21.*
[93] For example, *Table 1. 1, 13, 26*.
[94] *Bitrakova 1988* 208; *Maneva 1992* 53.
[95] *Table 1. 21, 25–29.*
[96] *Table 1. 1–4, 8, 12–14.* The items often referred to as "swallowtail-shaped" pieces in previous scholarly literature also belong here, *Szőke 1962* 50.
[97] *Table 1. 21, 23.*
[98] *Table 1. 4, 8.*
[99] *Table 1. 12, 27–28.* The two pieces of jewellery discovered in Székesfehérvár also belong here.
[100] *M. Janković 1983* 99.
[101] *Bosselmann-Ruickbie 2011* 255.
[102] *Jovanović 1976* 136; *Miletić 1967* 101–102.
[103] *Table 1. 4, 13, 32.*
[104] See also *Table 1. 1, 14, 22*. The jewellery found in grave no. 55 of the Sten'e-Golem grad site is unique in this respect, as well. In addition to the ornament at the bottom, it has elongated conical elements that are similar to spheres made of sheet metal, but the decoration of their surface imitates granulation, *Janković 2007* 53.
[105] The finds from Székesfehérvár and Szeged can be considered like this. See also *Table 1. 1, 3, 12.*
[106] The items from Öthalom and Halimba are like this. See also *Table 1. 8, 14, 21, 25, 28, 32.*
[107] The jewellery from Gyula and the stray item from Odarci must have been like this, *Dončeva-Petkova – Ninov – Parušev 1999* 100.
[108] *Table 1. 4, 22.*

an extent that it was just signalled.[109] In these pieces, a small part was omitted from the casting where the upper and lower arches met[110] imitating thus the place of the former lock *(fig. 1. 1–2)*.[111]

It can also be seen in the case of three pendants that balls made of sheet metal typical of Type I were applied where the lower and upper arches met. The sheet metal balls of the stray find from Odarci survived in the best condition *(fig. 9. 9)*. Here, the decorations are intact on both sides.[112] In the case of the item from Gyula, the sheet metal ball remained only on one side *(fig. 1. 7)*, while the piece discovered at the site Ptuj-Spodnija Hajdina has one half of the sheet metal sphere on the upper arch with a round cross-section *(fig. 9. 1)*.[113] This phenomenon is also worth considering because it illustrates well that this archaeological material comprises not only carefully crafted pieces of goldsmith works soldered together from several parts and their imitations cast as one piece. A given type may also contain "hybrid" pieces, some parts of which were cast (such as the ornament on the lower arch of the stray find from Demir Kapija),[114] while other elements were soldered together from several parts *(fig. 6. 1–2)*.

Some of the finds in this group were classified as a separate type by Valeri Grigorov.[115] The items belonging to this type are made up of two parts: a bored-through casting holding ornaments along its central vertical axis as well as a piece of wire threaded through the hole of the casting.[116] The crescent-shaped ornament with a pendant discovered in Northern Bulgaria certainly belonged to such an item *(fig. 10. 4)*.[117] The central ornament itself was rough-and-ready in terms of its finishing, and in the case of a pair of jewellery found in Dolni Lukovit, it also occurred that the crescent-shaped ornament itself was made of a thin metal strand. The cylindrical segments where the lower and upper arches met were merely signalled in the case of these pieces. The small decorative elements joined to the elongated globular ornament formed at the bottom of the artefacts were similar in design. The pieces found in Dolni Lukovit were open *(fig. 10. 3)*, and only the pointed part of the upper arch was indicative of the way of wearing,[118] while the piece of jewellery discovered in Kragulevo had a hook-and-eye catch *(fig. 10. 5)*.

The area of distribution of artefacts classified as Type II was fundamentally the same as that of finds belonging to Type I *(fig. 11)*. It was perhaps only the northern part of their distribution area that showed a major difference. While Type I appears in the early (9th-century) archaeological material of Dalmatia, Type II is completely unknown there. In contrast, in Slavonia and the southern part of the Great Hungarian Plain, the cast finds are present, all of which can be dated to the 10th to the 11th centuries. The earliest finds of Type II emerged in the southern (Bulgarian) areas[119] at the end of the 9th century, but they became widespread in the 10th century[120] and their

[109] *Table 1. 12, 22.*
[110] The fact that this part was not cut out later, but was originally cast in this way could be observed well in the pieces of jewellery from Székesfehérvár.
[111] These pieces could be worn as earrings, or if they were to be used as pendants, they had to be stitched to the headdress because the cut upper arch could have fallen off a loop relatively easily.
[112] *Dončeva-Petkova – Ninov – Parušev 1999* 100–101.
[113] Unfortunately, it is not possible to tell whether this is a secondary decoration or the lower and upper arches were originally separated by such elements. Consequently, it cannot be decided either, whether the piece of jewellery originally had a socketed catch (and this was removed when the sphere of metal sheet broke off) or this part was formed from the beginnings by cutting the pendant where the upper and lower arches met.
[114] *Aleksova 1970* 98.
[115] In Grigorov's classification: Type VI.1 *(fig. 12. 3)*, *Grigorov 2007* 40.
[116] *Table 1. 22, 25.*
[117] *Grigorov 2007* 40.
[118] *Važarova 1976 210.*
[119] *Grigorov 2007* 40.
[120] *Miletić 1967* 116.

fashion lasted until the 11th century.[121] Apparently, this "hey-day" of more than one century resulted in their appearance within the political boundaries of the Hungarian Principality, where these pieces of jewellery can be mainly dated to the 10th century. However, neither in the Balkans nor in the Carpathian Basin was their fashion so widespread and long-lasting as the use of earrings with bunches of grapes or pendants with four spheres, which also explains their limited occurrence.

When reviewing the inter-relationships of the discovered finds, it is also worth mentioning that just as the items of Type I discovered in Greece or Croatia belonged more closely together,[122] the pieces of Type II found in Slovenia also formed a distinct group.[123] In the case of the latter, it can be clearly seen that the design of the objects is very similar, while their analogues mainly appear among artefacts found in Bosnia, and the item from Himód is closely related to these, as well. The site of Gomjenica also bears considerable relevance to the finds from Székesfehérvár and Szeged, as the pendant discovered in grave no. 21 is still regarded as the closest parallel to the aforementioned artefacts *(fig. 10. 1)*.[124] Unfortunately, in connection with the object from Gyula, we could not find such a close parallel as the pendant from Gomjenica. However, a somewhat more distant connection can be demonstrated between this item and the find from Odarci *(fig. 1. 7, fig. 9. 9)*.[125]

1.5. A comprehensive evaluation of the artefact type

Based on the classification above, it can be concluded that the object type emerged in the 9th century. The pieces belonging to Type I appeared earlier. The simpler, cast variants belonging Type II spread over a wider area than the former and met the requirements of easier production. However, the emergence of the latter did not mean the end of those pieces that required a much longer time of production,[126] they could exist parallelly in the broader region of the Balkans.

It was proposed earlier that the finds from Brno and Stará Kouřim *(fig. 10. 9–10)* may have been the antecedents of the jewellery Type In terms of design.[127] However, this idea has already been refuted by Vojislav Jovanović and Károly Mesterházy.[128] Their existence, on the other hand, certainly highlights what Mechtilde Schulze-Dörrlamm has recently pointed out concerning other types of contemporary jewellery.[129] Northern items imitating pendants from the Balkans may partly suggest that the 9th-century form of the object type was known in this area, as well. In contrast to the southern occurrence of crescent-shaped earrings with a wavy inner arch, none (or only a very small number) of this type of jewellery reached these northern areas either from Byzantium or the neighbouring regions of the Balkans. Furthermore, the design of the Czech

[121] *Jovanović 1996* 94; *Mikulčić 1996* 143; *Bitenec – Knific 2001* 116. The site Svete Gore in Slovenia can also be dated to the 11th century, *Korošec – Korošec 1973* 133–134. The dating of the finds discovered in Aerino to the 12th century is not confirmed by the data available, *Cat. Athens 2002* 585; *Bosselman-Ruickbie 2011* 255.

[122] *Petrinec 2009* 254–256.

[123] That is also the reason why Maja Petrinec considers the cast finds to be local products made in nearby workshops, *Petrinec 2003* 533.

[124] *Miletić 1967* 85; *Mesterházy 1990* 107.

[125] *Dončeva-Petkova – Ninov – Parušev 1999* 100.

[126] *Petrinec 2003* 533.

[127] *Dostál 1965* 386–387; *Šolle 1966* 159, 272; *Jovanović 1976* 135; *Cat. Brno 2014* 402. The interesting thing about the two objects is that, based on the ornaments hanging from the lower arch, one of the pendants goes back to those items that were decorated with a ball made of sheet metal *(fig. 10. 9)*, while the other has a decorative element that evolved from the bunch of grapes *(fig. 10. 10)*.

[128] For the dating of the pieces of jewellery discovered in grave no. 139 of the Stará Kouřim cemetery, see *Šolle 1966* 159. On parallels for the decorative pendant of the Brno earring, *Dostál 1966* 35–38.

[129] *Schulze-Dörrlamm 2020*.

finds also sheds light on that these objects (apparently, the pendants composed of several pieces belonging to Type I) were re-imagined and re-created according to Moravian jewellery-making practices in the north.

The development and antecedents of the object have been highlighted by finds recently discovered in Greece. The crescent-shaped decoration that belonged to the objects discovered in Agia Triada and Azoros was widespread in the Middle Byzantine period *(fig. 8. 10–15)*.[130] Their shape goes back to examples that spread from Byzantium to the steppe areas *(fig. 13. 1)*,[131] while also being the forerunner of several other types of jewellery.[132] It can be concluded, therefore, that the type of object explored by us probably evolved from crescent-shaped pendants made of sheet metal in Byzantium. Subsequently, it became popular in the wider areas of the Balkans, too. After its 9th-century emergence, it spread as far as Dalmatia. In the Balkans, the pieces made of sheet metal – based on their raw material (silver) and the expertise needed to produce them – must have been the jewellery of noble families.[133]

The type of object later remained in use until the 11th century, and, despite the fact that some of the cast versions had rather crude finishing, it retained its characteristic elements of design to the end. It can also be clearly observed that due to the limited fashion of the object type, only one piece of jewellery of extraordinary beauty – of unknown provenance – is known, and even that was made of silver *(fig. 8. 8–9)*. The fine decorative elements of this item and the technical solutions typical of Byzantine jewellery-making equally suggest that its most artistic parts must have been made by artisans working there.[134] I could not find any similar object among the pieces of gold jewellery that influenced the taste of the age and determined the wear of the elite. Examples of the object type that were simpler in design yet associated with workshops and masters of greater expertise in terms of their production were present in many parts of the Balkans. In the mountainous region of Macedonia, to the north of Hellas, there were already items where the lower arch of the pendants was replaced by an ornament resembling a bunch of grapes (instead of a sphere made of sheet metal) in the 10th century. This type of decoration cannot be traced further to the south, but in the northern parts of the Balkans, where such pieces of jewellery decorated with a bunch of grapes were widespread, it enjoyed similar popularity as the variants decorated with a sphere. In the northern regions, however, there was no longer a demand (or opportunity) for jewellery to be made of multiple pieces (Type I). Thus, the simpler, cast versions also became widespread. Sometimes these were only pale imitations of the truly outstanding pieces.[135]

The pieces that reached the Carpathian Basin attest that the jewellery had no pervasive fashion. Although only cast items classified as Type II have been found at the sites so far, the finds from Székesfehérvár and Szeged can be regarded as good-quality specimens. It is also noticeable that these pieces of jewellery are not directly related to the Slovenian items described and distinguished

[130] *Malenko 1976* 223; *Kougioumtzoglou 2002* 435; *Katsarova 2002* 219.

[131] Attila Türk called my attention to one of the foreshadows discovered along the Dnieper. Hereby, I would like to thank his help.

[132] The pendants discovered in grave no. 8 of the site Petroševci in Bosnia are such unique finds, *Žeravica 1986* 133, 176–177.

[133] *Petrinec 2003* 533.

[134] On the question of the workshop, see *Petrinec 2003* 533.

[135] In this respect, it is perhaps enough to refer only to the finds discovered in grave no. 161 of the Gomjenica cemetery, at Kragulevo, and in Novograd.

above. They are in a closer relationship with the Gomjenica piece *(fig. 10. 1)*.[136] The find from Himód, on the other hand, can be associated well with the Slovenian group *(fig. 9. 1, 3, fig. 10. 2)*.[137]

There is little information about the chronology of these memories and the position of the bodies buried together with such pieces of jewellery. From this point of view, the finds from Szeged and Himód can be described the best, as in these cases well-observed, archaeologically interpretable find contexts are available, even if was not possible to record everything during the excavation.[138] In the case of the Székesfehérvár grave, there are at least data about the other finds discovered in the grave. However, we do not have any further information about the position of the individual artefacts inside the grave or the location of the burial within the cemetery.[139] Unfortunately, we have even less information concerning the Gyula cemetery. The piece of jewellery found there cannot be connected to any archaeological context or even a grave.[140]

Based on the preliminary reports, the Himód cemetery part was in use from the ninth to the 11th century.[141] As the site could not be fully excavated, it is not possible to determine whether the cemetery was continuously used (perhaps by a community living there from the 9th century onwards) or there was only site continuity. The burial in question was located in the 10th/11th-century part of the cemetery by researchers who conducted the excavation.[142] Furthermore, based on a neck-ring, they assumed that it is more likely to be dated to the 11th century.[143]

The burials of the Öthalom cemetery can be dated to the 10th century. The earliest date of the cemetery is given by the coin of Berengar I discovered in grave no. 4/1950. The date of royal coin minted in Pavia sometime between 888 and 915 has not been further specified by numismatists (probably due to the uniqueness of this type of coin). Therefore, the year 915 must be regarded as the *terminus post quem*. The cemetery was still used in the middle third of the 10th century and perhaps even later.[144] This is suggested by a pair of trapezoidal shouldered stirrups yielded by grave no. 9/1950. This type of artefact is an important chronological clue when dating 10th-century burials in the Carpathian Basin.[145] The cemetery part yielded no artefacts (S-terminalled lockrings, Árpádian-age coins) that would have testified to the continuation of burials into the late 10th or 11th century.[146] It is, therefore, not possible to provide more exact dating within the given period. In addition to the grave, the cemetery part also points to that the people buried there could not have been well-to-do in their lifetime, either. Horse remains were unearthed only from two richer burials (grave no. 4/1950 and 9/1950). Furthermore, next to the grave that contained

[136] In my view, this finding also proves that contrary to the suggestion made by Željko Tomičić *(Tomičić 1992)* – to be discussed later in my study – the comparison of the pieces of jewellery discovered in Slovenia and the Carpathian Basin does not allow us to arrive at such conclusions that the Croatian researcher's suggestion (namely that such pieces of jewellery found in the two areas are connected) points to. The types of jewellery coming from both areas (the Eastern Alps and the Carpathian Basin) point in the direction of the Gomjenica site, as their southernmost "close parallels" appear there.

[137] *Ungerman 2016* 30–31.

[138] *Bálint 1968* 54. For the reasons, also *Szalontai 2016* 691.

[139] *Bakay 1966* 45.

[140] For the circumstances of the discovery, *Medgyesi 2015* 70.

[141] *Egry – Tomka 2000; Tomka 2010*.

[142] *Egry – Tomka 2000* 148; *Tomka 2010* 200–203.

[143] *Tomka 2010* 200, n. 7.

[144] *Bálint 1968* 56; *Kovács 1989* 61; *Coupland – Gianazza 2015* 318. The latter work erroneously named the year 1859 as the date of the discovery. The mistake stems from the typographical error at *Kovács 1989* 61, where the 1879 excavation conducted by Gusztáv Varázséji was published with the date 1859. The coin, however, was not discovered in 1879, but in 1950. László Kovács referred to the 19th-century excavation because, after *Bálint 1968*, he considered the two cemetery fragments to be the same site.

[145] *Kovács 1986a; Kovács 1986b; Révész 1996* 45–46.

[146] For the chronology of their appearance in the region, *Révész 2020* 420–421.

the piece of jewellery studied by us, there was another female burial with several grave goods including a bronze bracelet and bronze mount fragments (grave no. 5/1950).[147] All this paint a poorer picture of this community than the burials excavated in 1879 and 2009.

Based on the unearthed artefacts, the Székesfehérvár cemetery can be dated to the second half of the 10th century. Despite some assumptions that the cemetery was probably opened in the late 9th century, researchers have accepted the inferences made by Kornél Bakay that the use of the cemetery started in the second half of the 10th century. Recent investigations have only modified the *terminus ante quem* of the cemetery to the extent that its use probably did not end in the 1020s but the late 10th century. Among the graves of the community buried here, some were much richer than the burial containing the earring (e.g., graves no. 5–6 and grave no. 33), but there were also burials poorer in furnishings. Overall, the investigated grave from Fehérvár also belongs to less rich burials. The piece of jewellery discovered there can presumably be dated to the second half of the 10th century.

Due to its being a stray find, the artefact discovered in the Gyula cemetery cannot be evaluated precisely. The large number of grave goods found in the cemetery suggest that the burials must have begun in the 10th century and continued up to the 12th century.[148] Based on the fact that the piece of jewellery in question was made of bronze and several manufacturing defects are listed in its archaeological description, this object may not have belonged to a rich grave (like those that contained gilded silver braid ornaments and gilded silver fittings) but to one of the poorer burials.

Based on the above, this type of jewellery[149] came to the Carpathian Basin in the 10th century (probably in the second half of it). However, the fashion of the object type was by no means common. The three sites located at a great distance from one another also suggest that these pieces reached the northern areas at random. In most cases, their appearance here cannot be considered a strong Byzantine or Balkanic influence, as neither the Szeged nor the Székesfehérvár site yielded other pieces of jewellery that could be associated with these regions. In contrast, the Gyula cemetery is somewhat different, as several other objects with southern analogues came to light there.[150]

In relation to the distribution of the type of jewellery in the Carpathian Basin, it is necessary to briefly discuss the findings made by Jochen Giesler and later by Željko Tomičić. As mentioned in the overview of the history of research above, the German researcher regarded this object type as a kind of jewellery characteristic of the "Bijelo Brdo culture" that he considered being distinguishable *(fig. 12. 1).* The Croatian researcher was of the same opinion, with the difference that he sub-divided Giesler's typology. He divided the pieces decorated with crescents on their inner arch into two sub-types – considering them representative finds of the "culture" in question.[151] In contrast, after the 1959 study by Béla Szőke, Hungarian researchers rejected the concept of "Bijelo Brdo culture" for several reasons[152] – as Jochen Giesler referred to it himself. Consequently, they were not able to relate to the analysis of culture offered by Giesler and his followers in this sense, either.[153] The reason for this can only partly be explained by the problems related to ethnic approach also recognised by the German researcher. The study written by Béla Szőke – published,

[147] *Bálint 1968*. For their more recent assessment, *Révész 2020* 379, 411.
[148] *Szatmári 1995* 223–225; *Medgyesi 2015* 72; *Révész 2020* 132.
[149] *Petrinec 2003* 532.
[150] *Szatmári 1995* 223–225; *Medgyesi 2015* 75, 83, 88, 91.
[151] *Tomičić 1992* 114, 116, 122. In light of the other types of jewellery presented by Károly Mesterházy, the division made by the Croatian researcher is even less justifiable, *Mesterházy 1990; Mesterházy 1991.* Researchers are of the unanimous opinion that the finds with a crescent-shaped ornament held by Željko Tomičić as different types can, in fact, can be classified in the same group, *Grigorov 2007* 40.
[152] *Giesler 1981* 13–14.
[153] *Mesterházy 1984; Fodor 1984; Kovács 1985; Bóna 1986* 576. For a recent review of Jochen Giesler's work with a different viewpoint, *Révész 2020* 11.

unfortunately, only in Hungarian – was based on a much more complex line of arguments.[154] It demonstrated why we cannot identify as a separate cultural unit those rural cemeteries that had been differentiated under the aforementioned name in the scholarly literature of the period for a long time.[155] Following Béla Szőke's argumentation, it became evident to professionals reading and using his work that no such "culture" existed.[156] Probably because this important paper was published only in Hungarian and foreign researchers were able to read only a brief summary of it, the logical reasoning employed by Szőke did not gain ground in the wider international research.

The interpretation of this type of object as being a characteristic find of the "Bijelo Brdo culture" can be easily refuted if we consider the discovered items. In this aspect, only those pieces of jewellery can be taken into account that were found in Slovenia and the Carpathian Basin, as the Dalmatian finds were not formerly listed here, and Željko Tomičić did not involve them, either.[157] The pieces discovered in Slovenia were not regarded as belonging here in earlier research, either, because they were associated with the "Köttlach culture".[158] However, the more recent analyses have demonstrated that this cultural unit described with archaeological finds was also different from what was previously believed.[159] Regardless of this, it can be said that neither former nor more recent scholarly research has ever considered the 9th–11th-century archaeological find horizon of the Eastern Alpine region to have been identical with the 10th–11th-century material of the Carpathian Basin,[160] and it was not believed to have belonged to the "Bijelo Brdo culture", either.[161] It is, therefore, worth taking another look at the proposition expressed by Tomičić, who divided the artefacts decorated with a crescent-shaped ornament into two sub-types (15a, 15e) of Type 15 distinguished by him *(fig. 12. 2)*. How can these finds be considered in any way as objects that are typical of the 10th–11th-century archaeological material of Slavonia, Transdanubia, Syrmia, the Great Hungarian Plain, and Upper Hungary at all? This is particularly problematic from the aspect that we know about a total of six finds representing Sub-Type 15e that were found at four sites. Furthermore, the items belonging to Sub-Type 15e are known only from Slovenia and the Eastern Alpine region (which areas, as I have already mentioned, are normally not associated with this group of finds).[162] To what extent can we regard a type of jewellery as a representative example to separate an archaeological culture within the 10th–11th-century material of the Carpathian Basin that is less common in the area in question than the similar items in the only contemporary cemetery in Macedonia?[163] Of course, the same stands for the other sub-types described by the Croatian specialist under Type 15. Among the 10th–11th-century archaeological finds of the Carpathian Basin, I could identify a total of nine specimens belonging to Sub-Type 15b (from five or six sites),[164] thirteen specimens belonging to Sub-Type 15c (from seven sites),[165] but I did not manage to discover a single item from Sub-Types 15d–e. What kind of "culture" is it that has no more than 30 items of its most characteristic types of jewellery found in all of the extended cemeteries (often comprising hundreds or thousands of burials) associated with it?

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[154] *Szőke 1959.*
[155] For an overview of the research history, *Langó 2005.*
[156] *Bóna 1986* 576.
[157] *Tomičić 1992* 123.
[158] *Korošec 1979; Giesler 1980; Giesler 1981.*
[159] *Kramer 1994* 28–32; *Nowotny 2005* 230–235; *Eichert 2010* 156–175; *Horváth 2014* 357–412; *Ungerman 2016*.
[160] *Giesler 1981; Eichert 2010; Horváth 2014* 357–412.
[161] *Giesler 1980; Giesler 1981.*
[162] *Table 1. 1–4.*
[163] *Table 1. 18–20; Maneva 2000* 55.
[164] For the analysis of the object type, *Chapter 2* of this paper.
[165] *Langó 2012.*

1

2 3 4 5

Fig. 4. Pendants and earrings decorated with a crescent on their inner arch.
1. Biskupija-Crkvina; 2–3. Gata-Cemetery around the St. Cyprian's Church; 4–5. Podgrađe
(Photographs and drawings after *Petrinec 2009*)

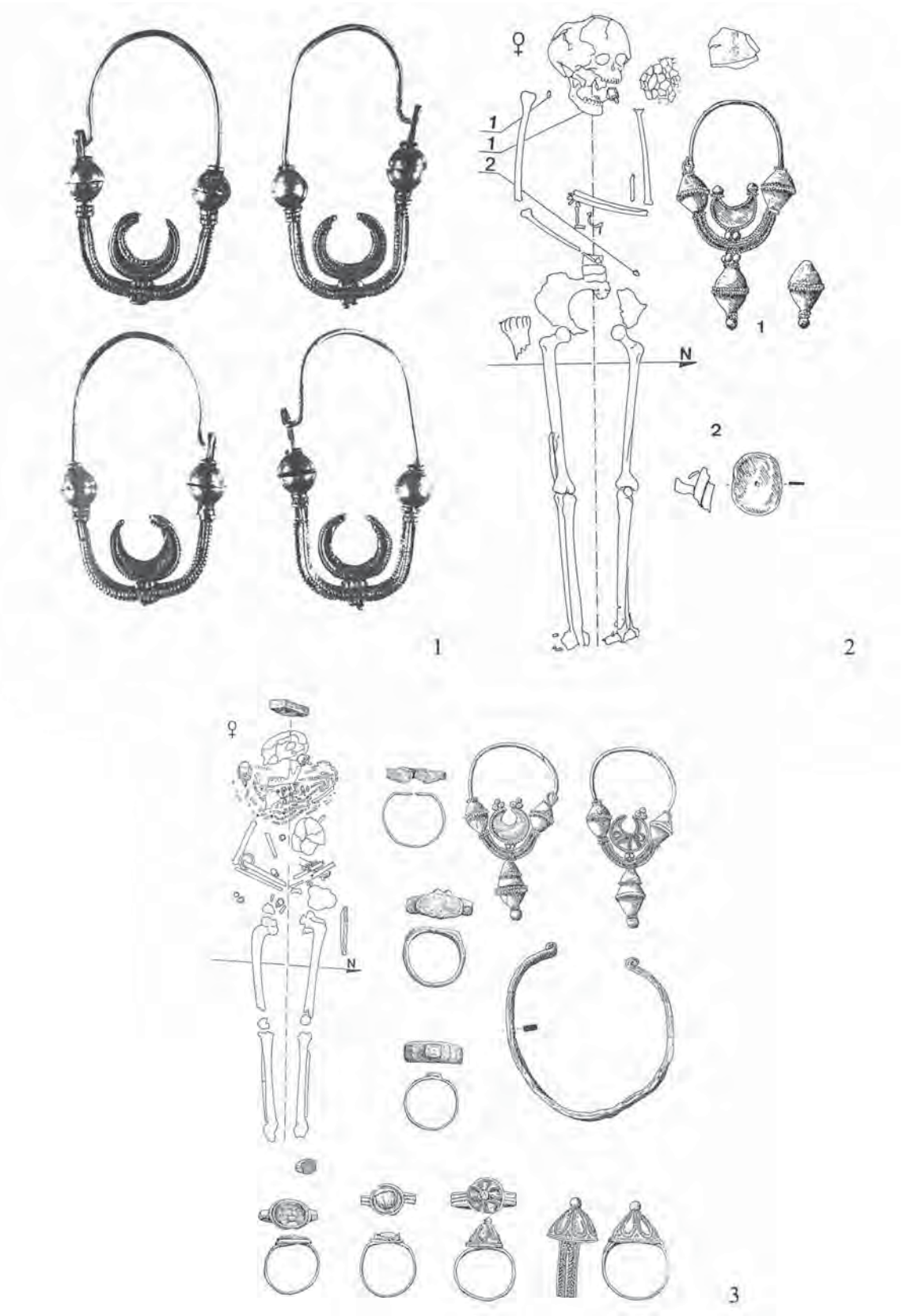

Fig. 5. Pendants and earrings decorated with a crescent on their inner arch.
1. Mount Čečan; 2. Matičane-Berg, Grave 84 with grave finds;
3. Matičane-Berg, Grave 46 with grave finds
(Photograph after *Jovanović 1976;* drawings after *Jovanović – Vuksanović 1981*)

Fig. 6. Pendants and earrings decorated with a crescent on their inner arch.
1–3. Demir Kapija; 4–5. Negotin; 6–10. Krstevi, Grave 4;
8. location of the pendants and further finds in the grave 4
(1–2, 4–5. after *Maneva 1992;* 3. after *Aleksova 1970;* 6–10. after *Maneva 2000*)

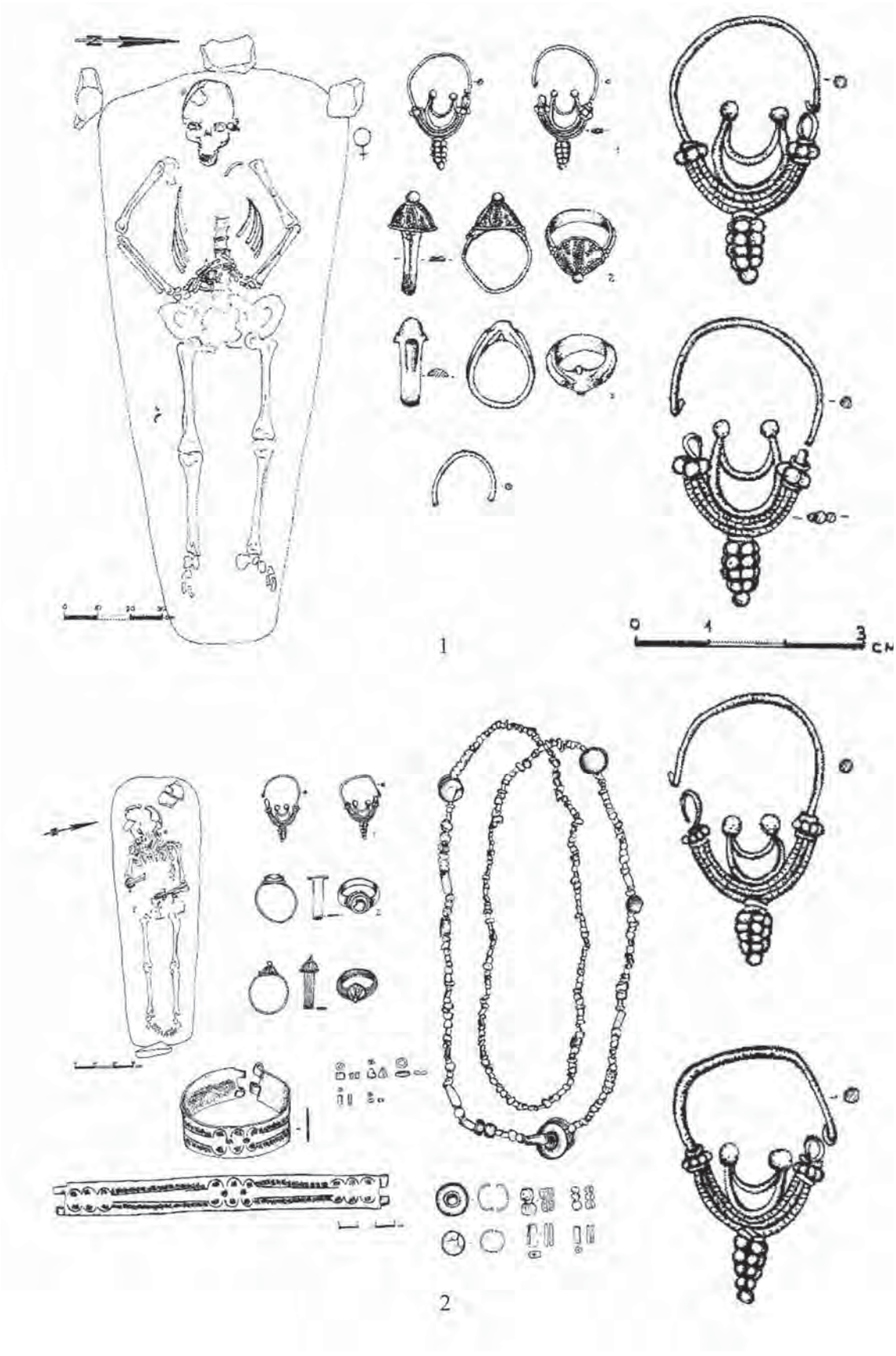

Fig. 7. Pendants and earrings decorated with a crescent on their inner arch.
1. Krstevi, Grave 9; 2. Krstevi, Grave 17 (after *Maneva 2000*)

Fig. 8. Pendants and earrings decorated with a crescent on their inner arch.
1–2. Kavarna-Vasil Levski ul. 17, excavated area in the cemetery; 3–4. stray finds from the region Targoviste; 5. Kaliakra; 6–7. stray finds from Bulgaria; 8–9. stray finds from unknown sites; 10–11. Agia Triada; 12–15. Azoros (1–2. after *Grigorov 2007;* 3–4. after *Zhecheva n. d;* 5. Photograph: ©Péter Langó; 6–7. after *Kapelkova 2006;* 8–9. after *Sternberger 1994;* 10–15. after *Deriziotis – Kougioumtzoglou 2005*)

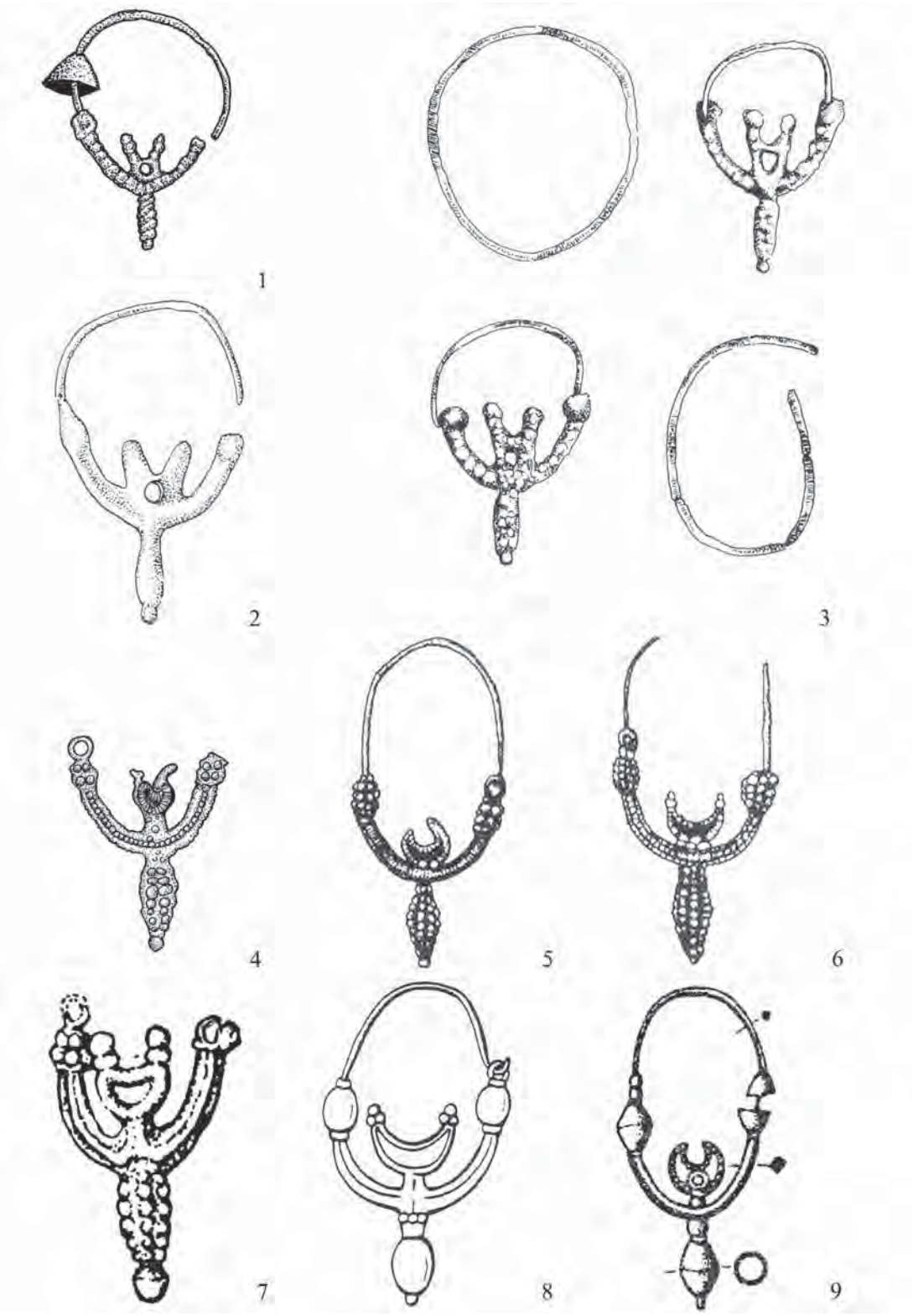

Fig. 9. Pendants and earrings decorated with a crescent on their inner arch.
1. Ptuj-Spodnija Hajdina, Grave 2; 2. Gomjenica-Baltine, Grave 161;
3. Svete Gore nad Bizeljsko, Grave 15 with lockrings; 4. Bitola, Grave 52;
5–6. Sten'e-Golem grad-Prespa, Grave 55; 7. Prahovo; 8. Zlati dol; 9. Odarci
(1, 4. Drawings: ©Zsóka Varga; 2. after *Miletić 1967;* 3. after *Korošec – Korošec 1973;*
5–6. after *Maneva 1992;* 7. after *Janković 1983;* 8. after *Grigorov 2007;*
9. after *Dončeva – Petkova – Parušev 1999*)

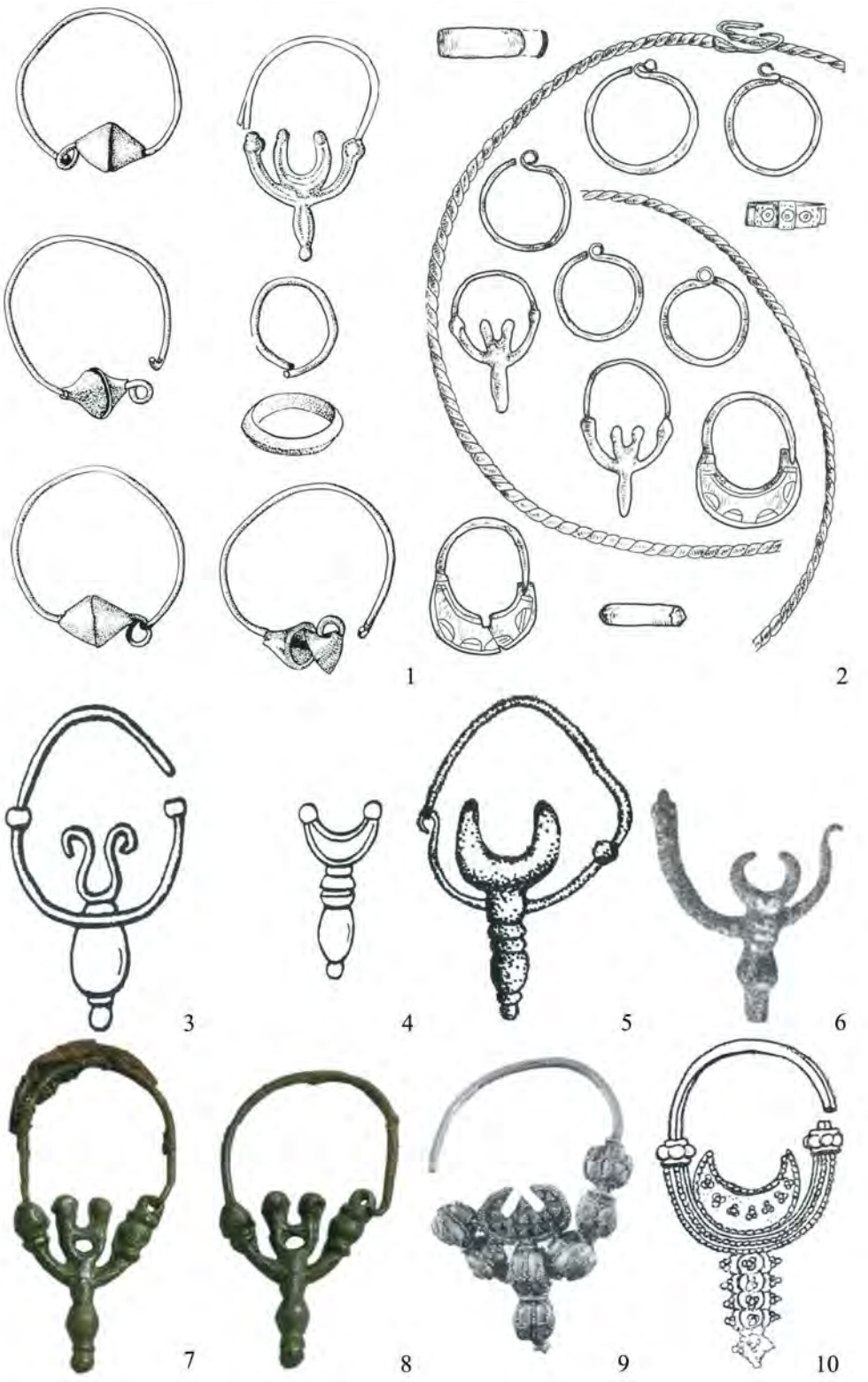

Fig. 10. Pendants and earrings decorated with a crescent on their inner arch. 1. Gomjenica-Baltine Bare, Grave 21, with further jewellery from the grave; 2. Ptuj-Grad, Grave 104, with further grave finds; 3. Dolni Lukovit, Grave 85; 4. Stray finds from Northern Bulgaria; 5. Kragulevo, Grave 26; 6. Novgrad-Iridiol-Kriveblato; 7–8. Aerino; 9. The parallel from Stará Kouřim cited by B. Dostál; 10. The parallel from Brno-Líšen cited by B. Dostál (1. after *Jovanović – Vuksanović – Berič 1972;* 2. after *Korošec 1999;* 3–4. after *Grigorov 2007;* 5. after *Bobčeva 1984;* 6. after *Hensel 1961;* 7–8. after *Bosselman-Ruickbie 2011;* 9. after *Šolle 1966;* 10. after *Dostál 1965)*

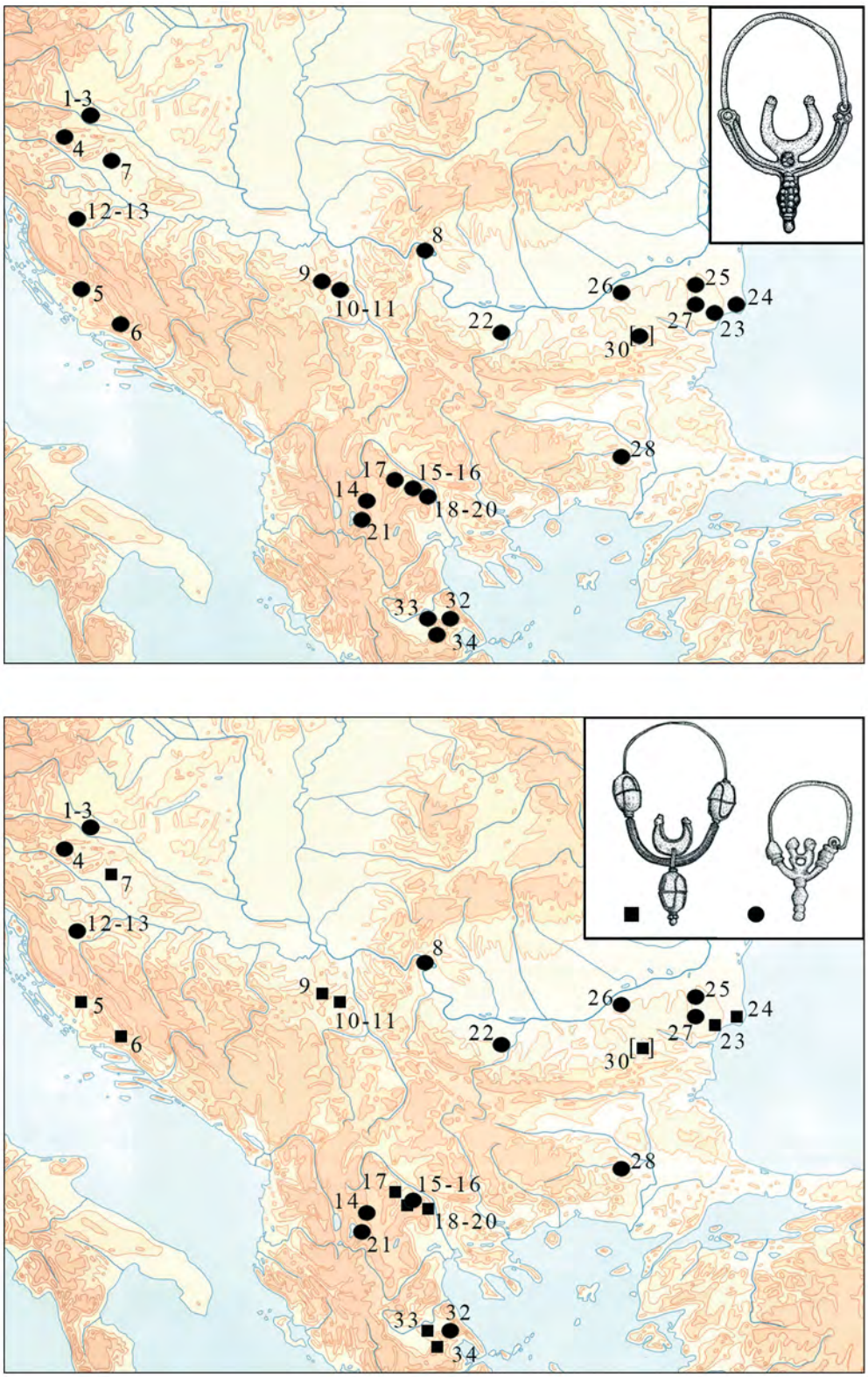

Fig. 11. Distribution of the pendants and earrings decorated with a crescent on their inner arch found outside the Carpathian Basin, for numbers see *Table 1*, rectangle: Type I; circle: Type II (Map: ©Péter Langó)

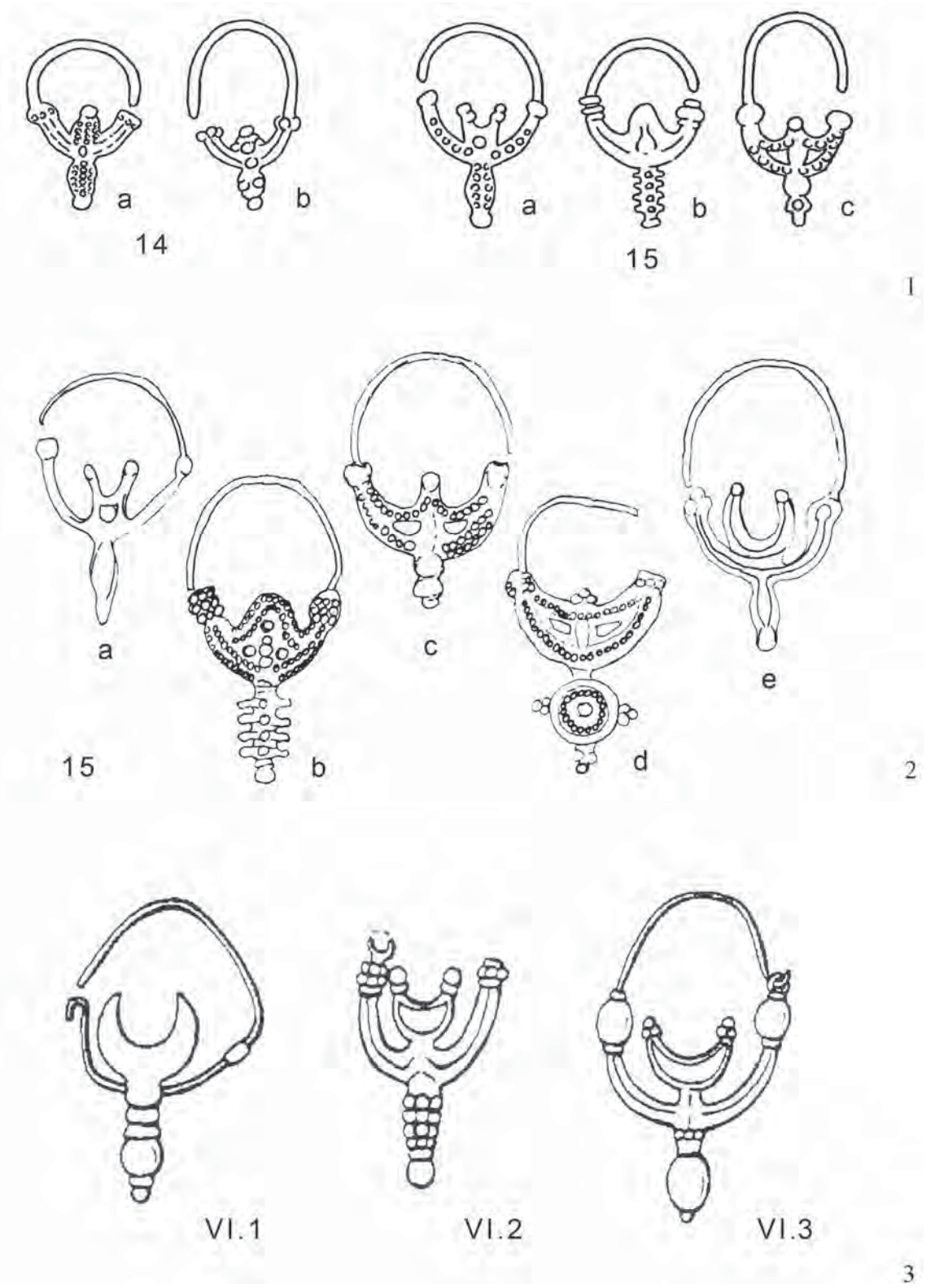

Fig. 12. Classification of the types discussed in the study.
1. by J. Giesler; 2. by Ž. Tomičić; 3. by V. Grigorov
(1. after *Giesler 1981;* 2. after *Tomičić 1992;* 3. after *Grigorov 2007*)

2. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant

2.1. Items from the Carpathian Basin

For a long time, this type of find was more peripheral to research in Hungary, even compared to finds with a crescent-shaped decoration presented in the previous chapter. Béla Szőke briefly referred to them because – although he could not mention any piece connected to the Carpathian Basin when writing his work – he had information about such a piece from one of the cemeteries in Ptuj that was closely connected to the 10th-century find horizon of the Carpathian Basin.[166] The first (and for a long time the only) object to be classified here was a piece of jewellery discovered in the cemetery of Halimba dated between the 10th and 12th centuries *(fig. 13. 2–3)*.[167] However, the development of this type of jewellery is much more controversial than that of the finds decorated with a crescent moon. The starting point, in this debate, was the work by Bořivoj Dostál mentioned above.[168] Jochen Giesler, followed by Károly Mesterházy, responded to it disputing the view of the Moravian researcher that these pieces were of Moravian origins.[169] In Hungarian research, the definition of this type of jewellery was also coined by Mesterházy, who – relying on the description given by Béla Szőke – separated it from similar types by the term "crescent-shaped earrings with a wavy inner arch and a four-pronged pendant".[170] The latter specialist was able to expand the database of finds from the Carpathian Basin with a piece discovered in South Baranya, and he also referred to several finds found in Vojvodina. The publication of finds by Željko Tomičić comprised several further items from South Baranya. Additionally, one more find was discovered in the southern part of the Great Hungarian Plain *(fig. 15)*.

As with the group of finds above, before the classification of this type, it is worth again describing those 10th- and 11th-century items found in the Carpathian Basin that I was able to study in detail. Afterwards, I will briefly present those published finds that I could not subject to similar scrutiny, but which belong to the same geographical and chronological context.

Halimba-Cseres (Veszprém county), grave no. 859. The site, excavated between 1952 and 1954, yielded one of the earliest village cemeteries comprising a large number of early Árpádian-period graves archaeologically recorded and published so far.[171] The cemetery is fully excavated, but a significant part of the graves have been destroyed without being recorded due to the establishment of a bauxite mine and a railway investment associated with that.[172] Based on the 932 rescued burials, despite missing data about them,[173] it is possible to reconstruct the former structure and internal dynamics of the cemetery.[174]

The burial containing the examined jewellery was associated with an early phase of the cemetery by Gyula Török, who excavated it. The dating was supported by other finds discovered in the grave, as well.[175] In addition to the jewellery found on both sides of the skull, the grave of the child of the *infans I* age group contained a silver ring with a round cross-section on either side of the skull. Additionally, underneath the cervical vertebrae, there was a pair of copper-alloy

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[166] *Szőke 1962* 50. On the relevance of the Ptuj site to Hungary, *Szőke 1956; Korošec 1985*.
[167] *Török 1962* 144; *Mesterházy 1991* 145.
[168] *Dostál 1965* 385.
[169] *Giesler 1981* 97–99, 165–166; *Mesterházy 1991* 145.
[170] *Mesterházy 1991* 145.
[171] *Török 1962*.
[172] *Szigeti – Szilágyi 2013* 861–862.
[173] Due to the track-laying works of a short-gauge railway line carried out in the area, Gyula Török could not investigate the entire site. He was unable to explore the site at certain parts of the track. Therefore, the internal division of the cemetery on the drawing by Török is unreliable at several points, *Török 1962*.
[174] *Török 1962; Giesler 1981* 33–55; *Kovács 1997* 84–85; *Szigeti – Szilágyi 2013*.
[175] *Török 1962* 140, 144, Taf. VII–VIII, Taf. XIII.

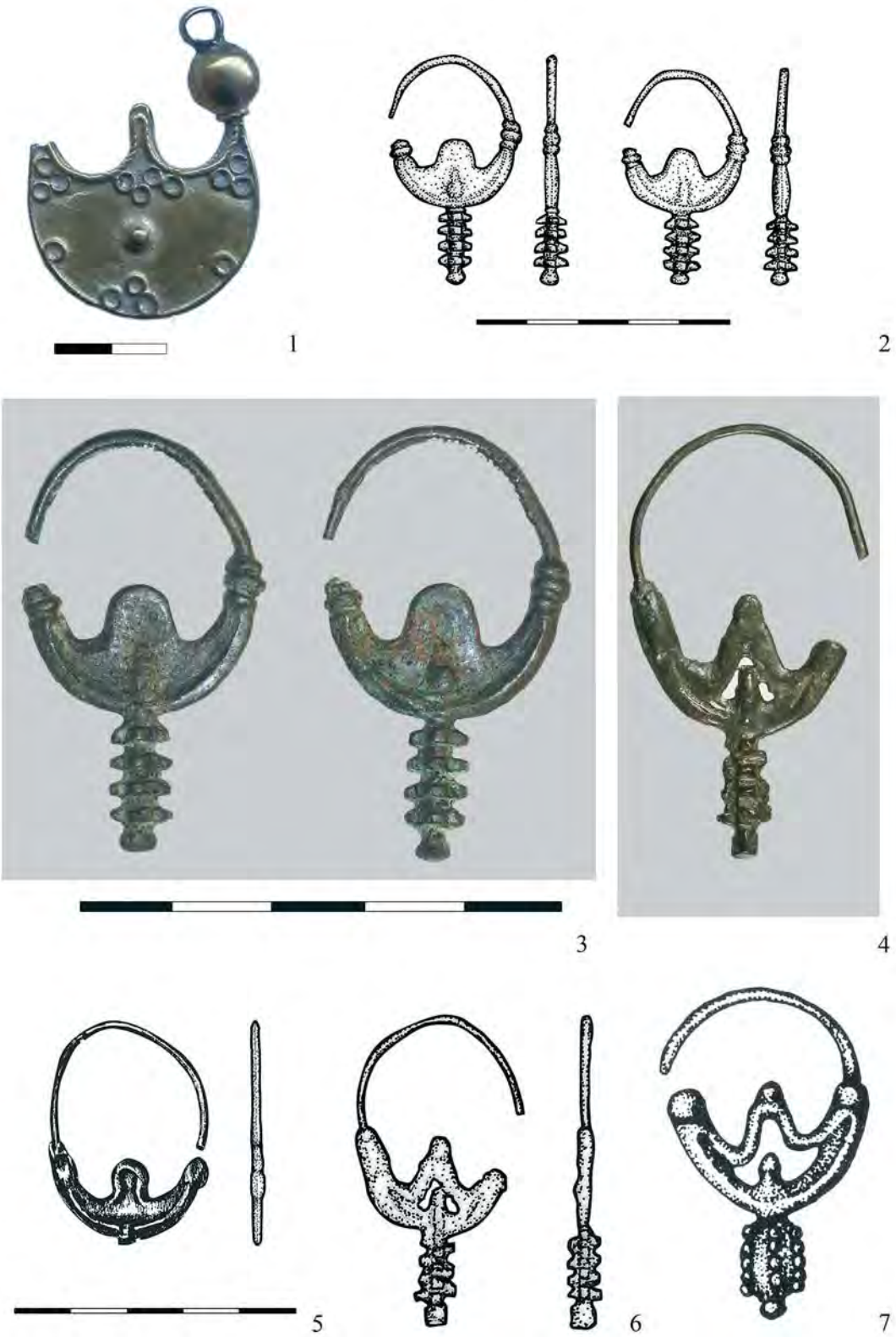

Fig. 13. 1. Parallel of the pendants and earrings decorated with a crescent on their inner arch from the steppe areas; 2–7. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant from the Carpathian Basin. 2–3. Halimba-Cseres, Grave 859; 4, 6. Felgyő-Kettőshalmi-dűlő, Feature 2076; 5. Batina (Kiskőszeg); 7. Pančevo (Pancsova) (1. Photograph: ©Attila Türk; 2, 5. Drawings: ©Zsóka Varga; 3. Photograph: ©Péter Langó; 4. Photograph: ©Patrícia Mészáros; 6. after *Mészáros 2014*; 7. after *Bálint 1991*)

braid discs with five rings. Above the cervical vertebrae and ribs, there was a string of beads.[176] At a distance of 4–6 cm from the tip of the left shoulder blade, there were two animal teeth. On either side of the right clavicle, two cast bronze ball buttons were discovered. On the eighth vertebra, a pressed rosette lay, while on the ninth vertebra, there was a *denarius* of Hugh of Provence (Arles), King of Italy (926–931), minted in Venice.[177] On the ring finger of the right hand, there was a silver band ring with a ribbed surface. Additionally, the remains of some organic material could be observed in the burial, but the publication did not discuss their exact position and character.

The earrings (current location and inventory number: Hungarian National Museum, Budapest 55.1.1084.A) are well-preserved, cast bronze pieces *(fig. 13. 2–3)*. Their dimensions: height: 4.3–4.49 cm, width: 2.55 cm. The thickness of the upper arch: 0.13–0.16 cm. The thickness of the middle, curved part of the loop: 0.13–0.16 cm, the length of the vertical ornament shaped at the bottom: 1.43 cm, the diameter of the four-pronged pendants: 0.64–0.66 cm. The weight of the items: 5.21–5.52 g.

The jewellery cast as one piece can be divided into two parts. The upper arch is made up of a wire of round cross-section tapering towards the end. The lower arch terminates in two decorative ribs on both sides. The lower arch consists of a wire of oval cross-section with a wavy profile on the inside. On the vertical central axis, the lower arch has a four-pronged ornament. Along the vertical axis of the ornament, there is an oval boss in the middle of the wavy, curved part above the lower arch. The objects got slightly deformed during use and their surface is tarnished. Otherwise, they are well-preserved pieces. The slanting marks at the points of the open, tapering upper arches, as well as the minor casting defect (inclusion) in one of the upper arches were caused by casting. The wavy decoration of the lower arch also bears the traces of casting.

Batina (Kiskőszeg, Croatia, Osijek-Baranya county), a stray find. In June 1911, a fragment of such a piece of jewellery and an S-terminalled lock-ring discovered at the settlement that currently belongs to Croatia were purchased from subvention. The find circumstances and the exact provenance are unknown.[178]

Broken, cast bronze earrings (current location and inventory number: Janus Pannonius Museum, Pécs 55.1.1084.A) *(fig. 13. 5)*. Dimensions: height: 3.65 cm, width: 2.6 cm. The thickness of the top arch: 0.14 cm. The thickness of the middle, curved part of the hoop: 0.13–0.16 cm.

The jewellery cast as one piece can be divided into two parts. The upper arch is round and the lower arch is oval in its cross-section. The lower arch terminates in two elongated oval ornaments on both sides. On the inner side of the lower arch, there is a cast plate with a wavy profile. The ornament originally attached to the lower arch along its vertical central axis is broken off. The wire of the upper arch is damaged in one place, a part of the material is missing.

Felgyő-Kettőshalmi-dűlő (Csongrád county), feature no. 2076. The large-scale excavation of the archaeological site conducted between 2006 and 2007 brought to light a total of 4.665 features. Among other things, 127 burials of an 11th-century cemetery were unearthed in the area.[179] Pit no. 2076, with a round opening, curved sides, a straight bottom, which was found outside the cemetery and in which an earring was found was considered contemporaneous with the burials.[180]

A cast bronze earring (current location and inventory number: Koszta József Museum, Szentes 2007.8.34799) *(fig. 13. 4, 6)*. Dimensions: height: 4.8 cm, width: 2.5 cm. The jewellery cast as one

[176] According to the observation made by Gyula Török, the beads could have been stitched onto the clothing, *Török 1962* 144. There are currently 525 poorly preserved beads in the collection.

[177] On the identification of the coin, *Kovács 1989* 32. no. 111. was associated with a wrong minting site. This error was corrected by *Coupland – Gianazza 2015* 316.

[178] *Kiss 1983* 43.

[179] *Mészáros 2014*.

[180] *Mészáros 2014* 539, n. 7, 584, fig. 37. 17 (In the caption, feature no. 2076 is erroneously referred to as a burial. According to the text of the footnote, it was a pit).

piece can be divided into two parts. The upper arch has a round cross-section and the lower arch has an oval cross-section. The lower arch is thicker and more irregular in design than the upper one, and it has a wavy profile on the inside. The arch is pierced through in the shape of a V, so the continuation of the pendant found on the central axis of the jewellery fills this part. The four-pronged ornament on the external edge of the lower part has remained in good condition. In the prismatic decoration of the pendant with trapezoidal prongs, the prongs are irregular and got damaged during casting. The edges of the protruding prongs were not filed after casting. The object is a casting of relatively poor quality. The joint flashes along the pierced hole in the middle of the crescent-shaped ornament with a wavy profile were not filed down, either. The four-pronged pendant got bent during use. The deformation of the upper arch also suggests that the object was subjected to considerable pressure, but the lack of wear-marks that would indicate prolonged use and the fact that the casting fins can be still observed suggest that the item may have been worn for a short time.

In addition to the objects above, there are several finds that can be connected to the 10th-century horizon of the Carpathian Basin, which belong to foreign collections.

In Slavonia, one of the burials of the forty-two-grave village cemetery at the site Veliko polje, near present-day Zvonimirovo,[181] contained such types of earrings *(fig. 14. 1)*.

Two such earrings were yielded by grave no. 19 of the cemetery, in which a woman was buried. In addition to these finds, the burial contained four earrings of Kiev-Volhynian type cast from a silver alloy, two silver S-terminalled lockrings, and two bronze finger-rings (one of which was tinned).[182]

The earrings (currently preserved in Croatia) are cast of silver.[183] Their dimensions are unknown.

The jewellery cast as one piece can be divided into two parts. The upper arch is round, while the lower arch is oval in its cross-section. The lower and upper arches are separated by a spherical ornament on each side. On the inner side of the lower arch, there is a cast plate with a wavy profile, which gets thicker along the edge, imitating wire decoration. On the external edge of the lower arch, along the central vertical axis of the jewellery, there is a considerably simplified, four-pronged ornament that has remained in good condition.

A stray find from the area of Pančevo (Pancsova, Serbia) – or maybe Banatska Palanka (Palánk, Serbia) – belonging to the southern part of Banat, present-day Serbia, was included in the old collection of the City Museum of Vršac *(fig. 13. 7)*.[184]

The earring (current location and inventory number: City Museum of Vršac, 14730) was cast of copper allow. Its dimensions are unknown. The upper arch of the jewellery is round, the lower arch is oval in its cross-section. The lower arch is thicker than the upper one. Inside, there is a wavy plate pierced through in a V-shape which is filled with the continuation of the pendant along its central axis. The four-pronged pendant connected to the lower part is intact and decorated with beads imitating granulation.[185]

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[181] *Tomičić 1996–1997; Tomičić 1997; Tomičić 2019*. On the anthropological data of the cemetery, *Boljunčić 1997*. For the genetic testing producing very informative results, *Boljunčić 2007*.

[182] On the material of the objects determined by Željko Tomičić as silver, I could not find more precise data produced by metal composition analyses.

[183] *Tomičić 1997* 78–79.

[184] *Bálint 1991* 245, Taf. LXII. a17, 245. *Mesterházy 1991* 145. n. 6. This find is referred to under a different site name at *Grigorov 2007* 36. Certainly, the same find was published by Stanimir Barački and Marin Brombolić, who referred to the region of the Karas River near Banatska Palanka as its provenance. Unfortunately, we were unable to decide exactly to which site the object may have originally belonged, *Barački – Brombolić 1997* 210.

[185] According to the drawing published by *Bálint 1991* Taf. LXII. a17, the shape of the pendant was ovoid. Based on the photograph by Stanimir Barački and Marin Brombolić, however, it rather had the traditional elongated rectangular shape, *Barački – Brombolić 1997* 210.

Fig. 14. 1–5. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant from the Carpathian Basin. 1. Zvonimirovo-Veliko polje; 2–3. Banatska Palanka (Palánk); 4. Zalavár-Vársziget, Hadrian's Temple Grave 37/2000; 5. Zalavár-Vársziget, Hadrian's Temple Grave 157/99; 6. the classification of the type (1. after *Tomičić 1997;* 2–3. after *Barački – Brombolić 1997;* 4–5. after *Szőke 2014;* 5. Drawing: ©Zsóka Varga)

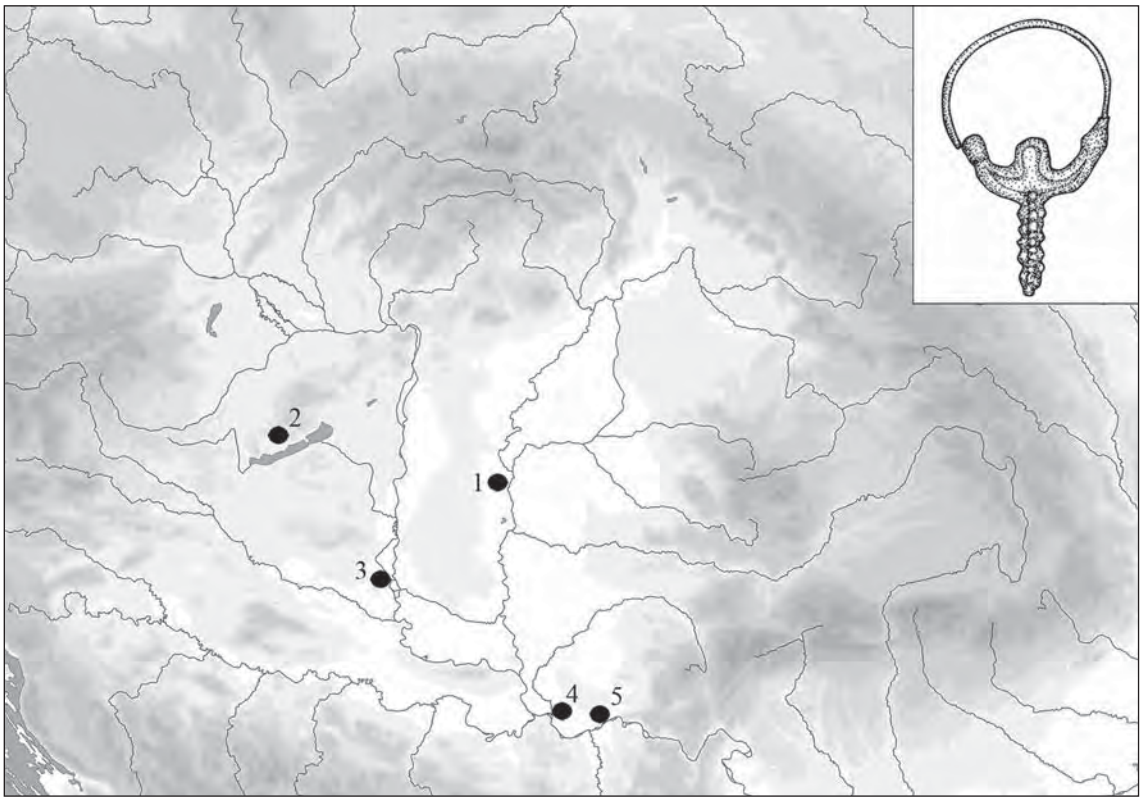

Fig. 15. Distribution of the 10th–11th-century crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant in the Carpathian Basin.
1. Felgyő-Kettőshalmi-dűlő, Feature 2076; 2. Halimba-Cseres, Grave 859;
3. Batina (Kiskőszeg); 4. Pančevo (Pancsova); 5. Banatska Palanka (Palánk); 6. Zvonimirovo

Before World War II, several 10th–12th-century finds were taken to the museum from a site located by the Karas River, near the Banatska Palanka (Palánk), approximately 50 km from Pančevo. These finds comprised, among other things, a pair of jewellery belonging to the type under discussion *(fig. 14. 2–3)*.[186]

The pair of earrings (current location: City Museum of Vršac) are cast, fragmentary pieces. Their dimensions are unknown. The upper arch of the jewellery is missing. The lower arch has an oval cross-section and a wavy plate on the inside. The wavy arch is pierced through in the shape of a U, and the continuation of the pendant can be seen along the central axis of the jewellery. On the outside of the lower arch, the four-pronged ornament has been preserved. The pendant of one of the earrings is in better condition, the other one is deformed.

The finds presented above faithfully reflect the 10th-century variants of the object type themselves. Nevertheless, it is worth comparing the items found in the Carpathian Basin with each other, as well. Most of the currently known finds are made of bronze. Only the pair of jewellery from Zvonimirovo was described by its publisher as being made of silver *(fig. 14. 1)*.[187] The pieces of jewellery were mostly discovered in pairs, especially when observed *in situ* in graves. Of these pieces, the Slavonian ones are closely related. The finds discovered in Batina and Zvonimirovo must have been made in similar moulds, the only difference between them being their raw material. The comparison of the pieces of jewellery discovered at other sites with the aforementioned finds or with each other reveals no such similarities. The upper arch of each item is open. The

[186] *Barački – Brombolić 1997* 210.
[187] *Tomičić 1997* 78–79.

differences between the objects can be observed mainly in the openwork decoration of the wavy element and in the design of the four-pronged pendant. The items from Halimba had the most robust decorative pendants. In contrast, the ornaments of the finds from Zvonimirovo seem to be quite thin, especially in comparison with the former. The pendant part of the item from Pančevo/ Banatska Palanka had an interesting, unique design. It appears to be shorter than what is typical of this type of object. I did not come across any find of similar design even in the wider area of the collection. In the light of the above, a narrow-scale, local tradition of production can be identified in Slavonia, but concerning other finds from the Carpathian Basin, no such circle can be detected.

2.2. Views concerning the classification of the object type

Mirjana Ćorović-Ljubinković was the first to discuss the jewellery thoroughly in her analysis of early medieval earrings found in the territory of the former Yugoslavia.[188] She has already realised that these pieces of jewellery represented a well-distinguishable type with marked features, so she separated them in her typological work highlighting the characteristic features of this group of finds through numerous examples.[189] In this work, the renowned researcher regarded the pierced wavy inner arch as a key feature of the separation, so she included several objects in the group, where the lower arch terminated in a cast spherical ornament instead of a prismatic pendant.[190] The relatively small number of finds still allowed the joint discussion of finds with globular and prismatic pendants back then. Today, these finds are rather classified as "hybrid" items mentioned in the previous chapters. Following the work written by Mirjana Ćorović-Ljubinković, Béla Szőke called attention to these finds, emphasizing that one of their basic features was "a spiky cluster hanging from the lower arch".[191] Subsequently, Bořivoj Dostál analysed this type of object, which still has an impact on their interpretation today. He did not include pieces with a globular pendant in the collection and – similarly to Szőke – he emphasised that these items had two typical features, a wavy inner arch and a prismatic pendant.[192] Another turning point in research was represented by the work of Jochen Giesler (type Giesler 15b) and Károly Mesterházy (type 10), who also discussed these finds as a separate group *(fig. 12. 1)*. The difference between their classifications is that Giesler assumed a close connection between the cast items and the more complex but similarly designed pieces decorated with filigree wire and granulations also mentioned by Bořivoj Dostál, while the Hungarian researcher put a greater emphasis on the production techniques employed during the manufacturing of this type of jewellery rather than its

[188] *Ćorović-Ljubinković 1951 50.*

[189] In the classification by Mirjana *Ćorović-Ljubinković*, these pieces of jewellery belong to variant 5 of Type II. In her work, she also included here another piece of bronze jewellery discovered near Ritopek, *Ćorović-Ljubinković 1951* 52, fig. 18. 7. However, in my opinion, this cannot be considered to have been a member of this group.

[190] For example, the find from Kurvingrad, *Ćorović-Ljubinković 1951* 52, fig. 18. 8. referred to by her and the piece of jewellery discovered in the area of Kupinovo (Kölpény, Serbia), *Ćorović-Ljubinković 1951* 53, fig. 18a are such items *(fig. 20. 7)*. The views and classification associated with the renowned specialist still have an impact on research, and rightly so, *Cat. Zagreb 2003* 117–118.

[191] *Szőke 1962* 50.

[192] The grouping by Bořivoj Dostál had several elements that were rejected by subsequent analyses. For example, he classified here those earrings decorated with a ball made of sheet plate (subgroup 4 in his classification) on the inner arch of which there was a crescent-shaped, wavy ornament, but the pendant with spherical decoration terminates in an elongated column, *Dostál 1965* 384–387, Karte 4. For the separation of this group, *Mesterházy 1994* 212–214. The difficulty of applying this division later was due to the fact that this type of jewellery was classified into the same group as earrings with a pierced plate and globular decorations on the inner and outer arches. For the latter type, *Ćorović-Ljubinković 1951* 50; *Giesler 1981* 95–99, Taf. 3; *Mesterházy 1991* 146.

design when describing it.[193] Accordingly, Mesterházy regarded the pointed or wavy decorative element in the inner part of the lower arch as less important. In addition, he involved several objects in the analysis where the prismatic pendant of the lower arch could be well observed, but the inner edge of which was decorated with a sectioned globular, ribbed, or undulating ornament instead of a plate with a wavy top. He also included here those pieces which were decorated with a ball instead of a prismatic pendant at the bottom.[194]

The research results of Dostál gave important support not only to the interpretation of jewellery discovered in the Carpathian Basin and South-Eastern Europe but also concerning those items that were discovered in Moravia and the northern region.[195] Among the earrings decorated with granulation and beaded wire, the pieces with a pointed plate on the inner arch also formed a well-distinguished group in this region.[196] Furthermore, in his analysis of the silver treasure horizons (Group XIII), Roman Jakimowicz also called attention to the characteristic production techniques used for the manufacturing of this object type.[197] Polish researchers not only gathered analogues found in their region, interpreting the emergence of these finds primarily as a Moravian influence,[198] but they also demonstrated that this type of jewellery brought about new object types due to their being combined with different kinds of earrings in the 10th century.[199] The dating of the parallels discovered there was considerably aided by the fact that a significant part of the Polish finds belonged to treasure hoards. The time of hiding of the individual finds in the ground could be determined quite closely by the latest coins.[200] The idea that this type of object should be assessed on the basis of the finds discovered in the Middle Danube Region was modified by the discovery of a piece of jewellery in grave no. 27 at site Galiče, Bulgaria *(fig. 19. 16)*, published in the 1970s,[201] which was first pointed out by Giesler.[202] Subsequently, the connections of the group of finds with South-Eastern Europe were given new prominence. Similar pieces of jewellery have become known in increasing numbers in the territory of present-day Bulgaria due to the investigations carried out by Valeri Grigorov (*fig. 17. 16, fig. 19. 13–16, fig. 20. 1–6)*.[203] Furthermore, a find like this was unearthed in Gnezdovo, Russia *(fig. 20. 12)*.[204] Most recently, the object type has been explored by Maja Petrinec in detail, who relied on the observations of Giesler and the findings of Dostál as a starting point.[205] She also grouped the parallels known to her among earrings. In her view, the group of finds with Byzantine characteristics spread from the Middle Danube Region both northwards and southwards. In Dalmatia, the simpler, cast pieces of the jewellery type were in use.[206]

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[193] *Giesler 1981* 94–103, 165–166; *Mesterházy 1991* 145. These considerations as well as the observation that it is a common feature of many pieces of hoop jewellery that their characteristics described by the methods of archaeology and classified into separate types of earrings according to their design appear together, resulting in unique, so-called mixed types, *Mesterházy 1991* 154.

[194] *Mesterházy 1991* 145.

[195] *Kóčka-Krenz 1993* 82–83; *Zoll-Adamikowa – Dekówna – Nosek 1999* 109–111.

[196] *Hanuliak 2004* 169.

[197] *Jakimowicz 1933 121.*

[198] *Wachowski 1981; Kóčka-Krenz 1982.*

[199] *Zoll-Adamikowa – Dekówna – Nosek 1999* 109–111.

[200] *Table 2. 8, 10, 13–16, 18; Wachowski 1981; Kóčka-Krenz 1993* 82–83, 132; *Zoll-Adamikowa – Dekówna – Nosek 1999* 14–15.

[201] *Važarová 1976* 232, 234.

[202] *Giesler 1981* 98.

[203] *Grigorov 2007* 36.

[204] *Petruhin – Puškina 1996* 59–60, no. 370; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110.

[205] *Petrinec 2009* 266–267. She also used the term "pine-cone-shaped" *("zapfenförmiger Verzierung"; "ukrasom u obliku češera")* to describe the pendant.

[206] *Petrinec 2009* 266–267.

2.3. The classification of the earrings

Previous research generally interpreted this group of finds as a separate type or as a variant of crescent-shaped earrings.[207] The reason for this is the – previously presented – tendency that researchers studying this type of object predominantly relied on finds discovered their own region, and despite a broader outlook, they normally did not find it necessary to explore the individual types comprehensively.[208] A finer distinction was made by Dostál, as discussed above, as well as by Grigorov, who made a classification under the influence of Ćorović-Ljubinković. However, the latter researcher did not interpret this group of finds as an independent type either but viewed it as part of a bigger unit. Nevertheless, the inference made by the Moravian researcher that the jewellery type evolved from 9th-century finds decorated with real granulations in the Middle Danube Region, and it was their simplified, cast version that emerged somewhat later in the South, proved to be an important observation.[209] This also represents the cornerstone of a comprehensive classification, because it also implies that those 9th-century artefacts also need to be taken into account that are not closely related to the period in question but are connected to the development of the 10th-century types of the jewellery. Another important aspect was the recognition made by the Serbian researcher when, in connection with the cast versions of the object type, she drew attention to those items the lower arch of which had a globular ornament instead of a four-pronged decorative element. This finding was later confirmed by Mesterházy and Grigorov, as well.[210] The latter researcher divided the crescent-shaped earrings into two groups: pieces with a cast four-pronged decoration and a spherical ornament (or a biconical bead).[211] Due to the classification made by the Bulgarian researcher, the finds from South-Eastern Europe became readily distinguishable. As a result, the fundamental elements of the cast finds that were widespread there could also be identified. These are the crescent-shaped sheet metal with openwork decoration formed on the inner arch and the prismatic pendant with elongated diamond-shaped ribs, which were cast together with the earrings.

The present paper does consider those finds that were decorated with globular ornaments or biconical beads,[212] or those which had no wavy decorative element on the inner edge of the

[207] Regarding the classification of 9th–10th-century finds, there are two major trends in research. One discusses the object types by major groups and derives the individual sub-types and variants from them, e.g., *Ćorović-Ljubinković 1951; Grigorov 2007; Sokol 2016*. The other approach starts with the separate types and analyses those, e.g., *Mesterházy 1990; Mesterházy 1991; Petrinec 2009*. The advantage of the first grouping is that it connects pieces of jewellery that developed from a similar design. Its disadvantage is that it is difficult to distinguish minor groups of design within the large system. In the case of the other approach, the latter aspect is more prominent, but – in the case of a comprehensive analysis – the former aspect (demonstrating links among the major similar groups in terms of design) mentioned above is given less room. During my work, I opted for the second approach, but I also tried to make sure that I would implement the aspects of the first line during the analysis. In my view, the comparative material that can be gathered in the regional context is so substantial that it is possible to carry out such a complex analysis.

[208] This position is understandable, as it is very difficult to form an opinion on the artefacts of other regions exclusively on the basis of the publications focusing on different aspects, in which often only few data of the objects are given. The analysis made by me probably also contains a number of errors and misunderstandings, which will become apparent after further investigations carried out on the individual (already published) finds.

[209] More recently see, for example, *Petrinec 2009* 267.

[210] *Mesterházy 1991* 145; *Grigorov 2007* 36.

[211] In his classification, Grigorov differentiated Sub-Types 7 and 8 (the latter having a globular pendant on the lower arch) within crescent-shaped earrings (Type V), *Grigorov 2007* 36.

[212] Such finds with a biconical bead decoration were discovered, for example, in Batin (*Stančev 1985* 51), Novgrad (*Dymaczewski – Hilczerowna – Wislanski 1965* 259), and Poprusanovo (*Grigorov 2007* 36).

lower arch, only the four-pronged prismatic pendant.[213] We do not discuss the northern mutations of the jewellery, either.[214] The reason is that these finds do not correspond to the definition of the object type summarised above because they lack either the wavy inner arch or the four-pronged pendant.[215] Nevertheless, it is important to refer to these pieces briefly, as well. They were apparently "hybrid" forms of the object type that had already evolved in the Balkans (most likely in the territory of present-day Bulgaria),[216] yet their appearance presumably represented the last phase in the metamorphosis of this object type.[217]

It is uncertain in this case as well, whether the individual objects were worn as earrings or pendants. Many researchers regarded these objects as earrings. Béla Miklós Szőke pointed out that in the 9th century, such pieces of jewellery could also be worn as pendants.[218] The complexity of the question is highlighted by the fact that the Hungarian researcher himself refers to them as "earrings" in his more recent analysis.[219] Although in several burials only one or two such pieces of jewellery were found, there were also other types of jewellery of similar size, which seem to suggest that they were worn as pendants.[220] Nevertheless, it does not eliminate the possibility that some of the finds discovered in the burials were used as earrings.

Building on the results of the investigations above, I propose a classification according to design, which may be further refined in the future with the help of archaeometrical analyses[221] and thorough studies including the description of the individual objects.

I relied on a database of 64 sites as well as nine stray finds and assemblages to prepare the classification, and took into account a total of 90 pieces of jewellery and a significant number of fragments *(Table 2)*.

In view of the above, the finds can be grouped into three types *(fig. 14. 6)*:

I. Items decorated with beaded wire and ball-shaped granules.
II. Simple items cast as one piece, where the inner arch of the earring is decorated with a piece of perforated crescent-shaped sheet metal.
III. Simple items cast as one piece, where the inner arch of the earring is decorated with a piece of unpierced crescent-shaped sheet metal.

2.4. The characteristics of Type I

The items of Type I are carefully crafted, high-quality pieces of jewellery made mainly of silver and gilded silver,[222] and less often gold.[223] Their design (being soldered together from several tiny

[213] Such an object is known, for example, from sites Buzet (*Marusić 1962* 462), Preslav *(fig. 20. 8, Mavrodinov 1959* 224); Novgrad (*Dymaczewski – Hilczerowna – Wislanski 1965* 259), and Valčedram (*Mesterházy 1991* 145).

[214] In detail on these, *Zoll-Adamikowa – Dekówna – Nosek 1999* 109–111.

[215] I could not identify any find without a wavy inner arch in the Carpathian Basin, while an item with a spherical decoration was discovered along the Sava, in the area of Kupinovo mentioned above *(fig. 20. 7), Ćorović-Ljubinković 1951* 53.

[216] *Grigorov 2007* 36, 173.

[217] In this case, it is important to emphasise again that – to the best of my knowledge – this simplification in design does not represent a well-separable chronological phase compared to the use of the Types II and III to be described below.

[218] *Szőke 2014* 98.

[219] *Szőke 2020* 440, 442.

[220] *Ruttkay 2005* 48. A similar piece of jewellery found in grave no. 37/2000 of Zalavár-Hadrian's Temple was probably also worn as a pendant, which is supported by the other pendants with a bunch of grape found in the tomb *(fig. 14. 4)*. I am grateful to Béla Miklós Szőke and Ágnes Ritoók for sharing with me the data about the assemblage.

[221] A good example for this is offered by *Zoll-Adamikowa – Dekówna – Nosek 1999* 79–95.

[222] *Table 2. 1–2*.

[223] *Table 2. 25, 28–29; Galuška 1996* 96.

elements) and raw material suggest that these objects were popular among the elite of the period.[224] The silver granules of different sizes and beaded wires soldered to the lower arch demonstrate that they were the products of outstanding goldsmiths' workshops *(fig. 18)*.[225]

The finds listed here represent a significant proportion of the object type. I managed to collect 46 intact and another 32 fragmentary finds from 38 sites. The other two Types fall behind the present group in terms of the number of finds even combined.[226]

The upper arch of the jewellery is made of wire with a round cross-section. The two ends of the lower arch often terminated in an element made up of small spherical ornaments soldered to each other. The elements decorated with small balls were flanked by a thin disc on each side.[227] In the late ninth and early 10th centuries, the lower arch typically terminated in a large sphere made of sheet metal.[228] Later in the 10th century, some of these large spheres were perforated.[229]

The items of this Type uniformly had a frame converging in a tip in the middle of the inner arch, often strengthened with a straight bar connecting the two terminals of the arch[230] or a beaded wire bent in the shape of an Ω that filled the arch inside.[231] Over time, the originally unadorned crossbar was replaced with a decorated metal strand,[232] which often consisted of two wires soldered together instead of one piece of wire.[233] In many cases, the apex of the arch was further decorated.[234] This became a more common practice in the case of later, over-decorated ("Baroque-like") pieces.[235] In these cases, the structure could also be strengthened with a vertical bar along the central axis of the piece of jewellery *(fig. 18)*.[236] Beaded wires[237] or granules[238] were soldered to the wire forming the lower arch in a way that this decoration would run along all four[239] but at least three sides of the arch.[240]

The prismatic pendant of these items, like other parts of the jewellery, was made of many elements soldered together. The granules consisting of larger balls were soldered here so as to

[224] *Galuška 2013* 187; *B. M. Szőke 2020* 440.

[225] *Galuška 1989; Galuška 2013* 108–161; *Galuška 2014.*

[226] Type II has altogether 30 items (from 22 sites and five stray finds), while Type III consists of seven pieces of jewellery (from five sites), *Table 2*.

[227] *Table 2. 2, 11, 17, 19–27, 29–31, 33, 37, 60, 68–69.*

[228] *Table 2. 28*. For the recent dating of the burial, *Cat. Brno 2014* 404. For its earlier interpretation, *Ruttkay 2005* 33; 48.

[229] *Table 2. 29.* On its dating see, *Kóčka-Krenz 1993* 82, 231; *Zoll-Adamikowa – Dekówna – Nosek 1999* 109; *Cat. Brno 2014* 461.

[230] *Kóčka-Krenz 1993* 82; *Table 2. 1, 19.*

[231] *Table 2. 1, 5, 18–22, 25, 28, 32–33, 35, 70–71.* This wire was sometimes made of the same material as the frame (e.g., *Table 2. 1, 17, 20, 25*), but in most cases, a different kind of wire was used for this (e.g., *Table 2. 5, 19, 22–24, 26, 69*). It can also be observed that the ends of the wires bent in an Ω shape were sometimes turned inwards (e.g., *Table 2. 5, 20–22, 26, 68–69*), but generally, they were twisted outwards (e.g., *Table 2. 1, 17, 19, 23*).

[232] For the design of wires with different types of decoration, *Wolters 1998* 378; *Rácz 2009* 83. The items belonging to Type II often imitated the decorations of beaded wires or twisted wires typical of Type I. *Table 2. 44, 46–48, 50–51.*

[233] *Table 2. 28, 60.*

[234] In the beginning, this decoration must have been a major granulation *(Table 2. 1, 22–23, 27, 37)*, which was later complemented with further granules (e.g., *Table 2. 11, 27, 69*) and more and more complex structures of decoration were added to it (e.g., *Table 2. 17–18, 25*).

[235] *Kóčka-Krenz 1993* 82.

[236] *Table 2. 11, 18; Zoll-Adamikowa – Dekówna – Nosek 1999* 76–77.

[237] *Table 2. 5, 17, 21–30, 68–69.*

[238] *Table 2. 11, 18, 20, 60.*

[239] *Table 2. 11, 18, 25, 28–29.*

[240] In those case when the three sides of the arch were decorated, there was no such ornament on the inner side of the arch. *Table 2. 5, 20, 23–24, 26–27.*

form four-pronged structure specific of this type of jewellery.[241] In most cases, the large granules of the pendant thus constructed were further decorated with one[242] or more additional granules of smaller size.[243] In the case of 10th-century finds, however, it could also be observed that the axis of the decorative pendant consisted of a wire and the granules were soldered to that *(fig. 16. 1, 3–4, 6–14).*[244] The element at the end of the pendant was varied in shape and design. In some cases the object had no such element at all, or if there had originally been one, it broke off over time.[245] When the terminal can be still observed, it is usually a regular globular ornament, which was also adorned with granules.[246] Biconical beads[247] and – in the case of finds from Poland and Russia – elaborate ornaments of irregular shape could also decorate the end of the pendant.[248]

Regarding the size of the finds, it is worth noting that, in general, the 9th-century items had smaller height (2.3–3.3 cm) and width (1.5–7.7 cm) than the pieces dating to the turn of the 9th and 10th centuries (height: 4.7 cm, width: 2.6 cm), or the 10th- and 11th-century pieces (height: 5.2 cm, width: 3.5 cm). It can be clearly observed, therefore, that this type of object became not only more and more adorned but also increased in its size. It is also worth adding that it probably does not necessarily mean that – as in the case of other groups of finds – the smaller pieces are earlier than the larger finds. Numerous examples illustrate that the smaller, thinner pieces of jewellery remained in use in the Middle Danube Region even after the more robust types emerged.[249]

This type of find developed in the Middle Danube Region. Its earliest specimens were discovered in Transdanubia, the Little Hungarian Plain, and the valley of the River Morava. In the cemetery of Holiare (Alsógellér, Slovakia) in Csallóköz (Veľký Žitný ostrov, Große Schüttinsel), it was discovered in an environment dated to the first half of the 9th century *(fig. 17. 13–15)* – provided it was not a subsequent burial.[250] The cemetery in Skalica (Szakolca, Slovakia), where grave no. 2 of barrow no. 3 yielded such a piece of jewellery, supports its early appearance in the 9th century.[251] The inner arch of the find discovered there already had an inner arch converging in a peak, and only the pendant part differed from the later items *(fig. 20. 13–14).*[252] Early pieces dating back to the first half of the 9th century were also present in the Váh (Vág) Valley,[253] and transitional types were found there too.[254] The 9th-century Moravian sites of outstanding significance already reflect the widespread use of the object type.[255] The jewellery also appears in Moravian archaeological material and its emergence is currently dated to the first third of the 9th century by researchers.[256]

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[241] Their development is highlighted by finds from Zalavár, as well, *Szőke 2020* 440, fig. 99. 26–27, 32.
[242] *Table 2. 1, 22, 28.*
[243] *Table 2. 19, 20, 23–27, 29.*
[244] *Dostál 1965* 384–386; *Kóčka-Krenz 1993* 82; *Zoll-Adamikowa – Dekówna – Nosek 1999* 76–77.
[245] *Szőke 2020* 442.
[246] *Table 2. 20, 24–26, 30, 60.*
[247] *Table 2. 19, 23, 28.*
[248] *Table 2. 11, 18, 69.*
[249] Similar observations were made in the case of bracelets, *Langó 2000* 41.
[250] *Točík 1968* 116, Taf. LXXXVIII. 8, 10
[251] *Budinsky – Krička 1959* 136. For a more recent interpretation of the site, *Szőke 2020* 419.
[252] The spherical design of the pendant also indicates that this closure, which later spread in the Balkans, was already present during the development of the object type.
[253] *Table 2. 28, 31.*
[254] Such an item unearthed in the cemetery of Borovce (Vágbori, Slovakia) was published by *Staššíková-Štukovšká 1997* 199; *Staššíková-Štukovšká 2001* 373; *Staššíková-Štukovšká 2005; Ungerman 2005* 736. However, not only such finds are known from the site, but also a "hybrid" item with a bunch of grapes, *Cat. Brno 2014* 404.
[255] *Staššíková-Štukovšká 2001* 373–374; *Hanuliak 2004* 169; *Cat. Brno 2014* 401–404.
[256] *Staššíková-Štukovšká 1997* 199; *Ungerman 2005* 736.

Another important centre of the development of the object type was the territory of present-day Transdanubia. The earrings unearthed from the graves of women in cemeteries excavated in Zalavár clearly show the diverse forms within which the group of finds characterised in connection with Type I are strongly represented.[257] We can find among them those items where the pendant decorated with four-pronged granulation is already present, but the inner arch with a pointed top is still missing from them.[258] We can also identify those variants where the structure of the characteristic inner arch can be recognised, but the pendant is either a bunch of grapes[259] or a cylindrical sheet metal element decorated with granulation.[260] Among these, the pair of gilded silver jewellery discovered in grave no. 157/99 of the cemetery belonging to Zalavár-Hadrian's Temple demonstrates well how this type acquired its widespread features *(fig. 14. 5)*.[261] In the case of these finds, the pendant decorated with a bunch of grapes was combined with an inner arch having a pointed top. These hybrid pieces also show another common feature of Type I described above, namely the cross-bar supporting the frame of the inner arch. Grave no. 37/2000 belonging to the cemetery surrounding Zalavár-Hadrian's Temple contained an object belonging to Type I, too *(fig. 14. 4)*.[262] The finds discovered in Transdanubia and the Little Hungarian Plain along with the artefacts from the Morava Valley confirm the development and widespread use of the object Type In the Middle Danube Region.

In the beginning, this type of jewellery was dated to the first half of the 10th century by Moravian researchers. However, the chronological division proposed by Vilhém Hrubý has become much more refined by now,[263] and it is obvious that the origins of this group of finds go back to the early Moravian find horizon dated to the first third of the 9th century.[264] The data above confirm this date, as well. Around the turn of the 9th and 10th centuries, this artefact type disappeared from the region due to a shift of power that took place in the Carpathian Basin. This can partly be explained by the fact that the group of objects in question had mainly belonged to the attire of the elite, both on the Carolingian border area and among the Moravians.[265] In the 9th century, no simple bronze variant of this jewellery existed that would have become part of common people's wear, as well. The disappearance of Type I from this region, however, did not mean its complete vanishing, as the type became fashionable in the North, in the territory of present-day Poland, from that time onwards. Its emergence in that region was also attributed to the above-mentioned shift of power by researchers.[266] Some of the craftsmen and the Moravian elite representing the fashion of such objects, found their new homeland in the North.[267] The fashion of these items can be observed in this region to the end of the 10th and the beginning of the 11th century.[268] Due to their presence in the North, these artefacts also reached the early Russian centres. Such pieces of jewellery were also discovered in Gnezdovo and Kiev *(fig. 20. 9–12)*.[269] Their appearance in the latter area, as well as their occurrence in various silver treasure hoards, can be ascribed to the long Viking/Russian presence

[257] *Szőke 2020* 440, 445.
[258] *Szőke 2020* 442, fig. 99, no. 26.
[259] *Szőke 2014* 98; *Szőke 2020* 442, fig. 99, no. 30.
[260] *Szőke 2020* 442, fig. 99, no. 32.
[261] *Szőke 2014* 98.
[262] *Table 2. 1.*
[263] *Galuška 1996* 96; *Chorvátová 2004; Chorvátová 2007; Ungerman 2005; Ungerman 2017* 20–23.
[264] *Staššíková-Štukovšká 1997* 199; *Chorvátová 2007; Ungerman 2005* 736
[265] Regarding the connections between representation and wear in the wider region, *Nowotny 2013.*
[266] *Dostál 1965* 385; *Wachowski 1981* 177–179; *Petruhin – Puškina 1996* 60; *Zoll-Adamikowa – Dekówna – Nosek 1999* 109; *Tomičić 2003* 154.
[267] *Tomičić 2003* 154; *Zoll-Adamikowa – Dekówna – Nosek 1999* 109–111.
[268] *Gąssowska 1979* 111–118; *Kóčka-Krenz 1993* 82–83; *Zoll-Adamikowa – Dekówna – Nosek 1999* 15, 111, 131; *Karger 1958* 180; *Puškina – Muraševa – Einosova 2012* 257–258.
[269] *Karger 1958* 178–182; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110; *Puskina – Muraseva – Einsova 2012* 257–258.

in the region.[270] In this northern region, the object type underwent further changes. Several other types of pendants developed from it. However, those are outside the scope of the present study.[271]

It is also worth addressing briefly the issue of the southern origins of Type I. After Vilhém Hrubý, these artefacts are still generally called an "East-Byzantine type of jewellery" in Moravian research.[272] However, the type exists only in its name. Slovak and Czech researchers are unanimously of the opinion that, despite the similarities in design, this jewellery – similarly to the other types of objects listed here – cannot be considered a Byzantine legacy.[273] Its development can be probably connected to those craftsmen who, after the fall of the Avar Khaganate, started working for the elite of the Moravian Principality and the Carolingian border regions. There was a demand and adequate financial background for their employment in these territories.[274] The pieces sporadically occurring in the South are therefore not the forerunners of the finds discovered in the Middle Danube Region, but probably came from there.[275] This is also supported by their being dated to the late 9th[276] and early 10th[277] centuries. I could not find similar pieces of jewellery in the central parts of the 9th-century Byzantine State. Similarly, apart from the specimen found at the site Galiče in Bulgaria *(fig. 19. 16)*, I could not detect such finds in the southern zone of the Balkans, either *(fig. 21)*. This is important to note because in the case of other types of hoop jewellery held to be of Byzantine origins, the items of similar design can be readily detected in the inner parts of the empire and even their antecedents can be identified.[278] Conversely, in the case of the artefact type under discussion, no such observations could be made. In terms of the technological characteristics, it cannot be testified either that Byzantine innovation would have underlain the development of the object type.[279]

The findings presented recently by Béla Miklós Szőke have highlighted that these finds were not exclusively present in Moravia. Their use in Transdanubia as well as the emergence of different hybrid variants in the Carolingian peripheries suggest that these pieces of jewellery were widespread outside the Moravian Principality, as well. This type of object was therefore a representative type of jewellery in a wider region, which may not have exclusively originated in Moravia. Accordingly, it is worth paying special attention to connections with Carolingian Pannonia.[280] Ptuj, for example, where this type of jewellery also appears,[281] must have been under the authority of Priwina.[282] Consequently, we do not necessarily have to assume a direct Moravian influence concerning the southern occurrence of I. This may as well have taken place in the inter-related parts of the Carolingian peripheries.

2.5. Characteristics of Type II

These finds – as reflected by the classification above – are cast items made of a copper alloy with a simpler design than those belonging to Type I. Perhaps the closest antecedent of the Type Is

[270] On the question with further literature more recently, *Sikora 2019.*
[271] For these, *Zoll-Adamikowa – Dekówna – Nosek 1999* 110–111; *Komar 2012* 331–333.
[272] *Chorvátová 2007.* As an example for the earlier views, *Gassowska 1979* 130.
[273] *Štefanovicová 1995; Štefanovicová 2004; Chorvátová 2007; Ungerman 2017* 26–27.
[274] *Ungerman 2017* 26–27.
[275] *Žeravica 1986* 179; *Korošec 1999* 50–53; *Tomičić 2003* 154–155.
[276] *Zoll-Adamikowa – Dekówna – Nosek 1999* 111; *Tomičić 2003* 154.
[277] The finds from Ptuj (*Korošec 1996; Korošec 1999* 50) and Zadar (*Tomičić 2003* 153–154) were dated to the late 9th, early 10th centuries by Slovenian and Croatian researchers. In connection with the find from Galiče, also *Važarova 1976* 220–246.
[278] See, for example, *Langó 2010.*
[279] In the Byzantine innovation, *Daim 2000.*
[280] *Szőke 2020* 73, 226–227.
[281] *Table 2. 33.*
[282] *Szőke 2020* 437. n. 2876.

the find discovered in the much-referenced Ducové (Ducó, Slovakia) cemetery *(fig. 16. 11–12)*.[283] The main difference between this group and Type I can be perceived in the raw material and the manufacturing technique employed. While the items belonging to Type I were always put together of several elements, the pieces of Type II were cast as one piece without exception.

The upper arch has a round cross-section in these pieces too, while the lower arch is ellipsoidal. The two ends of the lower arch terminate in a beaded frame[284] or a globular ornament on each side.[285] Both solutions are imitations of the relevant elements of Type I presented above. This part of the jewellery is almost completely unimportant in many items, as in the case of the aforementioned pieces discovered in the Carpathian Basin (Felgyő and Pančevo/Banatska Palanka). Here, only the slightly thickening shape of the lower arch indicates its closure.[286] The beaded decoration, often arranged in three rows on the lower arch, marks the place of the former filigree wire or granulation. On the cast pieces of higher quality, this decorative frame also runs along the inner and outer edges of the arch, as well as in the middle.[287] In the case of items of poorer workmanship, however, they are visible only in the middle of the arch.[288] There are also schematic pieces where merely a rib protruding from the surface of the arch has remained of the former decoration.[289] In some cases (such as the finds from the Banat, or the item from Felgyő) the imitation of these decorative elements is entirely missing.[290] The wavy cross-bar had the same variants.[291]

The plate under the wavy part is perforated in most items. In these, the shape of the openwork usually follows the wavy line of the upper cross-bar.[292] The fin had to be removed from the pierced items after casting.[293] However, this was not done in every case as can be seen, for example, in the find from Felgyő. There were some items where this openwork did not remain at all, because the surface was completely filled by the spilled metal during casting, which was not removed afterwards, either. The finishing of this part required greater knowledge and shaping skills from the craftsman of the masterpiece.[294] The products of goldsmiths of poorer skills, therefore, often had casting defects.[295] Some items show that no post-casting work was carried out on them. In the case of the find from Troyan *(fig. 20. 5)*, for example, it can be seen well that the casting fin still connects the wavy rim and the terminal of the cross-bar dividing the perforated part into two halves as it was not filed out after casting.[296] A similar defect can be observed on the item from Knin, where the wavy profile of the openwork was reduced to three oval holes *(fig. 17. 9)*, and on the find from Kladovo it was replaced by two holes *(fig. 19. 1)*. All this illustrates well how Type III developed. An isolated pair of jewellery from Serbia[297] represents a transition between Types II and III. One of the items has a clearly visible curved perforation, but its pair is not pierced through due to a casting defect that was not filed out subsequently *(fig. 19. 7)*. The bar

[283] *Cat. Brno 2014* 404.
[284] *Table 2. 44, 46–47, 49–51, 61–62, 67.*
[285] *Table 2. 32, 38, 45, 58, 67–69.*
[286] For further such pieces see *Table 2. 52, 57, 66*.
[287] *Table 2. 44, 51–52, 61.*
[288] *Table 2. 45–47, 50, 59, 62*.
[289] *Table 2. 32, 49, 66, 68–69.*
[290] *Table 2. 38, 57–58, 67.*
[291] In general, those pieces where the lower arch was decorated with a beaded wire (e.g., *Table 2. 44, 50–51*), also had beaded wire on the edge of the wavy arch, while in the case of those items where the lower arch was simpler, a similar tendency can be observed in terms of the wavy arch, as well.
[292] *Table 2. 32, 39, 44–48, 50–52, 58, 61–65.* The items from Felgyő and Banat were the same.
[293] *Table 2. 46*.
[294] For the difficulties of contemporary traditions of casting, *Bíró – Szenthe 2011; Szenthe 2012*.
[295] *Table 2. 32*.
[296] The find from the site Trojan bears numerous marks of use. *Welkow 1942* 48.
[297] *Ćorović-Ljubinković 1951* 52*; Table 2. 48*.

along the central vertical axis of the perforated part can also be considered as the continuation of the pendant connected to the lower arch. Its design is also varied. There are items where the decorative ball[298] or balls placed on top of each other[299] can be observed at the end of the cross-bar. In the case of less carefully finished pieces of jewellery, this part is just tapered[300] or simply rounded.[301] As for the find from Felgyő, the craftsman did not even bother to shape this part in this way. Among those pieces where the perforation was not filed out as described above and only a rounded triangular hole remained on each side of the central axis, we could also identify a variant where the dividing bar was, in fact, the organic continuation of the pendant and its sides were emphasised by vertical rows of beads *(fig. 19. 15, fig. 20. 4)*.[302]

The prismatic pendant ornament at the bottom was covered with cone-shaped (e.g., the artefacts from Banatska Palanka)[303] or trapezoidal ribs (e.g., the jewellery from Felgyő).[304] Less frequently, this part was also covered with beaded decoration, as in the case of the item from Pančevo and Banatska Palanka *(fig. 13. 7, fig. 14. 2–3)*.[305] Most often, the ribs were arranged in three or four rows, one below the other,[306] on the four side planes of the pendant. At the bottom of the prismatic pendant, there was usually a globular ornament,[307] or a thin cylindrical closure as can be seen on the jewellery from Szeged.[308]

Comparing the dimensions of finds classified in Type II with those of the objects belonging to Type I, we can clearly perceive that the items of the latter group are larger and wider. The items belonging to Type II were 2.7–5.5 cm high and 1.9–3 cm wide. The majority of the finds within this size range were higher than 3.4 cm and wider than 2.5 cm. It is clearly apparent that – as discussed above – the general height (2.3–3.3 cm) and width (1.5–1.7 cm) of the 9th-century pieces increased towards the end of the century. Apparently, this tendency was followed by the cheaper imitations belonging to Type II. The size of the pieces of jewellery forming group II, therefore, must have been the same as contemporary precious metal items that were put together from several elements.

This type was uniformly dated to the 10th century by researchers.[309] Nevertheless, for some finds, a later date was also considered possible by experts.[310] In the case of the Köttlach cemetery, which also contained 9th-century grave goods, for example, the 10th-century date is more likely. This is confirmed by other finds from the site dated to the 10th century with certainty.[311] The survival of the type to the 11th century is supported, among other things, by the item from Felgyő, which is the only piece of this type of jewellery from the Carpathian Basin that can be dated on the basis of find-circumstances. Based on relevant grave goods, the find from Felgyő can probably be dated to the 11th century.[312]

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[298] *Table 2. 52, 57.*
[299] *Table 2. 44–45, 47–48, 50, 51, 61–62.*
[300] *Table 2. 58, 68–69.* The find from Pančevo/Banatska Palanka can also be classified here.
[301] *Table 2. 46, 52.*
[302] *Table 2. 59, 67.*
[303] *Table 2. 32, 36, 38, 44, 47, 50–51, 57, 61, 67, 69.*
[304] *Table 2. 42, 45–46, 48–49, 52, 58, 62, 68.*
[305] For another parallel, see *Table 2. 59.*
[306] It was only the pieces decorated with beaded wire, as well as the item from Köttlach and one of the stray finds from Northern Bulgaria that had more rows that this. *Table 2. 32, 59, 67.*
[307] *Table 2. 32, 38–39, 42, 44, 46–51, 57–59, 61, 67–69.* The items from Banat also had globular decorations.
[308] *Table 2. 36, 52, 66.* The tapering end is a unique phenomenon, *Table 2. 62.*
[309] *Ćorović-Ljubinković 1951* 50–51; *Ercegović-Pavlovič 1980* 89; *Perišić et al. 1981* 90; *Mesterházy 1991* 145; *Petrinec 2009* 266–267.
[310] *Miletić 1963* 131–132; *Janković – Janković 1990* 97; *Bálint 1991* 246; *Živić 2003* 194; *Grigorov 2007* 36.
[311] *Pittioni 1943* 15; *Giesler 1980.*
[312] *Mészáros 2014.*

The distribution area of Type II, however, significantly differs from that of Type I. Type I was prevalent in the Central Danube Region as early as the 9th century and after disappearing there in the 10th century, it became fashionable in the territory of present-day Poland, Russia, and Ukraine. Conversely, Type II was clearly related to the Balkans *(figs 21–22)*. The main focus of the use of the jewellery was in the Lower Danube Region. The northernmost item of this type comes from 10th-century Köttlach *(fig. 17. 5–6)*. This piece may also reflect in which direction the jewellery spread, as its design can be perfectly compared with the latest items known from the Central Danube Region, namely the pair of jewellery from Ducové *(fig. 16. 11–12)*.[313] Many elements of the Ducové jewellery can also be observed on better quality pieces of the type: for example, a beaded decoration on the top of the wavy upper arch,[314] or a spherical ornament placed on the central axis of the pierced part below the cross-bar. In this way, it can be traced well how the motifs observed on finds soldered together from several pieces were passed to simpler, cast pieces.

2.6. Characteristics of Type III

The items in this group are usually cast from a copper alloy and represent the most simplified versions of this type of object.[315] In the case of these earrings, even the middle wavy plate was abandoned, which was still present on the pieces of Type II.

The collected parallels are characterised by a round upper and an oval lower arch. The element closing the two ends of the lower arch is crudely shaped in almost every piece. In most cases, we can observe there an element similar to a spherical decoration (for example, in Batina and Zvonimirov, *fig. 13. 5*, *fig. 14. 1*), but a ribbed closure reminiscent of a disc-shaped decoration also occurs (in Halimba) *(fig. 13. 2–3)*. However, the wavy element on the inner side of the lower arch is cast as one piece and no perforation is visible on it. The place of the bar that the former openwork had is only signalled by an elongated oval bulge in the item from Halimba.[316] The lines of the lower arch and frame are marked by a thickened rim, as can be seen on the pieces of jewellery from Batina and Zvonimirovo.

The design of the cylindrical pendant is also simpler and cruder than those of the types discussed above. Trapezoidal ribs can still be observed on the item from Halimba, but in many other finds, this part was simplified to an irregular, notched form, like in the pieces discovered in Zvonimirovo *(fig. 14. 1.)* and at the site Bosanska Gradiška *(fig. 19. 12)*. This feature, as I mentioned above, is not only typical of Type III but as the find from Felgyő illustrates, some of the artefacts classified as Type II have similar characteristics, too.

In addition to the design of the objects, their dimensions are also similar in many respects to those of the finds belonging to Type II. The finds classified here range from 3.7 to 4.5 cm in height and from 2.6 to 4.3 cm in width. In terms of the date of the object type, we can again describe similar characteristics to what has been mentioned about Type II. The finds can be dated to the 10th and 11th centuries. They may have developed somewhat later than the finds belonging to Type II. However, they must have already existed in the middle third of the 10th century – as the coins of Hugh of Provence (Arles) discovered in the Halimba burial confirm[317] – and remained in use to the first half of the 11th century. The existence of this type of object in the latter period is also supported by the find-circumstances of the Slavonian pieces, especially the chronology of the cemetery discovered

[313] *Cat. Brno 2014* 404.

[314] In the case of Type II, it often consisted of beaded decoration arranged in a triangular shape. *Table 2. 47–48, 51–52*.

[315] The only exception in this respect is the pair of jewellery found in Zvonimirovo presented above. These items are considered to be silver alloys by their publisher.

[316] The preceding phase of its development is represented by the defective piece of a stray find from Serbia *(fig. 19. 7)*.

[317] *Coupland – Gianazza 2015* 316.

in Zvonimirovo.[318] The find from the site at Bosanska Gradiška can also be dated to the late 10th and early 11th centuries.[319] This is suggested by the age of other pendants,[320] the animal-headed bracelet,[321] and costume fittings with pendants[322] discovered together with this type of jewellery. A similar age was assumed by Serbian researchers in connection with the find from the site Grocka.[323]

This object Type is rarer compared to Type II. Based on the currently known finds, its main distribution area was the territory of former Pannonia[324] and the neighbouring territories *(fig. 22)*.[325] The analogues of the artefact from Bosnia discovered further away can also be found among the 10th- and 11th-century finds of Slavonia and Transdanubia.[326]

2.7. Overall assessment of the type of object

The group finds presented above was not widespread in the 10th-century Carpathian Basin but was certainly more common than jewellery decorated with a crescent on its inner arch. This frequency was, however, due to the relatively high number of finds discovered in Slavonia and the Banat. At the same time, it is important to take into account that their number is still below ten pieces. It demonstrates well that in the 10th-century Hungarian Principality, and subsequently in the early Hungarian Kingdom, the use of this type of object was very sporadic. It is enough to compare them with the numerous pieces of ring jewellery made of twisted wire, crescent-shaped pendants, or S-terminalled lockrings.[327] Even when compared with the fashion of other South-East European objects – such as, pendants decorated with four spheres or a bunch of grapes – in the Carpathian Basin, the number of the investigated objects is insignificant *(fig. 15)*.

Despite the local marginality of this 10th-century artefact, the background of its development offers a number of interesting phenomena. In spite of the fact that the 10th-century items reached the Carpathian Basin from the south-east, (to the best of my knowledge) the object Type Itself is not of Byzantine origins, although the technological solutions that can be observed on the finds are closely associated with Byzantine jewellery craftsmanship.[328] I have not been able to find similar artefacts or pieces of jewellery, which could be regarded as the antecedents of the object Type in terms of design, either in scholarly literature or in the Byzantine archaeological material known to me. The earliest pieces are represented by the finds of the Central Danube Region. The area bordered by the former Carolingian Pannonia and the Moravian Principality is where the earliest pieces of this jewellery type emerged. These pieces categorised as Type I were precious metal items and were composed of several parts indicating advanced goldsmithing skills. Their fashion is fundamentally connected to the contemporary elite. Among the early pieces, there were no simple cast versions or parallels made of bronze. Type I later spread northwards. Its presence in Poland, as well as the early Russian finds and treasure hoards testify that this jewellery type still existed after the political transformation of the Central Danube Basin. It survived to the turn of the millennium as an object type worn by the local elite in the North *(fig. 21)*. After the Hungarian Conquest, its fashion ended in the wider region

[318] *Tomičić 1997; Tomičić 2019.*
[319] *Korošec-Vračko 1942* 280.
[320] For their analogue, *Tomičić 1997* 99–100.
[321] The closed animal-headed bracelet belongs to Sub-Type 3c in the classification established by László Kovács, and can be dated to the first half of the 11th century, *Kovács 1994* 136.
[322] On their chronology more recently, *Tomičić 2019.*
[323] *Bajalović – Haci-Pešić 1984* 58.
[324] For the identification of the area, *Filipec 2015* 17–20.
[325] The find from Grocka was discovered on the border of the Banat, on the right bank of the Danube, between Smederovo (Szendrő, Serbia) and Belgrade (Nándorfehérvár, Serbia).
[326] *Korošec-Vračko 1942*.
[327] *Horváth 2016* 49–123; *Kovács 2019* 364–432.
[328] *Žilina – Makarova 2008*.

of its development. One of the latest such finds, which already bears some of the characteristics of Type II, was discovered in Ducové and can be dated to the late 9th or early 10th century.

The main distribution area of Type II was, however, the region of the Lower Danube. These are, without exception, pieces made of bronze. In terms of their size and design, they can be associated with the above-mentioned finds from Ducové *(fig. 16. 11–12).* They are also larger than the earlier 9th-century pieces of jewellery made of precious metal, and they are most closely related to this find in terms of their design, as well. The pieces of jewellery found in the Carpathian Basin (the northernmost being the find from Felgyő, as well as the items from Pančevo and Banatska Palanka discovered to the east of it), are late items and have southern connections. The closest parallels of the find from Felgyő can be found among the Serbian stray finds,[329] while the pieces from the Banat are most closely related to finds discovered at the sites of Mitrovica, Vinča, and Felix Romuliana.[330] All this also demonstrates that, according to our present knowledge, the object type did not cross the Carpathian Basin when its fashion spread from the North to the South. Probably the transport corridor may have been the North Alpine Region, which is also suggested by finds from Köttlach classified as Type II.[331] The fact that this transport corridor was already extant in the 9th century is confirmed by several other artefacts, such as the 9th-century find from Ptuj *(fig. 17. 7–8),*[332] also published by Béla Szőke, and the item from Zadar *(fig. 17. 10).*[333] Preceding the Hungarian settlement, Transdanubia was an integral part of this network, as demonstrated by the analysis carried out by Béla Miklós Szőke.[334] This system of relations between the North and South is also testified to by the cemetery of the site Bagrusa in Bosnia, which contains northern finds.[335] The object type thus most likely spread from here to the South and became prevalent to the Lower Danube Region *(fig. 22).* This type of jewellery is not the only example of the spread of fashion from the North to the South. It may be enough to refer to the observations made by Károly Mesterházy, who pointed out in connection with the Kiev-Volhynian-type pendants that although "certainly going back to Byzantine precedents, the Kiev-Volhynian-type earrings developed in Ukraine, or, more precisely, the settlement area of the Polianians (since they do not occur anywhere else) in the late 9th and early 10th centuries".[336] It was from there that they travelled southwards. In this way, they arrived in the Carpathian Basin from the North, and from there, they spread further to the south and became fashionable in the Balkans, as well.

A Type III is connected to a local group based on currently available data. This type of jewellery was common in the territory of former Pannonia and the adjacent parts of Bosnia *(fig. 22).* Although it most likely developed somewhat later than Type II, it was in use between the middle of the tenth and the first half of the 11th century. In other words, its fashion was contemporary to that of Type II.

Concerning Types II and III, it should be emphasised again that the design sequences of these types did not stop with their development, as further variants emerged along the Lower Danube. Such are the pieces where, instead of the four-pronged pendant, a spherical ornament was soldered to the outer edge of the lower arch,[337] or where the manufacturers omitted the aforementioned wavy

[329] *Table 2. 52; Kovačević 2003* 57.
[330] *Table 2. 38, 45–46*.
[331] *Pittioni 1943* 15; *Mesterházy 1991* 145.
[332] *Szőke 1962* 50; *Korošec 1966* 155.
[333] *Tomičić 2003* 153–154.
[334] *Szőke 2018* 302–303; *Szőke 2020* 73, 226–227, 437.
[335] *Žeravica 1986*. For its more recent interpretation, *Tomičić 2010*.
[336] *Mesterházy 1994* 229.
[337] The item discovered in grave no. 2 of the mound burial no. 3 at site Skalica (Szakolca, Slovakia) already had a spherical ornament on the lower arch instead of a four-pronged pendant with granulation *(fig. 20. 13–14), Budinský-Krička 1959* 134–135.

inner arch.[338] Nevertheless, in connection with these unique features, it is worth taking into account the fact that the craftsmen who prepared the pieces of jewellery studied by us were certainly able to make many other designs. Moreover, they must have even produced them. Therefore, the items discussed above separately may as well have been made by the same craftsman.[339]

Summary

From the analysis of the two types of jewellery presented above, we can also draw some general conclusions concerning the 10th- and 11th-century relations between the Carpathian Basin and South-Eastern Europe. In conclusion of my study, I would now like to discuss these in brief.

The distribution of the finds in the Carpathian Basin corresponds to the general feature that László Török observed when examining a completely different tradition.[340] The role of a given cultural region as a transferor and the other as a recipient is not an exclusive and one-sided process. The recipient – in this case, the population of the 10th-century Hungarian Principality and the early Árpádian Hungarian Kingdom – did not take over everything from the local population and neighbouring regions in terms of jewellery culture, either. Relatively few of the simple mass-produced goods, including cast bronze pieces, coming from the Balkans have actually become fashionable in the Carpathian Basin. In most cases, only a few pieces were left of them. The jewellery types presented above belong to this "unsuccessful" category. Their presence is only evidenced by few data, and moving farther away from the southern contact area, fewer and fewer pieces have remained of them. Their sporadic presence does not justify the kind of interpretive framework that many researchers referred to before, namely that they would be markers of the so-called (actually, never-existing) "Bijelo Brdo culture".

The relations of the types of objects with South-Eastern Europe in the 10th century does not necessarily imply that their development was associated with the Balkans or directly with Byzantium. This presupposition could also be confirmed by identifying parallels of the items decorated with crescent-shaped ornaments on the inner arch at Byzantine sites. Finds with a wavy inner arch and a four-pronged pendant did not have such connections. In the case of these pieces, we found that they evolved in the Central Danube region (partly in the Carpathian Basin) in the 9th century. Subsequently, their fashion ended there because of the local shifts of power that took place at the end of the century. At the same time, they became popular in the Balkans due to the network of relations existing to the west of the Carpathian Basin across the Eastern Alps in the 10th and 11th centuries. Their secondary fashion there had little impact on the Carpathian Basin in the end.

The find from Himód also highlights that this Eastern Alpine cultural channel existing in the 10th and 11th centuries transmitted cultural goods not only from the North to the South but also in the opposite direction. The Himód pendant is not only the westernmost example of the type of jewellery adorned with a crescent on its inner arch but also suggests that it could have hardly originated directly from the Balkans. The best analogues of the Himód find are known from Slovenian cemeteries. The close connection with them is well perceptible.[341] This piece of jewellery found in the cemetery testifies to the existence of connections with the Eastern Alpine Region instead of South-Eastern Europe. The cultural channel of which Transdanubia was also an integral part in the 9th century did not disappear in the 10th century, either. Its focal area only shifted to the west.

[338] There is evidence for the lack of a wavy inner arch not only among cast items discovered along the Lower Danube but also in the North. E.g., Holiare grave no. II (*Točík 1968* 116); Roztoky (*Sláma 1977* 137) Zákolany (*Sláma 1977* 177).

[339] For a similar line of reasoning, *Mesterházy 1991* 145.

[340] *Török 2011.*

[341] *Ungerman 2016* 30–31.

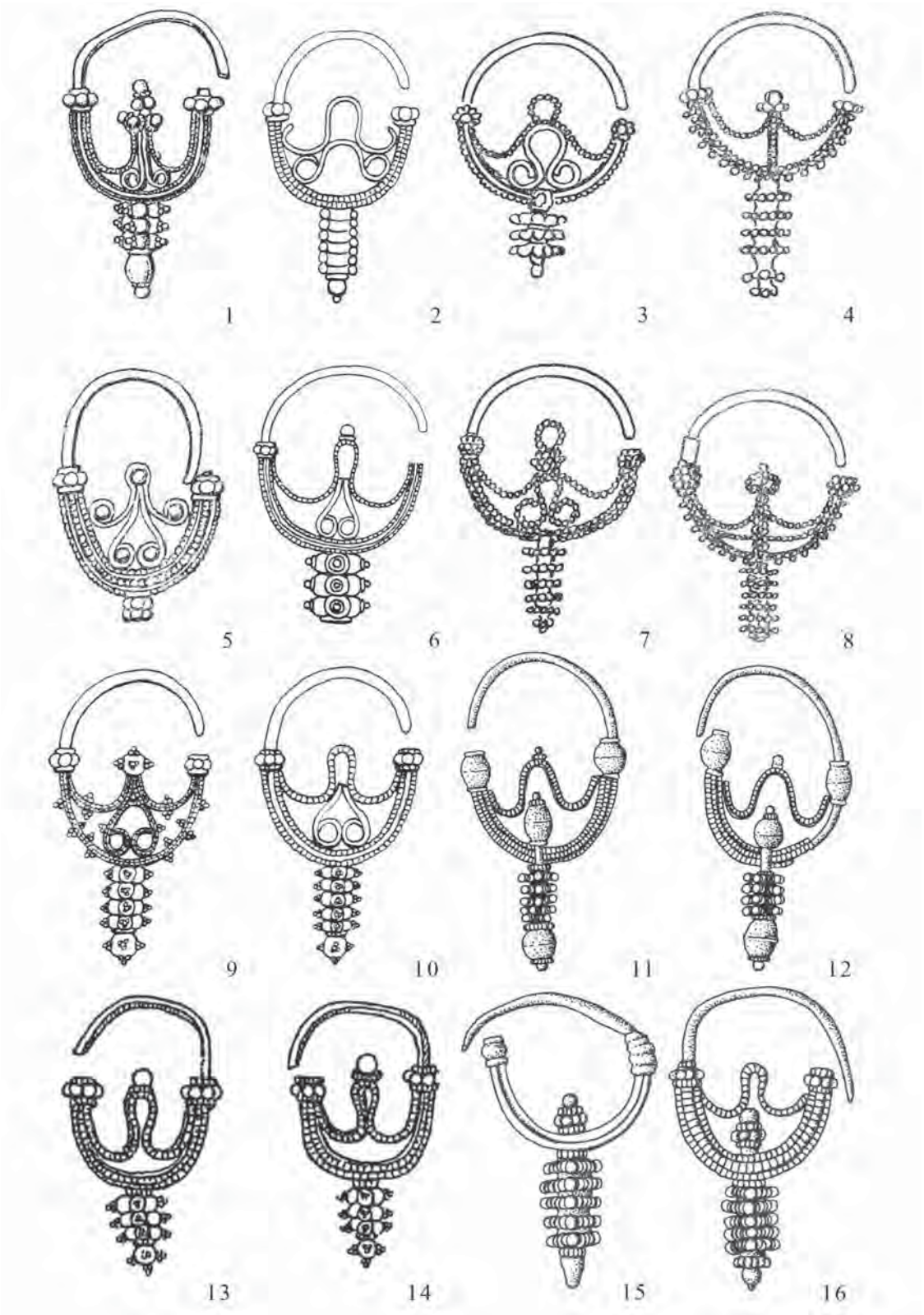

Fig. 16. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant. 1. Breclav-Pohansko; 2. Dolní-Věstonice-Písky, Grave 742/57; 3. Gostyń; 4. Obra Nowa; 5. Kouřim, Grave 136; 6. Lanžhot, Grave 6; 7. Zalesie; 8. Zawada Lanckorońska; 9. Staré Mesto „Na valách", Grave 103; 10. Staré Mesto „Na valách", Grave 40/51; 11–12. Ducové (Ducó), Grave 1460; 13–14. Uherské Hradiště-Sady, Grave 87/60; 15–16: Holiare (Gellér), Grave II (1–9. after *Dostál 1965;* 10. after *Dostál 1966;* 11–12, 15–16. after *Hanuliak 2004;* 13–14. after *Galuška 1996*)

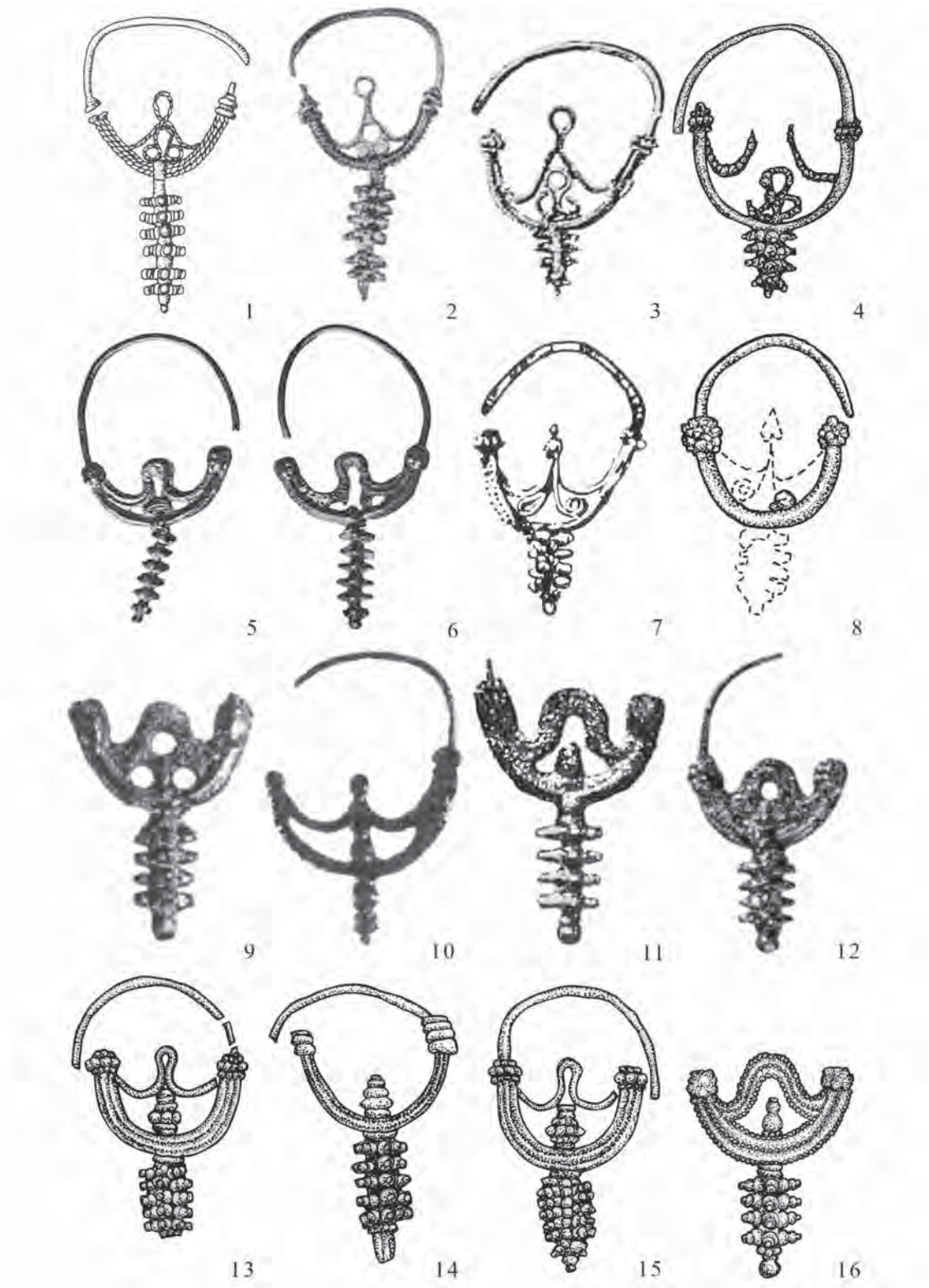

Fig. 17. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant. 1–2. Stray finds from Lipová-Ondrochov (Ondrohó); 3–4. Borovce (Vágbori), Grave 26; 5–6. Köttlach; 7–8. Ptuj, Grave 350; 9. Knin-Plavno; 10. Zadar-Sv. Petar Stari; 11. Felix Romuliana; 12. Grocka-ul. Sava Kovačevića 8; 13–15. Holiare (Gellér), Grave II; 16. Stray find from the region Targovishte (Bulgaria) (1. after *Hanuliak 2004;* 2. after *Točík 1971;* 3–4. after *Staššíková – Štukovšká 2001;* 5–6. after *Pittioni 1943;* 7. after *Dostál 1965;* 8, 13–16. drawings: ©Zsóka Varga; 9. after *Karaman 1940;* 10. after *Tomičić 2003;* 11. after *Živić 2003;* 12. after *Bajalović – Haci-Pesić 1984*)

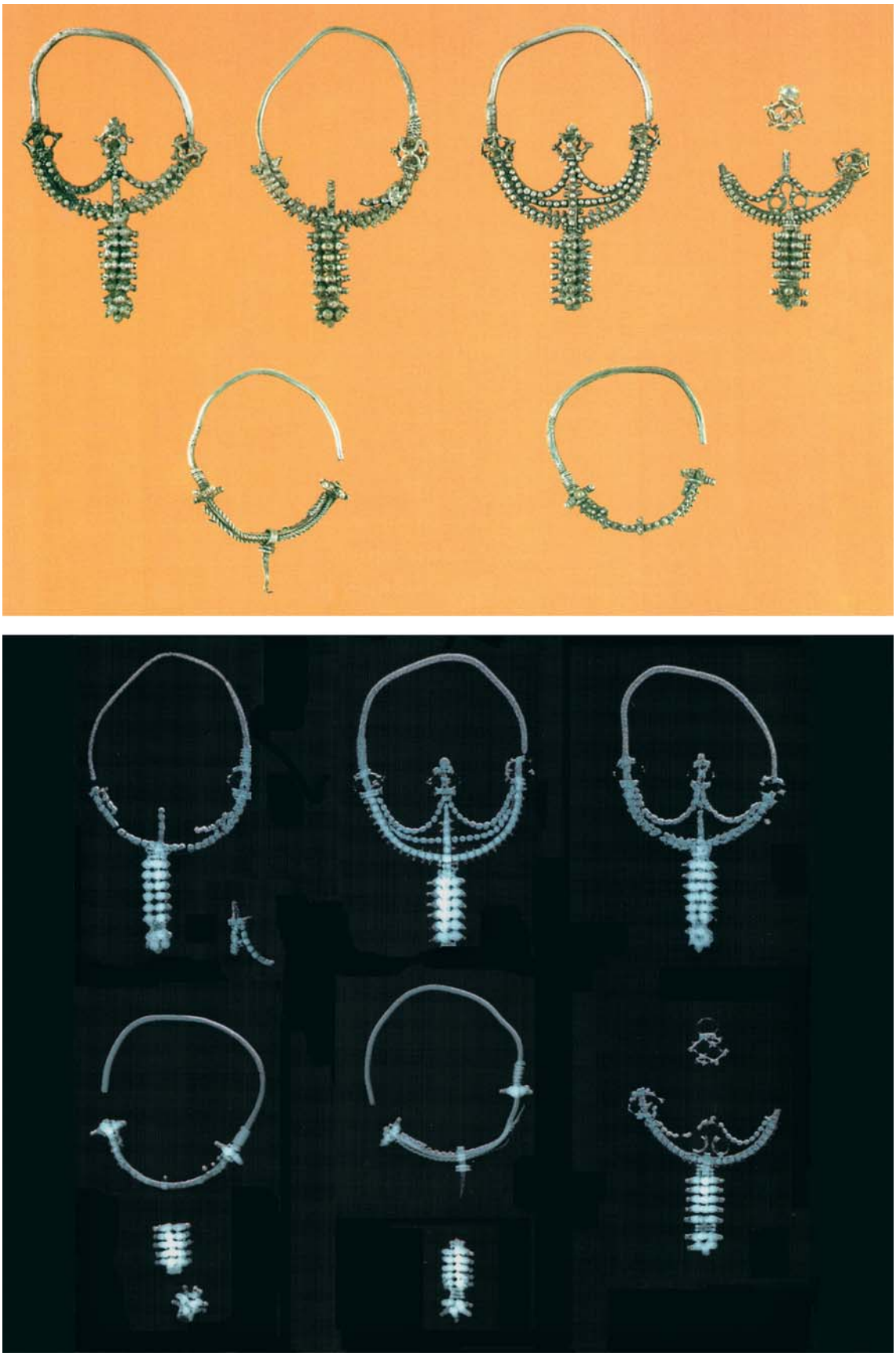

Fig. 18. Photograph and X-ray photo of some jewels found as part of the treasure from Zawada Lanckorońska (after *Zoll-Adamikowa – Dekówna – Nosek 1999)*

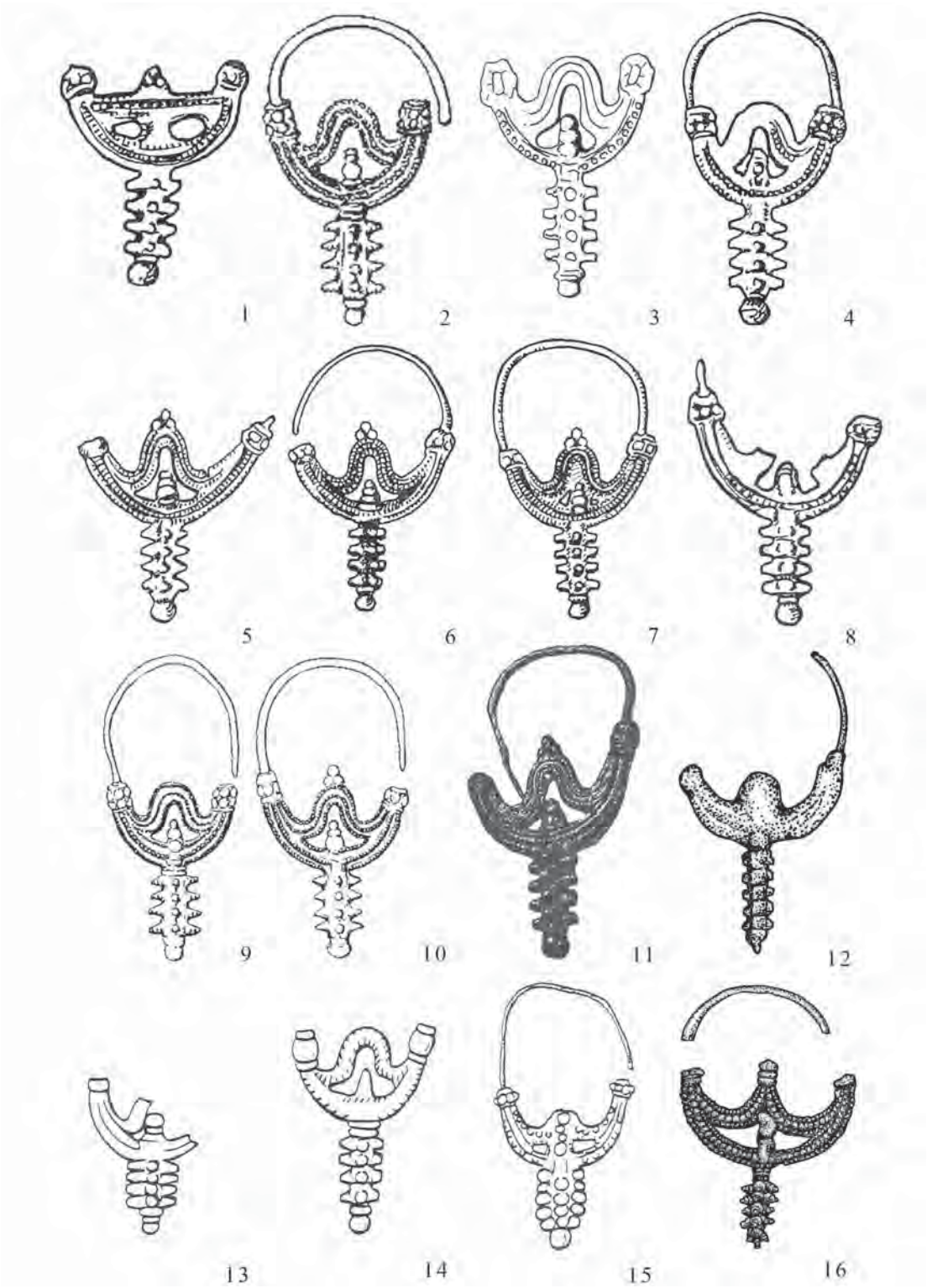

Fig. 19. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant. 1. Kladovo; 2. Kostolac; 3. Mačvanska-Mitrovica; 4. Vinča; 5. Piece from the territory of present-day Serbia, near the Danube between Ritopek and Dubravice, exact location unknown; 6–11. Pieces from the territory of present-day Serbia, exact location unknown; 12. Bosanska Gradiška-Junuzovci; 13–14. Balik; 15. Batin-2; 16. Galiče, Grave 27 (1, 4–8. after *Ćorović-Ljubinković 1951;* 2. after *M. Janković – Janković 1990;* 3. after *Ercegović – Pavlovič 1980;* 9–10. after *Bajalović – Haci-Pesić 1984;* 11. after *Kovačević 2003;* 12, 16. drawings: ©Zsóka Varga; 13–15. after *Grigorov 2007*)

Fig. 20. Crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant. 1. Rujno; 2–3. Središe; 4. Stray find from Northern Bulgaria; 5. Troyan; 6. Garlica-Ostrov; 7. Kupinovo (Kölpény); 8. Transitional type from Preslav: while the wavy decorative element on the inner edge of the lower arch is missing, the four-pronged prismatic pendant can be seen; 9–11. Kijev; 12. Gnezdovo; 13–14. Skalica (Szakolca) Barrow 3, Grave 2 (1–4, 6. after *Grigorov 2007;* 5. after *Welkow 1942;* 7–11, 13–14: drawings: ©Zsóka Varga; 12. after *Petruhin et al. 1996*)

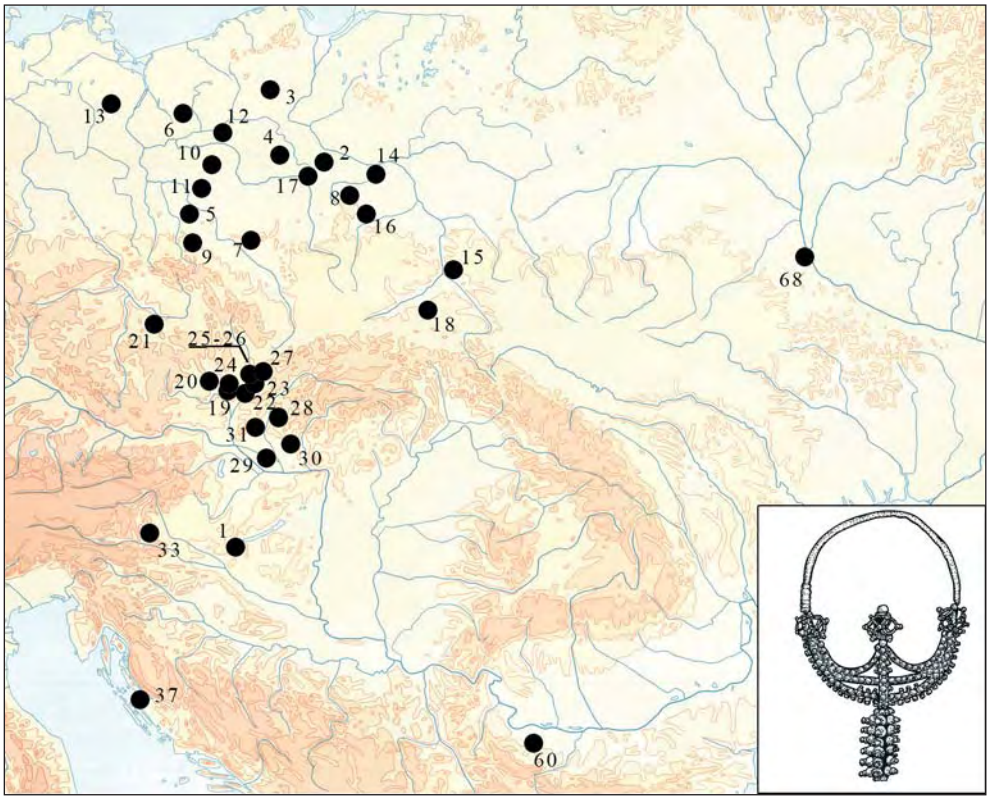

Fig. 21. Distribution of the Type I of crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant in the 9th century, for numbers see *Table 2* (Map: ©Péter Langó)

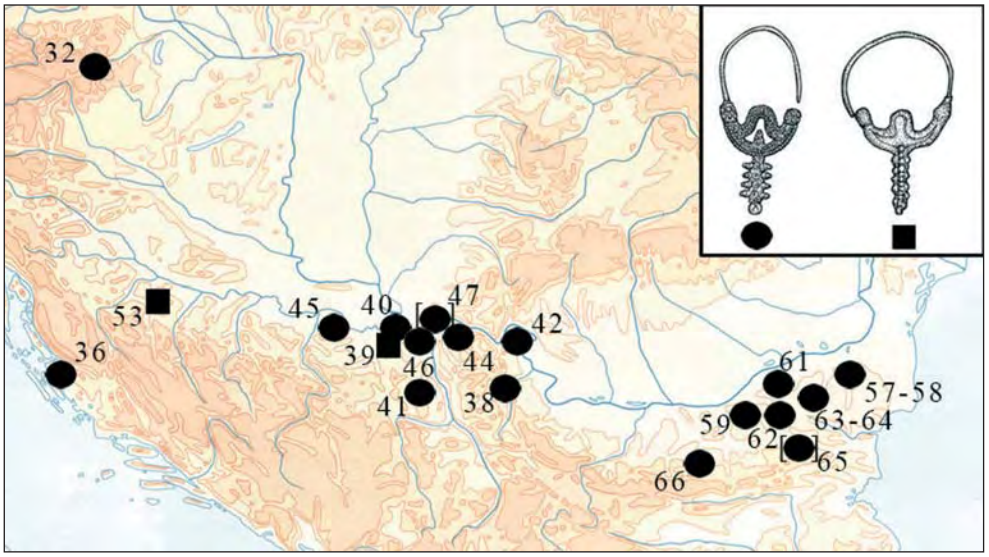

Fig. 22. Distribution of the Type II and Type III crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant outside the Carpathian Basin, for numbers see *Table 2*, rectangle: Type II; circle: Type III (Map: ©Péter Langó)

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Table 1. Locations with pendants and earrings decorated with a crescent on their inner arch found outside the Carpathian Basin

	Site	Feature	Collection	Material	Type	Total	Dimensions (cm)	Reference	Figure
Slovenia									
1.	Ptuj-Grad Podravska region	Grave 104	Ptuj – Ormož Regional Museum Inv. no. 482–483.	Silver	II.3	2	Height: 4.0 Width: 2.5	*Jovanović – Vuksanović – Berič 1972* 108; *Jovanović 1976* 136; *Korošec 1996–1997* 59.	Fig. 10. 2.
2.	Ptuj-Grad Podravska region	Grave 296	Ptuj – Ormož Regional Museum Inv. no. 482–483.	Silver	II.3	1	Height: 4 Width: 2.5	*Korošec 1996–1997* 59.	–
3.	Ptuj-Spodnija Hajdina Podravska region	Grave 2	Maribor Regional Museum Inv. no. A 2416.	Silver[1]	II.1	1	Height: 5.27 Width: 3.36 Height of the preserved laminated spherical ornament: 0.9 Largest diameter: 1.2	*Korošec 1947* 29–30; *Jovanović 1976* 136; *Giesler 1981* 166; *Bitenec – Knific 2001* 116.	Fig. 9. 1.
4.	Svete Gore nad Bizeljsko	Grave 15	Museum of the Posavje Region, Brežice	Silver	II.1	2	1. Height: 4.08 Width: 2.49 2. Height: 4.13 Width: 2.52	*Korošec – J. Korošec 1973* Pl. VI.; *Korošec 1976* 508–509; *Jovanović 1976* 136; *Bitenec – Knific 2001* 119.	Fig. 9. 3.
Croatia									
5.	Biskupija-Crkvina Region Šibensko-kninska	Grave 29	Museum of Croatian Archaeological Monuments, Split	Silver	I	4	Height of the pendants (on one side): 7.3 Height of the pendants (on the other side): 6.8 Width: 3.0	*Aleksova 1966* 54; *Jovanović – Vuksanović – Berič 1972* 108; *Jovanović 1976* 135; *Mesterházy 1991* 108; *Petrinec 2009* 79, 256.	Fig. 4. 1.
6.	Gata-Cemetery around the St. Cyprian's Church	Grave 86	NDA[2]	Silver	I	2	Height: 10,3 Diameter: 4.0 Height of the conical pearl ornaments: 2.0	*Petrinec 2009* 84, 569.	Fig. 4. 2–3.

[1] In his first publication Josip Korošec still described the find as a bronze artefact *(Korošec 1947* 29*)*.
[2] NDA = no data available.

Site		Feature	Collection	Material	Type	Total	Dimensions (cm)	Reference	Figure
7.	Podgrađe[3]	Stray finds from early medieval graves	Museum of Croatian Archaeological Monuments, Split	Silver	I	2	Height: 11.5 Diameter: 5.0 Height of the conical pearl ornaments: 1.8	*Petrinec 2009* 105, 617.	Fig. 4. 4–5.
Serbia									
8.	Prahovo Ključ-Negotin Region Borsk	NDA	National Museum in Belgrade	NDA	II.2	1	Height: 2.62 Width: 1.6 Length of the grape-shaped ornament on the outer side of lower arch: 1.3 Width: 0.4 Height of the crescent-shaped ornament on the inner side of the lower arch: 1.0 Width: 0.67	*Janković 1983* 99, 118, Pl. IV. 5; *Mesterházy 1990* 107.	Fig. 9. 7.
Kosovo									
9.	Mount Čečan (Rigómező – Kosovo polje) Kosovo district	Treasure hoard	National Museum in Belgrade	Silver	I	2	1. Height: 4.4 Width: 2.7 Weight (g): 3.1 2. Height: 4.55 Width: 2.5 Weight: 3.3	*Jovanović 1976* 123–128; *Mesterházy 1990* 107–108; *Grigorov 2007* 40.	Fig. 5. 1.

[3] In her recent study Maja Pterinec *(Petrinec 2009* 60, 105*)* demonstrated that the pendants were published wrongly associated with the site Đeverske–Ležajiča Glavica in former publications (See *Jelovina 1976* 43; *Gunjača – Jelovina 1976)*. Scholarly literature *(Jovanović 1976* 135; *Mesterházy 1990* 108*)* also contains references to a find from Knin, which was publised in a study by Anđela Horvat *(Horvat 1954)*. However, the artefact is one of the pendants from Podgrađe, as Maja Petrinec brought my attention to it. Hereby, I would like to thank her for her help.

	Site	Feature	Collection	Material	Type	Total	Dimensions (cm)	Reference	Figure
10.	Matičane-Berg Kosovo district	Grave 46	Kosovo Museum, Pristina Inv. no. 123.	Silver	I	2	Height: 6.27, 6.42	*Jovanović – Vuksanović – Berič 1972* 108; *Jovanović 1976* 135; *Jovanović – Vuksanović 1981* Y 245; *Mesterházy 1990* 108; *Tasić 1998* 363; *Bikić 2010* 47.	Fig. 5. 3
11.	Matičane-Berg Kosovso district	Grave 84	Kosovo Museum, Pristina	Silver	I	2	Height of the intact piece: 5.42 Length of the fragment: 1.6	*Jovanović – Vuksavonić – Beric 1972;* *Jovanović 1976* 135; *Jovanović – Vuksanović 1981* Y 247; *Mesterházy 1990* 108.	Fig. 5. 2
Bosnia and Herzegovina									
12.	Gomjenica-Baltine Bare Banja-Luka district	Grave 21	The National Museum of Bosnia and Herzegovina Inv. no. 449	Bronze	II.2	1	Height: 4.7 Width: 2.9	*Miletić 1967* 85; *Jovanović – Vuksanović – Berič 1972* 108; *Jovanović 1976* 135; *Giesler 1981* 165; *Mesterházy 1990* 107.	Fig. 10. 1.
13.	Gomjenica-Baltine Bare Banja-Luka district	Grave 161	The National Museum of Bosnia and Herzegovina Inv. no. 1457	Bronze	II.3	1	Height: 4.6 Width: 2.9	*Miletić 1967* 101–102; *Miletić 1975* 102.	Fig. 9. 2.
Macedonia									
14.	Bitola (Herakleia- Bitola) Pelagonia district	Grave 52	NDA	Silver	II.1	1	NDA	*Maneva 1992* 53; *Mikulčik 1996* 143; *Grigorov 2007* 40; *Janković 2007* 53.	Fig. 9. 4.
15.	Demir Kapija	Grave 336	NDA	Silver	II.1	2	Height: 2.5, Width: 0.9	*Aleksova 1966* 44.	–
16.	Demir Kapija	Stray find	NDA	Silver	I	2	NDA	*Aleksova 1966* 53–54;[4] *Jovanović – Vuksanović – Berič 1972* 108; *Jovanović 1976* 135; *Mesterházy 1990* 108; *Maneva 1992* 53.	Fig. 6. 1–3.

[4] Probably, the photograph of this object was published by Blaga Aleksova in 1966. However, the artifact with several differences showed up in a later publication, see *Aleksova 1970* 98.

Site		Feature	Collection	Material	Type	Total	Dimensions (cm)	Reference	Figure
17.	Negotin	NDA	NDA	Silver	I	2	NDA	*Maneva 1992* 53; *Grigorov 2007* 40.	Fig. 6. 4–5.
18.	Krstevi	Grave 4	NDA	Silver	I	2	Height: 6.3 Width: 6.0	*Maneva 2000* 55, 87; *Grigorov 2007* 40; *Špehar – Zorova 2012* 437.	Fig. 6. 6–10.
19.	Krstevi	Grave 9	NDA	Silver	I	2	Height: 3.4 Width: 1.9	*Maneva 2000* 55, 91.	Fig. 7. 1.
20.	Krstevi	Grave 17	NDA	Silver	I	2	Height: 3.4 Width: 1.9, 2.2	*Maneva 2000* 55, 99.	Fig. 7. 2.
21.	Sten'e-Golem grad-Prespa	Grave 55	NDA	Bronze	II.1	2	NDA	*Bitrakova 1988* 208; *Maneva 1992* 53; *Janković 2007* 53; *Grigorov 2007* 40.	Fig. 9. 5–6.
Bulgaria									
22.	Dolni Lukovit	Grave 85	NDA	Bronze	II.3	2	Height: 3.5 Width: 1.5	*Važarova 1976* 210; *Važarova 1980* 489; *Grigorov 2007* 40.	Fig. 10. 3.
23.	Kaliakra	Grave find	Yordan Yovkov Museum in Dobrich	Silver	I	1	NDA	*Bobčeva 1982* 108.	Fig. 8. 5.
24.	Kavarna-Vasil Levski ul. 17. excavated area of the cemetery	Grave find	NDA	Silver	I	2	Height: 4.2 Width: 2.6	*Važarova 1976*. 333; *Jovanović 1976* 135; *Mesterházy 1990* 108; *Grigorov 2007* 40.	Fig. 8. 1–2.
25.	Kragulevo	Grave 26	NDA	Bronze	II.3	1	NDA	*Bobčeva 1984* 56; *Grigorov 2007* 40.	Fig. 10. 5.
26.	Novgrad-Iridiol-Kriveblato Ruse region	NDA	Historical Museum in Svishtov Inv. no. 942	Bronze	II.3	1	NDA	*Hensel 1961* 259; *Jovanović 1976* 135.	Fig. 10. 6.

	Site	Feature	Collection	Material	Type	Total	Dimensions (cm)	Reference	Figure
27.	Odarci	Stray find from Polish excavation sector	The National Archaeological Institute with Museum, BAS	Bronze	II.2	1	Height: 5.9 Width: 2.8	*Dymaczewska – Dymaczewski 1980* 166; *Mesterházy 1990* 108; *Dončeva-Petkova et al. 1999* 100–101; 160; *Grigorov 2007* 40.	Fig. 9. 9.
28.	Zlati dol Haskovo region	NDA	NDA	NDA	II.2	1	NDA	*Jovanović 1976* 135; *Mesterházy 1990* 108; *Grigorov 2007* 40.	Fig. 9. 8.
29.	Stray find Northern Bulgaria	Stray find	NDA	NDA	II	1	NDA	*Grigorov 2004* 70; *Grigorov 2007* 40.	Fig. 10. 4.
30.	Stray find Targoviste region	Stray find, cemetery	Regional Historical Museum of Targovishte	Silver	I	2	NDA	*Zhecheva n.d.* 4.	Fig. 8. 3–4.
31.	Stray find	Stray find	The National Archaeological Institute with Museum, BAS Inv. no. 42831	Silver	I	2	Height: 6.8 Width: 3.3	*Kapelkova 2006.*	Fig. 8. 6–7.
Greece									
32.	Aerino Pref. Magnesia	Grave find	Archaeological Site of Nea Anchialos Inv. no. E. E. 63.1.; E. E: 64.2.	Bronze	II.3	2	Height: 4.9 Width: 2.5	*Cat. Athens 2002* 585; *Bosselman-Ruickbie 2011* 255.	Fig. 10. 7–8.
33.	Agia Triada	Cemetery	7th Ephorate of Byzantine Antiquities	Silver	I	2	NDA	*Deriziotis – Kougioumtzoglou 2005* 169.	Fig. 8. 10–11.
34.	Azoros Pref. Larissa	Cemetery	7th Ephorate of Byzantine Antiquities	Silver	I	4	NDA	*Deriziotis– Kougioumtzoglou 2005* 156.	Fig. 8. 12–15.
Unknown site									
35.	Stray find	Unknown	Private Collection	Silver	I	2	Height: 4.23 Width: 4.27	*Sternberger 1994* 833.	Fig. 8. 8–9.

Table 2. Locations with crescent-shaped earrings with a wavy inner plate and a four-pronged ("pine-cone-shaped") pendant: the 9th-century antecedents of the crescent-shaped earrings and the 10th–11th-century artefacts found outside the Carpathian Basin

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
Hungary								
1.	Zalavár-Vársziget, Hadrianus church	Grave 157/99	Hungarian National Museum, Budapest Inv. no. 2013. 117.1–2.Z.	I	2	Height: 3.2	*B. M. Szőke 2014* 98; *B. M. Szőke 2020* 440, 442.	Fig. 14. 5.
Poland								
2.	Borucin woj. włocławskie	Treasure hoard	NDA	I	2 fragments	NDA	*Dostál 1965* 384; *Kóčka-Krenz 1993* 231; *Zoll-Adamikowa–Dekówna–Nosek 1999* fig. 7; *Petrinec 2009* 267.	–
3.	Człuchów woj. słupskie	Grave find	NDA	I	2	NDA	*Dostál 1965* 384; *Kóčka-Krenz 1993* 230; *Petrinec 2009* 267.	–
4.	Near to Gniezno woj. poznańskie	Treasure hoard	NDA	I	2 fragments	NDA	*Kóčka-Krenz 1993* 231.	–
5.	Gostyń woj. legnickie	Treasure hoard	NDA	I	1 intact piece, 2 fragments	NDA	*Dostál 1965* 384–386; *Wachowski 1981* 178; *Kóčka-Krenz 1993* 231; *Petrinec 2009* 267.	Fig. 16. 3.
6.	Kania woj. szczecińskie	Treasure hoard	NDA	I	2 fragments	NDA	*Dostál 1965* 384; *Kóčka-Krenz 1993* 230; *Petrinec 2009* 267.	–
7.	Kotowice woj. wrocławskie	Treasure hoard	NDA	I	2 fragments	NDA	*Kóčka-Krenz 1993* 231.	–
8.	Łęczyca woj. płockie	Treasure hoard	NDA	I	1 intact piece, 1 fragment	NDA	*Kóčka-Krenz 1993* 231.	–
9.	Meschwitz	Treasure hoard	NDA	I	1	NDA	*Kóčka-Krenz 1993* 231.	–
10.	Nojewo woj. poznańskie	Treasure hoard	NDA	I	1 intact piece, 3 fragments	NDA	*Kóčka-Krenz 1993* 230.	–

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
11.	Obra Nowa	Treasure hoard	NDA	I	1 intact piece, 2 fragments	NDA	*Ćorović–Ljubinković 1964* fig. 5; *Dostál 1965* 384–385; *Wachowski 1981* 178; *Kóčka-Krenz 1993* 231; *Petrinec 2009* 267.	Fig. 16. 4.
12.	Obrzycko woj. poznańskie	Treasure hoard	NDA	I	1 intact piece, 3 fragments	NDA	*Dostál 1965* 384; *Kóčka-Krenz 1993* 230.	–
13.	Prenzlau-Alexanderhor	Treasure hoard	NDA	I	2 fragments	NDA	*Kóčka-Krenz 1993* 231.	–
14.	Sejkowice woj. płockie	Treasure hoard	NDA	I	2 fragments	NDA	*Kóčka-Krenz 1993* 231.	–
15.	Trójca woj. płockie	Treasure hoard	NDA	I	2 fragments	NDA	*Kóčka-Krenz 1993* 231; *Zoll-Adamikowa – Dekówna – Nosek 1999* 109.	–
16.	Tum woj. tarnobrzeskie	Treasure hoard	NDA	I	1 intact piece, 1 fragment	NDA	*Kóčka-Krenz 1993* 231.	–
17.	Zalesie woj. konińskie	Treasure hoard	NDA	I	10 fragments	NDA	*Dostál 1965* 384; *Wachowski 1981* 178; *Kóčka-Krenz 1993* 231; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110; *Petrinec 2009* 267.	Fig. 16. 7.
18.	Zawada Lanckorońska woj. tarnowskie	Treasure hoard	Archaeological Museum of Kraków Inv. no. 10157/75.	I	2 intact pieces, 10 fragments	Height of intact pieces: 5.2 Width: 3.2	*Dostál 1965* 384–386; *Wachowski 1981* 178; *Petrinec 2009* 267.	Fig. 16. 8, Fig. 18.
Czech Republic								
19.	Breclav-Pohansko	Treasure hoard	The Institute of Archaeology and Museology, Faculty of Arts, Masaryk University in Brno	I	1 intact piece, 3 fragments	Height: 2.5	*Hensel 1961* 54; *Dostál 1965* 384–386; *Zoll-Adamikowa – Dekówna – Nosek 1999* fig. 5; *Tomičić 2003* 154–155.	Fig. 16. 1.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
20.	Dolní-Věstonice-Písky	Grave 742/57	The Institute of Archaeology of the Academy of Sciences of the Czech Republic, Brno Inv. no. 1364/1	I	1	Height: 3.2 Width: 1.7	*Dostál 1965* 384; *Dostál 1966* 41.	Fig. 16. 2.
21.	Kouřim	Grave 136		I	1	Height: 2.4 Width: 1.5 Thickness: 0.2	*Dostál 1965* 384–386; *Šolle 1966* 153, 273–274.	Fig. 16. 5.
22.	Lanžhot Jihomoravký region	Grave 6	Archologické muzeum Břeclav-Pohansko Inv. no. 30237; 30247.	I	2	Height: 2.3	*Dostál 1965* 384; *Dostál 1966* 41, 139.	Fig. 16. 6.
23.	Mikulčice-Valy	Grave 714	The Institute of Archaeology of the Academy of Sciences of the Czech Republic, Brno Inv. no. 594-3010/58.	I	1	Height: 2.6 Width: 1.7	*Cat. Brno 2014* 401, no. 216.	–
24.	Pohansko-Ducal Manor		The Institute of Archaeology and Museology, Faculty of Arts, Masaryk University in Brno Inv. no. P 1060–1061.	I	2	Height: 3 Width: 1.7	*Cat. Brno 2014* 404, no. 224.	–
25.	Staré Mesto „Na valách”	Grave 103	Moravian Museum Brno	I	1	NDA	*Dostál 1966* 41.	Fig. 16. 9.
26.	Staré Mesto „Na valách”	Grave 40/51	Moravian Museum Brno Inv. no. 105656.	I	2	Height: 3.3	*Dostál 1966* 41; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110; *Tomičić 2003* 153–154.	Fig. 16. 10.
27.	Uherské Hradiště-Sady	Grave 87/60	Moravian Museum Brno Inv. no. 105713–105714.	I	2	Height: 2.8 Width: 1.1	*Galuška 1996* 138, 154.	Fig. 16. 13–14.
Slovakia								
28.	Ducové (Ducó) district Piešťany	Grave 1460	Institute of Archaeology of Slovak Academy of Sciences, Nitra Inv. no. 161k–162k	I	2	Height: 4.7 Width: 2.6	*Ruttkay 1991* 159; *Hanuliak 2004* 169, 316, Tab. Xxxiv. 8–9.	Fig. 16. 11–12.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
29.	Holiare (Gellér) district Nitra	Grave II	Institute of Archaeology of Slovak Academy of Sciences, Nitra	I	2	Height: 4.0–4.4 Width: 2.3	*Točík 1968* 116, Taf. Lxxxviii. 8–10; *Tomičić 2003* 153–154; *Hanuliak 2004* 169, 262, 318. Tab. Xxxvi. 5.	Fig. 16. 15–16, Fig. 17. 13–15.
30.	Ondrohó (Lipová – Ondrochov) district Nové Zámky	Stray find from the cemetery	Institute of Archaeology of Slovak Academy of Sciences, Nitra	I	1	Height: 3.9	*Točík 1971* 269. Taf. Lv. 12; *Hanuliak 2004* 169, 332. Tab. L. 9.	Fig. 17. 1–2.
31.	Vágbori (Borovce) district Piešťany	Grave 26	NDA	I	2	NDA	*Staššíková – Štukovšká 2001* 373.	Fig. 17. 3–4.
Austria								
32.	Köttlach	NDA	Museums für Urgescichte des Landes Niederösterreich in Asparn a. d. Zaya Inv. no. 8274a	II	2	Height: 5.5, 5.4 Width: 2.9, 3.0	*Pittioni 1943* 15; *Dostál 1965* 385; *Šribar – Stare 1975* 37–38; *Giesler 1981* 98, Abb. 14/10; *Mesterházy 1991* 145.	Fig. 17. 5–6.
Slovenia								
33.	Ptuj[1]	Grave 350	Regional Museum Ptuj Ormož Inv. no. S 549.	I	1[2]	Height: 3.15 Width: 1.94	*Korošec 1966* 185; *Dostál 1965* 384; *Petrinec 2009* 266–267.	Fig. 17. 7–8.
Croatia								
34.	Bohinjska Srednja vas	NDA	NDA	NDA	1	NDA	*Dostál 1965* 385.	–
35.	Buzet žup. Istarska	NDA	NDA	NDA	1	NDA	*Dostál 1965 385.*	–
36.	Knin-Plavno (Međine) Žup. Knin	Stray find	Museum of Croatian Archaeological Monuments, Split Inv. no. 1084.	II	1	Height: 3.3 Width: 2.5	*Karaman 1940* 29; *Gunjača 1960* 7; *Dostál 1965* 385; *Jelovina 1976* T. Lxxi. 11; *Giesler 1981* 165; *Mesterházy 1991* 145; *Grigorov 2007 36*; *Gunjača 2009* 67; *Petrinec 2009* 266.	Fig. 17. 9.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
37.	Zadar-Sv. Petar Stari	NDA	NDA	I	1	NDA	*Tomičić 2003* 153–154.	Fig. 17. 10.
Serbia								
38.	Felix Romuliana Gamzingrad Zaječar region	Stray find from 1955	National Museum, Zaječar Inv. no. 1565.	II	1	Width: 2.4	*Živić 2003* 194.	Fig. 17. 11.
39.	Grocka-ul. Sava Kovačevića 8. Grocka region	Stray find from the area of the bath, SE section of the site, found in 1996	National Museum, Belgrad Inv. no. AC I. 209.	III	1	Height: 4.5 Width: 2.5	*Bajalović – Haci-Pesić 1984* 58; *Grigorov 2007* 36.3	Fig. 17. 12.
40.	Karaburma Palilula region	Cemetery	NDA	II	NDA	NDA	*Grigorov 2007 36*; *Petrinec 2009 266*.	–
41.	Kavadar-Levač	Stray find	Regional Museum of Jagodina ЦКУ 4064.	II	1	Height: 3.3 Width: 2.4	*Krstić 1997* 329, 344.	–
42.	Kladovo Borski region	Stray find	Museum of Applied Art, Belgrad Inv. no. 699.	II	1	Height: 2.8 Width: 2.1	*Ćorović-Ljubinković 1951* 52, fig 18. 6; *Dostál 1965* 385; *Giesler 1981* 165; *Mesterházy 1991* 145; *Grigorov 2007 36*.	Fig. 19. 1.
43.	Klostar	NDA	NDA	NDA	NDA	NDA	*Dostál 1965* 385.	–
44.	Kostolac	NDA	National Museum, Belgrad	II	3	Height: 4.2	*M. Janković – Janković 1990* 96–97.	Fig. 19. 2.
45.	Mačvanska-Mitrovica	Stray find	Museum of Srem	II	1	NDA	*Ercegović-Pavlovič 1980* Pl. Xxvi. 18.	Fig. 19. 3.

[1] At the site, Korošec also reconstructed a type of earring belonging to this group in connection with Grave 341, in 1966. In his work of 1999, however, P. Korošec published only a strongly fragmented piece of ring jewellery (*Korošec 1999* Taf. 36. 2). Based on these, the reconstruction of the type of the object is questionable.

[2] According to *Korošec 1966*, there were two items in the grave. In 1999, however, Korošec reconstructed only one such item (*Korošec 1999* Taf. 36). In this case, the other object is a crescent-shaped earring made of sheet metal.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
46.	Vinča	Cemetery	National Museum in Belgrad Inv. no. 51.	II	1	Height: 4.8 Width: 2.5	*Ćorović-Ljubinković 1951* 52, fig 18. 4; *Dostál 1965* 385; *Grigorov 2007* 36.	Fig. 19. 4.
47.	Unknown site near the Danube, between Ritopek, Dubravice Grocka region	Stray find	Museum of Applied Art, Belgrad Inv. no. 697.	II	1	Height: 3.4 Width: 3.2	*Ćorović-Ljubinković 1951* 52, fig 18. 3; *Grigorov 2007 36.*	Fig. 19. 5.
48.	Unknown site	Stray find	Museum of Applied Art Inv. no. 1096 –1097.	II	2	Height: 4.7, 5.0 Width: 3.0, 2.9	*Ćorović-Ljubinković 1951* 52, fig 18. 1–2.	Fig. 19. 6–7.
49.	Unknown site	Stray find	Museum of Applied Art Inv. no. 700.	II	1	Height: 4.0 Width: 2.8	*Ćorović-Ljubinković 1951 52,* fig 18. 5.	Fig. 19. 8.
50.	Unknown site	Stray find	National Museum in Belgrad Inv. no. I. 2022.	II	1	Height: 4.9 Width: 2.7	*Bajalović – Haci-Pesić 1984* 66.	Fig. 19. 9.
51.	Unknown site	Stray find	National Museum in Belgrad Inv. no. I. 2026.	II	1	Height: 4.4 Width: 2.6	*Bajalović – Haci-Pesić 1984* 66.	Fig. 19. 10.
52.	Unknown site	NDA	National Museum in Belgrad	II	1	NDA	*Kovačević 2003* 57.	Fig. 19. 11.
Bosnia and Herzegovina								
53.	Bosanska Gradiška-Junuzovci	Cemetery	NDA	III	1	NDA	*Korošec – Vračko 1942* 280; *Miletić 1963* 162–163; *Dostál 1965* 385; *Miletić 1975* 102.	Fig. 19. 12.
54.	Dubravice (Konjic)	NDA	NDA	NDA	NDA	NDA	*Grigorov 2007* 36.	–
Albania								
55.	Durrës	NDA	NDA	NDA	NDA	NDA	*Dostál 1965* 385.	–
56.	Kalaja e Dalmacës	NDA	NDA	NDA	NDA	NDA	*Dostál 1965* 385.	–

[2] According to *Korošec 1966*, there were two items in the grave. In 1999, however, Korošec reconstructed only one such item (*Korošec 1999* Taf. 36). In this case, the other object is a crescent-shaped earring made of sheet metal.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
Bulgaria								
57.	Balik	NDA	NDA	II	1	Height: 2.7 Width: 1.9 Length of the prismatic ornament: 1.3	*Grigorov 2007* 36, 156, fig. 19. 16.	Fig. 19. 13.
58.	Balik	NDA	NDA	II	1	Height: 3.7 Width: 2.4 Length of the prismatic ornament: 2.0	*Grigorov 2007* 36, 156, fig. 19. 12.	Fig. 19. 14.
59.	Batin-2	NDA	NDA	II	1	Height: 4.6 Width: 2.8 Length of the prismatic ornament: 1.5	*Grigorov 2007* 36, 156, fig. 19. 13.	Fig. 19. 15.
60.	Galiče Mihajlovgrad region	Grave 27	NDA	I	1	Height: 1.6 Width: 3 Length of the prismatic ornament: 1.5	*Važarova 1971* 6; *Važarova 1976* 232, 234; *Tomičić 2003* 153–154. *Grigorov 2007* 36; 156.	Fig. 19. 16.
61	Garlica-Ostrov	NDA	NDA	II	1	Height: 3.9 Width: 3.0 Length of the prismatic ornament: 1.5	*Grigorov 2007* 156, fig. 19. 10.	Fig. 20. 6.
62.	Rujno Silistra region	NDA	NDA	II	1	Height: 3.15 Width: 2.2 Length of the prismatic ornament: 1.6	*Grigorov 2007* 156, fig. 19. 14.	Fig. 20. 1.

Site		Feature	Collection	Type	Total	Dimensions (cm)	Reference	Figure
63.	Središe	NDA	NDA	II	1	Height: 3.7 Width: 2.8 Length of the prismatic ornament: 1.4	*Grigorov 2007* 36, 156, fig. 19. 11.	Fig. 20. 2.
64.	Središe	NDA	NDA	II	1	Height: 3.4 Width: 2.6 Length of the prismatic ornament: 1.5	*Grigorov 2007* 36, 156, fig. 19. 15.	Fig. 20. 3.
65.	Targovishte region	Stray find	Regional Historical Museum of Targovishte	II	1	NDA	Unpublished	Fig. 17. 16.
66.	Trojan Loveč region	NDA	NDA	II	1	NDA	*Welkow 1942* 48, Taf. 9; *Giesler 1981* 95, 218.J; *Mesterházy 1991* 145, 10.J.	Fig. 20. 5.
67.	Northern Bulgaria	Stray find	NDA	II	1	Height: 4.6 Width: 2.8 Length of the prismatic ornament: 1.4	*Grigorov 2007* 156, fig. 19. 9.	Fig. 20. 4.
Ukraine								
68.	Kiev	Grave 112	National Museum of the History of Ukraine	I	2	Height: 3.0 Width: 2.7 Length of the pendant: 1.7	*Karger 1958* 178–182; *Dostál 1965* 384–386; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110.	Fig. 20. 9–11.
Russia								
69.	Gnezdovo	Settlement area	NDA	I	1	Height: 5.0 Width: 3.5	*Petruhin – Puškina 1996* 59–60, no. 370; *Zoll-Adamikowa – Dekówna – Nosek 1999* 110.	Fig. 20. 12.

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GYÖRGY TEREI

THE RELATIONSHIP OF ÁRPÁDIAN-PERIOD CASTLES AND SETTLEMENTS IN PEST COUNTY

Zusammenfassung: In diesem Beitrag wurde die Verbindung der árpádenzeitlichen Burgen und Siedlungen im zentralen Gebiet Ungarns, im Komitat Pest, auf jahrzehntelanger Forschung von Zsuzsa Miklós basierend, behandelt. In geographischer Hinsicht können die Burgen der Epoche in vier Gruppen unterteilt werden: Burgen im Tiefland, auf Flussterrassen, im Hügelland und in Gebirgen. Glücklicherweise deckt der Untersuchungsbereich der Archäologischen Topographie Ungarns den Großteil des Gebiets ab, daher können die Burgen samt ihrer Umgebung analysiert werden. Dabei stellt sich heraus, dass die Siedlungen der ersten drei Kategorien in der Nähe der Burg lagen, während Gebirgsburgen eine separate Klasse darstellten, da sich keine Dörfer in der Umgebung offenbarten. In Ungarn reicht die Burgenforschung in sehr vielen Fällen lediglich bis zum befestigten Gebiet, bzw. den Grenzen der Mauern und Wälle, die Untersuchung des Umfelds bleibt dabei aus. Dabei gibt uns die Analyse des Einzugsgebiets viel genauere Antworten auf die Frage, warum die Burg wohl an eben dieser Stelle erbaut worden war. Im Fall árpádenzeitlicher, meist kleiner Burgen, die heute nur noch aus Gräben und Wällen bestehen, ist die Inspektion der geographischen Lage und des Verhältnisses der Burg zur Umgebung und der Siedlung womöglich viel wichtiger, als im Falle größerer Steinburgen.

Keywords: castles, settlements, topography, typology, Árpádian period

The present study explores the relationship between Árpádian-period castles and settlements in Pest county, in the central part of Hungary, based on several decades of research carried out by Zsuzsa Miklós. In terms of topography, castles built in this period can be divided into four groups, these are castles on a lowland, on a riverside terrace, in a hilly landscape or the mountains. We are in a fortunate position because a significant part of the area under investigation is covered by the *Archaeological Topography of Hungary*, and thus the castles can be studied not only in themselves but also together with their surroundings. Based on this, we can conclude that in the case of the first three groups there were settlements in the vicinity of the castles. Castles in the mountains, however, represent a separate type, since there was no village nearby.

In Hungary, the investigation of castles is often restricted to the fortified area enclosed by the walls and ramparts disregarding the environment of the castles. Nevertheless, the question of why a castle was built at a certain place can be fully answered after studying its region. As regards the Árpádian-period castles – that are predominantly small castles of which only the ditches and ramparts have remained by now – it is perhaps much more important to examine their topographical location, environment, and relationship with settlements than in the case of large stone castles.

Miklós Zsuzsa dedicated her life's work to these Árpádian-period features. Not only did she carried out fieldwalking, survey, and take aerial photographs of them, but she also conducted major or minor excavations in them. These excavations have yielded a lot of new results. Their importance arises from the fact that the age of small castles identified in the field, often without finds on the surface, was normally determined with typological methods. Excavations, even brief test excavations, offer more accurate data for determining the age and function of these

strongholds. Zsuzsa Miklós investigated the surroundings of the castles, as well. Her fieldwalking surveys also covered those areas where the contemporary settlements belonging to the castles were located.

It is worth noting that in her work on the castles of the Gödöllő Hills as early as 1982,[1] she often ended the description of the individual castles with a list of contemporary settlements discovered nearby. The volumes of the *Archaeological Topography of Hungary* presenting certain districts of Pest county gave a great impetus to the research of the issue. Most of the castles mentioned in the present study are included in Volumes 9 and 11 of the *Archaeological Topography of Hungary*, one of the authors of which was Zsuzsa Miklós.

Several of my works written together with Zsuzsa Miklós focused on the relationship of Árpádian-period small castles with settlements. Our paper was presented at the VII Castrum Bene conference, which was also published later.[2] We explored this topic in the territories of Pest, Fejér, and Tolna Counties, three adjacent counties occupying the central part of Hungary. Two years later, we also had the opportunity to publish a slightly revised and expanded version of our study in Hungarian.[3]

The untimely death of Zsuzsa Miklós prevented her from writing a monograph about her investigations in Pest county as she did in Tolna county.[4] The staff of the Institute of Archaeology HAS RCH and external experts cooperated to complete the work. Having joined the project, I had the opportunity to finish the work started together with Zsuzsa Miklós, and summarise the relationship between the Árpádian-period castles and settlements, with special regard to the area of Pest county. Laying the foundations was the merit of Zsuzsa Miklós. Using the results of her collecting work carried out over many years, and conducting new fieldwalking surveys around Árpádian-period castles in Pest county, the question of these castles was raised again. In my present study, I will be focusing on small castles, which were built in the Árpádian period but did not survive into the Ottoman era. Among other things, this was due to the fact that the surrounding settlements had a very important role in the case of this type of castle. In the following, I will be studying only those castles that were discovered by Zsuzsa Miklós. The Árpádian-period strongholds discovered since then will be the subject of another work of mine.

In my study published in 2004,[5] I differentiated between two groups of castles dated to the period between the 12th and 14th centuries.[6] As to the first type, the area of the castle – that is the defended area itself – is usually very small, normally less than 0.1 ha. The territory of castles forming the second type is slightly larger than that of the previous ones, but not significantly. Their topographical location is, however, completely different. While the smaller castles were built at an altitude of about 100-200 metres above sea level, the castles of the second group were positioned higher. Their relative altitude is even more telling. As for the lower-lying castles, the relative altitude is less than 50 metres, whereas, in the case of the other group, it can be up to hundreds of metres. This observation can be interpreted as follows: while the castles belonging to the first group can be easily approached, the castles of the second group are located at a hard-to-reach, hidden place. Although the presence or absence of stone as a building material depends on many factors, it can be noted that stone walls are less common in the smaller, more easily approachable castles, and it was typically the side more exposed to an attack that was protected with a rampart or moat. In contrast, the second type of castles often had stone walls and the

1 *Miklós 1982.*
2 *Miklós – Terei 2004.*
3 *Miklós – Terei 2006.*
4 *Miklós 2007.*
5 *Terei 2004.*
6 *Terei 2004* 545–548.

entire area to be defended was surrounded by a rampart or moat, or both. It is of major relevance to my present study that the castles of the first group had a contemporary settlement nearby in almost every case, while in the case of the second group, it could be much less frequently observed. These criteria are certainly not carved in stone, the surrounding geographical features can sometimes override one factor or another.

The first type is known as the group of 'small castles' among archaeologists investigating strongholds. This term is, however, not accurate because those who have not seen these castles in the field, cannot imagine what they are exactly like. As a matter of fact, only a description could clearly define what kind of feature we think of here. There is no precise name for the second type, either. Perhaps the term 'mountain castles' describes this group the best. The problem of terminology was first addressed by András Gábor Szörényi.[7] Afterwards, István Feld discussed the issue in detail in his grandiose work.[8]

Zsuzsa Miklós set up a different system of classification. She distinguished among several groups in terms of topographical location, which was already included in our article published in 2004.[9] The two ways of classification share a lot of common features. Apparently, the first type was divided into several parts (i.e. castles built on a lowland, a riverside terrace, and a hilly area).

As to our two studies on the relationship between castles and settlements,[10] the castles found in Pest county were still not included in the group of lowland castles. As a result of recent investigations, several such features were identified in the southern part of the county, including Csévharaszt-Pusztapótharaszt. When writing these studies, Zsuzsa Miklós still did not start her systematic aerial photography for archaeological purposes, which is one of the most important tools for discovering castles in such a geographical environment. Furthermore, the investigations conducted by Zsuzsa Miklós in Pest county were either focused on the mountains, such as the Börzsöny Mountains, or hilly regions, like the Gödöllő Hills.

She placed Domony-Temető, Felsőgöd-Várdomb, Galgagyörk-Templomdomb, and Valkó-Csákópart among castles built on a riverside terrace.

Galgahévíz-Szentandráspart, Galgamácsa-Ecskend-Templomhegy, Kerepes-Kálvária, Mende-Lányvár, Szada-Várdomb, Tinnye-Kisvár, and Váchartyán-Várhegy were classified as castles erected in a hilly landscape.

Her 2006[11] list of castles built in the mountains comprised no examples from Tolna county, and only two castles from Fejér county, but it included seven castles from the part of the Börzsöny Mountains that belongs to Pest county. These latter castles are Bernecebaráti-Templomhegy, Ipolydamásd-Zuvár, Kemence-Tamásvár, Márianosztra-Bibervár, Perőcsény-Salgóvár, Szokolya-Királyrét-Várhegy, and Szokolya-Paphegy.

Similarly to Csévharaszt-Pusztapótharaszt belonging to the lowland castles above, there were also three mountain castles (Perbál-Ajnát-hegy, Perőcsény-Jancsihegy, Vác-Látóhegy) which were not included in the collection, although they had been identified by Zsuzsa Miklós. The reason for this might be that these strongholds either yielded no finds, or they could hardly be used for dating.

At the entries of the castles, I will be writing little about the castles themselves and will be focusing on the neighbouring settlements, instead.

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7 *Szörény 2011* 61–66.
8 *Feld 2014* 374–379.
9 *Miklós – Terei 2004* 201–202.
10 *Miklós – Terei 2004; Miklós – Terei 2006*.
11 *Miklós – Terei 2006*.

Csévharaszt-Pusztapótharaszt

This is a typical lowland castle protected by a regular circular moat, which rose only a few metres above its surroundings. The stronghold was discovered by Zsuzsa Miklós during aerial photography. Although no archaeological finds were discovered there, it can certainly be classified as an Árpádian-period small castle based on its typological features. It sits on an elevated piece of land rising a few metres above its waterlogged, swampy surroundings. The Árpádian-period village is located on a hillside, to the north of the castle. The site was identified by Ákos Tibor Rácz during a fieldwalking survey in 2015. Subsequently, in connection with investigations in Pest county, the area was surveyed and further fieldwalking was carried out, during which 12th to 14th-century finds were collected from the surface as before.

This situation clearly demonstrates that not only castles built on a riverside terrace but also those on the plains could have had a settlement nearby. In this case, the fortress was not protected by elevation but by the swamps, as the settlement was lying somewhat higher than the castle.

Domony-Temető[12]

In terms of its topographical location, it belongs among castles sitting on a riverside terrace. This is a representative example of this group. The small Árpádian-period castle is located at a relative altitude of 18 metres above the banks of the Stream Galga. Fieldwalking surveys and the test excavation conducted by Zsuzsa Miklós in 2006 demonstrated that the site was inhabited with longer or shorter breaks from prehistoric times onward. The village developed on the banks of the stream and the hillside in the 12th–13th century. The stronghold surrounded by a moat was erected in close proximity of the settlement, on the highest point of the landscape affording good visibility of the surrounding area.[13]

Felsőgöd-Várdomb[14]

Based on its topographical location, it is a castle built on a riverside terrace. Today, it lies in a densely built-in town, which makes it rather difficult to reconstruct the former geographical conditions. Although only minor archaeological excavations and fieldwalking surveys were carried out in the area, the available data reveal a fairly accurate picture of the Árpádian-period topography of the site.[15] The terrace lying 5-10 metres above the floodplain of the River Danube, was already inhabited in prehistoric times. This area with excellent geographical conditions was also selected for habitation in the Middle Ages. Archaeological excavations conducted in the area stretching to north and east of today's Várdomb ('Castle Hill') brought to light finds dated between the Árpádian period and the late Middle Ages. At the edge of the area, at a site with the telling name of Templom domb ('Church Hill') stone debris was found. Not far from this, skeletons were discovered in Rózsa Street and the neighbouring sports field.[16] Based on these, the church of the settlement can be located with a great probability. However, it was not possible to explore large contiguous areas, as the site was densely built-up. We need to rely only on sporadic data. At the same time, besides the prehistoric material, lots of medieval finds came to light from the area under discussion. Based on the available archaeological and historical evidence, this

[12] *MRT 11* site no. 6/12.
[13] *MRT 11* site no. 6/5 and 12; *Miklós – Terei 2006* 206–211; *MRT 11* 147–149.
[14] *MRT 9* site no. 7/4.
[15] *MRT 9* 89–91.
[16] *MRT 9* 89–90.

site can be identified with the village of Göd *(Gud, Gewd)*, which was first mentioned in written documents in the 12th century.[17] It must have been the property of the Gyula – Sombor family.[18]

The available data paint a picture of this site that corresponds with our knowledge about other small Árpádian-period castles. The castle was erected in the 13th century, at an elevated spot, on the outskirts of the settlement. In this case, we are in a fortunate situation because even the builder of the castle can be assumed due to historical evidence.[19] Although in 1991 Zsuzsa Miklós investigated the site of Várdomb only with one test trench, it can be hypothesised that the fortress, like the village, still existed in the late medieval period.

Galgagyörk-Almáspuszta (Pusztatemplom)[20]

On the basis of its topographical location, it is a castle built on a riverside terrace. The fortress heavily destroyed by now sits on a mound, five metres above the Galga floodplain. Its moat can only be observed on the eastern side. The site of the former church is found east/south-east of the castle, 150 metres from it. This site has continuously yielded stone debris and human bones since the 19th century. The small-scale excavations and fieldwalking surveys produced prehistoric pottery shards as well as finds from the period between the twelfth and sixteenth centuries.[21]

In this case, the characteristics of castles set on a riverside terrace could be observed again. The village is located next to a watercourse that was inevitable for settlement. The church and the castle are in its vicinity, but on higher ground. The settlement can be identified with the medieval village of Almás.[22] The archaeological material suggests that it continued to exist up to the Ottoman era. Due to the lack of major archaeological investigations in the area enclosed by the moat, we can merely assume that the castle was abandoned in the 14th century.[23]

Galgahévíz-Szentandráspart[24]

Zsuzsa Miklós classified this stronghold among castles situated in a hilly landscape. However, its topographical location is very similar to that of castles built on a riverside terrace. The relative altitude of the narrow strip of land protruding from the range of hills is 32 metres. The site was first used by the people of the Hatvan culture who established a major settlement in the area. The fortifications that are still visible today were constructed in the Árpádian period, although – based on the observations – prehistoric embankments may have also been used for their construction.[25] After abandoning the castle fortified by massive ramparts, the Ákos kindred *(gens)* established a monastery in it.

In addition to the rich prehistoric material, twelfth to 15th-century finds were found in large quantities at the site below the castle, on the western side of the Stream Sósi. Researchers identify the site with the village of Monostor(osalja) known from written documents. The village may have belonged to the Benedictine monastery built on the hilltop.[26] Although the earliest written

[17] *MRT 9* site no. 7/3.
[18] *MRT 9* 90.
[19] *MRT 9* 92.
[20] *MRT 11* site no. 7/2.
[21] *MRT 11* 159–162.
[22] *MRT 11* site no. 7/2.
[23] *MRT 11* 162.
[24] *MRT 11* site no. 8/3.
[25] *MRT 11* 179–180.
[26] *MRT 11* site no. 8/3.

document referring to the village comes from 1425, based on the finds gathered during the fieldwalking survey, it dates back to the 12th–13th century.[27] If we consider the idea that, according to archaeological evidence, the monastery must have been established in the abandoned castle in the second half of the 13th century at the earliest,[28] the Árpádian-period settlement found at this site can certainly be connected to the castle. The geographical conditions were ideal, as the castle sitting at a relative altitude of 32 metres offered good visibility of the village below.

Galgamácsa-Ecskend-Templomhegy[29]

Based on its topographical location, this is a castle built in a hilly area. It is set at an altitude of 252 metres above sea level and an altitude of 42 metres relative to the stream valley. After the castle surrounded by a circular ditch and rampart was abandoned, a church was established in the enclosed area in the second half of the 13th century.

During fieldwalking surveys, medieval finds were also collected at Templomhegy ('Church Hill'), but the village also extended north-eastwards to the southern side of the Alma valley. Based on the observations, it can be concluded that the church discovered on the hill above the village belonged to the site identified with medieval Ecskend.[30] It is also presumable that earlier the owner of the village had built the castle, as well.[31]

At sites that were reused after the abandonment of Árpádian-age castle, that is where a church or monastery was erected at the very end of the Árpádian period or within two centuries after that (see also Kerepes-Kálvária, Galgahévíz-Szentandráspart), the connection between the later feature and the village is much more certain, especially if we have late medieval finds from the area of the settlement. In contrast, it can only be assumed that the early finds gathered during the fieldwalking surveys are contemporary to the use of the castle.

Zsuzsa Miklós, who supervised the excavations of the Galgamácsa-Ecskend castle, dated a knife sheath fitting and an arrowhead found in the stronghold to the 13th century[32] However, based on similar items discovered at Kána,[33] they may as well be somewhat earlier. The existence, abandonment, construction, and use of the church can be all dated to the 13th century. Consequently, the small amount of 13th-century pottery shards gathered during the fieldwalking survey can hardly be used to determine whether the castle and the village were contemporary or not.

Ipolydamásd-Zuvár[34]

On the basis of its topographical location, it is a castle built in the mountains. It was erected at an altitude of 313 metres above sea level and a relative altitude of 140 metres.[35] It is a representative example of castles built on the summit of a mountain in the second half of the Árpádian period. Compared with my categorisation of Árpádian-age small castles, fortresses like this can be identified with Group II. Based on the results of the excavations, it was built in the 12th–13th century and was already abandoned a century later.

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[27] *MRT 11* 185.
[28] *MRT 11* 182.
[29] *MRT 11* site no. 9/6.
[30] *MRT 11* site no. 9/3.
[31] *MRT 11* 216.
[32] *MRT 11* 216.
[33] *Terei – Horváth 2007* 163–165.
[34] *MRT 9* site no. 9/3.
[35] *MRT 9* 108–110.

In the cases of these castles, neighbouring settlements could be less frequently identified. The reason for this was probably the fact that the location was more difficult to access. Nearby settlements could be identified if the castles were in use for a longer time.

In the case of Ipolydamásd-Zuvár, no trace of a settlement was discovered in the vicinity. The nearest site yielding Árpádian-period finds is located more than one kilometre to the south,[36] which is unlikely to have been connected to the castle.

Kemence-Felső-Tamásvár[37]

Based on its topography, it belongs to the group of castles built in the mountains. It has an altitude of 554 metres above sea level and a relative altitude of 153 metres. At present, it is located in an extreme place away from any inhabited settlement. Its identification has raised many questions. Iván Skerletz regarded it as an earthwork castle. He hypothesised that the hilltop was used as a refuge by the people of the Late Bronze Age.[38] Gyula Nováki held that it was a natural formation, not a stronghold.[39] Zsuzsa Miklós and István Torma argued that it could not be a Bronze Age earthwork castle, but it did not fit in the category of Árpádian-period castles, either.[40] Afterwards, in 1984, Zsuzsa Miklós had the opportunity to carry out excavations in the area, during which 12th–13th-century pottery shards, iron artefacts, and pieces of daub came to light. At the same time, it turned out that it was protected with a natural ditch on one side. In her opinion, "In Tamásvár, there must have been a log-house on a wider part of the ridge, which was built directly on the rock. Based on the size of the site, the finds, and the excellent natural protection, it can most likely be identified as a small Árpádian-period castle."[41]

Even though the site was subjected to archaeological excavations, numerous questions remained unanswered. The first and most important question is whether this feature established at such an extreme location was truly a castle. If we accept the defensive role of the area, then we can classify it among those short-lived hilltop castles in the vicinity of which there was no settlement. However, this is not surprising at all, as there is no suitable land for settlement anywhere near.

Kerepes-Kálvária[42]

Based on its topographical location, it is a castle built in a hilly landscape. It was erected at an altitude of 244 metres above sea level, and an altitude of 25 metres relative to the stream valley. Like many other castles belonging to this group, Kerepes-Kálvária does not sit on a riverside terrace, yet it shares common features with this latter group in its character. The excavations revealed that it was built in the 13th century, but it was used for only one century. In the 14th century, the parish church of Kerepes was established at the site enclosed with ramparts and ditches.[43]

The medieval village of Kerepes was below the castle, by the bank of Stream Szilas.[44] According to the archaeological material, the settlement was already inhabited in the early phase

[36] *MRT 9* site no. 9/13.
[37] *MRT 9* site no. 11/10.
[38] *MRT 9* 139.
[39] *MRT 9* 139.
[40] *MRT 9* 139–140.
[41] *MRT 9* 140.
[42] *MRT 11* site no. 15/5.
[43] *MRT 11* 335–340.
[44] *MRT 11* site no. 15/7.

of the Árpádian period, so the castle and later the parish church of the village may have been connected to the settlement, which was built in the abandoned stronghold.[45]

Márianosztra-Bibervár[46]

Based on its topographical location, it is a castle built in the mountains, but due to its being erected at a small relative and absolute altitude, it can be classified as a 'small castle'. What modifies these are the hard accessibility, stone building material, and marked fortifications (ramparts and a moat). The picture is further complicated by the fact that there are several medieval sites in the neighbourhood, including a monastery. Based on the excavations supervised by Zsuzsa Miklós, the castle consisting of a keep and an adjacent bailey was built in the 13th century and was abandoned in the early 14th century at the latest.[47]

The Malom valley stream flows below the castle, and on the opposite side of the watercourse, Árpádian-period and late medieval finds were scattered over an area of nearly two hectares.[48] The village was probably called Toronyalja.[49] The late medieval finds were found around the monastery. Based on the observations of Zsuzsa Miklós, the 13th-century finds discovered at the site of the monastery belonged to an earlier settlement, which had already been destroyed by the construction of the monastery.[50]

The archaeological evidence confirms that the castle was built above the village lying on the bank of the stream, which was a more prominent, more easily defended height here. It was similar to other castles in Pest county, but in this case, the stronghold was built of stone, and the stone walls have remained to posterity. The castle was probably abandoned together with the village in the early 14th century, and the monastery was already established in a vacant piece of land.

Mende-Lányvár

Based on its topographical location, it can be classified as a castle erected in a hilly area. This multicomponent stronghold is situated at the end of a north-west/south-east oriented hill, dominating over its surroundings and having good visibility of the valley of the Stream Tápió. It is set at an altitude of 225 metres above sea level and an altitude of 70 metres relative to the stream valley.

In her study published in 1981, Zsuzsa Miklós explored the Árpádian-period settlement system surrounding the castle in this part of the valley of the Stream Tápió.[51] At the bottom of the western slope of Lányvár, there is a site occupying each bank of the stream, which can be dated to the Árpádian period with pottery shards. In my opinion, this settlement can be connected to the castle. Zsuzsa Miklós identified this site with Árpádian-age Szentistván. The village of Bille to the west, as well as Oszlár, Sáp, and Süly to the east of the castle are further away than other settlements from castles belonging to the same era.[52]

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45 *MRT 11* 341.
46 *MRT 9* site no. 17/13.
47 *MRT 9* 188.
48 *MRT 9* site no. 17/24; *MRT 9* 194.
49 *MRT 9* 192.
50 *MRT 9* 191.
51 *Miklós 1981* 249.
52 *Miklós 1981* 245, 249.

Perbál-Ajnát-hegy[53]

It has not been previously classified according to its topographical location. It rather belongs to the group of castles built in the mountains. The double summit rising 380 metres above sea level is surrounded by steep mountain slopes. Although there are historical data about the castle, the 1980 excavations supervised by Zsuzsa Miklós did not yield any finds or features.[54]

We are in a fortunate position because this area is also included in a volume of the *Archaeological Topography of Hungary*. When studying the region, we did not find any Árpádian-period site nearby. It is easy to understand it, as the immediate vicinity of the castle is not suitable for settlement at all.

Perőcsény-Jancsihegy[55]

Based on its topographical location, it is a castle built in the mountains. It is set at an altitude of 586 metres above sea level and a relative altitude of 250 metres, on one of the summits of a north-south ridge stretching at the western edge of the Börzsöny Mountains. It was undoubtedly a stronghold, for its double moat is clearly visible on its northern side. Zsuzsa Miklós explored the area with several test trenches. In addition to finds from various prehistoric periods, a few fragments of Árpádian-period ceramics came to light, as well. Eventually, based on typological analogues, she dated the stronghold to the 12th–13th century.[56]

Although castles were sometimes built at an extreme location in the Árpádian period, in my opinion, a few medieval pottery shards do not provide sufficient evidence for the 12th–13th-century establishment. Such castles built on hard-to-reach hilltops were more typical after the Mongol Invasion, and they were constructed of stone in almost every case. An important feature of small castles built in the 12th and 13th centuries was the proximity of a settlement, but here, due to the steep hillside, we do not find any trace of an Árpádian-period.

In my opinion, it was a prehistoric feature, which is also supported by the fact that there was a stone rampart on the north-western side.[57] In the Árpádian period, it was only intermittently used and did not function as a stronghold any longer.

Perőcsény-Salgóvár[58]

This is a castle built in the mountains. Sitting at an altitude of 730 metres above sea level and 370 metres above the valley of Stream Fekete, it is the highest medieval castle in the county. According to archaeological evidence, it was already used in the second half of the 13th century.[59] In 1424, it was confiscated and demolished by the king for minting counterfeit coins.[60] It belongs to type II of our classification. Although it was used up to the 15th century, there was not any village below the castle either in the Árpádian period or in the subsequent centuries as its surroundings were unsuitable for settlement.

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53 *MRT 7* site no. 14/26.
54 *MRT 7* 139–140.
55 *MRT 9* site no. 23/19.
56 *MRT 9* 287.
57 *MRT 9* 287.
58 *MRT 9* site no. 23/10.
59 *MRT 9* 283.
60 *MRT 9* 284.

Szada-Várdomb (Vár-oldal)[61]

It is a castle built on a hilly landscape. Its altitude above sea level is approximately 267 metres, and its relative altitude is 30 metres. It is set on the ridge of a hill stretching in a north-west/south-east direction. According to the excavations supervised by Zsuzsa Miklós, it was built in the 13th century and was abandoned in the same century. Unfortunately, no further research can be conducted at the site because the castle was bulldozed to the ground at the end of the 20th century.[62]

The area lying below the castle currently forms the inner part of the village of Szada, so a fieldwalking survey could be carried out in very limited circumstances. In recent decades, archaeological finds were discovered in this part of the village on several occasions, which were mainly dated to the late Middle Ages.[63] In light of the above, we can assume that the Árpádian-period village was also situated there.[64]

Szokolya-Királyrét-Várhegy[65]

Based on its topographical location, it was a castle built in the mountains. It is set at an altitude of 359 metres above sea level and a relative altitude of 100 metres. The castle hill was already inhabited in the Bronze Age and was re-used in the 12th–13th century, when a moat and rampart defending the area was constructed, as well.

Although it can be classified as a mountain castle, it does not belong to the extreme sites. Perhaps this also explains why Árpádian-period and 14th-century finds could be collected at the foot of the mountain.[66] Based on the archaeological material, Zsuzsa Miklós suggested that the castle was not in continuous use.[67] Nevertheless, it is still plausible that the castle belonged to a nearby Árpádian-period site.

Szokolya-Paphegy[68]

Concerning its topographical location, it is a castle built in the mountains. It is situated at an altitude of 473 metres above sea level and a relative altitude of 250 metres. In terms of its typological features, it is a representative example of small castles built in the Árpádian period. The end of the ridge was cut off with a single ditch, which was presumably left unfinished.[69]

At a distance of 150 metres from it, in a flatter area with a diameter of 40-50 metres, 13th-century finds were discovered.[70] Despite its being a mountain castle, the area around the stronghold is not very steep, which made it suitable for habitation. As the territory is forested, it was possible to collect only a small amount of finds during the fieldwalking survey, so the size of the site could not be determined. It is probable that, at this site, there was a small settlement and a connected castle used for a short period.

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61 *MRT 11* site no. 21/2.
62 *MRT 11* 440.
63 *MRT 11* site no. 21/1.
64 *MRT 11* 434.
65 *MRT 9* site no. 27/1.
66 *MRT 9* site no. 27/10; *MRT 9* 359–360.
67 *MRT 9* 351.
68 *MRT 9* site no. 27/16.
69 *MRT 9* 360; *MRT 9* site no. 27/16.
70 *MRT 9* site no. 27/9.

Tinnye-Kisvár[71]

This is a castle built in a hilly area. It is set at an altitude of 275 metres above sea level and a relative altitude of 20 metres. It sits at the end of an elongated hill oriented north-west/south-east. No finds dated to the Árpádian period were gathered there. However, based on its typological features, the castle can be dated to the Árpádian era.[72]

Below the castle, on both sides of the modern road 12th–13th-century finds were collected,[73] so it can be claimed with great certainty that the Árpádian-period village belonging to the castle was here again located near the castle, at a lower altitude.[74]

Vác-Látóhegy[75]

It is a castle built in the mountains. It is set at an altitude of 533 metres above sea level and a relative altitude of 150 metres. Sitting on a rocky protrusion, the castle was protected with a moat and ramparts. No archaeological material was discovered at the site of the heavily destroyed castle. Zsuzsa Miklós suggested dating to the Árpádian period on the basis of typological analogues.[76]

There is no archaeological site in the vicinity of the castle. The steep mountainside is not suitable for settlement at all. Approximately one kilometre to the south-west, some medieval pottery shards were collected along a road,[77] but I do not regard this as sufficient evidence for the existence of a settlement.[78]

Váchartyán-Várhegy[79]

It is a castle built in a hilly landscape. It is set at an altitude of 205 metres above sea level and an altitude of 40 metres relative to the valley. It is located at the western end of an elongated ridge, protected on three sides by the steep hillside. The inner area was defended by a ditch and a rampart erected on its outer side. Based on the excavations conducted by Zsuzsa Miklós, the castle was built in the second half of the 12th century–in the 13th century and was destroyed in the first half of the 14th century at the latest.[80]

Although the geographical features are advantageous in the case of this site (there is a stream bank below the mountain), no Árpádian-period site with a substantial amount of finds was identified nearby. In the area lying under the castle, one 13th–14th-century[81] pottery fragment was found, which is certainly not enough evidence for the existence of a settlement.

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71 *MRT 7* site no. 33/14.
72 *MRT 7* 327.
73 *MRT 7* sites no. 33/2 and 33/4.
74 *MRT 7* 325–326.
75 *MRT 9* site no. 31/41.
76 *MRT 9* 478.
77 *MRT 9* site no. 31/79.
78 *MRT 9* 487.
79 *MRT 9* site no. 34/14.
80 *MRT 9* 512–513.
81 *MRT 9* 511.

Valkó-Csákópart[82]

Based on its topographical location, it is a castle built on a riverside terrace with a relative altitude of 12 metres. The site, once protected with a circular moat, was heavily damaged due to ongoing agricultural work.[83] Based on archaeological excavations, the castle was erected in the 13th century and became abandoned in the same century.

The castle is surrounded by a large site, which yielded finds from several eras, including the medieval period. Presumably, the village of Szörény (Szörém)[84] was there once. Most of the ceramic finds collected during a fieldwalking survey are of the same age as the castle, but a small amount of shards from both the previous and following centuries were also discovered there.[85] Based on the findings, it is safe to say that the castle was built on a hill rising above its environment, which was surrounded by the village.

The research of strongholds dated to the Árpádian period raises numerous questions and problems, as well. Not many of them have been subjected to full archaeological excavation and scientific publication. In many cases, we can connect strongholds to a historical era with the help of typological methods, which may also lead to false dating. The investigation into the "fortification environment" of the period studied by us is still at an early stage. It is hard to describe the methodology of the research because it is not possible to define the criteria precisely.

What distance is considered to be the 'environment' of the castles? How many metres need to be between a settlement and a castle to be associated with each other? It is not possible to give a specific number, as the environmental and local conditions differ in every case. While the site polygons of riverside castles and the settlements often meet according to archaeological investigations (particularly fieldwalking surveys), in the case of those located in hilly areas, the distance is larger. The geographical factors and the findings of the visibility study[86] carried out by András Gábor Szörényi may answer the question together. It is imperative to study the geographical environment because it is one of the most important conditions for human settlement. Is not possible to establish a settlement on a steep hillside; conversely, the proximity of water has always been an important factor. The investigation of visibility is significant because, together with Zsuzsa Miklós, we believe that in the case of castles built in a plain, on a riverside, or in a hilly area, it was of fundamental importance for the owners of the stronghold that their settlement would be close and that they would have a view of it. The visibility modelling undertaken by András Gábor Szörényi should be carried out for all the castles mentioned above. It would be possible to research more distant areas. Nevertheless, the castles of the Sajó Valley discussed by him predominantly belong to the mountain category, and in Pest county we need to consider three more geographical groups, which may produce completely different results. In my opinion, in the case of castles erected in a plain, on a riverside terrace, and in a hilly area, the settlements presented above must have been clearly seen from a ten-metre tower. The area where the settlement is located is often still visible to the naked eye from the castle. Sometimes the vegetation may obstruct the view. In such cases, visibility modelling may demonstrate what can be seen in addition to the immediate surroundings, as these castles are not built on high summits, and their relative height is not so great. Take the visibility of a river valley, for instance. Similar to the Sajó Valley, visibility modelling would be significant in the case of mountain castles, where geographical features can modify the picture to a greater extent. The environment

[82] *MRT 11* site no. 26/1.
[83] *MRT 11* 530–531.
[84] *MRT 11* site no. 26/2.
[85] *MRT 11* 532.
[86] *Szörényi 2011.*

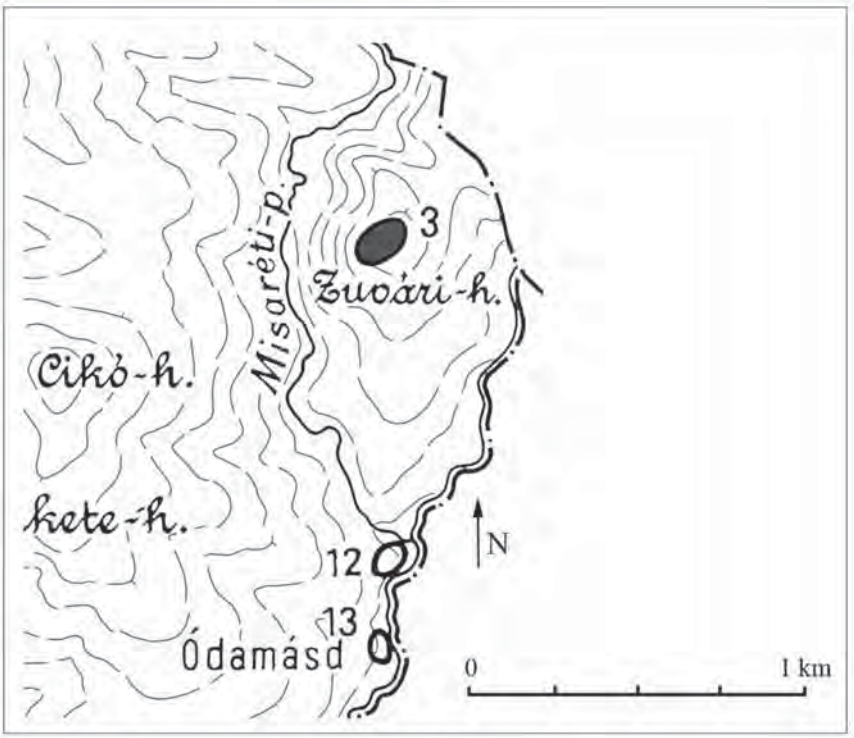
of the castle might be determined by defining the area suitable for settlement in the closest proximity of the castle.

The methodology comprises defining the term 'site', as well. I have already noted at the individual settlements and settlement features that the definition of inhabited places near fortifications is a very challenging question. It makes a difference whether only a pottery shard is discovered or a larger number of ceramic fragments are found during a fieldwalking survey. It is much easier to come across finds in arable land than in a forest, where it is merely mole hikes that are bound to bring any objects of archaeological age to the surface, or in a modern settlement, where many archaeological features tend to be observed only when utility trenches are dug. The findings may, therefore, be superseded by subsequent archaeological research. Normally, a small number of artefacts were found in the Árpádian-period castles of Pest county and nearby settlement features. Can we say contemporaneity for absolutely certain if only a few 12th- or 13th-century pottery shards are found at the two sites? In my opinion, we cannot. We may only suspect it. Just a large-scale excavation of the castle and the village can offer a more reliable answer.

From the twenty-two Árpádian-period castles in Pest county examined above, in seven cases (Ipolydamásd-Zuvár, Kemence-Tamásvár, Perbál-Ajnát-hegy, Perőcsény-Jancsihegy, Perőcsény-Salgóvár, Vác-Látóhegy, Váchartyán-Várhegy) there was no settlement in the vicinity of the stronghold. It probably does not come as a surprise that six of them belong to the group of castles built in the mountains. Among these, there are some problematic sites where the interpretation as a castle or even the dating is uncertain (Kemence-Tamásvár, Perőcsény-Jancsihegy, and Vác-Látóhegy). Most of the castles have a relative altitude of several hundreds of metres, which made it difficult to approach them. Consequently, it was not possible to establish a settlement on the steep mountainside *(fig. 1).*

In 15 cases, there was an Árpádian-period settlement in the vicinity of the castle. The distribution of these castles according to their topographical location is as follows: three in the mountains (Márianosztra-Bibervár, Szokolya-Királyrét-Várhegy, Szokolya-Paphegy), six on a hilly area (Galgahévíz-Szentandráspart, Galgamácsa-Ecskend-Templomhegy, Kerepes-Lánykali, Kerepes-Kálvária, Mende-Leányvár, Szada-Várdomb, and Tinnyes-Kisvár), four on a riverside terrace (Domony-Temető, Felsőgöd-Várdomb, Galgagyörk-Almáspuszta, and Valkó-Csákópart), and one on a lowland area (Csévharaszt-Pusztapótharaszt). Two of the three mountain castles – despite being situated in the Börzsöny Mountains – were not built at a relative altitude of several hundreds of metres and were therefore not difficult to approach. The relative altitude is 30 metres at Márianosztra and 100 metres at Szokolya-Királyrét-Várhegy. Szokolya-Paphegy is found in a hidden, hard-to-reach place, but it was not built in such an extreme place as Perőcsény-Salgóvár, for example.

The archaeological investigations are uneven, although most of the sites are covered by the volumes of the *Archaeological Topography of Hungary.* While the majority of the castles were subjected to archaeological excavations, in the nearby settlements it was possible to collect data only with fieldwalking surveys. These fieldwalking surveys usually demonstrated settlement over several eras, and the Árpádian period was only one of these. Nevertheless, these findings still allow for the conclusion that the castles were built close to an area suitable for habitation. At some places, it was possible to carry out thorough fieldwalking surveys and collect finds, but in the cases of those Árpádian-period villages that lie under modern settlements, only a few pottery shards uncovered during the sewerage construction works help localisation. The question arises as to whether we can make a parallel or connection with the nearby settlement based on the



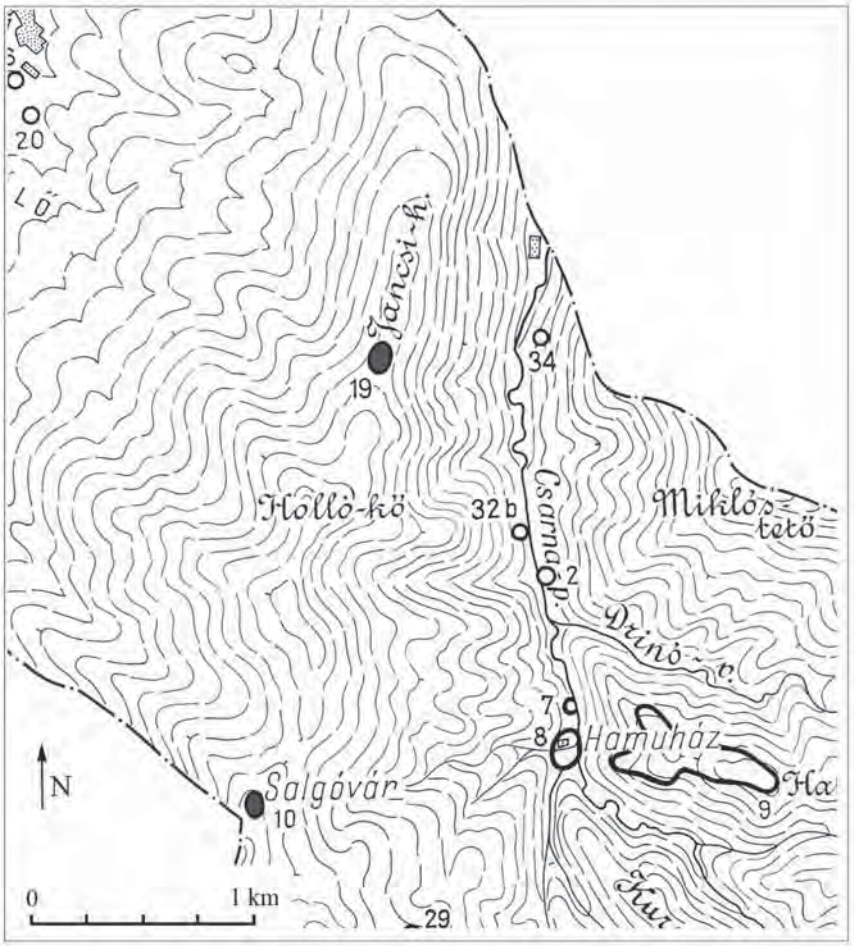


Fig. 1. Examples of the relationship between castles built in the mountains and nearby settlements: Ipolydamásd-Zuvár, *MRT 9* site no. 9/3; Perőcsény-Salgóvár, *MRT 9* site no. 23/10; and Perőcsény-Jancsihegy *MRT 9* site no. 23/19)

small amount of dating material discovered in the castles and the shards found in their vicinity. Although this can be rightly assumed so, in those cases when there is little dating material, any claim must be made with circumspection. István Feld also draws attention to this, pointing out that without significant archaeological research of both the settlement and the castle, it is not possible to say anything certain about the connection between the two features.[87]

If we consider the topographical location, the positions of the castles on the riverside terraces *(fig. 2)* and on the hills *(fig. 3)* are quite similar. Although in the former case, the castle is situated on a steeper hillside, both are in an accessible place and a settlement could develop at the bottom of the hill or terrace. It is fairly common for hillside castles that the stronghold is situated above a stream. Perhaps the real difference lies with that in the case of castles built a few metres above major rivers and streams there is enough space for a settlement to emerge next to the stronghold, whereas in the other case, the village is always at the bottom of the hill, at a place where the terrain made its establishment possible. The picture is completely clear, the castle needed to be built above the village, at a spot that allowed for good visibility of the settlement.

András Gábor Szörényi studied view from Árpádian-period castles found in the Sajó valley concerning the visibility of other castles and settlements.[88] He compared his findings with the results of our research made with Zsuzsa Miklós and did not fully agree with our conclusions, as there were some places in the Sajó valley where the castle had no visibility of its own estate but of the neighbouring land.[89] Even though the exploration made by András Gábor Szörényi is completely unique, spectacular, and convincing, in my opinion, it is not possible to compare Árpádian-period castles in the Sajó valley with castles built on the plains, hills, or riverside terraces of Pest, Fejér, and Tolna Counties. While mountain castles are typical of the Sajó valley, which were further away from the settlements, the castles built in the central region of Hungary are in a more accessible place and the features of the terrain generally do not hinder visibility. In Pest county, which was subjected to careful investigation, there was generally a medieval village within a distance of a few hundred metres of the castles.

Lots of studies have been published about the small castles of the Árpádian period, and several monographs are available, as well. Recently, István Feld has published a major gap-filling work discussing numerous questions of the subject comprehensively. Regarding the topographical location of the castles, he writes that the relatively easily accessible strongholds must have been the permanent residences of landowners. Furthermore, he also raises an idea that I found most interesting, namely that not only castles built on a high hilltop and protected by steep hillsides could be in an extreme location. Swamp castles were also like that, and if you think about it, he is absolutely right.[90]

Another question that needs to be examined is that Zsuzsa Miklós assumed about some of the small features that they were not completed or inhabited.[91] It is difficult to prove her assumption because in most cases it was not possible to excavate the entire area of the castle. But even if this was so, it is still necessary to examine what relationship the castle and the settlement below had. The question of habitation was raised by István Feld.[92]

Our overview demonstrates well that it is not enough to consider the castles in themselves. Their surroundings must be included in the exploration in every case. However, this is relatively rare in the research of castles in Hungary. We are in a lucky position when studying Pest county for

[87] *Feld 2014* 372.
[88] *Szörényi 2011.*
[89] *Szörényi 2011* 49.
[90] *Feld 2014* 364.
[91] *Miklós – Terei 2006* 219.
[92] *Feld 2014* 366.

Fig. 2. Examples of the relationship between riverside castles and nearby settlements (Galgagyörk-Almáspuszta, *MRT 11* site no. 7/2; Felsőgöd-Várdomb, *MRT 9* site no. 7/4; and Domony-Temető, *MRT 11* site no. 6/12)

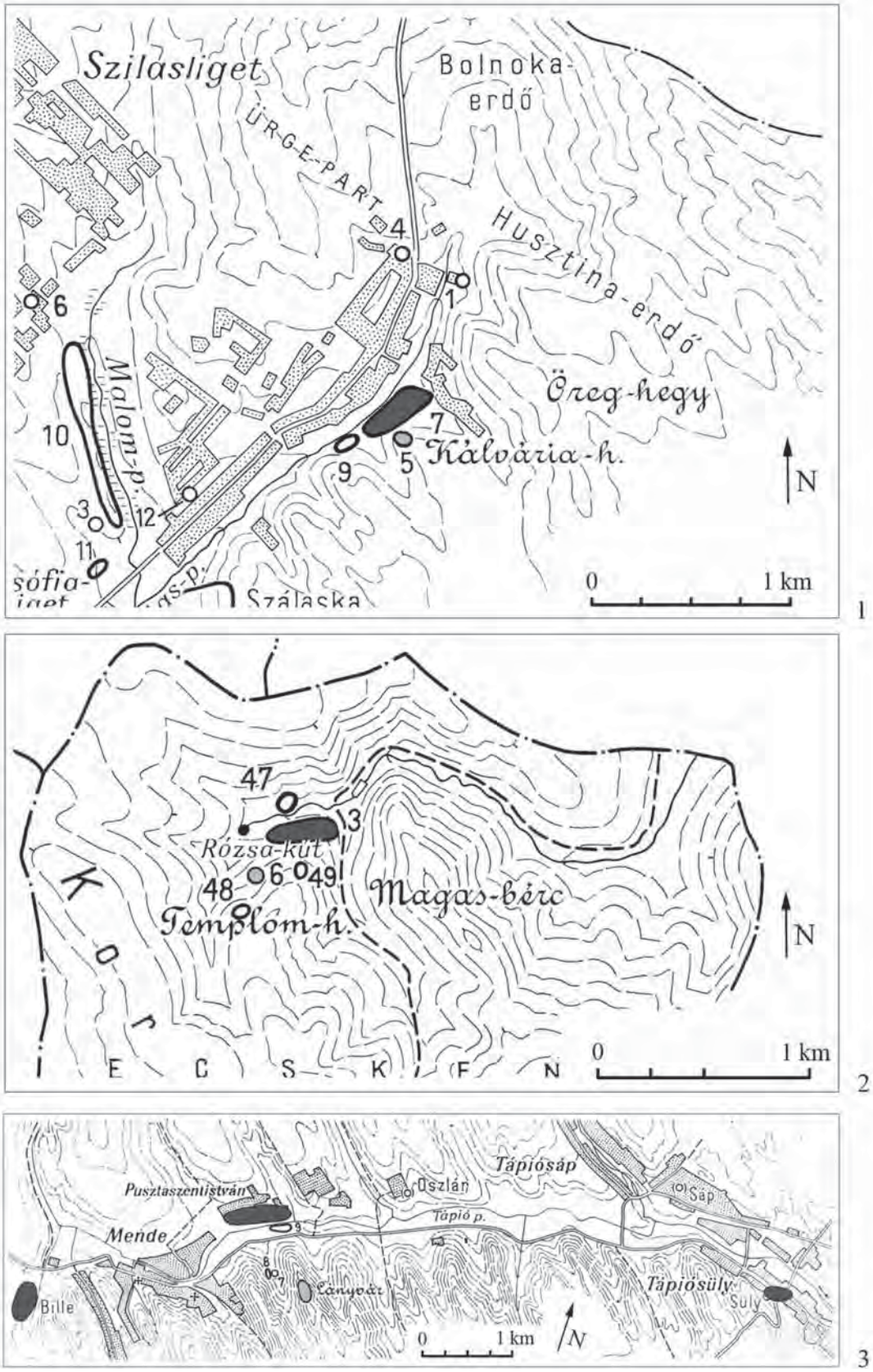


Fig. 3. Examples of the relationship between castles built in hilly areas and nearby settlements (Kerepes-Kálvária, *MRT 11* site no. 15/5; Galgamácsa-Ecskend-Templomhegy, *MRT 11* site no. 9/6; and Mende-Lányvár, *Miklós 1981* fig. 20)

Fig. 4. Map of the castles mentioned in the study

several reasons. On the one hand, several volumes of the *Archaeological Topography of Hungary* cover certain areas of Pest county, so we can easily analyse the settlements found in the vicinity of the castles. Only two of the examined Árpádian-period strongholds (Csévharaszt and Mende-Lányvár) are missing from the volumes of the topography. On the other hand, the relationship of the castles and the surrounding villages was always important to Miklós Zsuzsa, which was already discussed by her in her 1982 work on the castles of the Gödöllő Hills *(fig. 4)*.[93]

At each site, I called attention to that there were a lot of pitfalls to the investigations. Further research and exploration of the settlements around the castles will certainly help us get closer to solving the problem.

[93] This includes the work carried out by Ákos Tibor Rácz, who, reversing the approach of the research, seeks castles in the vicinity of Árpádian-period villages. He is surveying those parts of the county, which could not be investigated by Zsuzsa Miklós.

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ELEK BENKŐ

THE MEDIEVAL WATER SUPPLY SYSTEM OF PILIS ABBEY

Zusammenfassung: Die ehemals im Pilisgebierge, am Rande des Dorfes Pilisszentkereszt erbaute und bis zur Neuzeit vollkommen zerstörte Zisterzienserabtei war eine vom König in Auftrag gegebene kirchliche Institution (1184), die größtenteils von ausländischen Steinmetzen umgesetzt wurde. Nicht nur die Mauern und Schnitzereien der Kirche und des Klostergebäudes ließen auf die Großzügigkeit des begründenden ungarischen Königs, Béla III. und später András II., bzw. Königin Gertruds schließen, sondern auch das Niveau und das breite Spektrum der angewandten Baulösungen. Das Kloster und die dazugehörigen Wirtschaftsgebäude, darüber hinaus der hohe Standard der technischen Anlagen (Wasserleitungen, Mühle, Schmiedewerkstatt etc.) wiesen auch im 14.–16. Jahrhundert auf die Anwendung zahlreicher neuartiger technischer Lösungen hin. Dazu trug der praktische natürliche Umstand bei, dass der aus Kalkstein bestehende Pilis-Berg über große Karstwasservorräte verfügte und sich in der unmittelbaren Umgebung des Klosters eine reichhaltige Quelle und fließend Wasser befanden.

In den Jahrzehnten nach der Begründung des Klosters hatte man oberhalb der Abtei einen künstlichen Teich angelegt, der anfangs eine Getreidemühle und später die Maschinen einer Schmiedewerkstatt betrieb und schließlich spülte das Wasser über einen eingemauerten Abwasserkanal aus Stein die große Latrine des Dormitoriums, bzw. des Infirmariums und mündete in den unweit fließenden Bach.

Die westliche Grundmauer der am Anfang des 13. Jahrhunderts erbauten Kirche barg eine aus Quadersteinen gemauerte, breite Abflussrinne, die der Ableitung des in großen Mengen vom Hang des Pilis-Bergs herabfließenden Regen- und Schneewassers diente.

Den Kreuzgang, der ungefähr zur selben Zeit entstand, wie die Kirche, hatte man mit einem Brunnenhaus versehen, das einen Springbrunnen barg, dessen Ebenen abwechselnd aus rotem Marmor und weißem Kalkstein gefertigt waren. Im Verlauf des Mittelalters ergänzte man den Brunnen mit einem Wasserleitungssystem, das mit unterschiedlichen Techniken und in verschiedenen Richtungen angelegt worden war.

Die älteste, aus gehauenen Steintrögen gebaute Wasserleitung ist gleichaltrig mit dem Kreuzgang und dem Brunnenhaus, ihre Trasse hatte man noch während der Verlegung des Fundaments angelegt. Wir nehmen an, dass man vorhatte, die Tröge mit Bleirohren zu versehen, jedoch haben wir dafür keine handfesten Beweise gefunden.

Im Verlauf des 14.–15. Jahrhunderts tauschte man die bisherigen Steinleitungen gegen Rohre aus gewölbten Firstziegeln, bzw. ineinander gefügte Keramikrohre aus. Diese verlegte man in eindeutig geringerer Tiefe und flüchtiger, als die früheren.

Sowohl die erste, der Orientierung dienende Ausgrabung unter der Leitung von Péter Gerecze (1913), als auch die umfassenden Aufdeckungsarbeiten von László Gerevich (1967–1982) trugen in erster Linie der Klärung einzelner Gebäudeteile bei, und zielten nicht auf vertiefte Analysen technischer Anlagen ab. Dennoch wurden im Rahmen dieser Arbeiten Daten erfasst, die trotz ihrer Unvollständigkeit brauchbar waren und während unserer Rekonstruktion, mit den Ergebnissen der geophysischen Messungen der letzten Jahre ergänzt, verwendet werden konnten.

Keywords: Cistercian monastery, aqueduct, artificial lake, mill, medieval period

The Pilis Cistercian monastery, which had been completely destroyed by the modern age, was located on the border of Pilisszentkereszt. The ecclesiastical institution founded by King Béla III in 1184 was erected by foreign masons. The main mass of the Pilis abbey decorated with many carved details, including carvings of red marble, had already been constructed by the early 13th century. In the Late Middle Ages, further buildings were added to it, which made it one of the richest and

definitely the most influential Cistercian monasteries in medieval Hungary. The generosity of the founder followed by that of King Andrew II and Queen Gertrude is reflected not only in the walls and carvings of the church and monastery but also in the quality and variety of the technical solutions used. The monastery and its outbuildings, as well as its facilities (the aqueduct, the mill, the blacksmith's workshop, etc.) equally employed many technical innovations between the 14th and 16th centuries. The building complex was destroyed by the Ottomans in 1526. Although the ruins are barely visible on the surface, the site and its surroundings have not been built up to this day, which created unique opportunities for research into environmental and technical history.

The practical and economic activities of the Cistercian monks have traditionally been highly regarded by researchers. They have pointed out that it was the monks skilled in water management, forestry, and the exploitation of subsoil resources who converted the remote wooded or swampy areas into carefully cultivated monastic landscapes using many new technologies. Although we have a more refined view of this question today, we do not question its fundamental veracity, adding that it took longer to build the various facilities and obtain the results associated with them. It was not otherwise in the case of the Pilis monastery, either.

For the Cistercians – as for other monastic communities – water was of paramount importance, both in a liturgical-symbolic sense and in the practice of daily life.[1] The monks washed their hands before meals in the fountain house found outside the monks' dining room *(refectorium)*, which was accessible from the cloister. They also used the fountain for drinking water, for the weekly washing of the feet *(mandatum)*, as well as for shaving a tonsure, cleaning their clothes, and other practical activities. The mills of the monasteries, as well as the bellows and hammers in the iron foundries and smithies were operated with water. Additionally, water was needed for animal husbandry and horticulture. It was therefore of fundamental importance to supply monasteries and other ecclesiastical communities with water from the onset.

Before presenting local data, we should briefly describe the natural conditions of the Pilis Abbey, with special regard to its water resources.

The abbey was established in the Pilis Mountains, to the east of the peak Pilis-tető (756 m) that the mountains were named after, in the flaring valley of the right-hand tributary of Dera (Kovácsi) stream, near today's Pilisszentkereszt. The plateau selected for the construction, which was already inhabited in previous ages, rises 15–20 m above the valley plain, and then ascends increasingly steeper towards Pilis-tető in the west. The relatively fast-flowing Dera (formerly called as Kovácsi) stream running under the monastery is an ideal watercourse for damming a lake. The stream runs along a geological fault line: to the north of it lies the volcanic andesite block of the Visegrád Mountains, while to the south-west of it stretches the mountain range of the Pilis largely made up of limestone. The greyish-white Dachstein limestone formed at the end of the Triassic period, about 220-210 million years ago, dissolves easily in water, which results in caves and cavities. This allowed the limestone layer to capture a significant amount of karst water. One of the springs of karst water is located in the immediate vicinity of the monastery. It was an important source of drinking water to the abbey. The water yield of the spring (called Klastrom-forrás, i.e. "Monastery spring") is still considerable today.

Research on the building that preceded the foundation of the monastery (which was probably a royal manor house with a chapel) has not revealed any data about its water supply so far, and much the same can be said of the early Cistercian monastery built at the end of the 12th century. The latter formed the earliest, eastern wing of the later completed quadrangle – the walls of which clearly separated from the later masonry. It comprised rooms indispensable for monastic life (the chapel, the chapter hall, the monks' hall, and the upstairs dormitory). In the early 13th century, the new church with three aisles and a transept (the predecessor of which can only be identified from

[1] *Rüffer 2017.*

sporadic details and carved fragments) and the adjoining, closed quadrangle were constructed. The building of the Cistercian abbey with a "classical" (since the 1950s called "Bernardine") groundplan was accompanied by "classical" solutions for water supply and use. The first and most spectacular element of this was the octagonal fountain house *(lavatorium)* accessible from the cloister, located outside the monks' dining room *(refectorium).* Inside the fountain house there was a lavabo with superimposed basins of red marble and white limestone, connected to the aquaduct established with various techniques and tracks in the medieval period *(fig. 6–7, 10).* The excavations also brought to light some sections of stone sewers which were used to drain rainwater, water overflowing from the artificial lake built above the monastery (which operated the mill and then cleaned the latrine of the monastery), as well as wastewater leaving the fountain house. It needs to be emphasised that these do not represent unique, exceptional inventions (even in the case of the royally founded Pilis monastery erected with great financial effort and employing excellent specialists), but regularly emerging facilities in Cistercian monasteries. However, their details naturally reflect the local conditions and the possibilities of the founders.

Although both the first exploratory excavations of the ruins led by Péter Gerecze (1913)[2] and the large-scale excavations supervised by László Gerevich (1967–1982)[3] were fundamentally conducted with the aim of identifying the individual parts of the building instead of carrying out an in-depth investigation of the technical devices, they also recorded useful pieces of information about the old water supply system. Unfortunately, the excavations led by Péter Gerecze – which were carried out in the cloister and, particularly, on the area of the fountain house – also caused irreversible damages due to the use of excavation techniques typical of the early 20th century. The interior of the relatively well-preserved fountain house containing the remains of the lavabo richly decorated with carvings, the potential remains of the floor and lavabo foundations, as well as the water conduits running to and from the fountain have been largely destroyed. As a result, the subsequent excavations led by László Gerevich were not able to record these details *(fig. 7. 4),* even though the readily visible parts of the water supply system that could be investigated caught the attention of the excavation supervisor, who focused mainly on architectural questions. He entrusted their survey to Balázs Erdélyi, a young architecture student assisting in the Pilis excavations. After careful levelling, the drawings were made by Endre Egyed, who had wide experience in geodesy and architecture. Consequently, the remains have been carefully recorded in drawing during this excavation that was not up-to-date even according to contemporary standards. (The notes in the field notebook written by the excavation supervisor are unfortunately much sketchier.) The excavation records left to us – together with the finds taken to the museum, archival photographs, and the recently made geophysical surveys – allow the reconstruction of the overall picture, which is quite an exceptional case in the practice of Hungarian archaeology. This was greatly aided by the fact that the monastery and its surroundings are not built up, so the site is ideal for carrying out non-invasive archaeological surveys. It must be emphasised though that this picture contains many hypothetical elements that could only be clarified with authenticating excavations. In some cases, even a closer dating of certain sections within the medieval period is difficult.

In the following, the individual water conduits and their associated artefacts will be presented separately, grouped according to their functions, contexts, and ages.

[2] For the summary of the findings made during the excavation supervised by Péter Gerecze, see *Takács 1992* 1–7, 15–17.

[3] *Gerevich 1983; Gerevich 1984; Gerevich 1985.*

The artificial lake, the mill race, and the vaulted drainage canal

One of the first and fundamental aims of geodesy during the series of excavations carried out in the Pilis between 1967 and 1982 was to survey the building complex of the Pilis monastery and the surrounding stone walls. These structures had been destroyed to the ground by modern times, but their traces were marked by higher stony tracks running straight, mostly covered by shrubs.

The surveys have also revealed that there is a completely filled-up lake in the highest part of the distorted rectangular area enclosed by walls. The lake bed, which is almost imperceptible in its present state *(fig. 1. 3)*, was supported on the eastern side by an earth dam and was separated from the rest of the abbey by a stone wall built subsequently to the surrounding walls of the monastery on the outside *(fig. 1. 5)*. The artificial lake deepened to the limestone substratum took up an area of about 80×25 m when completely filled with water. Based on a test trench dug during the archaeological excavation supervised by Gerevich, its deepest point was at an altitude of 361.62 m. Our core prospection (by Ákos Pető and Gábor Serlegi) carried out for authentication in 2017 confirmed this somewhat blurred level information (361.5 m). As it was discovered later, this lake played a key role in the water supply of the abbey, along with a nearby spring (and other potential springs that have dried up by now).

The construction date of the lake could not be determined at the time of the excavation by Gerevich, but important observations have been made in connection with this as well. It was discovered that the digging of the lake bed disturbed the burials of an Árpádian-period cemetery established before the founding of the monastery. Some human bones were discovered even in the earthen dam of the lake. It was also ascertained that the dam was constructed when the medieval ground surface was already covered with fragments and debris from intense stone dressing associated with large-scale building activities in the early 13th century. Archaeological finds suggest that the lake may have been subjected to a particularly intense use in the late medieval period when a multi-room iron ore smelter operated by hydropower was built next to the dam. The deep stone trench of the water wheel made of carefully carved ashlars, belonging to the workshop and the initial part of the large stone-walled and vaulted canal transporting water to the monastery were also unearthed. We have detailed drawings and archival photographs about these sections and our description below will be largely based on them.

In 1980, László Gerevich had the sediment layers of the lake cut through, and the following year (1981), samples were also taken for palynological analysis. They were studied at the Botanical Research Institute of the Hungarian Academy of Sciences, under the supervision of Prof. Bálint Zólyomi. Unfortunately, the sediment that filled the lake bed had dried up several times over the centuries and thus contained only degraded plant remains. Nevertheless, the analysis revealed a considerable amount of walnut pollen, which demonstrates that there was an orchard next to the monastery. From the otherwise poorly preserved pollen, researchers inferred that the clearings around the monastery were mainly used as hayfields and orchards. The small proportion of cereal pollen suggests that there was less arable land at that time, and there were not many signs of animal husbandry or grazing, either. The surrounding forests comprised beech, hornbeam, and oak trees. However, the value of these instructive findings was significantly lessened by several factors (such as the fact that only a short, 60 cm part of the whole sample was subjected to a thorough analysis, the unfortunate scarcity of pollen grains, and the complete lack of possibilities for dating within the medieval period with contemporary methods).[4] In order to fill these gaps and adopt the modern methods of environmental archaeology, the sediment of the lake was re-examined in 2002 under the supervision of Pál Sümegi. Using manual labour, the research team dug a 180 cm deep geological trench across the layers deposited above the Triassic Dachstein

[4] *Zólyomi – Précsényi 1985.*

limestone bedrock at the apparently deepest point of the lake bed, which had been almost completely filled up since the medieval period. Afterwards, they carried out sedimentological, geochemical, archaeobotanical, anthracological, and pollen analyses on the soil samples taken. The results have been published in a separate study.[5]

The new findings did not differ significantly from the results of the analyses performed by Zólyomi and Précsényi, but they proved to be more detailed. The lake was once surrounded by forest-steppe vegetation with patches of wood comprising a significant number of fruit trees. Based on the proportion of oak, elm, and ash trees, as well as alder and willow trees, the garden-like vegetation could have been surrounded by oak and alluvial forests.[6] The total amount of cereal crops was not significant either. Oat *(Avena)* was dominant among the pollen grains of cereals. Based on the data, we can reconstruct horticultural farming, orchards, and possibly vegetable gardens. There was also a considerable amount of fly ash in the samples examined, suggesting a considerable human community.

In the sediment layer filling the lake bed, just above the rocky bottom of the lake, a piece of charred wood (D-AMS 016721) and a fragmented walnut shell (D-AMS 017667) were found, which were suitable for radiocarbon dating. The results of the two measurements coincided with each other.[7] They both pointed to a period between the second half of the 12th century and the beginning of the 13th century. This relatively broad interval of time itself does not make it possible to decide whether the artificial lake was established during the existence of the royal manor house built before the monastery or during the first decades of the monastery founded in 1184. However, because we can exclude the early phase of the radiocarbon interval between the 11th and 12th centuries due to the existence of an Árpádian-period cemetery, which was used before the founding of the monastery, we can only take into account the later phase of this period (i.e. the second half of the 12th century or the early 13th century). This clearly suggests that the lake came into existence after the Cistercian monastery was founded, which is supported by the fact that the medieval ground surface under the dam was covered by debris from stone carving suggestive of major building activities in the early 13th century. This layer was naturally above the burials found 60 cm deeper than the Árpádian-period ground surface. The exact chronology of the construction of the dam is unknown. However, the earthen bank with an inner stratification presumably reached its final size after several phases of construction.

The results of earlier investigations proved to be incomplete regarding the precise extent of the lake bed, its possible inner structure, and the exact line of the dam. Thus, we explored the site again with logging-while-coring in 2017 (Ákos Pető, Gábor Serlegi) followed by field measurements and a magnetometer survey in 2019 (Gábor Serlegi, Bence Vágvölgyi). The survey revealed that to the south of the floodgate the dam along the west wall of the workshop must have turned to the south-west in a curve. Otherwise, due to the level conditions, the water could have easily left its bed endangering the deeper-lying buildings of the monastery, especially a building (a guesthouse) found nearby *(fig 1. 5, fig. 11).* Based on the excavation records, it appears that on this section, the inner side of the dam facing the water was lined with a stone wall, a curved section of which was observed during the excavations led by Gerevich *(fig. 2. 3).*

A magnetometer survey of the area suggests that above the lake, on the inside of the western wall enclosing the monastery, there were small stone structures (outbuildings?). Geophysical measurements did not detect any structure in the lake bed *(fig. 1. 4).*[8] Based on the terrain model

[5] *Sümegi – Jakab – Benkő 2021* 262–267.
[6] *Zólyomi – Précsényi 1985.*
[7] *Sümegi – Jakab – Benkő 2021* 264.
[8] The survey was carried out by Gábor Serlegi and Bence Vágvölgyi (HAS RCH Institute of Archaeology).

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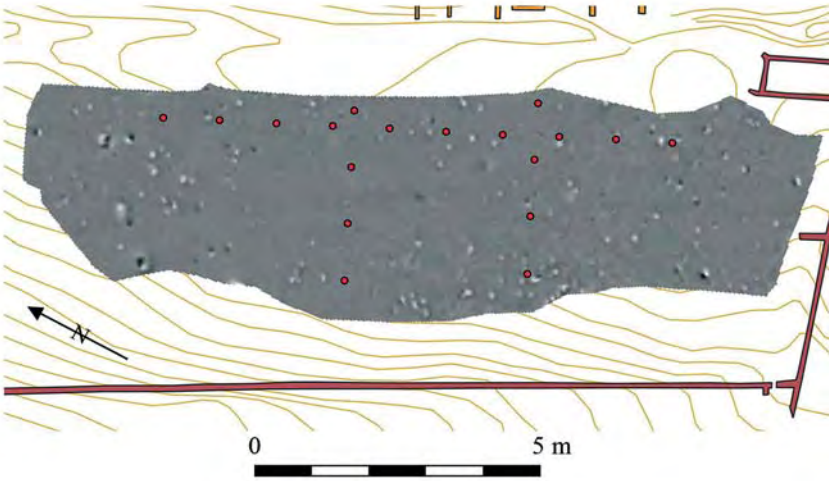

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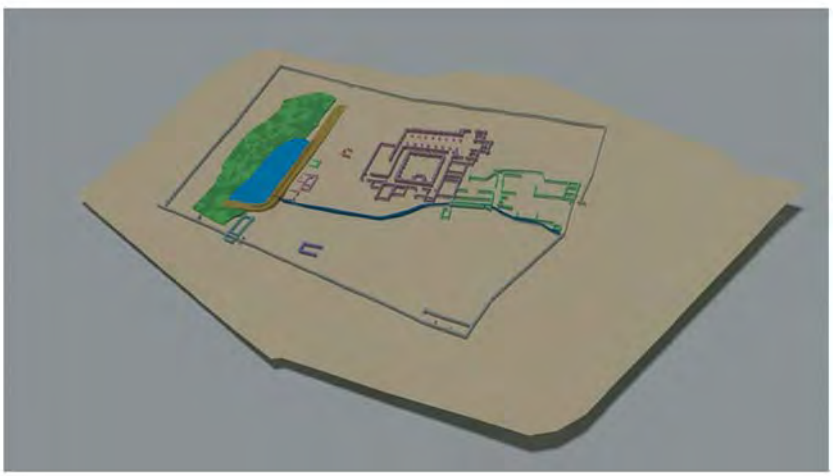

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Fig. 1. 1–2. Pilisszentkereszt-Klastromkert, the ruins of the Cistercian monastery (Photograph: Zsuzsa Miklós); 3. The site of the filled-up artificial lake (Photograph: Elek Benkő); 4. Magnetometer survey (Survey: Gábor Serlegi and Bence Vágvölgyi); 5. The artificial lake and its drainage channel in a terrain model (Model: Gábor Serlegi)

of the area, the largest extent of the old lake must have been 80×25 m, and its water surface was slightly above the 364 m elevation contour line at that time.

It was assumed as early as the excavations in Pilisszentkereszt that the Dera stream flowing under the monastery fed into a lake suitable for the operation of a water-mill. This idea was also supported by mill sites of medieval or modern origin discovered elsewhere in the valley of the stream. Vilmos Balás, the supervisor of the excavation, who was particularly interested in technical features of the terrain, investigated "heaps suggestive of building ruins on the right side of the Dera stream, closer to the excavation site" in 1981, where the fragment of a millstone was also discovered. The "heap of earth" observed there was cut across with a trench, but it did not yield any find of dating value.[9] Core taking in the area in 2014 did not detect sediment layers typical of medieval fishponds. Consequently, the existence of a medieval dammed lake under the abbey has not yet been verified there. Nevertheless, in a lower part of the Dera (Kovácsi) stream, about 5 km from the site of the Pilis Cistercian abbey, near the Árpádian-period village of Kovácsi, under the medieval monastic grange,[10] cores taken from the widening bed of the stream yielded the remains of a medieval lake and sediment layers suitable for analysis in it.[11]

In the light of all this, at the present stage of the research, it seems certain that in the immediate vicinity of the Pilis monastery there was only one medieval lake that could operate a mill and other industrial facilities, namely the artificial lake within the walls of the monastery.

Water from the relatively small lake, fed by rainwater and presumably several springs that have dried up by now, poured on the wheel operating the machines in the workshop through a cylindrical conduit with a flaring mouth. The pipe carved from Andesitic tuff was 25 cm in diameter *(fig. 3. 1).* It was laid near the deepest point of the lake bed (its bottom was at 362.14–362.15 m) and ran through the dam of the lake. This means that at the deepest point of the lake, there was always some water in the lake bed, even after the maximum amount of water had been drained off. Presumably, this was intended to prevent the clogging of the pipeline, but this may have also required regular cleaning of the lake bed. The shape of the carved stone at the end of the conduit suggests that the pipe could be closed with a latch after the flaring part. Unfortunately, we have no written record of the rare technical equipment excavated at the end of the series of excavations (1979–1980) in the Pilis Mountains.

The level conditions suggest that water flowed from the stone conduit onto the overshot wheel. The wheel itself rotated in a ditch very carefully walled with Andesitic tuff ashlars and lined with smooth, rectangular sandstone slabs at the bottom *(fig. 3. 2–8).* The mill race which slightly widened in the east was 1.5–1.6 cm wide and 6.15 m long. Its bottom moderately sloped eastwards. The altitude of the bottom at the western end was 356.28 m, at the eastern end it was 356.14 m (so the conduit sloped 14 cm in 6 m). The bottom of the shaft hub of the wheel was discovered at 359.37 m. Thus, the centre of the rotating shaft must have been somewhat higher than this. Considering the level conditions of the narrow stone conduit that directed water onto the wheel, the diameter of the wooden water wheel must have been around 5 m *(fig. 2. 4).*

The sidewalls of the canal built of ashlars showed limescale and traces of erosion caused by running water. The silty layer covering the bottom of the ditch (comprising pieces of stone and mortar, fragments of roof tiles and iron nails) was covered by a layer of "building remains" and an approximately 14 cm thick burnt layer. The latter suggests that some kind of wooden building may have stood above the wheel. The finds discovered there date between the 13th century and the early modern period (the 16th and 17th centuries).

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[9] From the notebook of Vilmos Balás, work foreman, 5–6 May 1981 (Archive of the HAS RCH Institute of Archaeology).

[10] *Laszlovszky et al. 2014; Laszlovszky – Stark 2017.*

[11] *Sümegi – Jakab – Benkő 2021* 267–274.

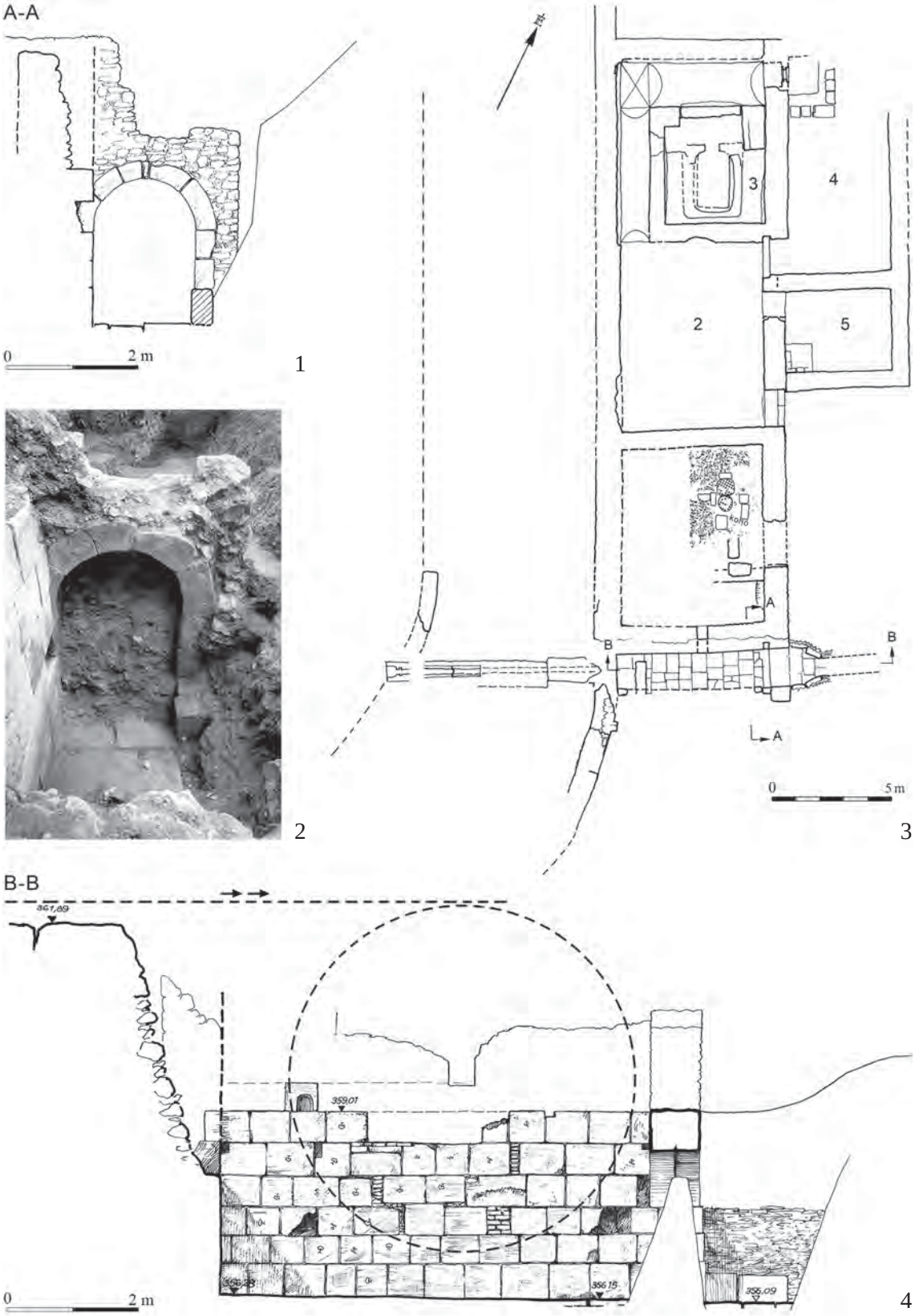

Fig. 2. 1–2. Pilisszentkereszt-Klastromkert, the walled mill race with the opening of the drainage channel (Survey: Endre Egyed, photograph: Lajos Sugár); 3. The workshop of the Cistercian monastery with the aqueduct and the mill race crossing the dam to the south of it; 4. The ashlar wall of the mill race with masons' marks and the location of the water wheel (Survey: Endre Egyed)

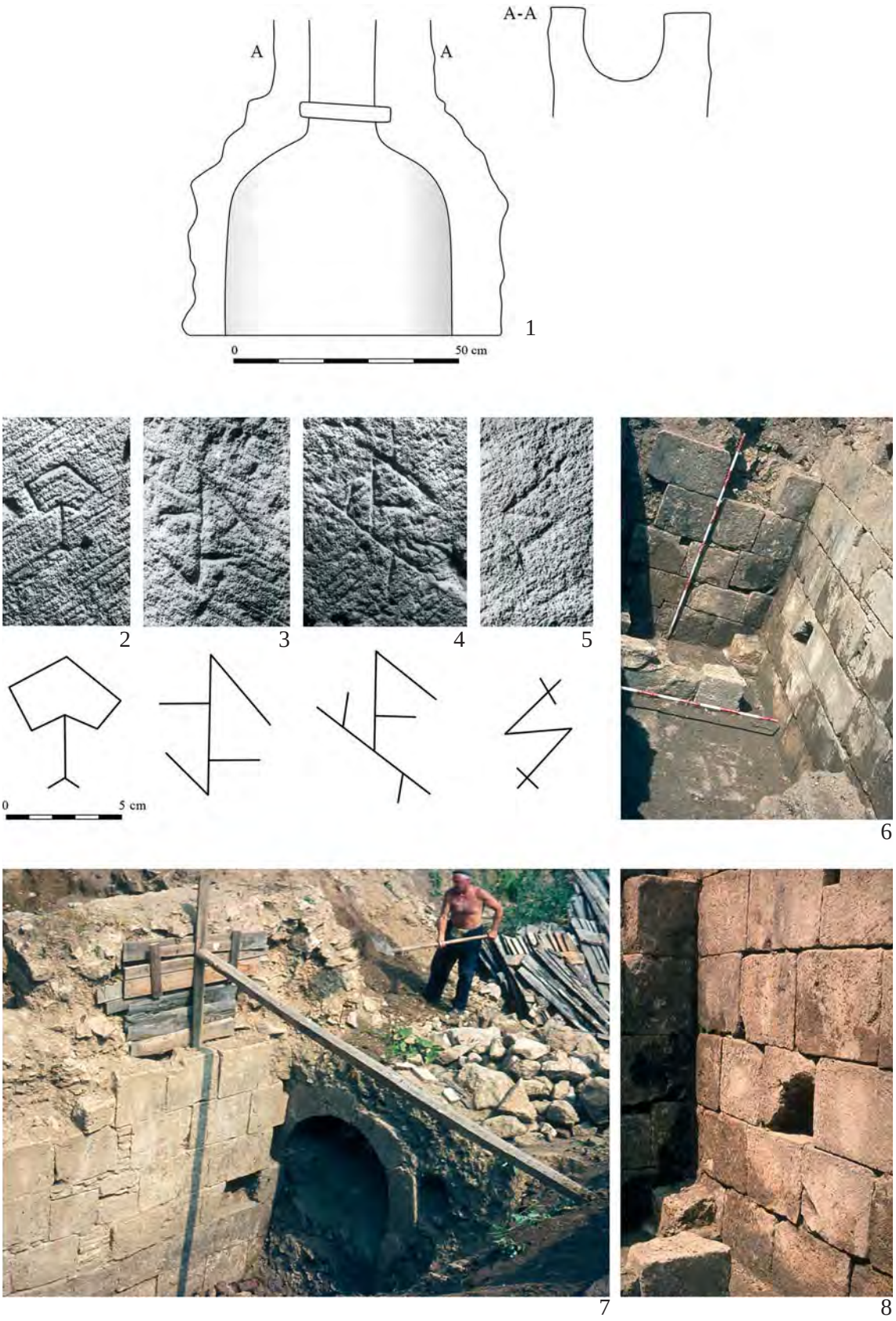

Fig. 3. 1. Pilisszentkereszt-Klastromkert, the stone conduit transporting water from the artificial lake onto the mill wheel terminating in a funnel with a notch made for the latch (Drawing: Zsóka Varga after sketches made by Endre Egyed); 2–5. Masons'marks on the ashlars of the mill race (Photographs: Lajos Sugár); 6–8. The excavation of the mill race and walled channel (Photographs: Lajos Sugár)

It should be mentioned that a remarkably large number of ashlars with masons' marks were built in the masonry of the wheel trench *(fig. 3. 2–5).* These masons' marks differ from the early mason's marks of the Pilis abbey dated to the beginning of the 13th century. Imre Holl found their analogues on stone carvings dated the second half of the 14th century.[12] Fragments of brick and roof tiles were observed between the stones of the sidewalls at some places.

The observation above suggests that – although the lake itself had been established earlier – the walled mill race was not completed in its present form until the 14th century, which seems to confirm that the latrine – used by the inhabitants of the infirmary in addition to those of the monastic dormitory – receiving water from the mill was added later to the 13th-century building block *(fig. 4. 4).* This facility evidently had some kind of antecedent, as the dormitory was upstairs in the earliest, 12th-century wing of the building. However, this was not discovered during excavations, nor was the early flour mill that preceded the metalworking workshop. The existence of the latter is suggested by the fragments of millstones discovered as stray finds in the area of the monastery.

The deep ditch of the water wheel is closed in the east by an arched, gate-like opening (height: 2.2 m, *fig. 2. 1–2, fig. 3. 7*), after which the trench continued into a vaulted stone channel that was about 62 cm in width and 60–62 cm in height *(fig. 4. 4).* A short section of this large structure was discovered on the south-eastern side of the monastery as early as 1968 and was referred to as the "main sewer". Its continuation was not found at that time. "The base is made of smooth rectangular stones and its semi-circular vault is built of bricks." The drawings made during the excavation confirm that the bottom of the channel was made of large flat pieces of stone, but the other parts of the vault appear to have been constructed of stone slabs rather than bricks. The exact track of the channel was not identified during the excavations by Gerevich. It was detected by the extensive geophysical measurements of 2003–2004.[13] These measurements clearly showed that the channel ran straight from the trench of the mill wheel to the north. Then, it changed its direction to the north-east at the level of the former refectory and ran towards the monastic latrine. This corresponded to the general practice of medieval Cistercian monasteries. According to this, a longitudinal, walled channel was constructed under the seats of the large toilet block upstairs, behind the dormitory. A watercourse, usually a stream, was led through this, which continuously removed the contents of the latrine. An excellent example of this is the 13th-century latrine block of the Cistercian abbey of Royaumont (Île-de-France), with a 32 m long and 2.35 m wide walled stone channel, as well as 31 openings in the vault connected to the upstairs lavatories *(fig. 4. 1).*[14] A similar facility survived in the Cistercian monastery in Zwettl, Austria *(fig. 4. 2–3).* The foundation walls of the Pilis latrine were excavated at the end of excavations supervised by Gerevich. Apart from a ground plan showing the periodisation – that is, the construction order – of the walls, little documentation is left of it. However, it still reveals that the large common latrine of the dormitory and the infirmary built on its eastern side followed the usual tradition of Cistercian monasteries: its superstructure rested on long, parallel walls and the water coming from the artificial lake could wash through the bottom of the latrine covered with stone slabs between the walls. Leaving the latrine, the water could run towards the Dera stream meandering below the abbey *(fig. 4. 4).* The length of the Pilis latrine was 24 m.

An intriguing discovery of the 2003–2004 geophysical survey was that a minor channel forked off from the large channel on the farmyard of the monastery (which must have contained workshops, storehouses, wagon sheds, and stables). The shape and function of the minor channel could only be revealed by authenticating excavations but its existence was presumably related

[12] *Holl 2000* 133.
[13] *Benkő 2010.*
[14] *Renaud 1999* 65.

to keeping the farmyard clean. Apparently, this minor branch also crossed the stone wall of the monastery and led to the Dera stream *(fig. 11)*. In the middle of the farmyard, the mark of a rectangular (6×5 m, inside dimensions: 4×3.5 m), dug-in, and most probably walled feature could be seen, which may belong to the remains of a large well or cistern.[15] Interestingly enough, the monastic court in the middle of the cloister had no dug well. Water was provided by the fountain standing in the southern walkway of the cloister.

The channel draining the water of the artificial lake was filled with earth mixed with rubble. The finds discovered in the backfill (glass and pottery shards, including many roof tile fragments; iron artefacts, including a substantial number of iron nails) also shed light on the time when the channel was used, as they can be dated to the 13th and 14th centuries. Of these, the earlier ones are particularly important to us, because they can be associated with beginnings. These include, for example, the high-quality – largely matching – colourless glass fragments of a large jar decorated with applied cobalt blue glass threads. This object discovered in the channel was reconstructed in a drawing. László Gerevich still dated it to the 10th century with uncertainty and listed it among the finds pre-dating the foundation of the monastery.[16] However, after further research, Imre Holl dated the artefact – which is still without exact analogues today – to the period between the second half of the 13th century and the beginning of the 14th century, and carefully hypothesised that its provenance was in Southern France or somewhere else in the Mediterranean.[17]

To summarise the observations related to the fishpond of the Pilis monastery, this artificial lake date back to the 13th century, but the earliest facilities (the mill, the early drainage channel) associated with it are unknown. Only the earthen dam bordering the lake bed on the east might still date from the 13th century. The other facilities were presumably destroyed when the walled ditch suitable for the installation of the large water wheel and the connected vaulted stone channel were completed in the 14th century. The latter ran to the large latrine block of the monks' sleeping quarters and the infirmary, which was built later to the eastern side of the dormitory. Since the monks' dormitory belonged to the earliest part of the building, it certainly had an early latrine at the south end of the building, but its remains were either not covered or were undetected by the excavations. This hypothesised early latrine on the short, southern side of the dormitory suggests that the vaulted stone channel may have been built along the track of a former sewer, as water necessarily had to flow behind the monks' hall and the sleeping quarters for sanitary reasons. Unfortunately, there is still no relevant archaeological evidence on this question.

It seems probable that the water wheel originally belonged to a flour mill; otherwise, the large fragments of millstones discovered in the excavation area could not be interpreted. When discussing the authentication core taking at the site, we have mentioned that the Dera stream under the monastery was not dammed into a mill pond in the medieval period. Consequently, it was only the water of the artificial lake above the monastery that could operate a gristmill in the immediate vicinity of the abbey.

Considering the wider region, however, the Pilis abbey was not short of mills. We have already referred to the old Cistercian grange and the lake located near the lower part of the Dera (Kovácsi) stream, about 5 km from the territory of the Pilis Cistercian abbey, in the area of the Árpádian-period village of Kovácsi, near today's Pomáz. Another mill of the monastery operated next to the Danube, in the area of Békásmegyer.[18] Further research is needed to clarify which of the seemingly modern lake and mill sites located in the valley of the Dera stream could have been medieval and in the possession of the Pilis abbey.

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[15] *Benkő 2010* 412, fig. 6.
[16] *Gerevich 1984* fig. 15; *Gerevich 1985* fig. 6.
[17] *Holl 2000* 18–19, fig. 21.
[18] *Ferenczi 2014*.

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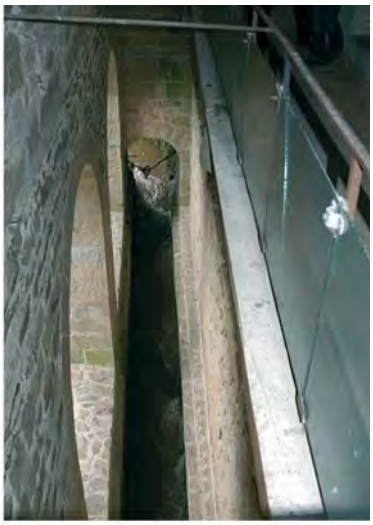

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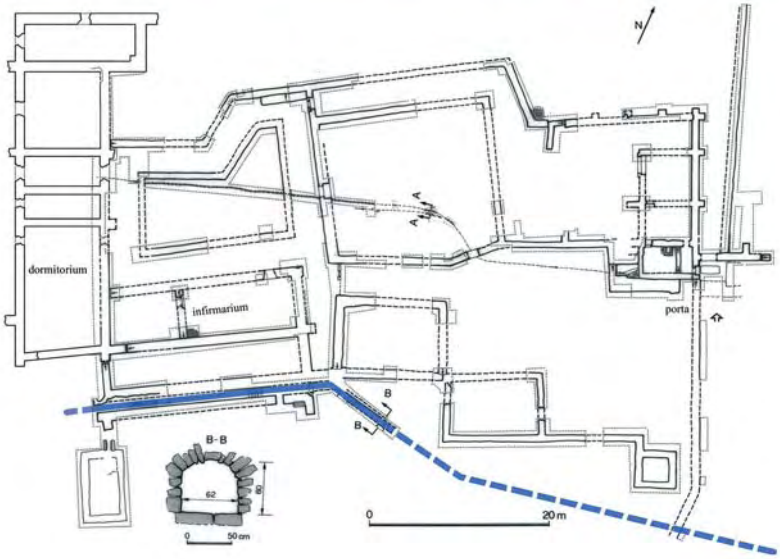

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Fig. 4. 1. Royaumont, the latrine of the 13th-century Cistercian abbey (after *Renaud 1999*); 2–3. Zwettl, the reconstructed shaft of the latrine in the Cistercian monastery (Photographs: Elek Benkő); 4. Pilisszentkereszt-Klastromkert, the upstairs dormitory, the infirmary, and the eastern wing of the building with the latrine and the water conduits in the Cistercian monastery (Drawing: Endre Egyed)

In the 15th century, the function of the mill wheel of the Pilis monastery changed. Instead of flour milling, it became part of a workshop that carried out iron ore smelting and blacksmithing, leaving large quantities of slag behind. Archaeological data suggest that these activities continued for a few decades even after the monastery was set on fire by the Ottomans in the autumn of 1526, but monastic life in it ceased to exist forever. In regions rich in iron ore, the medieval Cistercian monasteries were also engaged in iron ore smelting. The smelting masters of the Walkenried monastery in the Harz Mountains, for example, are mentioned in the first half of the 13th century. In the area of the Heiligenkreuz monastery, the late medieval mother house of the Pilis abbey, smelting was carried out in the late medieval period.[19] The processing in the Pilis probably depended on the small amount of local iron ore. However, this question still awaits in-depth examination by researchers.

Rainwater drainage channel outside the western façade of the monastery church

Right in the first year of the long series of excavations led by László Gerevich, it was discovered that the western foundation wall of the church was much wider than it was customary, and a section of wide foundation ditch extending westwards from under the rising wall comprised a large channel with walls made of ashlars and covered by thick rectangular stone slabs *(fig. 5).* Its function can be interpreted precisely in the knowledge of the site. The artificial terrace of the hill cut into the hillside rising sharply towards the west was exposed to a considerable amount of rainwater and thawed snow coming from the hill. This could have flooded the church through the western gate. The 125 cm high and 68 cm wide feature (narrowing to 50 cm at the bottom), which can be partly still crossed today, was meant to drain away this mass of water coming down suddenly. It ran along the full width of the western façade, but the excavations could not reveal where and through which openings it absorbed the water coming from the hillside. The channel started at the south-east corner of the longhouse of the church, passed in front of the western façade, then turned eastwards at the north-east corner and began to move away from the building. Its exact line has not been detected, but we can assume that turning to the north-east, it left the area of the monastery enclosed by walls before reaching the axis of the northern transept, as the burials of the churchyard were already there *(fig. 11).* The channel was filled with clay washed in by the water pouring down, as well as the "rubble of a destroyed building". László Gerevich suggested that the channel could be earlier than the western end wall of the church, but this is not supported by the records available to us. It seems that the channel made of ashlars was built when the church was founded. The level data of the channel also help to understand the ground-level conditions outside the western façade. It is striking that the bottom of the channel in front of the western wall (355.95 m) lies only 17 cm deeper than the floor of the nave (356.12 m), which practically means that the channel, as a whole, is found higher than the church floor *(fig. 5. 6–7).* This clearly suggests that the ground level on the western side of the church, towards the Pilis Mountains, was already very high. From the western church gate, the main nave could be accessed through steps, crossing about a 1.6 m difference in the levels. The drainage of rainwater – using different techniques – has also been proposed in the case of other Cistercian monasteries.[20]

[19] *Schich 1980* 230–232.
[20] *Kinder 1995* 113.

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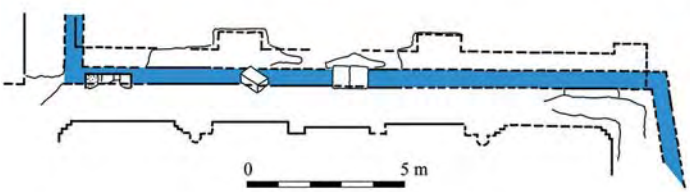

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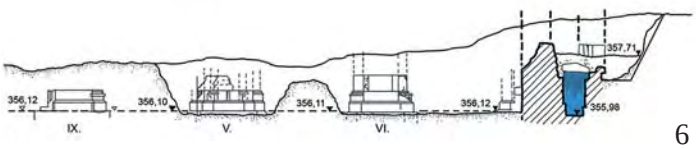

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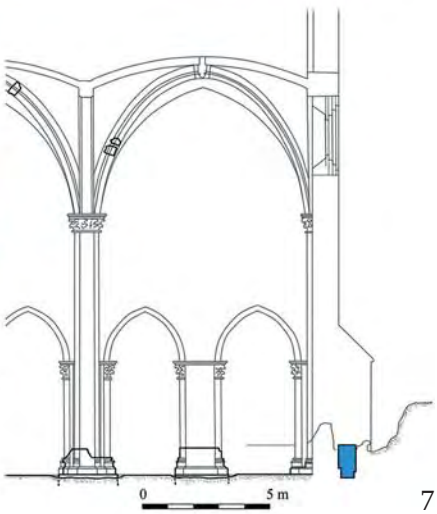

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Fig. 5. 1–4. Pilisszentkereszt-Klastromkert, the remains of a sewer built into the western wall of the church in the Cistercian abbey (Photograph: Lajos Sugár);
5–6. The floor plan and cross-section of the sewer; 7. The position of the drainage channel in the longitudinal section of the church, a reconstruction (Drawing: Endre Egyed)

The fountain house and the early aqueduct

The earliest aqueduct of the Pilis Cistercian monastery, made of carved stone elements, is demonstrably contemporary to the monastery and the fountain house accessible from the southern walkway of the cloister, built in the first third of the 13th century. The aqueduct continuously transported water to the *lavatorium* from the Klastrom spring (and possibly other nearby springs that have dried up by now). In terms of its chronology, it is telling that its line crosses the walls of the cloister at several points. In each case, the aqueduct passed through the wide and carefully laid foundations of the monastery walls, when it was constructed. (For example, under the eastern walkway of the cloister, the half-cylindrical stone channel passes through the buttress foundations of the cloister protruding into the monastery court. It would have been pointless to construct it later with great destruction.) The fountain house itself – although its building belongs to a different stage within the construction of the cloister, as indicated by the separation of its wall foundation *(fig. 10)* – was built in the first third of the 13th century, which is confirmed by the style of its carvings *(fig. 6. 1–5)*. The fountain house found in the middle of the southern walkway of the cloister, just outside the refectory, has a composite stone fountain in it that provided the monks with permanent running water. Such fountain houses played a key role in the life of Cistercian monasteries as they offered the monks the possibility for washing their hands before entering the dining hall, as the *Liber usuum* prescribing the rituals and daily activities for the Cistercian monks puts it: *ablutis igitur manibus et detersis intrent refectorium*.[21] Its other functions have been summarised above.

The fountain house is the least known part of the cloister in Pilis. In addition to the excavation techniques employed during the investigations supervised by László Gerevich, it was mainly caused by the fact that the exploratory excavation led by Péter Gerecze in the early 20th century significantly disturbed the remains. The ruins were also severely disturbed later as a very deep and wide pit was discovered at the site of the fountain house during the excavations in 1967, which destroyed a considerable part of the remains *(fig. 7. 4)*. The extent of the subsequent disturbance is demonstrated by the fact that one of the fragments of a statue belonging to the 14th-century chancel screen erected in the nave was also discovered here.[22] The foundation of the fountain house (for which stones from the masonry of an earlier building were also used) held walls covered with ashlars. Inside the building that led to the cloister, no floor, lavabo foundation, and conduit remains were discovered, or they could not be observed. There was no trace of the old level conditions and the flooring, either. Based on analogues, we may assume that the old ground level inside the fountain house was the same as that of the cloister.[23] The octagonal building, supported with small buttresses at its corners, had a stone vaulted ceiling held by the leaf capitals of half-columns placed in the corners *(fig. 6. 3)* and by profiled cornice sections *(fig. 6. 4–5)*. The main elements of the vaulted ceiling were the carved ribs with a profile similar to the ribs used in the nave of the church, but smaller in size *(fig. 6. 1–2)*. The existence of the vaulted ceiling is also suggested by the fact that the buttresses of the fountain house had much deeper foundations than the sidewalls of the octagon.

No parts of the lavabo built in the middle of the fountain house survived *in situ*. Imre Takács carried out its reconstruction based on the discovered stray stone carvings. Many of these pieces

[21] *Liber usuum Sacri Cisterciensis Ordinis.* Parisiis, 1643, 168; *Simon 1997* 5.

[22] From the notebook of Vilmos Balás, work foreman, 1974: "a madonna was discovered among the old ruins of the fountain house" (Inv. no. 76.263).

[23] Under fortunate circumstances, the operation of the monastic fountain is indicated by major wall foundations and aqueduct remains, as in the case of Durham (*Lillich 1982* 142; *Coppack 1999* 40) or Eberbach (*Liebert 2015* 47).

had been lost decades earlier, so only drawings or photographs were available for research. This makes the identification of the individual details and dimensions somewhat uncertain.

The lavabo with a composite structure stood in a stone basin 3.2–3.3 m in diameter, the base of which was assembled from white hard limestone elements. The remaining carvings reveal that the bottom of the basin was made sloping so that the water pouring in it from above would enter the drain found in the middle of the fountain *(fig. 6. 10, fig. 7. 3).* The curved side panels of the basin carved from red marble were fixed to this pedestal with pegs. These side panels surrounded the 55 cm high cylindrical basin *(fig. 6. 9, fig. 7. 3, 5).* In the middle of the basin, there was a thick marble column, supplemented by six additional pillars placed radially, crowned by a flat red marble capital decorated with leaves *(fig.6. 11).* This held a large red marble fountain dish (diameter: approx. 2.5 m, *fig. 6. 7*), from which water flowed into the lower basin and then down the drain. In the centre of the large red marble dish, a large cylindrical column was placed, which was bored through vertically (diameter: 7.5 cm). This column had a base and presumably a capital too, on which a smaller dish was placed. The dish was made of limestone and had openings for spouts placed under the rim *(fig. 6. 8).* A slender pinnacle was attached to the upper basin, and it had a vertical borehole of the same size as that of the column mentioned above *(fig. 6. 6).* From this pinnacle, water flowed through narrower holes in four directions. According to this reconstruction, the height of the fountain was above 2.65 m *(fig. 7. 3).*[24] Subsequently, Imre Takács made some modifications. He added one more small-sized dish at the top of the fountain. The base of the lavabo is made of white limestone. The side panels of the basin, the central pillar, and the lower, large fountain dish were carved from red marble, while the two dishes above it together with their columns, as well as the pinnacle crowning the structure were made of white limestone *(fig. 7.* 5).[25]

According to the assumption made by Imre Takács, the lower basin of the fountain – when fully filled with water – could act as a water tower providing the necessary water pressure for the complex water supply system of the monastery built of stone and ceramic elements.[26] Recent research has significantly modified this view in several respects. On the one hand, the network only seems to be too complicate, because we have to reckon with stone and ceramic pipes that existed successively in time. The water pressure in them – as we shall see below – must have had a source with a stone conduit lying higher than the monastery. The lowermost tray of the fountain found at the floor level and enclosed by a wall consisting of thin curved segments carved from red marble probably only served for collecting splashing water that came from the fountain dish above instead of storing a large amount of water that was already contaminated from use. On-site research carried out since the 1990s, as well as the in-depth evaluation of the archaeological records clarified several details related to this question.

The drinking water infrastructure of the Pilis monastery started at the still working and used Klastrom spring, located to the north-west of the building complex, just 40 m from the outer stone walls of the abbey. Field surveys revealed that debris from a destroyed medieval stone building (or more buildings) can be observed on the surface in the thicket surrounding the spring. In the same place, a copper coin of Béla III (1172–1196) was discovered during the excavations supervised by László Gerevich. We assume that the spring was inserted into a stone socket and a small building was erected over the walled basin. The water pressure was provided by the difference in the altitudes of the spring and the *lavatorium* in the cloister. (Today the altitude of the spring is around 372 m above sea level. The bottom of the medieval reservoir dug in the ground evidently lied deeper than this.) Near the fountain house, the elevation of the floor of the cloister paved with

[24] *Takács 1992; Takács 1994* 239–240.
[25] *Takács 2007* 36–38.
[26] *Takács 1992* 10.

bricks was at 355.69 m. The atmospheric pressure was therefore approximately 1.5 atm, which ensured that water also reached the upper spouts of the tall fountain. The walled structure (well house/cistern) built around the spring has parallels in the Benedictine abbey of Prüfening (with Romanesque antecedents)[27] and the Cistercian abbey of Royaumont.[28]

The upper section of the water supply system leading from the spring to the monastery is not known (its hypothetical line is marked with a red dashed line on *fig. 11*), neither do we have exact data on where the pipeline may have entered the inner area of the monastery. It certainly came from the direction of the lay brothers' *(conversi)* building, as the furthest section of the aqueduct running to the fountain house was found under the eastern corridor of the lay brothers' wing, parallel to the western part of the cloister. However, it is uncertain whether the conduit entered the quadrangle at the corner of the church, where it could have been built into the wall foundation under the western water drainage channel lying relatively high, or it crossed the building of the *conversi* in an east–west direction. It remains the task of future authenticating excavations to decide this question.

The body of the conduit was made up of matching blocks of stone hollowed like troughs. Sometimes, the channel in the conduit was formed by two stone troughs with semi-cylindrical cavities turned towards each other (the size of the channel with a standing oval cross-section thus created was 14×22 cm). In other cases, the lower stone troughs were covered with thick stone slabs, which were fixed with mortar *(fig. 8. 1–2, fig. 10).* According to Western tradition, thick lead pipes were laid in these longitudinal cavities. The best-known example of this solution is known from the Benedictine monastery of St. Emmeram in Regensburg, where Peringer II (1177–1201) built an approximately 3 km long aqueduct around 1200, which conveyed water from a distant spring to the monastery. The tombstone of the abbot, who died in 1201, also commemorates this extremely important facility, specifically mentioning the lead pipeline: *obiit sanctae memoriae Perngerus abbas huius loci, qui fecit aquaeductum plumbeum.* The original stone troughs of the Regensburg aqueduct have survived to this day, but the lead pipes inside were replaced around 1580 *(fig. 8. 5).*[29] The excavations did not yield lead pipes inside the early aqueduct of the Pilis monastery, but these may as well have been removed from the stone conduit damaged in several sections either already in the medieval period, or at the time of the destruction in the 16th and 17th centuries. In principle, we can also imagine that here the relatively short pipeline with a significant inclination was designed without a pipe as it was considered sufficient to thicken the troughs to maintain pressure and leak-tightness. This may be confirmed by the fact that the troughs were covered in some places with a thick layer of limescale on the inside. It is an important observation that the masonry surrounding the troughs contains pieces of roof tiles in addition to small stones, which is another proof of that the first tiling of the building (complex) took place in the Árpádian period.

On leaving the corridor of the lay brothers' wing, the aqueduct turned eastwards and crossed the western walkway of the cloister through its foundation and entered the court of the monastery. László Gerevich uncovered a relatively long, intact section of the aqueduct in the court *(fig. 10A–A)* where it descended 29 cm in 7.5 m (i.e., about 4 cm in 1 m). The aqueduct passed along the north side of the fountain house, where – according to a drawing made by Péter Gerecze – a short section branched off at a right angle to the main line and led towards the inside of the fountain house. It was not discovered during the excavation led by László Gerevich, so the drawing made by Gerecze was projected onto the excavation plan. In the absence of concrete evidence, the assumption recorded by László Gerevich in the excavation notebook, namely that the short

[27] *Gieß 1999.*
[28] *Raynaud – Wabont 1998* 72.
[29] *Regensburg 1995* 142–144; *Reidel 1999; Liebert 2015* 30.

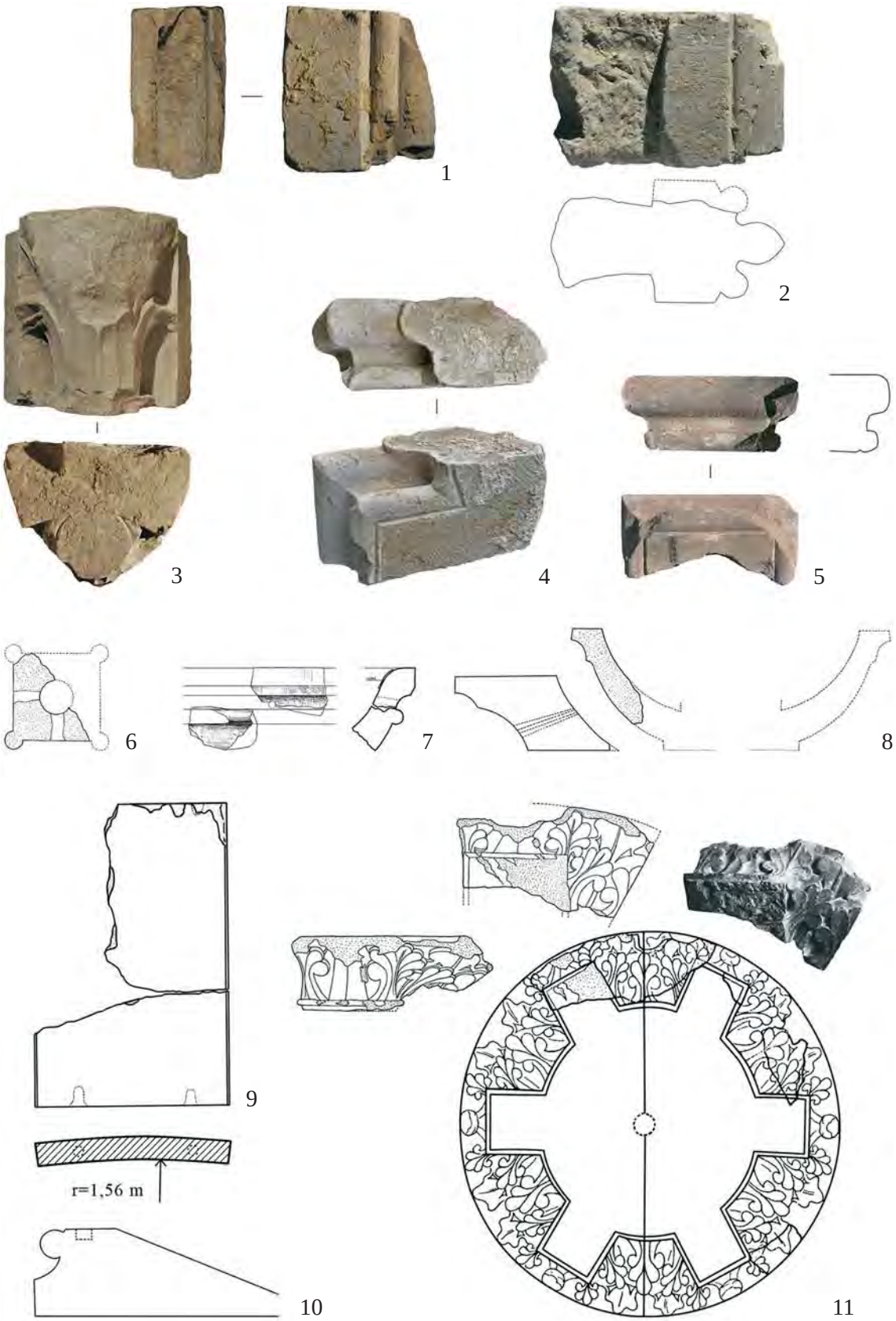

Fig. 6. 1–11. Pilisszentkereszt-Klastromkert, the 13th-century fountain house and the carved stone fragments of the fountain in it
(Surveys: Endre Egyed, Sándor Ősi, and Elek Benkő; photographs: Elek Benkő)

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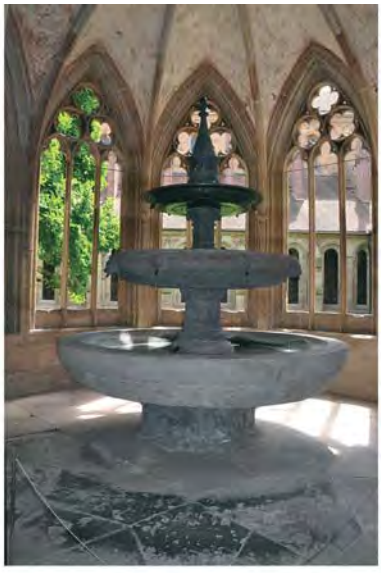

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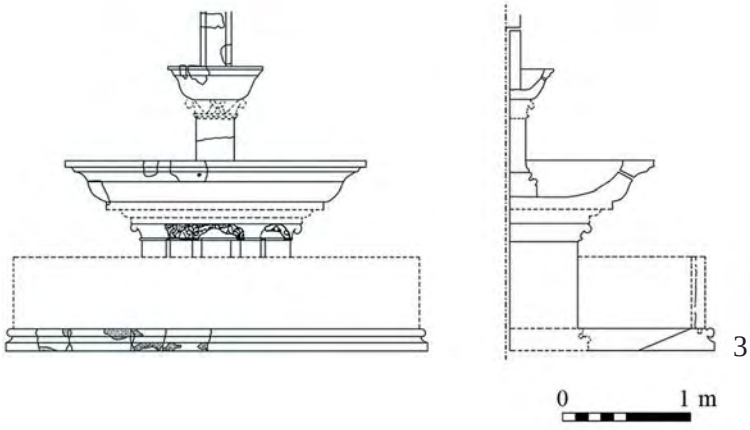

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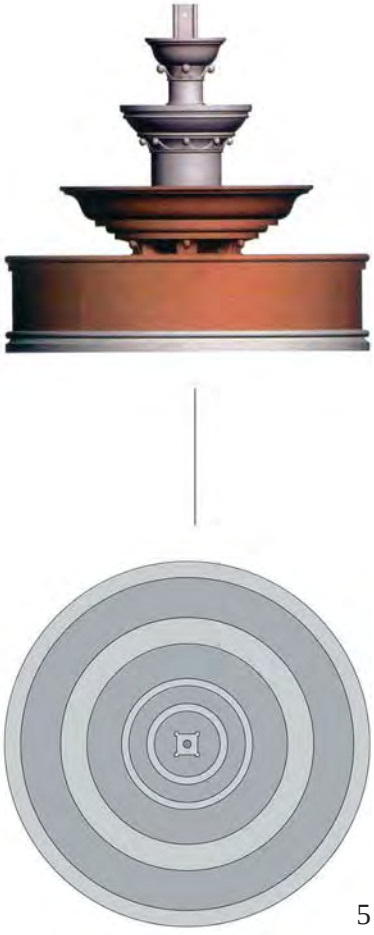

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Fig. 7. 1–2. Maulbronn, Cistercian monastery, fountain house and *lavabo* (Photographs: Elek Benkő); 3. The reconstruction of the fountain in Pilis Abbey (after *Takács 1992*); 4. The heavily damaged remains of the fountain house at the time of the excavations led by László Gerevich (Photograph: Tibor Kádas); 5. A modified reconstruction of the fountain (after *Takács 2007*)

section of conduit heading for the middle of the fountain house may have had some kind of closing mechanism, cannot be substantiated – although it seems probable.

The conduit in which clean water flowed under pressure did not terminate at the fountain house, but continued on to the walls of the cloister walkway facing the garden. Getting there, it turned southwards at a right angle, and then it ran to the south-east under the calefactory, which was added to the building complex subsequently. Its continuation has not been unearthed, but based on the floor plan it obviously fed into the large vaulted channel leading the water of the artificial lake towards the latrine *(fig. 10)*. In terms of its function, this section must have served as an overflow outlet for the continuously flowing lavabo in the fountain house. At the same time, it is also conceivable – although there is no concrete evidence for it – that there was one more access point of water supply for the kitchen at the final section of the aqueduct.

On the east side of the fountain house, the bottom of the stone trough of the aqueduct ran about 1 m below the late medieval pavement and gradually deepened in the direction of flow. The aqueduct leaving the cloister to the south was found 150–160 cm deeper than the late Gothic surface (355.77 m).

The stone aqueduct needed maintenance or thorough cleaning in the mid-14th century at the latest. In the late medieval period, a wide ditch was dug in the south walkway of the cloister to access the aqueduct. Subsequently, the stone conduit was covered with mortar, which comprised fragments of roof tiles and floor tiles *(fig. 8. 1–2)*. A brick (4×12×24 cm) was also discovered there. The backfill of the trench also yielded plain and patterned floor tiles from the 14th century. It was observed that the stone laid on the stone trough had once been broken. The original yellow mortar joining the troughs seemed identical to the mortar used in the wall foundation of the cloister and clearly differed from the white mortar used in the wall surrounding the stone channel. It was filled with soil mixed with loam.

Archaeological excavations carried out in the Benedictine monastery of Blaubeuren (Baden-Württemberg) brought to light a close analogue to the Pilis aqueduct in terms of the direction of the conduits. Similar to the latter, the aqueduct to the late medieval (1482) fountain house came from the direction of the lay brothers' wing in the west. Then, running below the dormitory, it continued its way eastwards, in the direction of a nearby stream.[30]

Unfortunately, the excavations did not solve one of the fundamental questions concerning the early aqueduct: how was wastewater drained from the fountain house? No such pipeline was found in the heavily disturbed area, although it certainly existed. Moreover, there must have been a sewer not only in the Árpádian period but also in the late medieval period, as the fountain house operated continuously until the destruction of the monastery in the 16th century. In our view, this early sewer must have run roughly along the later pipeline constructed of ceramic pipes (more on this below). We observed that this late pipeline followed at several points the track of an earlier stone channel constructed for the gravity-based drainage of wastewater without pressure, which also headed for the Árpádian-period gatehouse built on the eastern side of the abbey. Its approximate path can therefore be reconstructed with the help of the later ceramic pipeline *(fig. 11)*. We assume that, similar to the ceramic pipeline, the early sewer left the fountain house on the eastern side after collecting the water flowing at the bottom of the lowest stone basin. Then, passing under the eastern walkway of the cloister and the eastern building block of the monastery, it ran in a sloping terrain through the inner courtyards of the abbot's wing towards the gatehouse. Its structure differed significantly from that of the stone trough construction transporting drinking water. It was a rectangular channel composed of columnar blocks of stone (inside width: 18 cm, height: 22 cm). The channel had no mortar or masonry on the outside. The silt and limescale found in it suggest that the wastewater flowed freely in it. At the south-west

[30] *Simon 1997* 223.

corner of the gate, the sewer broadened into a shaft built of ashlars (inside width: 50 cm, height: 55 cm) and covered with large stones on top *(fig. 11)*.[31] It was presumably made to settle and clean the sewage, but it was clearly neglected towards the end of its use. It is filled with silty soil mixed with debris with a thick layer of limescale on top of it. The section of the sewer excavated next to the gatehouse yielded 13th-century and late medieval pottery, the shoulder fragment of a small bronze bell (with a small detail of an inscription framed with a band of intertwining strands) dated to the 13th/14th century.[32] The slightly used water flowing from the fountain house arrived in the southern room (kitchen?) of the gatehouse. However, the excavations did not reveal how the water was used there, and they did not discover either how its track continued outside the monastery walls towards Dera stream. Late Árpádian-period finds yielded by the sewer suggest that this section was indeed part of the early system that drained from the fountain house and was used for a long time, as evidenced by late medieval finds. It was laid clearly deeper than the late ceramic pipeline, which run just below the medieval ground surface.

Aqueduct made of roof tiles suitable for monk-and-nun roofing

North-west of the fountain house, in the monastery garden, there was a short section of the aqueduct assembled from arched roof tiles turned towards each other *(fig. 8. 8–10, fig. 9. 13–14)*. It ran somewhat to the north of the previous aqueduct as if they wanted to direct the drinking water of the fountain house on a new route with a new pipeline. The large, thick roof tiles (length: 64.7–67.5 cm) suitable for monk-and-nun roofing did not show any sign of previous use. No trace of mortar or limescale could be seen on them, either. Similar pieces have not been found anywhere else during excavations carried out in the Pilis, where the local tradition of monk-and-nun *(Klosterziegel)* roofing cannot be demonstrated, even though a considerable number of roof tile fragments came to light. However, they all belong to rectangular, flat tiles as well as semi-cylindrical tiles, which were different from the arched tiles above. The semi-cylindrical tiles were laid over the joints between the raised sides of the flat tiles. The pieces above appear to have been acquired specifically for constructing a new section of the aqueduct.

Of course, an aqueduct assembled of arched roof tiles laid down and turned towards each other without fixing them together could not be used on its own. (In this part of the monastery, we cannot expect the drainage of sewage or rainwater. Furthermore, a channel assembled without mortar would not have been suitable for this either). Therefore, we assume that the roof tiles put together may have originally protected a new lead pipeline from external damage. It could carry drinking water on a new route to the point where the short section branched off at a right angle towards the inside of the fountain house.

The excavated part of the aqueduct inclined downwards about 8.7 cm per meter in the direction of the *lavatorium*. Its peculiarity (which we will also see in the case of the ceramic pipeline below) is that, unlike the previous stone conduit, it runs at a strikingly shallow depth compared to the late medieval ground surface. Only the part next to the fountain house is known but the section the Klastrom spring mentioned above is not. Therefore, we neither know the exact track nor the way this new pipeline ran through the foundation walls it crossed.

The age of the pipeline can be determined approximatively on the basis of the roof tiles, which unfortunately can only be dated within a wide range. The pieces that are broad at one end and have a gradually tapered, narrow termination at the other end (the shape of which allows a more precise and firm fixing) do not belong to the earliest (11th–13th-century) horizon of the medieval

[31] *Holl 2000* 213, Taf. 24. C–C.
[32] *Holl 2000* 106, Abb. 38. 3.

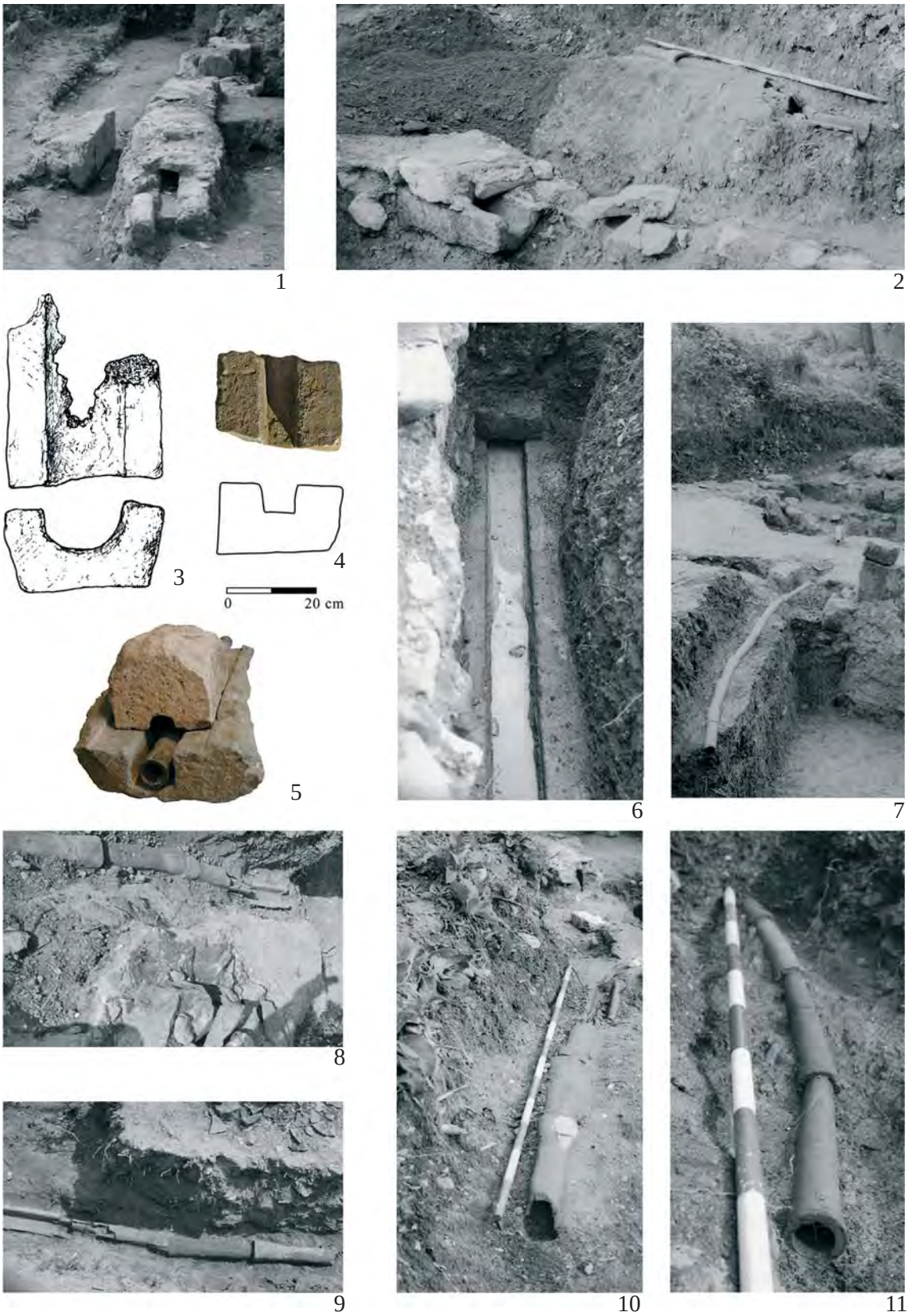

Fig. 8. 1–2, 6–11. Pilisszentkereszt-Klastromkert, sections of the medieval aqueducts (Photographs: Lajos Sugár and Tibor Kádas); 3–4. Carved stone elements of the 13th-century aqueduct (Drawing: Endre Egyed, photograph: Elek Benkő);
5. a section of the Regensburg aqueduct, circa 1200 (Photograph: Elek Benkő)

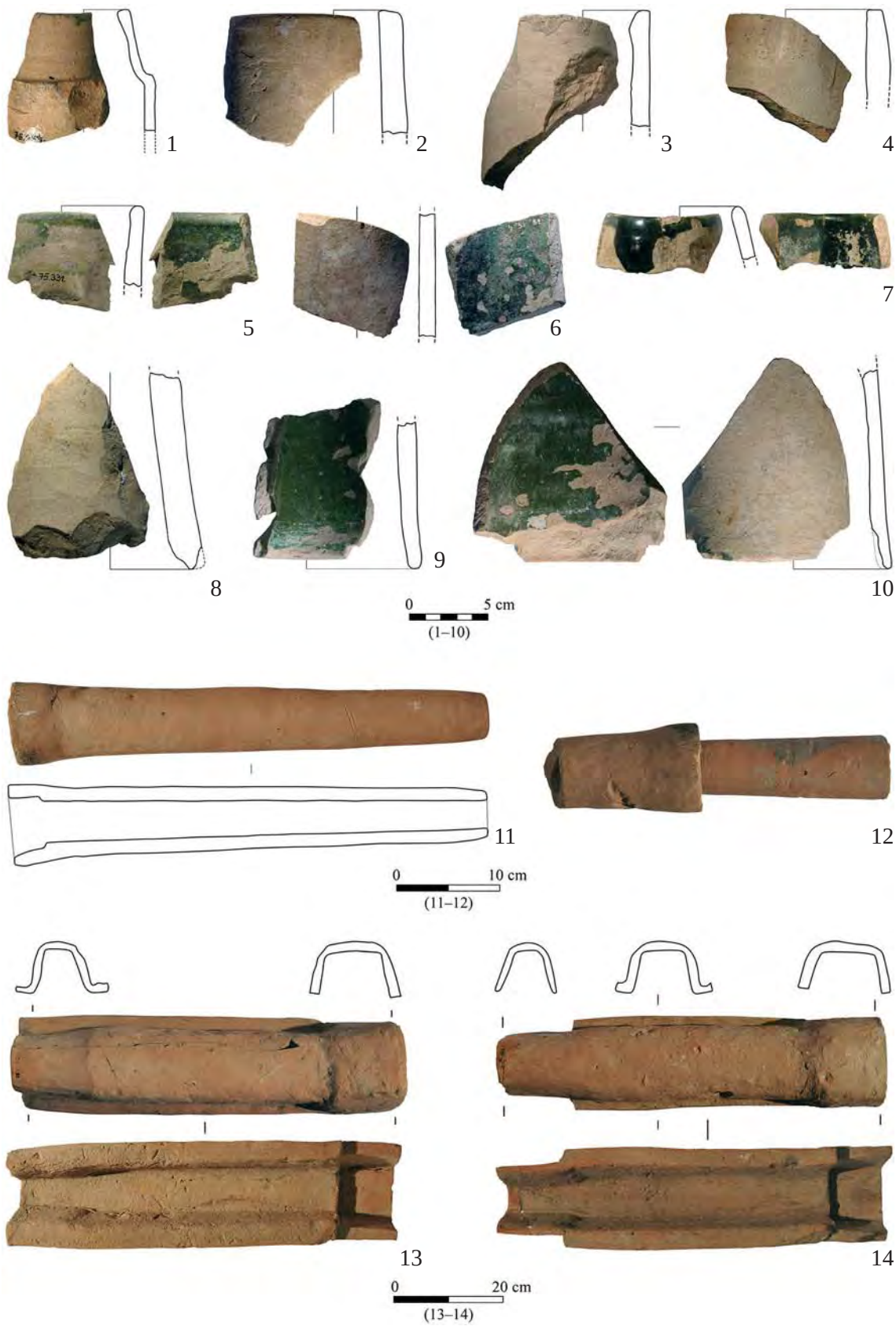

Fig. 9. 1–10. Pilisszentkereszt-Klastromkert, fragments of late medieval glazed ceramic pipes; 11–12. late medieval ceramic pipes without glaze; 13–14. 14th-century (?) roof tiles used for aqueducts (Photograph: Elek Benkő)

arched tiles.[33] According to scholarly literature, their earliest dated analogues come from the period between the late 13th and late 14th centuries[34] and remained in use to the modern period. In the vicinity of the Pilis monastery, similar but not exactly identical items were used to cover the 14th-century church chancel of the Pauline monastery in Kesztölc-Klastrompuszta.[35]

A new aqueduct made of ceramic pipes

In the decades before the monastery was destroyed in the late fifteenth or early 16th century, the entire aqueduct was renewed after the lead pipes in the old channel probably decayed and the drainage section was also clogged with scale and sediment. Fragments of several wheel-thrown ceramic pipes of light red or light brown material covered with green glaze on the inside have been found from this period *(fig. 9. 1–10)*. These pieces were discovered in the area extending from the wing of the lay brothers on the western side of the cloister to the eastern walkway of the cloister and the fountain house, but some were also discarded to the late medieval rubbish heap next to a more distant workshop. We cannot determine the length of the pipes from the small fragments, and no archaeological observation has been made as to the exact track along which they were laid, but the individual fragments were scattered roughly in the area where the drinking water was supposed to reach the quadrangle from the spring. The stray finds represent various types, but it is a common feature of theirs that they taper at one end after a sharp shoulder (outer diameter: 6–8.8 cm) and widen evenly at the other end (outer diameter: 10.6–14.8 cm). At their tapered end, where the pipes are the narrowest, the diameter is 4.6–6.4 cm on the inside. Due to the lack of context, we could not determine the exact age of the stray fragments, but based on their material and glazing they are clearly late medieval (from the 15th–16th centuries).

In the late medieval period, not only the track and structure of the drinking water pipeline leading to the fountain house changed but a new pipeline running from the fountain house through the abbot's wing to the gatehouse was built, too *(fig. 8. 7, 11, fig. 11)*. It transported wastewater through the gatehouse to the stream on a sloping terrain, without pressure. In this case – as far as can be ascertained from the incomplete excavation observations – the track did not change significantly, but the channel with a square cross-section made of stone slabs was replaced by a pipeline consisting of 44.1–45.4 cm long ceramic pipes fit into one another. The smallest inside diameter of the ceramic pipes was 2.6–2.7 cm. All the pieces were unglazed *(fig. 9. 11–12)*. There is no evidence for the use of mortar where the pipes were joined,[36] but it was observed that the pipeline leaving the fountain house was surrounded by a 10–20 cm thick layer of clay. The track of this new ceramic pipeline only roughly followed that of the stone conduit. When it was laid, the subsequent cutting through of the thick wall foundation was avoided as much as possible and the pipes were rather led through the entrances. Additionally, it ran along the corridors and across the inner courtyards of the abbot's wing on the east. Its foundation ditch was clearly shallower than that of the earlier stone conduit. The pipes ran strikingly high in late medieval debris, just a little below the contemporary ground surface, which is clear evidence of the late origin of the ceramic pipeline. It descended 6.5 cm per metre in the monastic court that had a horizontal ground surface. Several parts of the pipeline were subsequently disturbed.

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[33] *Goll – Knapp 2008; Morel 2009; Kruse 2014.*

[34] *Claus 1997* 44.

[35] *Kovalovszki 1992* 196, fig. 8. 2.

[36] During the careful construction, thin mortar was poured onto the ceramic pipes of the medieval pressure pipeline in the trench lined with stone tiles. As a result, the aqueduct was solidified into a uniform, pressure-resistant block. *Wild 1992; Bingener – Flosdorf – Haasis-Berner 2002* 34.

It is conspicuous that the unglazed ceramic pipeline draining water from the fountain was made with a much narrower cross-section than the previous stone conduit. Moreover, it was even narrower than the pipeline made of glazed ceramic pipes that seemed to be contemporary. It is uncertain whether this was due to the decreasing water yield of the springs, or to the fact that, in the late medieval period, water was also led to the kitchen and the wing of the lay brothers – along a still unknown track – and thus only little water was left for the fountain standing in the cloister, which could now be transported in a pipeline with such a small cross-section to the lower-lying abbot's wing and the gatehouse.

The ancient technique of aqueducts made of ceramic pipes emerged sporadically in the 11th century but became more commonly used in the monastic water supply system after 1200 (e.g. in the Cistercian monastery of Maubuisson,[37] around 1238; in the Dominican monastery of Zurich[38], in the mid-13th century; in the Cistercian nunnery of Alzey,[39] in the 13th century). Beginning with the 13th and 14th centuries, it also appeared in urban use (Siegen) as a much cheaper alternative for lead pipes.[40] However, the majority of the examples date from the late medieval and modern periods.[41]

According to the excavation notebook of László Gerevich, this ceramic pipeline was established as late as the 16th century, but this has not been evidenced in more detail. Based on our current knowledge, we do not have data for more precise dating within the period between the 15th and early 16th centuries. We can, therefore, only guess whether the modification of the water supply system may be connected to one of the major, late medieval constructions of the Pilis monastery (like the construction of buildings in the abbot's wing during the reign of King Sigismund), or it was – with more likelihood – the indirect effect of reforms that ended the 15th-century decline of the Pilis monastery (1478: measures taken by King Matthias to reform the Cistercian monasteries in Hungary, 1494: measures taken by the Cistercian abbot of Heiligenkreuz in Pilis). Here, we refer primarily to the archaeologically observed constructions of the abbot's wing by Stephen, the abbot of Pilis (1497–1512), which must have included the renewal of the old water supply system with great likelihood.[42]

When summarising our observations, it should be emphasised that the reconstruction of the water conduit system of the Pilis monastery – although it tried to rely on archaeological data that seemed accurate – was based on the incomplete observations and records of excavations that were not up-to-date even according to contemporary standards, and thus it has many missing details or elements that need to be modified in the future *(fig. 11)*. Nevertheless, it can be stated that the two 20th-century excavations carried out in Pilisszentkereszt brought to light the most complex monastic water supply system of Árpádian-period Hungary,[43] where the functions and the network of pressure pipelines and sewers can be reconstructed relatively well, together with late medieval repairs and additions. Since the abbey was destroyed in the 16th century, its water conduit system was not modified in the early modern period. Thus – apart from the early modern disturbances and the systematic demolition of the walls – the medieval conditions could be studied more distinctly. Unfortunately, this rare opportunity could not be fully exploited due to the poor excavation technology employed.

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[37] *Benoit – Wabont 1991* 185.
[38] *Wild 1992*.
[39] *Grewe 1991* 34; *Kosch 1991* 106.
[40] *Bingener – Flosdorf – Haasis-Berner 2002*.
[41] *Zäschke 1981; Nagy –* Čurný *2011.*
[42] *Békefi 1891* 267–274; *Benkő 2007* 26–27.
[43] Recent archaeological research in Hungary has focused primarily on medieval towns, especially Buda *(Végh 2011)* and Székesfehérvár *(Siklósi 2003; Kolláth 2021).*

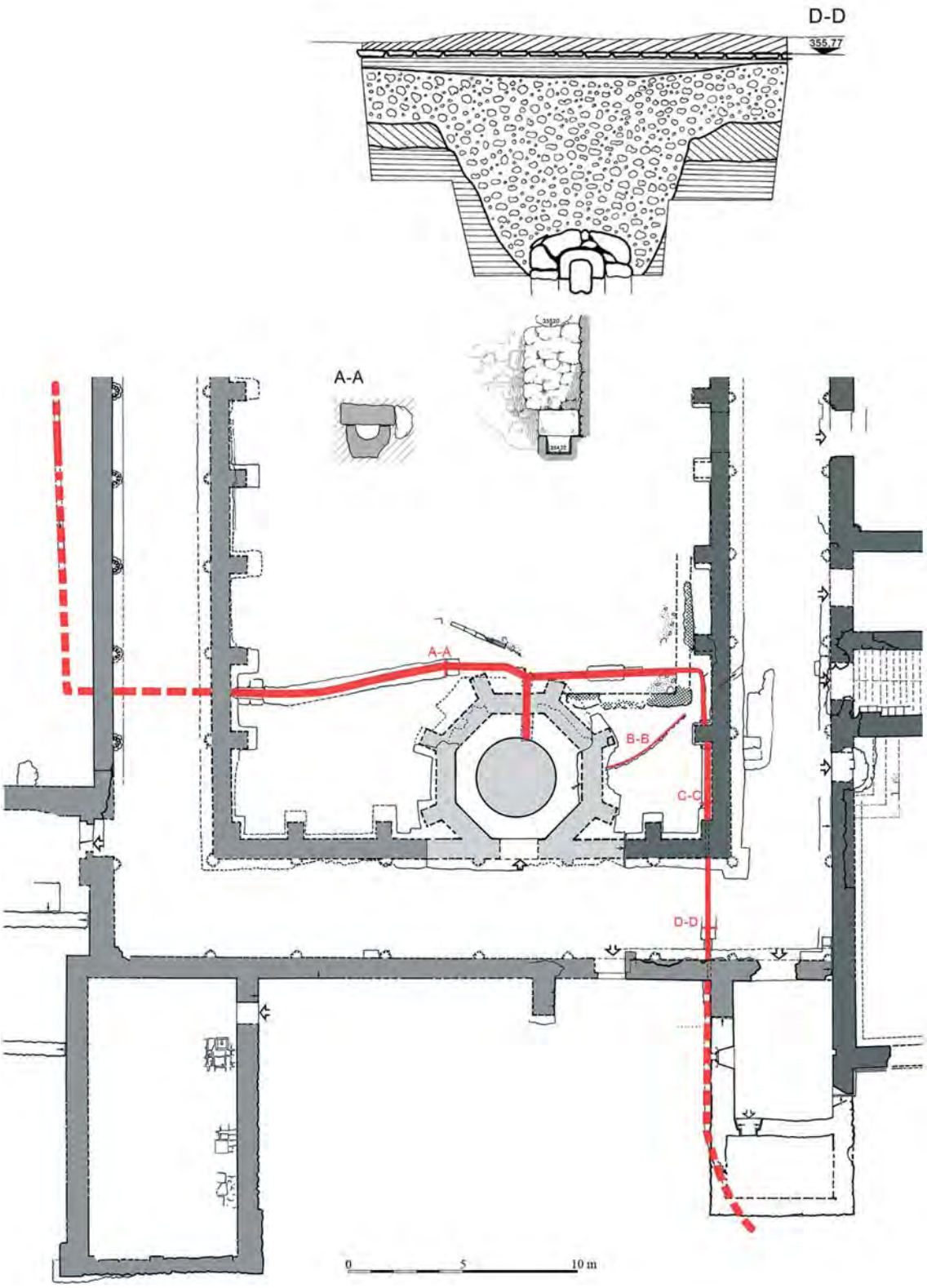

Fig. 10. Pilisszentkereszt-Klastromkert, the cloister garden, with the construction periods of the cloister and the fountain house, as well as the line of the 13th-century (A-A, C-C, D-D) and the 15th–16th-century (B-B) aqueduct
(Designed by Elek Benkő after the surveys by Endre Egyed)

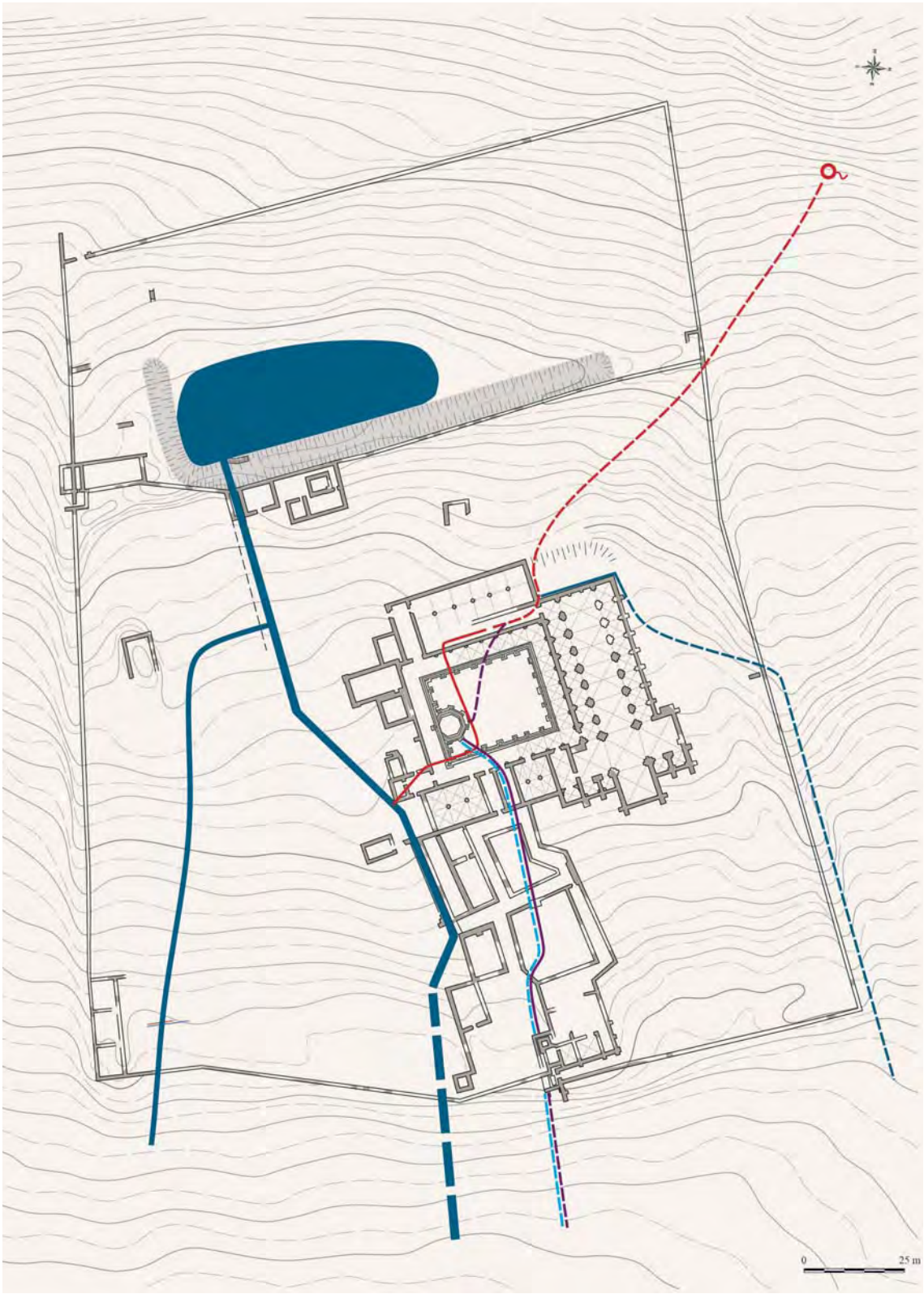

Fig. 11. The reconstructed system of water channels belonging to Pilis Abbey.
Dark blue: the drainage of rainwater from the western façade of the church (13th century) and the runoff of water from the artificial lake (14th–16th centuries); red: drinking water coming from the Klastrom spring (13th century); purple: the expansion of drinking water pipelines (14th century?); light blue: drinking water pipeline towards the abbot's wing (15th–16th centuries)
(Designed by Elek Benkő after the survey by Endre Egyed)

Compared to the similar facilities of major Western European ecclesiastical institutions (e.g. Canterbury[44]), including the most prominent Cistercian abbeys (Eberbach,[45] Maulbronn[46]), the water conduit system of the Pilis monastery can be regarded as a modest establishment – although it is an outstanding architectural achievement with royal foundation and support (unfortunately, due to the lack of local research, a comparison with similar Cistercian monasteries in Hungary is not yet possible). It was fundamentally constructed for supplying water to the fountain house built in the cloister and the separate wing built for the abbot. According to our present knowledge, no running water was led to the wing of the lay brothers, the kitchen, and the – only little-known – infirmary, although this picture may be altered by future excavations. This may also have been in connection with the relatively low number of monks and lay brothers. The situation was simplified by the geological and topographical conditions, such as the close proximity of the karst spring abundant in water and the artificial lake, and the sloping of the terrain towards the valley. These considerably aided the construction of aqueducts and sewers, and the nearby fast-flowing stream could carry away all the wastewater of the monastery. Interestingly enough, the frost line was not taken into consideration when the late medieval ceramic pipeline was laid down. This may have been caused by the hasty and superficial work, as well as the assumption that the constantly running water could not freeze at such shallow depths in an average winter. The refinement of the details of the Pilis water supply system and the complementing of the overall picture obtained so far is only possible through authenticating excavations.

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[44] *Grewe 1991b.*
[45] *Liebert 2015.*
[46] *Seidenspinner 1989; Seidenspinner 2010;* on the question, in general: *Schich 1999; Rüffer 2017.*

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THE MATERIAL CULTURE OF URBAN PRAGMATIC LITERACY IN MEDIEVAL HUNGARY[1]

Zusammenfassung: Der vorliegende Beitrag kombiniert die Ansätze der Erforschung materieller Kultur und die Geschichte der pragmatischen Schriftlichkeit, um die Relevanz der Materialität für die Etablierung des Vertrauens in das Schreiben herauszustellen. Es stellt die maßgebende Rolle von Objekten, Materialien und Räumen in der Verwirklichung der mittelalterlichen „dokumentarischen Revolution" in städtischen Kanzleien und Gesellschaften am Beispiel der königlichen Städte des mittelalterlichen Ungarns dar. Die Analyse der Entstehung der städtischen administrativen Schriftlichkeit hat ihren allmählichen Charakter gezeigt. Jeder Schritt stellte neue Herausforderungen und verlangte neue Formen der Glaubwürdigkeit auf institutioneller und materieller Ebene. Die Erwerbung und Aufbewahrung der städtischen Privilegien bedeutete die erste konkrete Begegnung mit dem Schreiben auf Gemeindeebene. Danach, die Etablierung der Bedingungen für die örtliche Produktion ähnlicher Dokumente benötigte die Existenz eines Stadtsiegels als Symbols der Gemeinde, und der vertrauten Person des Notars, zusammen mit der Beschaffung ausreichender Mengen an Schreibmaterialien und Geräte. Hinzu kam die Einführung von Papier, einer neuen Ressource, die die materielle Voraussetzung für die Einrichtung von Städtebüchern, einem spezifisch urbanen Genre für die Aufzeichnung von gemeinschaftlichen Angelegenheiten darstellte. Städtebücher als ein neues Format ohne Siegel und die formalen Elemente von Urkunden verlangten Vertrauen auf einer höheren Ebene. Schließlich boten die Archive und ihre Einrichtungen neuartige Mittel zur Geheimhaltung und Aufbewahrung der städtischen Dokumente. All dies lässt uns die Verflechtung von Materialität und pragmatische Schriftlichkeit auf zwei Ebenen erkennen. Einerseits machte es die Entwicklung der städtischen pragmatischen Schriftlichkeit notwendig, Schritt für Schritt neue Elemente der materiellen Kultur in den städtischen Kontext zu übernehmen. Andererseits spielte Materialität eine aktive und dynamische Rolle bei der Produktion des geschriebenen Wortes und trug zu dessen sozialer Einbettung und Akzeptanz wesentlich bei.

Keywords: materiality, trust in writing, urban autonomy, charters, seals, notaries, paper, municipal books, bookbinding, archives, medieval Hungary

Literacy and materiality

When we see the word "writing", we tend to focus on the content rather than the form, the material, or the mechanical movements that created it. Likewise, the history of literacy is usually considered part of intellectual or administrative history. Related scholarship concentrates mostly on the information preserved and transmitted by writing, be it by handwriting, printing or electronic forms, or on persons and institutions involved in the process. The materiality of writing and its safekeeping may have been too obvious to capture historians' attention until very

[1] While writing this article, the author was Senior Research Fellow at the "Religion and Urbanity: Reciprocal Formations" (FOR 2779) research group of the Max Weber Center for Advanced Cultural and Social Studies at the University of Erfurt and member of the 'Lendület' Hungarian Economic History Research Group of the Hungarian Academy of Sciences.

recently, when the profound changes brought about by digitization directed our attention to "the world we have lost".[2]

Archaeology has by its nature taken a different approach to matters written. Even if only a minority of excavated objects or features carry writing or are connected to its production or storage, archaeology has profoundly influenced our way of understanding the significance of the written word for pre-modern societies. It has also allowed us to trace the presence of written culture in contexts where writing itself has perished. Such an investigation was conducted by Elek Benkő, the jubilant of this volume, regarding the Cistercian monastery of Pilis, a 12th-century royal foundation in the heartland of the Kingdom of Hungary. His masterly study uses book clasps and other book fittings to reconstruct, if not the contents of the forever-perished volumes, but the networks of trade contacts and supply systems that the monastery was part of.[3] The results help us set Pilis in a web of monastic written culture and raise the possibility of the presence of a monastic scriptorium. This study inspired the present essay to expand the inquiries into the materiality of literacy in a different social context, that of the royal towns of medieval Hungary and their civic communities.

Elek Benkő's and Péter Barkóczy's article fits into welcome new trends both in archaeological and textual scholarship. The former is exemplified by Moreland's pioneering monograph, 'Archaeology and Text', including, but not restricted to, examples from medieval Europe[4] and the initiative of the *Institut für Realienkunde des Mittelalters und der frühen Neuzeit* in Krems to consider texts as objects of everyday life.[5] The potentials of building-archaeological research for revealing artefacts with writing have been highlighted by Birgit Kata's studies.[6] Further impulses are provided by the results of major research projects running to date such as the "Material Text Cultures. Materiality and the Presence of the Written in Societies Prior to Printing" at the University of Heidelberg,[7] and the Medieval Literacy Platform at the University of Utrecht.[8] The proceedings of the conference "Transforming Information: Record Keeping in the Early Modern World" also directed due attention to the material aspects of their subject.[9]

On another note, the Utrecht project has been instrumental in pointing out the importance of trust in writing as a factor in the growing acceptance and use of literacy in the legal and administrative realm.[10] This approach builds on the work of several generations of social scientists and historians who established the fundamental role of trust as a "mechanism for reducing social complexity"[11] and on the subsequent adaptation of this concept as an analytical tool to pre-modern urban societies.[12]

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2 Historians of ideas have remarkably "immaterialized" all subjects connected to writing. For instance *Foucault 2002* 145, defined archives as "the law of what can be said, the system that governs the appearance of statements as unique events".

3 *Benkő – Barkóczy 2017.* Elek Benkő's co-author, Péter Barkóczy contributed with the chemical analysis of the metal finds.

4 *Moreland 2001.*

5 *Brunner – Jaritz 2003.*

6 *Kata 2003.*

7 Materiale Textkulturen. Materialität und Präsenz des Geschriebenen in non-typographischen Gesellschaften. Sonderforschungsbereich (SFB) 933, Universität Heidelberg, https://www.materiale–textkulturen.de/ (last accessed October 31, 2020). From among their publications see e.g. *Meyer – Schultz – Schneidmüller 2015.*

8 The series curated by the platform, the Utrecht Studies in Medieval Literacy (USML) dedicated several volumes to the materiality of script and writing, e.g. *Wilcox 2013; Barret – Stutzmann – Vogeler 2016.*

9 *Walsham 2016; Corens – Peters – Walsham 2018.*

10 *Weltecke 2008* and other contributions to the same volume.

11 *Luhmann 1979;* the original German title published in 1968 was: *Vertrauen: Ein Mechanismus der Reduktion sozialer Komplexität.*

12 *Reynolds 2012; Blockmans 2010.*

The present essay sets out to combine the frameworks briefly outlined above and to point out the relevance of materiality for achieving trust in writing, using the case of royal towns in the medieval Kingdom of Hungary as an example. In other words, it will investigate the contribution and agency of objects, materials and spaces in realizing the medieval "documentary revolution" in urban chanceries and societies in a realm of East Central Europe that represented the eastern borderland of Latin Christianity. In doing so, I will follow the intellectual path laid out by Moreland: "I will critically assess what we mean when we talk about applying 'agency' and 'materiality' in our studies of the early medieval period, and ask whether adopting these perspectives will help us to understand better that past *in its own terms* – or whether they will make such understanding even more remote."[13]

Urban administrative literacy, step by step

Around the turn of the first millennium, when the Kingdom of Hungary joined the community of Christian states, the Carpathian Basin was sparsely inhabited. Accordingly, urban development also started relatively late. Archaeologists often distinguish between a "pre-urban" development phase of old cultic, administrative and trading centres, and an "urban" phase of later towns. I would be reluctant to subscribe to this terminology since the early centres also fulfilled urban functions in their own environment. However, it would be appropriate to call them "pre-literate" since reading, writing, and written administration played a very minor role, if at all, in their internal life and external connections. This was one of the features that changed gradually, but significantly in the second phase of medieval urban development, which led to the emergence of fully-fledged towns during the 13th and 14th centuries. In these towns, the use of writing became part of everyday practice for an increasing proportion of the population.

The analysis of the appearance and diffusion of urban administrative literacy has revealed not only its relatively late appearance compared to, for instance, monastic literacy, but also its gradual character. From acquiring urban autonomy and having a municipal seal that enabled the towns to issue authentic documents to the appearance of civic archives, one can identify several distinct steps, each of which represents a new and higher degree of trust in writing and the expansion of its use.[14] At the same time, each step was shaped by specific conditions of materiality, and immaterial as well as material consequences. In what follows, I will explore the new challenges and the material solutions to them in the subsequent steps.

The acquisition of municipal liberties and autonomy

The development of municipal literacy had to start with the acquisition of municipal liberties. Town privileges were standard elements of medieval legal practice from the high medieval period onwards. Max Weber's thesis that "at least partial autonomy" was among the main defining criteria of towns has become an axiom of urban research. In the Kingdom of Hungary, this process began in the early 13th century, first as a sort of development policy where the charters laid down the rights and duties of new settlers called "guests" *(hospites)*, both migrating from abroad and moving within the country. The main issues regulated were autonomy and the right of jurisdiction over the members of the community; economic privileges; and ecclesiastic privileges, namely electing their parish priest. These liberties were then transferred to inhabitants of other, already well-established settlements in the centre of the kingdom. Until the Mongol invasion of 1241/42, ten such charters have come down to us as originals or in later transcriptions. After this enormous

[13] *Moreland 2017* 218.
[14] *Szende 2018*.

cataclysm, the process of social transformation accelerated and by the end of the 13th century, a further 38 such charters have been preserved, with more to follow in the 14th century.[15]

Few things are more immaterial than the concept of liberty, but its acquisition and leverage by the communities had several tangible concomitants. The conveying of liberties took the physical form of a royal charter. In fact, for most of the inhabitants of the privileged settlements, the charters were "best considered as written objects rather than as texts".[16] The safeguarding of these objects was vital for the community. Among the preconditions to the authenticity of a donation charter or any other legally binding document, its physical integrity was one of the most apparent and easily controllable features.[17] Therefore, protecting that most valuable piece of parchment from damages by fire or water, or from theft was indispensable. Keeping this in mind explains why it was such an important concession to the community of Pest (part of modern-day Budapest) in their charter of 1244 (later taken over by Buda) that they were not obliged to produce the original document with the king's golden seal in court cases, but it sufficed to present a copy of it.[18]

Despite the efforts for preservation, very few of the earliest charters of privileges issued by kings of the Árpádian Dynasty in the 13th century have come down to us as originals. The earliest is the charter of Trnava (Nagyszombat/Tyrnau, Slovakia) from 1238, although without its golden bull.[19] The costs of preparing the charter were, as a rule, covered by the recipients, but we very seldom know how much money this exactly meant. A later episode in the adventurous history of Trnava's municipal charter offers an example of the expenditure involved in tis reissuing. In 1437, the town council wanted to have their municipal charter confirmed by King Albert (1437–1439) after the tribulations of Hussite rule over the town (1435–1436). As the town accounts specify, the procedure started with redeeming the above-mentioned 1238 charter from the Hussites. Next, the judge and two burghers had to visit the king in Buda after his coronation and they stayed there for five weeks to complete their mission, to present the original to the royal chancery, to pay for its confirmation and hand over their gifts to the monarch. The expenses of all this exceeded 200 florins, of which the charter itself cost 84.[20]

Exceptionally, some of the liberties awaiting the settlers could be – literally – set in stone. This rare epigraphic document on a stone slab kept to date in the Hungarian National Museum was most likely found by one of the roads leading to Buda *(fig. 1)*. It reads as follows:

Gaudeat hic sospes
veniens huc civis et ospes
ac veniam lapsi
capiant et premia iusti

Let here rejoice in protection
all burghers and guests who come;
let the fallen receive grace
and the just get reward.[21]

[15] *Fügedi 1961; Szende 2015.*
[16] This expression is borrowed here from the description of the "Acculturation to Documentary Practices" in Île-de-France in the 11th and 12th centuries in *Bedos-Rezak 2011* 22.
[17] *Guyotjeannin – Pycke – Tock 1990* 64–66, 369–370.
[18] *Kubinyi 1997* 39–41.
[19] *Marsina 1987* 30–31.
[20] *Rábik 2013* 32–34. The expenditure is noted on Fol. 60r.
[21] *Györffy 1975* 240, fig. 150.

Beyond their physical existence on parchment or otherwise, municipal liberties had far-reaching consequences on the development of urban literacy, including its material aspects. In order to make full use of the rights obtained through the charters and to comply with the duties listed in the same documents, urban communities had to familiarise themselves with the use of writing. Both for securing property rights and control over municipal land and taxation, as well as recording and following up judgments made by the municipal court, recurrence to writing and its various instruments was indispensable. It is these instruments that will be in our focus in the following steps.

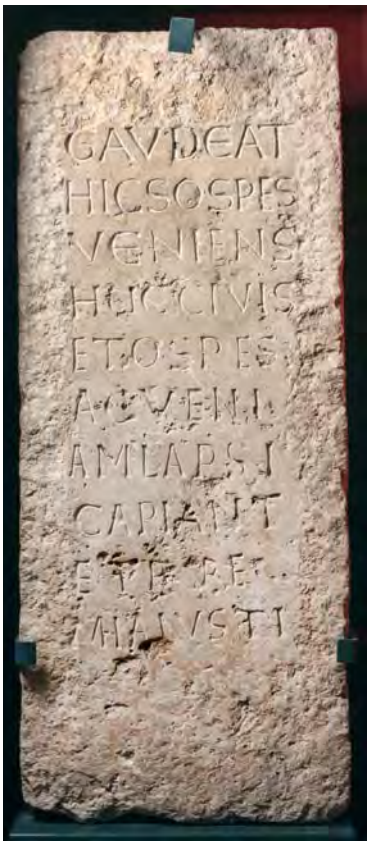

Fig. 1. Column with inscription greeting the settlers, probably in the boundaries of Buda. Hungarian National Museum, Budapest (©Photo: József Rosta)

The design and use of authentic seals

The autonomy of urban communities included their capacity to issue authentic documents concerning matters within their purview. From in the 13th century onwards, authentication was linked to the use of an authentic seal, the examples being set in Hungary by the operation of the royal chancery and the places of authentication, i.e. ecclesiastical bodies authorized to issue authentic documents.[22] Just like the liberties themselves, the right to have such a seal prepared also depended on seigniorial authorization. This principle is concisely summarized in the *Tripartitum*, the summa of Hungarian customary law compiled by Stephen Werbőczy in 1514 and printed in 1517: "In addition, cities and towns have authentic seals which kings and princes have granted them, and which confirm facts and matters which are moved and come to pass before them and in their midst."[23]

In spite of this later normative formulation, there are no 13th-century royal charters preserved that grant the use of municipal seals other than those granting municipal liberties. This may be due to the more ephemeral character of the matter (once a seal was lost or replaced, its granting became irrelevant), or it may have been sufficient to receive an oral permission or to start using a seal with the coat of arms of a community based on the customary acknowledgment of the symbol. However, some 14th-century charters allowing towns to use, renew, or authenticate seals have indeed come down to us. For instance, Sopron received Charles I's (1301–1342) approval in 1340 for sculpting a new matrix (although without describing its image): "having destroyed and abolished their old and publicly known seal let them carve a matrix for a new authentic seal".[24] Fortunately and exceptionally, the matrix mentioned in the text has survived and is still kept in the town archives of Sopron *(fig. 2. 1).*

Royal permission was even more important in case of contested authority. Louis I's charter attesting to the authority of the municipal seal of Cluj (Kolozsvár/Klausenburg, Romania) in 1377 was issued in response to a complaint by the envoys of the town, stating that the major courts and dignitaries of the realm refused to accept documents issued under their seal. The refusal was probably due to the fact that by 1377 Cluj had not yet reached the highest level of autonomy (it was granted to the town in 1405); nevertheless, the king confirmed that

[22] *Hunyadi 2003; Szende 2018* 72–83.
[23] *Werbőczy 2005 [1517]*, 242–243 (Part II, title 13, 3§).
[24] *Házi 1921–1943* Vol. I.1, 77–78.

Fig. 2. Municipal seals and seal matrices with architectonic elements,
1. Imprint of the municipal seal of Sopron, endorsed by King Charles I
in 1340 appended to a document issued on March 15, 1389,
HU MNL Sopron Archives of Győr-Moson-Sopron county, DL 276. (©Photo: József Kücsán);
2. Seal matrix of the town of Cluj (Kolozsvár/Klausenburg), 1480.
National Archives of Romania, Cluj-Napoca Branch (©Photo: Ágnes Flóra);
3. Reverse side of the seal matrix of the double seal of the Esztergom Latini, 1240s-1250s,
based on an earlier model. Hungarian National Museum;
4. Seal matrix of the reginal town of Óbuda, 1370s. Hungarian National Museum

> "Our burghers of the said *Clusuar* are allowed and authorised from now on, following the custom of our kingdom, like our other royal towns, to issue letters of advocacy under the seal of their community, on which the image of three towers is said to be sculpted, in whatever issues and causes pertaining to them, namely in court cases and lawsuits to be brought up and handled in front of any secular or ecclesiastical court of our kingdom. And we wish to attribute full authority to such letters of advocacy in our entire kingdom through the testimony of our present charter."[25] The king's intention to increase the trust in the probative value of the municipal seal added significantly to the authority of the urban community. In Ágnes Flóra's words, "[t]his was not only an important step in the development of urban literacy and the establishment of a local chancery, but it also represented one step forward towards the free status of the town, i.e. direct subordination to the king".[26] *(fig.2.2)*

The next step after receiving the royal permission in oral form or in writing was to have a matrix prepared. This was an act of utmost importance. The fact that the community had an object with a symbolic image that personified and authenticated its legal actions was one of the most significant manifestations of its corporate existence and the trust in its corporate decisions.[27] Despite the destruction or possible melting down of municipal seals, a number of seal matrices of medieval Hungarian urban communities have come down to us. Their survival may have been a result of institutional continuity and the preservation of the pertaining archives. A systematic cataloguing of all extant seal matrices is a desideratum of Hungarian research on sphragistics that the current study cannot solve. Only a few selected highlights will be presented that shed light both on the material aspects, and the role of seals in the display of power.

Pride of place is taken by the two gilded bronze matrices of the double seal commissioned by the *Latini*, the Romance-speaking (Walloon) settlers of Esztergom *(fig.2.3)*. The original design presumably dates from the 1220s or 1230s; the extant piece was restored to the community in the 1240s or 1250s, after the Mongol invasion.[28] The matrix of the obverse bears the royal coat of arms of the Árpádian Dynasty, the reverse depicts an elaborate town wall with four bastions and a large gate decorated with iron bars, flanking a tripartite palace-like building with tracery windows. This scene is situated by a riverside, presumably the Danube, replete with fish, also a reference to the material realities of the time. Its legend invokes the commissioners: SIGILLVM · LATINORVM · CIVITATIS · STRIGONIENSIS, but was soon after its preparation adopted and used by the entire civic community.[29]

The other extant matrix from the *medium regni* is approximately 150 years younger than the pieces from Esztergom, although less elaborate *(fig.2.4)*. This silver object belonged to the town of Óbuda ("Old Buda", currently a district of Budapest), as indicated by its legend: SIGILLVM+CIVITATIS+VETERI+BVDENSIS. It "features an octagonal tower, flanked symmetrically by building wings. On the tower and the wings there are Gothic tracery windows. In front of the building there is a polygonal ashlar wall with a gate in the middle. On either side of the tower there is a coat of arms, on the right the Anjou Hungarian royal arms with lilies and stripes, on the left the Polish arms with the eagle, above them with tiny figures, possibly an eagle next to a

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[25] 18 May 1377, edited in *Werner – Zimmermann 1897* No. 1071, translated by the author.

[26] *Flóra 2019* 39.

[27] *Bedos-Rezak 2011* 238–252; for Hungary: *Szende 2018* 98.

[28] *Vattai 1963; Kiss 2007* 65.

[29] The earliest imprint of the double seal survived on a municipal charter from 1265: National Archives of Hungary, Collection of original documents prior to 1526 (HU MNL OL DL 76145); it continued to be used in the 14th century, the deed at the, HU MNL OL DL 6292 for instance is dated to 01.08.1375. For a comprehensive list of documents corroborated with this seal see *Vattai 1963* 39, note 8.

lily."[30] The coats of arms clearly signal that at the time of the preparation of the matrix, in the 1370s, Óbuda was under the overlordship of the Queen Mother, Elisabeth Piast. The building presumably bears some resemblance to the excavated remains of the queen's castle that stood in the town.[31]

Beside the matrices of the seals of Sopron and Cluj, mentioned above in connection with the royal grant, the seals of the mining towns are of particular interest.[32] The mining towns located in the northern and eastern range of the Carpathians (now in Slovakia and Romania) were engaged in the extraction of the most important mineral resources of the medieval Kingdom of Hungary. They rose to prominence first in the mid-13th century, under the reign of the Árpádians, when silver was the main produce; and then again from the 1320s onwards, under the rule of the Angevin Dynasty, when gold was added to the range of production and copper also gained in importance. Compared to the relatively protracted pace of the development of municipal literacy in other Hungarian urban centres, this process was swifter in the mining towns, the granting of privileges was followed much faster by the appearance of the first municipal seal, the employment of notaries, and the setting up of municipal books.[33]

Remarkably, the shape and character of the municipal seals also changed between the two major periods mentioned above. Those towns where the mines were already in operation in the "silver age", namely Rodna (Radna/Rodenau, Romania), Banská Štiavnica (Selmecbánya/Schemnitz, Slovakia), Banská Bystrica (Besztercebánya/Neusohl, Slovakia), Hybe (Hibbe, Slovakia) and Krupina (Korpona/Karpfen, Slovakia) have rounded seals with an escutcheon in the middle, and carry static images of architectonic and heraldic features as well as mining tools: the hoe, the chisel, the pickaxe and the hammer *(fig.3.1)*.[34] The conformity of the visual appearances may be due to the mining towns following a model copied from each other, or a shared practice created with the assistance of the royal chancery.

In the "golden age", the shape and imagery of the matrices and seals changed significantly, following the main artistic trends of the mid-14th century. The shapes of the seal imprints were often angular (hexagonal or octagonal) and the imagery "came to life", showing mining or devotional scenes, or the combination of the two, in an almost cartoon-line manner. The most prominent examples are Kremnica (Körmöcbánya/Kremnitz, Slovakia), Nova Baňa (Újbánya/Königsberg, Slovakia) *(fig.3.2)* and Baia Mare (Nagybánya/Frauenbach, Romania), but even the rounded seal of Telkibánya from this period depicts some mining activities. The most illuminating image on the workflow in mining is to be found on the municipal seal of Baia Mare *(fig.3.3)*, featuring "a rocky mountain with the entrance of a mine. In the cavity a miner kneels, working with a pickaxe in his left hand and a hammer in his right. At the bottom of the hill there is a lawn with pieces of ore which another miner collects with his hoe. The hillside is flanked by flowers and two four-leaved oak branches, on top of the hill there sits Saint Stephen with the coronation regalia. The legend reads: S[igillum] D[e] R[ivulo] D[ominarum] MUTVVS AMOR CIVIV[m] OPTIMV[m] E[st] CIVITATIS F[ir]MAME[n]TV[m]."[35] For the seals of Nova Baňa and Baia Mare, as well as that of Rudabánya in episcopal ownership, the matrices have also been preserved, while others are only known from their imprints appended or attached to the documents.[36]

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[30] Description by E. Kiss, in: *Benda et al. 2016* 165. Cat. 4.H.3.

[31] *Buzás 2015* 714, 718–719.

[32] I have published a detailed study on this aspect of municipal literacy and sphragistics: *Szende 2020*. The following paragraphs are based on the conclusions of that article.

[33] See Table 4 in *Szende 2018* 327 for an overview.

[34] *Szemán 1996*.

[35] Description translated from *Bándi 1982* 197.

[36] The matrices and Nova Baňa and Rudabánya are kept in the Hungarian National Museum; that of Baia Mare was kept until 2011 in the Historical Museum of Baia Mare, when it was stolen; its copy is kept in the National Archives of Hungary: HU MNL OL V 8–1170.

Fig. 3. Municipal seals and seal matrices of mining towns, 1. The municipal seal of Banská Štiavnica, 1275. National Archives of Hungary, HU MNL OL DL 923; 2. Matrix of the municipal seal of Nová Baňa, before 1348. Hungarian National Museum; 3. Copy of the municipal seal matrix of Baia Mare, c. 1350. National Archives of Hungary, HU MNL OL, V 8–1170; 4. The municipal seal of Kremnica, 1331 (©Drawing by Anna Grüll)

The seal of Kremnica, which bears the oft-debated image of Charles I or perhaps St. Catherine next to an ore-mill and a smelting furnace *(fig.3.4)*, may be conjecturally matched with some information on a well-known goldsmith of the period, Peter son of Simon from Siena, who worked on the matrix of Charles I's majesty seal and probably also on the design of Charles's first golden florin. For these services to the court, he was lavishly remunerated by a royal grant to the estate of Jamník (Jemnyk, Slovakia) in Szepes county. The spatial and chronological proximity of the donation (the Spiš/Szepesség/Zips region, where Jamník lies is in the vicinity of the Upper Hungarian mining towns) allows us to assume that besides the king's majesty seal, the Italian

goldsmith was also commissioned to prepare matrices for other seals as well, including that of Kremnica.[37]

The mining towns offer telling examples of how monarchs of different dynasties used the instruments of municipal administration in general, and the physical form, legend and imagery of the seals in particular, to assert their own authority over this strategically most important branch of the economy. In the "silver age", i.e. under the Árpádians, the royal presence can be detected through heraldic motifs, and perhaps through the uniformity of the visual appearance of the seals. The indication of royal overlordship through the coat-of-arms emphasizes the ruling dynasty rather than a particular monarch. In the "golden age", i.e. in the Angevin period, the legends as well as the imagery directly refer to the reigning king, showing his figure and his name. "Karolus" appears on the seal of Kremnica and "Ludowicus" on that of Nova Baňa, whereas on the seal of Baia Mare the figure of St Stephen is seated on top of the mountain just like King Louis I is depicted on his majesty seal.[38] The medium of the seal with its capacity to be reproduced like "printing before printing" lent itself eminently for royal propaganda.

Once the matrix was ready, seals could be prepared in beeswax of natural colour or coloured with green and red with the help of additives (Spanish wax became known only later); silk, flax, or hemp cords were used to append the seal to the document. Metal bulls appear only exceptionally in the urban context: towns were occasional recipients of golden bulls issued by monarchs, and papal bulls in lead may have ended up in their archives. Their own production was, however, restricted to wax seals. The colour of the seals was defined by royal grace: green was more prominent than the natural wax, but red was even more prestigious than green.[39] As, for instance, a royal grant to Sopron for using red wax from 1465 "like other royal towns" *(instar aliarum civitatum nostrarum)* testifies, by this time royal towns typically enjoyed this privilege.[40] Detailed studies on the uses of seals issued by urban communities would be needed to highlight the proliferation of seal matrices and their differential use, following the hierarchical structure of administration: secret seal, closing seal and private signet rings of municipal officials. From the early 14th century onward, the charters of privilege were as a rule corroborated with the big or double seal, and the patent and closed charters with the smaller or secret seal, if the community had one, or sometimes several in different sizes.[41]

Just like with charters of privilege, safekeeping was a major issue concerning seal matrices as well. The most extensive explanation on this can be found in the municipal law code of the town of Buda, the *Ofner Stadtrecht:* "Who should keep the municipal seal over the year. A German councillor has to keep both municipal seals, the small and the large, but separately; the large that one does not use for anything else than for sealing letters of privilege has to be locked up and sealed with the signet rings of at least two German burghers. The small seal has to be kept by a German councillor, locked in his chest, and the town notary should have the key to that chest."[42] Materiality apparently plays a crucial role here: signet rings, chest and keys were all there to control access to these precious objects. Trust in the seals as objects ensuring the continuity of municipal authority between changing mayors and councillors, as well as distrust in those who might have abused this instrument was equally present.

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[37] 28.03.1331: *Fejér 1832* 529–530; *Marosi 1986* 249–256.

[38] *Marosi 1987* 376–377.

[39] This issue is discussed in detail on the basis of surveying the material from market towns and seigniorial towns by *Lakatos 2019* 83–86.

[40] *Házi 1921–1943* Vol. I.5, 181–182. Data on the uses of wax colour have been collected by Tibor Neumann, who will hopefully publish an overview study on the theme.

[41] *Kubinyi 1961; Kubinyi 1972; Szende 2018* 95–98.

[42] *Mollay 1959* Cap. 53, 81. See also the handling of the seal matrices at the time of municipal elections, *Mollay 1959* Cap. 62, 84.

Issuing authentic municipal documents

Having obtained an authentic seal, royal towns started to pursue their document-issuing activity. After the first sporadic traces from the 1250s, the written output of Hungarian towns took off from the 1290s.[43] The documents were related to their external relations with the monarchs, other towns, the Church and the nobility, as well as internal affairs such as the exchange of real estate or the administering of justice. This is not the place to assess issues of content, just to make a few remarks on the outward appearance. The first documents, as it is to be expected with incipient practice, give a mixed impression as far as the sizes, the quality of parchment, the ink and the lining of the sheet are concerned. In several cases, there is evidence for cooperation with the local places of authentication (ecclesiastic bodies authorized to issue authentic documents, performing similar tasks as public notaries did elsewhere in Europe) in formulating and writing down the first municipal documents,[44] and it can be reasonably assumed that these chapters and monasteries were instrumental in the procurement of the necessary writing tools and materials at the outset. Taking over a specific means of authentication, the chirograph (preparing the text in two copies and cutting them apart along a line with the letters of the alphabet) also points towards the influence of the *loca credibilia* on the early municipal practice.[45]

The next, truly revolutionary step in the materiality of pragmatic literacy was the introduction of paper as writing support. Although this material was already known, produced and traded in the Mediterranean since the 11th century, the breakthrough in its use only took place in Italy in the mid-13th century and a few decades later north of the Alps. In Hungary, the first document written on paper was dispatched by the papal legate Gentile da Montefiore in 1310.[46] In the following decades, the new material found its way into both ecclesiastic and secular chanceries. This means that trust in the new fabric was established relatively fast. From the mid-14th century, towns received mandates and letters from the king and the royal dignitaries on paper and started writing their own documents on paper, too. Acts pertaining to the internal administration of the towns, especially in financial matters, were regularly written on paper, often earlier than the sealed deeds and charters were. This applies in particular to the earliest municipal books, which will be discussed later. Paper's favourable weight/value ratio made it an ideal commodity of long-distance trade. The demand of Hungarian administration was met mainly by the production of German paper mills. The most famous of these was the *Hadermühle* at Nuremberg, owned by the Stromairs (Stromers), a family that had members in most major trading hubs of Central Europe, including Buda. By the end of the 15th century, paper may have also been produced in Buda, at one of the mills in the "industrial suburb" of Felhévíz, north of Buda. Likewise, from the 1520s, industrial plants in northern Hungary also embarked on the production of the new writing and printing support.[47]

However efficiently the use of paper spread, certain types of charters and deeds remained exclusively written on parchment, allegedly considered to be more durable and prestigious. These were charters in the form of privileges, with a hanging seal, and the credit contracts on loans taken from Christian as well as Jewish creditors. When collecting the credits, only contracts of full physical integrity could be enforced, and after the repayment the contract was deliberately invalidated by making V-shaped cuts on the parchment, probably with a pair of scissors.[48]

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[43] See the list of the earliest municipal documents in *Szende 2018* Appendix 3, 340–351.

[44] *Hunyadi 2003; Rady 2015* 37–43; on their influence on municipal literacy: *Šedivý 2005* 84–88; *Goda – Majorossy 2008* 80.

[45] *Szende 2018* 82–84.

[46] *Rácz 2011* 32–43. The letter issued on 02.05.1310, is kept in the National Archives of Hungary, HU MNL OL DL 40326.

[47] *Decker 1982*.

[48] *Szende 2014* 269–270.

Employing professional notaries

The increase in the volume of written production necessitated employing professional and trustworthy notaries and setting up municipal chanceries. The materiality of the documents reflects this next major step through the regular layout as well as the dorsal notes that were introduced in order to facilitate information retrieval. The notaries were the first salaried employees of the municipal administration, as entries on their revenues in the municipal accounts or in the statutes testify. The above-mentioned *Ofner Stadtrecht*, written in instalments between 1403 and 1440, included a two-page pricelist on the various types of documents that could be ordered from the chancery.[49]

Besides the testimony of the products, some documents reveal evidence pertaining to the person and material cultures of the notaries. For instance, the last wills of several notaries from Bratislava (Pozsony/Pressburg, Slovakia) have survived, the most famous of them being Liebhardt Egkenfelder, who served the town between 1441 and 1456. His testament reveals a well-equipped household and a rich wardrobe, with several robes made of expensive imported cloth, leggings in red, lilac, green and black, and a small "home arsenal" consisting of two hand-held guns (one of iron and one of brass), a long sword, three daggers, a lance and a pair of spears.[50] Even more relevant for our theme is that he lists his private library – one of the richest of his time, consisting of 38 hand-written volumes, partly copied or compiled by himself. Moreover, he also mentions the binding of the books, some with wooden boards *(in preter)*, and many in soft vellum (*losch*, often colored red) or the combination of the two. A small excerpt illustrates the wealth of information in every single item:

> "*Item* a German legal book bound in red vellum in boards, in my handwriting.
> *Item* a German formulary bound in red vellum, good *dictamina*, in my handwriting.
> *Item* a German book bound in red vellum in boards, in which one finds the reign of Alexander the Great; how the city of Acre was lost; Cato, and Teichner in German, all in my handwriting.
> *Item* a German book on medicine, half-quire with five registers, bound in red vellum in boards, in my handwriting."[51]

Two of the books mentioned in his will have survived up to this date and testify his scribal prowess and intellectual acumen.[52]

Data from early modern Transylvania confirm that the notaries were respectable and well-paid members of the urban community. Their skills were so much in demand, not only as writers and archivists, but also as envoys and diplomats, that towns competed for them by offering higher wages than their neighbours. The incomes of civic notaries indeed covered their refined lifestyle and material well-being, and increased trust by making them less prone to corruption.[53]

Setting up municipal books

The institutionalization of urban chanceries in the 14th and 15th centuries, heralded by the employment of professionals, elevated municipal administration to new dimensions and capacities. Chanceries had to meet growing demands of the royal administration and the town's inhabitants as well. The increasing volume of tasks inevitably led to the use of municipal books, registers of accounts, and protocols of litigation brought before the local court.

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[49] *Mollay 1959* Cap. 50, 79–80.

[50] *Majorossy – Szende 2010* No. 183, 241–248; See also *Spiritza 1967* and *Szende 2018* 127–128.

[51] *Majorossy – Szende 2010* 242.

[52] Budapest, Library of the Hungarian Franciscan Province, Múz.1, Esztergom bequest and Brussels, Bibliothèque Royale Albert I., Ms. 8879–80.

[53] *Flóra 2014*.

The introduction of the book format into chanceries all over Europe, urban or otherwise, was indeed the most practical way of keeping large amounts of information accessible in whatever order was needed.[54] This was facilitated by the extensive use of paper as an affordable writing support available in sufficient quantities. The introduction of books was not dependent on royal grants in the way that the seals were, thus the format and size of the extant volumes offer the best clues on the process of "book formation". One regularly finds in archives quires of paper that were folded lengthwise to create stand-alone booklets. Records of mid-term financial significance such as tax lists or municipal accounts are frequent examples of this type. These may have only been collected and bound together as a book later. Among other examples, the first judicial protocols and property registers from Gradec (the royal town of Zagreb, Croatia) illustrate this practice.[55] As the use of the book format developed, full-width paper folios were bound together from the outset, reflecting a conscious choice for the long-term preservation of information. For instance, the property registers or testamentary protocols in Bratislava, with an almost unbroken series of volumes spanning several centuries exemplify this new level of institutionalization.[56] Books set up with such ambitions, but abandoned in the course of their use, leaving behind an abundance of empty folios, are also important testimonies of urban literacy. In these frequently encountered cases, the void material tells stories of reorganization, loss of importance, or scribal negligence.

Besides its practical advantages, the shift from charters to books presented strong conceptual challenges, also involving materiality. Books lacked practically all the physical features that ensured the authenticity of charters and the trust vested in them: they were written on paper, without the formalized layout of the single-sheet documents (including writing only on one side of a leaf), and carried no seals or other visual signs of authentication. Furthermore, they very often switched to a vernacular language instead of Latin – to German in case of towns in Hungary. The means to overcome this "trust deficit" was to increase the consistent, regular and structured character of information in the books. This was often accompanied by features of the physical layout, the use of headings or other features separating documents or sections, or alphabetic indexes. The legal form of deleting content from municipal books, by crossing out rather than removing the page, was also a practice ensuring confidence. The most crucial element, however, was the strict regulation of access to the books and the limitation of persons authorized with adding entries to them to the municipal notary. This ties into the question of safekeeping and archiving, to be discussed below.[57]

The materiality of municipal books was strongly connected to binding, which may sometimes be the most durable feature of a volume, as Elek Benkő's above-quoted study exemplifies. Several different binding methods developed and coexisted, showing varying levels of professionalism. Stitching the quires together with a hemp cord, adding a cover leaf usually of parchment, often combined with reinforcing the middle of the quire at the place of the stitches with a piece of old parchment *(fig.4)*, could easily be carried out by the scribe or notary. A helpful tool in holding the bundle together could be lace ending in a metal tag, "similar to the tip ('aiglet') on a modern shoelace", used elsewhere for filing documents *(fig.5)*.[58] The cover sheet could be a reused

[54] *Arlinghaus 2015.*

[55] *Notae ex cathernis civitatis Zagrabiensis*, 1375–1391 Hrvatska Akademija Znanosti i Umijetnosti, Zagreb, Arhiv (HAZU), II d 233, in 11 quires *Protocollum fassionale super possessiones et fundos*, 1384–1402, HAZU II d 233, in 6 quires; *Liber citacionum et sentenciarum*, 1412–1448, HAZU II d 234, in 10 quires.

[56] See the Introduction to *Majorossy – Szende 2010.*

[57] *Szende 2018* 152–201. Legally binding deletion was also done by the town scribe for a fee, see e.g. *Mollay 1959* Cap. 56.

[58] *Wolfe – Stallybrass 2018* 183–186 identifies this instrument for filing in Early Modern English private archives. Quote from page 184.

Fig. 4. Parchment piece with notation strengthening the binding of the 1404 municipal accounts of Sopron. HU MNL Sopron Archives of Győr-Moson-Sopron county, DL 3270 (©Photo: Katalin Szende)

Fig. 5. "Italian-style" parchment binding of the 1427. municipal accounts of Sopron, with metal tag on the lace. HU MNL Sopron Archives of Győr-Moson-Sopron county, DL 3284 (©Photo: Katalin Szende)

document that was no longer relevant, or a parchment codex leaf. The latter raises important questions of provenance and access, and there is a growing corpus of evidence indicating that trade in easily transportable dissected codex folios is responsible for at least part of the archival binding materials.[59] In other cases, it is possible to connect the availability of sheets to local events or cataclysms, for instance in Sopron with the expulsion of the local Jewish community in 1526, and later with the Reformation.[60] In case of the reuse of Hebrew codex leaves, intentional humiliation may have accompanied the pragmatic considerations.[61]

More professional expertise was required for fixing the quires by way of a spine made of horn or bone and sewn together with a hemp cord *(fig.6);* this method could be combined with soft parchment or leather cover or wooden boards. Besides the surviving books themselves, we have anecdotal evidence on persons practicing the bookbinder's craft in Hungarian towns.[62] However, professional bookbinders appear as municipal employees only from the 17th century onwards.[63]

[59] *Lauf 2014.*
[60] *Szende 2007; Szende 2008.*
[61] *Keil 2003* 49–61.
[62] *Rozsondai 2020.*
[63] *Dominkovits – Szakács 2007.*

Fig. 6. Spine and binding of the first municipal book of Sopron begun in 1390.
HU MNL Sopron Archives of Győr-Moson-Sopron county, DL 2988
(©Photo: Katalin Szende)

Municipal archives and other methods of record keeping

As we ascend the ladder of municipal literacy, one rung after the other, the last and most advanced stage is the establishment of municipal archives, first as a mobile collection and then an assemblage solidly tied to a designated space. By its nature, archiving needed the most tangible material toolkit beyond the documents themselves and has thus attracted most attention by scholars engaged with the materiality of writing.[64] Archiving was a reciprocal process: the modes of placement of the records reflect on their retained or changing relevance for their keepers, but at the same time, methods of filing and record-keeping tell much about the communities and individuals that practiced them.[65] Not every medieval town reached the most advanced level of municipal literacy of having a designated archives space, but used other means of storing their records. The documents were often simply deposited in a chest or trunk that was taken to the house of the actual judge and moved over to his successor's home after each municipal election. In smaller towns this practice remained unchanged until the early modern period.[66]

The first step toward archiving proper was to gain an overview by adding short dorsal remarks on the contents and compiling a list of documents from these. The process often involved discarding or reusing a part of the collection. For instance, the cover of Sopron's first extant archives register was the scrap parchment of a royal deed from 1346.[67] A similar list of charters of privilege kept in the municipal archives has been preserved in Sibiu (Szeben, Hermannstadt, Romania).[68] Parallel to this, deposition in a safe and fire-proof space, for instance the sacristy of the local parish church, could be negotiated. A further advantage of using the upper floor of the sacristy, like St. Barbara's chapel at St. Giles's in Bardejov (Bártfa, Bartfeld, Slovakia), was restricted and controlled access;[69] at the same time, this reduced immediate contact with the material for day-to-day business.

[64] *Head 2019; Friedrich 2018* 111–138.
[65] *Wolfe – Stallybrass 2018.*
[66] *Szende 2004; Lakatos 2019* 48.
[67] *Házi 1921–1943* Vol. I.1, 89.
[68] *Dincă 2015* 73 and note 15.
[69] *Iványi 1910* V–VI, quotes the parish accounts from 1487: *"Item exposita super labore et edificatione reservatorii privilegiorum in capella Sancte Barbare"*.

Fig. 7. Archives cabinet in the town hall of Bardejov (Bártfa/Bartfeld) (©Photo: Béla Zsolt Szakács)

The ideal long-term solution was to erect a town hall or transform a building for this purpose, an investment that only the most important civic communities could afford.[70] Indeed, the proportion of town halls to the number of communities granted urban status in medieval Hungary was much lower than in the Duchy of Austria or the Kingdom of Bohemia in the same period.[71] Town halls also housed a court room and the municipal chancery, so the small number of such buildings draws attention to the limitations of municipal literacy as well.

Wherever available, accounts on the building, furnishing and upkeep of town halls offer valuable insights into the material culture of record-keeping. For instance, the accounts of Prešov (Eperjes, Slovakia) mention a major expense for a chest *(ladula civitatis)* in 1442, as well as further boxes *(scatularium)* and containers *(retentorium)* year after year, reflecting the growth of the collection. In 1510, the town paid a blacksmith for an iron grid for the archives window *(pro cratere ad fenestram conservationis privilegiorum)* and a painter *(pictor)* for painting it.[72] Exceptionally, not only the accounts but also the building and the furniture have been preserved intact in the town hall of neighbouring Bardejov.[73] In 1511, when the building was finished, a special archives cabinet was also ordered: "Item, to Master John who made a cabinet for the storage of the charters of privilege, fl. 9½." This piece of furniture, an ash cabinet with four doors, still stands on the first floor of the town hall *(fig. 7)*, in a room next door to the court room where the judicial procedures took place under the auspices of the depiction of the Last Judgment.[74] This unique ensemble conveys the essence of the workings of the civic community and its material and spiritual buttresses.

Conclusion: Beyond antiquarian interest

The aim of this overview was to show that there is more to studying the material culture of medieval urban literacy than simply satisfying antiquarian curiosity. Besides collecting the often scattered and disparate information on artefacts, buildings and physical circumstances associated with the written products by municipal authorities, one needs to place them into their social context and understand what part they played in the process. Thinking in contexts and processes instead of isolated objects not only adds to the appreciation of the individual objects, but also helps in bridging the gaps caused by the uneven survival of the evidence. This is particularly relevant for the towns of medieval Hungary where the source material has been subject to heavy losses. One also needs to pay attention to direct and indirect references in the written record to the artefacts and conditions connected to their creation, use and survival.

Taking all this into account helps us realize that materiality and pragmatic literacy were strongly intertwined. On the one hand, the gradual development of urban literacy made it necessary to embrace new elements of material culture that had hitherto been part of monastic, ecclesiastical or courtly environments and adopt them to the urban context; on the other, materiality played an active and dynamic role in the production of the written word and impacted its social embeddedness and acceptance.

Each of the successive steps in the introduction of written urban administration presented new challenges of adaptation and required new forms of underpinning credibility by institutional as well as material means. The latter were particularly important for those who did not possess the ability of reading and writing. The agency of materiality manifested itself in various ways

[70] *Majorossy 2012* 155–210.
[71] *Sedivy 2019* Tab. 1. 170.
[72] *Iványi 1931* 4–5.
[73] *Mikó 2004.*
[74] *Kovalovszki 1980* 10–13; *Szeghyová 2018* 68–69.

throughout the process. The granting and safekeeping of the first royal charters meant the first trustful encounter with writing on a community level. Establishing the circumstances for the local production of similar documents already entrusted probative value to the common symbol (the seal) of the municipality and to the person of the notary hired by it. It also needed the procurement of sufficient amounts of writing support, ink and sealing wax. Paper was an especially ingenious resource and the material precondition of introducing municipal books, a specifically urban genre of recording collective agendas. Lacking the visual and material features of individual documents, they presupposed trust in the institution of municipal chanceries on a different level. Finally, secrecy and safekeeping required ordering and restriction of access for which new spaces and instruments needed to be introduced.

The examples presented here from the towns of medieval Hungary show both quantitative changes and qualitative breakthroughs similar to other European towns, following the inner logic of the gradual increase of trust in writing and the institutionalization of authority. Therefore, the model presented here may be useful for comparative studies across cities and regions. It would also be worthwhile following up how epigraphic manifestations of writing carved in stone such as building inscriptions or epitaphs, or cast in metal like church bells or baptismal fonts (another of Elek Benkő's fields of expertise) complemented the material culture of urban literacy. Even if the growth had its limits and not each and every town had the incentive and capacity to employ a professional notary, operate a chancery or set up an archive, by the 15th century the tangible presence of written artefacts became an integral element of urban life. It was not only a vehicle of autonomy, but also an instrument of economic control and social discipline. In our modern times, when written culture and administration undergoes fundamental changes and takes on new digital forms, it is even more urgent to be aware of how materiality in municipal administration shaped human lives over time.

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LATE MEDIEVAL CERAMICS WITH STAMPED DECORATION IN CENTRAL TRANSDANUBIA

Zusammenfassung: Die mitteltransdanubischen, auf der Schulter mit Rundstempeln verzierten Töpfe aus dem Zentralgebiet des einstigen Ungarischen Königreiches gehörten in erster Linie zu den charakteristischen Produkten jener Töpferei, die im Spätmittelalter gelbliche Keramik herstellten. In der Region des Vértes-Gebirges ist auf jeden Fall mit ihrer Produktion zu rechnen, allerdings könnten sie auch in der Umgebung von Buda hergestellt worden sein. Anhand der bisherigen Daten sind sie um Buda seit der zweiten Hälfte des 14. Jahrhunderts und im Vértes-Gebirge seit der ersten Hälfte des 15. Jahrhunderts belegbar. Ihre Produktion kann bis zur Mitte des 16. Jahrhunderts nachgewiesen werden. Anhand der Stempelmuster sind Kontakte zwischen mehreren Fundorten belegen zu können. Auf dem Untersuchungsgebiet kommen Exemplare aus rotgebranntem Ton in weitaus geringerer Zahl zum Vorschein, bei denen es sich womöglich um die minderwertigeren Nachahmungen der gelben Stücke handelt. Das stempelverzierte Tafelgeschirr wurde allerdings auf einem weitaus größeren Gebiet produziert: Die Budaer Zierkeramik und ihre Nachahmungen waren in Nordost-Transdanubien, während die roten Exemplare in der Region Nordwest-Transdanubiens verbreitetet, ihre Herstellungsorte sind ebenfalls auf diesem Territorium zu suchen. Darüber hinaus geht man bei den wenigen grauen Stücken von österreichischem Ursprung aus.

Keywords: stamped pottery, stamped decoration, cylinder seal, late medieval period, 15th–16th century, Western Hungary, Central Transdanubia

During the study of late medieval pottery from Tata and the Vértes Mountains, I discerned a relatively small yet characteristic group: ceramics with stamped decoration. Under the term stamped ceramics I mean tableware decorated with a simple stamp or a round seal, as well as pots decorated with a cylinder seal on the shoulder.[1] The latter pots offer interesting research opportunities and can also serve as a starting point for the analysis of plain or differently decorated pots. In the present study, I am primarily focusing on stamped pots, but I also consider the stamped tableware of the investigated area. The overview of the published finds showed that for a thorough analysis of pots stamped on the shoulder, it is necessary to expand the geographical scope of the study, so I included the region of Central Transdanubia in the investigation. Central Transdanubia is one of the regions of present-day Hungary, it includes Fejér, Komárom-Esztergom, and Veszprém counties. In my study, I discuss only those stamped ceramics in detail that were discovered in this area.

The territory serving as a basis for the study is geographically divided: in the north, the Little Hungarian Plain and the ranges of the Transdanubian Midmountains define the landscape, in the south, there are the Transdanubian Hills, while in the middle, the Great Hungarian Plain stretches into the area.[2] Thus, in addition to exploring the characteristics of local pottery, it may also be possible to shed light on to what extent the geographical conditions limited the spread of pottery-making techniques and the pottery trade.

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[1] Although a stamper was also used during the production, it did not serve as a decoration, but indicating the workshop, so I do not deal with the so-called Austrian ceramics with a stamped rim.

[2] *Marosi – Somogyi 1990a* 107, 365; *Marosi – Somogyi 1990b* 597, 661, 700.

Spread in the Carpathian basin

Decoration with a cylinder seal in Western Europe was already widely used between the 9th and 12th centuries, for example, in the Rhineland.[3] Decoration made with a cylinder seal appeared on vessels fired in reducing atmosphere at sites in Austria: the earliest known items date to the 12th and 13th centuries (e.g., at Tulln),[4] but this mode of decoration survived to the 14th and 15th centuries, as well.[5] Near the western border of the Hungarian Kingdom (Kőszeg,[6] Sopron,[7] Gencsapáti-[Besenyő]Sziget[8]), grey vessels with characteristic decoration emerged as early as the 13th century due to trade. At that time, based on the patterns of the finds, the products of one workshop must have been brought to the marketplaces of Hungary located near the western border of the country. Some reduced-fired pots discovered in Kána can also be dated to the 13th century, still before the Mongol Invasion (1241–1242). The patterns of the items discovered in contemporary Sopron and Kőszeg are different, so these vessels must have been made in other workshops. According to their publisher, the Austrian origin of these ceramics is uncertain,[9] although they may as well have come from there thanks to the mediating role of the Danube.

It was probably under the influence of Austrian ceramics that Hungarian potters started using this technique of decoration. The earliest stamped pots in Buda date to the 14th century. According to Imre Holl, these vessels were already made locally, as their colour is not grey but yellow or pink.[10] Some pieces of tableware made with reduced firing and decorated with cylinder seals showing an intricate pattern can be dated to the same period. According to publications that have come out so far, they were not only widespread in Buda,[11] but also in North-Eastern Hungary[12] and Transylvania.[13] Additionally, due to recent excavations, a few similar pieces are also known from Western Hungary.[14] The foreign origin of some of these ceramics seems certain (they are associated with Austrian and Czech territories by their publishers),[15] while other pieces, similarly to the pots, may have already been locally made.[16]

In Hungary, only a few items are known from the first half of the 15th century, which bear this type of decoration. The large, glazed storage vessels found in Visegrád,[17] a pot from Fülöpjakabpuszta dated to the second half of the Sigismund era (1387–1437) with a coin,[18] as well as a few fragments from the Dominican Cloister in Buda[19] certainly date back to this period. Based on its shape and decoration, a grey pot discovered in Buda-Tabán may also be of a similar age.[20] Additionally, the vessels found in the Vértesszentkereszt-kolostor were also dated to this

3 See, for example, *Grunwald – Pantermehl – Schreg 2012*.
4 *Cech 1989* 168, Taf. 1.
5 E.g. *Cech 1987* Taf. 80. Q7.
6 *Holl 1992* figs 44–45.
7 *Holl 1973* fig. 26. 40, fig. 29. 10.
8 *Koller 2016* 145, fig. 10. 8–9.
9 *Terei 2016* 119, Pl. 9.
10 *Holl 1963* 346, fig. 73. 4.
11 *Ritoók 1986* 225–233, figs 2–4; *Holl 1966* 25, Abb. 26–27.
12 *Parádi 1965* 163–167, fig. 56; *Magyar 1969* fig. 86. 1–4.
13 *Benkő 2004* 57, Pl. 4. 11–12; *Bencze 2008*.
14 Bánd-Essegvár (excavated by Szabolcs Balázs Nagy).
15 *Parádi 1965* 164–167; *Holl 1966* 25; *Magyar 1969* 105.
16 *Ritoók 1986* 239.
17 *Tóth 2006* 58–61, figs 166–167.
18 *Parádi 1963* 224, 244, fig. 17. 4.
19 *H. Gyürky 1981* 43, Abb. 181. 4–5.
20 *Holl 1955* fig. 52; *Feld – Gerelyes 1983* 169.

period by the supervisor of the excavations.[21] In Transylvania, based on finds yielded by a pottery kiln in Székelykeresztúr, yellowish-red tableware decorated with cylinder seals was already produced there in the first half and around the middle of the 15th century.[22] According to the Slovak scholarly literature, although stamped decoration appeared in the western part of present-day Slovakia as early as the 14th century, it became more common in the first half of the 15th century,[23] whereas in South-Eastern Slovakia, which was predominated by white pottery, it was not typical.

Within the borders of today's Hungary, this technique of decoration became more widespread in the second half of the 15th century. It seems that, by that time, stamped decoration had been introduced in the practice of pottery production used by local workshops in several regions. In rural areas, patterns made with a stamp or a cylinder seal usually appear on unglazed pots, but thanks to the producers of decorative pottery of Buda, glazed items also appeared in and around Buda.[24] While the decoration of tableware with seals was widespread over a large part of Transdanubia, pots stamped on the shoulder were mainly present in the central part of the country, according to scholarly literature. Large quantities are known from the castles of Tolna county (Felsőnyék,[25] Ozora[26]), and usually only one or two fragments have been published from other sites.[27] The publishers of the fragments discovered in Ozora found that these vessels imitated the shapes of Austrian graphite pots.[28] Publications summarising the types of stamped motifs on pottery have so far been written in the case of two sites, the castles of Felsőnyék[29] and Liptó.[30]

In the territory of Slovakia, this technique of decoration certainly survived and the patterns became more and more intricate over time.[31] Sporadically, some early modern items were also found in Hungary (Füzér-Vár,[32] Tata-Vár,[33] Székesfehérvár-Hiemer-ház[34]) and Transylvania (Csekefalva),[35] but they represent a completely different type. Their shapes are different from that of the medieval vessels and they are glazed on the inside.

Methodology and aspects of the investigation

In my work, I fundamentally relied on assemblages processed by me (Tata-Kossuth tér 16, pottery finds from the cellar of the Tata-Vár, Gesztes-Vár, Gesztes-Kisvár, as well as previously published finds and assemblages. Furthermore, I tried to view the finds of as many sites as possible in person. So far, I have inspected the assemblages of sixteen excavations and thirty field-walking surveys

[21] *Mezősiné Kozák 1993* 218–219, Pl. 33. 1–3, 6–7, 10, 12.
[22] *Benkő 1992* 176–177, Pl. 47. 3, 5, Pl. 48. 1, 3, 5–6.
[23] *Hoššo 1984* 136–137; grey and red stamped vessels are known for example from Bratislava, *Polla 1979* 127–128, fig. 67, 76, Pl. XIX.
[24] *Holl 1963* 355–364.
[25] *Miklós 1988* 210, fig. 7.
[26] *Feld – Gerelyes 1985* 169, fig. 4. 4–5; *Feld et al.* 1989 181, fig. 8. 5.
[27] For example, *Pintér 2006* fig. 16. 1; *Tóth 2006* fig. 58–60; *Kocsis 2016* fig. 6. 7; *Molnár et al.* 2018 fig. 1r; *Trifunović 2012* Pl. 124. 13; *Horváth – H. Simon 1996* fig. 45. 8.
[28] *Feld – Gerelyes 1985* 169.
[29] *Miklós 1988* fig. 12.
[30] *Hoššo 1984* Tab. 1.
[31] *Hoššo 1984* 138.
[32] *Farkas 2017* Pl. XVII. 1.
[33] Unpublished find (Inv. no. KDM 69.2.4).
[34] *Kovács 2017* fig. 3. 14.
[35] *Benkő 1992* Pl. 61. 6, Pl. 67. 7.

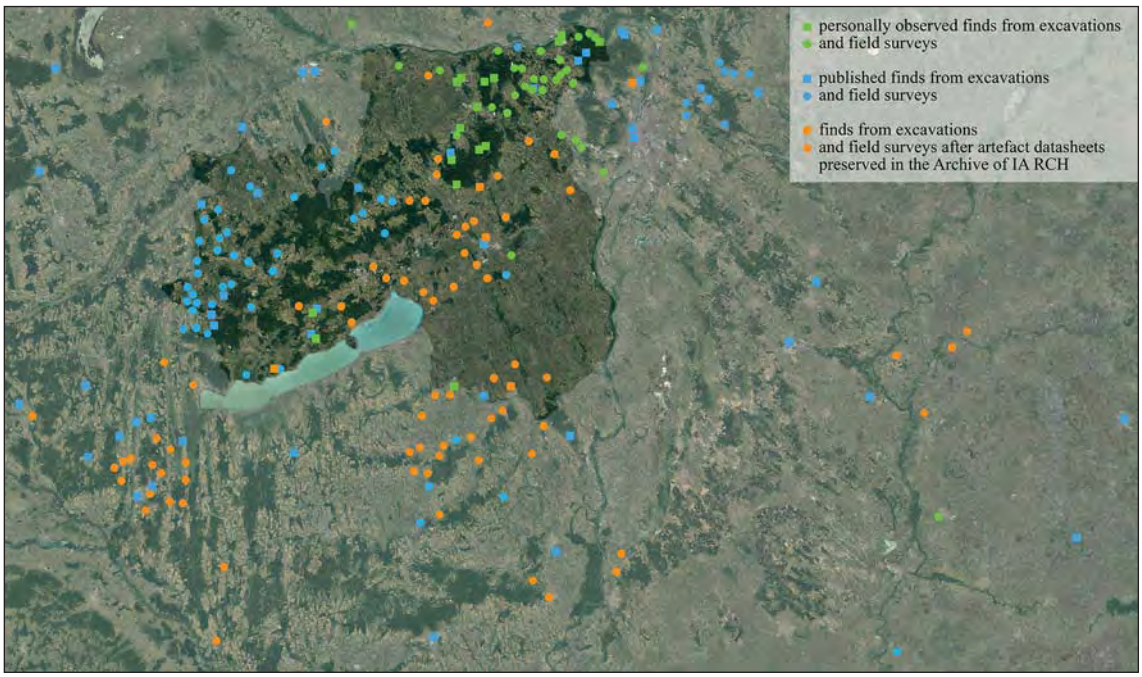

Fig. 1. Locations and types of the studied sites

either in part or full,[36] twenty of which comprised stamped ceramics. I was able to complement these with forty-six sites based on the datasheets of artefacts preserved at the Archive of the Institute of Archaeology at the Research Centre for the Humanities *(fig. 1).* Therefore, including sites known from scholarly literature, I was able to study stamped pottery from ninety-one sites of forty-three settlements in some way or another (in person, in photographs or drawings).

In the case of the pots stamped on the shoulder that I could inspect in person, I measured the width of the pattern on the spot, and when the stamped decoration remained in an appropriate length and quality, I recorded its length, too. In order to make the comparison more accurate and to facilitate the drawing, I started my research by making an imprint of the stamped decoration (if I had the opportunity) and then I digitised it. However, it turned out during the work that taking good quality, close-up photographs was a much more efficient method of data collection (mainly because of its speed) in terms of digitisation and comparability. During my research, I was looking for answers to the following questions:

– On what types of vessels (concerning material, shape, size) does the stamped decoration appear?
– When were the stamped vessels made in the examined area?
– What could have been the size of cylinder seals and what could they have looked like?
– Are there any vessels with identical motifs?

[36] Hereby, I thank the following colleagues and institutions for allowing me to inspect their assemblages personally: Kuny Domokos Museum in Tata (Sándor Petényi, Richárd Schmidtmayer) [KDM], Szent István Király Museum in Székesfehérvár (Krisztián Pokrovenszki, Tamás Belegrai) [SZIKM], Balassa Bálint Museum in Esztergom (Mónika Merczi, Anita Kocsis) [BBM], Mátyás Király Museum in Visegrád (Edit Kocsis), Laczkó Dezső Museum in Veszprém (Ádám Pátkai) [LDM], Wosinsky Mór Museum in Szekszárd (Márta Vizi) [WMM], Danube Museum in Komárno (András Csuthy), Ferenczy Museum Centre in Szentendre, Tatabánya Museum, as well as Elek Benkő, Gábor Hatházi, and Gyöngyi Kovács. The datasheets of artefacts in the Archive of RCH Institute of Archaeology and the data collection of the Siklósi Legacy helped me in the collecting the pieces from Székesfehérvár, for which I am also grateful.

– Are the patterns workshop-specific?
– Do the vessels with the same pattern share other features, as well? By examining their characteristics, is it possible to "connect" plain ceramics or other vessels decorated in other ways with them? In other words, is it possible to identify the products of the individual workshops?
– Based on the stamped vessels, can we obtain any evidence whether the castles and monasteries in the studied area were supplied with ceramics from local workshops or from other places of production?
– Finally, my objective was to determine area of distribution of these artefacts as accurately as possible.

Stamped pots

Types of pots

According to the findings of Imre Holl, the colour of pottery vessels can be used as a starting point for their classification, as each raw material can usually be associated with certain characteristics (vessel form, shape of the rim, and decoration).[37] In line with his view, in the following, I will also be discussing the artefacts grouped by colour.

Yellow pots

The vast majority of pots stamped on the shoulder found in the study area had yellow, yellowish-white, and sometimes pink or orange colour *(figs 2–4, Table 1).* These colour variations can be grouped together because of the contemporary technology of firing. At that time, pots of different shades could be made even during the same firing, depending on where they were placed in the pottery kiln. They were usually tempered with large-grained sand, often containing black grains, as well. The shapes of their body and rim imitated the so-called "Austrian-type" graphite pottery as it was found concerning the items from Ozora. Minor differences can be observed in the shapes of the rims (e.g., rounded, terminating in a sharp edge at the bottom, terminating in a sharp edge at the top, terminating in sharp edges at the bottom and the top). The pieces that can be classified here were thrown on a fast wheel with no exception. Item glazed on the inside is still known only from Székesfehérvár.[38]

The proportion of yellow pots is remarkably high among the finds from North-Eastern Transdanubia studied by me. These were already present in large quantities among the ceramics of the 12th–13th centuries. The yellow pots stamped on the shoulder that I have recorded were also particularly widely-used in the area above. Accordingly, I believe that the place of production of the group in question should be sought – at least in part – in this territory. This is also supported by the location of clay quarries recorded during data collection that took place around the turn of the 19th–20th century *(fig. 5).* Around the Vértes and Gerecse Mountains, several sites have been registered where good-quality, so-called refractory clay was quarried.[39] From these, the clay mines lying to the south of the Vértes Mountains were used by potters in Csákvár[40] in the modern era, but the high proportion of yellowish pottery in the area suggests that the high-quality

[37] *Holl 1963* 336.
[38] Székesfehérvár-Sziget (Inv. no. SZIKM 80.522), Székesfehérvár-Zalka utca 4 (Inv. no. SZIKM 91.2148).
[39] Refractory clays are much more suitable for making ceramics used for cooking. In the Carpathian Basin, such clay mines are located at the foot of the mountains, after *Mattyasovszky – Petrik 1885* and *Kalecsinszky 1905.*
[40] *Kresz 1991* 537.

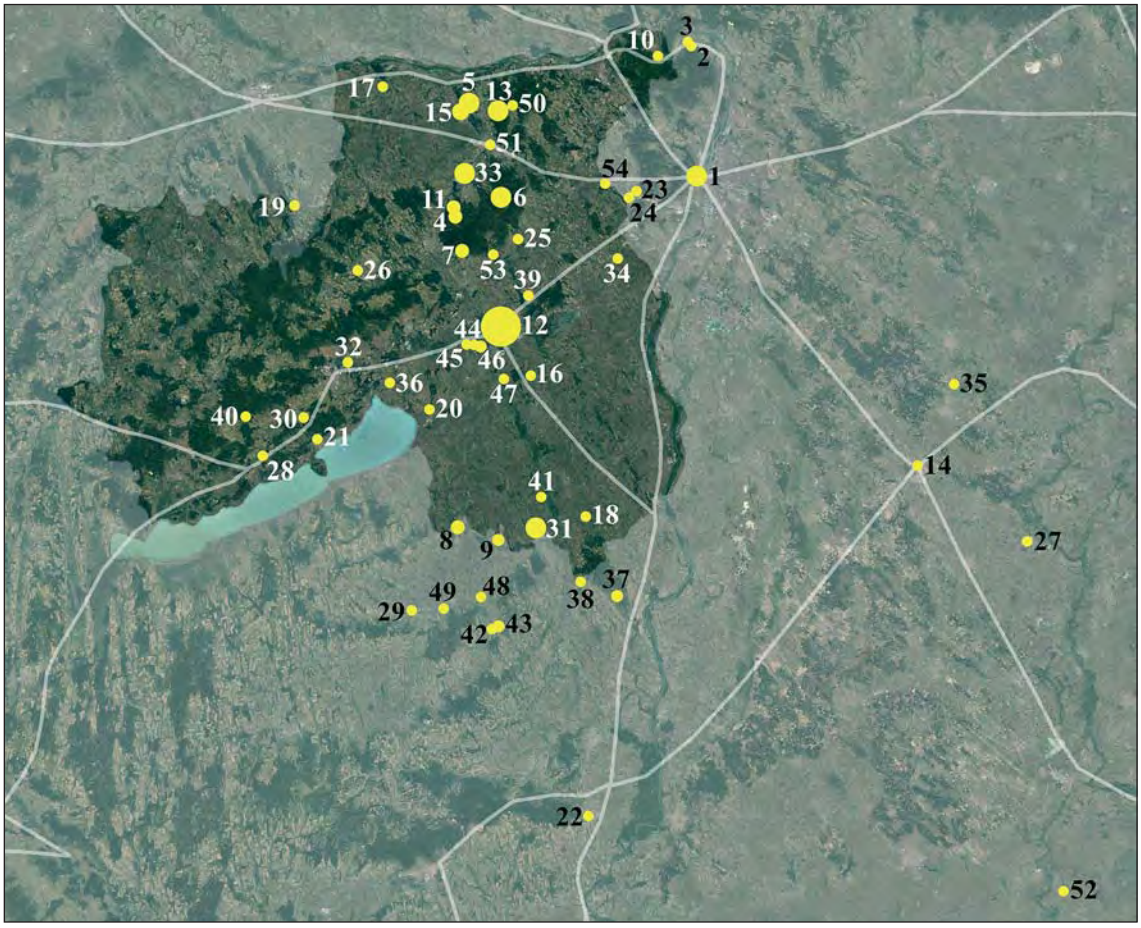

Fig. 2. Distribution of the stamped pots according to current knowledge
(the size of the circles indicates the number of the pots, see details *Table 1*)

clays found there were already used in previous periods, including the Middle Ages. This is also confirmed by pottery kilns and the traces of workshops discovered in the investigated area *(fig. 6)*. In the vicinity of Bajna, several 15th–16th-century pottery kilns producing yellowish pottery vessels are known from archaeological excavations and field-walking surveys.[41] One of the excavated pottery kilns contained unfired items, as well. Zsolt Vágner experimented with firing them and demonstrated that the clay from which they were made has a yellowish colour in itself after being fired. However, he also found that the unearthed finished vessels had a lighter colour than the items fired by him, which indicates that a reduced firing process was used during their production.[42] Presumably, the potters of other workshops in the region did the same. The products of the pottery kilns from Bajna and the pottery shards gathered during field-walking surveys in their vicinity, however, did not contain pots stamped on the shoulder,[43] which shows that although yellow-coloured ceramics were produced there, this method of decoration was not used by local potters.

[41] *MRT 5* 40; *Horváth 1975* 108; *Horváth – Kelemen 1976* 51.

[42] *Vágner 2002* 332–333.

[43] After information kindly communicated by Zsolt Vágner and István Feld, as well as based on the finds of field-walking surveys (Bajna-Bercse, Bajna-Kertalja, Bajna-Nagysárás, Bajna-Faluhely, Bajna-Csima, Bajót-Péliföldszentkereszt, Dág-Kiscsévpuszta, Dág-Temetőtábla, Dág-Dági-puszta, Epöl-Öregszentegyház-dűlő, Sárisáp-Sápi-völgy, Pilismarót-Alsómarót, etc.) that I could inspect myself.

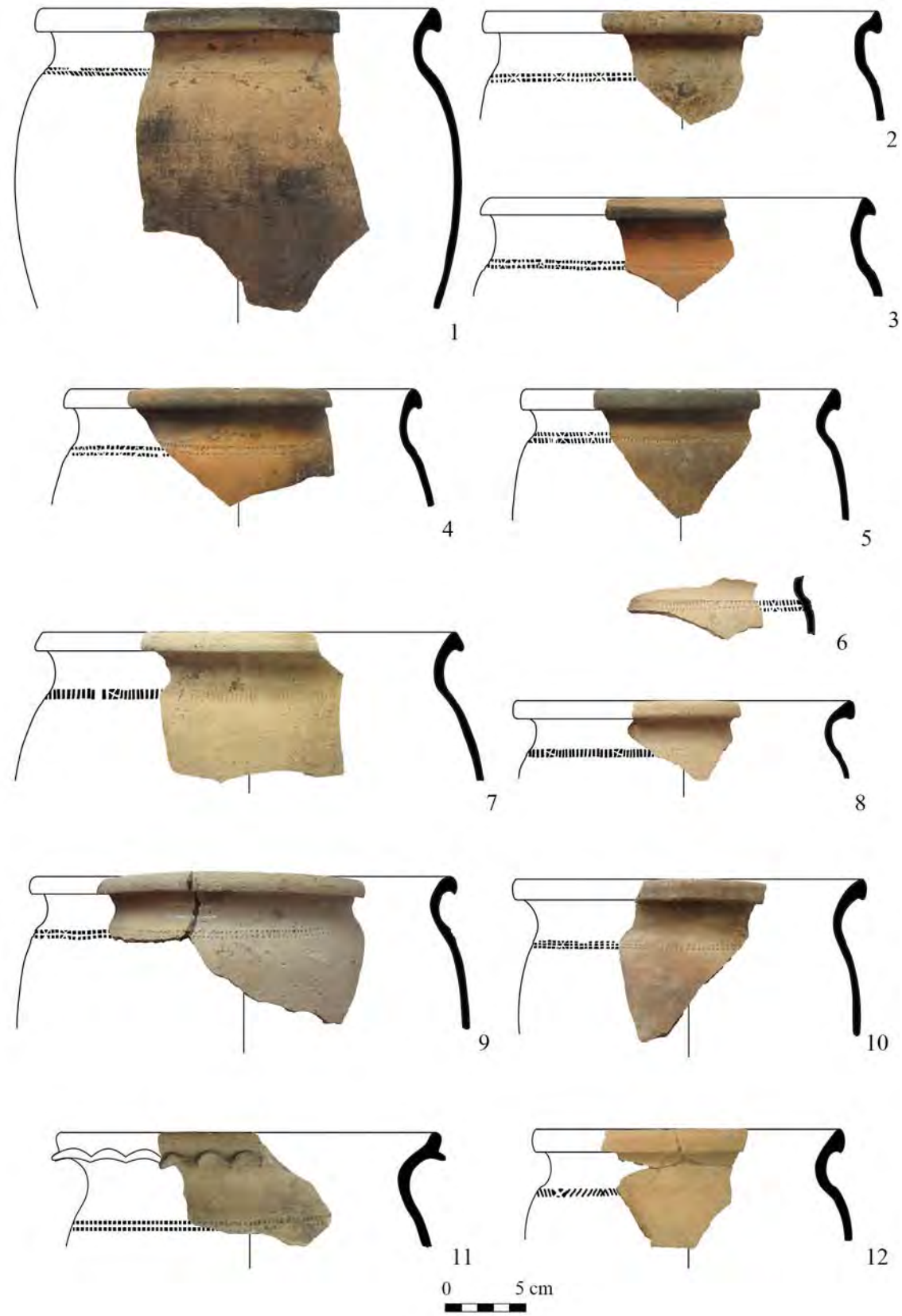

Fig. 3. Pots with stamped decoration on the shoulders. 1–7. Tata-Kossuth tér 16 (Inv. nos KDM 2016.13.29.28, 2016.13.29.14, 2016.13.29.13, 2016.13.29.167, 2016.13.29.169, 2016.13.29.124, and 2016.13.4.171); 8–10. Tata-Vár (Inv. nos KDM 68.21.1, 68.20.324, and 66.2.450); 11–12. Gesztes-Vár (KDM not inventoried)

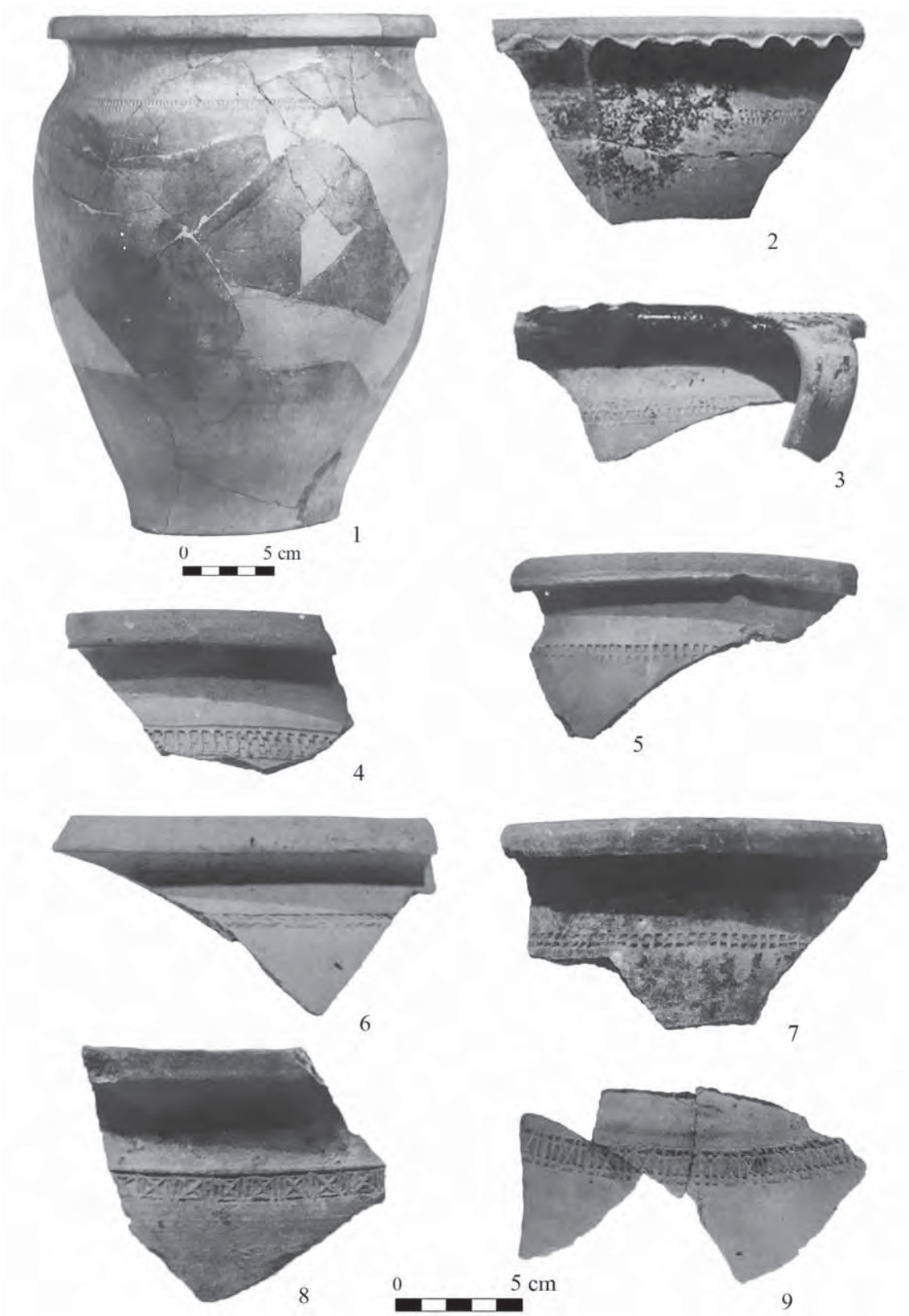

Fig. 4. Pots with stamped decoration on the shoulders. 1. Székesfehérvár-Géza tér (Inv. no. SZIKM 80.260); 2–3. Székesfehérvár-Sziget (Inv. nos SZIKM 79.230 and 80.552); 4–5. Székesfehérvár-Malom utca 27 (Inv. nos SZIKM 87.204 and 87.203); 6. Csákvár-Gasser ház (Inv. no. SZIKM 60.17.2); 7. Zámoly-Kerekszenttamási (Inv. no. SZIKM 62.95.1); 8. Pusztaegres-Őrspuszta (Inv. no. SZIKM 8967); 9. Igar-Kemencék (Inv. no. SZIKM 81.6.73)

By contrast, in Kecskéd, located in the northern part of the Vértes Mountains, a workshop was excavated that had produced yellow ceramics, including pots stamped on the shoulder, dating to the first half of the 16th century *(fig. 6)*.[44] Therefore, there was certainly local production in that area. Although I have recorded most of the stamped pots in the neighbourhood of Székesfehérvár, their production in the town cannot be evidenced, as only one yellow and two red damaged stove tiles are known from the territory of the settlement.[45] These fragments might as well suggest the existence of a local pottery workshop, but it is also conceivable that they were taken to the site along with the finished products. In my opinion, local production cannot be completely ruled out on the basis of the yellow item, although there was no suitable raw material available for that in the close vicinity of the town. In the 19th century, in addition to non-refractory clay quarried locally, potters in Székesfehérvár also used high-quality clay transported from other places (e.g. from Csákberény). However, there is no evidence of obtaining raw material in this way in earlier periods.[46] On the issue of local production, the research carried out by Szabina Reich would yield further results. In any case, it is certain that, even if there was no local production, the town and its suburbs represented an important market for workshops producing yellow pottery. What we can infer from the location of clay quarries and the modern pottery production centre in Csákvár as well as the spread of stamped pots is that there must have been some workshops making yellow stamped pots in the territory of past villages lying at the southern feet of the Vértes Mountains.

The local production of yellow pots stamped on the shoulder in the vicinity of Buda is also uncertain. Relatively good-quality clay was available in this area that turned yellow after firing *(fig. 5)*, so the conditions were favourable in this respect. However, while pots stamped on the shoulder are known in larger quantities from Buda,[47] they are completely missing from other sites in the region, [48] or there are only one or two items.[49] So two explanations might be proposed here: either there was local production in Buda (or its immediate vicinity), or this type of vessel was transported to the area in large quantities.

Exploring other parts of the distribution area, we find that the colour of ceramics produced in workshops excavated in Veszprém county is red *(fig. 6)*.[50] Red ceramics predominated at other sites, too.[51] Therefore, in light of the clay quarries, the local production of yellow pots stamped on the shoulder can be excluded in that region. According to currently available evidence, only a few fragments were discovered in the Great Hungarian Plain, where no suitable clay was available. Thus, we cannot talk about local preparation there, either. Some presumably non-locally made white pottery shards found in Kecskemét were subjected to material analysis. In addition to the white pieces, the fragment of a yellow pot stamped on the shoulder was also included among the samples. According to the results of the analysis, the material of the yellow fragment was completely different from that of the white ceramics, which – based on its properties – presumably originated from Northern Hungary.[52] From the aspect of local production the southern part of Fejér county and Tolna county are also interesting. Here, too, the stamped ware in question is

[44] The excavation conducted in 2018 was supervised by Sándor Petényi, and I also took part in it.
[45] *Siklósi 2010* 22.
[46] *Kolláth 2015* 130; *Kresz 1991* 537.
[47] *Holl 1963* 346
[48] E.g., Solymár-Vár, after *Feld 1976*.
[49] E.g., Visegrád-Vár (*Tóth 2006* figs 58–60); Visegrád-Királyi palota (*Kocsis 2016* fig. 6. 7).
[50] *Szentléleky 1960* 96; *Regenye – Rainer 1996* 78.
[51] E.g., *Holl – Parádi 1982a; Kovalovszki 1969; B. Wellisch 2008*.
[52] *Molnár et al. 2018* 20, 23. Its material also contained crushed carbonate stone, which, in my opinion, supports that it originated from one of the above-mentioned clay extraction sites at the foot of the limestone mountains.

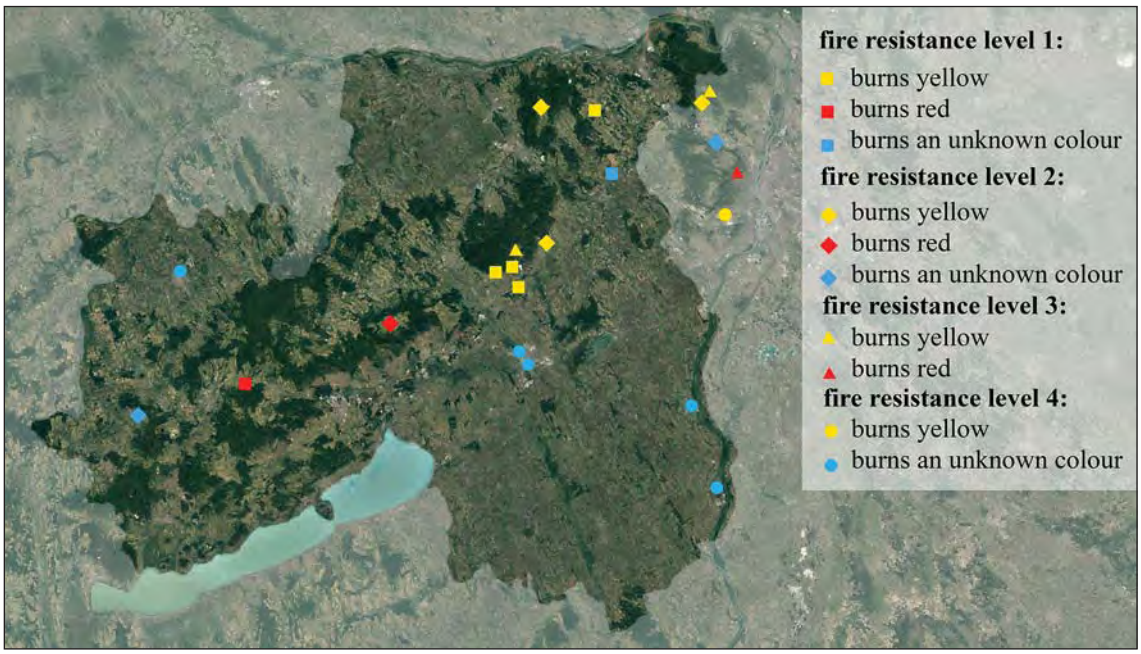

Fig. 5. Clay quarries in the area (after *Mattyassovszky – Petrik 1885* and *Kalecsinszky 1905*)

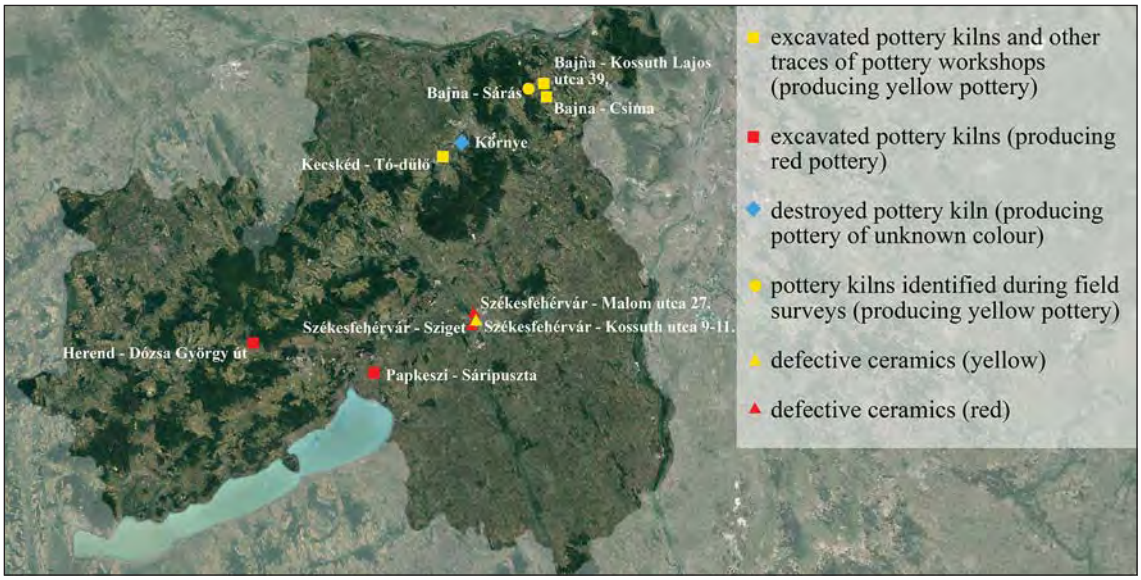

Fig. 6. Known late medieval pottery kilns and finds which refers to pottery workshops in the area

present in a considerable amount, but no clay firing to yellow colour was available. On the other hand, if we consider the market area of the modern pottery production centre around Csákvár using clays quarried at the southern foot of the Vértes Mountains, it appears that the Csákvár potters also transported their products to the area in question at that time *(fig. 7)*. In my view, the same might have been the case in the late Middle Ages, as well.

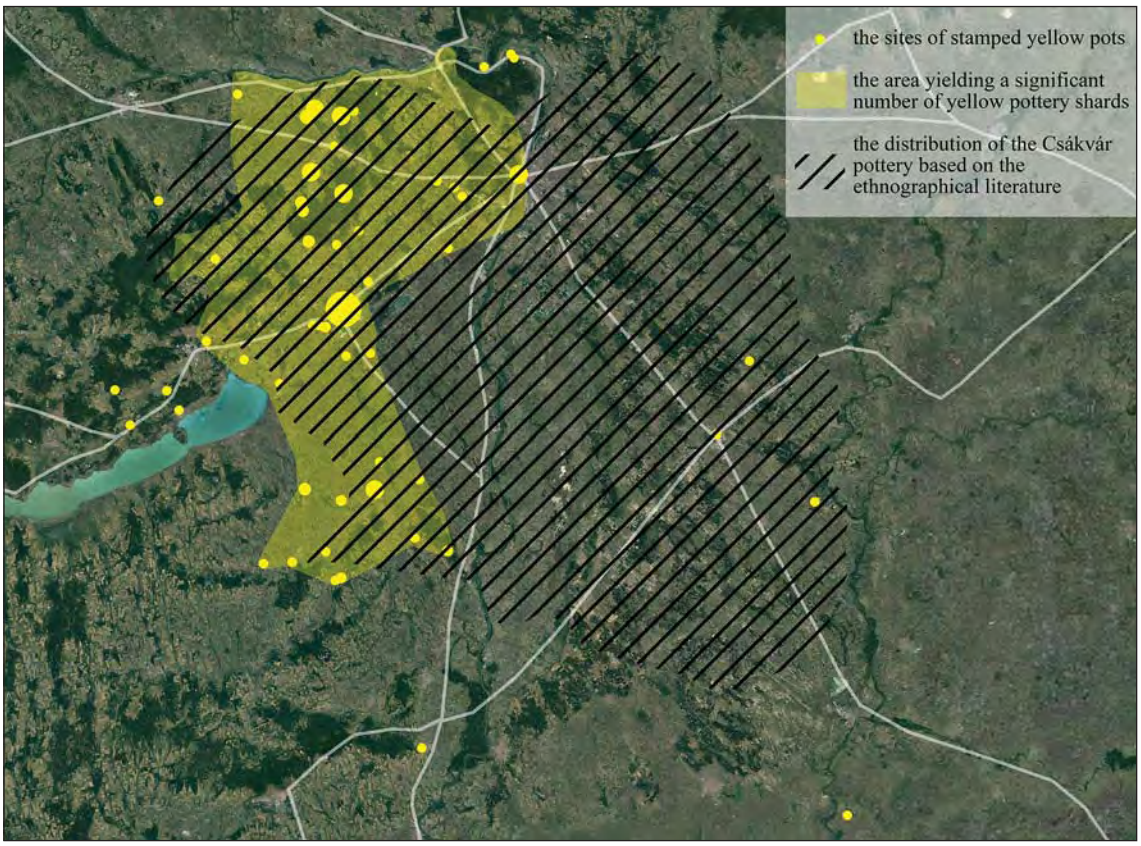

Fig. 7. Distribution of the late medieval yellow ceramics (second half of the 15th century and first half of the 16th century) and the market area of the pottery of Csákvár in the 19th century

Red pots

A small number of pots made of red-firing clay and stamped on the shoulder are also present in the material under investigation *(figs 8–9)*. Due to their extensive spatial distribution, their characteristics are not uniform, but their shapes are generally similar and were thrown on the fast wheel like their yellow counterparts. Red stamped pots with identical forms are present among the finds discovered at the castle of Ozora,[53] the castle of Felsőnyék,[54] Felsőnyék-Déli halastó,[55] Székesfehérvár,[56] Moha-5. lelőhely (archaeological site no. 5),[57] the castle of Tata,[58] the monastery of Vértesszentkereszt,[59] the castle of Solymár,[60] Esztergom-Kovácsi,[61] Biatorbágy-Református temető,[62] and Érd-Riminyák (Pusztafalu).[63] Dark pink vessels with similar shapes, but decorated with cylinder seal resulting in a lower quality also emerge among the artefacts of the castle of

[53] Inv. no. WMM OZ.84.8.
[54] *Miklós 1988* 210.
[55] Inv. no. WMM 85.12.3.
[56] Székesfehérvár-Piac tér (Inv. no. SZIKM 89.3430), Székesfehérvár-Sziget (Inv. nos SZIKM 82.1014, 83.267, 83.393 and 83.592), Székesfehérvár-Táncsics utca 2 (Inv. no. SZIKM 86.836), Székesfehérvár-Zalka utca 4 (Inv. nos SZIKM 90.1968 and 90.2284–90.2286).
[57] Inv. no. SZIKM 91.1557.
[58] Unpublished material (Inv. no. KDM 69.1.31).
[59] Inv. no. KDM 86.1.307, see *Mezősiné Kozák 1993* Pl. 33. 10.
[60] *Feld 1976* Pl. 15. 6.
[61] *MRT 5* Pl. 49. 8.
[62] *MRT 7* Pl. 49. 8.
[63] *MRT 7* Pl. 49. 11.

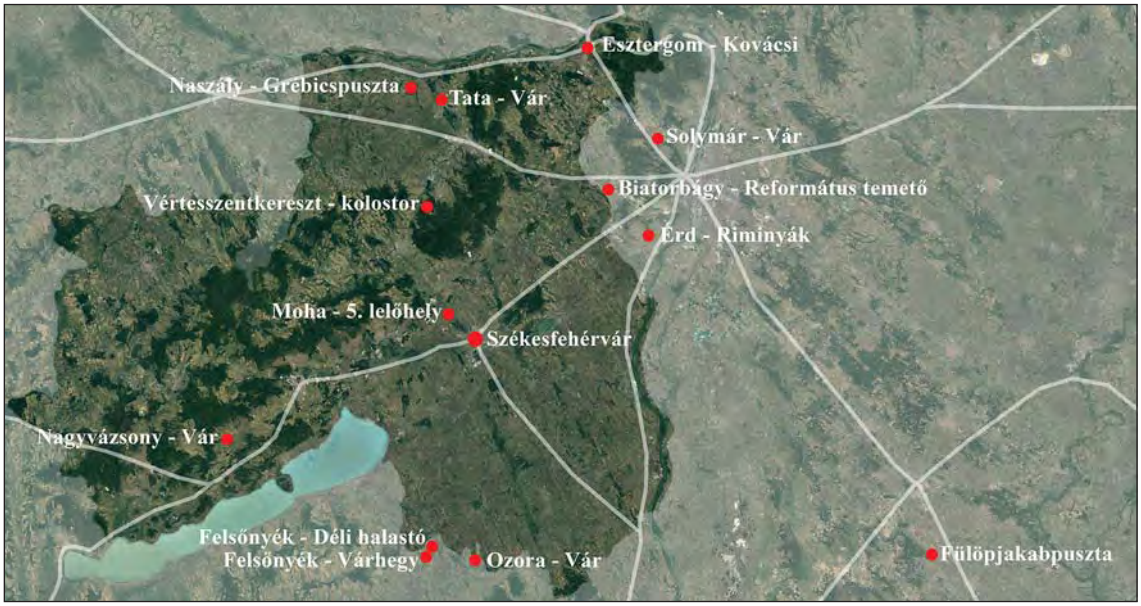

Fig. 8. Sites of the red pots with stamped decoration

Nagyvázsony.[64] A vessel with a similar shape in reddish-brown colour, but dated earlier, to the first half of the 15th century, is known from Fülöpjakabpuszta.[65] Red items with different types of rims can be found in the assemblage of the Tata-Vár[66] and site Naszály-Grébicspuszta,[67] which was an estate of the castle *(fig. 9)*. In the case of the latter fragments, only the mode of decoration was adopted, but concerning the other items, it is a question, why do they have similar shapes? In my view, except for the early piece from Fülöpjakabpuszta, these vessels no longer imitated the "Austrian-style pottery", but were rather the locally made, high-quality yellow ceramics. It seems likely that these are the products of workshops that did not have access to the better quality, yellow-firing clay. Nevertheless, the shapes of their vessels were influenced by the nearby workshops producing yellow ware.

Grey pots

Grey vessels stamped on the shoulder also existed in the studied area. Some of them are light grey and their forms are completely identical to the yellow vessels presented above (Székesfehérvár).[68] It seems likely that they were made in the same workshops as the yellow pieces, and their grey colour may be the result of a different rate of reduced firing, which could have been done on purpose or even by accident. Additionally, a dark grey, "Austrian-type" rim fragment was discovered in Vértesszentkereszt, which does not contain graphite, and its material and shape also differ from those of the pots described above. Similar ones are known from Kőszeg and Visegrád-Vár, which date to the 13th century,[69] so the item from Vértesszentkereszt may belong to the group of earthenware that emerged there.[70]

[64] I would like to thank Ádám Pátkai to allow me to inspect the assemblage of the 2018 excavation of the castle of Nagyvázsony partially.

[65] *Parádi 1963* 224, 244, fig. 17. 4.

[66] Inv. no. KDM 69.1.44.

[67] Inv. no. KDM 71.4.1.

[68] Székesfehérvár-Királyi bazilika (*Kolláth 2012* 22, fig. 27), Székesfehérvár-Vasvári Pál utca 3 (Inv. no. SZIKM 89.448), Székesfehérvár-Jókai utca 2 (Inv. no. SZIKM 87.856).

[69] *Holl 1992* figs 44–46; *Tóth 2006* fig. 78.

[70] Its place of discovery does not provide any clue for dating.

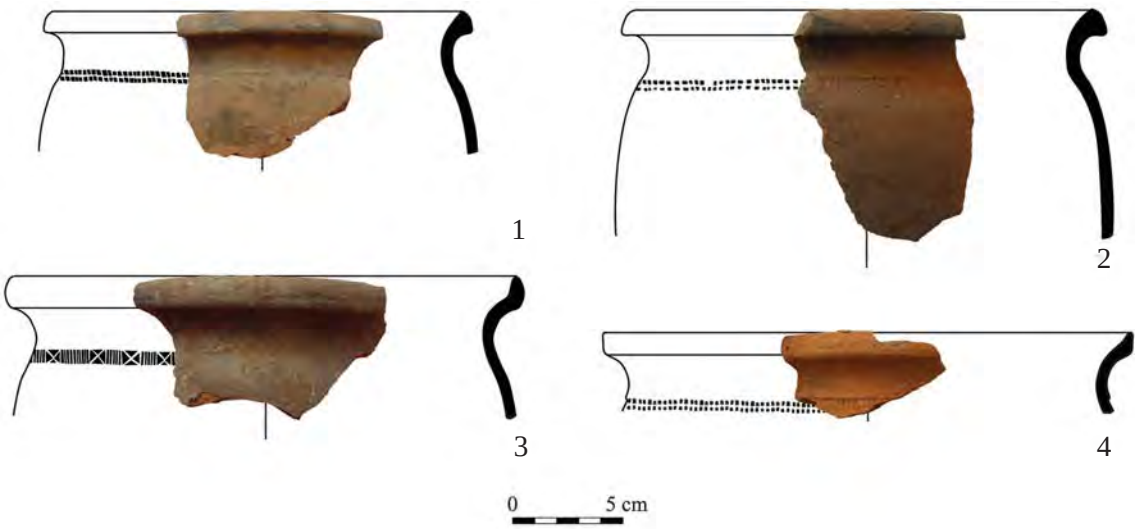

Fig. 9. Stamped red pots. 1, 3. Tata-Vár (Inv. nos KDM 69.7.31 and 69.1.44); 2. Oroszlány-Vértesszentkereszt (Inv. no. KDM 86.1.307); 4. Naszály-Grébicspuszta (Inv. no. KDM 71.4.1)

Dating the pots

A significant portion of pots stamped on the shoulder was yielded by mixed layers or field-walking surveys, but fortunately, some pieces were also found as part of a closed assemblage. The medieval cellar of the castle of Tata must have been buried around the mid-16th century based on the rich material – including 15th-century stove tiles and imported cups – discovered in it.[71] Most of the fragments unearthed during the small-scale excavation in the medieval market town of Ótata, next to the castle, came from a late medieval pit. Additionally, some other fragments were yielded by the levelling layer of a similar age. The former must have been used in the second half of the 15th century and the first half of the 16th century on the basis of 15th-century belt fittings and stove tiles dated to the second half of the 15th century discovered in its fill. The latter could also have developed in the first half of the 16th century judging from a Loštice cup originating from the late 15th century.[72] The Vértesszentkereszt Abbey was abandoned by its monks in 1543 and was not used afterwards, so the finds discovered there unquestionably date before this event.[73] A significant part of the fragments was found in layers that formed next to the northern wall of the monastery. The supervisor of the excavations thought that these layers must have been got into place when the building was reconstructed after 1478. According to written sources, the monastery was uninhabited for some time before the reconstruction, so the supervisor of the excavations dated the material found in the above-mentioned layers to the first half of the 15th century, which is confirmed by the large number of stove tiles dating to the reigns of Louis the Great of Hungary (1342–1382) and Sigismund of Luxembourg (1387–1437). The room in the north-east corner of the rectangular monastery functioned as a kitchen from the late 15th century on,[74] so a part of the layers could have started to develop next to it. Pots stamped on

[71] According to Sarolta Szatmári, who supervised the excavations, it was likely to take place in 1529, when the Ottomans occupied the castle for the first time, *Szatmári 1974* 47.

[72] *B. Kovács 2018* 33–35, figs 8–9, fig. 13.

[73] Strong burn marks were observed at several places in the area of the monastery, which probably indicates the destruction of the building. Most of the finds were discovered below this layer everywhere, *Mezősiné Kozák 1993* 60, 96.

[74] *Mezősiné Kozák 1993* 23, 94–95.

the shoulder were found in the fill layers of both periods.[75] In Géza tér located in the inner city of Székesfehérvár, a cesspit and a garbage pit were excavated, which therefore contained closed assemblages of artefacts. The finds discovered together with the pots stamped on the shoulder (i.e. glass and pottery artefacts) originate from the period preceding the Ottoman occupation, that is, the second half of the 15th century and the early 16th century.[76]

Turning to the items discovered outside the studied area, yellow and pink coloured pottery of "Austrian shape" emerged among the finds of the castle of Buda as early as the 14th century, as discussed above. The earliest item came from a layer dated with the coins of King Louis the Great and Queen Mary of Hungary (1382–1385).[77] In the castle of Felsőnyék, the excavation of the cistern yielded well-dated finds. At that site, the pots stamped on the shoulder came from a layer slightly above the layer that contained the coins of Vladislaus I, so the supervisor of the excavations dated them to the second half of the 15th century and the early 16th century.[78] Based on their stratigraphic position, the items unearthed from two cesspits of the castle of Ozora were dated to the late 15th and early 16th centuries by their publishers.[79] Two well-dated finds are known from the Great Hungarian Plain, as well. The brownish-red pot from Fülöpjakabpuszta must originate from the first half of the 15th century, based on the coins found in it.[80] The yellow item from Kecskemét was found in a 16th-century well that was filled back in the same century.[81]

In the light of the foregoing, the majority of the pots stamped on the shoulder discovered in North-Eastern Transdanubia fit well with the previously established chronology of similar pots in Tolna county: their production had its heyday in the second half of the 15th century and the first half of the 16th century. Within the investigated area, earlier items dated to the first half of the 15th century are only known from the monastery of Vértesszentkereszt. It is still uncertain how the 14th-century pots stamped on the shoulder in Buda relate to the presented group made in North-Eastern Transdanubia as no items belonging to such early assemblages are known from the latter area. Judging from the well-dated finds, it appears that the production of pots stamped on the shoulder terminated in the investigated area around the mid-16th century, presumably due to the devastation of the Ottoman wars.

The size and use of the pots

Most of the discovered pots stamped on the shoulder are, of course, fragmentary. Within the studied area, it occured only in Székesfehérvár that the discovered pottery shards could be fit together and completed.[82] This fact and the diameters of rim fragments indicate that the variations of stamped pots in terms of size were quite considerable. The items 20-22 cm in diameter (and about 7-10 litre in volume) were the most common ones, but much smaller and larger pots were also in use *(fig. 10).*

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[75] Based on the publication, it appears that the fill had several layers, but the finds discovered in it were bagged up together. The supervisor of the excavation dated the tableware found there to the second half of the 15th century, while the pots stamped on the shoulder – presumably based on the known analogues from Buda – were uniformly dated to the first half of the 15th century. Judging by the shapes of vessels, I believe that the fill contained pieces from the later period, as well, e.g. *Mezősiné Kozák 1993* Pl. 33. 12.

[76] Inv. nos SZIKM 80.188–80.243, 80.256–80.272 and 82.688–702.

[77] *Holl 1963* 346, 365, fig. 73. 4.

[78] *Miklós 1988* 210.

[79] *Feld – Gerelyes 1985* 169; *Feld et al. 1989* 181.

[80] The latest ones of which were minted towards the end of the reign of Sigismund of Luxembourg, *Parádi 1963* 210, 224.

[81] *Molnár et al. 2018* 14.

[82] Further completed items are known from the castles of Felsőnyék and Ozora, *Feld – Gerelyes 1985; Miklós 1988; Feld et al. 1989.*

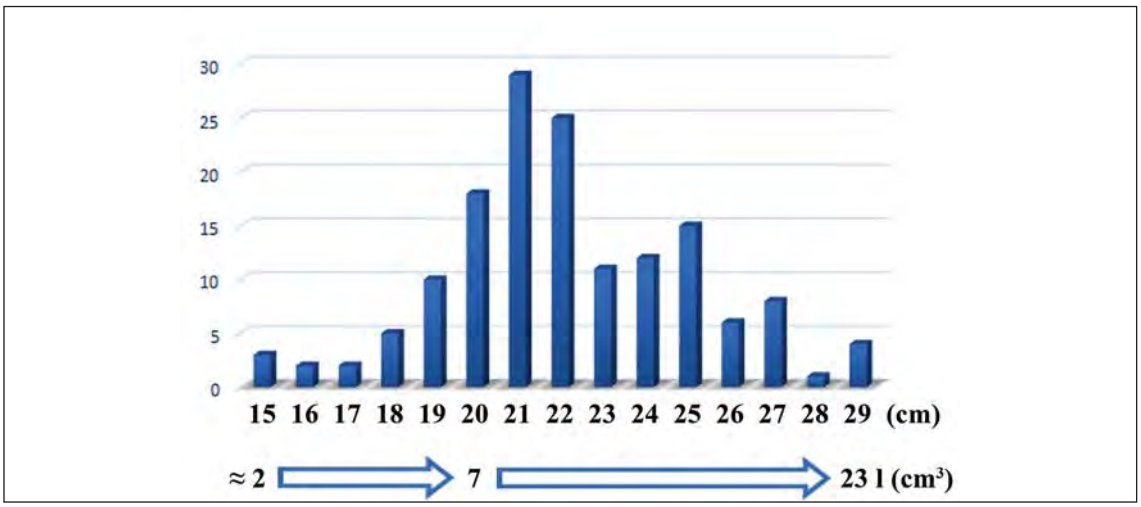

Fig. 10. Diameter and capacity of the stamped pots

The question of the function was raised in relation to an item found in the kitchen of the Visegrád Palace. Edit Kocsis proposed that the given vessel was used for storage because of the lack of soot traces on it.[83] Approximately two-thirds of the examined items showed characteristic marks of burning due to cooking, from the smallest to the largest pieces.[84] So these pots – like pots, in general – had primarily a cooking function, but some of them could certainly be used for storing, as well.

The appearance and size of the seals

Numerous representations of medieval potters have survived in Western Europe, showing several tools used by them during their work. Despite this, I have not found any image depicting a cylinder seal, yet. According to scholarly literature, this type of tool was used only by a few workshops in the modern era,[85] but their appearance was recorded during ethnographic collection,[86] and the seals used in the Middle Ages must have looked similar (a disc with a handle). The decorated pots can be used not only to reconstruct the motifs and thickness of the individual cylinders, but, provided that the complete section of a pattern is available, the diameter of the tool may also be calculated (based on the circumference of the circle: $K = 2 r \pi \rightarrow d = K / \pi$). In the case of the studied items, the length of the patterns was between 3.1 cm and 7.9 cm, so the diameter of the cylinders ranged from about 1 cm to 2.5 cm *(fig. 11).* The thickness of the cylinder was between 3 mm and 10 mm. Naturally, both in terms of the diameter and thickness the mean values were the most common (diam.: ca. 1.5 cm, Th.: 5-6 mm).

As no such tool is known from archaeological excavations, the material of the cylinder seals is uncertain. According to Péter Véninger, the seals originating from the Migration Period could be made of wood, ceramics, bone, and metal, alike.[87] When studying late medieval decorative pottery of Buda, Imre Holl inferred that wooden seals were used for their production.[88] Based on

[83] *Kocsis 2016* 179.

[84] E.g. pot, diam.: 15 cm (Inv. no. SZIKM 82.692); pot, diam.: 20 cm (Inv. no. SZIMK 80.260); and pot, diam.: 29 cm (Inv. no. SZIKM 82.688).

[85] E.g. in Mohács, pitcher makers used a rolling stamp cylinder, which was called 'cifra' in Hungarian, *Kresz 1991.*

[86] *Csupor – Csuporné Angyal 1998* fig. 22.

[87] *Véninger 2016* 218.

[88] *Holl 1963* 355.

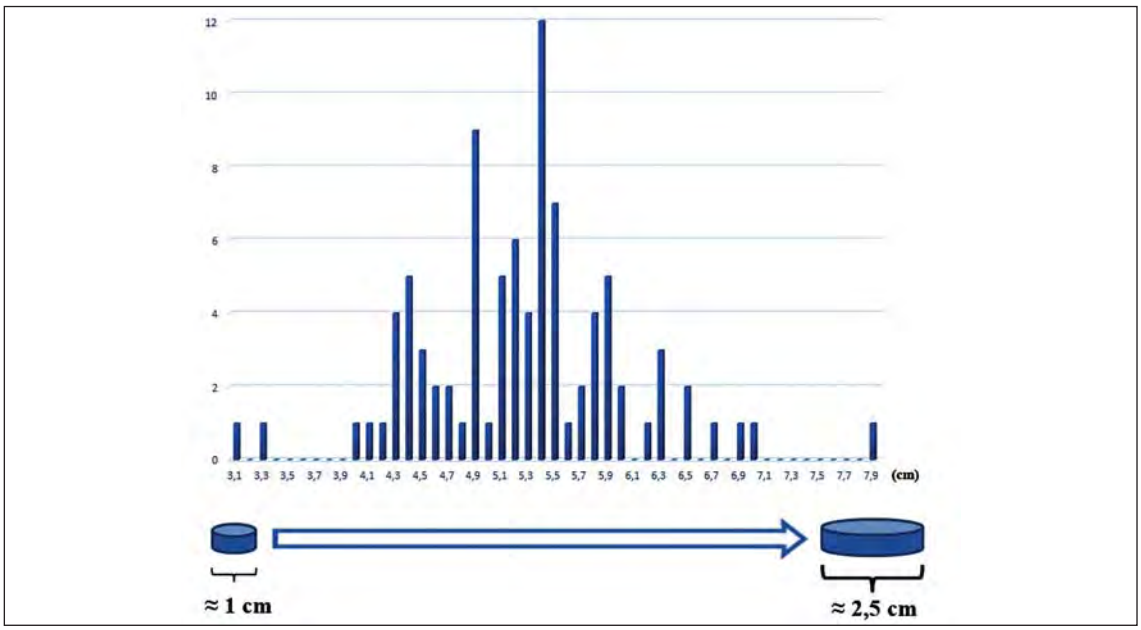

Fig. 11. Section length and the diameter of the stamping tools

ethnographic collections, wooden cylinder seals were used in the modern era.[89] Consequently, wood seems to be the most likely material in the case of medieval cylinder seals, as well. If that is so, it also explains why no such tool has come to light in archaeological excavations, so far. From this point of view, the large glazed storing vessels from Visegrád mentioned above are also interesting. Only five of them bore stamped decoration, yet these were made not with one but two cylinder seals of almost identical pattern. The two patterns differ in a minor detail, which also renders their diameters somewhat different. One of them is made up of slightly thinner lines, but otherwise, the proportions and angles of the motifs on them are completely identical.[90] The close similarity raises the question whether it is possible (and worthwhile) to make such an exact copy of wood. In my opinion, they must have made a clay replica of a wooden seal, which also seem to offer an explanation for the slightly thinner lines. Based on this, it is far from certain that all medieval cylinder seals were made of wood, but of course, this could only be proved if a tool would be found during an excavation.

Patterns

The patterns on the cylinder seals are extremely diverse. They have numerous variations ranging from the simplest patterns consisting of two to three rows of small squares to the more complex versions divided by various X motifs. On one occasion, decoration made with a cylinder seal was referred to as a workshop sign in scholarly literature,[91] so I thought it would be worth addressing this question, as well. In this, I could make use of the finds unearthed during the 2018 excavation of the site Kecskéd mentioned above. I could inspect only a part of the artefacts produced in the workshop discovered there, but even this was enough for me to identify the motifs of at least seven different cylinder seals. Some of these belonged to the simplest type, comprising two rows of squares, but there were other motifs (e.g. fishbone pattern), as well. In my view, this suggests that the patterns were not used as workshop signs but rather as decorations. We

[89] *Csupor – Csuporné Angyal 1998* 32.
[90] *Tóth 2006* 58, figs 166–167.
[91] *MRT 7* 101.

cannot say that vessels decorated with different cylinders were made in different workshops, but the pieces bearing completely identical patterns were certainly produced in the same workshop. Concerning the rim stamps of grey graphite ceramics, the experiments carried out by Márta Vizi demonstrated that the same seal could produce different patterns due to the convexity and different dimensions of the rims of the pots.[92] In the case of vessels decorated with a cylinder seal, these minor differences are less confusing, since they bore was a complete row of motifs which, even if not pressed on the vessel at the same angle, could be compared due to the repetition of the small motifs. The assemblage from Tata, for example, comprised a pot on which the same cylinder seal was applied upside down as on another item, but the identity was still clearly visible. Thus, the close observation of the stamped patterns can help us to identify the market district of a workshop even if we do not know the place of production itself. Naturally, the successfulness of its reconstruction depends on the discovery and accessibility of finds.

Relations based on the patterns

Based on the patterns available so far, several connections could already be recorded, the number of which will certainly increase in the future *(fig. 12)*. Naturally, in some cases, the pots belonging to the assemblage of the same site (e.g., Tata-Kossuth tér 16[93], Tata-Vár[94]) were decorated with

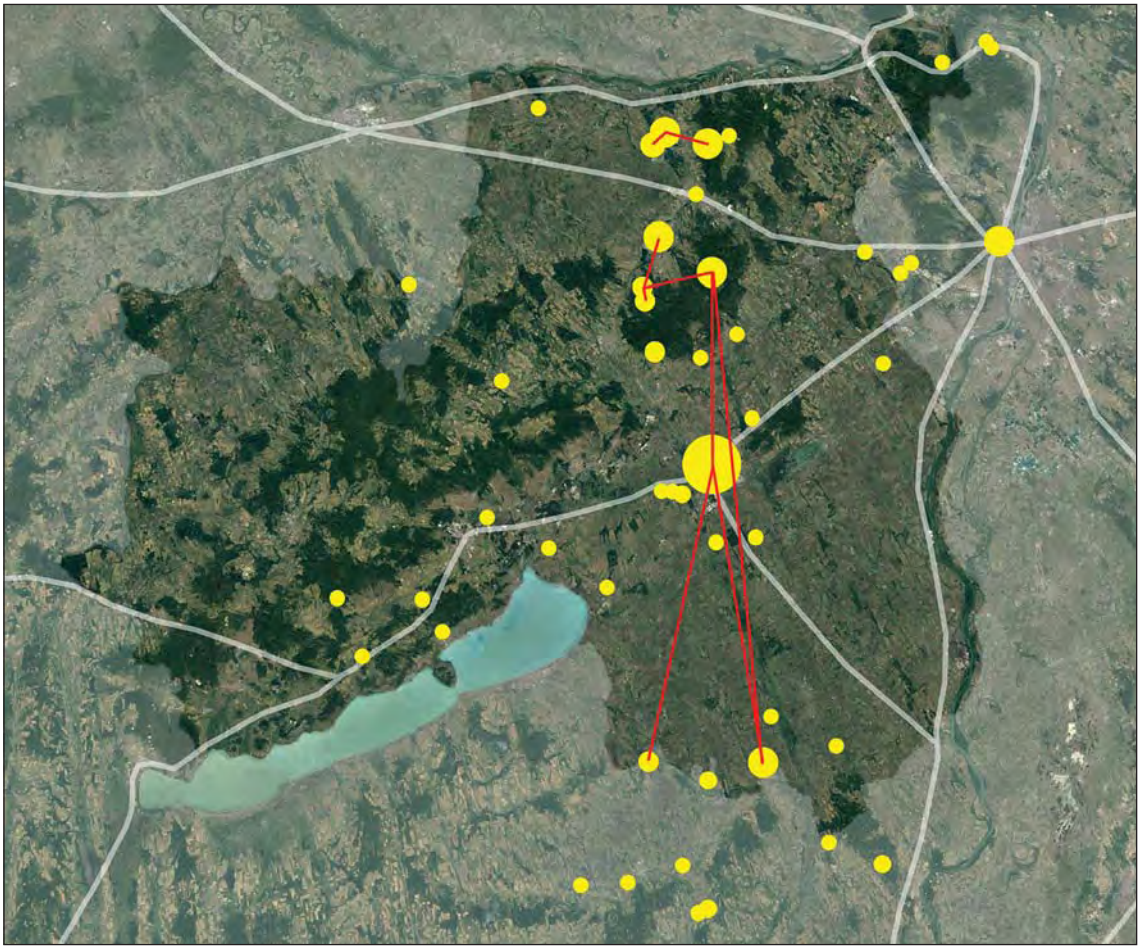

Fig. 12. Network relations based on the patterns

[92] *Vizi 2000* 182.
[93] Unpublished finds (Inv. nos KDM 2016.13.29.124 and 2016.13.29.167).
[94] Unpublished finds (Inv. nos KDM 66.3.450 and 67.6.9).

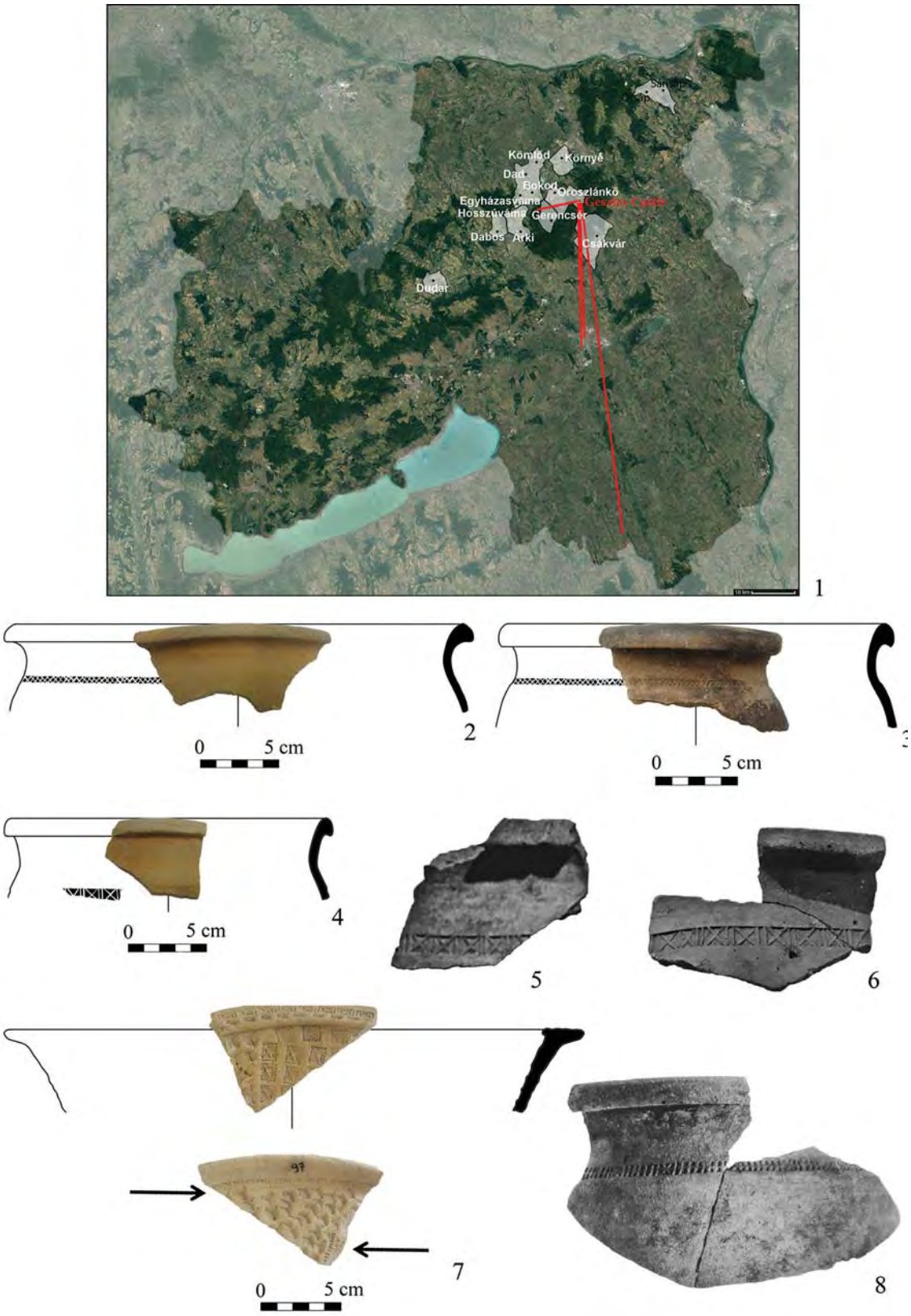

Fig. 13. Network relations of the stamped ceramics of the castle of Gesztes. 1. The estates of the castle of Gesztes and the relations of the stamp patterns on the finds from the castle;
2, 4, 7. Gesztes-Vár (KDM not inventoried); 3. Oroszlány-Vértesszentkereszt (Inv. no. KDM 86.1.364);
5. Székesfehérvár-Sziget (Inv. no. SZIKM 82.1014); 6. Igar-Kemencék (Inv. no. SZIKM 81.6.67);
8. Székesfehérvár-Szűcs Gyula utca (Inv. no. SZIKM 55.196.1)

the same pattern. From the aspect of relations, it is of particularly high importance to examine the finds of those sites where there was certainly no local production (e.g. castles). In the case of the Tata-Vár, based on the stamped patterns found on the pots, it was possible to demonstrate links with the finds of two nearby sites, Tata-Kossuth tér 16 (the area of the former Ótata market town) and Baj-Öregkovács-hegy (a noble manor house), which clearly illustrates that the castle and the surrounding settlements were supplied by the same workshops with cooking pots. In this respect, the case of the castle of Gesztes in the Vértes Mountains is even more intriguing, as it seems to have been provided with ceramics by workshops located both to the north and south of the mountains. The former is demonstrated by a completely identical stamped pattern known from the Vértesszentkereszt Abbey, while the latter is supported by another stamped pattern also known from Székesfehérvár and Igar, as well as by the decoration of a ceramic tableware, the exact analogue of which was again discovered in Székesfehérvár *(fig. 13)*. This is striking because, logically, it would have been easier to supply the castle from the north than to transport pottery across the mountain from the south, all the more so as products of the same quality were made in both places. Perhaps, the fact that ceramics were also taken to the building from the south may be in connection with the fact that Csákvár, located on the south side of the Vértes, was one of the estates of the castle. It is possible that the situation similar to the case of the village of Deák, a property of the castle of Sümeg, where, according to a written document from 1524, the potters of the village provided vessels for the kitchen of the castle in exchange for some tax relief.[95] In the case of the monastery of Vértesszentkereszt, also situated in the Vértes, in addition to the item from Gesztes mentioned above, connections could be demonstrated with Gerencsérvár and the ceramics of the Kecskéd pottery workshop on the basis of the decorative patterns.[96] I have seen relatively few assemblages from sites to the south of the Vértes in person, but some connections might be established even in this way: in Székesfehérvár the possibility of the same stamped motif emerged in connection with a fragment discovered in the castle of Felsőnyék and a fragment from the site of Igar-Kemencék, in addition to the patterns known from the castle of Gesztes.[97]

Considering the pottery studied so far, it could be observed in the case of vessels decorated with the same stamped pattern that their tempering was similar and the shapes of their rims were identical, as well. Since the rim shapes differing only in minor details may reflect the passage of time and multiple potters may as well have produced the same rim forms, more extensive statistical analyses might be needed to associate undecorated pots with stamped ones.

Stamped tableware

Tableware comprises more impressive items of stamped pottery. Stamped patterns can be seen on four types of artefacts. Stamped cups and bowls are the most common ones, and sometimes jugs and lids are also decorated in this way. The distribution area of such pieces of tableware was much larger than that of pots stamped on the shoulder. While the decoration of cooking pots with stamping was used only by potters in North-Eastern Transdanubia, the stamping of tableware was also widespread in Western Transdanubia *(fig. 14, Table 2)*.[98] Known vessels and fragments make it possible for us to identify several workshops. When studying the finds from Buda, at first, Imre Holl was able to distinguish between two groups within tableware decorated with stamping.[99] The first group comprised vessels made of white or yellowish material, with

[95] *Holl – Parádi 1982a* 110.
[96] Unpublished finds in Kuny Domokos Museum in Tata and *Mezősiné Kozák 1993* Pl. 33. 12.
[97] Székesfehérvár-Sziget (Inv. no. SZIKM 79.125) and the castle of Felsőnyék (Inv. no. WMM 85.1.570).
[98] E.g. *Parádi 1965* 163.
[99] Groups I and II of the decorative pottery of Buda.

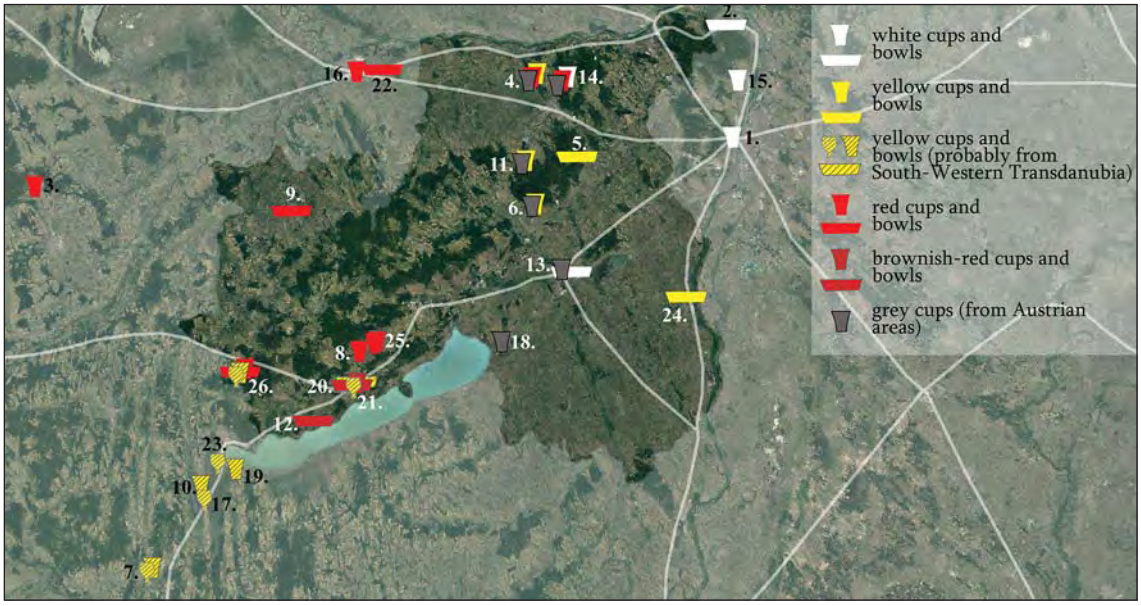

fig. 14. Distribution of stamped tableware types in and around the studied area (see details *Table 2*)

or without glaze, and the second consisted of glazed cups and bowls with the red material and white engobe.[100] Later, he identified further types, which were also present in the castle of Buda, even if in small numbers.[101] Some pieces of pottery belonging to Group I were also discovered at the sites examined by us. The glazed items seem to be largely concentrated in the central region of the country, mainly around Buda,[102] but their unglazed versions were discovered in more remote places, as well.[103] A cylindrical cup made of fine yellowish clay and decorated with triangular stamped motifs was found in the castle of Tata *(fig. 15. 2)*.[104] The fragment of pottery vessel fired pink, and decorated with stamping and spikes was discovered in the monastery of Vértesszentkereszt.[105] The excavations of the manor house at Baj brought to light the fragments of a very fine, stamped cup fired snow-white,[106] which is probably associated with a cup discovered at Szent György tér in Buda,[107] and a stamped bowl known from the Visegrád Citadel.[108] In the castle of Csókakő, the fragment of a yellowish-white cup with bevelled rim was unearthed. Its rim was decorated with impressed sticks, and below the rim, a row of stamped triangles is visible *(fig. 15. 5)*.[109] At the Hospitallers' Convent in Székesfehérvár, a white pottery shard decorated with leaf-shaped stamped motifs was discovered *(fig. 15. 7)*.[110] The fragments of two unglazed bowls

[100] *Holl 1963* 355.
[101] *Holl 2005* 377–382.
[102] *Holl 1963* 362–364.
[103] Published unglazed items from the central part of the country: Royal Castle in Buda (*Holl 2005* Abb. 41); Pomáz-Kastély (*MRT 7* Pl. 49. 12–13); Esztergom-Helemba-sziget (*Parádi 1965* 159, fig. 51, it is considered to be a local item, and not the product of a Buda workshop).
[104] *Szatmári 1974* fig. 9; *László – Schmidtmayer 2008* 58, cat. no. 40.
[105] *Mezősiné Kozák 1993* Pl. 29. 3.
[106] Inv. nos KDM 96.109.1 and 96.113.1.
[107] *Benda 2002* fig. 11.
[108] *Tóth 2006* 52, Pl. 75.
[109] Inv. no. SZIKM 89.1.914, datasheet at the Archaeological Archive of the Research Centre for the Humanities.
[110] From the site Székesfehérvár-Sziget (Hospitallers' Convent) (Inv. no. SZIKM 79.215).

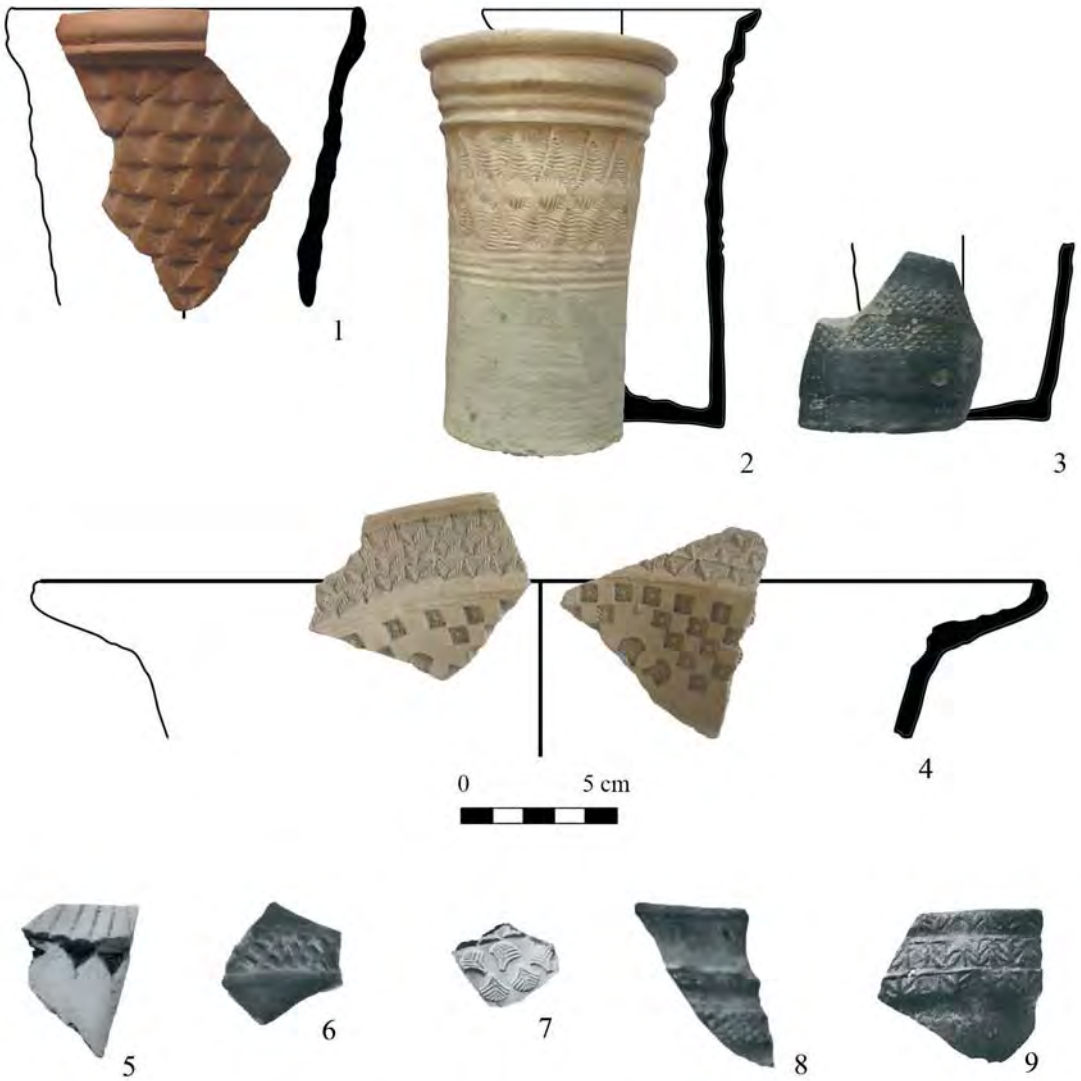

Fig. 15. Stamped tableware. 1–3. Tata-Vár (Inv. nos KDM 68.20.682, 66.3.410 and 68.20.853); 4. Gesztes-Vár (KDM not inventoried); 5. Csókakő-Vár (Inv. no. SZIKM 89.1.914); 6. Balatonfőkajár-Rókalik (Inv. no. LDM 65.50.12); 7, 9. Székesfehérvár-Sziget (Inv. nos SZIKM 79.215 and 79.214.); 8. Székesfehérvár-Gagarin tér (Inv. no. SZIKM 90.1425)

were found at the castle of Gesztes.[111] One of them is of finer material, pink-yellow in colour, and has a wide rim decorated with triangular motifs similar to that on the Tata cup, and bears square and leaf-shaped seal impressions on its side *(fig. 15. 4).* Leaves similar to the latter also appear on ceramics from Buda[112] and the mentioned fragment from Székesfehérvár, while the triangular motif can be seen on pottery shards from Nagykanizsa in addition to those from Buda.[113] The material of the other fragment from Gesztes also has yellowish material, but it was tempered with slightly coarser, larger-grained sand, and its rim was much narrower than that of the other specimen. It is covered with patterns not only on the inside but also on the outside. In addition to the stamped motif showing an X within a frame, a triangular stamped pattern similar to the

[111] Kuny Domokos Museum in Tata, without inventory number.
[112] *Holl 1963* fig. 54.
[113] *Parádi 1965* fig. 53. 8.

one demonstrated above also appears on it, but their placement seems much more casual, lacking a concept. On the outer surface, there are also triangular motifs and an ornament made with a cylinder seal known from pots also appears on it. This suggests that in the workshop where the bowl was made, pots stamped on the shoulder were also produced, which is confirmed by a pot from Székesfehérvár decorated with the same pattern *(fig. 12. 7–8)*.[114] Based on their quality, the pieces discussed above must have been produced by potters in Buda, while the latter fragment certainly comes from a local workshop.[115] The bowl fragment from Iváncsa, already described by Imre Holl, seems to have similar material.[116] From the yellow cups discovered in Sarvaly, Imre Holl also inferred to a workshop found in the countryside, but he localised it in Southern Transdanubia based on the published fragments from Nagykanizsa[117] and some unpublished pieces (from Zalavár, Balatonszentgyörgy-Téglagyár, and Fenékpuszta-Pusztaszentegyháza).[118] The published item from the Balatonmagyaród-Kolon site[119] can certainly be connected to this circle, just like a cup from Felsődörgicse[120] and perhaps a bowl fragment from Alsódörgicse.[121] Stamped lids emerging among white and yellowish ceramics (e.g. Buda,[122] Kőszeg[123]), are still not known from Central Transdanubia.

The fragments of red cups found at the castle of Tata *(fig. 15. 1)* and the manor house of Baj' belong to another group, which is missing from Buda. Both vessels are bright red and have finely tempered material and a polished surface. They are shaped like a funnel. The side of the cup from Tata is decorated with triangles, while the side of the one from Baj bears rouletted patterns, and both have bumps on the inside due to stamping. Similar stamped ceramics imitating Gothic metal cups were widely used in the second half of the 15th century: their specimens were discovered in Buda and its region, as well as in Lower Austria[124] and in the territory of present-day Slovenia (the so-called Celje type cup).[125] Due to the material and the technique used, the two items presented above can be classified into a relatively well-defined group. Similar pieces are known from Győr-Káptalandomb,[126] the castle of Kőszeg,[127] the castle of Nagyvázsony,[128] and probably a fragment from Sarvaly and another piece from Csepely[129] can be classified here, too.[130] The listed finds were presumably the products of a workshop the market district of which seems to have covered the Little Hungarian Plain and its peripheral areas, and their place of production must have also been located somewhere in this area. Other, stamped cups of similar shape, but rather brownish-red in colour also appear in the Balaton Uplands. However, because of the difference in the quality of their material and the lack of bumps on the inside, they must have been made in a different

[114] Székesfehérvár-Szűcs Gyula utca (Inv. no. SZIKM 55.196.1).
[115] Its material and quality is very similar to those of the stamped pots found in the region.
[116] *Holl 1963* fig. 65.
[117] *Parádi 1965* fig. 53.
[118] *Holl – Parádi 1982a* 104.
[119] *Vándor 1996* fig. 70.
[120] *Pintér 2006* fig. 15. 1. It is not evident from the drawing that the cup was decorated with stamping, but I also had the opportunity to view it in person.
[121] Inv. no. LDM 78.37.61. This piece has fine, yellowish material, *B. Wellisch 2008* fig. 15 (the fragment in the middle).
[122] *Holl 2005* Abb. 41.
[123] *Holl 1992* fig. 53. 1–2.
[124] *Holl 2005* 382, Abb. 54.
[125] *Guštin 2001* 146–154.
[126] *Szőke – Szőnyi – Tomka 1978–1979* Taf. 85. 1.
[127] *Holl 1992* Pl. 59. 13; *Holl 2005* Abb. 17. 3.
[128] From the excavations conducted in 2018.
[129] *Kovalovszki 1969* fig. 33 (the top left fragment).
[130] It is not clear from the publication whether they had bumps on the inside, hence the uncertainty.

workshop from the group of pottery discussed above. They have been discovered in Csepely[131] and Felsődörgicse[132] so far, so it is possible that they were made in one of the local workshops, the market district of which covered a smaller area based on our current knowledge *(fig. 14)*. Among the red, stamped cups it is possible to identify a major group, which comprised both funnel-shaped cups and spherical goblets. Their common feature is a more coarsely tempered material and less demanding workmanship. Their specimens are mainly known from Sarvaly,[133] but they were also found in Alsódörgicse[134] and the Little Hungarian Plain (e.g. Kóny).[135] On the other hand, they seem to be missing from the territory of Eastern Transdanubia. These vessels intended for use on the table must have been made in local workshop(s), which also produced simple kitchen vessels.

A few bowls of red material are also known from the area under investigation. In the western part of this area, they form at least three different groups according to their material and quality similar to that of the cups. The pieces of the finest material – like the first type of red cups presented above – made with the most careful craftsmanship have a polished surface, and there are bumps on their outer surface due to stamping.[136] One of the bowl fragments found in the site Győr-Szeszgyár[137] and another one from Sarvaly[138] can be included here. Based on their characteristics and area of distribution, their place of production is likely to be the same as that of the first group of red cups. Conditionally, the piece found in the castle of Pápa can also be included here, although its colour is grey according to the publication. Its craftsmanship, however, seems to be completely identical to that of the red bowls.[139] It is still uncertain how the spherical goblet with a polished surface and the polished bowl – which has a different shape from the previous bowls – discovered in Sarvaly relate to the first group, as their material appears to be different based on the photographs found in their publication. The second group comprises unpolished items of slightly coarser material but still of good quality and decorated with a variety of stamped patterns. Its known provenances are Alsódörgicse[140] and the Pauline Monastery at Salföld *(fig. 14)*.[141] The items belonging to the third group might be imitations made by local masters. Their material is much coarser, tempered with small pebbles. In some cases, the stamped motifs were replaced with a simple rouletted pattern (Gyepükaján-Nagykeszi,[142] Sarvaly[143]), and there are even some pieces where the stamped decoration was imitated with incisions (Győr-Szeszgyár,[144] Alsódörgicse[145]).

[131] *Kovalovszki 1969* fig. 33 (the fragments in the middle of the second row).
[132] *Pintér 2006* fig. 16. 2.
[133] *Holl – Parádi 1982a* Abb. 164, Abb. 165. 5–8.
[134] Inv. no. LDM 78.2.37.62, see *B. Wellisch 2008* 61.
[135] *Holl 1963* 364, fig. 64.
[136] There were bumps on the outer surface because the bowls, unlike the cups, were usually decorated on the inside.
[137] *Takács – Paszternák 2000* fig. 13. 2.
[138] *Holl – Parádi 1982a* Abb. 54. 1, Abb. 160. 6.
[139] *Mithay 1988* fig. 9. 11; after photograph (neg. no. 54.487) in Archaeological Archive of the Research Centre for the Humanities shows well that the surface of the piece was polished. It may have turned grey only due to secondary burning, but, of course, reduced firing is also possible.
[140] *B. Wellisch 2008* fig. 15 (the fragment on the right).
[141] Inv. no. BM 65.117.309.
[142] *Holl – Parádi 1982b* fig. 12. 3–5.
[143] *Holl – Parádi 1982a* Abb. 54. 3.
[144] *Takács – Paszternák 2000* fig. 13. 4.
[145] *B. Wellisch 2008* fig. 15 (the fragment on the left).

In connection with red, stamped vessels, it is also worth mentioning those vessels that were used for storing liquid, as their handles were sometimes decorated with impressed motifs. This way of decoration does not seem to have been popular among potters who made yellow ceramics,[146] but in red material various items came to light in Sarvaly.[147]

Finally, the representatives of one more group were present in the studied area. The items that can be classified here were made of particularly fine material. Their outer surface is dark grey, while their inner surface and their broken surface is light grey. In terms of their material and colour, they are very similar to the grey jars made with reduced firing known from the early modern period. Although the fragments are tiny, most of them appear to belong to cylindrical cups. Their sides are decorated with a stamped grid pattern. Until now, such ceramics are known from five sites, namely the castle of Tata,[148] the Baj manor house,[149] the monastery of Vértesszentkereszt,[150] Székesfehérvár,[151] and Balatonfőkajár[152] *(fig. 15. 3, 6, 8)*. While the context of the fragments from Baj, Székesfehérvár, and Balatonfőkajár cannot be dated well, the item from Tata was found in the previously mentioned cellar buried around the middle of the 16th century,[153] and the Vértesszentkereszt Abbey was abandoned around the 1543 Ottoman occupation of Tata and was not used later.[154] Therefore, based on the latter two find-circumstances, these fragments must be dated to the late Middle Ages (the second half of the 15th century or the first half of the 16th century). Similar cups dating to the second half of the 15th century are known from several sites in Austria and Moravia (Wiener Neustadt, Eisenstadt, Horn,[155] Pfaffenschlag),[156] so the origins of this group of grey pottery can probably be located in that area.

Other types of pottery

It is worth mentioning here that decorations made with a seal or cylinder stamp appear not only on vessels but also on other ceramic artefacts (e.g., stove tiles, children's toys).[157] So far, such stamped decoration is known from a stove tile (Tata-Kossuth tér 16) [158] and a red candlestick (Székesfehérvár-Sziget)[159] within the examined area.

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[146] Among the finds viewed so far, I did not find any handle made of yellow clay decorated with stamping. It was only in the case of the jug from Sarvaly that I suspect that it could be yellow in colour based on its decoration and the material as seen in its published photograph, but the authors mention it among the red jugs, *Holl – Parádi 1982a* 100, Abb. 160. 5.

[147] *Holl – Parádi 1982a* Abb. 160. 1–5, Abb. 163. 5–6.

[148] Inv. no. KDM 68.20.853.

[149] Inv. nos KDM 2010.2.233 and 2010.32.42.

[150] *Mezősiné Kozák 1993* Pl. 29. 4.

[151] Székesfehérvár-Vasvári Pál utca 3 (Inv. no. SZIKM 89.652); Székesfehérvár-Gagarin tér (Inv. no. SZIKM 90.1425), Székesfehérvár-Sziget (Inv. no. SZIKM 79.214).

[152] Inv. no. BBM 65.50.12.

[153] *Szatmári 1974* 47.

[154] *Mezősiné Kozák 1993* 96.

[155] *Cech 1985* 256, Abb. 36.

[156] *Nekuda 1975* Abb. 99. 8.

[157] E.g. *Slivka 1991* Abb. 5.

[158] *B. Kovács 2018* fig. 8 (the fragment on the right).

[159] Inv. no. SZIKM 81.166.

Societal questions

The different character of the sites of the examined group of vessels also allows us to draw conclusions about society. The data indicate well that the stamped pots were widely used. They were used in the kitchens of royal and aristocratic residences and ecclesiastical buildings, as well as in towns, market towns, and rural environments *(Table 1)*.[160] This can be observed both near their sites of production and in more remote place, too.

In contrast, stamped tableware of higher quality comes from a more upscale environment based on our current knowledge *(Table 2)*. In the eastern part of the studied area, grey, white and yellowish tableware is known only from castles (Csókakő, Gesztes, Tata), noble residences (Baj), and ecclesiastical environments (Székesfehérvár, Vértesszentkereszt).[161] In the western part of the studied area, the high-quality red ceramics emerge not only in castles but also in wealthier rural houses (Sarvaly, Csepely, Felsődörgicse). At the sites of the examined area (Sarvaly, Felsődörgicse, Alsódörgicse), the same can be observed in the case of yellow tableware associated with South Transdanubian workshops. Additionally, the lower-quality versions of red pottery may have been popular with the poorer members of the population.

Summary

Pots decorated with cylinder seals on the shoulder represent a characteristic type of ceramics, mainly of those yellow and yellowish-white in colour. Their presence can be evidenced in the examined area as early as the first half of the 15th century, but, according to our current knowledge, they became more widespread from the second half of the 15th century onwards and their production can be attested until the middle of the 16th century. The place of production of these pots can be located in the region of the Vértes and Gerecse Mountains, based on the identified quarries of refractory clay firing to a yellow colour and the distribution of the ceramics themselves. Their production around Buda is still uncertain. According to the testimony of finds, this mode of decoration was not used in the territory lying to the east of the Gerecse, but it was popular to the south and north of the Vértes, and to the west of the Gerecse. The comparison of the stamped motifs enabled us to prove that some of the vessels discovered at different sites were made in the same workshop. The number of such vessels will certainly increase in the future as more and more stamped pots are identified. By mapping the distribution of pots stamped on the shoulder, we also obtained information about the market district of yellow and yellowish-white ceramics produced in the studied territory, which covered a much wider area than the place of production. Southwards, these pottery vessels were transported in large amounts as far as the central part of Tolna county, but a few items appear farther away, as well. Furthermore, these products also seem to have been imitated in the region by potters using red clay.

In the area under investigation, the tableware decorated with stamping comprises a few vessels that can be classified as the so-called decorative pottery of Buda, but similar items were also made by local workshops producing yellowish ceramics. The red, unglazed, stamped tableware emerged primarily in the western half of the studied area. Based on their quality, at least three groups of them can be distinguished. Furthermore, in the eastern part of the area some fine grey stamped items were also found, which Austrian provenance can be presumed.

[160] As the pots found in the area of the former villages were mostly discovered during field surveys, it is not yet possible to decide whether they came only from the richly furnished houses or they were also used in the poorer houses of these settlements.

[161] Except for two items discovered during field-walking surveys.

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APPENDIX

Type of the archaeological site	Site no. on maps	Name of the archaeological site	Quantity (Yellow pots)
Castle – Royal residence	1	Buda-Királyi palota	?
	2	Visegrád-Vár	3
	3	Visegrád-Királyi palota	1
Castle – Royal residence / noble residence	4	Oroszlány-Gerencsérvár	12<
	5	Tata-Vár	43
	6	Várgesztes-Vár	32
Castle – Noble residence	7	Csókakő-Vár	14<
	8	Felsőnyék-Várhegy	16
	9	Ozora-Vár	5<
Monastery / other ecclesiastical buildings	1	Buda-Domonkos kolostor	1
	10	Dömös-Prépostság	1
	11	Oroszlány-Vértesszentkereszt-kolostor	9
	12	Székesfehérvár-Vasvári Pál utca 3.	3
	12	Székesfehérvár-Szent Anna kápolna előtt	1
	12	Székesfehérvár-Sziget	25
Manor-house	13	Baj-Öregkovács-hegy	42
Town	12	Székesfehérvár-Arany János utca	1
		Székesfehérvár-Gagarin tér	5
		Székesfehérvár-Géza tér	9
		Székesfehérvár-Jókai u. 2.	5
		Székesfehérvár-Jókai u. 20.	2
		Székesfehérvár-Kossuth utca	1
		Székesfehérvár-Kossuth utca 9–11.	2
		Székesfehérvár-Népköztársaság út 21–23.	1
		Székesfehérvár-Piac tér	10
		Székesfehérvár-Táncsics Mihály utca 2.	10
		Székesfehérvár-Zalka utca 4.	12
		Székesfehérvár-Zalka utca 6.	1
Suburb	1	Buda-Tabán	?
	12	Székesfehérvár-Malom utca 16.	1
		Székesfehérvár-Malom utca 28.	1
		Székesfehérvár-Malom utca 35.	5
		Székesfehérvár-Móri út 26.	1
		Székesfehérvár-Móri út 28.	1
		Székesfehérvár-Szűcs Gyula utca	2
	12	Székesfehérvár-Selyem utca	1
		Székesfehérvár-Selyem utca 1–13.	13
Market town	14	Kecskemét-Nagykőrösi utca 7–9.	1
	15	Tata-Kossuth tér 16.	19
		Tata-Nagykert utca 34–36.	1

Table 1. Types of the archaeological sites with stamped pots and their quantity

Type of the archaeological site	Site no. on maps	Name of the archaeological site	Quantity (Yellow pots)
Village	16	Aba-Belsőbáránd	2
	17	Ács határa	1
	18	Alap-Dózsa u. 109.	1
	19	Bakonytamási-Hathalompuszta IV. (*MRT 4* site no. 14/6)	1
	20	Balatonfőkajár-Rókalik (*MRT 2* site no. 5/13)	2
	21	Balatonfüred-Molnár Antal szőlője (*MRT 2* site no. 6/22)	1
	22	Bátaszék-Kövesd-Diósvölgy	1
	23	Biatorbágy-Dózsa György utca (*MRT 7* site no. 34/11)	1
	24	Biatorbágy-Református temető (*MRT 7* site no. 1/43)	1
	25	Csákvár-Gasser-ház	1
	26	Csetény-Református templom (*MRT 4* site no. 20/1)	1
	27	Csongrád-Bokros, Rekettyés-ér, Gyója	1
	28	Dörgicse-Felsődörgicse, Szérűskertek	1
	29	Értény-Barnahát-puszta	1
	30	Hidegkút-Eresztvény (*MRT 1* site no. 24/3)	1
	31	Igar-Kemencék	30
	32	Kádárta	1
	33	Kecskéd-Tó-dűlő	42<
	34	Martonvásár-Orbánhegy	1
	35	Nyársapát-Templompart	1
	36	Papkeszi-Rostás-puszta (*MRT 1* site no. 39/16)	1
	37	Paks-Cseresznyés	5<
	38	Pálfa-Al-Egres	1
	39	Pátka-MRT 7/3. lelőhely	1
	40	Pula-Templom-dűlő (*MRT 2* site no. 41/1)	1
	41	Pusztaegres-Őrspuszta	1
	42	Regöly-Sánc a temetőtől DNy-ra	1
	43	Regöly-Alsómajsa Sóstói-dűlő	4
	44	Sárszentmihály-Május 1. út	1
	45	Sárszentmihály-Varga-malom	3
	46	Sárszentmihály-MRT 10/13. lelőhely	4
	47	Tác-Pötöllepuszta	2
	48	Tamási-Adorjáni-erdő alja	1
	49	Tamási-Szemcsepuszta	1
	50	Tardos-Ófalu-dűlő	2
	51	Tatabánya-Építőipari Szövetkezet	3
	52	Törökkanizsa (Нови Кнежевац)-77. lelőhely	1
	53	Zámoly-Kerekszenttamási	3
	54	Zsámbék-Római katolikus templom (*MRT 7* site no. 38/22)	1

Table 1. Types of the archaeological sites with stamped pots and their quantity

Type of the archaeological site	Site no. on maps	Name of the archaeological site
Castle – Royal residence	1	Buda-Királyi palota
		Buda-Szent György tér
	2	Visegrád-Fellegvár
Castle – Royal residence / noble residence	3	Kőszeg-Vár
	4	Tata-Vár
	5	Várgesztes-Vár
Castle – Noble residence	6	Csókakő-Vár
	7	Nagykanizsa-Vár
	8	Nagyvázsony-Vár
	9	Pápa-Várkastély
	10	Zalavár
Monastery / other ecclesiastical buildings	11	Oroszlány-Vértesszentkereszt-kolostor
	12	Salföld-Kolostorrom
	13	Székesfehérvár-Vasvári Pál utca 3.
	13	Székesfehérvár-Sziget
Manor-house	14	Baj-Öregkovács-hegy
	15	Pomáz-Klissza
Town	16	Győr-Káptalandomb
Market town	17	Balatonmagyaród-Kolon
Village	18	Balatonfőkajár-Rókalik (*MRT* 2 site no. 5/13)
	19	Balatonszentgyörgy-Téglagyár
	20	Dörgicse-Alsódörgicse, Templomrom
	21	Dörgicse-Felsődörgicse, Szérűskertek
	22	Győr-Szeszgyár
	23	Fenékpuszta-Pusztaszentegyháza
	24	Iváncsa
	25	Nagyvázsony-Csepely
	26	Sümeg-Sarvaly

Table 2. Types of the archaeological sites with stamped tableware

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ÁGNES KOLLÁTH

THE RESEARCH HISTORY OF EARLY MODERN POTTERY IN HUNGARY

Zusammenfassung: Ziel der Studie ist die Zusammenfassung der ungarischen Forschungsgeschichte, die sich der frühneuzeitlichen Keramik während der Türkenherrschaft, und der charakteristischen und sehr vielfältigen Palette an Keramiktypen des einstigen Ungarischen Königreichs widmet. Die Forschungsarbeit dieses Keramikmaterials hatte bereits in den ersten Jahren des 20. Jahrhunderts begonnen, jedoch blieb das Interesse am Thema bis zum Anfang des 21. Jahrhunderts eher verhalten, weshalb sich im Allgemeinen nur wenige Forscher – die mitunter über grundlegend verschiedene professionelle Hintergründe verfügten – gleichzeitig damit beschäftigten. Deshalb sind sowohl Denkansätze, als auch die Thematik ihrer Werke sehr vielseitig. Die Studie widmet sich den wichtigsten Warengruppen der Keramik und geht auf die Ergebnisse der letzten 120 Jahre, einer lockeren Zeitordnung folgend und anhand der ersten publizierten Abhandlung über das Thema ein. Sie bespricht österreichische unglasierte und osmanische glasierte Keramik, die grauen und roten unglasierten Tafelgeschirre, die über weitverzweigte Wurzeln verfügen, die südslawischen, handgeformten und/oder mit der handgedrehten Keramiktypen, nahöstliche Fayence und chinesisches Porzellan, Habaner Gefäße mit Bleiglasur, sowie weitere, importierte oder lokal gefertigte Tafelware. Außerdem summiert sie kurz die Ergebnisse bisheriger, regionaler Bearbeitungen und bietet so einen Ausgangspunkt für weitere Forschungsarbeiten. Schließlich muss allerdings betont werden, dass sich die vorliegende Abhandlung nicht mit Gebäudekeramik, Kachelofen-Elementen, bzw. Pfeifen beschäftigt, da diese Gegenstände über eigene Forschungsgeschichten verfügen, die das Gebiet von Koch- und Tafelgefäßen nur in wenigen Punkten berühren.

Keywords: historical archaeology, research history, pottery research, early modern period, Ottoman period, Hungary

The early modern period spans the 16th to 18th centuries, an age of conflict and transformation in Hungarian history. As the Ottoman and the Habsburg Empires had both reached their largest expanse by the mid-1500s, they clashed in this region, occupying the central and the northern–north-western parts of the Carpathian Basin, respectively. The medieval Hungarian Kingdom was torn into three parts, with the Transylvanian Principate becoming the third in the east. This meant 150 years of nearly constant military activity and vastly different cultural and political climates for the local population, which is amply reflected in their material culture.

While these centuries have been extensively studied by historians since the 1800s, archaeological interest in this period remained marginal at best for quite a long time. This was especially true for ceramics, as they were deemed too "new" or too similar to folk pottery by many archaeologists, while ethnographers apparently had no inclination to delve into a period lacking sufficient written sources and the possibility to collect artefacts from their original owners.[1] Nevertheless, some researchers did show an interest in the period's ceramics from the end of the 19th century onward, even though from highly different perspectives. This resulted in a heterogeneous research corpus, of which I will offer an annotated overview in this paper *(fig. 1)*.[2]

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1 *Vizi 2002* 209, note 4; *F. Lajkó 2015* 163.

2 This study was undertaken as part of my PhD thesis, *Typology and Chronology of Early Modern Period Pottery in Buda*, in 2019 at the Eötvös Loránd University in Budapest.

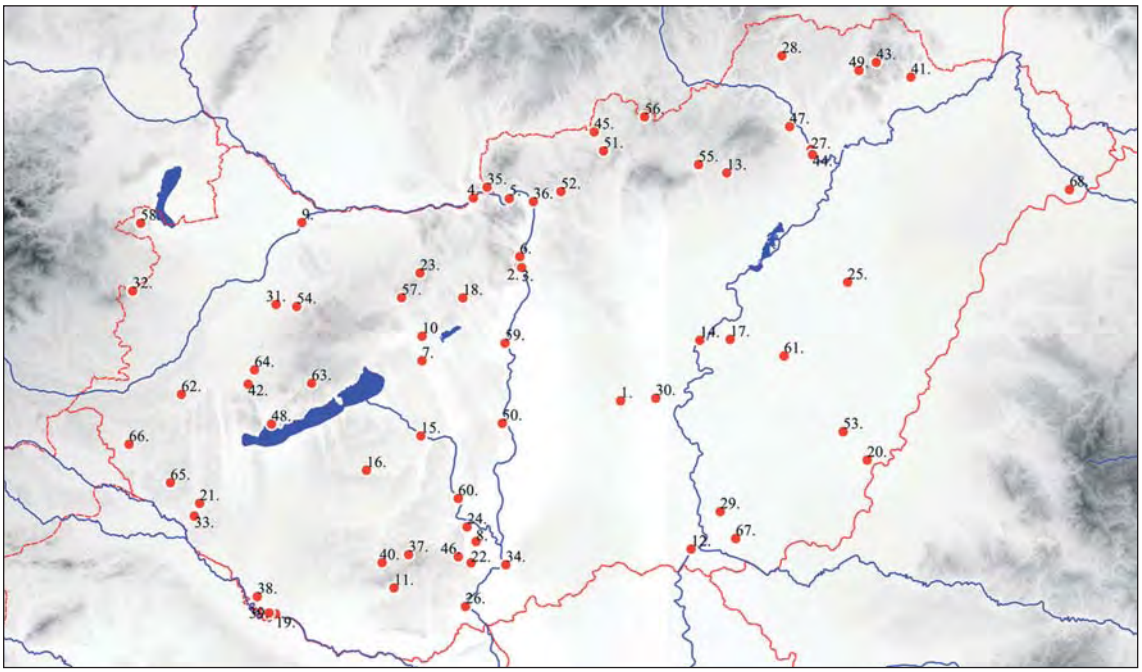

Fig. 1. Location of the studied sites. 1. Kecskemét; 2. Buda; 3. Pest; 4. Esztergom; 5. Visegrád; 6. Óbuda; 7. Tác-Fövenypuszta; 8. Decs-Ete; 9. Győr; 10. Székesfehérvár; 11. Pécs; 12. Szeged; 13. Eger; 14. Szolnok; 15. Ozora; 16. Törökkoppány; 17. Törökszentmiklós; 18. Vál; 19. Barcs; 20. Gyula; 21. Nagykanizsa; 22. Bátaszék; 23. Várgesztes; 24. Szekszárd; 25. Nádudvar; 26. Mohács; 27. Ónod; 28. Szendrő; 29. Hódmezővásárhely; 30. Szentkirály; 31. Pápa; 32. Kőszeg; 33. Nagykanizsa-Bajcsa; 34. Baja; 35. Ipolydamásd; 36. Vác; 37. Magyaregregy-Márévár; 38. Babócsa; 39. Barcs-Pusztabarcs; 40. Magyarhertelend; 41. Sárospatak; 42. Sümeg; 43. Regéc; 44. Mohi (Muhi); 45. Szécsény; 46. Mórágy; 47. Miskolc; 48. Szigliget; 49. Boldogkő; 50. Dunaföldvár; 51. Hollókő; 52. Csővár; 53. Békés; 54. Ugod; 55. Sirok; 56. Salgó; 57. Csókakő; 58. Sopron; 59. Ráckeve; 60. Medina; 61. Túrkeve; 62. Egervár; 63. Nagyvázsony; 64. Gyepűkaján-Nagykeszi; 65. Bánokszentgyörgy-Szentmihály; 66. Csesztreg-Mihon; 67. Óföldeák; 68. Ura (Map: ©József Attila Csiki)

Even though there was always an active international trade, the aforementioned regional and cultural changes as well as the beginnings of globalisation during this period led to the appearance of countless new pottery types. Most of them were usually named after their assumed origin in Hungarian scholarship, for example southern Slavic pottery, Turkish pottery, Balkan jugs, Chinese porcelain, Iznik and Persian faience, Italian majolica, western imported wares and Haban wares.

This mid-20th century classification was essentially based on the idea that pottery can be seen as an indicator of ethnicity and on the traditional research methods of art history. Sometimes correlations along these lines proved to be correct, although in most cases, the situation was far more complex. In the following, I will review the development, rejection and/or transformation of these terms and how they influenced or defined research themes as well as the results of more recent directions.[3] I will follow a loose chronological order, taking the first paper published on a particular type as a springboard in the sub-sections in order to illustrate the shifting foci of interests.

[3] Please note that although I will be using the most up-to-date terminology in my descriptions, current research is undergoing a transformative phase, which can lead to further changes. Furthermore, I will not cover stoves and pipes in this paper, as they have their own research history, separate from ceramic vessels. I have also focused on the research of present day Hungary, even though numerous counties of the medieval Hungarian Kingdom lay wholly or partially in other modern countries, due to the change of borders in the 20th century. As for the research of neighbouring countries, the most concise collections can be found in the following publications: *Španihel 2017* (Slovakia); *Kaltenberger 2009* (Austria); *Bikić 2003* (Serbia/former Yugoslavia); *Gaşpar 2019* (Romania).

Austrian-type pottery

Pottery fired in a reducing atmosphere, often with added graphite and stamps on the rim, were the first medieval-early modern period ceramic type that caught researchers' attention; however, at the beginning, their dating was highly controversial in Hungary and Austria alike.[4]

While evaluating the material of villages abandoned around Kecskemét (southern Hungary) in the 16th century, Kálmán Szabó noted that this kind of pottery had made up a significant part of contemporary kitchenware, although its quantity decreased in direct proportion with the distance from the Danube. He also assumed that yellowish or reddish sherds with the same forms, but without the added graphite and with stamps unattested on Austrian and German sites, could be local imitations.[5] One and a half decades later, Imre Holl refuted this theory based on his examination of find assemblages mainly from urbanised sites along the Danube (Buda, Pest, Esztergom and Visegrád). He claimed that most of the vessels had arrived from Austria, mostly from the workshops of Vienna, Tulln, Passau and Ried according to their rim-stamps.[6] This view remained dominant for a long time; however, the assessment of the finds from more recent large-scale excavations raised certain doubts regarding the locations of the production centres and the role of rim-stamps among Hungarian, Austrian and Slovakian researchers alike. It became clear that it is currently impossible to determine the boundaries of the "original" production district and to distinguish the workshops that had copied these high-quality kitchen and industrial wares. This issue will remain at least partly unresolved until more kiln sites come to light.[7] It also remains a question for the time being whether the trade and/or local production of this pottery type continued during the Ottoman occupation period in central Hungary, as most of the known later examples come from assemblages whose latest pieces date from the end of the 16th century.[8]

Ottoman pottery

The beginnings: 1930s to the 1980s

In the wake of the growing interest in the Ottoman period and the first urban excavations in Budapest, this ceramic group drew scholarly attention as early as the 1930s. It was easily identifiable, its basic forms remaining largely unchanged until the 19th–20th centuries in the neighbouring lands ruled or influenced by the Ottoman Empire, but seemingly different from the local material culture.[9] The main types of this rather high-quality, fast wheel-turned, usually lead-

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[4] Flóris Rómer had begun collecting stamped pottery sherds of this kind in the second third of the 1800s and Bálint Kuzsinszky had also brought stamped aqueduct pipes from Óbuda to the Aquincum Museum. József Hampel published some pieces from Tác-Fövenypuszta *(Gorsium-Herculia)*, although he was uncertain whether they were late antique or medieval. His uncertainty was understandable, as this pottery type had been catalogued as Roman in the material of the *Carnuntum mithraeum* (Petronell, AU). He finally resolved the problem by examining finds from other sites and by turning to Alfred Walcher von Moltheim, one of the earliest experts in this field, through the Museum of Salzburg. *Hampel 1895* 286–288, fig. 7; *Hampel 1897* 381–382; *Hampel 1901* 446–448.

[5] *Szabó 1938* 101–105.

[6] *Holl 1955* 163–176.

[7] *Feld 2008* 310–311. For examples of the unquestionably local production of these types, see Óbuda-Hajógyári-sziget: *Tóth 2016* 256, Pl. 14. Vessels with unknown stamps were also identified in this material (*Tóth 2017* 529), at Decs-Ete *(Vizi 2000)* and at Győr-Széchenyi tér.

[8] *Holl 2005a* 89–90; *Kolláth 2016a* 377; *Kolláth 2019a* 161. Vessels dated to the 17th century by their stamps are known from Óbuda (*Bertalanné 1998a* 203, Pl. XIII. 1–2) and Székesfehérvár (*Siklósi 2010* 12, Taf. 20–24), although their contexts are unclear.

[9] First noted by *Horváth 1936* 198–199, 217.

Fig. 2. Footed bowl and glazed lid from Visegrád-Alsóvár, second half of the 16th century. Excavation by Mátyás Szőke

glazed pottery are footed bowls, spouted jugs, ewers, storage jars, stove tiles and pipes, alongside mugs, lids and candlesticks *(figs 2–5)*.[10]

While it was clear from the very onset that these types were only represented by their classical forms during the 150 years of Turkish occupation,[11] their role and interpretation remained highly debated throughout the 20th century.

In 1936, Henrik Horváth pointed out the influence of "Turkish" metalwork on ceramics when describing the finds unearthed by Lajos Nagy on Budapest-Gellérthegy in 1932.[12] At the time, large-scale cityscaping works were undertaken in two historical suburbs of Buda, the Tabán and the Víziváros. Sándor Garády was present at the most promising sites, documenting and excavating Roman, medieval and early modern period features. He had a special interest in Ottoman-period material culture and summarised his observations of ceramics in 1944, laying the foundations of future work in this field during the next decades.[13] He pointed out the connections with metalwork as well and discussed footed bowls in detail, emphasizing their variability. Starting out from this and the assumed pottery workshops in the Víziváros, he contended that they had been partly imported and partly locally made. He noted the Byzantine origin of the vessel type and the *sgraffito* decoration, and emphasized their popularity in the Balkans.[14]

The next important step was the excavation in 1956 of a potter's kiln at Esztergom-Szenttamáshegy, a site known since 1927.[15] The broader area of the severely damaged kiln yielded firing tripods (kiln spurs), as well as finished and semi-finished vessels, with the fragments of two extremely rare "inscribed footed bowls" among them. Géza Fehér Jr., who initiated the research, discussed parts of this assemblage in several publications between 1957 and 1968.[16] His most well-known paper, published in 1960, was based mainly on the Ottoman pottery finds from Pécs, but he cited material from Esztergom and Buda as well, marking the start of a new chapter in the period's ceramic research. The problems he outlined set the course of research until the 1980s and his influence can be felt to this day.

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[10] For a more detailed description, see *Kovács 2010b* 92; *Kolláth 2016b* 111.

[11] The survival of some vessel types could be observed on settlements where a sizeable "Turkish" population remained after the re-conquering wars (e.g., Szeged, Eger), but only until the mid-18th century. Some rare 19th–20th-century liquid containers in heavily Slavic-influenced southern Transdanubia also have their roots in Ottoman-period material culture, cf. *Hancz 2006* 38; *Pusztai 1999* 474; *Csupor – Csuporné Angyal 1998* 80, 82; *Kolláth – B. Kovács – Kovács in press.*

[12] *Horváth 1936* 213–214, figs 52–56; *L. Nagy 1936* 26–27, Pl. XIV. 2, Pl. XV.

[13] *Garády 1943a; Garády 1943b; Garády 1945; Garády 1944.* Due to his death in 1944, he could not publish all his findings. Edit Sárosi has re-evaluated his excavations based on his notes and the find material: *Sárosi 2000; Sárosi 2002.*

[14] *Horváth 1936* 213–214; *Garády 1944* 385–388; 390, figs 37–38.

[15] *Balogh 1928* 59.

[16] *Fehér 1957* 44–45; *Fehér 1959; Fehér – Parádi 1960a; Fehér – Parádi 1960b; Fehér 1962a; Fehér 1962b; Fehér 1964; Fehér 1968.*

Fig. 3. Fragment of a spouted jug from Budapest-Szent Györgytér, second half of the 16th century and the beginning of the 17th century. Excavation by Károly Magyar (Photograph and drawing: ©Ágnes Kolláth)

Most importantly, he recognized the similarities between the Ottoman pottery of Hungary and the 19th–20th-century folk ceramics of Bosnia-Herzegovina and Bulgaria. He pointed out that the subjects of the Sultan who had arrived to and settled in the freshly-conquered province had been mostly Slavic and not Turkish, even if they were designated as such by the contemporaries.[17] He also published the evidence for local pottery production from Pécs and reviewed the written sources on the Hungarian province, in which potters or pottery are mentioned.[18] Although this multidisciplinary approach was instrumental in setting the archaeological data in broader perspective, it also reinforced researchers' preconceptions in dating and typology.

Dating problems

Associating excavated features with written data is a fairly common practice in all fields of archaeology, and seemed to be especially logical regarding the early modern period with its abundance of sources. Regrettably, this possibility proved to be so tempting in numerous cases that researchers paid little to no attention to the actual context of the finds and features.

The most prominent case in point is the Esztergom kiln, which Géza Fehér dated before 1594, arguing that the Turkish fortress of Szenttamáshegy had been destroyed that year in one of the numerous sieges of the Long War (1593–1606). Later, he dated the vessels from Eger-Vár (fallen to the Ottomans in 1596) to the end of the 16th century based on their parallels from the above mentioned assemblage.[19] Yet, similar pieces to the published Eger and Esztergom finds, including the inscribed footed bowls as well as the inscriptions' linguistic characteristics, all point to a 17th-century date, which is also underpinned by the original field documentation in the latter case.[20]

[17] *Fehér 1959* 123–124, 127–128, 136–140.

[18] *Fehér 1959* 142–146.

[19] *Fehér 1972* 196–197.

[20] The tell-tale signs are the high, conical pedestals with cordons and the everted, occasionally scalloped rims of footed bowls (*Fehér – Parádi 1960*a Table XXIX. 2, 4, 6; *Fehér 1972* 203–207, Pls I–V; *Kovács 1990–1991* 172; *Kolláth 2019a* 276–277). For the dating of the glazed stove tile (*Fehér – Parádi 1960*a Pl. XXVIII. 2), see *Sabján – Végh 2003*. The other inscribed bowls are known from Esztergom-Várhegy (*Gerő 1960* 45–46) and Buda-Szent György tér *(B. Nyékhelyi 2004).* For the translation and discussion of the inscriptions, see *Dobrovits 2004; Sudár 2010* 571–573. The re-assessment of the kiln's find material is in progress, I would like to thank Gyöngyi Kovács for the information on the original documentation.

The archaeological interpretation of features and stratigraphy was also ridden with preconceptions, which could lead to dating problems. In the case of the numerous storage pits and cesspits characteristic of the settlements under Ottoman rule – called "Turkish pits" in common parlance – the widely accepted view was that they had usually been open for a short time and then filled up in one instance and that their fill was therefore homogeneous. For this reason, most of these features were excavated without even an attempt to observe and record possible stratification in their fills, leading to a serious loss of information.

One typical example of this phenomenon is the publication of a ceramic assemblage from a pit dug near the town walls at Székesfehérvár-Jókai utca 20. site, excavated and evaluated in 1981 by Gyula Siklósi. Based on the stove tiles and debris found in the fill, he assumed that the pit can most likely be associated with 'cleaning up' after a siege. Based on a Benedictine medallion from the fill, he dated the find material to the late 1600s.[21] In fact, most of the published vessels themselves are more typical for the turn of the 16th and 17th centuries, with several elements indicating the earlier period. Some (absolutely not Ottoman) pots are even earlier, late medieval in date, while a few footed bowls seem to be indeed typical for the later Ottoman period, but there is nothing to indicate the typical "reconquest horizon" of the late 17th century.[22] Consequently, the fill had in likelihood been stratified with layers dating from various periods, and as the broader area of the pit was highly disturbed by a later feature,[23] it is also possible that its latest layers had been simply destroyed by the time of the excavation.

Still, it should be noted in all fairness that the publication of entire early modern period find assemblages was extremely rare at the time. Károly Kozák was among the first to regularly publish vessels together with their short description and exact findspots in his reports on the excavations of Eger Castle. He also wrote, together with László Fodor, the first evaluation of closed, more-or-less well-datable find assemblages from the area of the city's medieval cathedral.[24]

Early typologies

The correlation of pottery with ethnic groups was a widespread scholarly pursuit in 19th–20th century archaeological scholarship and the well-known and spectacular cultural differences between the subjects of the Hungarian Kingdom and the Ottoman Empire made this theory particularly appealing to some scholars.

Sándor Garády and Géza Fehér were quite cautious in this respect, unlike Olivér Soproni, who strove to separate "Hungarian" and "Turkish" wares in the find material from the city of Szolnok based purely on stylistic grounds (and his own personal taste).[25]

This led to a plethora of erroneous identifications and wrongly used technical terms in itself, and once the view that the Ottoman subjects arriving to the Hungarian province were mostly of Balkanic stock became widely accepted, Soproni strove to classify certain pottery types into rigid categories in his 1981 book. He based his typology on his contention that Hungarian potters commanded the least technical knowledge, Islamized Slavic craftsmen were somewhat better and that "genuine Turkish masters" had made all the high-quality pieces. He linked *sgraffito-*

[21] He was more cautious with dating the assemblage in the original publication (submitted right after the excavation) (*Siklósi 1982* 2–3), but after publishing a paper on the medallion *(Siklósi 1980),* he consistently dated the pit's material to the late 1600s: *Siklósi 2013* 30.

[22] *Kovács 1991* 172; *Kolláth 2014; Kolláth 2019a* 276–277, 307–309; *Kolláth 2019b* 402.

[23] *Siklósi manuscript*.

[24] *Kozák 1963* 130–136, 157–168, figs 30–63; *Kozák 1964a* 222–223, 246, 262–264, 269–271, fig. 15, figs, 41–45, figs 55–58; *Kozák 1966a* 104, 109–111, 113–114, 138, 148, 149, 152, figs 31–32, figs 44–45, fig. 47, fig. 50; *Détshy – Kozák 1967* 97, 104–107, fig. 15, figs 26–29; *Kozák 1969a* 119, fig. 26, fig. 49; *Kozák 1969b* 192, fig. 9; *Kozák 1989–1990* 355–360, figs 31–34; *Fodor – Kozák 1970–1971.*

[25] *Soproni 1956a; Soproni 1956b.*

decorated footed bowls exclusively to Armenians, based on the type's assumed ritual usage, although there is nothing to confirm this.[26]

Győző Gerő chose a more nuanced, but similarly ethnicity- and religion-based approach in his studies on Ottoman-period ceramics. His findings regarding the different layers of Ottoman-period material culture were very important in their time, defining the course of research until the 1990s and early 2000s. Given that he studied the find assemblages from some of the most important sites in Hungary such as the Buda-Budavári palota and the Buda-Pasapalota, Eger-Vár, Pécs and other, mainly southern Transdanubian sites, most of which are regrettably still unpublished, his papers remain of key importance.[27] However, he assumed a rather strict social stratification regarding pottery usage, based on the religion and ethnicity of Ottoman subjects, which practically would have meant that in a typical garrison, the low-ranking Christian southern Slavic soldiers and civilians would have used the slow wheel-turned coarse wares (cf. the relevant sub-sections below), glazed Ottoman vessels would have mostly belonged to the Islamized Slavic – mainly Bosnian – inhabitants, while "luxury wares" could only have been afforded by "genuine Turkish" officers and other high-status members of the community.[28] He highlighted the Byzantine roots of Ottoman pottery only in the case of *sgraffito* wares and argued that they had been produced in Balkanic workshops, contending that their local imitations had been solely decorated with glaze-painting, without incised patterns. He named the latter group "pseudo-sgraffito ware" *(fig. 4)*.[29]

His contentions undoubtedly had a certain logic to them. Yet, despite the excavations on the period's sites and the more detailed analysis of assemblages during the ensuing fifty years, it is still mostly unclear how the material culture of western and eastern Christian or Islamized southern Slavic groups had varied and to what extent their religion and other cultural elements (ethnicity, location, trade connections, means of communication, etc.) had influenced their pottery usage. It must be borne in mind that the glazed, fast wheel-turned ceramic wares in question had been organic parts of material culture in the southern Balkans, previously part of the Byzantine Empire, and that their origin can be traced to Late Antiquity in some cases. This means that – at least partly – the conquering Anatolian Turks had appropriated the locals' pottery and not the other way round.[30] As the ceramics of the southern Slavs in the Lower Balkans directly preceding the Ottoman conquest are mostly unpublished, we cannot determine when and under what influence their production had begun in that region.

A shifting focus: from the 1980s to the mid-1990s

Despite the many research results mentioned above and the period's relative popularity among historians, Ottoman-period archaeology remained on the periphery of Hungarian research for a long time and only two researchers with a background in Turkish studies picked up the thread in the 1980s.

Gyöngyi Kovács published her assessment of the Ottoman-period and partly early modern period material of the Szolnok Museum in 1984, re-evaluating the finds that had earlier been discussed by Olivér Soproni among others. She also covered the question of local production and the decoration of footed bowls, with a special focus on the *sgraffito* technique by mapping

[26] *Soproni 1981* 34–40, 43–86.

[27] *Gerevich 1966* 10, 27, 33, fig. 12, fig. 25; *G. Sándor 1959–1960; Gerő 1978; Gerő 1985; Gerő 1989; Gerő 1990*.

[28] *Gerő 1978* 350–351; *Gerő 1985* 195–197.

[29] *Gerő 1978* 350.

[30] See, e.g., *Frantz 1938; Vroom 2003* 69–71; *Böhlendorf-Arslan 2008; Böhlendorf-Arslan 2013; Bikić 2016*.

Fig. 4. Fragments of sgraffito-decorated and glaze-painted footed bowls from Székesfehérvár-Királyi bazilika, Anjou-sírkápolna, second half of the 16th century and 17th century, respectively. Excavation by Piroska Biczó (Photographs and drawings: ©Ágnes Kolláth)

out its origins and distribution as well as reviewing the published finds from the regions once ruled or influenced by the Byzantine Empire.[31]

Ibolya Gerelyes also began her ceramic studies by analysing *sgraffito*-decorated vessels, but then turned her attention to well-datable ceramic assemblages. Even though she still had to work with incomplete materials in the case of older excavations from Buda and Visegrád,[32] she participated in the excavations of Ozora-Vár – a medieval noble residence and later a small Turkish garrison – and was able to evaluate its closed contexts almost right on the site.[33] This more inclusive point of view yielded crucial insights. She confirmed the mostly 16th-century dating of *sgraffito*-decorated pottery, but pointed out that the type remained in use during the 17th century as well, although it had become much less popular compared to glaze-painted wares and disappeared only by the last decades of the 1600s.[34] She assumed a central *sgraffito* ware-workshop, probably located in Belgrade or Buda.[35] Her observations on the varying proportions of Ottoman pottery on sites of different locations and dating within the 16th–17th centuries were also quite novel at the time.[36]

Gyöngyi Kovács also noted the spectacular differences in the composition of the finds brought to light in the course of her excavation of two small Turkish garrisons, Törökkoppány in south-western Transdanubia and Törökszentmiklós by the Tisza River in the east. She was the first to discuss various traits with a chronological significance on footed bowls besides *sgraffito* decoration in her 1991 study.[37]

Ibolya Gerelyes and Gyöngyi Kovács's research has proved that many of the earlier theories – based mainly on highly selected museum collections from the centres of the former Ottoman province – call for a critical revision. It has become clear that an assessment of certain pottery types without looking at the overall context can yield highly misleading results. Consequently, from the early 1990s onward, there were but few papers focusing solely on Ottoman ceramics – instead, they were discussed as part of entire assemblages.

[31] *Kovács 1984* 19–34.

[32] The general practice was to inventorise complete or almost complete vessels and pottery sherds representing rare types only, and to discard the rest with minimal documentation.

[33] *Gerelyes 1986; Gerelyes 1987a; Gerelyes 1987b; Gerelyes 1991.*

[34] *Gerelyes 1986* 81–82; *Gerelyes 1987a* 175; *Gerelyes 1991* 45.

[35] *Gerelyes 1987b* 258; *Gerelyes 1991* 45. We only have proof of the production of *sgraffito* ware in Belgrade: *Birtašević 1970* fig. 63.

[36] *Gerelyes 1986* 69; *Gerelyes 1987a* 171.

[37] *Kovács 1990–1991* 171–172.

Age of the large-scale excavations: the 1990s until the 2010s

Following the political changes in Hungary in 1990, the ensuing economic boom and new legislation on archaeology and monument protection brought unprecedented opportunities, while simultaneously placing a huge burden on archaeologists. All of a sudden, all the infrastructural, industrial and urban developments were required to make preliminary archaeological site assessments, often followed by excavations. This resulted in an enormous amount of data and find material. In general, however, Ottoman-period or historical archaeology continued to remain a marginal field of research.

Gyöngyi Kovács published her findings on the ceramic material unearthed in the area of the medieval church of Vál (later a small Ottoman garrison) near Budapest and in the area of the Barcs palisade fort, which had served as a base for the Ottoman fleet on the Dráva River for a time.[38] Ibolya Gerelyes wrote a summary on the material culture, including the pottery, of Gyula-Vár in south-eastern Hungary.[39]

The change began with a conference held in 2000 whose theme was the fresh advances in Ottoman-period archaeology and its proceedings volume, titled *Archaeology of the Ottoman Period in Hungary*.[40] The 2004 thematic volume of the journal *Budapest Régiségei* similarly represented a major milestone in the field. Both contained noteworthy articles covering Ottoman-period pottery as well, mainly from the new excavations in the area of Budapest.[41]

At the same time, the critical re-assessment of old materials also gained momentum. Imre Holl – the *doyen* of medieval pottery research in Hungary – renewed his interest in early modern period ceramics and analysed the datable find complexes from the excavation conducted in the Buda-Budavári palota in the 1950s. Even though he did not discuss Ottoman pottery in detail, his monograph is still one of the main sources for finding parallels.[42]

These types of pottery evaluations account for the majority of papers to this day. When exceptionally promising assemblages are found, most archaeologists strive to at least partially publish them or they offer them as material for BA, MA or PhD theses.[43] Moreover, most museums hold several find assemblages from old excavations that still lack an assessment since the 1950s. Given that an awareness of Ottoman-period archaeology has been constantly rising, many of these have since been published.[44]

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[38] *Hatházi – Kovács 1996* 45; *Kovács 1998*.

[39] *Szatmári – Gerelyes 1996* 121–122.

[40] *A hódoltság régészeti kutatása 2002; Archaeology of the Ottoman Period 2003*.

[41] *Tóth 2003; Sabján – Végh 2003; Kovács 2003a; Bencze – Papp 2004* 36–37, 45–46, figs 7–8; *Bertalanné 2004* 57, fig. 8; *B. Nyékhelyi 2004* 133–151; *Zádor 2004* 218, 223, 225, fig. 4, figs 9–15.

[42] *Holl 2005a* 45, Abb. 11. 1, Abb. 19. 1–3, Abb. 33. 1, 3, 5–7, 10, 12–16, Abb. 36. 4–5, Abb. 39. 1–5, 11–12, Abb. 41. 2–3.

[43] Budapest: *Tóth 2011a* 228, 230–237, 241, fig. 2; *Kolláth 2012* 177–179, 190–192; *Éder 2014* 283–284, 292–293, 295–296, 302–303, figs 5–9; *Nádai 2016* 58–62, Pls 18–24, cat. VI–VIII; *Horváth – Komori 2020* fig. 6, fig. 8; Eger: *Pusztai 1999* 474; *Somodi 2016* 22–24, Pls VI–VII; Székesfehérvár: *Kolláth 2010* 6 7–75, 134–138, cat. nos 210–255, figs 60–65; Nagykanizsa: *Kovács 2003b* 159, 172, fig. 6; Bátaszék: *Pusztai 2003* 303, 308); Szeged: *Hancz 2006* 36–38; Várgesztes: *B. Kovács 2019*.

[44] The most prominent example is Attila Gaál's work on the find material of the Szekszárd-Újpalánk palisade fort by the Danube River. Excavations and field surveys had been conducted on the strongly eroded site between the 1960s and the 1980s, but he waited until he had the opportunity to publish the most important finds with detailed descriptions and illustrations in colour. It has to be noted, though, that because of the disturbed layers and old survey techniques, most finds do not have a secure context. For the Ottoman-period pottery, see *Gaál 2011*. For the finds from closed contexts from his more recent excavations within the city of Szekszárd, see *Gaál 2016*.

Several overviews of our current knowledge have appeared in foreign publications, and some exhibition catalogues also contain relevant articles.[45] The upsurge in data was much needed for a better understanding of the regional variants and datability of these highly standardised ceramics, even though their scientific examinations are still mostly lacking.[46] These new results have just started to surface and they hopefully mark a new period in the research of Ottoman pottery in Hungary.[47]

Unglazed grey and red wares

This ware group occurs on many early modern period sites in high quantities and has numerous types of different origins, but due to the characteristics of research history, they will be discussed together. Among these wares, grey-fired liquid containers with polished, incised and stamped decoration have the most extensive literature.

These vessels occupy an important place in Hungarian ethnographic and archaeological pottery research, which has mainly addressed their production and has focused on the most lavishly decorated specimens from the Ottoman Province and the Great Hungarian Plain. Their manufacturing process has been described in detail by György Duma, who had studied the present-day jug-makers of Nádudvar and Mohács, and supplemented his observations with scientific examinations in the 1960s.[48] The archaeological evidence suggests that early modern period potting techniques were by and large identical with those of later ages.[49]

The first ware type that gained attention was characteristic of Ottoman garrisons.[50] A rather atypical object of this type was published in 1936 from the excavations on the Gellérthegy in Budapest by Henrik Horváth, who emphasized the vessel's close connections to its metal counterparts.[51] Sándor Garády wrote about the most beautiful pieces found in Buda in 1944. He identified their firing method as "Byzantine", their range of forms as "Turkish" and again accentuated that they imitated metalwork.[52] Géza Fehér concurred with these conclusions in his above-cited 1960 study on the pottery of Pécs, and based on their parallels, he made a case for their Balkanic origin, where their production probably started under Byzantine influence. Since then, these liquid containers were labelled either "Turkish" or "Balkanic".[53] This was supported by ethnographic research, as they seemed to be continuous with the 18th–20th-century "black pottery of Mohács", whose makers were usually Slavic (of *sokác* ethnicity) and mostly produced their wares for the Danube trade towards the Ottoman Empire *(fig. 5)*.[54]

Based on these results, ethnographers regarded the question of origin resolved for a long time, even though they did note the striking differences between the Mohács wares and the black pottery made on the Hungarian Plain. Beginning in the 1980s, studies on early modern

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[45] *Gerelyes 2008; Dávid – Gerelyes 2015; Kolláth 2016b* 111–112; *Kovács 2010a; Kovács 2010b; E. Kovács 2010; Kincsek 2017* 166–167, 170, 175, 178–182, 187–189, 192–193.

[46] The only exception is Barcs: *per sylvam 2016*.

[47] E.g., *Kovács 2017* 328, 330, fig. 4. 1–3; *Szalai 2017* 44–54, Pls 18–50; *Kolláth 2016a; Kolláth 2018*; *Kolláth 2019a* 274–278.

[48] *Duma 1963* 367–405.

[49] *Kolláth 2017* 307–309; *Kolláth 2019a* 279–281.

[50] For their general description, see *Kolláth 2016b* 112–113; *Kolláth 2019a* 281–282. For the variants, see, e.g., *Gerelyes 1991* fig. 63. 8, fig. 64. 9; *Papp 2010* 187; *E. Kovács 2010* 188 (Buda); *Fehér 1959* figs XXVIII–XXXI (Pécs).

[51] *Horváth 1936* 213, fig. 52.

[52] *Garády 1944* 387–388.

[53] *Fehér 1959* 122.

[54] *Sarosácz 1972* 32–33; *Kresz 1991* 32.

Fig. 5. Footed bowl and „Balkan-type" grey jug from Várgesztes-Vár, second half of the 16th century. Excavation by Mária G. Sándor (Photographs: ©Bianka Kovács)

period finds have demonstrated that "Alföld [Hungarian Plain] black pottery" also had 16th–17th century predecessors, including the containers for some of the period's early coin hoards.[55] Gyöngyi Kovács highlighted the differing fabric of the Törökszentmiklós and Törökkoppány vessels, which recurs in folk ceramics as well.[56]

Gábor Tomka has demonstrated the presence of jugs fired in a reducing atmosphere at Ónod and Szendrő, two castles that never had an Ottoman garrison. He identified almost all the pottery sherds as representing the "Alföld type" and he also provided a general description and chronology of this ware. As burnishing and firing in a reducing atmosphere were both considered techniques arriving from the Balkans with the Ottoman conquest at that time,[57] he did not rule out the possibility that this ware had originated from the Balkan Peninsula as well, because Slavic *(rác)* settlements were to be found near their traditional production centres since the 15th century.[58]

Other related wares are occasionally attested in early modern period find assemblages that have their own distinct characteristics. For example, Orsolya Lajkó found that pieces from Hódmezővásárhely in south-eastern Hungary display the common decorative techniques of both the "Balkanic" (combed and stamped patterns) and the "Alföld" (burnishing) types and their range of forms is also partly different from the "classical Alföld" wares. It was also observed

[55] *Parádi 1963* 225. Sherds of local wares fired in a reducing atmosphere were also attested at Szentkirály, a village abandoned in the 16th century. *Pálóczi-Horváth 1996* 21.

[56] *Kovács 1990–1991* 174.

[57] *Tomka 2002* 301, citing *Szabadfalvi 1960* 177–183, and *Soproni 1981* 17.

[58] *Tomka 2002* 303, 306.

for the first time that vessels of seemingly identical shapes had been fired in both reducing and oxidising atmospheres.[59]

Zsuzsa Miklós and Márta Vizi came to the same conclusions regarding the finds from Decs-Ete. Several potters' kilns had been excavated in the 1930s on the abandoned site of this once bustling market town by the Danube and a potter's warehouse complete with a ceramic depot was found in the 1990s. This assemblage was crucial to understanding the product range of 16th-century Hungarian potters and it is by now undisputable that they had fired their pottery both in reducing and oxidising atmospheres. Vessel forms related to "Turkish" or "Balkanic" and to the "Alföld" wares were both present, while most of the ceramics displayed the general characteristics of the neighbouring eastern and south-eastern Transdanubian regions. This diversity can probably be ascribed to Ete's geographic location by the Danube, on the boundary of different landscapes and within the Ottoman province.[60]

The unglazed wares of western Hungary have not been particularly widely studied, which most likely stemmed from the long-standing belief originating from ethnographic research that firing pottery – especially liquid containers – in a reducing atmosphere and decorating them with burnishing had been a new and foreign practice among the country's 16th–17th-century potters. As a matter of fact, the use of both firing methods had a centuries-long tradition in the northern Transdanubian region by this time. Reduction firing had probably been introduced from Austria as early as the 13th century and the techniques' simultaneous use can be traced to the folk pottery of the 19th–20th centuries.[61] However, as 16th-century assemblages that would have easily proven the technique's continuity have only been published from a few sites, the demonstration of this connection ran into difficulties.[62] Hence, local unglazed grey wares have been sometimes omitted from publications of sites within the former Ottoman province on the grounds that they must be medieval, and papers in general have mostly dealt with the classical "Balkanic" or "Turkish" grey jugs from the region *(fig. 6)*.[63]

The situation changed with the evaluation of a significant 17th-century ceramic assemblage from Székesfehérvár and of the 16th–18th-century pottery from the Pápa-Fő tér ('Main square') by the present author. The first assemblage also contained "Turkish"- or "Balkanic"- and "Alföld"-type grey liquid containers, while both the grey and the red varieties of the vessels displaying the typical "Transdanubian" traits occurred.[64] In the case of Pápa, it was already known from the written sources that the town had had a flourishing pottery industry and the development of their wares could be traced through the early modern period. Burnishing could be observed both on red and grey vessels for the first time on a Transdanubian site, which had been part of the Ottoman Empire only briefly.[65] Zsófia Nádai analysed the grey-fired liquid containers from the Kacsa utca and Ganz utca site of Budapest-Víziváros with these new results in mind.[66]

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59 *F. Lajkó 2015* 116–118.

60 *Miklós – Vizi 2017* 369–383.

61 *Feld 1987* 262–263; *Kresz 1991* 15, 20, 23. For 14th-century exmaples see *Tomka 1998* 152.

62 E.g., Ozora: *Gerelyes – Feld 1986* 165, 173–176, Abb. 6. 3; *Feld et al. 1989* 193; Kőszeg: *Holl 1992* 30–33; Bajcsa: *Kovács 2001* 202, fig. 10.

63 Buda: *Gerelyes 1990* 274, 277–279, 284, Abb. 3. 1– 3, Abb. 4. 2; *Gerelyes 1991* 28–29, 31–33, 35, figs 8–9; Visegrád: *Gerelyes 1987a* 174; Vál: *Hatházi – Kovács 1996* 45; Barcs: *Kovács 1998* 162, 163, fig. 7; Baja: *Kovács 2006* 279, 280, fig. 5. 1–3, 6; Bátaszék: *Pusztai 2003* 301–310; Székesfehérvár: *Kovács 2017* 329, 332, fig. 6.

64 *Kolláth 2017.*

65 *Kolláth 2013* 165–168. The evaluation of medieval and early modern pottery from Győr – one of the region's economic hubs and a well known pottery manufacturing centre till the 20th century – would be essential in further research. At the moment, only one grey, burnished shard with a 16th–18th century dating has been published from the city. *Tomka 1998* 146, fig. 3. 1.

66 *Nádai 2014.*

Fig. 6. Unglazed red „milk jugs" from Székesfehérvár-Hiemer ház, turn of the 17th and 18th centuries. Excavation by Gyula Siklósi, courtesy of Gyöngyi Kovács (Photograph: ©Tibor Kádas)

As we can see, researchers have primarily focused on grey-fired liquid containers, while other related tablewares were largely neglected. Márta Vizi has published the unglazed bowls and plates from Ozora-Vár,[67] while a few footed bowls fired in a reducing atmosphere are known from Gyula in south-eastern Hungary [68] and two polished, grey-fired plates have been found on Pápa-Fő tér.[69]

Coarse Balkan wares

These characteristically archaic ceramic wares form an important group of folk pottery across the Balkan Peninsula and their production can be traced back to the early medieval period. On the other hand, their presence in the Carpathian Basin was restricted to the southern peripheries both before and after the Sultan's rule and they only appeared in garrisons and southern Slavic settlements within the northern parts of the Ottoman province.[70]

The three main types are baking pans and baking bells/lids, pots and lids, and jugs. These differ from each other not just in form and function, but also in fabric, manufacturing technique and decoration.[71] Numerous further wares can also be distinguished within each larger group, as they had been mostly produced as part of local craft industries or made by part-time potters.[72]

Baking bells or lids and baking pans

Baking bells or lids, which had still been in use in the southern borderlands of Hungary at the beginning of the 20th century, represent the first group that attracted scholarly attention.[73] The

[67] *Vizi 2008*.
[68] *Szalai 2017* Pl. 26. 46–47.
[69] *Kolláth 2013* 174, 176, fig. 14. 10.
[70] *Kovács 2003a* 260–261.
[71] For more detailed descriptions, see *Kolláth 2019a* 165–166, 171–172, 177, 185.
[72] See *Djordjević 2011; Djordjević 2013*, with further literature.
[73] *Bátky 1935* 17.

renowned ethnographers Zsigmond Bátky and Béla Gunda debated their origin in the 1930s, based mainly on the linguistic interpretations of these vessels' various folk names. Béla Rőmer surveyed the available information on baking bells in the 1960s, noting that Gunda had been right and that the Hungarians had started using these vessels in the early modern period under Balkanic influence. He has also published the first such finds from the Pécs Museum.[74] Tivadar Vida's overview of the vessel type's history through the ages revealed that baking bells had been in use between the 7th–12th centuries, but then disappeared almost completely from the material of the 13th–16th centuries.[75]

The first early modern period specimen from a known archaeological context has been published from Eger-Vár. However, this exemplar is quite atypical, being rather fine, wheel-turned and decorated. Thus, although Károly Kozák and László Fodor correctly identified its function, they were unable to find any parallels.[76] Eventually, Gyöngyi Kovács succeeded in correlating this vessel type with its ethnographic counterparts in her assessment of the Szolnok material in the early 1980s.[77] Attila Gaál excavated numerous brick baking surfaces beside open-air ovens and in-house stoves at Szekszárd-Újpalánk. They had quite certainly been used together with baking bells, as one was found *in situ* in the rubble of one of these stoves in a building that had burned down. Gaál also reviewed the research history of the vessel type in his study on the finds from Újpalánk.[78] Other specimens are known from almost all settlements with a significant southern Slavic population within the Ottoman province.[79]

One curious phenomenon is that early ethnographic research apparently had little interest in baking pans, even though they share several common traits with the lids. One possible explanation could be their possibly separate use and different importance among various populations.[80] A casserole of this type was first published from Eger-Vár.[81] In her study on the finds from Szolnok, Gyöngyi Kovács linked this vessel type with the *tepszi* or *tepszija* known from the written sources and noted its Balkanic origin.[82] She published comparable finds from Törökszentmiklós[83] and Barcs.[84] Further pieces are known from various settlement sites of the former Ottoman province *(fig. 7)*.[85]

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[74] *Bátky 1935; Gunda 1935* 179; *Bátky 1936; Rőmer 1966* 411, fig. 14.

[75] *Vida 2011* 726–732, 756. They are known from a few 10th–12th century sites in the southern Hungarian Plains region: *Rózsa 2016* 214–219. A single piece dated to the 15th century is known from Kőszeg: *Holl 1992* 31, 171, fig. 136. 1. However, it is quite possible that additional late medieval specimens will be found or identified in southern Hungarian contexts, as this region had always had close ties with the Balkans. *Kovács 1990–1991* 172.

[76] *Fodor – Kozák 1970–1971* 155, 196, fig. 46.

[77] *Kovács 1984* 42–43, Pl. 34. 1–5.

[78] *Gaál 1986* 189; *Gaál 2013* 229–232, 258–260, Pl. 16. 8–9, Pl. 17. 1–5; *Gaál 2015* 146–147, 148, fig. 1–3.

[79] Buda: *Gerelyes 1991* 35; *Kolláth 2019a* 177–185, 427–428, 557, fig. 50; Visegrád: *Gerelyes 1987a* 171; Segesd: *Magyar 1988* 147, fig. 13. 4; Babócsa: *Magyar 1990* 139, Pl. 30. 1; Törökkoppány: *Kovács 1990–1991* 172, Pl. VIII. 7–8; Barcs: *Kovács – Rózsás 1996* fig. 15. 7; *Kovács 1998* 155–156, fig 1. 1–5; Bátaszék: *Pusztai 2003* 306; Székesfehérvár: *Kolláth 2010* 33–36, 125–126, 160, fig. 31; *Vida 2011* 803, fig. 25. 1–2; Pécs: *Hancz – Varga* 2013 83, bottom picture.

[80] *Rőmer 1966* 405, 410; *Djordjević 2011* 11, 17.

[81] *Fodor – Kozák 1970–1971* 157, fig. 45, fig. 47.

[82] *Kovács 1984* 42.

[83] *Kovács 1990* 247, 249, fig. 6. 1.

[84] *Kovács 1998* 161.

[85] Buda: *Tóth 2003* 275, 279, fig. 5. 3; *Holl 2005*a 32–33; *Tóth 2011a* 232, 245, fig. 6. 5; *Éder 2014* 287; *Sárosi 2002* 521, fig. 31. 4; *Kolláth 2019a* 171–176, 180–185, 421–427, 556, fig. 49; Ipolydamásd: *Miklós 1989* 12, 15, fig. 10. 3; Vác: *MRT 9* site no. 31/3, 450–451; Szeged: *Hancz 2006* 36; Ozora: *Vizi 2008* 234–236, 246–250, Pls 2–6; Székesfehérvár: *Kolláth 2010* 35–36, 125–126, 160, fig. 31; Gyula: *Szalai 2017* 55, Pl. 51; Szekszárd-Újpalánk: *Gaál 2013* 232–233, 260–261, Pl. 17. 6, Pl. 18.

Fig. 7. Baking pan from Budapest-Kacsa utca, second half of the 16th century.
Excavation by Katalin Éder (Photograph: ©Bence Tihanyi)

Pots and lids

The photo of a slow wheel-turned coarse pot appeared among various other vessels of a 17th-century assemblage from Budapest-Tabán in Henrik Horváth's 1936 article; however, the author did not discuss this find in the main text.[86] The type was next briefly mentioned in Géza Fehér's 1960 study on the Ottoman-period pottery of Pécs, who noted that not only jugs, but slow wheel-turned pots with similar decoration had also been made in Bosnia and Herzegovina.[87] Győző Gerő identified this type in a securely dated Ottoman-period, late 16th-century context in Mária G. Sándor's excavation material from Márévár.[88] Based on these finds and the type's more intense presence in southern Transdanubia, he argued that they had been Bosnian products of the 16th century used by soldiers originating from that region who had retained their Christian religion.[89]

As already mentioned in the section on Ottoman pottery, this theory had been partly refuted and partly refined by Ibolya Gerelyes and Gyöngyi Kovács, in this case based on the finds from Ozora and Törökkoppány. Gerelyes also noted that this kind of slow wheel-turned pottery had been widespread throughout the entire early modern period and across the entire Balkan Peninsula, not just in 16th-century Bosnia.[90] Kálmán Magyar excavated a pottery kiln in Babócsa-Vár, which might have been used for firing such wares.[91]

The next major advance was represented by Gyöngyi Kovács's assessment of the finds from Barcs, Bajcsa and Nagykanizsa Castles.[92] She confirmed that slow wheel-turned wares had been

[86] *Horváth 1936* fig. 53.
[87] *Fehér 1959* 126, fig. 6.
[88] *G. Sándor 1959–1960* 126–127, note 45.
[89] *Gerő 1978* 352; *Gerő 1985* 200.
[90] *Gerelyes – Feld 1986* 177; *Kovács 1990–1991* 172–173.
[91] Sherds from vessels of this type were recovered from the fill and around the kiln, but the description of the excavation context is not clear regarding their exact position. *Magyar 1990* 138–140, figs 41–42, Pls 27–30.
[92] *Kovács 1998* 162.

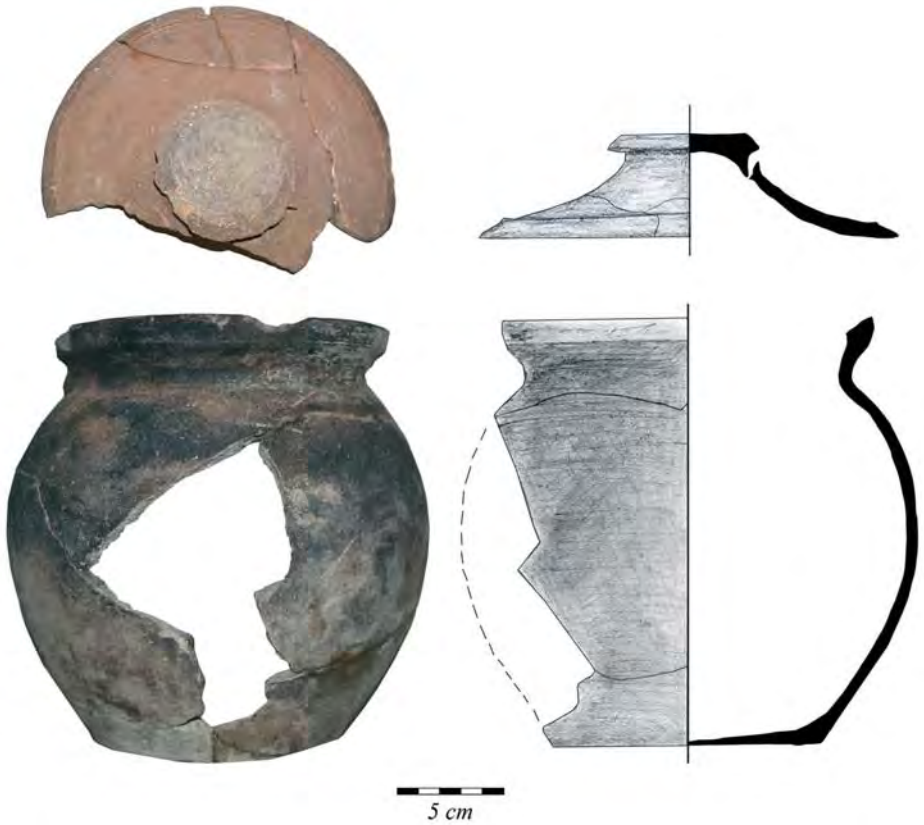

Fig. 8. Slow-turned pot and lid from Budapest-Színház utca and Szent György tér, 17th century. Excavations by István Feld and Károly Magyar (Photographs and drawings: ©Ágnes Kolláth)

produced locally right before the Ottoman conquest in southern Transdanubia, although they differed slightly from the Balkanic wares arriving with the new settlers.[93] Her findings have been corroborated by Vesna Bikić's observations regarding the slow wheel-turned pottery of Belgrade Castle (Serbia), which had been under Hungarian rule until 1521.[94]

Higher quantities of this pottery type have been published by Tamás Pusztai from Bátaszék,[95] by Márton Rózsás from Pusztabarcs[96] and by Attila Gaál from Szekszárd-Újpalánk.[97] It would appear that slow wheel-turned pots and lids played a more important role in the material culture of smaller south Transdanubian Ottoman forts, while they appear in lower numbers in the northern Transdanubian garrisons such as Visegrád[98] and Vál.[99] They are attested sporadically on larger settlements with significant trade connections such as Buda[100] and Székesfehérvár[101] or have not been identified at all yet (Szolnok, Eger). It must here be noted that data on this type are virtually lacking from eastern Hungary *(fig. 8).*

[93] *Kovács 1998* 156–162; *Kovács 2001* 197–198; *Kovács 2003a* 261.
[94] *Bikić 2003* 179.
[95] *Pusztai 2001; Pusztai 2002; Pusztai 2003.*
[96] *Rózsás 2006.*
[97] *Gaál 2013* 219–227.
[98] *Gerelyes 1987a* 175–177.
[99] *Hatházi – Kovács 1996* 41–42.
[100] *Gerelyes 1991* 46, fig. 11. 9; *Tóth 2011a* 231, 234–235, 237; *Éder 2014* 286; *Nádai 2016* 75, XII–XIII. cat. nos 117–118, Pl. 29; *Kolláth 2019a* 165–171, 417–421, fig. 48.
[101] *Kolláth 2010* 23, 27–28, 32, 123–124, cat. nos. 61–65, 75, 158, fig. 28. 159, fig. 30.

Jugs

This very distinctive, but rather rare type of coarse liquid container was either hand-thrown or turned on a slow wheel, or made by combining the two techniques. It has a distinct form and rich decoration consisting of applied, incised or thumb-indented ribs, incised lines, stamped and rouletted patterns, textile imprints. The vessels also often bear base stamps.[102]

Géza Fehér was the first to identify this ware in the material of the Pécs museum. He called them "prehistoric-like jugs" and found their parallels in Bosnian folk pottery.[103] Even though they occur very infrequently in archaeological assemblages, it seems that a variant had been produced in southern Transdanubia by the women of the Magyarhertelend village until the beginning of the 20th century.[104] It is known in Ottoman-period archaeological contexts from Kanizsa, Barcs, Bátaszék, Szekszárd-Újpalánk and Buda.[105]

Chinese porcelain and Near Eastern faiences

Faiences were first discussed in Sándor Garády's summary written in 1944, in which he identified them correctly as being of Near Eastern origin.[106] In the ensuing decades, faience and porcelain were only mentioned briefly or merely as illustrations of excavation reports.[107] Katalin H. Gyürky was the first to actually cover them in detail and to link the pieces from the Dominican Cloister of Buda to Iznik workshops. These finds could be dated to the earlier 16th century, and thus she and Imre Holl both concluded that they had arrived as gifts from the Sultan's court or as personal purchases of Hungarian emissaries to Istanbul.[108]

Although Győző Gerő studied such vessels at greater length, he only published concise summaries of his findings. He concentrated primarily on faiences, confirming the Iznik identification of the well recognisable pieces and classifying all the others as products of Persian workshops. He contended that these ceramics were all luxury wares, affordable only to the highest-ranking "genuine Turkish" members of Ottoman-period society.[109]

The first detailed study on faiences and porcelains, complete with find descriptions and illustrations, was Gyöngyi Kovács's study on the Szolnok material in 1984.[110] Ibolya Gerelyes wrote the first modern comprehensive overview in 1994.[111] The large-scale excavations of the 1990s yielded relatively high numbers of both faiences and china, indicating that they were more affordable goods than previously believed and that their occurrence depended mainly on the proximity of trade routes. However, it has proven true that their presence in the Hungarian Kingdom (outside the Ottoman province) was sporadic and confined to the immediate borderlands.[112]

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[102] *Kolláth 2019a* 185.

[103] *Fehér 1959* 126–127, Pl. XXXII.

[104] *Dankó 1968*.

[105] *Kovács 2003b* 159–160, fig. 8; *Kovács 1998* fig. 17. 1–8; *Pusztai 2003* 305–306, fig. 2. 5; *Gaál 2012* 300–305; *Kolláth 2019a* 185.

[106] *Garády 1944* 394, Pl. CXXXIX. 2–5, Pl. CXL. 4, Pl. CXLI.

[107] Buda: *Zolnay 1973* 251, fig. 10; *Kovács 2005* 84, notes 4–6; Eger: *Kozák 1963* 131, 159, fig. 35; *Kozák 1964a* 233, 270, 56; Székesfehérvár: *Siklósi 1982* 3, 11, 81, 200; Márévár: *G. Sándor* 1959–1960 126..

[108] *H. Gyürky 1974* 413–423, Taf. XLIX–LII.

[109] *Gerő 1978; Gerő 1985; Gerő 1989.*

[110] *Kovács 1984* 44–54, 125–130, Pls 28–32.

[111] *Gerelyes 1994*.

[112] *Sárosi 2002* 475, 476, 482, 484, fig. 37. 2, fig. 43. 3; *Tóth 2003; Sabján – Végh 2003; Bencze – Papp 2004; Kovács 2003b* 159, fig. 9. 1–4; *Tomka 2002* 299–300. We have no data about their quantities in the Transylvanian Principate.

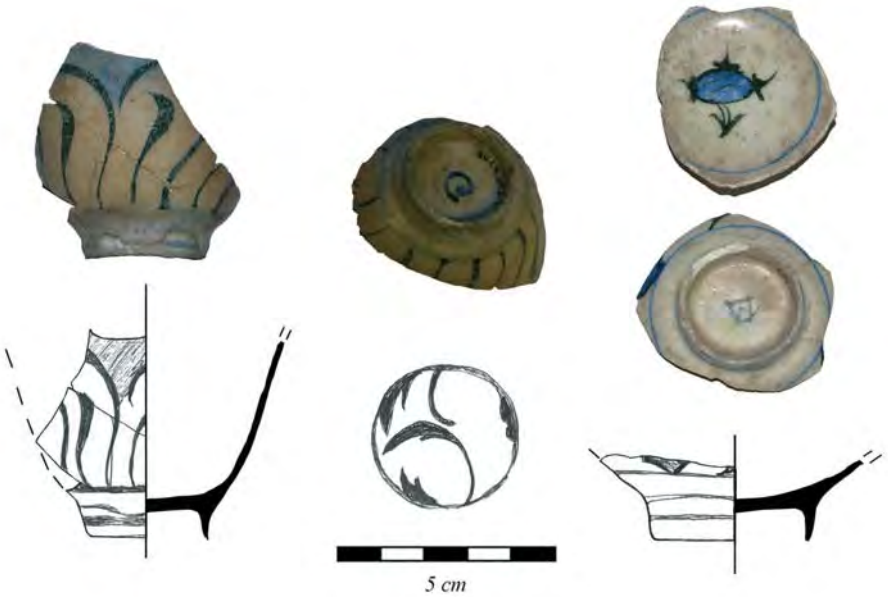

Fig. 9. Fragments of Near Eastern fayance cups with bottom marks, from Budapest-Szent György tér, 17th century. Excavation by István Feld (Photographs and drawings: ©Ágnes Kolláth)

Imre Holl's 2005 monograph on the finds from the Buda-Budavári Palota and his later studies on find assemblages from other sites are essential works on this topic. He constructed a typological scheme for porcelains and Near Eastern faiences, taking his cue from Győző Gerő's notion about Anatolian (Iznik) and Persian products, a distinction that remained widely accepted until the late 2010s.[113] Gyöngyi Kovács and Ibolya Gerelyes have also provided summaries on the current state of research, the latter also analysing the *celadon* finds from Hungary.[114]

There has been a welcome surge in publications on these finds from both recent and older excavations during the last one and a half decades.[115] One of the truly remarkable finds of these years was an assemblage of seven Iznik plates carefully placed in a wooden box and then concealed at the turn of the 16th–17th centuries in Esztergom, excavated and published by Edit Tari.[116]

The widely accepted distinction between "Iznik" and "Persian" faiences was challenged following the archaeometric examination of the composition of vessel fabrics from Budapest and Eger, as some of the samples considered "Persian" on stylistic grounds turned out to have the same characteristics as "classic" Iznik wares.[117] These findings and the increasing number of comparative assemblages published from other sites within the Ottoman Empire and along its long-distance trade routes are slowly, but surely transforming Hungarian researchers' views on Near Eastern faiences. However, at present, we are only able to securely identify the products of the classic, state-controlled Iznik workshops *(fig. 9)*.[118]

[113] *Holl 2005a* 100–160; *Holl 2005b* 212–221, 231–247 figs 16–40; *Holl 2006; Gerő 1978* 348–349.
[114] *Kovács 2005; Kovács 2010b; Gerelyes 2004; Gerelyes 2008*.
[115] Szekszárd-Újpalánk: *Gaál 2005;* Baja: *Kovács 2009*; Budapest: *Éder 2007; Éder 2012; Éder 2013; Tóth 2011b*; *Kolláth 2016a* 370–372; *Horváth – Komori 2020* 270, fig. 8; Pécs: *Hancz 2008; Hancz – Varga 2013* 78–80; Székesfehérvár: *Kolláth 2015a* 391–392, figs 6–11; Gyula: *Szalai 2013; Szalai 2017;* Szigetvár-Turbék: *Hancz 2020* 264–271.
[116] *Tari 2016*.
[117] *Zay 2014; Balla – Éder 2017.*
[118] *Kolláth 2019a* 199.

Simultaneously, the research of Chinese porcelains has taken a new turn as well, thanks mainly to the work of Tünde Komori. She explored the provenance of these wares found in Hungary, and was in some cases even able to identify the exact workshops in the city of Jingdhezen where they had been made. She has also created a new typology of china, based mainly on finds from Budapest and Eger.[119] Most recently, the present author's findings on the parallels of certain vessel types in the Netherlands have shed light on the Dutch Eastern India Company's involvement in the porcelain trade towards the Ottoman Empire, mostly known from written sources *(fig. 10)*.[120]

Fig. 10. Porcelain finds from the Eger Caste under evaluation, 17th century. Excavation by Károly Kozák (Photograph: ©Tünde Komori)

Tin-glazed wares

The first tin-glazed wares appeared at the end of the 15th century in the Hungarian Kingdom. However, most of the early modern period pottery made with this technique was produced by, or at least shows the influence of Anabaptist (also called Haban) craftsmen, who had arrived to this region in the mid-16th century.[121]

These wares have been principally discussed by art historians in Hungary. The first significant researchers discussing tin-glazed pottery were Béla Krisztinkovich, Imre Katona and Magda Bunta, all of whom wrote important comprehensive studies based on the main Hungarian and Transylvanian museum collections.[122] More recently Mária Krisztinkovich and Jenő Horváth have published a monograph on the vessels of the Krisztinkovich Collection in Vancouver.[123] Another volume by László Réti and Diána Radványi as well as numerous exhibition catalogues have also covered these wares.[124]

A few years ago, the Hungarian National Museum launched a research project on Haban pottery led by Anna Ridovics. The known pieces have been catalogued and an excavation has been carried out in the Haban Court of Sárospatak. The results of this research have been published by István Ringer and the scientific examination of the composition of several vessels was performed.[125] A thematic volume of *Acta Ethnographica* was dedicated to this ware in 2015, surveying the results from Hungary and the neighbouring countries.[126]

Haban pottery is fairly rare in the published archaeological assemblages from Hungary. In the case of Budapest, Sándor Garády has discussed the Haban pottery from the Tabán district. Since then, only Orsolya Havasy has published a vessel with the date of 1674 painted on it from Buda-

[119] *Komori 2014a; Komori 2014b; Komori 2015; Komori 2017a; Komori 2017b; Komori 2018.*
[120] *Kolláth 2019a* 205–206; *Kolláth 2019b* 403.
[121] *Radványi – Réti 2011* 21–23.
[122] *Bunta 1973; Krisztinkovich 1962; Katona 1974; Katona 1983.*
[123] *Horvath – Krisztinkovich 2005.*
[124] *Ridovics 2008; Réti 2007.*
[125] *Ringer 2014; Ringer 2015; Ringer 2016; Bajnóczi et al. 2011; Bajnóczi et al. 2015.*
[126] Acta Ethnographica Hungarica 60/2 (2015).

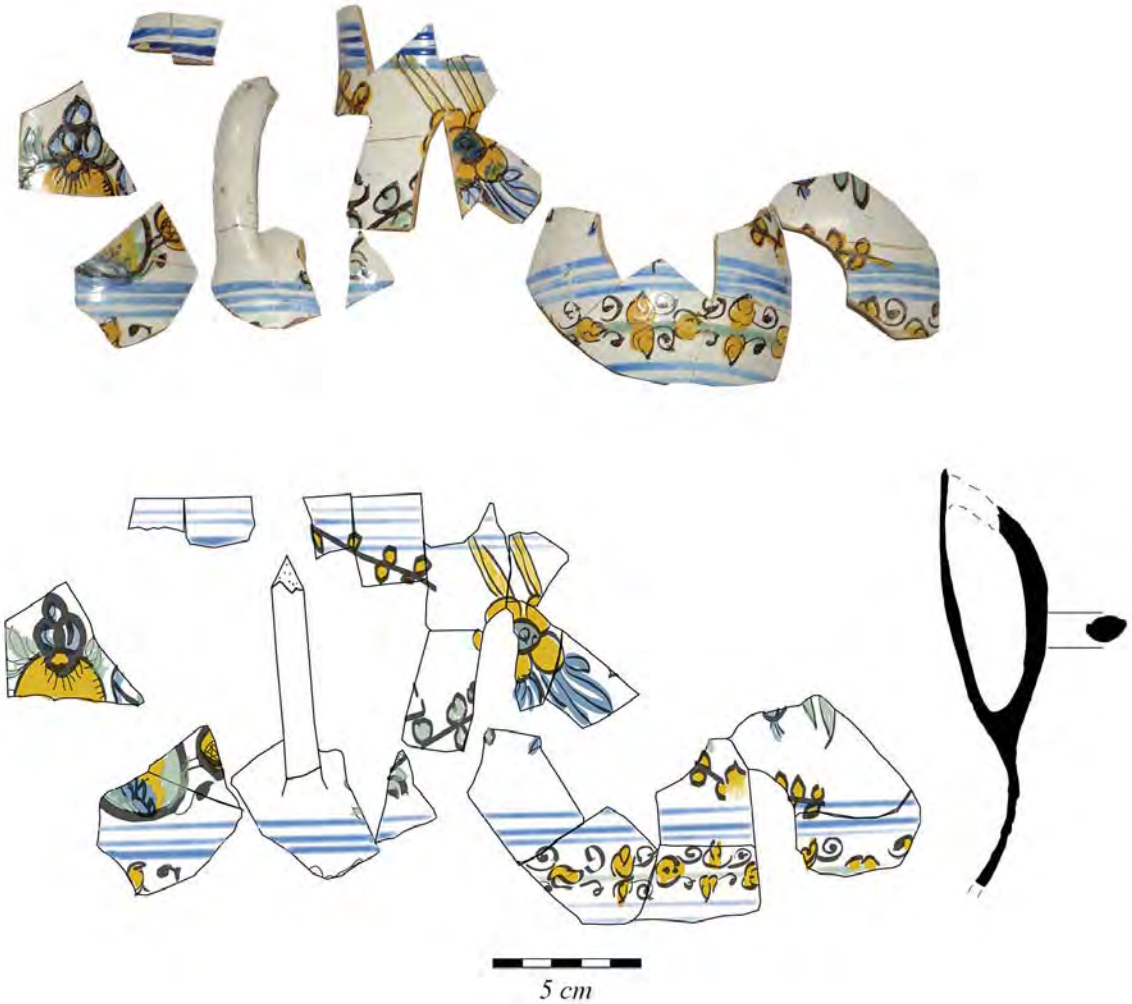

Fig. 11. Fragments of a tin-glazed jug with Anabaptist-style decoration from Budapest-Szent György tér, 17th century. Excavation by Károly Magyar (Photograph and drawing: ©Ágnes Kolláth)

Szent György tér.[127] Gábor Tomka has analysed the finds from Szendrő-Vár.[128] We know quite a few pieces from the inner city of Székesfehérvár, and also a probably unfinished vessel from the western *suburbium*, which sheds some light on the production of Anabaptist-style pottery in the 18th century.[129] A few fragments are known from Sümeg, Regéc, Nagykanizsa, Vál, Szekszárd, Eger and Pápa, but all things considered, much archaeological research is still needed to gain a better understanding of this ware *(fig. 11)*.[130]

[127] *Garády 1944* 395–396, Pl. CXXXIX. 1, 6, Pl. CXL. 3, Pl. CXLII. 1, 3; *Havasy 2016* 353–354, fig. 6. 1.
[128] *Tomka 2018* 62–64, Pls 52–53.
[129] *Kovács 2017* 336–341, figs 11–12; *Kolláth 2010* 78–79, 139, cat. nos. 268–275, fig. 67; *Kolláth 2015b* 131, Pl. 2. 3. The Haban courts themselves had split up by the mid-18th century at the latest, but their influence persisted until the 20th century.
[130] *Pető 2015; Kovács 2003b* 176; *Hathází – Kovács 1996* 46; *Gaál 2010* 450–451; *Somodi 2016* 26–28, Pls XXII–XIII; *Kolláth 2013* 169–172, figs 10–11.

"Cut-glazed" wares

The origins of certain techniques and motifs in Hungarian folk art have been since long debated by ethnographers. Given that the forerunners of several such ceramic wares can be found in 16th–18th-century find assemblages, these arguments have influenced archaeologists as well. Many ceramic groups are virtually unknown, making their evaluation difficult.

The single exception to this rule is the so-called cut-glazed pottery, which is actually one of the best-studied ceramic types in Hungary, and I shall therefore only summarise the main arguments concerning these wares. These various tablewares (mainly plates and liquid containers) have a light fabric and often a rich decoration consisting of multi-coloured lead and tin glazes combined with incised, stamped and applied ornament.[131]

Fig. 12. Fine material jug fired to a light colour with monochrome glazing on its mouth from Budapest-Kacsa utca, a typical product of the workshops in the Szécsény – Gömör – Rimaszombat region (today Northern Hungary and Southern Slovakia), second half of the 16th century. Excavation by Katalin Éder (Photograph: ©Bence Tihanyi)

Kálmán Szabó published the first securely identifiable pieces from the broader Kecskemét area.[132] Sándor Garády compared them to *sgraffito*-decorated footed bowls and correctly noted their diverse origins.[133] Imre Holl and Pál Voit voiced their contentions in 1956 based on the excavation material of Buda-Budavári palota, similarly to Katalin Irásné Melis in 1984.[134] The term "cut-glazed" referring to their characteristic decoration was coined by Pál Voit. He linked the vessels using tin glazes to the potters originally working in the majolica workshop of King Matthias I (1458–1490). However, he argued that the ceramics themselves, although displaying German and Czech-Moravian influence, were nevertheless the result of a local development, and dated the last specimens to the 16th century. Initially, he correctly located their production centres to northern Hungary and southern Slovakia, but later he modified his standpoint, deeming them the products of unknown and/or itinerant workshops.[135]

While Katalin Irásné Melis agreed regarding the importance of German and Italian influences, she argued that these wares had been made in Buda during a brief period between the last third of the 15th century and 1541. In her view, the potters fleeing the city occupied by the Ottomans subsequently made poorer-quality vessels in the 16th century in northern Hungary.[136] Herta

[131] The undecorated specimens of this type have been discussed by Gábor Tomka: *Tomka 2018* 85–90, 96–97, 118–119.
[132] *Szabó 1938* 108–109, figs 504–506.
[133] *Garády 1944* 386, Pl. CXXXIV.
[134] *Irásné Melis 1984*.
[135] *Voit 1954* 98–100; *Holl – Voit 1956* 133–134.
[136] *Irásné Melis 1984* 220.

Bertalan has published numerous finds from Óbuda, accepting Melis's dating to the turn of the 15th–16th centuries, as most of the vessels came from mixed layers.[137]

The problems of production centres and dating have been mostly resolved by Gábor Tomka and Maxim Mordovin, based on their assessment of the finds from Mohi, Ónod, Szendrő and Szécsény. They provided the typology and chronology of this ware, dating its last specimens to as late as the 17th century. They also proved that production had taken place mainly in northern Hungary and southern Slovakia. However, the pottery type's connections to the medieval, so-called Buda fine wares remain uncertain for the time being *(fig. 12)*.[138]

Slipwares

Early modern period slipwares were first covered by Henrik Horváth and Sándor Garády, who both linked them to Turkish pottery and decorative arts.[139] Gyula Mészáros and Olivér Soproni accepted this theory and developed it further, resulting in many misleading suppositions.[140] Ibolya Gerelyes and Gyöngyi Kovács began to refine these views in their studies on the find assemblages from Budapest-Tabán and Szolnok, Törökszentmiklós and Törökkoppány, respectively.[141]

Fig. 13. Glazed and slip-painted plates made in Styria from Nagykanizsa-Bajcsavár (Weitschawar), 1578–1600. Excavation by Gyöngyi Kovács (Photograph: ©Tibor Kádas)

[137] *Bertalanné 1998b.*

[138] *Tomka 2016; Tomka 2018* 31–40, 109, 112–114; *Mordovin 2016*, all with further literature. Péter Véninger has covered the technical aspects of this ware's production: *Véninger 2016*.

[139] *Horváth 1936* 213; *Garády 1944* 389–394.

[140] *Mészáros 1968; Soproni 1981.*

[141] *Gerelyes 1985; Kovács 1984; Kovács 1990–1991* 170–171.

However, in this case, the genuine breakthrough came from ethnography, when Janka Teodóra Nagy found the well-recognisable German forerunners of Szekszárd and Mórágy pottery, both of which were earlier considered to be "Turkish-like".[142] Judit Benda has excavated an 18th-century German potters' workshop in the Víziváros *suburbium* of Buda (Kapás utca), where the potters had worked with similar techniques and decorations as those of Mórágy.[143] We also have some information on the 16th-century imported German slipwares from Bajcsa, Buda and Visegrád.[144] The slipwares found on other sites in Transdanubia are mainly known from brief reports *(figs 13–14)*.[145]

The situation is somewhat better in the case of eastern Hungary. Gabriella Vida has pointed out the strong northern Italian influences in the decorative style of these slipwares in her overview on the pottery of Miskolc.[146] Gábor Tomka has analysed the finds from Ónod and Szendrő, while Orsolya Lajkó discussed the slipwares of Hódmezővásárhely in south-eastern Hungary *(fig. 15)*.[147]

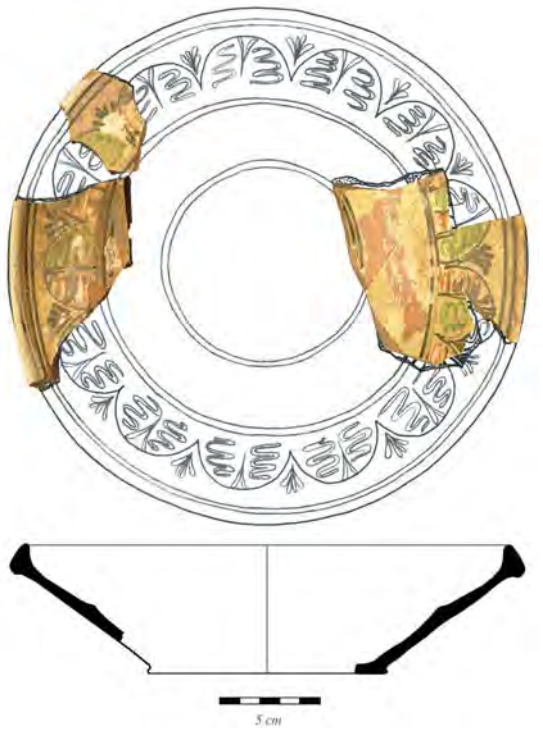

Fig. 14. Slip-painted plate decorated in "Transdanubian style" from Visegrád-Fellegvár, second half of the 17th century. Excavation by Mátyás Szőke (Photograph: ©Edit Kocsis, drawing: ©Éva Molnár)

Marbled wares

Vessels with "sedge-leaf pattern"

These plates and bowls were named after their specific decoration technique: the potter poured multi-coloured slips and sometimes glazes in them, creating leaf- or petal-like motifs. The colours were then often stirred in the middle, creating a marbled design.

These vessels were generally discussed together with other slipwares until the 1980s: Henrik Horváth, Sándor Garády, Olivér Soproni and Gyula Mészáros all accentuated the oriental, "Turkish" influences on these wares.[148] Gyöngyi Kovács voiced a partly different opinion based on her re-evaluation of the Szolnok finds. She highlighted the decorative technique's Byzantine roots and associated these vessels with settlers arriving from the Balkan Peninsula.[149] Ibolya Gerelyes refined this theory in her study on the plates from the Tabán *suburbium* of Buda. She

[142] *Nagy 1995*.
[143] *Benda 2006*.
[144] *Weitschawar 2001* 208–209; *Holl 2005a* 91–95; *Kocsis 2016* 271–273.
[145] Szekszárd-Újpalánk: *Gaál 2010;* Tata: *B. Kovács 2018* 35–36, 50, fig. 16; Pápa: *Kolláth 2013* 172–176; Székesfehérvár: *Kolláth 2010* 75–77.
[146] *Vida 1999* 18.
[147] *Tomka 2018* 114; *Lajkó 2002* 316, both with further literature.
[148] *Horváth 1936* fig. 56; *Garády 1944* 389, Pl. CXXXVI. 3–4; *Soproni 1956–58; Soproni 1981* 224, Pl. 2; *Mészáros 1968*.
[149] *Kovács 1984* 33–34, Pl. 33. 4–8.

Fig. 15. Slip-painted jug from Szendrő-Felső vár, 17th century. Excavation by Gábor Tomka (Photograph: ©Judit Kardos)

opined that these wares had been the products of southern Slavic *(rác)* Christian settlers arriving at the end of the 17th century, after the reconquest.[150]

The problem appeared to have been resolved, until the German origin of the Szekszárd and Mórágy pottery was identified, as the potters of these settlements had both used this decoration and it was attested in the German (Swabian) villages founded in the 18th century as well.[151] Securely datable proof from the potter's workshop in Budapest-Kapás utca and Pápa also pointed towards the vessel type's western origin.[152]

Adrienn Papp recently revisited this issue in her publication of the plates found in a late 17th-century assemblage during the excavation of the Rácfürdő 'Bath' in Budapest-Tabán. She found their closest parallels in Greece, which – in spite of the abovementioned results – would suggest the Byzantine-Balkanic connections of this decoration technique.[153] In this case, the closer re-examination of both the Early Modern finds and the vessels in ethnographic collections may bring the researchers closer to a clarification.

"Western marbled wares"

Similar problems arose in the case of the other distinctive group of marbled ceramics, made up mainly of plates and liquid containers of whitish or light red fabric. Their main decoration is multi-coloured marbling, sometimes combined with other techniques. They differ significantly from the marbled wares discussed above.

The first pieces were published from Szigliget and Sümeg by Károly Kozák, who assumed that they had been made in the latter settlement and dated them to the end of the 17th century.[154] Ibolya Gerelyes analysed a plate from Visegrád, found in an assemblage dating from the mid-17th century at the latest.[155] Comparable finds are mentioned mainly in the excavation reports and other shorter studies surveyed by Gábor Tomka as part of his evaluation of the pieces from

[150] *Gerelyes 1985* 232–240.

[151] *Nagy 1995* 509–510; *Kresz 1991* fig. 73.

[152] *Benda 2006* 299, 301, 307, fig. 7; *Kolláth 2013* 171, fig. 11. 8. More specimens are known from Óbuda: *Bertalanné 2004* figs 22–23.

[153] *Papp 2016*. The type is mentioned in early works: for example, David Talbot Rice dated a piece in the collection of the Victoria and Albert Museum in London to the 15th–16th centuries and identified it as a Byzantine product. *Talbot Rice 1930* 114, Table XVIa.

[154] *É. Kozák 1970* 238, fig. 297; *Kozák 1966b* 82–83, fig. 2. 1.

[155] *Gerelyes 1987a* 170, 175, fig. 3. 3.

Ónod and Szendrő. He found their parallels in German territory and in southern Poland.[156] Imre Holl added new details to the overall picture, placing their production between 1600–1688 and locating their workshop to Straubing, Germany.[157] Edit Kocsis described and discussed numerous pieces from Visegrád, dating them to the castle's Christian re-occupation at the turn of the 16th–17th centuries.[158] Additional vessels and vessel fragments are known from Szekszárd-Újpalánk and Budapest-Szent György tér.[159]

Regional pottery studies and typologies

Even though it has been clear since Mária Kresz's ethnographic and Imre Holl's archaeological studies in the 1950s that certain types of Hungarian folk pottery have a distinct regional distribution, which can be traced back to the early modern period or even the medieval period,[160] studies of this type have been few and far between in archaeological scholarship.

Nándor Parádi has collected the medieval vessels containing coins from the Hungarian museum collections in 1963, giving much needed starting points for dating certain types.[161] Károly Kozák was the first to attempt an identification of the products of the Sümeg potters in the 1960s, and published a study discussing the regional characteristics of ceramics in Veszprém County in 1986.[162] Béla Miklós Szőke published a late 18th–early 19th-century find assemblage from Győr, discussing the local ceramic production of the city as well.[163] Sarolta Lázár analysed the pottery types from Eger, considered to be "Hungarian" products at the time, and searched for their parallels among the region's more recent ceramics.[164] Ibolya Gerelyes also published a study with interesting conclusions on the pottery of the broader Ozora area.[165]

Interest in the topic rose considerably in the late 1990s and early 2000s. Gyöngyi Kovács discussed the connections and logistics of the Bajcsa fort by the western border of Hungary, which had been built and financed in 1578 by the neighbouring Styrian nobles. She compared its well datable ceramic finds to those of nearby Kanizsa Castle.[166] Márta Vizi evaluated the ceramic finds from the excavations of Ozora-Vár, later comparing them with the pottery from nearby Decs-Ete. She also mapped the 19th–20th-century production centres of the broader region and experimented with the usage of a pottery typology system developed in northern Germany.[167] Orsolya Lajkó chose another path in her treatment of the pottery of south-eastern Hungary, based mainly on finds from Hódmezővásárhely. She initially adopted the typology developed by Mária Kresz and Mária Igaz for museum collections of folk pottery, but found that it was only partially suitable for archaeological assemblages.[168] Gábor Tomka has contributed some of the

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[156] *Tomka 2018* 64–65, with further literature; Pl. 54. Other pieces are known from Ugod Castle: *Mithay 1988* 76, 80, fig. 24. 10; and from Lenti Castle: *Závodi 2003* 176, fig. 6. 6.
[157] *Holl 2005a* 92–93, Abb. 52. 5.
[158] *Kocsis 2016* 271, 281, Pl. 6. 1–5.
[159] *Gaál 2010* 448, Pl. 12. 3–4; *Kolláth 2019a* 243–245.
[160] *Holl 1956; Kresz 1960* 315.
[161] *Parádi 1963.*
[162] *Kozák 1964b; Kozák 1966b* 81, 86; *Kozák 1986*.
[163] *Szőke 1974.*
[164] *Lázár 1986*.
[165] *Feld et al.* 1989 179–181, 182–183, figs 5–6.
[166] Bajcsa was abandoned in 1600. *Kovács 2001; Kovács 2003a; Kovács – Vándor 2004; Kovács 2009; Weitschawar 2001..*
[167] *Vizi 2000; Vizi 2002; Vizi 2006; Vizi 2008; Vizi 2010; Miklós – Vizi 2006; Miklós – Vizi 2007; Miklós – Vizi 2017;*
[168] *Igaz – Kresz 1955; F. Lajkó 2007; Lajkó 2003; F. Lajkó 2005; F. Lajkó 2006; F. Lajkó 2010; F. Lajkó 2015.*

most important findings concerning the early modern period pottery of north-eastern Hungary, based on the material of Mohi, a market town first abandoned in the 16th century and then finally in the 17th century, and Ónod and Szendrő Castles.[169] Gyöngyi Kovács has explored the regional characteristics of the Dráva-region by the south-western border of Hungary together with Márton Rózsás, based on the finds from her excavation of the Barcs palisade fort, extensive field surveys and the petrographic analyses of ceramic samples.[170] The present author's research on the north-eastern Transdanubian region, based principally on the finds from Budapest, Székesfehérvár and Pápa, has also yielded some interesting results, mainly concerning household wares, unglazed liquid containers and local production.[171]

Additional information about the locally developed and produced ceramics can be found in excavation reports and various short studies.[172]

Conclusion

As shown by this overview, although the study of early modern period pottery in Hungary began at a fairly early date, interest in this topic fluctuated and was highly specialised for a long time, the latter leading to a number of strongly biased theories. Neither was it conducive to studies in this field that the ceramics from this period were often assumed to be younger than their real age, resulting in the destruction of their contexts, or even the finds themselves as they were considered to be modern. Even though there has been a welcome upsurge of publications since the early 2000s, enriching our knowledge of the period's ceramics, reports on individual assemblages or sites are still sorely needed, similarly to research on the connections of ceramic wares within and outside Hungary.

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[169] *Tomka 2002; Tomka 2018.*

[170] *Kovács 1998; Kovács 2012; Kreiter – Pánczél – Kovács 2016; Rózsás 2004; Rózsás 2006.*

[171] *Kolláth 2013; Kolláth 2014; Kolláth 2015b; Kolláth 2016a; Kolláth 2017; Kolláth 2019a; Kolláth 2019b.*

[172] Examples besides the earlier cited works: Boldogkő: *K. Végh 1966* 123, 133, 166–169, Pls II–V; Dunaföldvár: *É. Kozák 1970* 203–205, figs 31–35; Hollókő: *É. A. Kozák 1975* 46, 49–50 figs 28–31; Csővár: *Feld – Jakus – László 1979* 39–49, figs 39–43; Békés-Kastélyzug: *Gerelyes 1980* 110, figs 7–9; Ugod: *Mithay 1988* figs 21–24, fig. 28; Sirok: *Fülöp – Héczey-Markó 2013* 125, 132, fig. 8. 3–6; Salgó: *Balogh-László 2016*; Csókakő: *Hatházi – Kovács 2016* 130, fig. 15; Sopron: *Holl 1967; Holl 1968; Holl 1971; Holl 1973;* Ráckeve: *Fegyó 1973;* Medina: *Csalog 1941;* Túrkeve-Móric: *Méri 1954;* Egervár: *Fehér 1957;* Nagyvázsony-Csepely: *Kovalovszki 1969*; Gyepükaján-Nagykeszi: *Holl – Parádi 1982;* Bánokszentgyörgy-Szentmihály: *Holl 1987; Holl 1990;* Mihon: *Kvassay 1996;* Óföldeák: *F. Lajkó 2004;* Ura: *Fábián – Pintye – Ulrich 2011.*

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GYÖNGYI KOVÁCS

STOVES IN THE OTTOMAN CASTLE AT BARCS, DRAVA VALLEY, HUNGARY

In memoriam Tibor Sabján

Zusammenfassung: Vorliegender Beitrag widmet sich den Ofen- und Herdüberresten, bzw. Feuerstellenbestandteilen, die im Rahmen der osmanisch-türkischen Palisadenausgrabung bei Barcs, in der Drauregion zum Vorschein kamen, in einem breiteren historischen, archäologischen und völkerkundlichen Kontext. Die Palisade wurde 1567 erbaut und 1664 zerstört. Das während der Ausgrabungsarbeiten zutage geförderte Fundmaterial lieferte eine Vielzahl an Informationen über die Heizungsarten der Wohnräume, die Orte, Gegenstände und Arten des Kochens und der Lebensmittelzubereitung, außerdem über das Fortleben und die Vermischung von Traditionen. Die große Anzahl an Öfen und Herden hängt mit den klimatischen Verhältnissen („kleine Eiszeit") der damaligen Zeit zusammen.

Bei den Öfen handelte es sich um Schüsselkachelöfen mit Außenbefeuerung, formal gesehen war der untere Bereich meist viereckig und der obere typischerweise scheitförmig mit achteckiger Basis und unterschiedlichen Kuppeln. Die meisten der eingebauten Ofenaugen waren handgedreht, unglasiert und becher-, bzw. krugförmig, allerdings gab es auch relativ viele zwiebelförmige Ofenaugen, während glasierte osmanische Varianten kaum vorkamen. Die detaillierte Analyse legt die chronologischen Unterschiede offen.

Im Fundmaterial von Barcs ist die Dominanz der regionalen und balkanischen Merkmale weitaus augenscheinlicher, als im Falle anderer relevanter (ungarischer) Fundorte. Die Merkmale der Öfen von Barcs formten die regionalen Traditionen der Großen Tiefebene und die balkanischen Bräuche gemeinsam, und zwar irgendwo in der Wojwodina, auf dem Gebiet Slawoniens, der Batschka und Syrmiens (heute Kroatien und Serbien), wo die Bevölkerung unter osmanischer Hoheit gemischt war. Das Fundmaterial gibt uns Referenzen für die Bearbeitung jener Öfen des 16.–17. Jahrhunderts mit balkanischen Merkmalen, außerdem kann es bei der Bewertung des archäologischen Fundmaterials des Balkans, bzw. bei der Bestimmung regionaler Merkmale assistieren.

Keywords: stove tiles, stoves, reconstructions, archaeology of Ottoman Hungary, 16th–17th centuries, Drava valley, Ottoman castles

The Ottoman palisaded castle at Barcs was part of the Ottoman Empire's system of border defence in southern Transdanubia, a link in the Pécs – Szigetvár – Babócsa – Segesd chain of border fortresses along the Drava river *(fig. 1)*. It was built in 1567, on the north bank of the River Drava, following the capture of Szigetvár by the Ottomans the previous year. The castle served to protect Szigetvár's hinterland, the Drava bridgehead, and the Drava flotilla, ordered to the castle having previously been stationed at Eszék (today Osijek, Croatia).[1] In 1595, during the Fifteen Years' War, the stronghold was abandoned by its garrison, which set it ablaze when it withdrew.[2] It was recovered by the Ottomans following their capture of Kanizsa in 1600. Up until the end of the 16th century, the castle at Barcs belonged to the Sanjak of Sigetvar (Szigetvár); later, after 1600, it fell within the boundaries of the Kanija (Kanizsa) Eyalet. In 1664, at the time of the winter campaign waged by the poet and general Miklós Zrínyi, the castle was again set on fire and abandoned by its garrison. This was when the only known depiction of it was made: a pen-and-

[1] *Roth 1970* 158; *Szakály 1971* 52; *Hegyi 2007* I. 98, II. 1327.
[2] *Rövid magyar kronika 1753 (1993)* Anno 1595; cf. *Kanyar 1989* 91; *Kerecsényi 1993* 258.

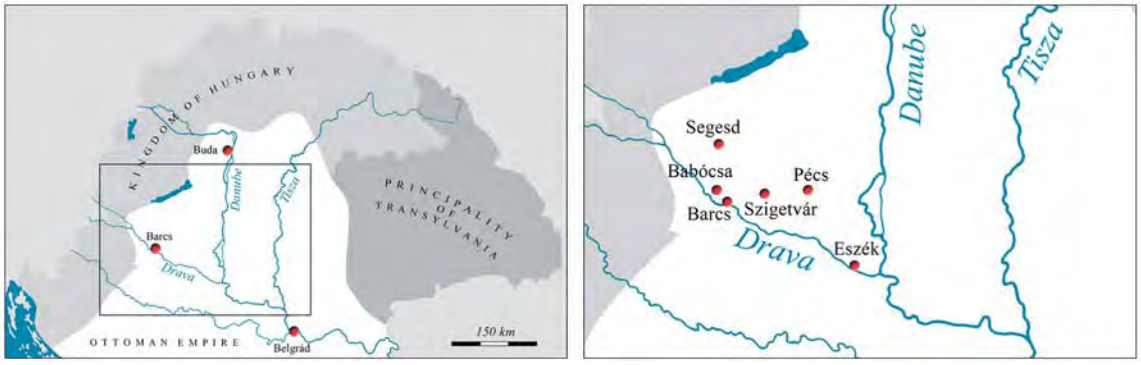

Fig. 1. Barcs and other Ottoman border fortresses in southern Transdanubia in Ottoman Hungary (Map: ©Sándor Ősi)

ink sketch that survives to this day in the work *Mars Hungaricus* by Count Pál Esterházy *(fig. 2).*[3] The castle was not rebuilt in the years after 1664 and began slowly to decay. Its garrisons largely consisted of *azab* and *martalos* foot soldiers serving on the river or on its banks; mounted troops and artillerymen also featured, albeit in smaller number. Garrisons were typically between 150 and 220 soldiers in size. Ottoman military payrolls indicate that a significant proportion of those who served at the castle were of Muslim and Balkan heritage.[4]

The site of the one-time Ottoman castle in question is to be found in the centre of today's Barcs, near to the Roman Catholic church on Hősök tere.[5] Test excavations were conducted on the site between 1989 and 1994. Subsequently, in 2002, and especially in 2003, larger areas were excavated, prior to construction work relating to a new residential complex on Nagyhíd utca.[6] Extending to around 1500 m² in all, the areas excavated amount to approximately one quarter of the castle area, which, it may be hypothesised, measured 90 × 70 m and covered 0.6–0.7 hectares *(fig. 2).* The excavations were supplemented in 2017 by a geophysical (magnetometer) survey of the castle's southwestern part.[7] Researches have confirmed the accuracy of some elements in the Esterházy drawing from 1664 (e.g., the castle's location right next to the River Drava); they have not, however, attested the veracity of its details concerning the bastions or the buildings inside the castle. The depiction published should be seen as a sketch merely, one that was redrawn in a stylised way after the campaign, as were other castle drawings in the *Mars Hungaricus* treatise. At the same time, as a result of the excavations it has been possible to add to the sketch the castle's orientation and approximate dimensions, as well as to glean data on the make-up of its walls and on the buildings within them. That the castle suffered great fire damage on two occasions is proved by layers of debris. Surviving relics of it have facilitated investigations into the lives of ordinary garrison soldiers stationed on the periphery of the Ottoman Empire. Additionally, these relics have yielded insights into archaistic particularities of the region, activities taking place at the castle, and issues of provisioning and trade.[8]

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3 *Esterházy 1664 (1989)* 140.

4 *Hegyi 2007* II. 1327–1329, III. 1590–1594.

5 The site stretches as far as the presbytery garden, several plots along Nagyhíd utca, and the courtyard of the Arany János General School.

6 *Kovács – Rózsás 1996; Kovács – Rózsás 2010.* The author would like to thank the local historian Márton Rózsás and the archaeologists Adrienn Papp, Katalin Éder, László Költő, Judit Szigeti, and Csilla Aradi for their work at the 2002–2003 excavations.

7 Magnetometer survey: Gábor Serlegi and Bence Vágvölgyi (Institute of Archaeology, Research Centre for the Humanities).

8 *Kovács – Rózsás 1996; Kovács – Rózsás 2010.* See also *Kovács 1998; Kovács 2019*, etc. The Barcs research project was supported by the Hungarian Scientific Research Fund (OTKA K 72231).

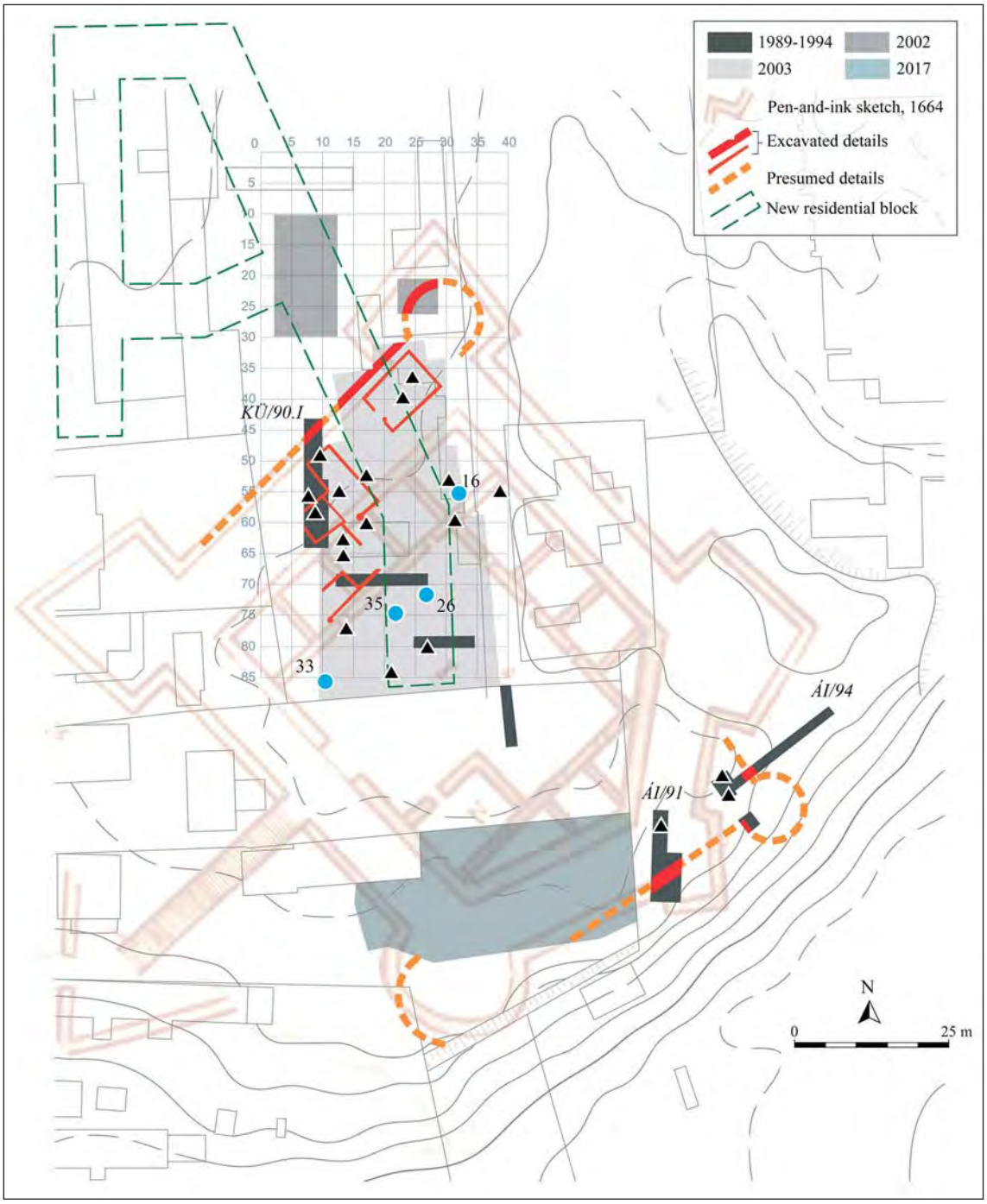

Fig. 2. Barcs, Ottoman castle. The 1664 sketch and the excavated areas with details of the castle wall and remains of the 17th-century buildings. ▲ = Bricked bases of stoves and hearths, ● = Pits with remains of stoves (Computer graphics: ©Zsolt Réti)

Of the finds excavated, remains of places where fires were kindled (stoves for heating, fireplaces, ovens for baking, and burnt surfaces) make up a significant group. Together with artefacts – pieces of stove wall; stove tiles; thick, hand-fashioned baking dishes and fragments of the bell-shaped covers used with them – these finds furnish much information on the heating of residential spaces, on stoves providing this, on items used in cooking, and on the endurance and mingling of heritages.

Within the group of finds, remains and component parts of cup-tiled stoves (stoves with concave tiles; Hungarian: 'bögrés szemes kályhák') constitute an ensemble that is very rich.[9] They will be examined closely in what follows.[10] Little will be said regarding stove-building techniques and solutions.[11] In addition to the stoves, the ovens and other fire-places will be discussed, albeit briefly. For the present study, the 2003 finds will be analysed. In a number of cases it has been thought necessary to involve findings of the test excavations conducted between 1989 and 1994.

Bases of heating stoves, ovens, and other fire-places

On the areas excavated, remains of twenty fire-places (i.e., places where fires were laid) could be observed, among them stoves, ovens, and hearths. When fragmentary burnt surfaces are counted, the number is higher. The remains came to light in various conditions and shapes. Heating-stove bases made from bricks that had survived in good condition, levelled heating-stove and oven bases, bricked surfaces and hearths *(figs 3–8, fig. 9. 2)*, pits full of stove parts and components, and brickwork (stove bases) enclosed in pits accompanied by stove tiles *(fig. 9. 1. and 3)*, – all were unearthed.[12]

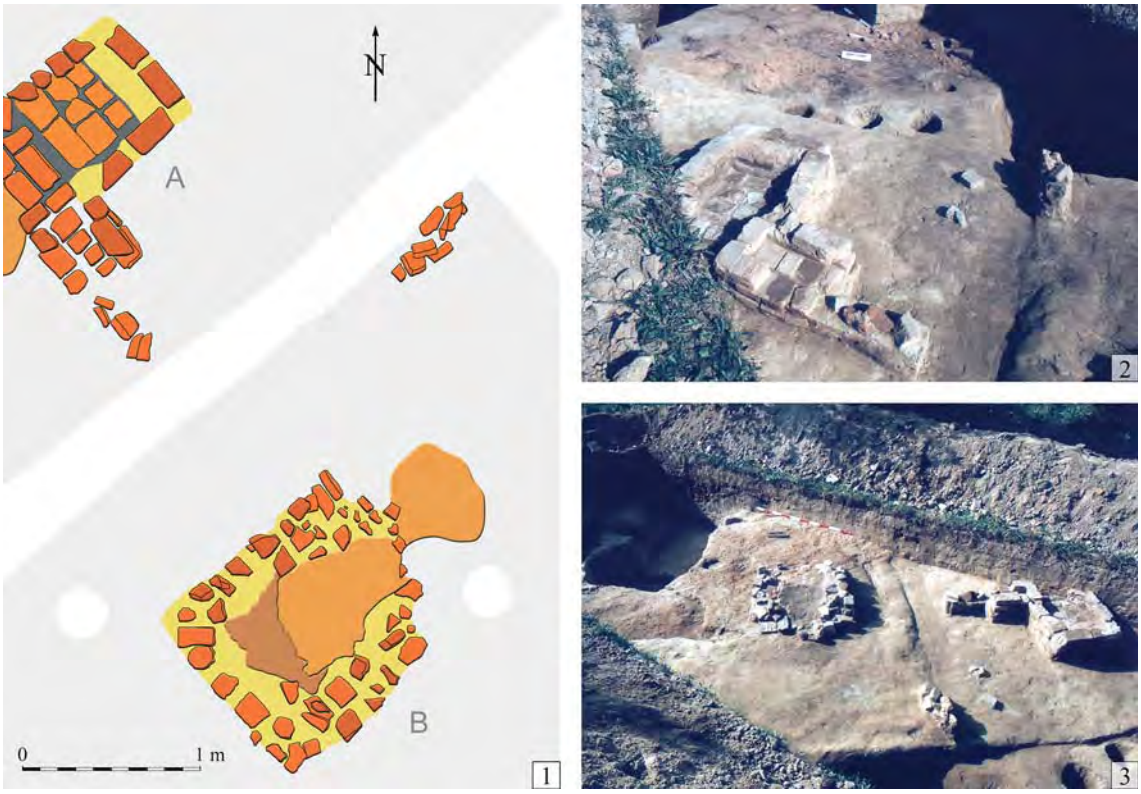

Fig. 3. Barcs, Ottoman castle. 1–3. Stove base and hearth, 17th century. Test Trench KÜ/90.I (Computer graphics: ©Zsolt Réti)

[9] 'Cup-tiled stoves' are stoves the great majority of whose tiles belong to the cup-shaped type or to variant forms of it that lack dish-shaped vessel-tiles. *Sabján 2001* 292.

[10] The finds can be found in the collection of Barcs's Drava Museum (today 'Dráva Közérdekű Muzeális Kiállítóhely').

[11] For observations made in connection with the building techniques used for Ottoman-period stoves in Buda's Water Town, see *Sabján – Végh 2003* 294–299.

[12] See also *Kovács – Rózsás 2010* figs 5. 2. and 4.

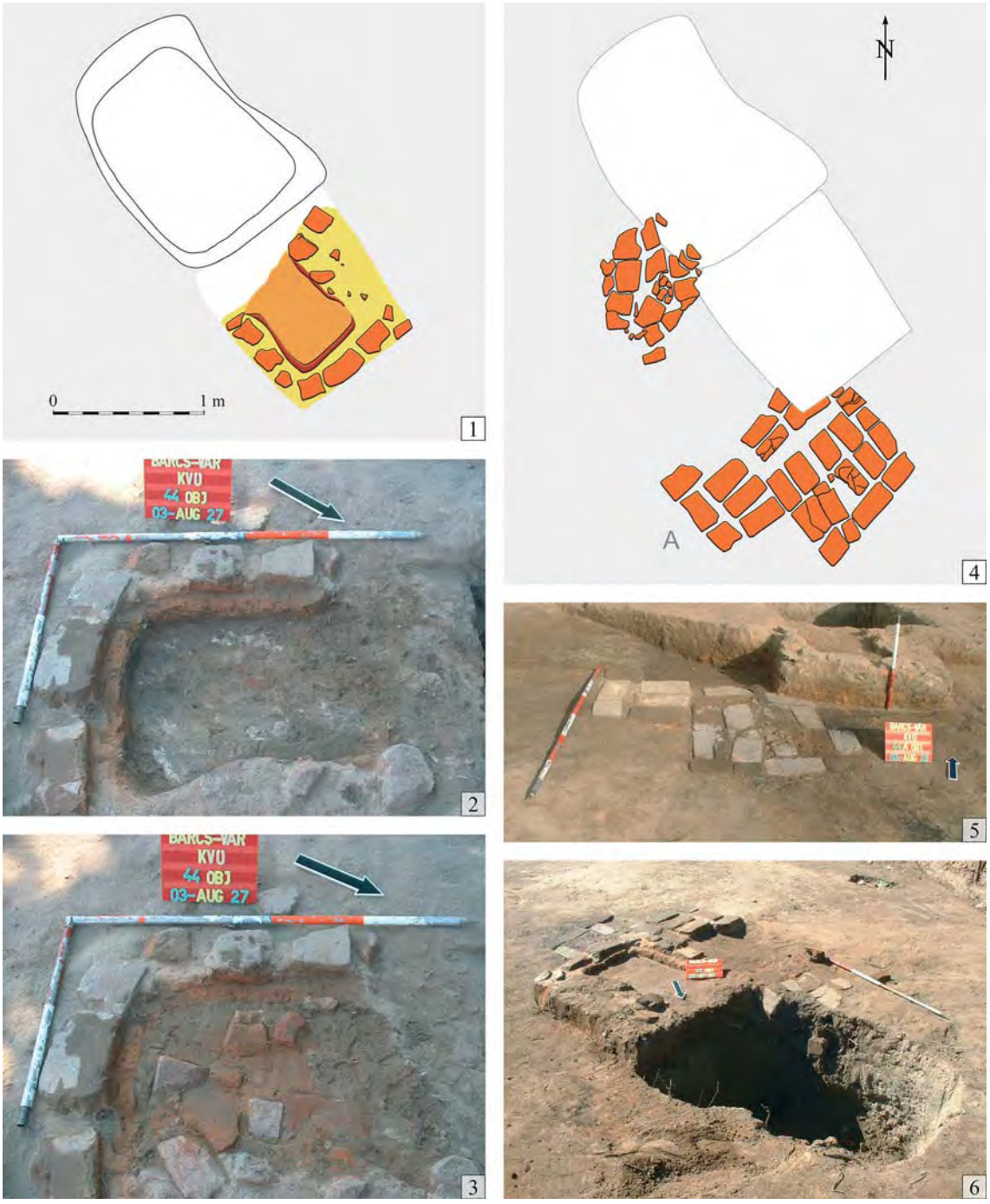

Fig. 4. Barcs, Ottoman castle. 1–6. Stove bases, 17th century, Features 44 and 44A, 2003 (Computer graphics: ©Zsolt Réti)

The bases of stoves consist in most cases of bricks set in clay. Bases with more than 2–3 rows of bricks were not observed, although such bases may have been created. Remains indicative of stoves without brick bases could be identified in one or two cases only. In the light of the brick bases, the lower parts of stoves were rectangular in ground plan; there was no trace of any cylinder-shaped stove at Barcs.[13] According to measurable brick bases, the sides of stove bases

[13] For remains of a cylinder-shaped stove from the Ottoman palisaded castle at Újpalánk (Yeni Palanka), see *Gaál 2015* 147.

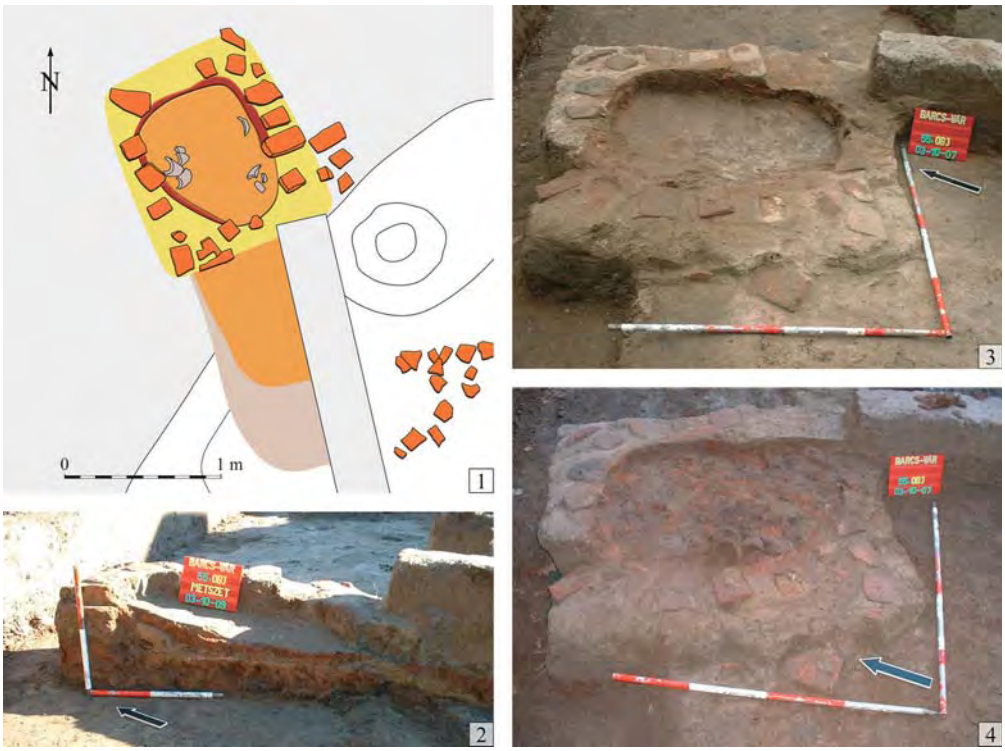

Fig. 5. Barcs, Ottoman castle. 1–4. Stove base, 17th century, Feature 55, 2003
(Computer graphics: ©Zsolt Réti)

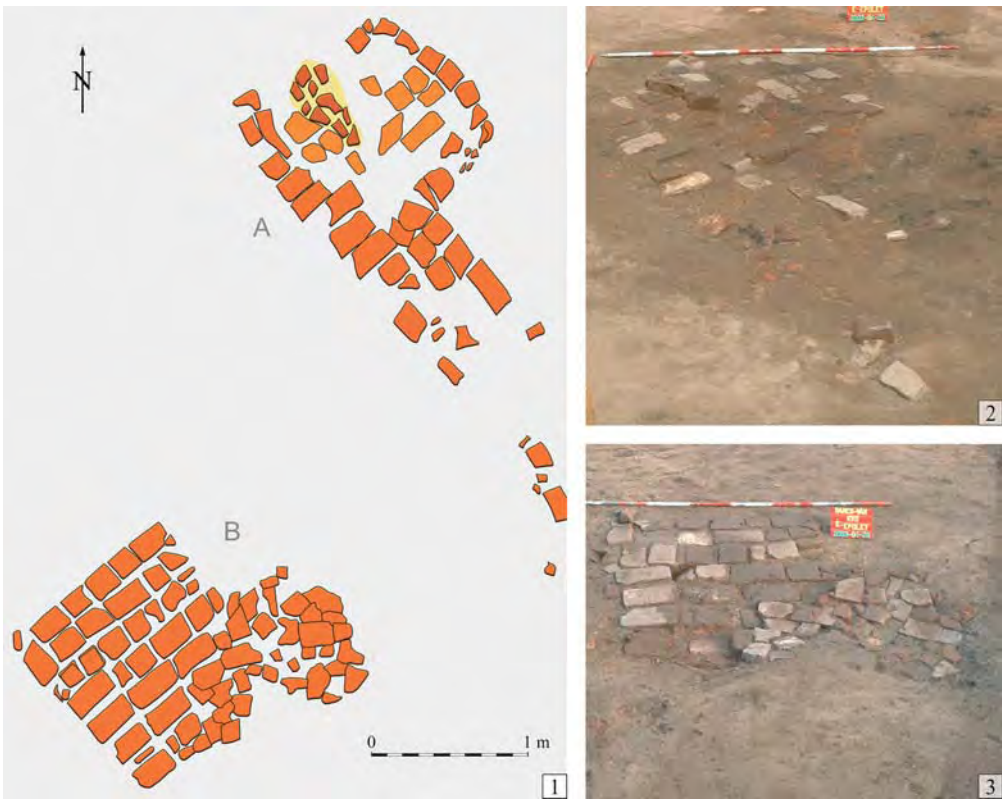

Fig. 6. Barcs, Ottoman castle. Stove bases, brick surfaces, 17th century.
‘North building’ (Building 1), 2003
(Computer graphics: ©Zsolt Réti)

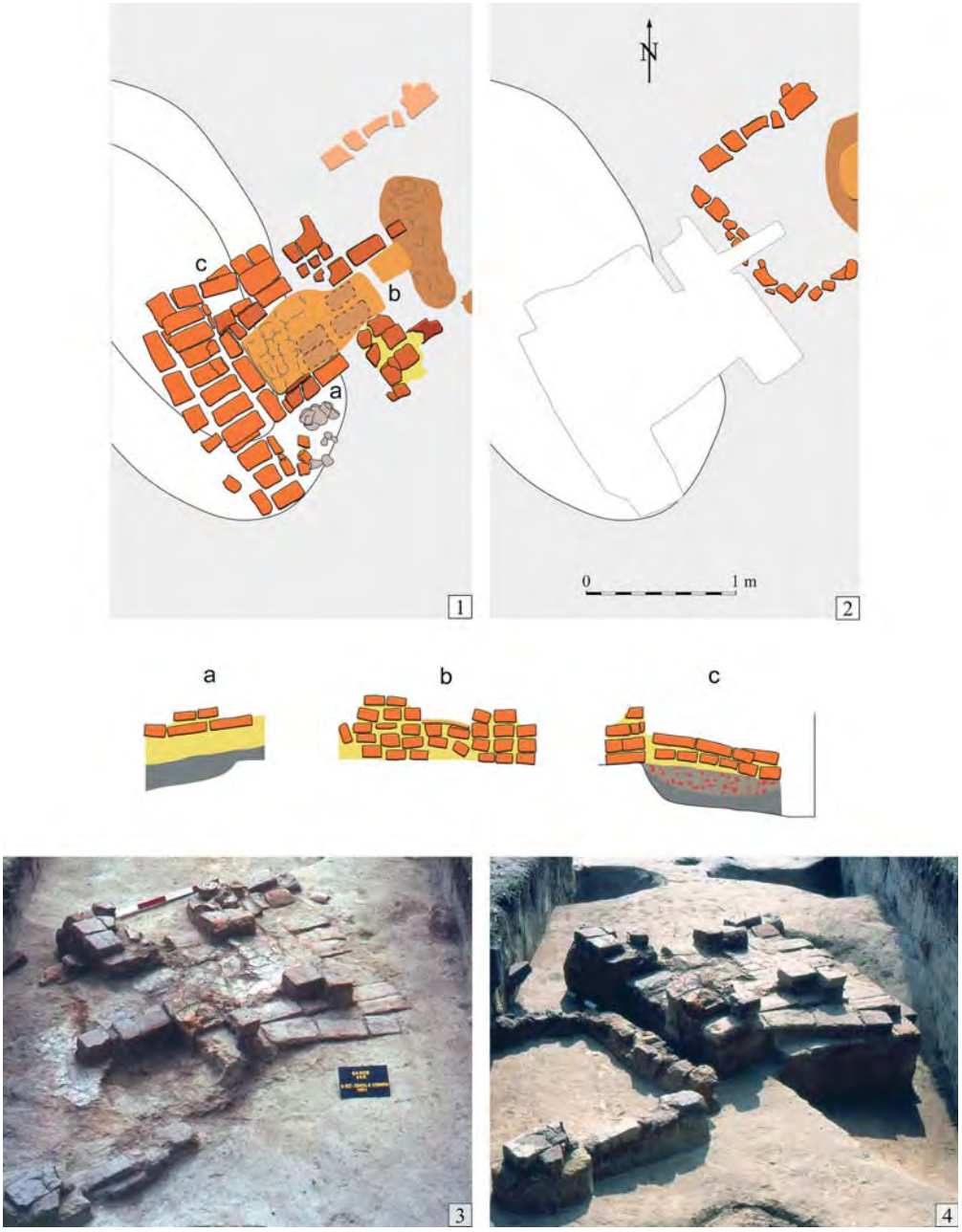

Fig. 7. Barcs, Ottoman castle. Stove base (1) and a burnt surface flanked by bricks (2), 17th century. Test Trench ÁI/91
(Computer graphics: ©Zsolt Réti)

were approximately 70 cm in length,[14] although larger bases, too, were found. The brick bases were protruding slightly from the surfaces of the stoves. The fire surfaces of the stoves (namely the surfaces on which the fire burned) were at the same level as the floors of the rooms;[15] the bases of the fire surfaces were built from bricks and ceramic sherds.

[14] The measurements of traditional stoves in Serbia shaped like those from the 16th–17th centuries are sometimes similar. Width of the mentioned Serbian stove at Osat: 70 cm; depth: 72 cm. *Sabján – Végh 2003* 296, fig. 16. 4a–d (see note 17). The measurements of the base of a 19th-century stove in a monk's cell at Rila Monastery (Bulgaria) are 60 × 60 cm. *Christov – Stojkov – Mijatev 1957* fig. 37.

[15] As on 15th–16th-century Great Plain ovens and stoves in rooms. *Szabó 1938* 83, 90.

Fig. 8. Barcs, Ottoman castle. 1–3. Oven base, 16th century, Feature 25, 2003
(Computer graphics: ©Zsolt Réti)

A piece of brick wall containing the stokehole of a stove survived in a Belgrade building destroyed in the late 17th century *(fig. 10)*.[16] In a number of instances, foundations of brick walls probably containing stokeholes could be encountered at Barcs, too. Stoves were stoked from outside the spaces they heated. According to archaeological and ethnological evidence, this solution counts as general in 15th–20th-century architecture; in this study, two examples from folk architecture in Serbia are presented *(fig. 11,*[17] *fig. 30A. 4a–d*[18]*)*.

The bricked and burnt clay surfaces discovered in front of the stokeholes were places where cooking and baking took place.[19] Baking dishes were placed in hot embers or over open fires, as were cooking vessels resting on iron tripods. Cauldrons may have been suspended over fires from poles held up at either end or even from ceiling beams. This solution can be seen, for example, in the 19th-century building at Šumadija (central Serbia) mentioned below *(fig. 11)*.[20]

Feature 25 *(fig. 8)* – in the southern part of the 2003 excavation area – held remains of a fire-place of some kind. It is conceivable that it was the base of a building-related small clay-walled oven; its size (150 × 110/120 cm), larger than the bases of the stoves, may indicate an oven function. The fire area measured 50 × 60 cm. In front of the stokehole was a multilayered, bricked work surface that was bordered by brick walling on the north side. Furthermore, it proved possible to document a continuation of the brick walling that included a stokehole, indicated by a charred beam.

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16 *Marjanović-Vujović 1973* 204, 227, Pls VII–VIII.

17 Šumadija (central Serbia, 19th century), after *Kojić 1980* fig. 6.

18 For a traditional Serbian stove at Osat (in Bosnia-Herzegovina), see B. Kojić: Stara gradska i seoska arhitektura u Srbiji. Beograd 1949, 158. Quoted by *Sabján – Végh 2003* 296, fig. 16. 4a–d.

19 *Szabó 1938* 82.

20 See note 17.

At Barcs, no evidence of open-air baking ovens could be identified, although there were probably simple, small baking ovens.[21] Baking mostly took place with the help of baking dishes and covers for those dishes. Thinned with chaff and thickish, fragments of these bell-shaped baking covers make up a very significant part of the archaeological material from Barcs,[22] proving unequivocally the use and popularity of this Balkan-rooted way of baking[23] at the castle.

During the excavations at Barcs, remains of open fire-places, too, were discovered. Insofar as our identification is correct, the free-standing hearth surrounded by bricks that was unearthed in Trench KÜ/90.I,[24] and dated to the first half of the 17th century may have been one such find *(fig. 3. 1B)*. Its base measured 120 × 120 cm and its fire surface had been repaired a number of times. In the event of cooking using a cauldron, the cauldron may have been suspected from a ceiling beam above the fire, as indicated by numerous such cases in the Balkans in the 19th century (e.g., *fig. 12*).[25] According to ethnology data from the Balkans, freestanding hearths stood in the central areas of houses.[26]

Fig. 9. Barcs, Ottoman castle. 1. Pit with stove tiles and debris, Feature 35, 2003; 2. Stove base and bricked surface, Feature 32, 2003; 3. Pit with remains of a stove, Feature 26, 2003

[21] Simple, mud-walled, small-sized bread ovens in 20th-century Balkan village settings: Szond/Sonta (west Bačka, Voivodina, northern Serbia), *Filipović 1951* 164, fig. 43; Garvan (Tutrakan, Silistra, north-eastern Bulgaria), *Vakarelski 1977* 312, fig. 277.

[22] *Kovács 1998* 155–156, 172, and fig. 1. The proportion in the 2003 material is also highly significant.

[23] Baking with dishes supplied with bell-shaped covers can be followed right up to the 19th–20th centuries. *Filipović 1951*, 73–78, 162; *Rőmer 1966* 390, 398–399, 411; *Tomić 1970*, with additional literature.

[24] KÜ = 'Költségvetési Üzem' (demolished).

[25] Little Shëngjin (north-western Albania), *Muka 1979* Pl. XVI. For occurrences in Albania, see, e.g., Zavalinë (central Albania), *Muka 1984* Pls IX–X. Examples from Bulgaria: *Vakarelski 1977* 231, figs 198–203.

[26] The place of the fire in a Bosnian house is a rectangular hearth in the middle of the house. Above it, on a chain, hangs a pear-shaped cauldron. The entire domestic life of the inhabitants is centred around the fire. *Bátky – Györffy – Viski n. d. [1933–1937]* 184.

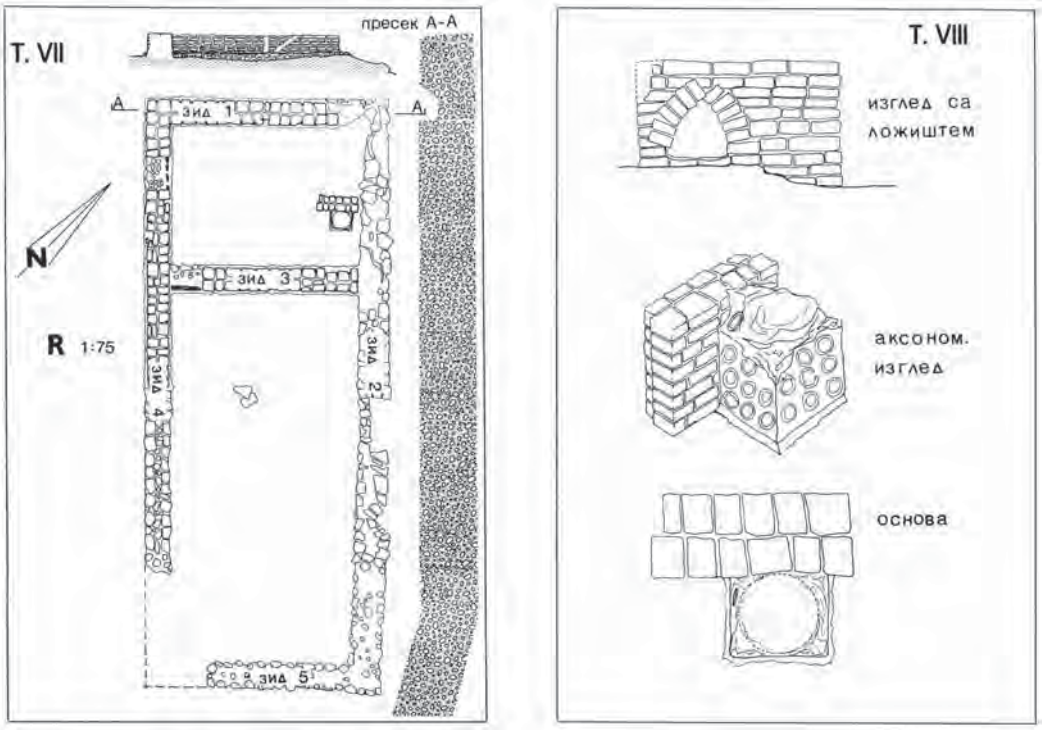

Fig. 10. Belgrade-Donji Grad. Foundations of a house from the second half of the 17th century along with remains of its ruined stove (after *Marjanović-Vujović 1973* Pls VII–VIII)

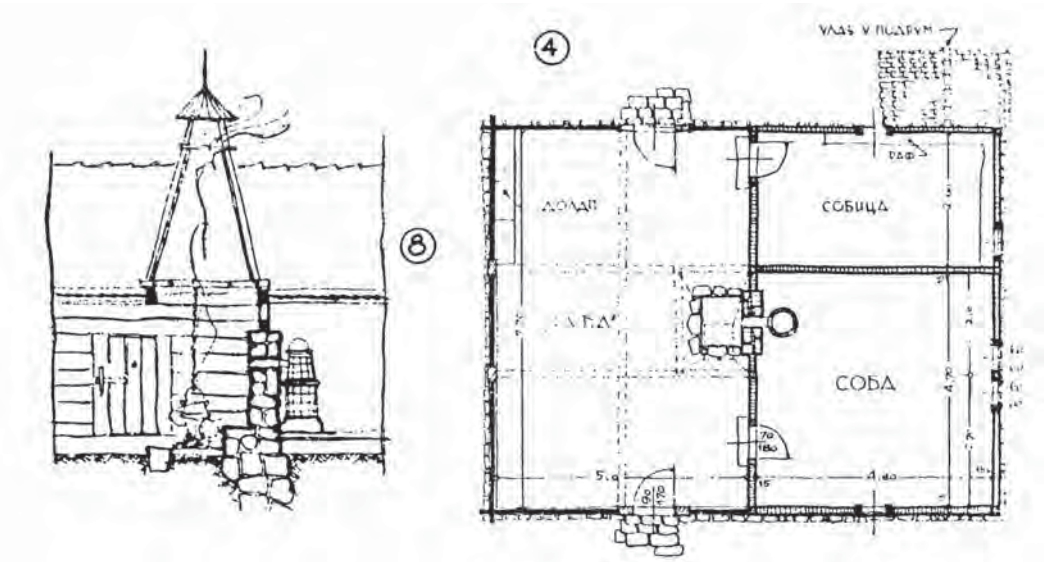

Fig. 11. Stove and hearth in a traditional Serbian house (Šumadija, second half of the 19th century) (after *Kojić 1980* fig. 6 [details])

In practice, freestanding burnt surfaces are simply signs of the lighting of fires, which may have occurred on many different occasions, since fires were lit not only for cooking purposes, but for other activities also (e.g., casting bullets, keeping warm).[27] Cooking may have taken place using pots and dishes placed on smaller clay supports *(topka)*, meaning that the fire was

[27] *Gaál 2015* 150.

burning underneath the baking dishes and cooking pots.[28] A baking cover supported by a cone is mentioned from Kosovo (Serbia).[29] Archaeological evidence of fires of this type is, then, merely a burnt surface which on occasion is surrounded by bricks, as, for example, in the case of the fire-place discovered in Trench ÁI/91[30] *(fig. 7. 2)*.

Rectangular and oval bricked surfaces of different sizes are harder to explain. At Barcs, they may simply have strengthened beaten-earth floor; however, many may have been the bases of stoves or ovens, or surfaces on which fire-connected work took place.[31] More precise identification will depend on their locations and their sizes.

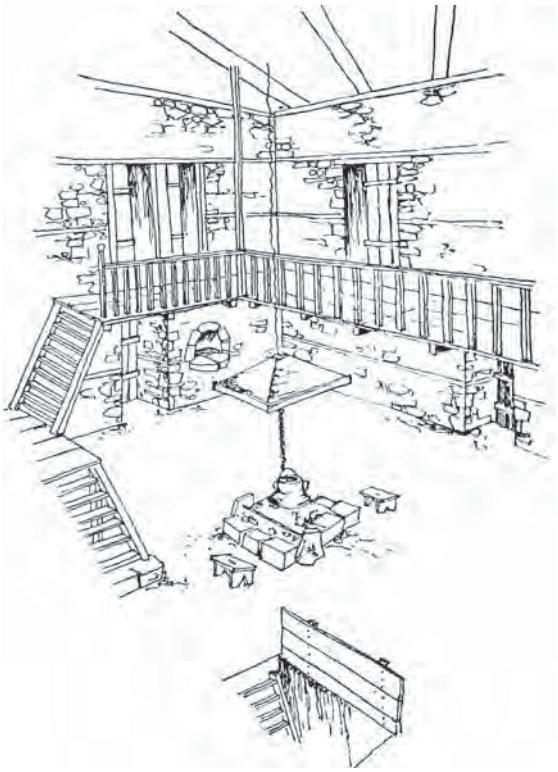

Fig. 12. Open hearth in a traditional Albanian house (Little-Shëngjin, 19th century–early 20th century) (after *Muka 1979* Pl. XVI)

We have no archaeological data on them, but we shall mention another two kinds of fire installations that in theory may have existed at Barcs. One is the fire-place, namely a hearth built into walls with a chimney *(odjak)*,[32] especially a variant built next to walls made of wooden beams.[33] The second type of fire installation is the *tandır*, which in a very simplified form is a pit or a large pot dug into the earth at the bottom of which are burning embers. Flatbread to be baked was placed on its inside walls. This installation has authentic heritages in the Middle East and a number of different variants of it are known.[34] It turns out that large pots dug into the earth served as 'baking ovens'; this type was described by Hans Dernschwam in the mid-16th century during his travels in Anatolia.[35]

[28] For conical and pyramid-shaped vessel supports, see *Filipović 1951* 162–163; *Djordjević – Zlatković 2011* 38, fig. 5.

[29] Sredska, near Prizren, Kosovo, Serbia, 1949. *Filipović 1951* fig. 36 ('Heating of a baking cover, supported by a cone').

[30] ÁI = '2. számú Általános Iskola' (today 'Arany János Általános Iskola').

[31] Bricked surfaces of this kind comprise the bases of 19th–20th-century brick ovens. *Sabján 2008* 170–171.

[32] For hearths built into walls *(odjak)* in Albanian rural settings, see *Riza 1985* passim.

[33] *Meringer1900* 259, fig. 33 (Jezero [Plaški], Croatia).

[34] In the Middle East, *tandır*s have been in use since the 9th century. For a survey, see *Shaddoud 2018*. Ethnological data from Anatolia: *Koşay 1957* Lev. I (Karahöyük köyü – Kültepe).

[35] As part of an embassy to Sultan Süleiman the Magnificent (r. 1520–1566) headed by Antal Verancsics, Hans Dernschwam travelled in the Balkans and Anatolia during the period 1553–1555, keeping a diary of his experiences. He described the baking method at issue while on the way to Amasya (north-eastern Anatolia) as follows: 'Some people have tall, broad-bottomed, wide-mouthed vessels made from fired clay whose middle parts are round and bulbous. Above, at the slightly narrowed rim of each, are broad apertures, as there are below it. The above-mentioned vessels are dug into the earth, with the said apertures open to the air. When baking is about to take place, fire is kindled in the vessel, with the air for it coming in through the apertures. When the vessel is hot enough, the bread dough is fashioned into scone shapes roughly of finger thickness (or more) [which] are then stuck onto the inside walls of the vessel. In this way, stuck to the sides, they are baked a splendid brown.' *Dernschwam 1984* 403–404.

Heating installations and cooking sites of various kinds were features of day-to-day life. Examples similar to the stove and oven bases (and other fire-place remains) found on the site of Barcs Castle have been uncovered on other Ottoman-period sites, too. With regard to smaller Ottoman castles in southern Transdanubia, numerous examples are published or mentioned from Dunaföldvár[36] and from excavations at Újpalánk (near Szekszárd),[37] Ozora,[38] Bátaszék,[39] and Turbék (near Szigetvár),[40] although instances occur at many other sites also.

The great number of stoves and other places for fires is probably connected to meteorological conditions. In the climate of the period, signs of the 'Little Ice Age' – cold winters and cool, wet summers – appeared increasingly in the Carpathian Basin from the 16th century onwards.[41] For example, the traveller Evliya Çelebi, staying at Zimony (today a part of Belgrade) in January 1664, wrote of bleak weather, mentioning frozen people and animals.[42] In the medieval period and the early modern period (1300–1800), the 'Little Ice Age' brought extreme weather and periods of great cold.[43] In the Mediterranean area, Ottoman-era Anatolia, and in the Balkans, hard winters were common. Heating installations were, however, still rare. Because of differences between Mediterranean and North European architecture (and heating installations), in the early modern period winters were more bearable in the Low Countries or in the German territories than they were in Rome or Naples, writes Fernand Braudel.[44]

Chronology

The stove and hearth parts brought to light at Barcs are not uniform as regards their age. On some parts of the castle site, the 17th-century layers have been destroyed.[45] In the early 17th century, during the rebuilding that followed the destruction wrought by the Fifteen Years' War, the remains of 16th-century stoves were removed. As a result of the levelling that was conducted, pieces of those parts that protruded became scattered or ended up in pits. During the general landscaping work performed in the post-Ottoman era, remains of 17th-century stoves and ovens disappeared from view.

Among other things, parts of a larger multi-roomed building that had been renovated on a number of occasions were uncovered in the course of the excavations. Some parts came to notice in 1990 and the remainder in 2003 *(fig. 2)*.[46] In the light of the remains, a stove – or hearth – stood in each of the 17th-century rooms. The building probably featured additional rooms to the south, but these could not be outlined definitively: excavation was able to identify vestiges only. On the other hand, the one-time existence of such rooms is attested by stove and hearth remains

[36] *É. Kozák 1970* 203, fig. 28.
[37] *Gaál 2015*.
[38] *Feld et al. 1988* 279, figs 40–41.
[39] *Pusztai 2003* 308.
[40] *Hancz 2020a* 227–231.
[41] *Rácz 2003* 236–241; *Rácz 2008* 141–151. See also *Vadas – Rácz 2013* 218–227, with additional literature.
[42] For example, '[…] gales battering everything, […] the snow killed all the camels, […] many people perished from the great cold.' *Evlia 1660–1664 (1985²)* 440–442.
[43] For examples from Europe, see *Behringer 2007* 126–128. Rivers and other expanses of water froze over; e.g., Venice's lagoon froze over many times between 1300 and 1800 (also in 1569, two years after the building of Barcs Castle). In the winter of 1491, tourneys (jousting competitions) were held on Venice's frozen Grand Canal.
[44] In Istanbul, for example, 'while living quarters and kitchen were equipped with fireplaces, the damp chill of the Bosphorus no doubt penetrated the houses once the wood of doors and windows had warped'. *Faroqhi 2000* 157.
[45] On the southern part of the 2003 excavation area (this part includes the Test Trench KÜ/90.II), saplings had at one time been planted, disturbing and partly destroying the 17th-century layers.
[46] The building walls highlighted in *fig. 2* are 17th century.

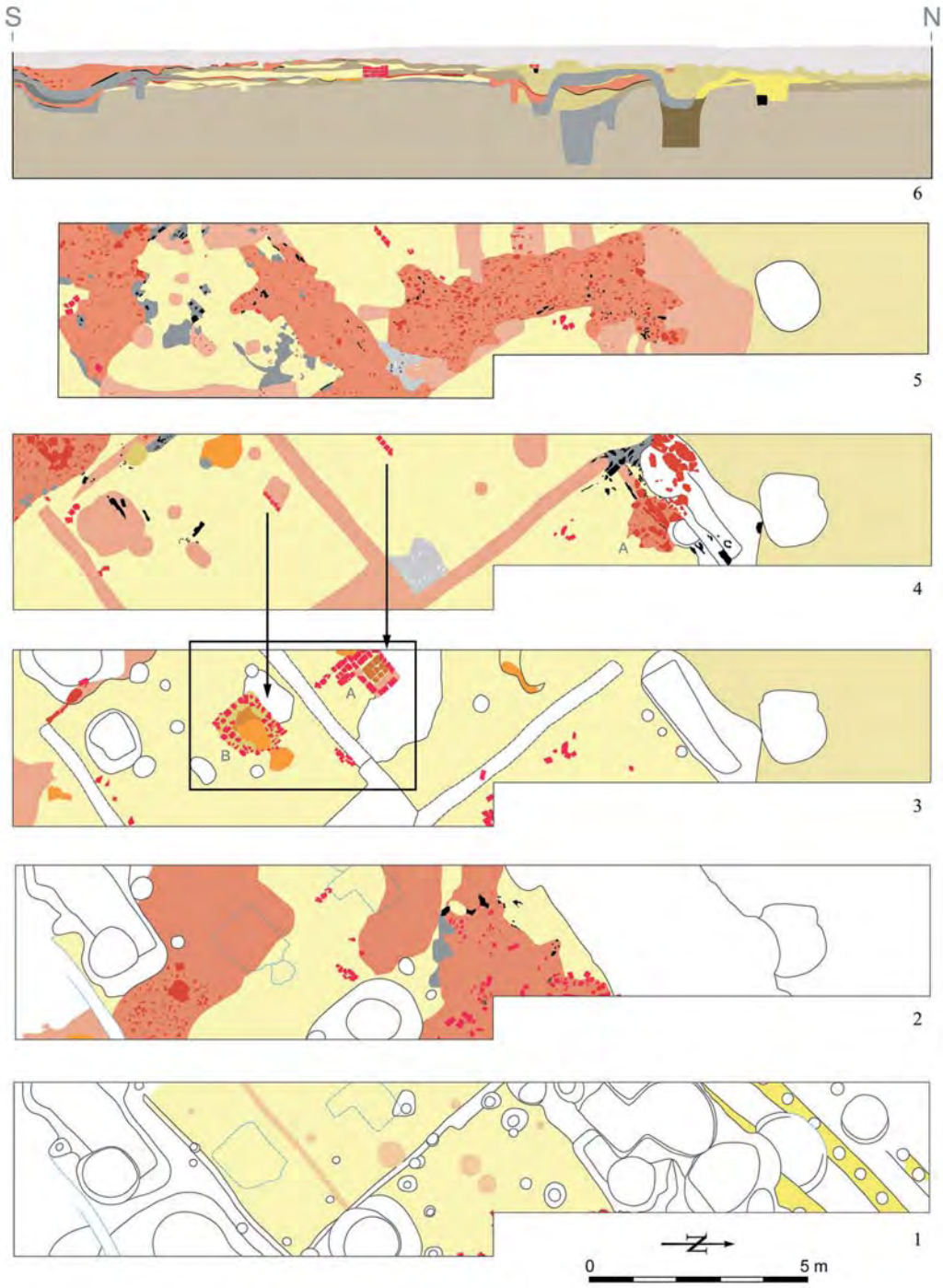

Fig. 13. Barcs, Ottoman castle. Layers of Test Trench KÜ/90.I:
1. Second half of the 16th century; 2. Debris from ruination at the end of the 16th century;
3. First half of the 17th century, with stove (A) and hearth (B); 4. Mid-17th century, with the foundations of walls of a larger building and with remains of a ruined stove (A);
5. Debris from the destruction caused in 1664; 6. West wall of the test trench
(Computer graphics: ©Zsolt Réti)

discovered on this area. The positioning and ground plans of the stoves afford help in recognising traces of the walls belonging to the one-time building and, consequently, in dating these walls and in establishing the different periods in the architectural history of the complex.

In those parts of the castle already excavated, evidence of levelling operations could be observed that were unconnected with work performed following the two great fires on the site. The different layers could be discerned the most precisely in one of the test trenches dug in 1990 *(fig. 13).*

In the north–south test trench cut in 1990 (KÜ/90.I), there came to light remains of a stove and a hearth set in brickwork on a clay floor *(fig. 3)* which covered a reddish debris layer linked to the castle's destruction in the late 16th century *(fig. 13. 3A–B).* When the building in question was refurbished in the mid-17th century, the protruding parts of the stove and the hearth bases were demolished and the bases covered with a layer of clay 30–40 cm deep. The floor of the refurbished building was subsequently covered with a layer of debris from the destruction wrought in 1664. On the basis of the layers, then, the levelled stove and the hearth were in use during the first half of the 17th century, until the middle part of that century at the latest. However, the stove uncovered in the northern end of the trench belonged to the refurbished building already, that is, it was standing in the castle's final period, from the mid-17th century onwards *(fig. 13. 4A);* elements of this stove were found in a pit to the north of it.[47]

Stove remains in the wings of the building that were excavated in 2003 can in part likewise be dated to the first half, or middle, of the 17th century *(figs 4–5).* One stove had been built on the site of an earlier one *(fig. 4. 1 and 4A).* On the other hand, the burnt surface assumable for the space in front of the stove's stokehole had been destroyed during digging in later on.[48]

Stove tiles

Many tens of thousands of finds came to light during the excavations. Animal bones apart,[49] finds (ceramic, metal, glass, and so on) in 2003 alone amounted to 32,273. Of the finds yielded by the 2003 excavation, 14,067 belonged to the stove-tile category; among them (without differentiating between types) were 144 fully intact stove tiles, 5701 fragments of rims, 8132 fragments of sides and bottoms, and 90 apex-, or crown-pieces of inverted beaker-tiles[50] (pre-conservation data). Especially in the case of sherds recovered from pits, it proved possible to assemble complete or nearly complete stove tiles in the course of the conservation work.[51]

Regarding the material from the test excavations conducted during the period 1989–1994, following conservation 50 completed stove tiles and 1678 stove-tile fragments were documented, from among the 91 intact or completed and the 5696 fragmentary ceramic finds.[52] Seventeen completed stove tiles belonged to the mid-17th-century stove mentioned above *(fig. 13. 4A).*[53]

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[47] *Kovács – Rózsás 1996* 170; *Kovács 1998* 170, fig. 15A. Judging by the large number of unglazed stove tiles discovered, it was a cup-tiled stove that was not supplied with a brick base, its base parts being indicated by blocks of clay.

[48] Although finds recovered from this digging in are from the Ottoman period, it is conceivable that the digging in took place during landscaping work performed after the cessation of Ottoman rule in Hungary (see also note 45).

[49] *Gál – Bartosiewicz 2016.*

[50] When naming the different stove-tile types, we have tried to use the terminology proposed by Eva Roth Heege. *Roth Heege 2012* 199–319.

[51] Finds were selected by the following: Gyöngyi Kovács, Katalin Éder, Márton Rózsás. Conservation: Ágnes Zamadits, Zsuzsanna Ba; photographs: Károly Kozma, Péter Hámori, Gyöngyi Kovács; drawings: Katalin Nagy; computer graphics: Zsolt Réti. Many thanks for their work.

[52] *Kovács 1998* 155. The counting up of the 1989–1994 finds occurred after conservation (*op. cit.* 176, n. 3). Data collection regarding the 2003 material took place a few years ago, before conservation, and was focused on certain basic data only. It is not possible to amalgamate the data for the 2003 finds and the data for the earlier ones; the data serves basic orientation purposes merely.

[53] For the stove-tile finds from the test excavations, see: *Kovács 1998* 170–174, figs 14–15A.

The overwhelming majority of the stove-tile finds belong to unglazed beaker- and cup-tiles, and to inverted beaker-shaped tiles with apexes. Here it should be remarked that in the material from the Ottoman castle at Barcs recovered hitherto, just one fragment of a dish-shaped vessel-tile with an angular opening has been identified, and no find at all from a panel-tile.

Glazed Ottoman concave stove tiles

In the excavation material recovered, the proportion of glazed Ottoman stove-tile finds is very modest and almost all examples are fragments or fragmentary. A total of just one almost fully intact example recovered from the castle's moat and five tiny fragments attest to the presence of this type of artefact in the finds from the test excavations of 1989–1994.[54] Amounting to 278 pieces, such finds make up 2 per cent of the stove-tile finds of 2003; there was just one intact glazed Ottoman stove tile among the 2003 finds.

As regards shape, these stove tiles resemble tall beakers, or else shallower or deeper cups; they have side-walls profiled by a rib and horizontal, wider or narrow grooved brims *(fig. 14. 1–5, A).* They were made on a fast wheel, from clay mixed with fine sand. They are light brown to brown in colour; their inner surfaces are coated in most cases with green glaze, more seldom with light brownish yellow glaze. The outer diameters of the brims vary between 12 cm and 15 cm, the inner diameters between 9 cm and 12 cm. In cases where these can be measured or deduced, their depths vary between 9 cm and 10.5 cm. Counting as a rare example is a shallow, dish-like (completable) stove tile *(fig. 14. 3)* whose depth is 4.5 cm. Remains of clay coating can be seen on a number of the brims, and, more seldom, on inside surfaces also. Clay found its way onto stove tiles when the outer surfaces of stoves were given a thin coating of clay by way of finishing.[55]

In publications brought out in Hungary, glazed Ottoman stove tiles often feature in passing only, accompanied by one or two drawings or photographs, although detailed descriptions, processings, and richer illustrations also occur.[56] Basically, two main types of stove tiles can be discerned: a deeper type with a narrower brim and a shallower type with a wider brim. (The pieces from Barcs fall into one or other of these two categories.) Such stove tiles are glazed on their inner sides; glazes are green in the majority of cases, yellow more rarely,[57] brown more rarely still. There are also examples made using a poured glaze technique (used in Gyula). These glazed Ottoman stove-tile types are likewise known from 16th–17th-century archaeological material recovered on the Délvidék ('Southern Great Plain'), on territories that today belong to Serbia and Croatia.[58] Finds of the type also occur in material from excavations in southern Romania.[59]

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[54] *Kovács 1998* 172.

[55] Similar observations were reported by Tibor Sabján in connection with Ottoman stoves in Buda's Water Town district. *Sabján – Végh 2003* 295.

[56] From larger castles and towns in Hungary, e.g., Pécs: *Fehér 1959* 115–119, 131–132, Pl. X. 1–15; Esztergom: *Fehér – Parádi 1960*, 42, Pl. XXVIII. 2; Eger: *Fodor – Kozák 1970–1971* 150, 155, figs 18–19, 45; Szolnok*: Kovács 1984* 44, 122–123, Pl. 26. 1–4, 6, *Ádám 2018* 235–236, figs 20–26; Visegrád: *Gerelyes 1987* 174, fig. 5. 4, 7; Segesd: *Magyar 1988* 143, fig. 14. 6, fig. 15. 1–2; Vác: *Tettamanti 1994* 110, Pl. 25. 1; Buda: *Gerelyes 1991* 31–34, 38, 40, 47, fig. 14. 3–5; *Sabján – Végh 2003*; Székesfehérvár: *Kolláth 2010* 84–85, cat. nos. 286–287; Kanizsa (Nagykanizsa): *Kovács 2003* 159, fig. 7. 7; Gyula: *Szalai 2017* 481, fig. 3. 17–20.

[57] *Sabján – Végh 2003* 296.

[58] Bács (Bač, Voivodina, Serbia): *Nadj 1961* 95, Taf. XIV. 5–10 (with mentions of other archaeological sites); Belgrade: *Marjanović-Vujović 1973* 215, (227), cl. 23; *Bikić 2003* 88, Tip XVI/4–5, 154–155, fig. 34; Eszék (Osijek, Croatia): *Radić 2015* cat. nos 140–146; in the catalogue, a stove-wall fragment with stamped decoration (cat. no. 139) also features (cf. Gyula: *Szalai 2017* 481, fig. 3. 22).

[59] Turnu Fortress (Turnu Măgurele, Teleorman county, on the left bank of the River Danube). *Gaşpar 2019* 135, cat. no. 53, Pl. VI. 3a–b (dated to the 16th–17th centuries in the text, to the 17th–18th centuries on fig. VI).

Fig. 14. Barcs, Ottoman castle: 1–5, A. Glazed Ottoman stove tiles, 6–11, B. Small dish-shaped stove tiles (Photographs: ©Károly Kozma, drawings: ©Katalin Nagy)

Unglazed concave and convex stove tiles

The unglazed stove tiles from Barcs present a rather uniform picture. During data compilation (before conservation) in connection with material recovered during the excavation work in 2003, 143 fully intact stove tiles of various kinds were registered, in addition to fragments of such tiles. All of the finds are made from clay containing fine sand. As regards colour, they are brown, brownish red, or, owing to secondary firing, brick red.

Beaker-, and cup-tiles with circular openings

Beaker-tiles with circular openings *(figs 15–16).* The overwhelming majority of the concave stove-tile finds are beaker-tiles with circular openings[60] that were made on a hand-turned potter's wheel. As regards shape, they have nearly straight side-walls, and they generally taper a little towards the bottom and broaden somewhat towards the rim, which is unpronounced. Sometimes they are cylindrical. These tiles are rather coarse in finish, with much roughness inside. They show emphatic signs of having been made on a hand-turned wheel. No example with a master's mark on its base has been found.[61] Tiles have rims that are 11–12 cm in diameter, bases that are 5.5–6 cm in diameter, and depths of 12–13 cm. On many, the lower part has been 'carved' (cf. e.g., *fig. 15. 1, 4–5*), thus removing the sharp edge where the base and the wall parts met, thereby narrowing the base part, of significance when tiles were being mounted on stoves. On account of their locations and the layers they contain, Features 26 and 35 at Barcs can be dated to the 16th century (in view of the historical data for the castle, to the second half of that century). Among the constituent parts of the stoves reassembled using material from these pits, simple beaker-tiles lacking brims predominated. It is impossible to generalise on the basis of these alone, but following surveys of material from other features and layers it would appear that at Barcs the use of simply made, brimless, beaker-shaped stove tiles is characteristic of the 16th century rather than of the 17th century (although not exclusively so).

Cup-tiles with circular openings *(figs 17–18).* Two types of cup-shaped stove tiles have come to light at Barcs. In its execution and in its shape, the first type resembles the beaker-shaped stove tiles, differing only in that it has an inwardly slanting brim or a horizontal narrow one. A significant proportion of the tiles from a mid-17th-century stove unearthed in Trench KÜ/90.I are of this type *(fig. 17)*,[62] but in the Feature 16 stove, too, there are many such tiles (e.g., *fig. 18. 4*). The average diameter at the rim is 12 cm, depths are 10–12 cm, and diameters at the base are 5–6 cm. According to observations made during excavation work, at Barcs stove tiles of this kind came to light more in material recovered from 17th-century pits: in these pits their proportions were more significant. Fashioned on a fast potter's wheel, carefully wrought, and delicately finished, tiles of the second type are characterised by narrow bases, plump, bulbous bodies grooved around, and by broad, inwardly slanting grooved-around brims. The average diameter of these tiles at the rim is 12–13 cm, their average depth 11–12 cm, and their average diameter at the base 5–6 cm. A good deal fewer finds at Barcs can be assigned to this second type (cf. *fig. 18. 2–3*) than can be to the first. Only in the case of Feature 16 can their occurrence be linked to a specific stove. As regards age and shape, near parallels of these tiles occur in an assemblage of finds recovered in Buda,[63] while more distant parallels crop up in an assemblage unearthed at Baja.[64] Both settlements were Ottoman-inhabited.

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[60] In the Hungarian specialised literature, the naming of beaker-shaped ('pohár alakú') and cup-shaped ('bögre alakú') stove tiles is inconsistent (cf. *Kocsis – Sabján – Tóth 2006* 111, n. 351); it cannot fully be reconciled with the terminology used in Central Europe (Switzerland, southern Germany). In the present study, generally, examples with straight sides and unprofiled rims are called beaker-tiles or beaker-shaped stove tiles (even when in shape and size they do not correspond to the medieval tube-like beaker-tiles from Central Europe), while those with more-or-less curving side-walls and rims each profiled with an inner edge are termed cup-tiles or cup-shaped stove tiles.

[61] The general lack of base stamps (namely the very rare use of them) was, perhaps, characteristic of the region; no base stamp was seen on any Ottoman-era, hand-turned vessels from Barcs.

[62] See also *Kovács 1998* fig. 15A.

[63] *Éder 2014* 287, 291–292, fig. 32. The collapsing of the stove can be dated to the early part of the first half of the 17th century (*op. cit.* 296).

[64] *Kovács 2006* 284, fig. 10. 8. The closing of the pit had probably occurred by the middle third of the 17th century (*op. cit.* 290).

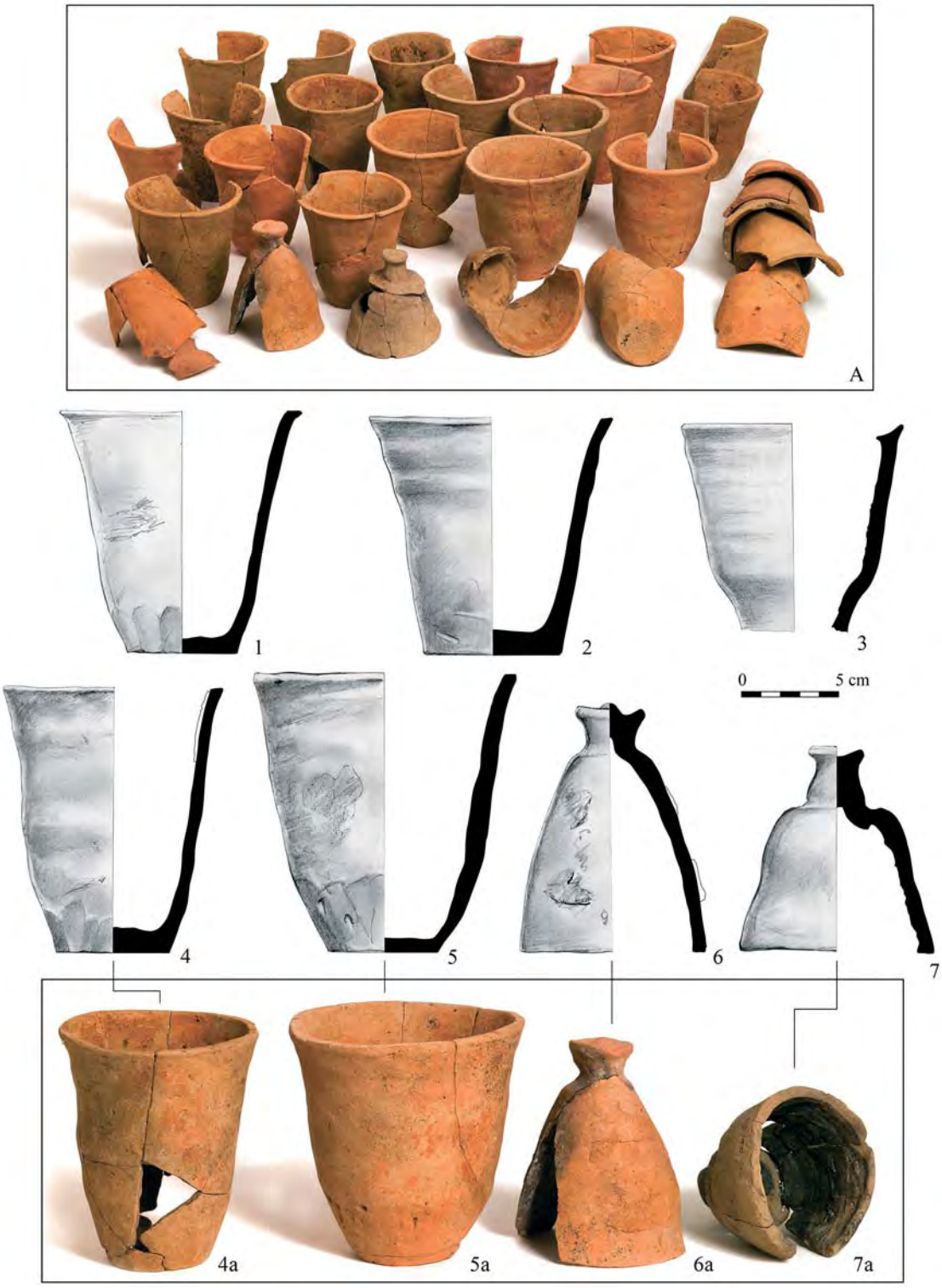

Fig. 15. Barcs, Ottoman castle. A, 1–7. Stove tiles from Feature 26, 2003, second half of the 16th century (Photographs: ©Károly Kozma, drawings: ©Katalin Nagy)

Fig. 16. Barcs, Ottoman castle. 1–6, A. Stove tiles from Feature 35, 2003, second half of the 16th century (Photographs: ©Károly Kozma, drawings: ©Katalin Nagy)

Fig. 17. Barcs, Ottoman castle. 1–8. Tiles from a stove from the mid-17th century. Test Trench KÜ/90.I (Photographs: ©Krisztina Pálfay)

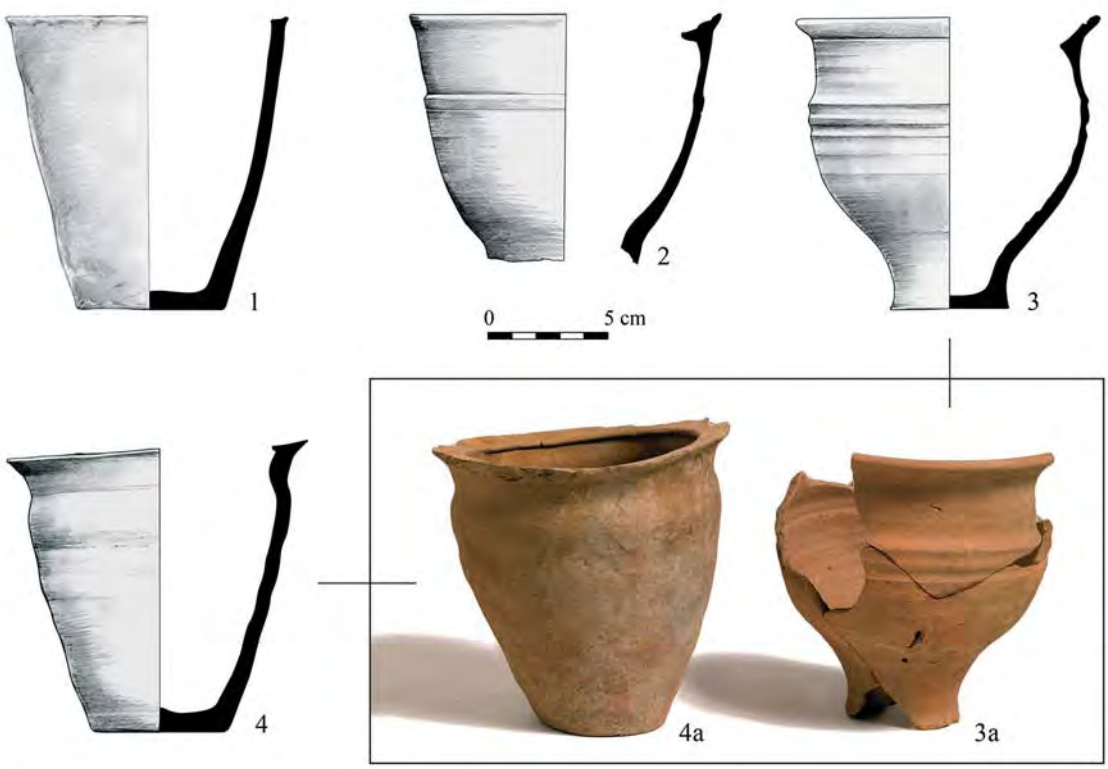

Fig. 18. Barcs, Ottoman castle. 1–4. Stove tiles from Feature 16, 2003, 17th century (Photographs: ©Károly Kozma, drawings: ©Katalin Nagy)

The incidence of the beaker- and cup-shaped types of stove tile can be documented in the Carpathian Basin from the late medieval period onwards. Cup-shaped stove tiles are the most frequently occurring, most characteristic, concave tiles on stoves discovered on the Great Plain, but are also common in the case of stoves found in eastern Transdanubia.[65] Late cup-shaped tiles from eastern Transdanubia are fully identical with those from the Great Plain.

Generally speaking, these tiles are dated to the 14th/15th–17th/18th centuries,[66] a timespan that can be narrowed to the 15th–16th centuries in late medieval village and castle settings.[67] More precise dating is harder in cases where relics occur jumbled together.[68] Examples from the 16th–17th-century period show unequivocally not only that the archaic, late medieval shape lived on, but also that the original production technique continued to be employed.[69]

Little plate- and dish-shaped tiles *(fig. 14. 6–11, B)*

Stove tiles featuring little plates or little dishes and stove tiles with lobed (rosette, quatrefoil) openings influence the picture in Barcs only slightly, so few are they.[70]

Tiles of this kind were placed on stoves next to larger tiles. Maybe they served as decoration and were mounted on the lower parts of stoves at the corners.[71] In the case of those at Barcs, however, such positioning could not be proved, nor – on the basis of Balkan stoves – that they might have been mounted on domes with walls that were a good deal thinner than the walls of the stove bodies. Just a few such tiles (approximately 10–12 pieces) have come to light at Barcs, at different locations of the areas excavated. A number of intact pieces were discovered in a heap *(fig. 14B)*; these, on the basis of where they were,[72] may have been from the above-mentioned mid-17th-century stove (Trench KÜ/90.I).

Made on a hand-turned wheel, all kinds are encountered, among them deeper and shallower examples. The diameter at the rim of the deeper ones is 8.5–9 cm, the depth 5.3–6 cm, and the diameter at the base 4.3–4.6 cm. The shallower tiles include some whose diameter at the rim is

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65 *Sabján 2001* 293, 305, 307; *Sabján 2002* 61.

66 *Sabján 2001* 324: fig. 18.

67 Beaker-tiles from medieval settlements and castle settings, e.g., Ágasegyháza (environs of Kecskemét, Great Plain), *Szabó 1938* 92, fig. 423; Tolna-Mözs (southern Transdanubia), *Vizi 2010*, examples with marks on the bottom; Felsőnyék, Ozora, Sarvaly, Őcsény (eastern part of Transdanubia). In the material from the last-mentioned locations, thick-walled, beaker-shaped tiles are characteristic whose rims are 7–10 cm in diameter and whose depths are 18–20 cm. *Sabján 2001* 305, 307, 309.

68 On the Babócsa-Nárciszos site, beaker-tiles recovered from Ottoman-era pits have been dated to the 16th–17th centuries and tiles found in pieces of stove wall to the medieval period. *Magyar 1990* fig. 19. 1–3. See also stove tiles from Raholca Castle (Ružica, Croatia), many of which are similar to those from Barcs; they date from the 14th–17th centuries. *Radić – Bojčić 2004* 229–233, cat. nos. 464–481.

69 Regarding southern Transdanubia and the Délvidék ('Southern Great Plain'), see (for example) the following: Pécs: *Fehér 1959* 117, Pl. X. 17, 16th–17th centuries; Eszék (Osijek, Croatia): *Radić 2015* cat. no. 148, 16th–17th centuries; Belgrade (Serbia): *Bikić 2003* 115–116, fig. 13, as 16th-century Central European ceramic continuing late medieval traditions.

70 On the Great Plain and in eastern Transdanubia there were stoves with richer exteriors that were decorated with them. *Sabján 2001* 293, 307, 309.

71 *Kocsis – Sabján – Tóth 2006* 111 (Visegrád). From among the Ottoman-era finds from the area around the Öregtorony at Dunaföldvár and from Visegrád Castle, Tibor Sabján mentions fragments of stove walls where a little plate-shaped tile was located near the corner edges of the stove, because here the back parts of the cup-shaped tiles at right angles to one another would have touched one another. He writes that the Visegrád fragments are 'rather clearly from an Ottoman-built stove for which earlier Hungarian material was reused. The very same suspicion may arise in connection with fragments from Dunaföldvár, too.' *Sabján 2001* 299. See also: a small plate-shaped stove tile from Babócsa in a stove-wall fragment, age uncertain. *Magyar 2002* 98, Diagram 7 (= *Magyar 1990* fig. 19. 1).

72 They occured around the survey points 45/10–50/15, among 17th-century burnt red debris (code 611). See also *Kovács 1998* 170, fig. 15A.

7–8 cm, whose depth is 4 cm, and whose diameter at the base is 5–5.5 cm. In a number of cases, the lower parts of these are 'carved', in the same way that the lower parts of the crudely worked beaker-shaped stove tiles are.

On examples that are shallow but broader at the mouth, diameters at the rim are 11–11.5 cm, depths 3–4 cm, and diameters at the base 6–8 cm. On these the rims are grooved, and on one of them a cone is to be found on the inner side of the base. A fragment of the base of a stove tile differing from the above-mentioned pieces (diameter at the base: 7.5 cm, measurable depth: 3.8 cm) is decorated with a three-petal rosette stamped on the inside. The last-mentioned examples belong to the little plate-shaped types from eastern Transdanubia, from the area between the Danube and the Tisza rivers, from the flatlands east of the River Tisza, and from Southern Great Plain area.[73]

Beaker-tiles with quatrefoil openings *(fig. 19)*

Fig. 19. Barcs, Ottoman castle. Beaker-tile with a quatrefoil opening from the early 17th century. Test Trench ÁI/91 (Photograph: ©Krisztina Pálfay)

Beaker-shaped stove tiles with quatrefoil (four-lobed) openings are likewise represented by only a few fragments.[74] As regards the more complex pieces, on each of which the middle of the opening is covered by a pierced clay disk, fragments from three such tiles came to light during the test excavations conducted in 1991. They were found around the brick base of a stove (datable on the basis of a coin to the first half of the 17th century) that was unearthed in the south part of the castle (Trench ÁI/91, *fig. 7. 1*). They were in the company of beaker-shaped and cup-shaped stove tiles, and may have been mounted on the one-time stove as decoration. Their diameters at the rim are 10–12 cm.

This type of stove tile occurs in 15th–17th-century settlement sites on the Great Plain, and also comes to light in Ottoman castles in Transdanubia. More complex examples similar to the ones from Barcs (i.e., supplied with a disk in the middle) are rarer; on the Great Plain, they were used only on more richly-made stoves.[75] Stove tiles of this type do not occur in the material recovered from the Ottoman castle at Szekszárd-Palánk (Yeni Palanka).[76] With regard to a stove tile of this kind from Bátaszék, an Ottoman castle, the researcher who has published the piece hypothesises that it may have come to the castle in the 16th century as a product from Ete or from the Great Plain.[77] Dated to the 15th–16th centuries but brought to light in the company of Ottoman-era concave stove tiles, a tile of this kind from Segesd may – in the light of the Barcs and Bátaszék examples – likewise have been part of an Ottoman (Ottoman-era) stove.[78] It cannot be excluded that the quatrefoil stove tiles each supplied with a disk in the middle found at the castles at Segesd and Barcs came from a Hungarian pottery workshop on the Great Plain.

[73] *Sabján 2001* 294, 307; *Sabján 2002* 62.

[74] *Kovács – Rózsás 1996* 170, 178, fig. 15. 2; *Kovács 1998* 172, fig. 14. 1–3.

[75] *Sabján 2001* 293. Cf. vicinity of Kecskemét: *Szabó 1938* 96, fig. 439; Nyársapát, Building 16: *Benkő 1980* 346, Pl. 45. 6; Szentkirály-Felsőszentkirálypuszta, Building 25: *Gerencsérek 2002* cat. no. 262 (P. Havassy); Juliskaháza (formerly Bács-Bodrog county): *Gerencsérek 2002* cat. no. 87 (G. Tomka).

[76] Just one trefoil tile fragment has been published that may have been made in a workshop in Ete. *Gaál 2015* 167, Pl. 2. 1.

[77] *Pusztai 2003* 308, fig. 3.

[78] *Magyar 1988* 143, fig. 15. 4.

Inverted beaker-tiles with an apex or crown part *(fig. 15. 6–7, fig. 16. 1–3, figs 20–23)*
A number of finds belong to convex stove tiles that once decorated the domes of stoves. Most such dome tiles were versions of the onion-shaped design; as well as these, bell-shaped and conical stove tiles have also come to light.

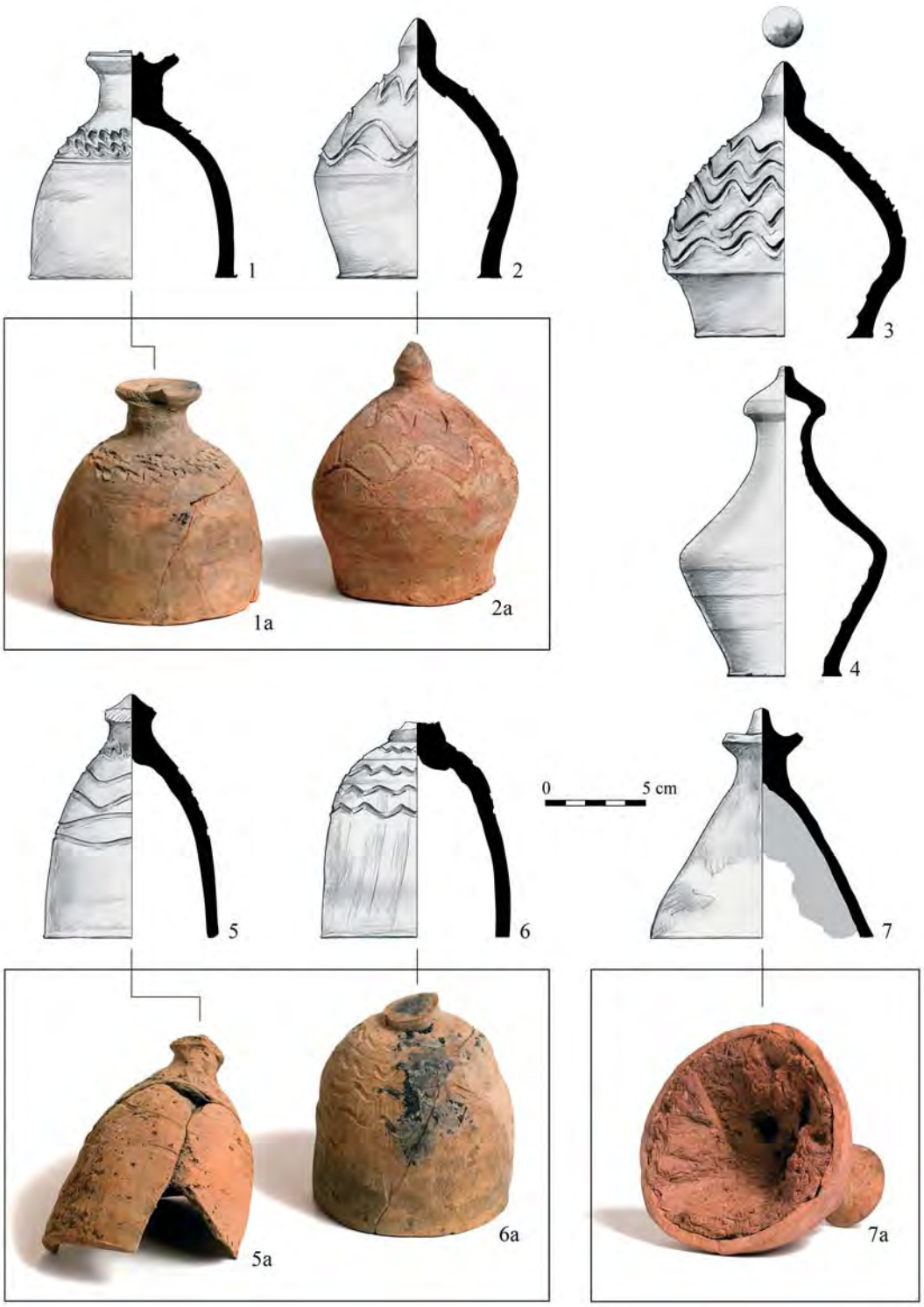

Fig. 20. Barcs, Ottoman castle. 1–7. Inverted beaker-tiles with an apex part
(Photographs: ©Károly Kozma, drawings: ©Katalin Nagy)

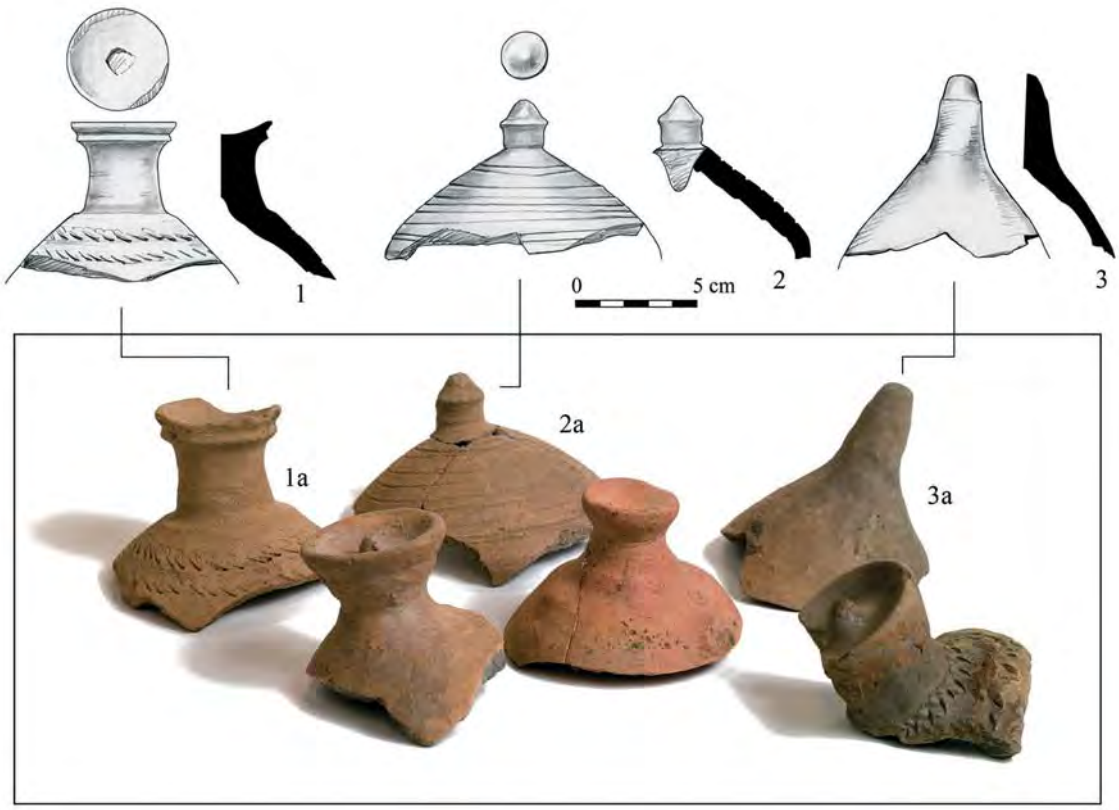

Fig. 21. Barcs, Ottoman castle. 1–3. Fragments of inverted beaker-tiles with an apex part (Photographs ©Károly Kozma, drawings: ©Katalin Nagy)

Most onion-shaped stove tiles were made on a hand-turned potter's wheel. Built up from coils of clay, they were not made fully smooth on the inside and some are rough. They are sooty on the inside and a number were found filled with mud *(fig. 20. 7)*. In more than one case, a thin layer of mud could be seen on the outside surfaces also. Most have a diameter across the rim of 10–11 cm (8.5 to 13 cm) and heights of 12–13 cm (9.5 to 14.5 cm). Especially remarkable is a 'jug-shaped' stove tile (a variant of the onion-shaped type) *(fig. 20. 4)*. Its diameter across the opening is 5.5 cm and its height 15.7 cm. On the basis of fragments, some onion-shaped tiles were surely larger in size *(fig. 21. 2)*. In closed assemblages of finds, only a few tiles, 3–5 merely, could be identified as having been used for dome decoration.

Fig. 22. Barcs, Ottoman castle. Inverted-beaker stove tiles with a pointed apex from Feature 33, 2003, second half of the 16th century (Photograph: ©Péter Hámori)

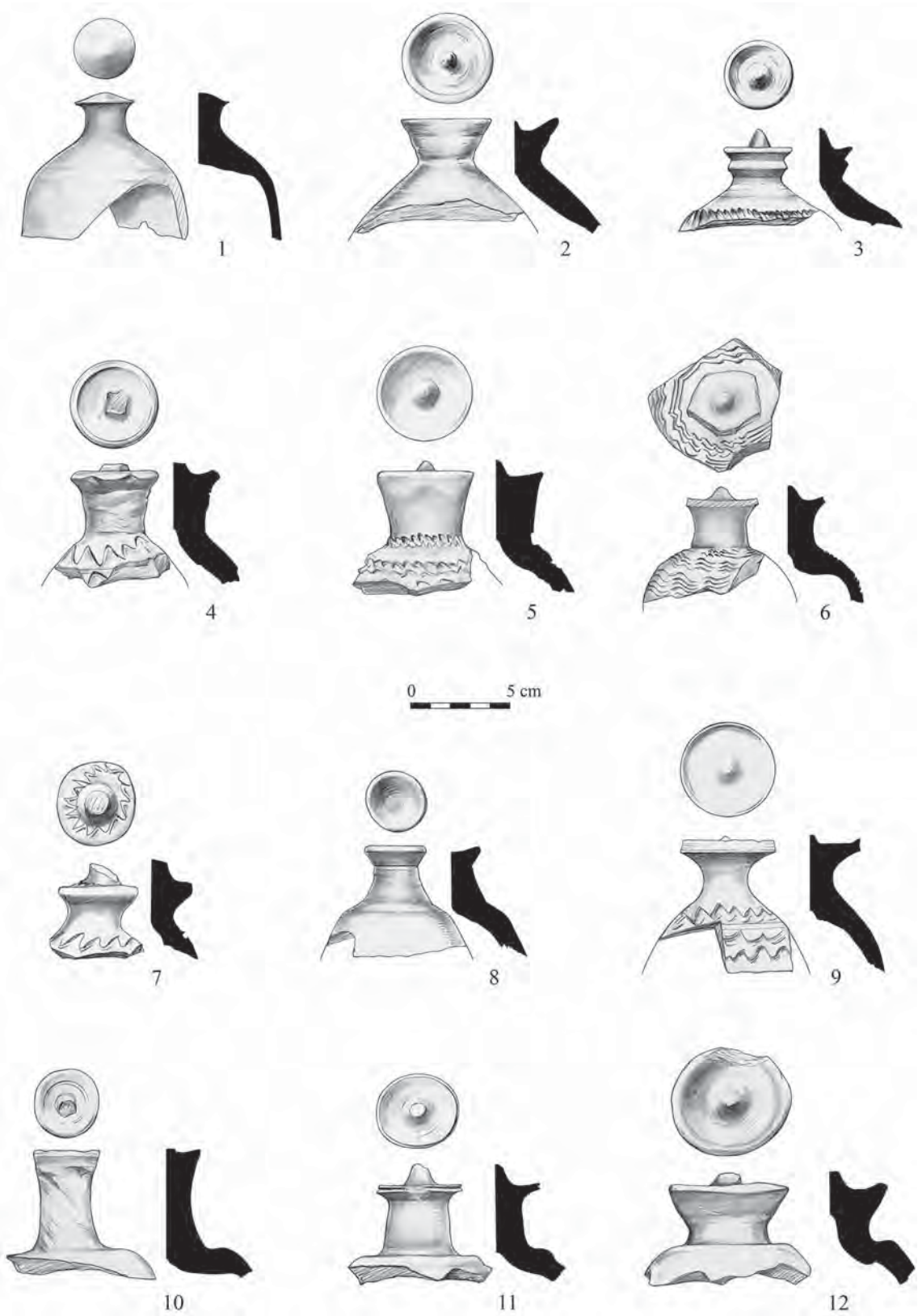

Fig. 23. Barcs, Ottoman castle. 1–12. Apex (or crown) pieces of inverted beaker-tiles
(Drawings: ©Katalin Nagy)

With regard to shape, the pinnacle parts of inverted-beaker stove tiles vary. There are 1) simple pointed apexes (e.g., *fig. 21. 3, fig. 22*), 2) complex apexes, (on one such, *fig. 21. 2*, the apex had been put on subsequently), and 3) small bowl-like elements on shorter or longer stalks with an apex in the middle; this last type is the most common *(fig. 23).*

The surfaces of inverted beaker-tiles with an apex part were either left undecorated or were decorated with irregular, incised wavy lines, with wavy lines put on using a comb, with slanting incised grooves, or with deep parallel lines running round the outside. In some cases, even the inside surfaces of the small bowl-like elements on stalks are decorated with wavy lines *(fig. 23. 7).* Methods of decoration and motifs show kinship with the decoration featuring on hand-turned pots of the time known from the region.

On cup-tiled stoves found on the Great Plain and in eastern Transdanubia, inverted beaker-tiles with an apex part feature almost invariably.[79] While parallels of our apexed stove tiles of types 1 and 2 are known from 15th–17th-century sites across broad areas of the Carpathian Basin,[80] it has been hard thus far to find analogies of our tiles of type 3. In material recovered from Újpalánk (Yeni Palanka), an Ottoman stronghold in eastern Transdanubia, no type-3 stove tiles were discovered.[81] At the Babócsa-Nárciszos site (in the neighborhood of Barcs) – formerly an Ottoman-inhabited location – stove tiles were recovered that are entirely similar to them.[82] Indeed, they show such high degrees of correspondence with the Barcs ones that the possibility of a common workshop emerges. Published kindred finds from Raholca Castle (Ružica, northern Slavonia, Croatia), on the other side of the River Drava, are significant for investigation of their links and roots. The majority of the Raholca finds have been dated to the 14th–16th centuries, but the stove tiles which – like those from Barcs – feature apexed small bowl-like elements on their points have been assigned to the 16th–17th centuries, based on parallels from Babócsa.[83]

Material composition investigations

According to results yielded by petrographic analysis of ceramic finds, the material composition of the stove tiles shows resemblance to that of vessels found at the castle.[84] On the basis of this composition, the Ottoman glazed stove-tile fragments looked at were in the main in one group with the Ottoman glazed vessels, while the fragments of unglazed stove tiles fashioned on a hand-turned potter's wheel were chiefly in one group with some of unglazed vessels made using this last-mentioned technique. Consequently, the stove tiles in question may have been made in the same geographical areas as the vessels corresponding to them; the workshop or workshops cannot, however, be specified.

Stove-wall remains

Although many more were found, just 230 stove-wall pieces were packed away for study. A significant percentage of them came from pits. They are fragments that bear impresses of concave stove tiles of various kinds. There are flat pieces, pieces of corners, pieces of perpendicular and horizontal edges, and pieces of polygonal structures. Also occurring are shoulder fragments from

[79] *Sabján 2001* 296, 308.

[80] *Sabján 2001* 296, 308. Cf. e.g., villages in the Kecskemét area (*Szabó 1938* 94–95, figs 432–435); Bátaszék (*Pusztai 2003* fig. 3); Decs-Ete (*Vizi 2012* 231, Pls 11–13); Szekszárd-Újpalánk (*Gaál 2015* 170–171, Pl. 5. 4–6); Visegrád (*Kocsis – Sabján –Tóth 2006* 111, fig. 30); Buda (*Éder 2014* fig. 1, fig. 32).

[81] *Gaál 2015.*

[82] *Magyar 1990* 113, Pls 35–42 (dated to the 16th–17th centuries), fig. 20. 1–4, fig. 21. 3 (dated to the medieval period); *Magyar 2003* 104, fig. 7. 1.

[83] *Radić – Bojčić 2004* cat. nos 483–489.

[84] *Kreiter – Pánczél 2016* 104–111 (Fabrics 6–7).

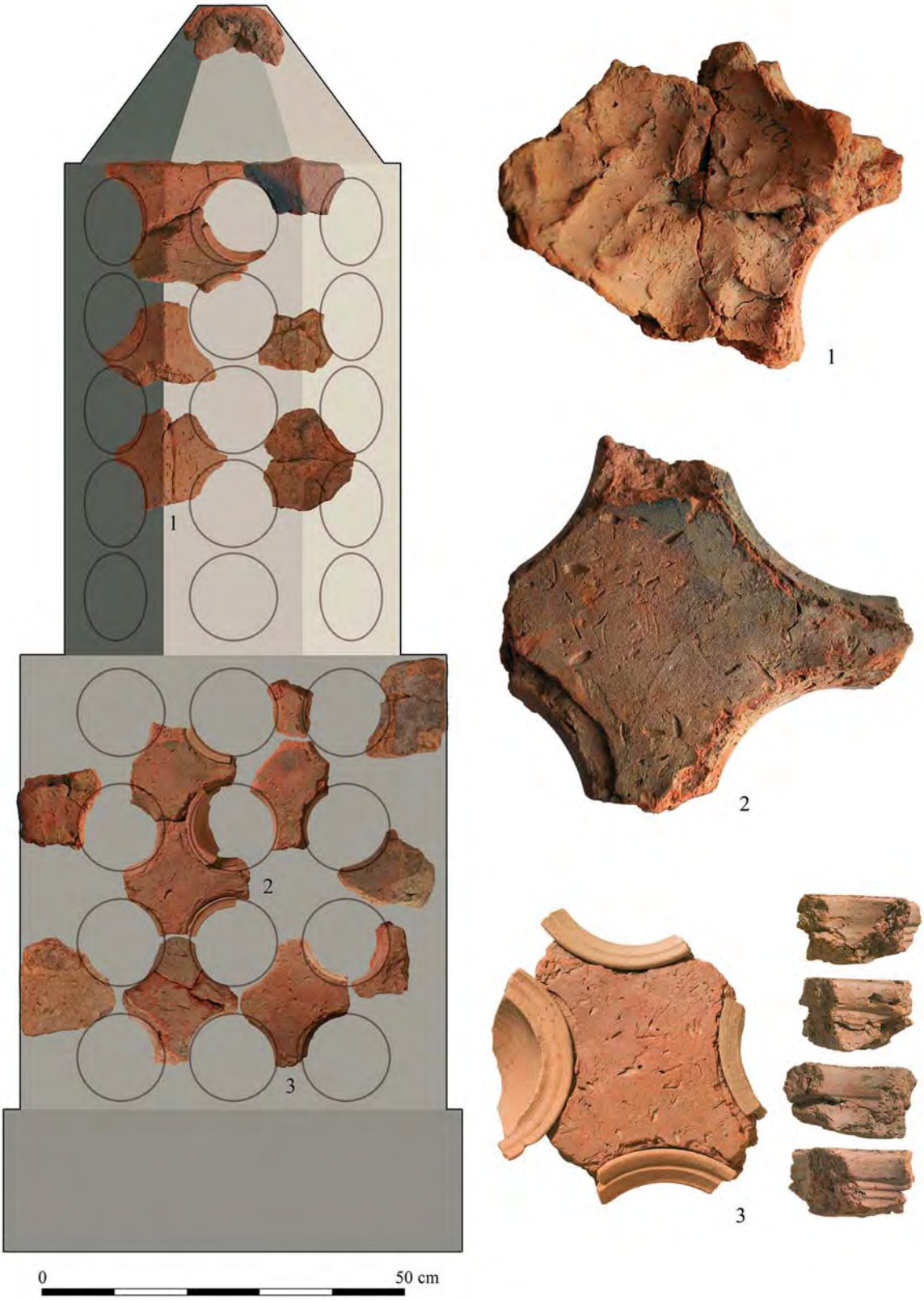

Fig. 24. Barcs, Ottoman castle. Stove reconstructed using pieces of stove wall recovered from Feature 16, 17th century (Photographs: ©Károly Kozma, ©Gyöngyi Kovács; computer graphics: ©Zsolt Réti)

the upper areas of the upper parts of stoves, dome fragments, pieces of decorative ribbing, and so on.[85] All preserve important information regarding not only the shapes and particulars of stoves, but also the manner of their construction. Moreover, they can also be used in the reconstruction of stoves *(fig. 24, figs 26–27)*. The investigations showed that a number of pits contained finds from one stove approximately.

The fragments

Flat pieces of stove wall

These are from the rectangular-based lower parts of the stoves. Among the flat pieces are examples marked by only one or two concave stove tiles, but also examples marked by four such tiles. On the basis of the marks made, the relationships of the tiles to one another can be determined, and also their density and arrangement, in which minor irregularities, not geometrical precision, can be observed. The distance of the tiles from one another is generally ca. 2–3 cm, sometimes barely 1 cm.

Judging by the impresses, the tiles of a stove differed in size (the tiles themselves also show this), but judging by the material available it is not possible to report categorically that larger-sized stove tiles were mostly used for the lower parts of stoves and smaller-sized tiles for the upper parts,[86] although it is likely that larger-sized tiles were indeed used on the lower parts. On the other hand, this much is certain: tiles of different sizes were used on stoves, and the sizes of tiles may have influenced the parameters of stoves (see, e.g., the differences between the stoves from Feature 16 and Feature 35 respectively; *figs 24* and *27*). In the case of the stove from Feature 16, it could be shown that its tiles differed from each other not simply as regards shape, but also as regards production technique employed.

Perpendicular edges with two sides that form a right angle and corner fragments

These belonged to the lower parts of stoves. When they bear impresses of concave stove tiles, these pieces acquire an importance in establishing the measurements of parts of stoves.

Horizontal edges (stove shoulders)

Less could be ascertained from the fragments of horizontal edges. The perpendicular areas of these bear the impresses of concave stove tiles; the horizontal expanses indicate the widths of stove shoulders. Horizontal edges recovered from Feature 26 permitted the hypothesising of two stove shoulders for the lower part of the stove *(fig. 26)*.

Fragments of the octagonal upper parts of stoves

These pieces are from the multi-sided upper bodies of stoves. On the basis of their obtuse angles, these upper bodies were invariably octagonal prisms. Their angles are not always geometrically correct; but even with allowances for differences, no structures other than prisms with eight sides are possible. Here it should be noted that no finds indicative of cylindrically-shaped upper parts were found in the material investigated. On the majority of pieces, marks made by one, two, three, or even four concave stove tiles are to be seen. A large section (assembled from pieces) of the eight-sided upper part of a stove was recovered from Feature 16 *(fig. 25)*. With sides 20 cm across, with impresses of tiles, and with marks indicating the incorporation of a dome on the upper shoulder, this part is one of the more spectacular stove-wall fragments.

[85] Similar stove-wall fragments reached the Museum from the 1989–1994 test excavations, among them a number of pieces from the above-mentioned mid-17th-century stove (Test Trench KÜ/90.I).

[86] This was observable on the stoves found in Buda's Water Town. Cf. *Sabján – Végh 2003* 288.

Fig. 25. Barcs, Ottoman castle. Larger piece of the upper part of a stove recovered from Feature 16, 17th century
(Photographs: ©Gyöngyi Kovács)

Upper shoulder fragments

Of the fragments from the upper sections of the stoves, a couple were set aside. The upper shoulder assembled from fragments discovered in Feature 16 has already been mentioned. The upper shoulder of the stove that took shape on the basis of finds from Feature 35 was decorated with a ledge *(fig. 27)*; some elements of the merlons were arched in shape and some were pointed. Evidence of the fitting of a dome is visible on some fragments.

Dome fragments

These pieces yield information about the shapes of the various domes (for basic types, see *fig. 28*). One such fragment (Feature 16), in the shape of a truncated pyramid, is from the topmost part of a dome. Its base was tailored to the octagonal prism upper part *(fig. 24).*

A number of the fragments came from semi-spherical, or roughly semi-spherical, domes; domes of this kind were in many cases decorated with inverted-beaker stove tiles with an apex part *(figs 26–27).* According to the specialised literature, inverted-beaker stove tiles with an apex part (onion-shaped tiles) were generally mounted on domes at depths that allowed only their upper parts – the shoulders and apexes of the onion shapes – to protrude.[87] However, the design of such inverted-beaker stove tiles at Barcs, the extent of their decoration, and sometimes the clay remains from the dome wall observable on their brims all attest that these tiles were mounted on their domes at depths of 2–5 cm in general, meaning – in the case of the decorated tiles at least – that more than the top half of each tile protruded from its dome. This is supported by another observation: on a few dome fragments – on average 3/4–7 cm thick – recovered at Barcs, stove-tile impresses 1–2 cm deep (!) can be seen.

It is conceivable that the castle once featured a dome or domes on which smaller concave tiles were mounted; this, however, could not be proved. It is certain that flat-topped stoves, too, once stood in the castle, although no flat tops were identified.

Decorative elements

Semi-circular in cross section, ribbings decorated with fine incisions came to light mostly among the stove fragments from Feature 35; the stove in question was decorated with these ribbings, as well as with ledge elements similar in style to those mentioned above. The ribbings and the merlons together formed a single decorative scheme *(fig. 27. 2–3).* Some of the stray finds recovered may well have come from this stove.

[87] *Sabján 2001* 296. See also *Szabó 1938* 91.

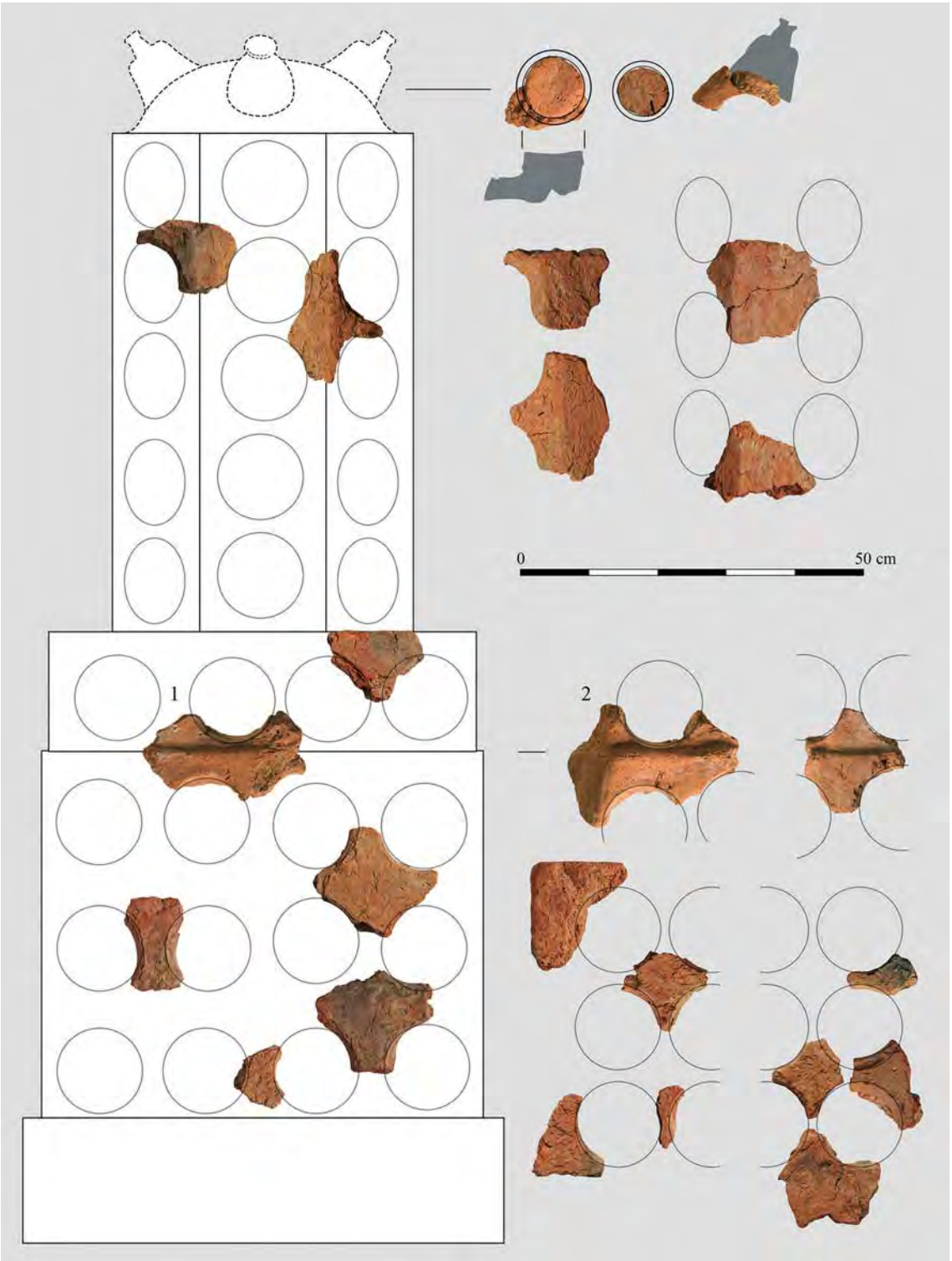

Fig. 26. Barcs, Ottoman castle. Stove reconstructed using pieces of stove wall recovered from Feature 26, second half of the 16th century (Photographs: ©Károly Kozma, ©Gyöngyi Kovács; computer graphics: ©Zsolt Réti)

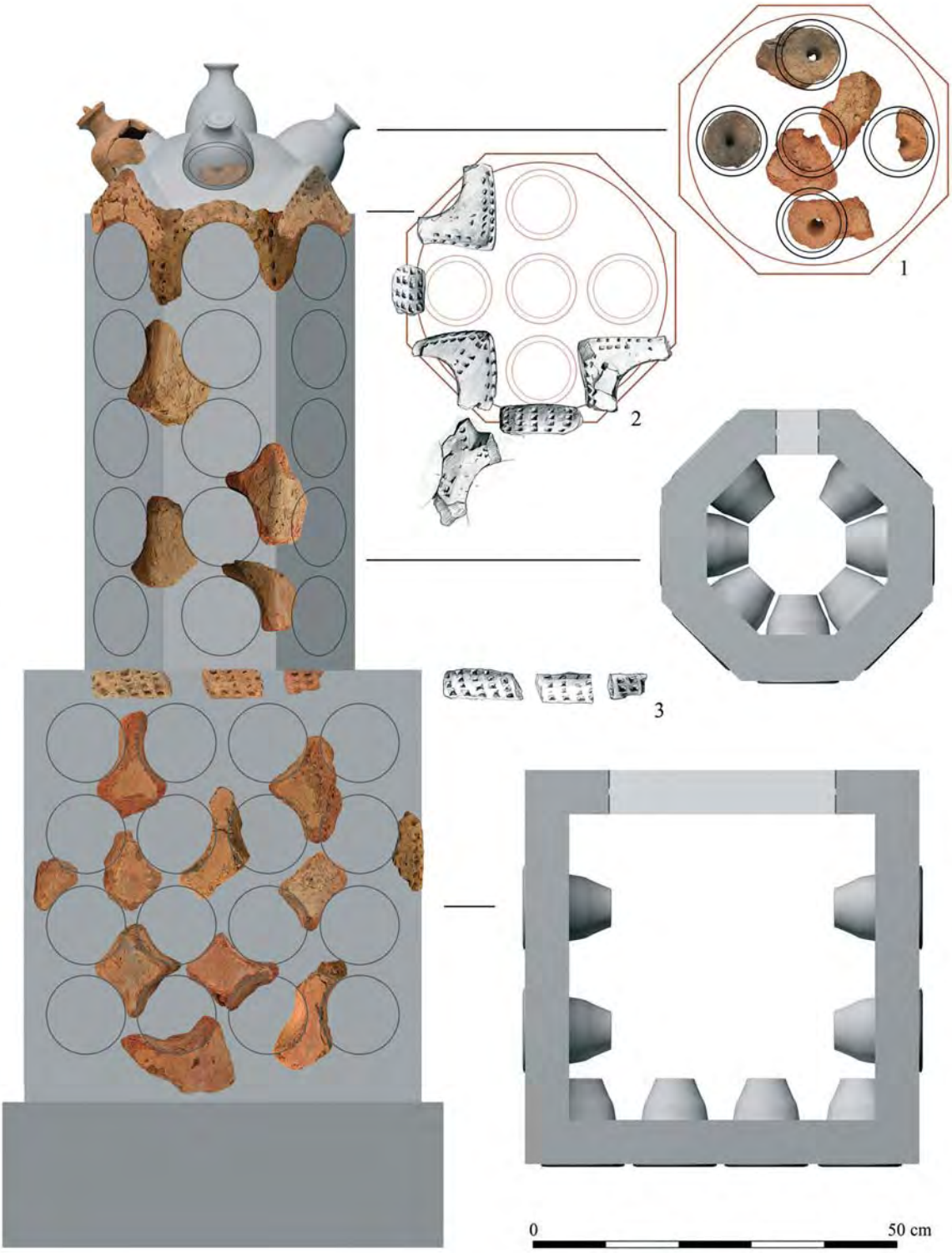

Fig. 27. Barcs, Ottoman castle. Stove reconstructed using pieces of stove wall recovered from Feature 35, second half of the 16th century
(Photographs: ©Károly Kozma, ©Péter Hámori, ©Gyöngyi Kovács; drawings: ©Katalin Nagy; computer graphics: ©Zsolt Réti)

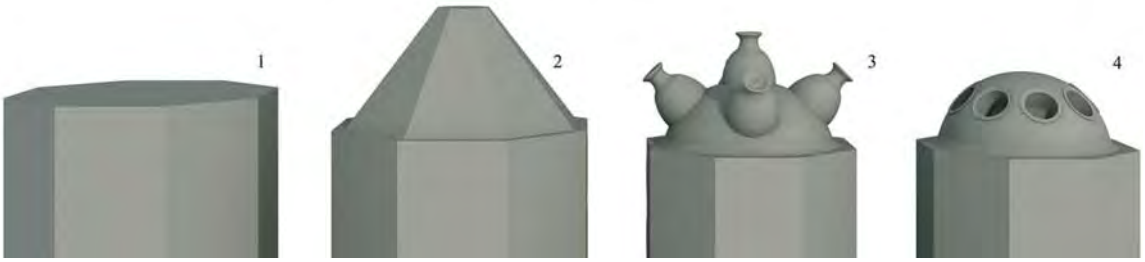

Fig. 28. Barcs, Ottoman castle. 1–4. Stove dome variants
(Computer graphics: ©Zsolt Réti)

Stove-building observations (fig. 29)

Stoves were built of clay or mud, without the use of a frame in most cases. On many fragments, the use of flattened coils of clay during the stove-building work can be observed *(fig. 29. 3–4, 6–7)*[88] and, in one or two cases, marks made by supporting framework (used for the building of domes, for example) *(fig. 29. 5)*.[89] Marks made by pressing and shaping can be identified on the rough inner surfaces (e.g., *fig. 24. 1*), as can those made by insertions. The outer surfaces of stoves were given a thin coating of mud *(fig. 29. 2)* which was then made smooth. A number of pieces feature finely smoothed surfaces in areas next to places where tiles would have been (e.g., *fig. 24. 2*). Generally speaking, the thickness of stove walls was 5–7 cm.

Encountered among the fragments of stove walls are remains of rendered wall pieces. These fragments come from the walls of buildings and sometime bear marks made by wattle.

It is very probable that clay sourced locally was used not only for the walls of the buildings,[90] but also for the walls of the stoves and ovens. The clay used for the stoves contains fine sand, but the mud (especially the mud coating applied externally) generally contains chaff as well. Feature 33 yielded many stove-wall finds containing chaff, but also cereal seeds suitable for archaeobotanical investigations *(fig. 29. 1)*. According to the sanjak tax registers for 1579, civilian inhabitants of the settlement at Barcs paid tax after wheat and rye.[91] Wheat and rye seeds may well be identified in the wall remains in the future.

Chronology, parallels, reconstructions

The stoves in the castle were stoves with concave tiles (and convex ones on the domes). Judging from the tiny quantity of glazed stove tiles recovered, the number of stoves in the castle that featured glazed Ottoman examples was fairly small. On the basis of the large number of unglazed beaker-shaped and cup-shaped finds recovered, stoves in the castle were built using unglazed tiles essentially.

[88] For their use in folk architecture, see *Sabján 1988* 51–54. For the coiled-clay technique used to build the Ottoman-era tiled stoves in Buda's Water Town, see *Sabján – Végh 2003*.

[89] *Miklós – Sabján 1992* 128.

[90] *Kreiter – Pánczél 2016* 117.

[91] From the 1579 tax register for the Sanjak of Sigetvar (Szigetvár) (München, Bayerische Staatsbibliothek. Orientalische Handschriften, Cod. Turc. 138); data published by *Rúzsás 1979* 9.

Fig. 29. Barcs, Ottoman castle. Pieces of stove wall: 1. Tempered with chaff (Feature 33); 2. With a thin layer of coating (Feature 16); 3–4. With clay coils (Feature 26, see *fig. 26. 1–2*); 5. With marks made by a support frame (Feature 16); 6–7. With clay coils (Feature 26 and Feature 33) (Photographs: ©Károly Kozma, ©Gyöngyi Kovács)

Stove built with glazed Ottoman concave stove tiles

According to observations, 70 per cent of the glazed Ottoman stove-tile fragments recovered were from an area in the middle of the 2003 excavation site.[92] The finds memorialise a stove built using glazed tiles. They made it 'more elegant' than most of the stoves at the castle. However, because the surfaces excavated had been disturbed appreciably earlier on, it proved impossible to identify other remains of the stove. As regards its type, it probably resembled stoves discovered in Buda's Water Town (there will be more on these below).[93]

Data on stove parts other than tiles are seldom encountered in the specialised literature. Rare is information regarding finds of this type, although in some instances mention is made of pieces of stove walls that bear impresses of stove tiles (e.g., finds at Dunaföldvár, Gyula). Prominent from this point of view is an ensemble of finds from Buda's Water Town. Two Ottoman-period stoves once stood in a building of medieval origin there that was altered in the Ottoman era. This building may have burnt down in the late 17th century, in one of the two Christian sieges of Ottoman Buda at that time (namely, in the siege of 1684 or that of 1686). Stove debris was discovered in the cellar of the house; during excavation, pieces of stove wall, stove tiles, and mud bricks from the bases of the stoves came to light. The stoves assembled on the basis of the finds show heating devices describable as Balkan in type. The principal parts of this kind of stove are a rectangular-based lower part, an upper part in the form of an octagonal prism, and a domed part. The stoves reconstructed by Tibor Sabján are of two kinds: without a base and with a base. As well as glazed concave stove tiles, footed bowls and Renaissance glazed panel-tiles were built into the Buda stoves.

An antecedent for the processing of the stove elements archaeologically was provided by above-mentioned remains of a stove brought to light in a suburb of Belgrade. Datable to the second half of the 17th century, this one-time stove was uncovered in a room of a building destroyed in 1688. Featuring green-glazed concave stove tiles, the lower part of the stove had stayed relatively intact *(fig. 10)*.[94]

Various parallels of the type represented by the Buda stoves exist in ethnological material from the Balkans. Stoves can preserve 16th–17th-century characteristics and in this way can offer information important for the evaluation of material from the Ottoman period in Hungary. In a study published in 1959, Géza Fehér the Younger drew attention to this type of stove, as well as to parallels from Bosnia and especially Bulgaria.[95] Tibor Sabján collected and analysed additional data from the Balkans, from Bosnia, Serbia, and Bulgaria *(fig. 30)*.[96] The list of Bosnian examples has been lengthened by high-quality stoves with glazed tiles in Svrzo's House in Sarajevo (Bosnia and Herzegovina) *(fig. 31)* that was rebuilt in the 18th century. Admittedly, in terms of shape they do not resemble the reconstructed Water Town type (e.g., the upper parts are not polygonal prisms). Next to one of the stoves in Syrzo's House is a small bathroom (*hamamjik*) *(fig. 31. 2)*.[97] An oven-equipped stove featuring glazed tiles can be seen on the ground floor.

[92] In company with the stove-tile finds (around survey point 60/25), rare and distinctive artefacts came to light on the area in question, such as a belt-plate made from walrus tusk, a fragment of an Iznik vessel, and a seal with Arabic lettering. These artefacts are from the 16th century. *Kovács et al. 2014* 162.

[93] *Sabján – Végh 2003* 282, 284.

[94] *Marjanović-Vujović 1973* 204, (227), cl. 23, Pls VII–VIII.

[95] *Fehér 1959* 131–132, cf. *Bakardschiew 1956* figs 42, 58–61.

[96] *Sabján – Végh 2003* 295–299, figs 16–18. See also *Meringer 1900* figs 30–32.

[97] *Sabján – Végh 2003* 296.

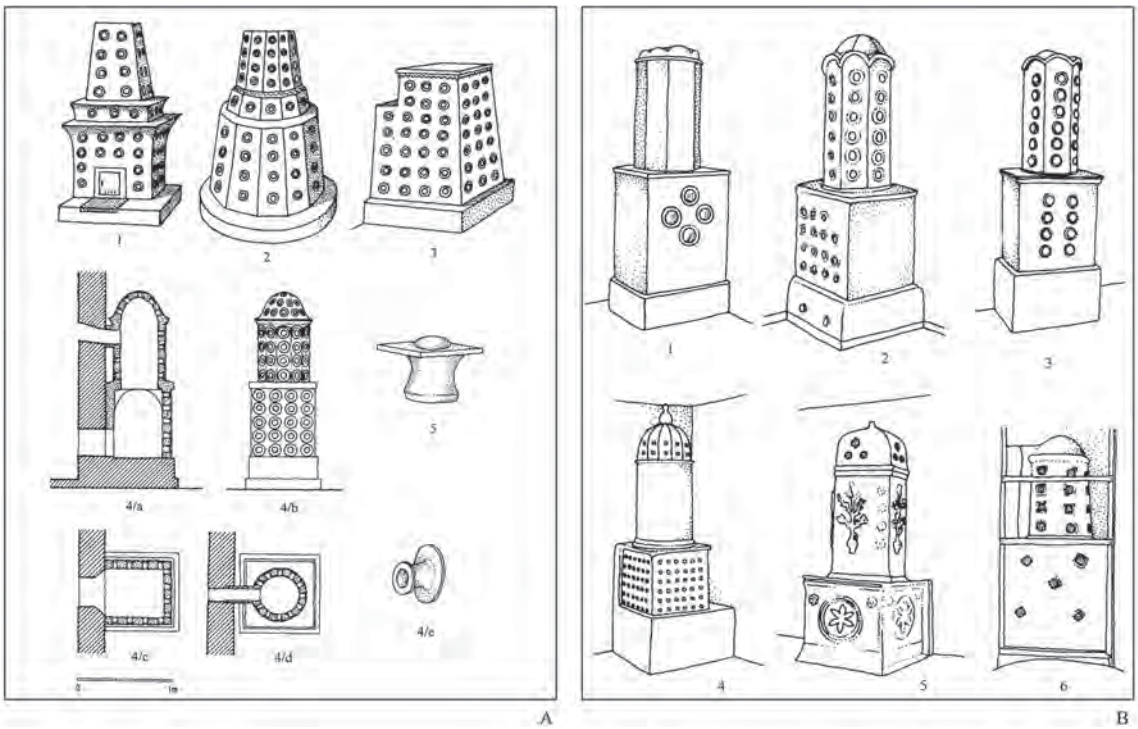

Fig. 30. Traditional stoves from the Balkans (after *Sabján – Végh 2003* figs 16–17):
A: 1–3. Bosnian stoves from Travnik, Jajce, and Dolnja Tuzla (after *Meringer 1900* 259, 30–32);
4. Serbian stove from Osat, 4a. Section, 4b. View, 4c–d. Ground plans,
4e. Tile (after *Kojić 1949* 158); 5. Balkan convex stove tile.
B: Bulgarian tiled stoves: 1–3. Rila; 4–5. Arbanis; 6. Etropole (after *Bakardschiew 1956* 54–60)

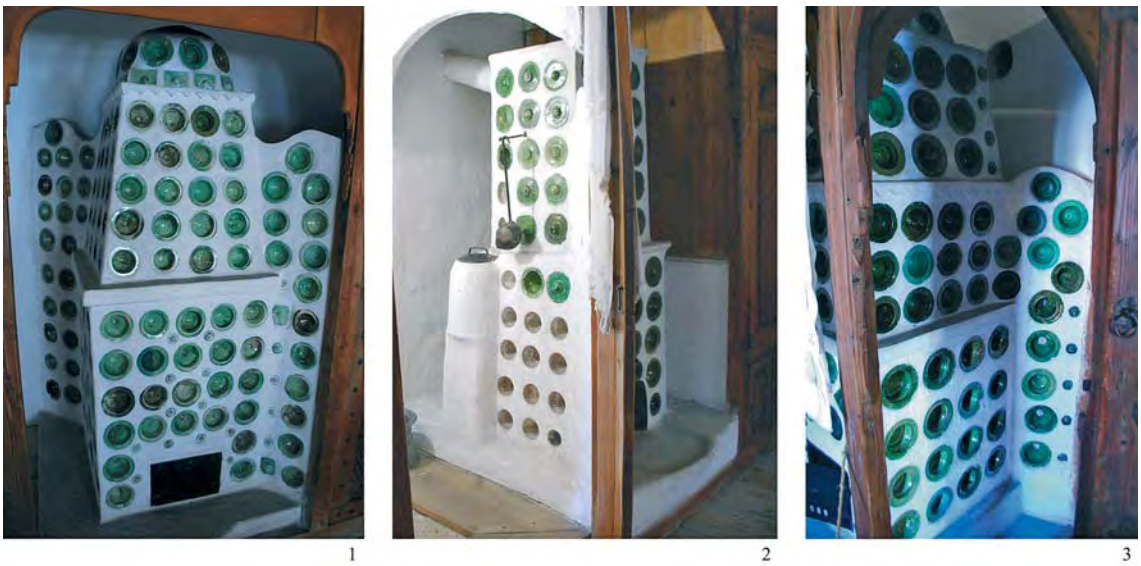

Fig. 31. Stoves in the Svrzo House in Sarajevo (Bosnia and Herzegovina), 18th century.
2. Next to one stove is a small steam bath *(hamamjik)* (Photographs: ©Gyöngyi Kovács)

On the basis of the archaeological finds published and/or referred to, more nuanced evaluation of issues linked to Ottoman-era stoves with glazed elements (e.g., social background, chronology, shapes, workshops, stove builders) is at present barely possible. Nevertheless, some conclusions can be drawn, as follows:

– Of those stove elements that are datable, many are from the 17th century. A significant proportion of stoves featuring glazed stove elements are, therefore, probably also from the 17th century.
– Glazed Ottoman stove tiles often come to light together with stove tiles of other types, which suggests and can prove in a given location the concurrent and parallel presence of different types of tiles and tiled stoves.
– On the basis of the incidence of Ottoman glazed stove tiles, it seems for the time being that during the Ottoman period in Hungary stoves with glazed elements tended to stand in towns, larger centres, and more important locations,[98] although not exclusively by any means. Such stove elements may be found in smaller castles, too, in the company of stove tiles of other kinds.[99]
– In certain locations, for example at Ozora Castle, glazed Ottoman stove elements are completely lacking, and, it appears, the situation is similar at Bátaszék.[100] On the site of Újpalánk Castle (Yeni Palanka), just two glazed Ottoman glazed stove-element fragments have come to light; there, too, stoves with glazed elements were in effect absent.[101]
– The Balkan links, and Balkan parallels, of the stoves are indubitable, but Balkan parallels that are currently known date from the 18th–20th centuries mainly; the characteristics of these parallels cannot be projected unequivocally onto material from Hungary in the 16th–17th centuries. Judging by the material from the Balkans, stoves in Hungary may also have been various from the point of view of shape: the octagonal prism form of the upper parts of the reconstructed Water Town glazed-tiled stoves was in all likelihood just one of a number. On the other hand, this form may have been common in Ottoman Hungary.[102]

Stoves with unglazed concave and convex tiles

Even while the excavations at Barcs were still under way, it seemed that some assemblages of stove-wall remains might prove more or less suitable for stove reconstructions. In what follows, a few such assemblages recovered at the time of the 2003 excavations are presented. During the processing of the finds, emphasis was placed on attempting to establish the shapes of stoves.

Assemblages and reconstructions with a contribution by Zsolt Réti

Prior to the reconstruction work, numerous data were recorded for every single find. Unfortunately, it was not possible to make photogrammetric evaluations. From other standpoints also, our findings may mislead, because, for example, 1) only the more characteristic stove-wall pieces

[98] See note 56.

[99] Dunaföldvár-Öregtorony. *É. Kozák 1970* 204–205 (with fragments of the clay walls in which sat stove tiles); Vál-Gótikus templomtorony. The tower was the central building of the one-time Ottoman palisaded castle; glazed Ottoman stove tiles were recovered principally from a late 17th-century pit in which a complete set of copper vessels was also discovered. *Hatházi – Kovács 1996* 48–49, 55, fig. 27. 3–6; Csókakő Castle. Relatively many Ottoman glazed stove tiles came to light that could be linked to a stove in an Ottoman-era storeyed building. *Hatházi – Kovács 2019* 39; Szigetvár-Turbék. The palisaded stronghold was built around the *türbe* of Sultan Süleyman the Magnificent. *Hancz 2020b* 294–297, figs 27–29.

[100] Ozora: *Gerelyes – Feld 1986* 177; Bátaszék: *Pusztai 2003* 308.

[101] *Gaál 2015* 168, Pl. 6. 11–12.

[102] *Sabján – Végh 2003* 300.

were packed away and documented, 2) only on one side of the schematised model were the fragments largely reassembled, and 3) unevennesses could not be reconstructed in the models.

Based on the remains, all three stoves reconstructed had rectangular-based lower parts. The obtuse angles of edges on fragments of upper parts showed that those parts were octagonal prisms. However, the widths of sides differed, depending on the measurements of the stove tiles. Finds attest to domes of differing shapes.

The outlines of individual stoves were determined on the basis of surviving elements. That is to say, the principal features of the stoves reconstructed were decided in accordance with the stove-wall pieces themselves that were placed onto the surfaces of schematic drawings, in places where they fitted *(figs 24, 26–27)* and with the average measurements of the stove tiles. The approximately 70 × 70 cm ground plan was in all three cases worked out from stove pieces and stove tiles (and from the precisely measurable stove bases uncovered in the excavation area). Starting out from remains unearthed, an average of three rows of bricks was hypothesised for the bases of stoves.

Generally speaking, the stove walls are 5–7 cm in thickness, as mentioned above. The beaker-shaped and cup-shaped tiles are generally 10–12 cm deep; as a result, they protruded from the walls into the stoves' interiors *(fig. 27, fig. 32. 2).* On the basis of pieces of wall that preserve impresses of multiple stove tiles, tiles were arranged in vertical and horizontal rows on the lower parts of all three stoves, albeit not too precisely; as regards the upper parts of the stoves, each side featured just one vertical row of tiles. The distance between the tiles was 1–3 cm. In the case of all three stoves, the flat back surface of the lower part adjacent to the wall featured a stokehole; the upper part there featured an aperture for a pipe that took away the smoke.[103]

When determining the number of tiles built into a stove, attention was paid to the quantity of intact and reconstructable tiles gleaned from a given feature. Care had to be taken that stove tiles fitted in with the inner spaces of stoves, especially at the corners. In reality, this problem was amenable to solution in multiple ways: 1) the stove tiles at the corners were 1–2 cm smaller, 2) the stove tiles at the edges tapered more strongly or were trimmed towards the bottom by means of carving, 3) the depths of stoves were greater than their widths by a few centimetres, and 4) the side walls of stoves featured fewer tiles.

Planning of the details was helped by data from research into the late medieval and Ottoman eras in Hungary, as well as into ethnology. In the ascertaining of heights and domes, and in the interpretation and understanding of many small formal marks, guidance is provided chiefly by the characteristics of the above-mentioned 18th–20th-century Balkan stoves *(figs 30–31),* but also by the archaeological remains. The display-type stoves in Syrzo's House in Sarajevo are rather different from the Barcs stoves with their unglazed stove tiles, although the Sarajevo stoves nevertheless proved useful when the details of the Barcs stoves were being worked out. In the case of the stoves reconstructed, heights of approximately 155–170 cm were arrived at as a result of the assembly work. The heights of the glazed-tiled stoves in Buda's Water Town, and of the 19th–20th-century Balkan stoves of this type, are 200–210 cm.[104] According to the analogies, the stoves in Barcs were short on the basis of the reconsruction work, although, their heights can be increased, for example, by raising the lower parts.

[103] *Sabján – Végh 2003* 296, fig. 16. 4a.

[104] The reconstructed heights of the stoves with glazed tiles that were unearthed in Buda's Water Town are 205 cm; the height of a similar 20th-century Serbian stove is 210 cm. *Sabján – Végh 2003* 293, and fig. 16. 4a–b. The height of the above-mentioned 19th-century stove in a monk's cell at Rila Monastery is 200 cm. *Christov – Stojkov – Mijatev 1957* fig. 37.

During the reconstruction-focused processing work, we followed an order that was not chronological. With one of the late assemblages, we began with finds from Feature 16, because in this assemblage there were the most pieces that could be put back together, pieces that could establish the measurements of the stove, but also because the material was interesting on account of the use of different types of stove tiles together with one another.

a) Feature 16 *(figs 24–25)*

Feature 16 was a pit on the eastern edge of the area excavated in 2003. Approximately 1.5 m in diameter at its outer edge, it was circular in shape, narrowing from the top to the bottom. It was more than 2 meters (228 cm) deep after it had been excavated fully. Among other things, stove-tile finds along with pieces of stove wall and wall fragments from a building came to light from the pit. On the eastern edge of the pit, fractured remains of the base of a one-time stove (Feature 32; *fig. 9. 2*) were identified that could be linked to the stove fragments. These remains were an 80 × 80 cm brick surface already sunken down (in our view, a surface for baking) and, next to it, a scorched hearth with pieces of brick wall (remains of the stove).

At the time of modelling, we opted for a stove base featuring three rows of bricks, on account of the remains. From the fragmentary finds, the number of stove tiles estimable could be put at roughly 60–70 (cf. e.g., *fig. 18*).[105] With this number in mind, stove tiles were incorporated into the model: reckoning with stove tiles featuring a diameter at the opening of 12 cm on average, on each of three outer sides of the lower part of the stove there were tiles in three vertical columns and four horizontal rows, while on each of seven sides of the octagonal prism upper part there were tiles in five vertical columns (no tiles were assigned to the side which held the pipe through which the smoke escaped). In this way, the number of tiles 'built in' was 71 *(fig. 32. 1).* Then again, arranging the tiles on the two side surfaces not in three columns but in two gave a total of 63 tiles, thus harmonising the planned number with the archaeological finds. As mentioned above, hand-turned beaker- and cup-shaped tiles on the one hand and good-quality cup-shaped ones on the other were built into the Feature 16 stove, in roughly equal measure.

On the basis of the impresses, the distance between the stove tiles on the flat pieces of stove wall was 3–4 cm. On two perpendicular surfaces forming right angles with one another, at the corners of the stove's lower part, there were differences of 3–4 cm in the distances of the tiles from the edge, while on the upper part, too, there were also minor differences in the distances between the tiles and the edge. In other words, the distances of the tiles from the edge were not the same on adjacent sides. Clearly, the reason for the differences was that this way tiles fitted more easily into the stove's interior space. The stove pieces provided exact data on the widths of the one-time shoulders (3 cm and 8 cm). On the basis of a surviving fragment from it, the dome of the stove resembled a truncated pyramid whose base followed from the shape and measurements of the stove's upper part, with one side being 20 cm in width. On the fragment's inner side may be seen the impress made by a small part of the framework that held up the dome during the construction work.[106] The stove's wall was uneven in thickness, 6–7 cm generally speaking. It was thicker at the corners, thinner on the dome.

By means of the above calculations, it was in the end possible to establish the stove's ground area as measuring 63/65 × 65 cm and its height as reaching approximately 170–172 cm. It is our belief that, starting out from the archaeological material, we have arrived at a form that (nearly) accurately depicts the mass of the stove and many of its details, at the same time offering possibilities for variations. Feature 16 and the collapsed stove it contained can – on the basis of the pit's location and the finds there – be dated to the 17th century.

[105] In the case of the stoves in Buda's Water Town, Tibor Sabján counted 66–68 stove tiles, a figure matchable with the archaeological material. *Sabján – Végh 2003* 294.

[106] *Miklós – Sabján 1992* 128, fig. 10.

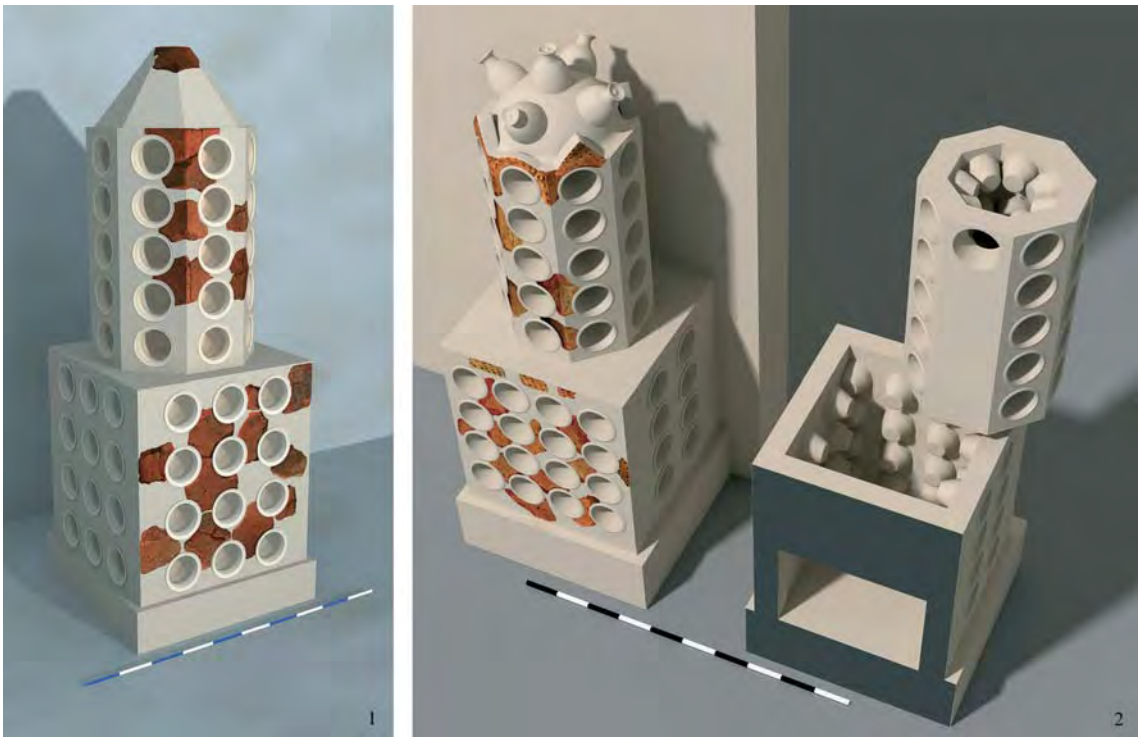

Fig. 32. Barcs, Ottoman castle. 3D models of the stoves reconstructed on the basis of finds from Features 16 (1) and 35 (2)
(Computer graphics: ©Zsolt Réti)

b) Feature 26 *(fig. 26)*

This feature was a pit complex in the southern half of the 2003 excavation area: the north-western part of a pit had been disturbed by the digging of another one. The mouth of the later (northern) pit was somewhat circular; its diameter was roughly 220 cm and its depth after complete excavation 310 cm. The depth of the earlier (southern) pit was 196 cm. In the filling of the later pit, two debris layers could be observed. Beneath the upper layer of red debris stretched a layer of clay. Beneath this was the lower layer of debris, in which there were remains of a stove. The stove parts appeared at a depth of 190–200 cm. Many intact tiles, many fragments of tiles, larger pieces of stove wall of various kinds, wall consisting of bricks set in clay, and a few remains of plastered wall were unearthed *(fig. 9. 3)*. The stove debris was in fact sealed off by the layer of clay. The stove's base was not found in the vicinity of the pit; it would seem that when the ruins were being cleared, everything (i.e., the stove's brick base, the brick-built walling that was probably around the stokehole, the stove tiles, and the pieces of stove wall) ended up in the pit. The stove material found in it could be dated to the second half of the 16th century; it was placed in the pit when the destruction wrought during the Fifteen Years' War was being cleared away.

Among the pieces of stove wall were flat pieces of side wall, shoulder fragments, angled pieces from an octagonal prism upper part, and fragments of a dome. Impresses made by stove tiles on the fragments varied significantly with regard to the distances between them (1–7 cm). Our view is that the fragments are probably remains of different sides of one stove, but it is conceivable that they are pieces of more than one stove. On the basis of some of the fragments, a model was created. A number of pieces were positioned on various planes in open schemes, thus giving opportunities for re-evaluation. On the basis of impresses made by stove tiles, no shoulder fragments could be allocated to areas where an octagonal prism upper part and a four-sided lower part would have met. For this reason, we postulated a lower part with two units, and shoulder

pieces were assigned to different sides of a hypothesised lower part. Similarly to pieces from Feature 35, the dome fragments from this stove preserve shallow impresses made by inverted-beaker stove tiles with an apex part.

Different calculations were performed in connection with the number of stove tiles recovered (e.g., *fig. 15*). If 16 stove tiles are postulated for the front side of the stove's lower part, eight for each of the two sides at right angles to it, 35 for seven sides of an upper part and four – according to the archaeological data – for the dome, then 71 stove tiles would be needed. There are in the archaeological material 40 tiles that are intact and 30 that that are stuck back together or capable of completion, that is to say 70 tiles in total (there are also some fragments). Accordingly, the hypothesised number of stove tiles and the actual number unearthed approximate to one another or even match.

c) Feature 33

This pit and its finds can be dated to the second half of the 16th century. Large-sized and amorphous, the 116-cm-deep pit was located at the southern edge of the 2003 excavation area. In its filling, especially in the lower third of it, a great amount of stove debris came to light that was burnt and featured pieces of larger size. The debris contained many intact and fragmentary stove tiles, as well as many small-sized intact and fragmentary bricks. Besides remains of wattle-marked daub and a few stove pieces made from sandy material, the debris contained in large measure stove fragments made from chaff-bearing material (cf. *fig. 29. 1, 7*). The tiles (57 intact or capable of completion, as well as other fragments) were mostly beaker-shaped, although unglazed cup-shaped tiles, and glazed Ottoman concave tiles, too, were found among them. In addition to inverted beaker-tiles with a bowl-like element, onion-shaped stove tiles with a simple pointed apex likewise featured *(fig. 22).* As regards composition, the assemblage is more mixed than the find complexes from Features 26 and 35; it appears to be more archaic, because of the use of strongly chaff-bearing adobe to build the stove.

d) Feature 35 *(fig. 27)*

Feature 35 made its appearance in the southern part of the 2003 excavation site, as a red patch measuring approximately 100 × 80 cm. It turned out, in the course of its investigation, that this patch covered not only a pit full of stove debris, but also, next to this pit, the damaged base of a stove *(fig. 9. 1).* The pit, 240 cm in diameter and 170 cm in depth, contained many pieces of stove wall, along with 21 intact concave stove tiles and a large number of fragments of such tiles. The pit and its relics can be dated to the second half of the 16th century.

Among the fragments of stove walls are flat pieces bearing impresses of stove tiles, pieces with edges at right angles, pieces of octagonal prism upper parts, and dome fragments, but also elements that once served as decoration. On the lower part, the distance of the stove tiles from one another is 2 cm on average. The thickness of the stove wall varies; on average it is 6–7 cm, a little thicker at corners. The dome wall is 3.5–4 cm thick. Starting out from the pieces of stove wall and a calculated average size for stove tiles, a stove on a base of three rows of bricks was modelled. The base's size was deduced; it was calculated to have been 62 × 62 cm. The height of the stove, including its dome, was likewise calculated: it was set at 155 cm. On the basis of the finds, the dome was decorated with five inverted-beaker stove tiles each with an apex part. The stove tiles set in the wall of the dome left circular marks in it that were 1–1.5 cm deep. In the middle of each such mark is a hole whose diameter is 1–2 cm. The dome was girded round – probably not all the way round – by a ledge which consisted of three peaked and two arched elements; all these elements were decorated with notches.

Across Europe, ledges and battlements on the top parts of stoves can be found on decorated and less decorated glazed and unglazed stoves of the most various kinds from the medieval period on. In respect to the 15th–17th-century material recovered in Hungary,[107] the 17th-century unglazed, triangular crown-tiles with moulded front panels found, for example, at Bátaszék, in south-eastern Transdanubia, and in Baja, on the Great Plain, deserve mention, as coming from Ottoman-inhabited locations.[108] However, the decorative ledge at Barcs does not consist of crown-tiles, but of arched and peaked elements. Nothing similar to it is currently known in the material recovered in Hungary. Consisting of arched sections, the ledges that border the domes of 19th-century stoves at Bulgaria's Rila Monastery *(fig. 30. B2–3)* are only faintly reminiscent of those at Barcs.[109] The Rila stoves were made by Bulgarian or Aromanian artisans.

As well as ledge elements, other – likewise notched – fragments have come to light at Barcs. In the model, these 4-cm-wide pieces, which are semi-circular in cross section, were placed on the upper edges of the stove's lower part, although it is not certain that they would have been there on the stove itself.[110] Elements partly similar to those from Barcs that came to light during excavations at the Ottoman palisaded castle at Bátaszék decorate the stove edges on schematic stove drawings.

The aggregate number of intact and glued concave stove tiles is 50 (of these, five are inverted-beaker stove tiles) (e.g., *fig. 16*); a number of fragments that underwent conservation are currently unavailable. The number of tiles used for the stove could not be established precisely. If 16 stove tiles are hypothesised for the front surface of the lower part of the stove and eight for each of the two side surfaces, 35 for seven sides of the octagonal prism upper part (the eighth side was for the smoke pipe), and five for the dome, then the number of tiles arrived at is 72 *(fig. 32. 2)*. With regard to the side surfaces of the lower part, a different allocation of tiles is conceivable in which the real and the assumed quantities approximate to one another.

Review

As mentioned earlier, rectangular-based lower parts, octagonal prism upper parts, and dome solutions of various kinds were the formal characteristics of the unglazed stoves in question.[111] Beaker-shaped and cup-shaped stove tiles were built into the bodies of stoves, and inverted-beaker tiles with apex parts into the domes – to the exclusion of almost all other types. No evidence was found to suggest that pre-used stove tiles were built into the stoves.[112] The conspicuously high number of intact stove tiles from Feature 26 might possibly point to a dismantled stove. The stoves were all stoked from outside the spaces they heated.

[107] *Holl 2002* 11–18. For simpler unglazed triangular stove tiles decorated on the front side, see *Gerencsérek 2002* cat. nos. 148, 150, 152, 154. (Gy. V. Székely). For regional characteristics, see *Sabján 2001*, with reconstructions of medieval stoves from Külsővat, Ete, Sarvaly, Galgahévíz, and the Great Plain.

[108] Bátaszék: *Pusztai 2003* fig. 3; Baja: *Holl 2002* 17, Pl. II. 15, *Kovács 2006* 284, fig. 11.

[109] *Bakardschiew 1956* 59–60, cf. *Sabján – Végh 2003* 296, fig. 17. 2–3.

[110] Placing decorative elements on a medieval stove (Germany): *Roth Heege 2012* 209, Abb. 325*; Roth Heege 2018* 37, fig. 5.

[111] This design may have been common in Ottoman Hungary, although it was not the only one. For example, a tiled stove reconstructed on the basis of wall pieces recovered from an Ottoman-era pit in Visegrád's Alsóvár had a rectangular-based lower part and an upper part shaped like a pyramid. *Kocsis – Sabján – Tóth 2006* 111, n. 352, cf. *Kováts 2010* fig. on p. 65. See also *Kocsis 2021* 194–199.

[112] For example, Tolna-Mözs: *Vizi 2010* 375. For Hungarian material of earlier date reused in a stove built by the Ottomans at Visegrád, see *Sabján 2001* 299.

The stoves from Feature 26 and Feature 35 date from the second half of the 16th century; their complements of tiles are characterised by a preponderance of brimless, beaker-shaped examples and the use of apexed inverted beaker-tiles on their domes.[113] To the stove recovered from Feature 35 belonged ledge elements together with other decoration. Smeared with chaff-bearing clay, the stove unearthed in Feature 33 is likewise from this period (the second half of the 16th century).

In their basic shape and constituent parts, the stoves datable to the first half and middle of the 17th century (KÜ/90.I, ÁI/91, Feature 16) resemble those from the 16th century, although as regards shape and physical composition the tiles in these stoves differ somewhat from the 16th-century ones. They are characterised by a significant proportion of cup-shaped stove tiles, use of different types of stove tiles together, use of tiles with quatrefoil openings, and also tiles featuring little plates or dishes (such tiles were presumably decorative).[114] The dome of the stove from Feature 16 was in the shape of a truncated pyramid.

Stoves were the defining objects of the rooms; their decoration emphsised this, and, moreover, may have indicated a striving for a kind of modest display.

Stoves and ovens with concave tiles were not in use in Anatolia in the 16th–17th centuries. Perhaps at this time they were not yet general in the Balkans,[115] although the archaeological data (stove tiles for the most part) attest to instances of them in these centuries. The characteristics of stoves in Ottoman Hungary built with beaker-shaped and cup-shaped tiles, and of the tiles themselves, differ from the characteristics of their – 14th/15th–20th-century – counterparts in Central Europe.[116]

While medieval antecedents of glazed Ottoman concave stove tiles, and of the stoves in Ottoman Hungary built with them, are unknown, the roots of the unglazed beaker-shaped and cup-shaped stove-tile types – and, in a way, of the stoves that featured them – can be found in late medieval stove-related archaeological material from across the whole of the Great Plain (here meaning the area between the Danube and Tisza rivers, the area east of the Tisza, and the Délvidék ('Southern Great Plain'), as well as parts of eastern Transdanubia).[117] At the same time, the Barcs stoves possess formal marks that point towards the Balkans (Serbia, Bosnia, Bulgaria, and so on). Parallels of the crudely-worked, decorated, apexed inverted-beaker stove tiles from beyond Barcs's immediate vicinity (cf. Babócsa) are, at present, barely known. It is noticeable that in the entirety of the material from Barcs the dominance of regional and Balkan characteristics

[113] Based on the number of crown-pieces and apex parts of stove tiles recovered, the castle featured several stoves whose domes were decorated with inverted beaker-tiles.

[114] *Sabján 2001* 293, 309.

[115] G. Goodwin: A History of Ottoman Architecture. London 1971/2003 429–453 ('The Ottoman house'), quoted by *Sabján – Végh 2003* 296, 299. For the lack of them, see Hans Dernschwam's diary of travels he made in Ottoman lands (1553–1555). In this there is mention of 'hearths' and 'brick hearths', on which food was cooked, but only in regard to public buildings (caravanserais). *Dernschwam 1984* 135–451. Nor does Evliya Çelebi, during his travels in the Balkans in 1664, make mention of stoves, although, perhaps, he failed to notice them. At the same time, in his description of the town of Ruda in Herzegovina, he does mention buildings 'supplied with baths featuring stoves *[hamamjik]'. Evlia 1660–1664 (1985²)* 454–455.

[116] Early occurrences of tiled stoves are known from Central Europe (Switzerland, Germany), from the 9th–12th centuries. *Roth Heege 2012* 35–37 (E. Roth Heege); *Roth Heege 2018* 33–36, with additional literature. Beaker/cup-tiled stoves in Central European settings were present in pictorial depictions in the 13th–14th centuries. *Franz 1981* 17, figs 4–5, cf. *Roth Heege 2012* 152–153, Abb. 245–248 (M. Henkel). For medieval stove remains in Central Europe and reconstructions of them, see, e.g., *Roth Heege 2012* 137–150 (E. Roth Heege); for beaker/cup-tiled stoves in modern-age traditional architecture, see, e.g., *Franz 1981* Abb. 22–26; for stove tiles, see *Roth Heege 2012* passim.

[117] *Sabján 2001* 291.

is a good deal more pronounced than it is in the material from other, related, sites (in Hungary). When, for example, stove parts unearthed on the site of the Ottoman palisaded castle at Újpalánk (Yeni Palanka) are compared with those unearthed at Barcs, differences are more apparent than similarities.[118]

Summary

The significance of the processing of the tiled stoves at Barcs lies not merely in the circumstance that it offers reference points for 16th–17th Ottoman stoves in Hungary, but also that it can assist the evaluation of Balkan archaeological finds of similar age and kind. It can also help in the establishing of regional characteristics.

In investigating the links of the relics uncovered, the nature and age of the site need to be kept in mind: this was a palisaded castle created by the Ottomans during the period of their rule in Hungary, one with a significant proportion of soldiers of Balkan heritage, in an area whose population was of mixed, Hungarian and Balkan, heritage. The castle was in existence between 1567 and 1664; its connections were determined by its geographical location and by historical processes characteristic of the era.

It is known from the written sources that during the Ottoman period in Hungary materials required for construction work at Ottoman castles were in many cases brought in from distant parts.[119] The Ottomans needed not just building materials, however. Lacking a workforce of their own, they availed themselves of the labour power of local artisans,[120] often ordering them in from faraway areas even. For example, in 1568 the Sultanic Council *(Divan)* in Istanbul ordered Christian peasants from the sanjaks of Pojega (Požega), Peçuy (Pécs), Mohaç (Mohács), Kopan (Koppány), Sekçöy ([Duna-]Szekcső) and Şimontorna (Simontornya) to make repairs at Szigetvár.[121] In another command, masters in the trades of lime burning and tile making were ordered to Szigetvár from Belgrade and other locations.[122] In 1570, too, an order reached the beys to support the construction operations in these places.[123] According to a decree issued in 1572, stonemasons and carpenters in sufficient numbers were ordered in from the sanjaks of İzvornik (Zvornik), Aladjahisar (Kruševac), Semendire (Smederevo), Sirem (Syrmia), Pojega (Požega), Bosnia, and Herzegovina to conduct renovation work at the fortresses of Esztergom, Székesfehérvár, and Szigetvár.[124] It is known from the sources that many artisans in southern Transdanubia and the Southern Great Plain area (today in Serbia and Croatia) were mobilised for work at Szigetvár.[125] The operations may have included other castle buildings in the area, e.g. at Barcs.

[118] Evidence of the proximity of Hungarian market towns (Ete but chiefly Tolna) is to be seen on the stove-related material from Újpalánk. High-level pottery and stove-making work was carried on in both settlements, *Vizi 2012; Gaál 2015.*

[119] For example, 'many thousand wagonloads of stone and lime were brought from the areas around far-away Pečui [Pécs]' ('Kalk und Stein von vielen tausend Wagen aus der Umgebung der sehr weit entfernt liegenden Stadt Pečui [Pécs] gebracht wurde') for repairs to Kanizsa Castle in the 1630s. *Fodor 1981* 67.

[120] *Fodor 1981* 72.

[121] *Fodor 2020* No. 1. (38–40).

[122] *Fodor 2020* No. 3. (41–42).

[123] *Fodor 2020* No. 5 (44).

[124] *Fodor 1981* 83, vö. *Fodor 2020* No. 10 (50–51).

[125] İzvornik (today Zvornik, Bosnia-Herzegovina), Aladjahisar (today Kruševac, Serbia), Semendire (today Smederevo, Serbia), Sirem (today Srem/Srijem, Croatia and Serbia), and Pojega (today Požega, Croatia). During the period in question, the Sanjak of Aladjahisar belonged to the Temeşvar Eyalet; the others all belonged to the Budin Eyalet. *Fodor 2020* 50.

Full implementation of the initial measures may have resulted in significant movements of artisans (including masters) and, consequently, movements of goods.

In the main, the stove tiles from Barcs are in all likelihood products from within the region: they may have been made nearby in pottery workshops in settlements along the River Drava (Babócsa, Segesd, and possibly Verőce [today Virovitica in Croatia]), although it cannot be excluded that wares were delivered from more distant territories in smaller or larger batches. Those who made the stoves may equally have come from settlements in the Drava district. Even so, the stoves' mingled stylistic marks permit the hypothesis that they are works by masters from further afield also.

The characteristics of the Barcs stoves were shaped by Great Plain traditions and Balkan traditions jointly, namely by traditions in the Délvidék ('Southern Great Plain'), Slavonia, the Bácska/Bačka, and the Szerémség/Syrmia regions (today Croatia, Serbia)[126] where the inhabitants, who were under Ottoman rule, were of mixed heritage. Historically, this line of argument is strengthened by the circumstance that in 1568–1569 garrison soldiers were ordered to the castle of Barcs (and to Szigetvár) from south of the River Drava (from the strongholds of Brezovica, Moslavina, and Sopje; today all three are in Slavonia),[127] and that artisans, including masters, arrived from these areas to join the building operations at Szigetvár and probably in its vicinity.

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BÉLA MIKLÓS SZŐKE

GUSSFORM EINES TÜRKISCH-BALKANISCHEN KOPFSCHMUCKES VON LENTI-ELŐHEGY (KOMITAT ZALA, SW-UNGARN)

Im Andenken an László Horváth (1945–2015) gewidmet

Abstract: The mold of a trinket common among the Balkan population during the Ottoman rule, which also proves its local manufacturing.

Stichwörter: Gussform, türkisch-balkanisch, Kopfschmuck, Ungarn in der Zeit der Ottomanen

Im März 1982 schenkte György Varga (Nagykanizsa, Andrejka [heute: Csokonai] utca 6). dem Thúry György Museum von Nagykanizsa eine Gussform, auf die er nordöstlich des mittelalterlichen Gosztola, in Lenti-Előhegy, 100 m nördlich vom Glockenstapel gestoßen war. Am 27. Oktober 1987 begaben wir uns gemeinsam mit László Horváth zum Fundort und obwohl die Sichtverhältnisse gut waren, fanden wir auf dem Acker zwischen dem Glockenstapel, der auf dem hufeisenförmigen Plateau des Előhegy stand und dem davon ungefähr 100 m entfernten, am Nordende befindlichen Wasserturm keinerlei Siedlungsspuren *(Abb. 1. 1)*, selbst die in den Weinkellern arbeitenden Ansässigen erinnerten sich nicht an Erdarbeiten, die archäologisch verwertbare und mit der Gussform in Verbindung zu bringende Funde zutage gefördert hätten. Der ursprüngliche Besitzer der Gussform muss also aller Wahrscheinlichkeit nach die Form woanders erstellt, bzw. benutzt, sie allerdings in jener Gegend verloren haben. Die zerbrochene und deshalb unbrauchbare Gussform wurde anhand der darauf befindlichen Spuren wohl längere Zeit lang als Schleifstein verwendet.

Die Gussform besteht aus dunkelgrauem und überall auf dem Ostalpengebiet vorzufindendem Schiefer,[1] ursprünglich war sie rechteckig. Ihre (messbare) Länge beträgt 5,9 cm, Breite 7,8 cm, Dicke 1,4 cm; auf der Rückseite verschmälerte sie sich allerdings – womöglich teils aufgrund der Verwendung als Schleifstein – an zwei Stellen auf bis zu 0,6 cm. In die Mitte der Gussform wurde ein rundes Loch mit einem Durchmesser von 0,8 cm gebohrt, womit die beiden Hälften der zweiseitigen Gussform ineinandergefügt wurden. In eine Ecke der Form hatte man ein Loch mit einem Durchmesser von 0,6 cm gebohrt, das als Lüftungsöffnung dienend den Rücklauf regulierte. Da die Ecke der Form gerade an dieser Stelle abgebrochen war, kam das während des letzten Gusses festgetrocknete Silber zum Vorschein.

Anhand der in die Vorderseite vertieften Muster wurde die Form für den Guss von Komponenten eines türkisch-balkanischen Kopfschmuckes verwendet, deren Dicke der eines Blechs entsprach. Eine dieser Komponenten ist eine fast kreisrunde Blechzier, die einen geschlossenen Halbmond darstellt und deren Rand rundum fünf kreisrunde Ösen aufweist: jeweils eine in der Nähe der beiden Spitzen des Halbmondes, eine in der Mitte, auf der Achse des Halbmondes, bzw. jeweils eine auf halber Strecke zwischen den beiden Spitzen und der Mittelachse. Die Ausgussrinne schließt an das obere Ende der kreisrunden Öse an, die sich auf der Mittelachse des Halbmondes befindet. Daneben hatte man noch die Muster dreier trapezförmiger Anhänger in die Schieferplatte

[1] Für die Materialbestimmung der Gussform möchte ich mich bei Pál Sümegi bedanken.

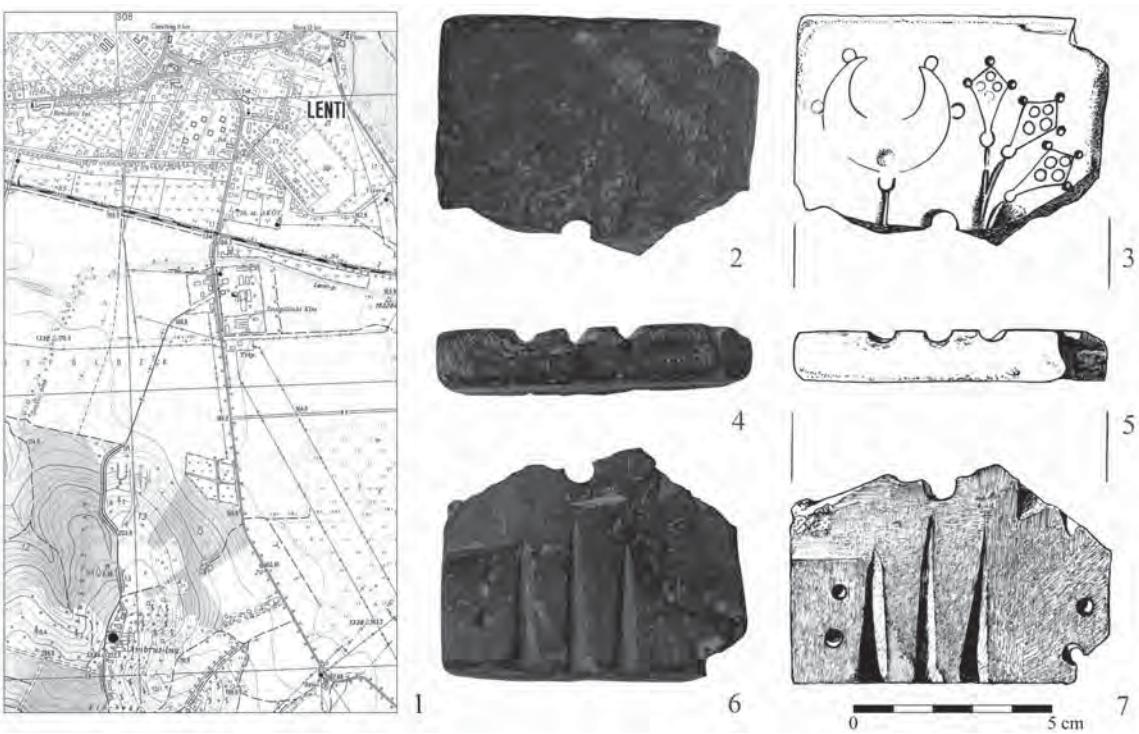

Abb. 1. 1. Lenti-Előhegy, der Fundort der Gussform (schwarzer Punkt);
2, 4, 6 (Foto der Gussform: ©Péter Hámori);
3, 5, 7 (Zeichnung der Gussform: ©Szathmáryné, Ida Polgár)

vertieft, jedes Muster weist vier kreisförmige Motive auf, an drei Ecken der Trapeze sind kleine Kügelchen zu sehen. Die Ausgussrinnen, die von einer gemeinsamen, breiteren Rinne abzweigen, laufen auch hier in Richtung der kleinen runden Ösen am oberen Ende des Trapezes, die dem Aufhängen der Form dienten *(Abb. 1. 2–3).*

Die auf der Rückseite der Gussform sichtbaren Einwirkungen sind sekundärer Art. Die drei spitz zulaufenden, länglich kegelförmigen Vertiefungen (Länge 4,0 und 3,3 cm, Breite 0,5 cm, Tiefe 0,5–0,3 cm) hatte man womöglich zum Anspitzen irgendeines spitzen Gegenstands, z. B. eines Knochenpfriems auf der Schiefergussform angelegt. Neben ihnen befinden sich auf einer Seite zwei runde Vertiefungen mit unbekanntem Zweck (Durchmesser 0,4 und 0,5 cm, Tiefe 0,4 cm), auf der anderen Seite ist eine seichtere, ähnlich runde Vertiefung zu sehen (Durchmesser 0,3 cm, Tiefe 0,2 cm), die unter Umständen mit der Gussform zusammenhängt, während das runde Loch mit beschädigtem Rand neben letzterer Vertiefung ein kreisförmiges Lüftungsloch für den Guss des Kopfschmucks war, dessen Rand herausgebrochen war *(Abb. 1. 4–7).*

Eine der Gussform aus Lenti sehr ähnliche Gussform kam 2005 auf dem Gebiet des Rác-Fürdő (Budapest I, Hadnagy u. 8–10) zum Vorschein. Jene Gussform bestand aus dunkelgrauem Stein, wahrscheinlich handelt es sich ebenfalls um Schiefer (Länge 6 cm, Breite 4 cm). Man hatte in die Oberfläche eine mondförmige, fast kreisrund abgeschlossene Verzierung gekratzt, deren Ausgussrinne auch hier zur runden Aufhängeöse hin, auf der Halbmondachse verläuft. Am Rand des geschlossenen Halbmondes offenbaren sich rundherum jeweils drei, leicht ovale Ösen, wovon die beiden in der Nähe der Halbmondspitzen kleiner sind, als die übrigen. Innerhalb des Halbmondes begleiten den Mondsichelrand drei vertiefte Linien, die sich wohl in Form schmaler Rillen aus der Rückplatte (?) des Schmuckstücks emporwölbten.[2]

[2] *Kincsek a város alatt 2017* 194, Kat. 797.

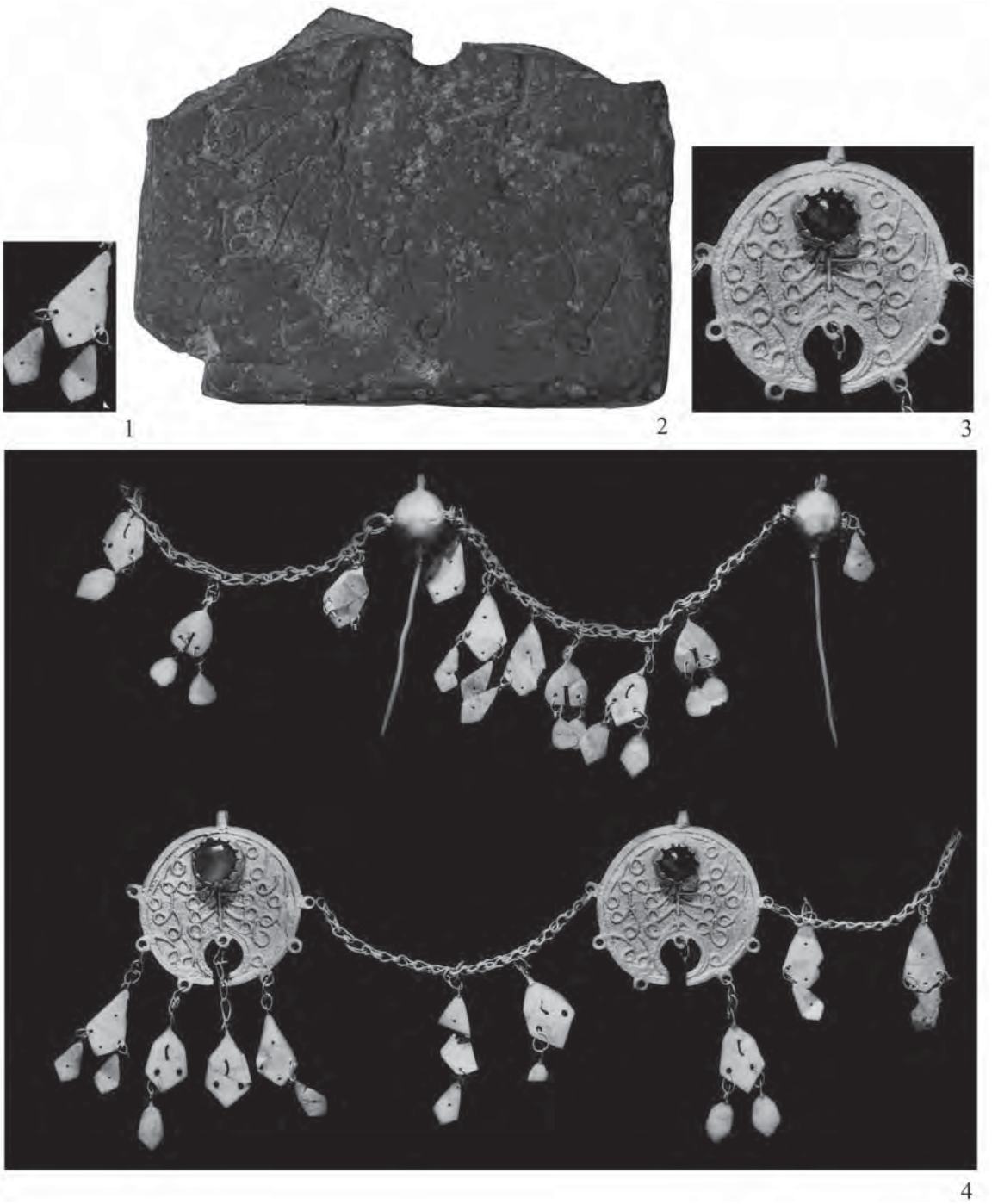

Abb. 2. 1, 3, 4. Kopfschmuck von Kajdacs (©UNM, Datensammlung, Fotoarchiv);
2. Lenti-Előhegy, Vorderseite der Gussform.

Die fast einen Kreis bildende, mondförmige Zier und die trapezförmigen Anhänger der beiden Gussformen sind aus gegossenem Silberblech gefertigte Komponenten eines türkisch-balkanischen Kopfschmuckes. Von den Nadeln mit kugeligem Kopf, die der Befestigung dienten und/oder von den Scheiben, die die Form eines geschlossenen Halbmondes hatten, bzw. von den Verbindungsketten hingen tropfen- oder trapezförmige Silberblech-Anhänger in dreifacher Gliederung herab (an jedem Blechanhänger hingen zwei weitere kleine Anhänger). Das Ungarische Nationalmuseum bewahrt eine im Jahre 1864 in Kajdacs (Komitat Tolna) *(Abb. 2. 4)*

und eine im Jahre 1943 in Battonya (Komitat Békés) geborgene Variante dieses Kopfschmucks auf. In beiden Fällen wurde die Vorderseite des halbmondförmigen Blechs mit aus Filigrandraht gefertigten Stäbchenranken, in strahl- oder netzförmiger Anordnung verziert, während sich aus der Mitte der Halbmondachse, in einer kreisförmigen oder viereckigen Fassung eine Glaseinlage hervorhebt.[3] Den Kopfschmuck von Battonya barg man gemeinsam mit 165 Münzen, die späteste darunter wurde im Jahre 1684 geprägt.[4] Auch der silberne Kopfschmuck von Kajdacs kann auf das Ende des 17. Jahrhunderts datiert werden, wovon ein Teil mit Scheiben in Form eines geschlossenen Halbmondes früher als Fund unbekannten Fundorts registriert worden war.[5]

Das Fragment von Lenti ist eine Hälfte einer zweiseitigen Gussform, jedoch kann nicht eindeutig festgestellt werden, ob man diese Hälfte für den Guss der Vorder- oder Rückseite des Schmuckstücks verwendete. Zwar hatte man praktisch nur die Konturen des halbmondförmigen Blechschmucks in die Form vertieft, die Innenseite ist dennoch vollkommen unverziert, was bedeutet, dass es sich wohl eher um die Rückseite handelt *(Abb. 2. 2).* Diese Annahme bestärkt auch der Umstand, dass von den bekannten Kopfschmuckvarianten die Filigranverzierung auf der Vorderseite der Halbmonde aus Kajdacs vermutlich mitgegossen worden war *(Abb. 2. 3).* Bei den Kreisen innerhalb der trapezförmigen Anhänger der Gussform handelt es sich offensichtlich nicht um Verzierungen, da die einzigen „Verzierungen" der kleinen, trapez- oder tropfenförmigen Blechanhänger jene runden Löcher sind, in die man noch kleinere Blechanhänger gehängt hatte. Deshalb könnte es sich bei den kreisförmigen Motiven innerhalb der trapezförmigen Anhänger der Gussform aus Lenti um die Andeutungen der runden Ausschnitte handeln *(Abb. 2. 1).*

Anhand der trapezförmigen kleinen Anhänger der in Lenti gefundenen Gussform steht sie dem Kopfschmuck von Kajdacs näher. Auf der Scheibenzier in Form eines geschlossenen Halbkreises aus Kajdacs befinden sich allerdings – ähnlich, wie bei dem aus dem Rác-Fürdő von Budapest – sieben runde Ösen, während der Schmuck aus Battonya – der dem aus Lenti ähnelt – nur fünf Ösen aufwies. Anhand der Analogien hatte man die Gussform aus Lenti eindeutig für den Guss der Komponenten eines solchen türkisch-balkanischen Kopfschmuckes benutzt, die einen weiteren, bisher unbekannten Kopfschmuck zierten.

Die türkisch-balkanischen Silberschmuckstücke mit Blechanhängern und Filigranzier können samt weiteren Fundgruppen, denen ebenfalls balkanischer Ursprung nachgesagt wird, auf der südlichen Tiefebene und in Süd-Transdanubien bis zur Südgrenze des Plattensees verfolgt werden, während sie zur Zeit des 17. Jahrhunderts bereits in Pest und Buda erschienen. Ihre Verbreitung deckt sich zum Teil mit der Verbreitung von rauen, auf der Handdrehscheibe gefertigten Hauskeramiken vom balkanischen Typ.[6] Dieser Umstand ist in jener Hinsicht wichtig, als dass diese türkisch-balkanischen Schmuckstücke nicht nur importiert oder als persönlicher Trachtengegenstand in die besetzte Region gelangten, sondern teilweise auch in hiesigen Werkstätten hergestellt worden waren. Die Nähe des Fundortes Lenti zu Nagykanizsa, das am 20. Oktober 1600 von den Ottomanen erobert wurde und von Anfang an als Sitz eines osmanischen Verwaltungsbezirks (Wilajet) diente,[7] weist mit ziemlicher Sicherheit auf den Ursprungs- und Gebrauchsort der Gussform hin.

Der Fund von Lenti ist auch deshalb besonders wichtig, weil wir lediglich über sehr begrenzte Kenntnisse hinsichtlich der Schmuckstücke aus der Zeit der Ottomanen verfügen. Eine Möglichkeit, mehr über sie zu erfahren, bieten die in Reisebüchern europäischer Besucher

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3 *Gerelyes 1994* 68, Abb. 22–23; *Gerelyes 2012* Abb 3–4; *Gerelyes 2017* Abb. 9–10.

4 *Gerelyes 1994* 44–45; *Gerelyes 2012* 231, Abb. 3.

5 *Gerelyes 1994* 45; *Gerelyes 2010* 793, Abb. 12.

6 *Gerelyes 2010* 794. Eine neuere Zusammenfassung über die Verbreitung türkisch-balkanischer Schmuckstückarten auf dem besetzten Gebiet, sowie über balkanische Analogien siehe in: *Gerelyes 2017.*

7 *Dávid 1992*.

überdauerten Abbildungen, bzw. jene traditionellen Formen des bäuerlichen und nomadischen Volksschmucks, der bis Anfang des 20. Jahrhunderts einen festen Bestandteil der Tracht bildete und viele Elemente der höflichen und bürgerlichen Mode des 17.–18. Jahrhunderts bewahrte. Dementsprechend bestand „der weibliche Schmuck aus vielfältigem Zierrat für die Haar- und Turbantracht, aus Hals- und Stirnbändern (meist mit Anhängern), Ohrringen und Gürteln mit Beschlägen. Die bei der Schmuckherstellung bevorzugten Techniken sind Filigran- und Granulationsarbeit, Treib- und Flechtarbeit, sowie die Gravur. Sehr beliebt ist die Verbindung vieler kleiner Teile mit Kettengliedern und das Anhängen von runden, tropfen- oder trapezförmigen Elementen und zahlreichen Münzen“.[8]

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[8] *Rohwedder 1985* 311. Hiermit möchte ich mich für die Ratschläge bei Gyöngyi Kovács und Ibolya Gerelyes herzlich bedanken.

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LÁSZLÓ BARTOSIEWICZ

FISH CONSUMPTION IN THE ARCHIEPISCOPAL RESIDENCE OF ESZTERGOM IN THE CONTEXT OF FISHING, AQUACULTURE AND CUISINE

Zusammenfassung: Der Fischverzehr spielte in der mittelalterlichen Ernährung eine besonders wichtige Rolle. Daher befassten wir uns im Rahmen der Auswertung jener Küchenabfälle, die aus der Residenz des Erzbischofs zu Esztergom stammten, verstärkt mit der gründlichen Analyse von Fischüberresten. Unser Ziel war es, die Artenzusammensetzung der in der Residenz verzehrten Fische zu bestimmen und ihre Körperlänge zu schätzen. Besondere Stärke der Forschungsarbeit ist, dass das komplette Material mithilfe der Schlämmanalyse aufgedeckt wurde. Dieser Methode ist es zu verdanken, dass wir nun zum ersten Mal in der Geschichte der ungarischen mittelalterlichen Archäologie ein differenziertes Bild über die Nutzung von Fischen erstellen konnten. Im Fundmaterial des 14. und 15. Jahrhunderts fällt die Zunahme des Anteils kleiner Karpfenfische auf, was auf einen Ursprung aus Teichwirtschaften hinweisen könnte. Auch das Vorkommen meist kleiner (junger) Hechte entspricht diesem Umstand. Der Anteil von Hausenüberresten im Fundmaterial ist auffälligerweise unbedeutend, obwohl mehrere Aufzeichnungen auf Hausenfang auf dem Gebiet des Erzbischofssitzes hinweisen. Ein Vergleich der sehr sorgfältig freigelegten Fischüberreste und der schriftlichen Quellen wird uns bei der differenzierten Auslegung dieser Phänomene behilflich sein.

Keywords: riverine fishing, fish farming, fish consumption, screening, cyprinids, pike, sturgeon, medieval period, Esztergom, archiepiscopal residence

One recurring commonplace in medieval sources is Hungary's richness in fish, regularly cited in the historical and ethnographic sources and the works that have determined fish studies.[1] The donation charters and lawsuits relating to fishing rights as well as the account books all underscore the economic significance of fishing. This is hardly surprising, given that the greater part of Hungary's territory, particularly the Little and the Great Hungarian Plain, was made up of the floodplains of the still unregulated rivers, extensive portions of which were intermittently or permanently covered with water. Moreover, the role of fish ponds and fish farming in food provisioning also increased.

Despite the natural and social environment conducive to fishing, medieval archaeozoological assemblages rarely contain fish remains. In an overview written in 1987, based largely on the available literature, hand-collected fish remains were known from no more than a dozen medieval sites.[2] Small fish bones can only be reliably recovered by screening. However, disregarding an experimental initiative over thirty years ago, which had little impact on archaeological fieldwork practices,[3] this procedure was not employed. The fish remains recovered through traditional hand collection restricted the fish species appearing in the archaeological record to the large acipenserids, pike, common carp and wels catfish, whose large bones are visible to the naked eye on excavations and are less concealed by the soil adhering to them. However, in order to accurately reconstruct fish consumption, an assessment of the smaller species such as the many small species

[1] E.g. *Bél 1764; Pfeiffer 1861; Pesty 1867; Herman 1885*.
[2] *Takács – Bartosiewicz 1998* fig. 7.
[3] Lászlófalva-Szentkirály: *Takács 1988;* Örménykút 54: *Bartosiewicz 1988*.

in the cyprinid family and of the juvenile individuals of larger-bodied species is indispensable. The meticulous field procedures such as screening employed during the excavations at Esztergom provided an extremely detailed and statistically sound picture of the fish supply of archiepiscopal residence's kitchen and of the dietary customs of the castle's onetime occupants as well as of their waste management.

Species identification based on sampling provides meaningful data both on the incidence of particular species as well as on their absence, while providing only indirect, general data on the number of consumed fish and the volume of fish meat. In the case of medieval Esztergom, one intriguing issue is whether the fish remains recovered from particular layers originate from the Danube or a fish pond, particularly in view of the growing tendency of medieval carp consumption.

I am greatly indebted to Erika Gál, Eszter L. Kis Szabó, Róbert Lóki, Krisztina Orosz and Csilla Zatykó for providing data relevant to the interdisciplinary interpretation of the assemblage as well as for their own invaluable insights.

Material and method

Lying at the point where the Little Hungarian Plain and the Danube Bend meet, Esztergom was one of the most prominent political and cultural centres in medieval Hungary. Its castle overlooks the floodplain extending on the right bank of the Danube. The find material was recovered from the southern side of the castle, from the pits of one-time medieval stone quarries, in which the refuse discarded from the kitchen had accumulated to a thickness of several meters over the centuries.

Chronological distribution of the finds

The fish bones recovered in 2016 from the site registered as Esztergom-Kőbánya originate from the following find groups of the vertical layer sequence, corresponding roughly to the "chronological" order of the deposition:[4]

Group IV: The lowermost layer of the accumulated material, which aside from the kitchen's food refuse, contained also the occasional archaeological artefact. The relatively few finds were not sampled for radiocarbon dating and thus the 90 fish bones representing this group are discussed as part of the general overview in order to gain as complete a picture as possible. These finds were obviously part of the refuse of the overlying two groups and their complementary role is important for the overall assessment.

Group III: In the layer sequence, this is the middle, undisturbed section containing the bulk of the kitchen waste. The fish remains totalled 768. The single bone sample submitted for radiocarbon measurement gave a date of 1295–1395 cal AD (1σ; 1285–1400 cal AD, 2σ), i.e. the 14th century.

Group II: The late, upper, undisturbed section of the closed deposit containing kitchen waste. The amount of animal bones recovered from this section[5] is about one-half of the previous one (400 remains in the case of fish), also reflected in the number of bird and mammal remains. The single bone sample submitted for radiocarbon dating gave a date of 1405–1430 cal AD (1σ; 1330–1445 cal AD, 2σ), assigning the bone to the earlier 15th century. Both dates were made on the limb bones of domestic hen, a species that has a relatively short life span.

[4] The natural movement of the finds and their sedimentation at different scales must also be taken into account even if this refuse deposit was, to all appearances, undisturbed by contemporaneous human activity.

[5] Erika Gál's kind personal communication.

Given that the material of Group I collected from the top of the deposit was mixed, only the fish remains from Groups II and III could be reliably compared. The lowermost layer (V) on the floor of the quarry, containing also construction debris, differed visibly. Moreover, the two radiocarbon dates on bones for this layer are controversial (13th and 15th century, respectively); even assuming that the measurements are accurate, they are an indication of the unavoidably mixed nature of the finds.

Taphonomy

The extent to which an assemblage can be regarded as being representative is influenced by three interrelated taphonomic factors. The first, the material's state of preservation, is determined by the interaction between the material and the chemical environment of deposition, which also determines the extent to which species identification is possible. Finally, the recovery techniques and the care by which the finds are handled also contribute to the reliability of the broad picture outlined by the finds.

Preservation of the fish remains: Owing to the upward thrust of water, the structure of fish bones is not as compact as that of terrestrial vertebrates and a part of the loosely structured fish bones inevitably perishes in the ground. The skeletal elements of the economically important acipenserids (such as sturgeon and sterlet) of the order Ganoidei are particularly porous. In these species, the mineral content of the bones decreases with age. As a result of physiological osteoporosis, the large bones of older acipenserids survive to a lesser extent in archaeological layers. Additionally, since the finds come from kitchen waste, the taphonomic resistance of the loosely structured skeletal elements could be further worsened by cooking.

Taxonomic identification: The overwhelming majority (202 pieces) of the fish remains was highly fragmented, causing difficulties in taxonomic identification even to the family level. Although it could be determined even with the naked eye that these fragments predominantly came from small cyprinids and juvenile pike, the possible presence of other small fish that could not be identified owing to the fragmentation seems more than likely. The "indeterminate" category also includes those skeletal remains that have lost their articular surfaces and became undiagnostic such as rib fragments as well as the small flat bones of the skull. These remains can rarely be identified on the species level.

Recovery methods: It has been demonstrated that hand collection is unsuitable for the reliable recovery of fish remains because bones smaller than 17 mm – and most fish remains fall into this size category – will end up in the soil dump without sieving.[6] The excavation of the Augustine abbey at Sankt Pölten in Austria provided an opportunity to compare the efficiency of recovering the 15th-century fish remains if hand collecting and sieving are employed.[7] Roughly 85-90% of the small cyprinids were recovered from the sieved samples, and no more than 35-40% of the remains from large-bodied carp and pike were recovered by hand collection. Additionally, sieving doubled the number of large sturgeon finds too. The column on the left side of *fig. 1* shows the aggregate taxonomic breakdown of the fish remains from 23 medieval sites in Hungary compared to the fish remains from Esztergom. Given that until now, fish remains were exclusively hand collected at medieval sites and screening was not employed, samples are dominated by large-bodied sturgeon, catfish, carp and pike remains, while the remains of smaller-bodied species were rarely recovered and identified. At Esztergom, the soil from the culture deposit was dry sieved using 5- and 2-mm mesh screens.[8] Even a cursory glance reveals that one single sieved

[6] *Bartosiewicz 1988.*

[7] *Galik et al. 2011* 102.

[8] Eszter L. Kis Szabó and Róbert Lóki's kind personal communication.

sample of the archiepiscopal residence contained roughly the same number of identifiable fish remains as has been taxonomically identified altogether during previous medieval research.[9] Moreover, these two screened Esztergom samples offer a considerably more detailed picture, with large-bodied sturgeon and catfish representing a smaller proportion, while the frequencies of small-cyprinids and sterlet, the smallest species in the acipenserid family, increased. Thus, the Esztergom sample can only be compared to previously excavated medieval fish bone assemblages with some constraints because any differences are not taxonomic in nature, but can be ascribed to different recovery methods. The species composition of the Esztergom sample was both enriched and made more detailed by employing screening.

Estimation of fish sizes

The measurements of fish bones are suitable for calculating the one-time length of individual specimens. Even though few intact, measurable remains came to light at Esztergom, these finds are nevertheless important sources of information on fish consumption and can also be collated with the references in the written sources. By recording the bone dimensions according to the international protocol,[10] it proved possible to roughly estimate the size of a few specimens.[11] The acipenserid remains were compared to the last Hungarian great sturgeon caught at Paks in 1987.[12] The body length of pikes could be estimated by means of a recent comparative sample from Sweden,[13] while catfish sizes were calculated based on material in the Museum of Hungarian Agriculture.[14] In the case of cyprinids, the sizes published in the academic literature provided useful comparisons.[15]

Not being a historian, instead of the primary contemporaneous sources, I relied on the references in the secondary academic literature. One of my main sources was the information contained in the still unpublished kitchen account book *(pro Coquina castri)* of Hyppolite d'Este, Archbishop of Esztergom,[16] kindly provided by Krisztina Orosz. Written in 1489, during the reign of King Matthias, it provides a snapshot of the very end of period spanned by the archaeozoological material. Even if it does not reflect the entire period spanned by the fish remains from Esztergom, it does offer a reliable picture of its very end. Most of the detailed written sources on fishing in medieval Central Europe come from this period.[17]

In view of the different sample sizes, the significance of the even or differential distribution of the finds (homogeneity analysis) was controlled using chi-square (X^2) tests, applying the generally accepted 5% level of probability.

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[9] This does not include the sites whose fish remains were simply denoted as "fish" within the entire animal bone samples, without a closer taxonomic identification.

[10] *Morales – Rosenlund 1979.*

[11] In the present study, these values refer to the total body length, measured from the nose to the tip of the caudal fins.

[12] *Bartosiewicz – Takács 1997* 13–14.

[13] *Bartosiewicz 1990.*

[14] *Takács 1987.*

[15] *Libois – Hallet-Libois 1988.*

[16] Hyppolite d'Este, cardinal of Ferrara, son of Ercole, prince of Ferrara, and Eleanor of Aragon, filled this post between 1486 and 1497.

[17] *Hoffmann 1997.*

Results

Table 1 presents the taxonomic composition and chronological distribution of the fish remains from Esztergom. Column 1, containing the few remains at the base of the deposit, is for information purposes only. The number of fish remains from the 14th century was twice as high as those from the 15th century. Owing to this difference, caution needs to be exercised when comparing the two groups since species representation depends directly on sample size.[18] Of the 1258 remains, 1056 could be identified to at least the family level. Although not fish remains, the few small claw fragments of crayfish reflect a nother freshwater dietary resource in the sample.

The species richness of the three groups differed. The 90 fish remains from the base of the deposit represented 8 taxa (species or family), while the largest, 14th-century sample exactly the double (16). The species richness of the 15th-century sample was even larger because 15 taxa could be identified in the half as large material. Of the fishes mentioned in the kitchen account book of Archbishop Hyppolite d'Este, carp, pike, barbel, Crucian carp and catfish were attested among the fish remains, but asp and burbot are also mentioned. Asp (*Aspius aspius* L., 1758) is a predatory cyprinid with a body length of up to 70-80 cm, while burbot (*Lota lota* L., 1758) is the single gadiform freshwater fish. It is sometimes called winter catfish because similarly to pike, it can be ice fished. Its body is 30-60 cm long. Despite their relatively large size, neither of the two species has been documented in archaeozoological assemblages from Hungary.

	Base of deposit	**14th century**	**15th century**	**Total**
Sturgeon (*Huso huso* Brandt, 1833)	1		1	2
Sterlet (*Acipenser ruthenus* L., 1758)	5	43	13	61
Large acipenserids (Acipenseridae)	2	35	15	52
Pike (*Esox lucius* L., 1758)	13	128	45	186
Common carp (*Cyprinus carpio* L., 1758)	21	120	95	236
Bream (*Abramis brama* L., 1758)		4	9	13
Barbel (*Barbus barbus* L., 1758)		4	2	6
Crucian carp (*Carassius carassius* L., 1758)	1	6	1	8
Ide (*Leuciscus idus* L., 1758)		8	2	10
Common roach (*Rutilus rutilus* L., 1758)	1	4	3	8
Tench (*Tinca tinca* L., 1758)		2		2
Vimba bream (*Vimba vimba* L., 1758)		3		3
Small cyprinids (Cyprinidae)	35	246	144	425
Wels catfish (*Silurus glanis* L., 1758)		17	4	21
Perch (*Perca fluviatilis* L., 1758)		2	1	3
Pikeperch (*Stizostedion lucioperca* L., 1758)	3	12	5	20
Indeterminate (Pisces)	8	134	60	202
Total	**90**	**768**	**400**	**1258**
Crayfish (*Astacus astacus* L., 1758)		**2**	**1**	**3**

Table 1. Species composition and chronological distribution of the Esztergom assemblage

[18] *Bartosiewicz – Gál 2007.*

The percentage distribution of the species in the 14th- and 15th-century sample is shown by the middle and right columns in *fig. 1.* On the testimony of the data, there was a statistically significant difference between the percentages of the 14th- and 15th-century fish remains relative to each other, despite the different sample sizes.[19] The percentage distribution of the larger fish groups in *fig. 1* are presented in *Table 2.*

	14th century (n=634)	**15th century** (n=340)
Sturgeon	0.0	0.3
Acipenserids	12.3	8.5
Pike	20.3	13.2
Cyprinids	43.8	**47.4**
Carp	19.0	**27.9**
Catfish	2.7	1.2
Percidae	1.9	1.5
Total	**100.0**	**100.0**

Table 2. Percentage distribution of the identifiable fish remains from Esztergom

The main reason for the differences between the two samples is that the proportion of cyprinids (including carp, which cannot always be accurately identified) rose from 62.8% accounting for two-thirds of the sample to 75.3% representing three-quarters of all remains during the 14th–15th centuries. The ratio of securely identifiable carp remains grew one-and-a-half-fold, which is particularly striking, while the frequencies of all other fish species obviously declined (the slight "increase" of sturgeon is not statistically significant i.e. could be accidental). In order to better understand this striking diachronic change, it seems instructive to survey the most important traits of the identified fish species and what we know about their exploitation.

Acipenserids

Of the identified fish species, the evidence for acipenserids will be reviewed first. The skeletal elements most likely to be preserved are the compact dermal scutes along the length of the body *(fig. 2d)* and the sturdy Y-shaped pectoral fin rays, which are to some extent suitable for species identification as well as for size estimations.[20] The two species that can be determined with relative confidence are sturgeon (with a body length of 2-3 m, although occasionally as long as 10 m), the largest in the family, and sterlet (1-1.2 m), the smallest. The extremes in bone sizes are illustrated in *fig. 2.*

Aside from sterlet and sturgeon, other members of this family found in the Danube include Russian sturgeon, ship sturgeon and stellate sturgeon.[21] The remains of the latter, not always securely identifiable owing to the transitional size of their bones, appear as large-bodied acipenserids in *Table 1.* The single measurable articulation point of a sturgeon fin ray was extremely large, indicating a body length of almost 3.5 m, came from the 15th-century sample. Although it could not be measured, the acipenserid fin ray fragment found at the base of the kitchen waste deposit *(fig. 2c)* was even sturdier. The early and late sturgeon finds provide the chronological frame for the otherwise scanty presence of large acipenserids in the kitchen waste of the archiepiscopal palace. The medieval value attached to the size of individual acipenserid

[19] The sturgeon and catfish remains numbering less than five could not be included in this calculation.
[20] *Brinkhuizen 1986* 18–33; *Desse-Berset 1994.*
[21] *Pintér 1989* 26.

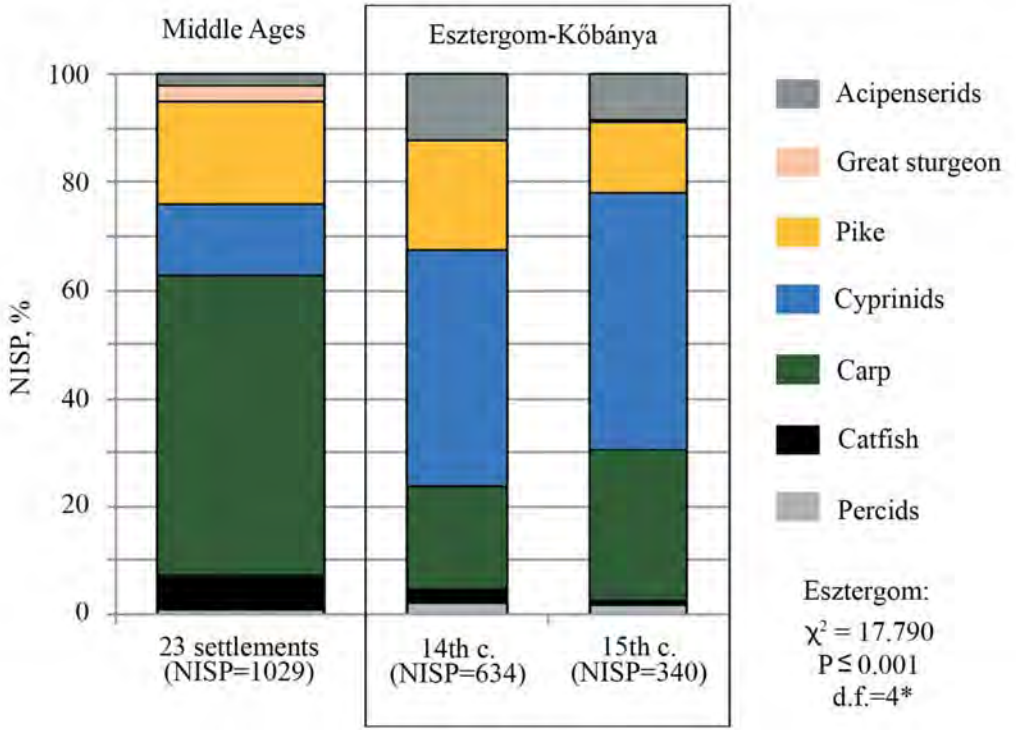

Fig. 1. The taxonomic composition of 14th- and 15th-century water-sieved samples from the Esztergom archbisopric in comparison with all medieval fish remains from Hungary. There is a statistically significant difference between the two framed samples from Esztergom (*Bones of acipenserids and catfish could not be included in the X^2 test due to the small number of cases)

Fig. 2. Size differences between sterlet (a) and great sturgeon (b: 14th century, c: bottom layer) shown by pectoral fin rays and dermal scutes of large acipenserids (d) from Esztergom

species can be gleaned from the 1329 toll register of Zsolca, a town of the River Sajó: a toll of two *denarii* had to be paid for sturgeon, while only one *denarius* for the other species.[22]

Sterlet, the single specifically freshwater acipenserid, does not migrate far during the spawning season. Before the construction of the dams in the Iron Gorges of the Danube (1971 and 1984), individuals of the larger acipenserid species swam as far as the river's upper reaches from the Black Sea.[23] In Hungary, the migratory period falls between January and June, and October and December, respectively, depending on the species.[24] For fishers, the spring/early summer upstream migration was ideal. One established method was to channel the sturgeons into traps and weirs at river sections that could be easily blocked or target them at the mouths of tributaries. A good catch could be had at the deep sections of river beds, natural bottle-necks where the mass of migrating fishes piled up and became easy prey, as well as at the confluence of rivers, where sturgeons swam towards the narrower, faster-flowing tributary.[25] Writing at the turn of the 15th and 16th centuries, Ladislaus Suntheim recorded that of the great many sturgeons caught in Komárom, where the Vág/Váh river flows into the Danube, some were transported as far as Vienna.[26] About a generation later, in 1518, Komárom lying less than 50 km west of Esztergom, was elevated to the rank of Royal Sturgeon Fishing Grounds.[27] This is all the more interesting because the Esztergom archiepiscopate in the medieval county of Komárom "possessed 36-38 settlements, while in the 15th century, it owned only 20-22 settlements,[28] specifically in the part of the county extending north of the Danube", i.e. the river section between Komárom and Esztergom.[29]

According to the medieval account books[30] and early modern period cook-books,[31] caviar from female acipenserids migrating to spawn was a highly-valued delicacy. The fish returning to the sea after spawning no longer bore roe and now swam downstream, in part borne by the current, and thus were more difficult – and also less profitable – to catch.

Sterlet, the smallest species in the acipenserid family, is slightly larger than a fully-developed pike or carp. Compared to the latter two species, its demand for dissolved oxygen content is relatively high (3.0–3.5 mg/l),[32] and therefore prefers "more fresh" habitats. On the testimony of the fish remains from Esztergom, large, fully developed sterlets were regularly served in the archiepiscopal palace. Judging from the width of the first pectoral fin ray, the length of the 14 individuals was near 1 m, with the exception of a single 14th-century specimen *(Table 3).*

[22] The latter corresponded to the toll duty for a horse, ox or a cattle driven to the market. *Tóth − Kubinyi 1996* 320−321.

[23] *Bartosiewicz et al. 2008* 39.

[24] *Bél 1764.*

[25] *Bartosiewicz et al. 2008* 47, fig. 10.

[26] *Pfeiffer 1861* 296.

[27] The occupants of Ács, a settlement located 10 km west of Komárom, caught sizeable sturgeons already in the Roman period: *Bartosiewicz 1989.*

[28] At the end of the 15th century, the archbishop of Esztergom ruled over 112 settlements in various counties: *Fügedi 1960.*

[29] *Csánki 1897.* This region, extending west of Esztergom, in part coincides with the Vágköz region, whose villages were famed for their fishing.

[30] *Kubinyi 2002* 249–261.

[31] *Herman 1884.*

[32] *Pénzes – Tölg 1977* 327.

Size range	Base of deposit	14th century	15th century
<100	93.9	75.0 84.5 88.3 89.7 93.9 94.0 95.6 95.7 96.6	
>100	100.9	100.0	100.9 103.4 107.8

Table 3. Body length estimates based on sterlet bones from Esztergom (cm)

The first pectoral fin ray rarely survives in its entirety and thus neither have any ratios been calculated for estimating body length. Of the ten intact pieces, one is very short (48.3 mm), one is fairly long (74.5 mm), while the average length of these bones is 58.7 mm (standard deviation=8.5 mm). This recalls the distribution of the values in *Table 3*, although larger individuals are slightly better represented among the intact fin rays.

Pike

Pike was a highly valued species, often served in the archiepiscopal residence. This fish is popular owing to its dry, white meat. It also has a symbolic value, as show, for example, by its appearance in coats-of-arms. One of the reasons for its popularity is that being a predator, it is active all year round; it does not burrow during the winter and was thus readily available with targeted ice fishing. Pike can be actively fished using hooks and harpoons, resulting in the catch of relatively large, solitary individuals.[33]

Fully developed males have a body length of *ca*. 1 m, while larger females can reach as much as 1.5 m. Sexual dimorphism of this magnitude evolves when the individual are around 8-9 years old. Although pike is a predator, it rarely attacks larger fish and its diet is mainly made up of small fish that are easy prey.[34] Its young feed on the larvae of cyprinids and later on any aquatic creature shorter than their own body, including their own young. One-summer-old pike is barely 20 cm long. The mouth of juveniles is disproportionately large and young pike sometimes prey on their smaller siblings.

When hunting, pike relies strongly on sight and is therefore regarded as an inhabitant of clear waters because good visibility conditions determine its habitat. However, if other fish are abundantly available, it will thrive in less clear waters, too.

At prehistoric sites, pike and small cyprinids tend to complement each other among the caught fishes. This species composition is typical for more-or-less euthrophic – slow flowing, even brackish – waters, whose soft bed is an excellent nutrient-rich soil for the aquatic plants on which its prey feeds.[35] The Bronze Age/Iron Age site of Wennungen (Sachsen-Anhalt, Germany) illustrates the leading role of these two groups of fish in the period's diet. Both smaller and larger

[33] *Kovács et al. 2010* 248.
[34] *Berinkey 1966*.
[35] *Heinrich 2013* 133.

individuals occurred among the pike remains at that site.[36] The bones of small-sized, young pike came to light at the Neolithic site of Ecsegfalva 23B. In view of their small, roughly 15-20 cm size, it seemed possible that they had become mixed up with small cyprinids, whose remains dominated the sample, during weir fishing (e.g. the use of basket traps in potting). The measurable pike bones in the Esztergom assemblage are the remains of 30-40 cm long or smaller fish, suggesting one-summer-old individuals. Only one skull fragment came from a fully-developed individual slightly longer than 80 cm *(Table 4).*

Size range	Base of deposit	14th century	15th century
<30	15.7	17.5 20.6 23.2	20.4 27.9
30–40		31.2 37.2 38.7	37.2
>40		83.3	

Table 4. Body length estimates based on pike bones from Esztergom (cm)

Even the relatively low number of remains reflects the chronological distribution of the bones: three of the seven pikes whose size could be estimated in the largest, 14th-century sample (i.e. in the most representative) were expressly small. This corresponds to the visual classification of the non-measurable pike remains. The very small-sized, young pike remains in the kitchen waste of the archiepiscopal residence in Esztergom account for 41.4% and 42.2% in the 14th and 15th centuries, i.e. there is no statistically significant difference in their presence during these two centuries (X^2=0.020, P=0.924, df =1). It seems likely that they reached the kitchen of the archiepiscopal residence together with the carp that had been caught en masse with nets.

It is instructive to compare the phenomenon noted in the screened bone assemblage with the 1489 kitchen account book of Hyppolite d'Este. Pike was considered to be a healthy food in medieval Europe – including the court of King Matthias – and its liver was regarded a royal delicacy,[37] Krisztina Orosz found that the archiepiscopal kitchen managed to acquire the fish fairly cheaply. While six carps were bought for 70 *denarii*, twelve pikes were purchased for 29 *denarii*.[38] In this case, carp was almost five times as expensive as pike (11.6:2.4=4.8). While two "large" carps are mentioned in another entry in the account book, there is no reference to the size of the pikes. The reason for their low price may well have been their small size. While it would not be prudent to draw far-reaching conclusions regarding the Danubian or fish pond origin, the collation of the osteological record and the documentary evidence nevertheless illustrates how the findings of different disciplines can be fruitfully integrated in the study of medieval life.

Cyprinids

Both assemblages from secure stratigraphic contexts from Esztergom are dominated by cyprinids, whose relative frequencies increased over time. Common carp, the largest species of this family in Hungary, can be often identified merely from the size of its remains:[39] the length of a fully developed carp, usually around 1 m, exceeds by far that of the other cyprinids (bream, Crucian carp,

[36] *Heinrich 2013* 129.
[37] *Csánki 1897.*
[38] Kisztina Orosz's kind personal communication.
[39] *Bartosiewicz et al. 1994a*.

tench, etc.) thriving in Hungary.[40] However, the species in this family can only be distinguished from one another based on diagnostic skeletal elements, principally the pharyngeal teeth needed for the processing of the large amounts of aquatic plants.[41] Aside from these, they can be securely identified from a few characteristic skull bones (such as parts of the mandible and the articular surface region of the gill cover), while the other non-diagnostic bones of young carp can only be identified on the family level and are inevitably assigned to the general group of small cyprinids.

Owing to its relatively large-sized bones, the continuous presence of wild carp[42] can be demonstrated in all Hungarian hand-collected assemblages. This species was an important source of food along the Hungarian sections of the Danube and Tisza rivers already in prehistoric times[43] and its continuous consumption is indicated by Roman-period remains from Austria.[44]

Native to the middle reaches of the Danube, carp spread beyond the Danube/Rhine watershed in the 11th–12th centuries, probably through the transport of live individuals to prominent secular and ecclesiastic centres.[45] Carp was part of the local wild fauna in France by the 1280s and in Poland by around 1530.[46] Yet, for example, assemblages rich in fish from the Cistercian monasteries of Łekno (1153–14th century) and Bierzwnik (13th–14th centuries) in central Poland contained no carp remains.[47] Farther north, in Sweden and in Finland, there are references to ecclesiastic and, later, to manorial and urban fish ponds from the 13th century onward.[48] However, these ponds were established for breeding Crucian carp and tench, and occasionally sterlet. Attempts were made in the mid-16th century to introduce common carp, but these were ultimately doomed to failure owing to the cold climate.[49] In our region, roughly two-thirds of the fish remains from Gaiselberg Castle in Lower Austria come from carp, most of which were recovered from post-1400 layers.[50]

The appearance and body proportions of the different carp species kept in isolated fish ponds changed, similarly as those of terrestrial species in the wake of domestication. However, it has proven impossible to convincingly identify the osteological traits of the domestic varieties. In Central Europe, a distinction was drawn by the early modern period between pond carp and Tisza carp *(Theißkarpfen)*,[51] and the written sources also mention mirror carp with its modified scales of much fewer, but enormous "fish coins" and leather carp lacking scales *(fig. 3)*. Although it is impossible to determine the role played by domestic carp gone feral and returning to natural waters from the fish ponds in the spread of these carp types, it was established by the 19th century that mirror carp was not a natural hybrid of wild carp and tench.[52]

Assuming that the length of the hyomandibular bone, on which the morphological differences between the different cyprinid species can be clearly identified, represents about 10% of the total body length of a fully developed carp, the estimated body sizes suggest the presence of not too large, but mostly full-grown specimens in the Esztergom assemblage (the full length of developed individuals is 40-80 cm). The length of the single smaller specimen is more or less identical with that of bream, also included in *Table 5*.

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40 *Bartosiewicz et al. 1994b.*
41 *Berinkey 1966.*
42 *Balon 1995.*
43 *Bartosiewicz – Bonsall 2004; Bartosiewicz 2013b.*
44 *Galik et al. 2015* 346.
45 *Hoffmann 1996* 662.
46 *Hoffmann 1999* 191.
47 *Wyrwa – Makowiecki 2009* 65.
48 *Bonow – Svanberg 2016* 95.
49 *Granlund 1876.*
50 *Spitzenberger 1983* 139.
51 *Schmelzl 1547.*
52 *Beiträge 1833* 334.

Size range	14th century	15th century
<30		23.7* 25.2
30–40	36.7	30.7
>40	43.2 47.1 51.2	41.7 43.2

Table 5. Body length estimates based on carp bones from Esztergom (cm, *bream)

In this small series, the consumption of fish pond carp is indirectly suggested by the body lengths around 40 cm, which correspond to carp sizes at the time of harvest.[53] A similar size range is also attested among the non-measurable carp bones, which did not include the remains of exceptionally large specimens, while the smaller ones were assigned to the small cyprinids, which could not be identified more closely. Obviously, the few length estimates are unsuitable for statistically proving the source of these fish, although the law of large numbers would nevertheless suggest that the handful of measurable bones represent the size category of carp reared in fish ponds.

The other securely identifiable cyprinid species are the popular varieties still farmed today that have body lengths of 20-60 cm when fully grown. The individuals in the Esztergom assemblage represent the lower third of this size range. These species of the Esztergom assemblage are suitable for characterizing the freshwater environment and the fishing season. In the case of fishes caught in the Danube, the reason is that individuals venturing closer to the shore during the spawning season were more likely to be caught. Each species prefers a particular water temperature and dissolved oxygen content during spawning.[54] These two factors are closely interrelated with the flow velocity:

Fig. 3. Image of mirror carp from the book of *Marsigli 1726*,
written on the expedition he led along the Danube in the Ottoman Empire

[53] *Galik et al. 2015* 347.
[54] *Berinkey 1966*.

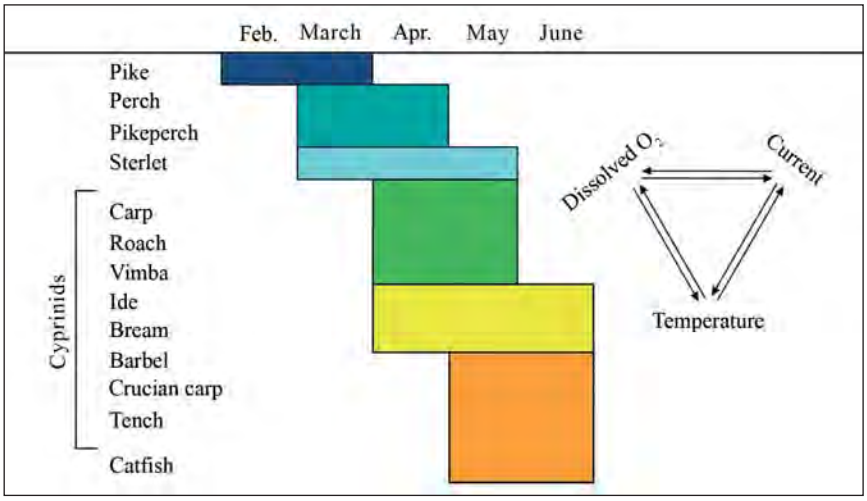

Fig. 4. Spawning seasons (months) of the species identified in the Esztergom find material. The interdependence between environmental factors determining spawning is shown to the right: dissolved oxygen, current and water temperature

swiftly-flowing, cooler water has a relatively higher dissolved oxygen content. Of the identified cyprinids, common carp and particularly tench have an expressly low oxygen demand (0.7 mg/l).[55]

An awareness of the spawning season of different species, the dominance of certain species in the archaeological assemblage provides indirect evidence for the most probable season of fishing *(fig. 4)*, which offers important insights into the intermittently or seasonally occupied prehistoric settlements.[56] According to the spawning calendar shown here, the species identified in the kitchen waste accumulated in the abandoned pits of the quarry represent the entire spring season.[57] One interesting relevant piece of information in Hyppolite d'Este's kitchen account-book from 1489 is that the consumption of Crucian carp increased during April – no doubt in relation to the onset of the spawning season – as indicated by their purchase by the basketful.[58]

Percidae

Perch and pikeperch remains are scarce in the Esztergom material. As shown by the sequence of spawning seasons in *fig. 4*, both species prefer not too fast-flowing river sections with abundant water and still water rich in dissolved oxygen (2.0–3.0 mg/l),[59] avoiding stagnant habitats covered with loose sediment. Similarly to pike, their predatory nature requires good visibility, which is why they thrive in clear water. In the light of the above, it seems likely that the specimens in the Esztergom

Fig. 5. Fragmented mandibular element *(dentale)* of a fully grown pikeperch showing the typical "fanged" dentition

[55] *Pénzes – Tölg 1977* 327.

[56] *Pike-Tay et al. 2004; Bartosiewicz et al. 1994b.*

[57] Sturgeon does not appear here, because even though its spawning occurred in late spring/summer, its spawning grounds were not located along the Hungarian Danube section.

[58] Krisztina Orosz's kind personal communication.

[59] *Pénzes – Tölg 1977* 327.

assemblage originate from the Danube. Fully developed Percidae are generally 50–60 cm long, rarely attaining a length of 1 m. Pikeperch exceeding 1.5 kg are known as *fogassüllő* ("fanged" pikeperch) in Hungarian after their canine-like teeth *(fig. 5).* Perch is smaller, no more than 50 cm long at the most.

Wels catfish

Catfish is less sensitive to aquatic conditions, being a predator with few environmental demands.[60] Called "peasant-gobbler" in folk parlance, this large predator[61] can grow up to 2.5 m long and attain a live weight of 120 kg.[62] The 13th thoractic vertebra of catfish found in the 3rd-century Roman military fort of Izsa (Iža) in Slovakia, lying some 40 km west of Esztergom, had a horizontal diameter of no less than 42.2 mm, based on which the estimated total body length was over 2.5 m, meaning the individual weighed around 100 kg. This estimated weight would make it the fourth largest trophy catfish in Slovakia[63] However, similarly to pike, this species – often dominating hand-collected assemblages – is represented by small, young specimens in the Esztergom material. The total body lengths calculated from two intact cleithrums were 34.1 and 39.9 cm, respectively, and the non-measurable bone fragments also suggest similar-sized specimens. Catfish this size, strongly resembling carp of the same size, probably became mixed up accidentally with the netted cyprinids.

Anatomical composition of the finds and their distribution according to body regions

Compared to mammals, fish have a strongly differentiated skeleton with many elements. The skull is made up of the smaller neurocranium and the considerably larger viscerocranium or branchiocranium. These incorporate some 130 bones since the complex system of the protective covering for the gills are part of the viscerocranium. Pure meat can only be found in the region of the gill cover *(operculum)* in the case of most fish, but even in fully-developed carp, the meat is no more than a spoonful.

The zonoskeleton is the strong suspension system of the paired pectoral fins, linked to the bones of the skull, among which the paired cleithrum lies on the boundary of the head and the body. Cut-marks attesting to the separation of these two regions can occasionally be noted on these bones (regrettably, no such cuts were present on the fish remains from Esztergom). The pelvic girdle is represented by a single symmetrical bone *(basipterygium).*

The number of vertebrae varies even within species. The ribs attach to the ventral section of the vertebrae. The lower haemapophysis, typical for caudal vertebrae, is located on the ventral section, where no ribs are attached to the vertebrae towards the tail.

While the number of fin rays in live fish is an important taxonomic trait, their exact determination in archaeological assemblages is generally a hopeless task. However, irrespective of the great morphological similarities between fin rays, their presence is an indication that the fins of little culinary value had usually been removed during the preparation of fish dishes. The aggregation of the abundant identifiable skeletal elements in the Esztergom assemblage according to body regions provides a statistically testable sample. The chronological distribution is shown in *Table 6*.

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60 *Berinkey 1966;* Its late spawning period coincides, among others, with that of well-adapting tench.

61 *Gozmány 1979* 957.

62 *Pintér 1989* 135.

63 *Hensel 2004* 201; Neither is it mere chance that the neighbouring village 5 km to the west is still called Harcsás (Harčáš) ["catfish-full"].

Body region		14th century		15th century		Difference
		n	%	n	%	%
Head	neurocranium	31	4.5	11	3.0	-1.5
	viscerocranium	231	33.4	111	30.6	-2.8
Trunk	shoulder girdle	70	10.1	38	10.5	**+0.4**
	spine vertebrae	254	36.8	143	39.4	**+2.6**
	fin rays	88	12.7	54	14.9	**+2.2**
	scutes (acipenserids)	17	2.5	6	1.7	-0.8
Total		**691**	**100.0**	**363**	**100.0**	

Table 6. Breakdown of the fish remains from Esztergom according to body region

The body region distribution presented in *Table 6* reveals a slightly growing proportion of the bones of the trunk over time. However, this slight increase is insufficient for proving a statistically significant difference between the assemblages representing the two centuries, meaning that it could be accidental (X^2=3.848, df=5, P=0.572).

Of the most frequent species identified in the Esztergom material, the number of pike vertebrae total 61-64 per individual,[64] about two-thirds of which represented the meat-rich dorsal section, the rest belonged to the caudal region. Carp has fewer vertebrae, about 36-37 in all,[65] and the ratio of dorsal vertebrae is smaller, roughly equalling the number of caudal vertebrae in each individual. A comparison of the number of vertebrae from the two main sections of the vertebral column in the two most frequent fish species *(Table 7)* immediately reveals that the aggregate number of vertebrae from small-sized cyprinids corresponds to only the number in a single (!) individual, a major caveat regarding the quantitative assessment of the number of vertebrae, which cannot be statistically checked. In the 15th century, the meatier regions of pike seem to dominate among the finds from the archiepiscopal kitchen, while in the case of carp, this holds true for both centuries. The aggregate ratios shown in brackets in *Table 7* were strongly influenced by the dominant cyprinids.

	Dorsal	Caudal	Dorsal/Caudal ratio	Natural ratio
	vertebrae, n			
14th century				
Pike	17	9	1.9	≈2
Carp	8	3	2.7	≈1
Small-sized cyprinids	31	48	0.6	≈1
Total	**56**	**60**	**(0.9)**	
15th century				
Pike	11	2	5.5	≈2
Carp	12	9	1.3	≈1
Small-sized cyprinids	14	16	0.9	≈1
Total	**37**	**27**	**(1.3)**	

Table 7. Proportion of identifiable cyprinid and pike vertebrae from Esztergom

[64] *Kiss 2000.*
[65] *Kiss 2000.*

Fig. 6. Hacking mark inflicted by a cleaver/axe on the proximal articular end of a pectoral fin ray from great sturgeon found in the bottom layer

Acipenserids occupy a special position owing to their taxonomic status and anatomical structure. The so-called dressing percentage of fully-developed sturgeons, the proportion of meaty regions without the head and offal compared to the entire body weight, can be as much as 70% of the live weight.[66] Regrettably, the majority of surviving skeletal elements come from the head region; in the lack of vertebrae, not even an educated guess can be hazarded regarding the total weight of the meat on the trunk of a sturgeon.

There is a single exception to the not too easily identifiable fin rays of the other fish species discussed here: the first pectoral fin rays of acipenserids *(fig. 2a–c)*. Their compactness ensures their preservation, enabling an archaeological assessment. While no cut-marks could be identified on the bones of other species in the Esztergom material, the proximal end of a fin ray chopped off with a cleaver was recovered from the base of the deposit *(fig. 6)*. This confirms the taphonomic observation that heavy butchering tools and vehement blows were applied to the most resistant part of the animal body and therefore any cut- and chop-marks will most likely survive on such well-preserved, robust bones.[67] Less heavy cut-marks performed with a knife could be noted on a sturgeon mandible from the Roman fort excavated at Ács-Vaspuszta.[68]

This find from Esztergom appears to reflect the primary butchery preceding its processing in the kitchen and thus possibly comes from a fresh, not a salted sturgeon. Primary butchery was generally performed near the catch site by chopping the animals into chunks that could be packaged and transported,[69] leaving behind the entrails and other parts deemed unfit for consumption. It would appear that primary butchery was undertaken in the palace kitchen during the earlier period. The chop-mark reflecting primary butchery recalls King Sigismund's edict of 1405, according to which the Buda butchers could sell portions of large fish on their meat stalls and tables.[70] Similarly to livestock, the butchery of large specimens called for ample space, expertise and a set of sturdy implements.

Discussion

With the exception of large acipenserids, which by the late 20th century had disappeared from the Danube and had also adapted to salty seawater, the fishes consumed in the medieval archiepiscopal residence have all inhabited the Esztergom river section from prehistoric times to the present. At the same time, fish farming and fish ponds played an undeniably prominent role in medieval fish consumption, but since the same species were reared in them, it is zoologically virtually impossible to determine the closer origins of the fish remains.[71] The role of trade has

[66] *Bartosiewicz – Bonsall 2008* 72, fig. 2.
[67] *Bartosiewicz 2006* 79.
[68] *Bartosiewicz 1989* 621.
[69] *Bartosiewicz – Bonsall 2008* 42, fig. 8.
[70] *Kenyeres et al. 2008*.
[71] In medieval England, when fish farms suddenly provided freshwater fish to elite diets, their remains could be taxonomically easily distinguished from the bones of the traditionally consumed marine fish regarded as a mass commodity, *Grant 1988*.

been considered in the case of sturgeon because the scarce occurrence of large acipenserids can be taken as the most convincing evidence of active Danube fishing.

Riverine fishing

On the testimony of the currently known archaeozoological assemblages, the meat of large-bodied aciepenserids, principally of great sturgeons, which also figured prominently in the cuisine of the archiepiscopal palace of Esztergom, was most typical of elite sites in the medieval period.[72] The bones of large acipenserids have been identified among the finds from ten major secular and ecclesiastic medieval centres (including both the Árpádian period and the late medieval period). Among the ecclesiastic centres, sturgeon bones were identified in assemblages from the Dominican monastery in Buda Castle, the convent of the Poor Clares in Óbuda and the Cistercian abbeys of Zirc and Pilisszentkereszt. The finds from the archiepiscopal residence of Esztergom fit in nicely with these finds. One noteworthy phenomenon is that all the sturgeon finds from the known ecclesiastic centres date from the 14th–15th centuries; the sturgeon finds from secular settlements have a broader chronological distribution, although this could be a result of the differential intensity of the investigation of these sites *(fig. 7)*.

The currently known medieval sturgeon finds occur most frequently at sites along the Danube section between Esztergom and Buda.[73] Only Zirc in Veszprém county, Sárszentlőrinc in county Tolna county, Szendrő Castle in the mountains of Borsod-Abaúj-Zemplén county and Romlott Castle in Zala county[74] lie far from this region. However, this does not merely reflect the exceptional abundance of fish in the Danube Bend, but also the concentration of investigated archaeological sites: the locations where record-size sturgeons were caught during the modern period have a considerably more even distribution along the middle section of the Danube crossing present-day Hungary.[75]

Sturgeon fishing in medieval Esztergom is amply documented in the sources. Sometime around 1411–1412, the bishop of Passau was entertained by János Kanizsai, Archbishop of Esztergom, and he visited a sturgeon catching location where the fishermen caught ten specimens within barely one and a half hours.[76] However, we do not know how far this place actually lay from Esztergom. According to studies on the economy of the Esztergom archiepiscopate, Gutha (Kolárovo), Nandor (Lándor) and Nazvad (Nesvady) in modern Slovakia were well-known locations of sturgeon fishing. These villages lay not near Esztergom itself, but some 60 km to its north, along the River Vág in present-day Slovakia.[77] The significance of the Danube section flowing through the Little Hungarian Plain through successive centuries is amply reflected by the dispute in 1206 between the settlements along the Vág regarding sturgeon fishing and the use of fish ponds.[78] According to the documents of the butchers' guild of Buda, sturgeon and other acipenserids were transported to the capital by the fishermen of Esztergom, Nagymaros, Megyer and Óbuda from the west and from Szentlászló lying on the river's opposite bank.[79]

The basic hydrological traits of the Danube in the broader area of Esztergom, a town founded at where the plain and the mountains meet, have changed relatively little since the maps of the First Military Ordnance Survey were made (1764–1784) *(fig. 8)*. Given the topographic conditions, the

[72] One indication of the prerogative to sturgeon fishing is that in 1432, the two sturgeons caught on the Palkonya estate of the Eger chapter was forcefully confiscated from the serfs: *Tóth – Kubinyi 1996* 279.
[73] *Bartosiewicz – Bonsall 2008* 38–39.
[74] *Tugya 2017* 188.
[75] *Khin 1957.*
[76] *Zolnay 1977* 96–121.
[77] *Nyáry 1870* 362.
[78] *Novák 2005* 48.
[79] *Kenyeres et al.* 2008.

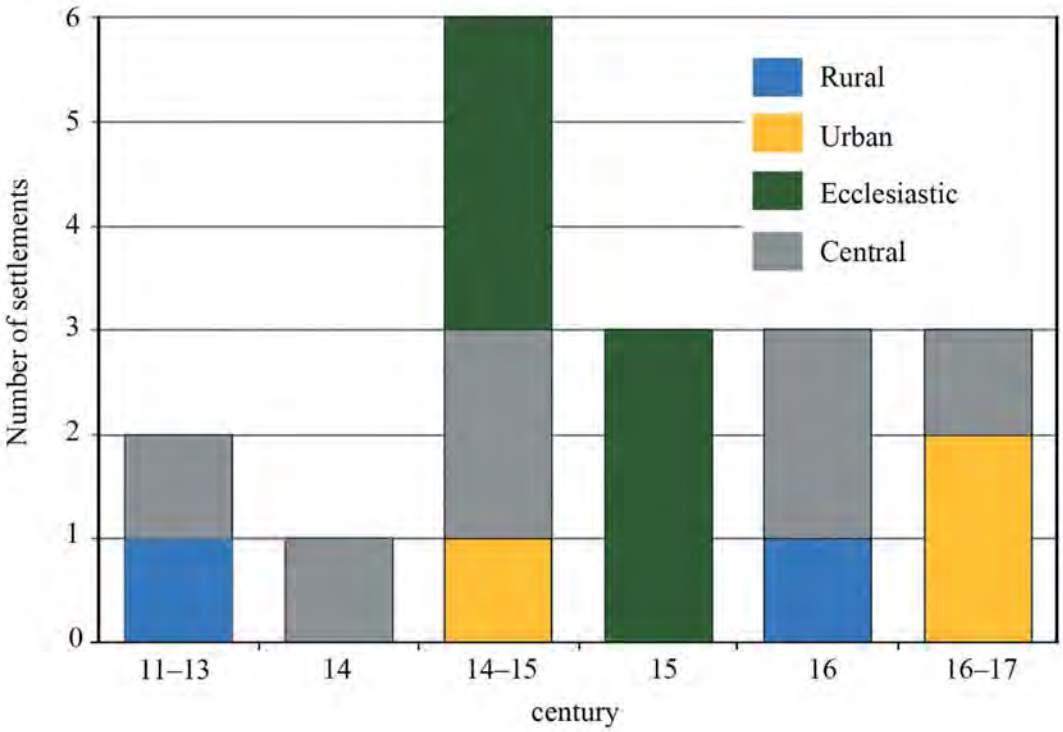

Fig. 7. The diachronic distribution of great sturgeon remains by settlement type found at medieval sites in present-day Hungary

single area suitable for sturgeon fishing near Esztergom Castle was the relatively wide and slower-flowing river section incorporating Prímás Sziget to its south. The velocity of current increases gradually in the narrowing river bed toward the north among the mountains where the river turns into the Danube Bend gorge, decreasing the chances of a good catch. One of the illustrations to the Italian military engineer Luigi Fernando Marsigli's book published in Amsterdam in 1726 shows how sturgeons swimming upstream were caught by constructing weirs on the sandbars at the "base" of the Iron Gates gorge towards the Lower Danube. However, hydrologically that environment has more in common with Leányfalu than with Esztergom, the latter being located upstream in relation to the Danube Bend gorge.[80]

Aside from large-bodied sturgeon, the overwhelming majority of the fish species from Esztergom are eurytopic species, meaning that they can thrive in various freshwater environments, amidst relatively broad water quality boundaries. There are only a few interesting exceptions: in addition to percidae, barbel and vimba bream are rheophilic species, preferring faster-flowing water. These two small-sized cyprinids have more recently also be found in two streams of the Visegrád Mountains.[81] The crayfish remains in the Esztergom material also indicate the exploitation of habitats with smaller watercourses since this species is extremely sensitive to water quality.

[80] *Bartosiewicz – Bonsall 2004* 267, fig. 8. On Marsigli's drawing, the direction of the Danube's outward flow is indicated with an arrow.

[81] *Weiperth et al. 2015* 52.

Fig. 8. The Danube near Esztergom in the map of the First Military Ordnance Survey (1764–1784). Note the northward turn of the river as it enters the Danube Bend gorge downstream. The arrow marked É indicates north

Fish farming

The advantage of fish ponds was that they provided a more-or-less even supply and functioned as "living meat reserves"[82] to complement riverine fishing. Undoubtedly, the fish species listed in *Table 1* were all available from the Danube. However, despite the undeniably favourable location of Esztergom in terms of fishing, the success of the catch was strongly influenced by the unpredictable changes in the water regime, which depended on the season and weather.[83]

The most striking insight provided by the bone material of the archiepiscopal residence is the statistically significant increase of cyprinids during the 14th–15th centuries. There is no indication of a radical climate change: although the period in question came after the medieval climate optimum, there was no extreme cooling in Hungary during these two centuries; the annual mean temperature was roughly the same. This raises the issue of what was the reason for this immense change in consumption, given the river's more or less stable fish fauna.

The medieval upswing in fish farming led to a series of innovations across Europe. There is evidence for the intentional modification of fish habitats such as the construction of fish ponds by damming streams from the 11th century onward.[84] In France, various local procedures for keeping and breeding carp, pike and other fish for fast-days are documented as early as the 12th century. Fish ponds could be found across the major part of Europe by the 13th century.[85]

In natural waters, the best season for fishing was spring and summer, and thus the demand for fish for the forty days of fasting before Easter and the June fast associated with the Feast of

[82] This shrewd remark, originally referring to early domestic mammals *(Bökönyi 1989)*, is valid for the fish raised in the fish farms too.

[83] *Figler et al. 1997.*

[84] *Hoffmann 2000.*

[85] *Hoffmann 2002.*

St. Peter and St. Paul could be easily met. In contrast, catering to the unceasing demand for the winter fast days from natural waters must have run into considerable difficulties.[86]

Fish farming emerged gradually from the fish ponds designed to store fish caught in the wild for fast days. Even though written records for the creation of ecclesiastic fish ponds are by far the most informative, the ponds themselves probably played many different roles in medieval food production, depending on the different geographic properties (topography, extent of forestation, proportion of water-covered areas and their seasonal changes) and their social role (rural and monastic fish farming, royal fisheries). A systematic coverage of the information on riverine fishing and aquafarming in the written sources will no doubt contribute to illuminating several issues in connection with fish consumption in Esztergom.

The practice of constructing fish ponds arrived to Hungary from the west. The Cistercian monastery founded in Waldsassen in 1133 *(Sacer Ordo Cisterciensis)* in the German-Czech border region established the Egerland fish pond around 1220.[87] The first installation of this type in Bohemia dates from 1263, and we know of a further 87 ponds during the period between 1347 and 1418, corresponding roughly to the period spanned by the fish remains from the archiepiscopal residence of Esztergom. Water management between 1450 and 1550 led to the transformation of the Czech landscape: large rivers were diverted and extensive ponds were created.[88] These fish ponds eventually played a role in supplying the Vienna fish market, too.[89] Although this process began roughly a generation later in southern Poland,[90] a manual on the creation and management of fish ponds written by Janus Dubravius, bishop of Olomouc, dedicated to the Fugger and Thurzó families was published in Wrocław.[91]

There were an estimated three to four thousands fish farms during the 11th–13th century in Hungary.[92] The archaeological remains of medieval weirs and dams indicate that fish ponds were established in the Búbánat Valley lying at the entrance to the Danube Bend gorge after the 13th century.[93] The springs flowing across the waterlogged valley floor could be easily dammed to create ponds. The management of these fish ponds can in all likelihood be linked to the Ákospalota residence established in the Árpádian period, which was rebuilt in the 16th century and enlarged with a game park (*MRT 5* site no. 8/115–116), and came into the possession of the archiepiscopate in the late 14th century.[94]

Medieval fish ponds were probably harvested opportunistically, according to the momentary demand for fish; however, with the technological advances in aquafarming, fish began to be separated according to age cohorts: spawning ponds for the females, ponds for rearing the fry, and fattening ponds for the market. Aside from carp, ponds were also stocked with other species in order to eliminate the competitors for carp, the less valuable smaller fish. Thus, by the 14th century, pike became an important by-product in developed aquafarming. Moreover, the high number of fry produced by carp with which the ponds were annually restocked would have led to overpopulation; the stock of carp fry was reduced by also stocking relatively young pike, in

[86] *Wyrwa – Makowiecki 2009* 67.
[87] *Muggenthaler 1924* 129–131.
[88] *Andreska 1984.*
[89] *Wacha 1956.*
[90] *Szczygielski 1967.*
[91] *Dubravius 1547.*
[92] *Pesty 1867* 68. Although this estimate might seem an exaggeration at first sight, we know that there were as many as 25,000 fish farms in Bohemia by the late medieval period in the wake of the upswing in fish farming: *Hoffmann 1999* 191.
[93] Csilla Zatykó's kind personal communication.
[94] *MRT 5* 219–221.

a sense a mirror of the natural balance of the fish fauna in natural waters.[95]

Less frequently, ponds were stocked with pikeperch and catfish whose meat was highly valued. In 1495, when the Bishop of Eger entertained the king, six thousand carp, sterlet, burbot, catfish and trout were served. Only pike, the abundantly represented species in archaeozoological assemblages is missing from this list, while sterlet and catfish are present.[96] The small individuals of the latter species in the Esztergom material are noteworthy in relation to aquafarming because fully developed, voracious catfish would have wreaked havoc in the valuable carp stock of an artificial pond.

Fig. 9. Pathologically fused caudal vertebrae of a small cyprinid from the 14th century assemblage

The screened material from Esztergom also offers other interesting cases. The two fused caudal vertebrae of a small cyprinid *(fig. 9)* is an unusual find. While the most obvious explanation for a fusion of this type is the old age of the fish, this cannot be conclusively established in this case: it remains uncertain whether these bones come from a very old bream or a young carp with a developmental disorder. Aside from old age and inherited traits, this anomaly can be a sign of phosphorus deficiency or the consequence of a parasitic infection (such as whirling disease, *Myxobolus cerebralis*, in the case of farmed salmonids).[97] Remains with pathological alterations are statistically more likely to crop up among screened finds. A similar fusion of vertebrae has so far been noted among Atlantic cod remains, identified by the thousands, although in no more than three cases.[98] One may reasonably ask whether these vertebrae, spectacularly recovered through careful screening, a technique rarely employed in Hungary, possibly represent a "domestic" fish influenced by aquafarming among the 711 identified cyprinids bones. Although there is nothing to support this assumption, the tendency is noteworthy, given the law of large numbers.

The culinary aspects of the fish remains from the archiepiscopal residence

One standard practice in Hungarian archaeozoological studies is the assessment of the animal remains directly indicating meat consumption in the context of their reconstructable social setting.[99] Rural villages and larger settlements reflecting urbanisation can be relatively easily identified. The high-status royal, ecclesiastic and military administrative centres assigned to the third settlement type represent a much more heterogeneous group, which has received greater attention in historical and archaeological studies. Here, I shall statistically compare the archaeozoological findings with a single written source only.

[95] *Bourquelot 1863* 71.
[96] *Bartosiewicz 2008* 105.
[97] *Kivikero 2018* 285.
[98] *Harland – Van Neer 2018* 266; *Kivikero 2018* 282.
[99] *Bartosiewicz 1999.*

Anna Bornemisza's cook-book[100] is the best-known collection of recipes written in Hungarian from the Early Modern Age, a somewhat revised version of the original work written for the prince-elector of Mainz in 1581[101] and translated into Hungarian from German by János Keszei. The recipes in this cook-book are a reliable reflection of how food was seen to be an important element of social display as well as of the tastes of the Central European sovereigns.[102] The 39 fish species appearing in the book account for about one-third of all animals. The abundant variety, in which marine fish species were also included, although contradicting somewhat the strict fasts imposed by the Church, was no doubt meant to enliven the austere diet of the long fast periods as would befit a royal table.[103] It should be noted here that similarly to Transylvania and Esztergom, the royal court in Mainz lay at quite some distance (450 km) from the sea.[104]

In part owing to the recipes calling for marine fish, no more than one-half of the fish species mentioned in Anna Bornemisza's cook-book were identified in the Esztergom assemblage. It is nevertheless striking that the proportion of recipes for freshwater fish relative to each other more-or-less corresponds to the percentage frequencies of the fish remains from Esztergom *(fig. 10).* Regrettably, the erratic data of the species less represented in the cook-book and the find assemblage (but over-represented in the recipes compared to the find material) detract from the statistical significance of total similarity. If the estimates are restricted to the dominant portion of "common" farmed fishes (sterlet, carp and small cyprinids: 93 recipes and 773 remains), there is no statistically significant difference between the taxonomic composition of the written source and the kitchen waste. Disregarding sturgeon, a luxury delicacy, the dishes prepared in the kitchen of the archiepiscopal residence reflect the consumption of fish species corresponding to the ratios outlined by the cook-book's recipes that could be acquired from fish ponds and were regarded as quotidian in Central Europe. Carp and pike were consumed in abundance, as reflected also in the account books. In April 1489, when King Matthias and the Bavarian prince visited Esztergom, the archiepiscopal court purchased 400 carp and pike each,[105] even though the archiepiscopate had its own fish ponds, an indication both of the outstanding fish consumption on an auspicious occasion and a confirmation of the regular role of carp and pike in the daily diet, reflected in the bone material.

Neither should the diachronic increase of small cyprinids in the diet of the archiepiscopal residence be belittled. Aside from cyprinids, the remains of other small-bodied fish (European bullhead, weatherfish, river lamprey) have not yet been identified at Hungarian archaeological sites.[106] However, the sieved assemblages from several sites in Germany and Switzerland clearly demonstrate that the population of medieval Europe had a definite taste for these small-bodied species and for similar-sized young farmed fish, which were both consumed in great quantities,[107] for they also appear among the period's recipes.[108] In terms of food preparation techniques, the small-sized pikes represent exactly the same size range.

The body part composition of the Esztergom assemblage also has some insights to offer. *Tables 3–4* reveal that the material from both centuries contained a relatively high number of skull remains, even allowing for the fact that one individual can have over a hundred cranial

[100] *Lakó 1983.*
[101] *Rumpolt 1581.*
[102] Recipes for virtually all imaginable creatures were included: *Herman 1884.*
[103] *Jaritz 1987.*
[104] The meat of freshwater fish from the fish ponds represented a higher level of luxury in the medieval cuisine of England, a land abounding in marine fish: *Woolgar 1999* 120.
[105] *Nyáry 1872.*
[106] *Galik et al. 2015.*
[107] E.g., *Heinrich 1995; Brombacher et al. 1998; Nussbaumer – Rehazek 2007.*
[108] *Bartosiewicz 2013a.*

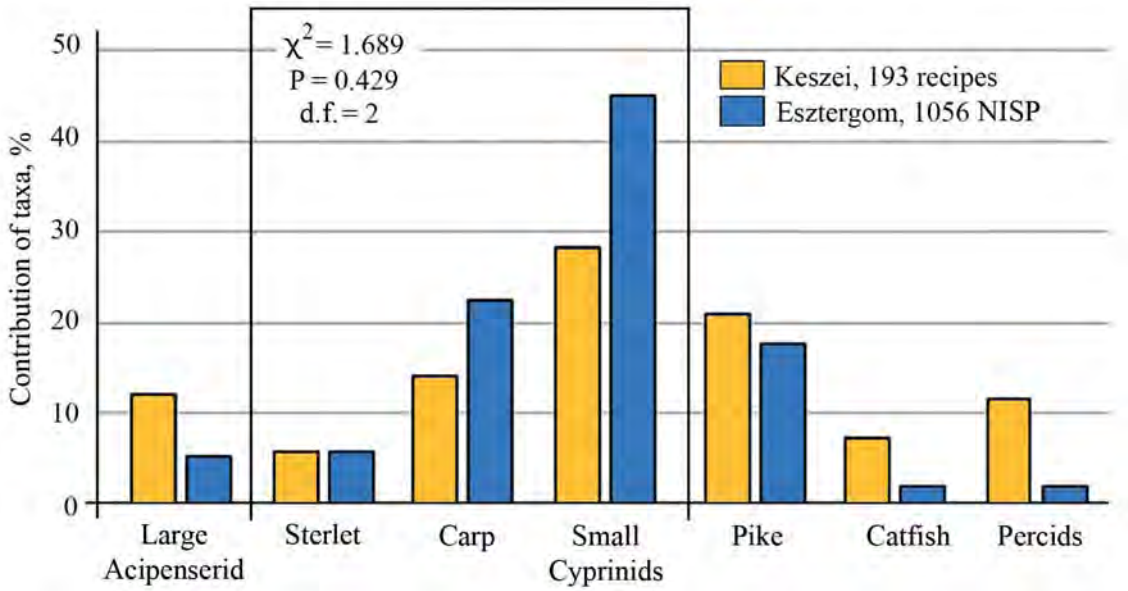

Fig. 10. Similarities between the relative frequencies of fish species mentioned in the 17th-century cookbook of Anna Bornemisza and the 14th–15th-century fish remains from Esztergom. Luxury fish are represented by more recipes than ordinary species. No statistically difference was found between the representation of ordinary species (framed)

bones. Fish heads, poor in meat, are still important, popular ingredients for fish soup and fish sauces, explaining in part the impressive proportion of skull bones in the kitchen waste. At the same time, we have no way of knowing how many fish heads had actually been served and how they had been prepared, e.g. as whole grilled fish. We can also reckon with discarded raw fish heads, whose scattered bones can no longer be distinguished from the remains of prepared dishes.

The skull bones account for about one-third of the assemblage, while the trunk bones, including rib fragments, did not total even one-half of the remains. This raises the question of whether remains of the food served had perhaps been discarded elsewhere, for example into cesspits, explaining their lower number in the kitchen waste accumulating in the pits of the quarry. The porous vertebrae of "royal" sturgeon, occupying a prominent role in the cook-books written for the elite, have not been found in Hungarian archaeozoological assemblages. The consumption of sturgeon rich in meat is at best indicated by finds of the sturdy, ornate ganoid scutes on the head and running along the back and two sides of these species *(fig. 11, E-F)*.

The environmental impact of the kitchen of the archiepiscopal residence

Yet another aspect must be briefly covered regarding the activity of the archiepiscopal kitchen as reflected in the screened archaeozoological material. The organic refuse dumped continuously into the pits of the former quarry, including decaying fish remains, was no doubt the source of foul smells and, in certain months of the year, the hotbed of flies and various other bugs and their larvae. The recovery of insect remains calls for the use of sieves with a finer mesh; however, the contribution of tiny rodent bones identified in the sieved material is consistently over 1% in both centuries (14th century: 1.5%; 15th century: 1.26%). These probably represent murids, mice and rats.[109] Their constant presence corresponds to what we know about kitchen waste deposits. The small fragment of a cat's temporal bone among the 14th-century fish remains can be regarded more as a cranial element representing a commensal creature than typical food refuse.

[109] Cf. Erika Gál's study in this volume.

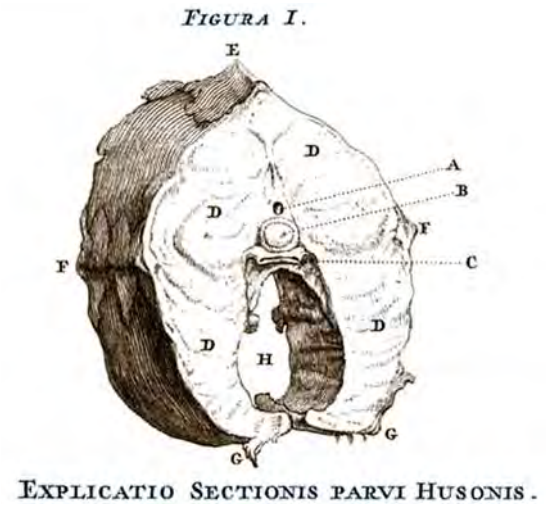

Fig. 11. Meat rich parts shown in the cross section of a great sturgeon after *Marsigli 1726*. The dorsal (E) and lateral (F) dermal scutes are marked

It cannot be mere chance that the enormous amount of refuse was dumped on the castle's southern side, below the level of medieval occupation. The prevailing winds on the Little Hungarian Plain conform to the prevailing north-western wind direction in Hungary, which follow the movement of the body of air flowing through the Dévény/Devín, Slovakia wind gate. Accordingly, the gusts of north-westerly winds swept the foul smells of the kitchen waste from the archiepiscopal palace towards the town and not towards the castle *(fig. 8)*. This spatial organisation corresponds to the location of several medieval tanneries (the Tabán in Buda, Pest, Vác), where the beneficial Danubian winds swept away the greater part of the air pollution from the elite residential quarters.[110]

Conclusion

Fish consumption at the archiepiscopal residence of Esztergom was modest in terms of its quality. The assemblage contains but a few sturgeon bones, a hallmark of luxury, while much-appreciated pike is mostly represented by small-sized specimens. The perhaps most important observation is the significant increase in the consumption of carp and small cyprinids, both "mass products", during the late medieval period examined here, which principally raises thequestion of how these fish were procured.

Palaeoecological and archaeozoological studies have demonstrated dynamic changes along the Austrian and Hungarian sections of the Danube during the medieval period.[111] However, it would be succumbing to environmental determinism not to be aware of the fact that a part of these changes was a consequence of human activity. The analysis of fish remains from the Esztergom residence and documentary sources both indicate that in addition to traditional riverine fishing exploiting the hydrological potentials of the Danubian floodplain, fish procured from fish ponds too may have played a significant role in the consumption of the archiepiscopal kitchen.

During an earlier study of prehistoric fishing in the Danube, it was possible to map the interaction between the main elements of fishing by applying factor analysis to ethnographic data on traditional artisanal fishing recorded in 32 locations around the world.[112] Those results provide an appropriate context for a summary overview of the issues raised in connection with the fish supply at Esztergom *(fig. 12)*. The two axes perpendicular to each other represent two independent concepts. The data points illustrate the proximity of the considered factors in terms of the concepts of "traditional" and "commercial" fishing.[113]

In the case of Esztergom, the variables associated with a positive sign with traditional fishing (x axis) are related to the Danube. The continuous reproduction of the fish stock is crucial in natural

[110] *Bartosiewicz – Bózsa 2009*. Similar principles of orientation can be noted in the case of the rather odoriferous processing of purple dye, i.e. Murex shell in the Mediterranean: *Bartosiewicz 2003*.

[111] *Haidvogl et al. 2015*.

[112] *Bartosiewicz – Bonsall 2004* 270, Table 8.

[113] The percentage values along the two axes indicate that these two concepts roughly account for 20% each regarding the variance represented by the studied phenomenon.

waters, which called for the protection of the stock and the fry. The over-fishing of the natural waters by the late medieval period indicates that this sustainability ethos known from ethnographic examples no longer sufficed. In the case of the Danube, a series of laws promulgated in 1412 forbidding the use of fine-meshed nets in order to spare the young ensuring the replenishment of the stock of valuable large-bodied species on the river's Austrian section are another indication.[114] Overpopulation, a variable with the smallest value in the negative range of the horizontal axis, was hardly a practical problem posed to traditional fishing in the case of rivers.

The best example for commercial river fishing represented by the vertical axis in the case of Esztergom is sturgeon fishing. The construction of weirs and sturgeon fishing in general was an endeavour calling for investment and co-ordinated group labour. In the 16th century, the serfs of several villages were sometimes mobilised to construct weirs from oak logs under the direction of the *magister clausurae*.[115] The closure of the Danube across its entire breadth, even with light structures, which on the testimony of a document dated to 1528 led to litigation between the fishermen of Vác and Buda, must have called for an enormous labour investment.[116] The mass processing of the caught fish (as well as the procurement of salt, if necessary) and their transportation to the markets conforms to the criteria of industrial-like logistics.

Even though sturgeon remains were identified in the kitchen waste, the commercial fishing of sturgeon – unlike in the case of other fishes – is indicated by lack of any references to the purchase of sturgeon in the kitchen account book of 1489,[117] or in any other known source relating to Esztergom. A remark by an Italian scribe (*usoni venduti*, "sold sturgeon") would suggest that the sturgeon finds from the archiepiscopal residence originated from the archbishop's own estates, which according to the account books sold salted surgeon in Guta and Naszvad in the late 15th century.[118]

While in the case of Esztergom there is no evidence for species quotas resembling the practice in marine fishing, there were regulations restricting sturgeon fishing, of which the best examples are the royal and noble prerogatives as well as the spatial limitations as expressed by land tenure conditions. Their role in traditional fishing was much less significant, but nevertheless became dominant by the late medieval period in Hungary.

Technology is more closely associated with commercial-type fisheries than with traditional fishing. Similarly to the construction of weirs, the establishment and maintenance costs of fish ponds, which in turn impacted the market price of fish, also fall into this category.[119] This was the case even if the costs could not always be expressed financially (*corvée* labour, payments in kind, etc.): power and money were the prerequisites to establish fish ponds.

The position of the data point for fish overpopulation indicates that this risk was real in aquafarming, which approximated industrial production. Suffice it here to recall the custom of stocking ponds with pike,[120] which in Esztergom can probably be associated with the strikingly high proportion of small-bodied specimens, often the length of one-summer-old pike, probably caught together with cyprinids.

Compiled on the basis of ethnographic examples, *fig. 12* shows that the imposition of temporal restrictions has been important both in traditional and commercial fishing. A 12th-century

[114] *Uhlirz 1900.*
[115] *Bencsik 1970* 73.
[116] *Bartosiewicz 2008.*
[117] Krisztina Orosz's kind personal communication.
[118] *Nyáry 1870* 368; The illustration to Marsigli's book, published in 1726, depicts how the fishermen of the Iron Gates weigh and dismember sturgeon before packaging them in large barrels, probably preserving them with salt, as was customary: *Bartosiewicz – Bonsall 2008* 42, fig. 8.
[119] *Woolgar 1999* 120.
[120] *Bourquelot 1863* 71.

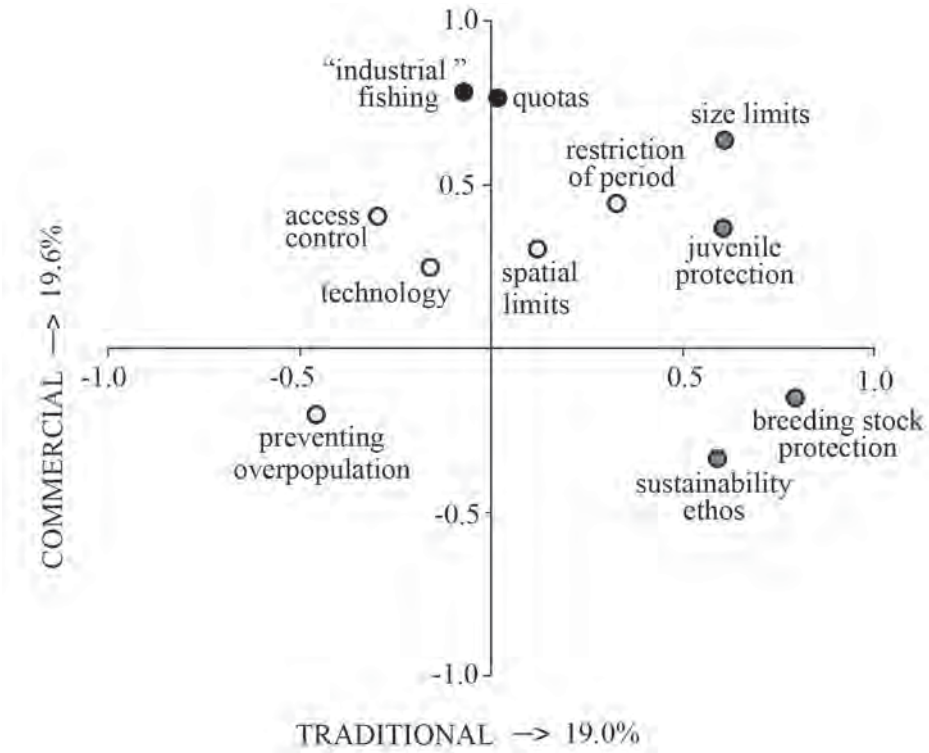

Fig. 12. Relationships between the determining factors in traditional and commercial fishing based on 32 ethnographically documented fisheries world-wide

English decree restricted fishing with nets from boats to Thursdays in Warwickshire, probably with a view to the Friday fast.[121] As indicated by modern fishing regulations, the spawning rush is the most sensitive time in the life of fish stocks on the seasonal scale, even if the easiest catch coincides with this period. This is best illustrated by the regular predation on sturgeon migrating to their spawning grounds, in part to meet the demand for caviar, which eventually contributed to the gradual extinction of this species in the Danube. The sustainability ethos variable has the smallest value on the vertical axis representing commercial fishing.

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[121] *Aston – Bond* 1988 422.

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ERIKA GÁL

ARCHAEOZOOLOGICAL ASSESSMENT OF THE REFUSE DEPOSIT OF THE ARCHIEPISCOPAL RESIDENCE IN ESZTERGOM

Zusammenfassung: Die zwischen 2014 und 2016 am Fundort Esztergom, Várhegy-Kőbánya durchgeführten Ausgrabungsarbeiten förderten eine beträchtliche Anzahl an Tierknochen zutage. Neben der manuellen Einsammlung war es dem Sieben zu verdanken, dass außer Säugetierfunden beispiellos viele Fisch- und Vogelknochen vorkamen, die uns seltene Einblicke in die Lebensmittelbeschaffungs- und Zubereitungsgewohnheiten des klerikalen Zentrums im 14.–15. Jahrhundert ermöglichen. Auch die Überreste gejagter Säugetiere ergaben ungewohnte Ergebnisse. An der Verteilung der Gebeine kann abgelesen werden, dass von den vier identifizierten Arten in der Küche des Erzbischofs lediglich Feldhasen verzehrt wurden, während Rehe, Hirsche und Bären nur in Form terminaler Skelettüberreste im Fundmaterial vertreten waren. Den Großteil der zur Gruppe des Rotwilds gehörenden Fundkomplexe machten Geweihstücke aus, bearbeitet, als Rohstoff oder in Form von Werkstattausschuss. Über die Erörterung der Fleischbeschaffungs- und Zubereitungsmethoden hinaus beinhaltet das Manuskript die typologische Kategorisierung und Beschreibung von Knochen- und Geweihgegenständen.

Keywords: bone and antler tools, animal husbandry, hunting, eating habits, medieval period, clerical centre

The archaeozoological literature on the settlements of the late medieval period (14th to 16th centuries), particularly on high-status sites such as noble and ecclesiastic centres, is for the greater part restricted to the finds from Buda within Hungary. The study of the goods arriving to the royal centre, including livestock and other meat provisions, as well as the human-animal interactions pointing beyond simply what was eaten, have always enjoyed a prominent position on the period's research agendas.[1] The overall picture of regional elite centres is highly varied and detailed assessments are available for animal bone samples from the queenly centre in Segesd, the *castellum* of Őcsény-Oltovány and the manor house of Baj, Öreg-Kovács-hegy.[2] In contrast, no more than species lists are available for the high-status sites of Visegrád, all assemblages featuring representative and remarkable elements, from which little more information can be gleaned than the frequencies of various species and their possible exploitation, while providing virtually no information about meat distribution and food preparation practices. The single exception is the recent study on the bone and antler implements from Visegrád Castle, offering an insight into the period's bone and antler working as well as into the range of mass-produced items for daily use and various unique decorative objects.[3]

One shared trait of the above bone assemblages, irrespective of the depth of their archaeozoological assessment, is that the finds were collected manually (only the assemblage from the lower layers of Well 8 of the Teleki Palace were sieved),[4] as a result of which the smaller finds such as fish, bird and rodent bones are poorly represented and, as a consequence, little is known

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1 *Bökönyi 1958; Bökönyi 1963; Bökönyi 1964; Matolcsi 1977; Matolcsi 1981; Csippán 2004; Daróczi-Szabó 2004.*

2 *Bartosiewicz 1996; Bartosiewicz 2010; Bartosiewicz 2016.*

3 *Bökönyi 1974* 26–28; *Kováts 2005.*

4 *Daróczi-Szabó 2004* 254, fig. 2.

about them. In the light of the above, the recent excavation at the Esztergom, Várhegy-Kőbánya site (Site no. 2246) between 2014 and 2016 does not merely increase the number of the few animal bone assemblages from medieval ecclesiastic centres, but the bone material recovered using advanced field techniques also holds out the promise of new insights.[5]

The layers on the southern slope of the castle hill accumulated underneath the kitchen of the medieval archiepiscopal residence. However, the bone material also contained remains that were not strictly associated with the kitchen premises and with meat processing and the various dishes prepared for the table, and in this sense, the assemblage can be characterised as household refuse. Knowing that the site had been disturbed by modern earth-moving operations and that the earth removed during previous excavations was also deposited on the site, the analysis focused on the material from closed layers. The stratigraphic units could be assigned to two groups (SU 4–8 and SU 18–23, and SU 3 and SU 17, respectively), which on the testimony of the radiocarbon dates were deposited between the late 13th and the 15th centuries. The three measurements (1270–1390 cal AD, 1285–1400 cal AD and 1330–1445 cal AD)[6] fall into the 1330–1390 range *(fig. 1)*, implying that the bones could have accumulated during a shorter period of time. Nevertheless, in the lack of more reliable data, the above dates are regarded as broad indications and it seems more likely that the material is made up of an assemblage that had accumulated earlier, during the 14th century, and one that was deposited later, during the 15th century.

The swift and efficient treatment of animal waste in the immediate vicinity of the archiepiscopal palace was no doubt an important task since the remains that were not adequately covered emitted foul odours and also led to the appearance of scavengers and rodents. At the same time, the buried animal bones were preserved in good condition in the pits of the stone quarry.

As a result of sieving, which complemented the hand-collection of bones, there is an unparalleled abundance of fish and bird bones in addition to mammalian bones in the assemblage,[7] providing a rare insight into the food acquisition and preparation practices of a late medieval ecclesiastic household. The present study focuses on the domestic and wild mammals as well as the fowls, while the fish remains will be discussed by László Bartosiewicz in a separate study. Given that no major differences could be noted either in the species distribution, or in the slaughtering age, or in the utilisation of various species between the 14th- and the 15th-century assemblage, the material will be analysed and discussed together.

Results

Of the 7294 animal bones, 6126 belonged to mammals and birds (cf. *Table 1*). The majority, 69.7%, came from domestic species, while wild mammals and fowl represent less than 6%. Although the bones of domestic mammals outnumber fowl in the overall number of bones, the highest number of finds originates from domestic hen. One possible explanation, aside from the fact that poultry keeping has modest space requirements compared to its many advantages (meat, eggs, feather, guano), is the employed recovery method, as a result of which small-sized bones are also amply represented *(fig. 2)*.

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[5] I am grateful to Dr. Balázs Major, department head and leader of the excavation, for the opportunity to assess the animal bone finds.

[6] The measurements were made of two domestic hen tibiotarsus fragments (Sample D-AMS 020206 from Layer SU and Sample D-AMS 020204 from Layer SU 3) and a sheep or goat tibia fragment (Sample D-AMS 023745 from Layer 10).

[7] Sieving was performed with 5 mm and a 2 mm mesh sieves. Kind personal information from Róbert Lóki and Eszter L. Kis Szabó.

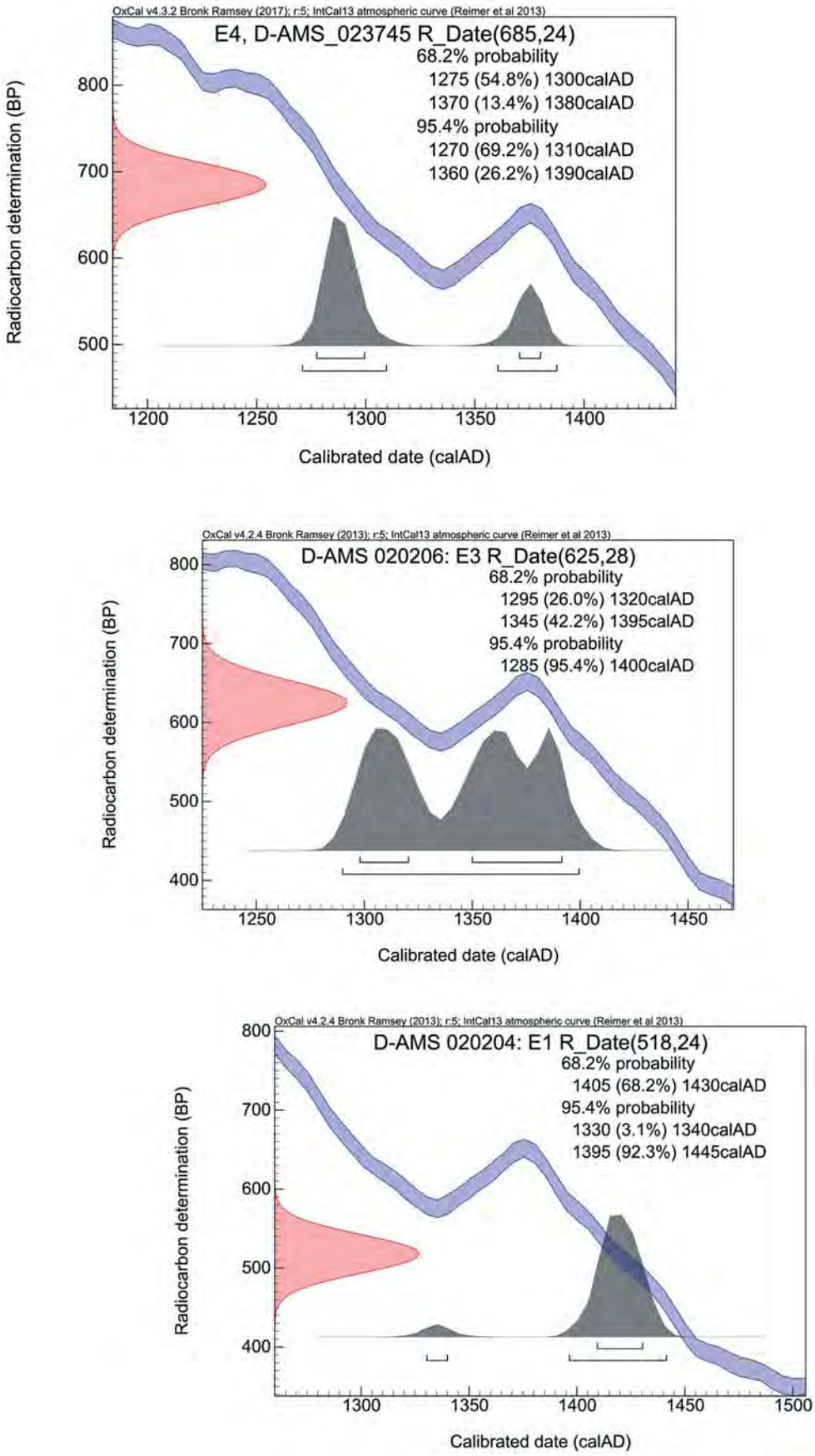

Fig. 1. Results of radiocarbon age determination of the site

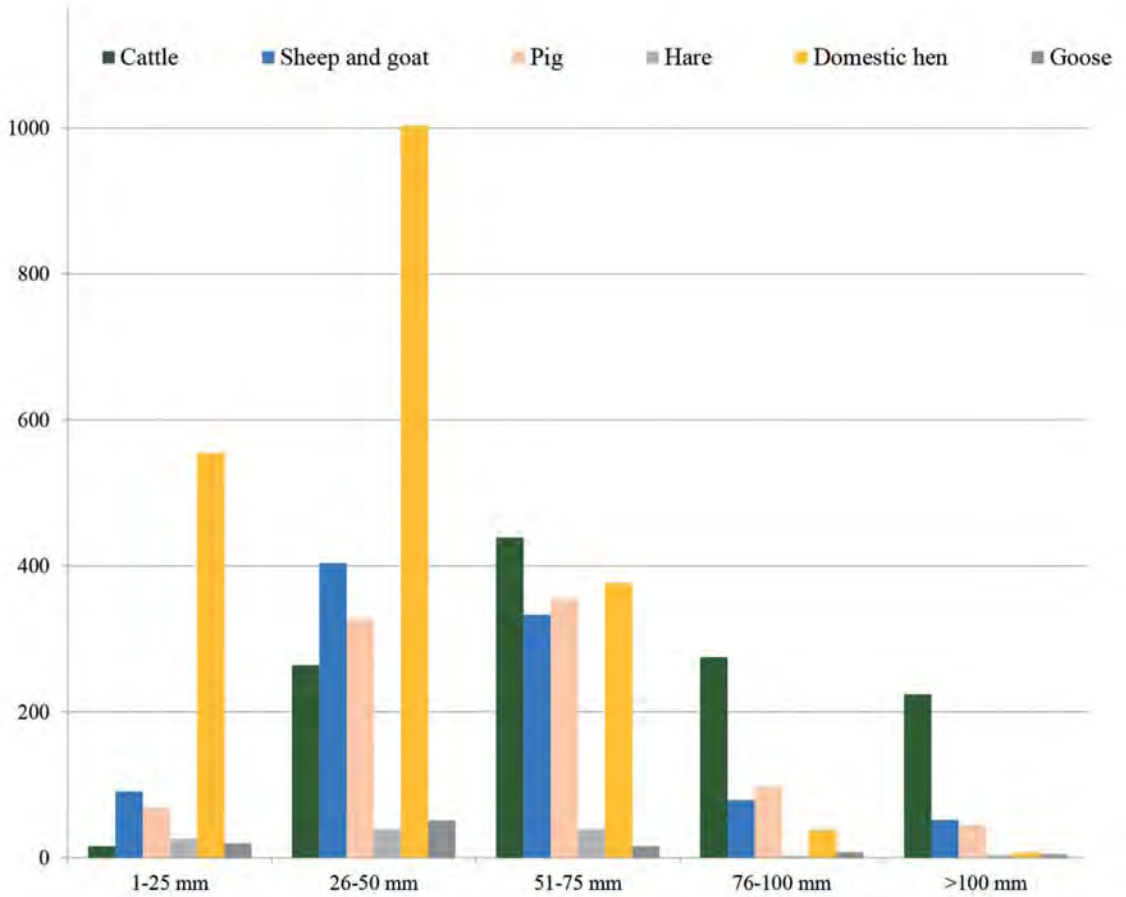

Fig. 2. The distribution of bone remains by main size groups

Horse, kept for transportation and traction, is entirely lacking from the material, while the few dog and cat bones most likely represent fallen creatures in the kitchen waste of the archiepiscopal palace. The rodent remains, apparently from mice and rats, were found in anatomical order and had more-or-less complete skeletons. Their presence in a refuse heap is quite natural since it was an abundant source of food for these animals. These two species are the two most frequent small mammals on human settlements because the artificial environment created by humans provides excellent habitats for them.[8]

1. Domestic animals

1.1. Cattle

Cattle bones (1218 pieces) were the most frequent mammalian remains in the assemblage by 16.7% of all determinable vertebrates *(Table 1).* It must be noted that the high number of bones can be explained by the chopped-up ribs and their fragments, which made up over one-half of the cattle bones (716 pieces, 50%). These were cut into 5–15 cm long "pot-size" chunks for preparing rib chops *(fig. 3. 1).* The number of vertebrae (116 pieces) and the bones of the meaty limbs (197 pieces) is considerably lower. At the same time, skull fragments and limb ends were also represented in the assemblage, indicating that the kitchen also received these body parts *(fig. 2).*

[8] *Kovács 2014* 50–51.

Fg. 3. Cut and chop marks, 1. cattle ribs; 2. cattle radius and ulna forming the elbow; 3. lumbar vertebra from sheep

Cattle is the by far the largest-bodied species in the assemblage, exceeding by far the body mass of smaller ungulates, and the meat distribution of this animal called for the most extensive primary (slaughterhouse) and secondary (kitchen) dismemberment, indicated not only by the number of fragments, but also by the chop and cut marks on the bones *(figs 4–5).* Aside from the ribs, the spine and the joints of the limbs (such as the elbow joint) and the skeletal parts bearing large muscles (such as the mandible, the scapula, the pelvis, the femur and the radius) called for chopping with sharp metal implements *(fig. 3. 2).*

Despite the high number of bones, there were hardly any suitable for determining the mortality profiles of cattle, owing to the dominance of ribs and the extensive chopping and cutting. The epiphyseal fusion of a few scapulae, ulnae and tibiae are an indication of the consumption of calves younger than two or even one year.[9] The 14th century assemblage contained the metacarpals of a cca. 255-day-old foetus,[10] indicating the spring slaughter of the mother, or an abortion.

[9] *Chaix – Méniel 2001.*
[10] *Prummel 1987* 29, fig. 9.

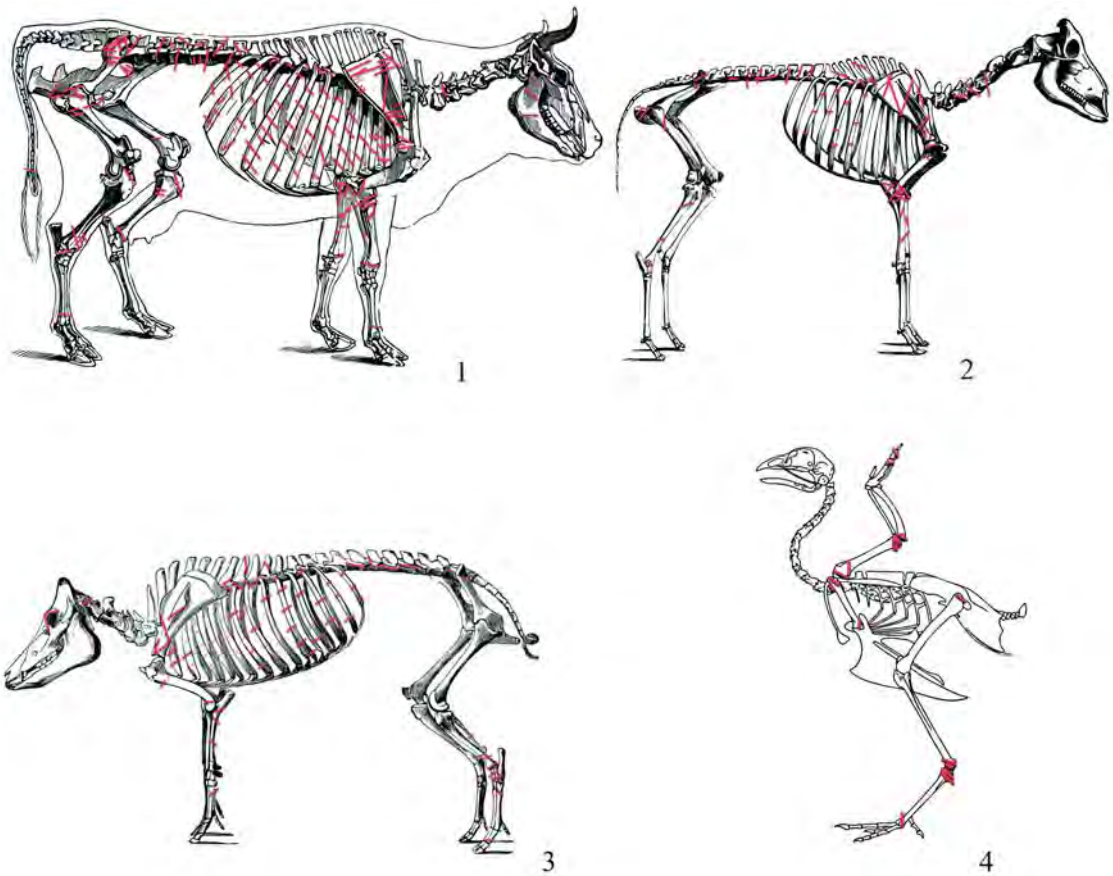

Fig. 4. Summary of cut and chop marks on skeletons of the most frequent meat-providing species. 1. cattle; 2. sheep and goat; 3. pig; 4. domestic chicken

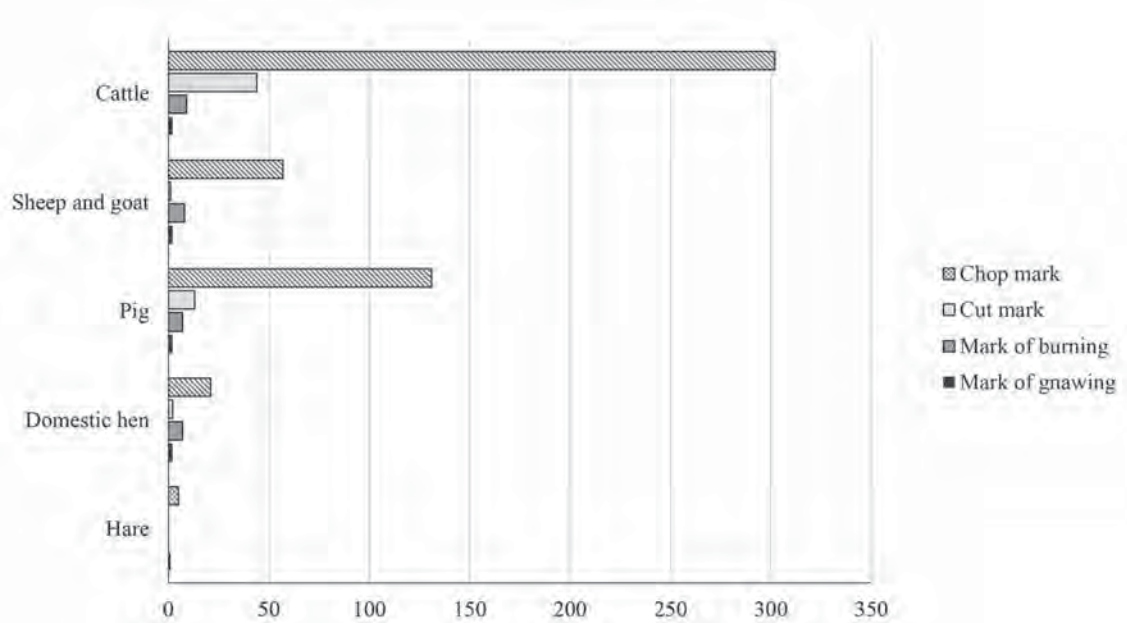

Fig. 5. The distribution of various taphonomic marks on remains of the most frequent species

1.2. Sheep and goat

The second most frequent mammals in the Esztergom assemblage are sheep and goat (13.1%). Only a few skeletal elements (skulls, horn-cores, metacarpals and metatarsals) enable a distinction to be drawn between these two species and therefore the presence of goat in the assemblage cannot be excluded, even though there was no conclusive evidence for its presence. Similarly, as in the case of cattle, there were no skull or horn-core fragments, and thus nothing is known about the breed of ruminants raised in the broader Esztergom area during the 14th–15th centuries. The withers height of a female sheep from the 14th-century assemblage was estimated to 53.7 cm *(Table 4)*.[11]

The distribution of skeletal parts is more even than in the case of cattle: in addition to the bones of the trunk *(fig. 2c)*, the meaty limb parts were the most frequent, and the dry limbs and the bones of the limb ends are present in higher numbers than of cattle, whose body size was considerably larger *(Table 2)*, suggesting the consumption of pork feet stew-like dishes, which is confirmed by the presence of a sheep hock found in anatomical order *(fig. 6)*.

The epiphyseal fusion of the skeletal elements and the extent of tooth abrasion indicate that most of the bones come from a few-month-old lambs and 1- or 2-year-old sheep, although a few wholly fused vertebrae reflect the slaughter of 5-6-year-old sheep.[12] The latter had probably been kept for their milk and wool as well as for maintaining the animal stock in the nearby villages provisioning Esztergom with meat.

Fig. 6. Articulated sheep bones forming the ankle: the distal part of tibia, the calcaneus and astragalus, and the os centrotarsale

1.3. Pig

The proportion of pig bones (12.3%) is roughly identical to that of small ruminants in the assemblage and even slightly exceeds it in the 14th century material *(Table 1)*. Regarding the distribution of body parts, the high number of skull fragments (117 pieces) is particularly striking, being higher than of all the other species together. One possible explanation is that pig skulls and mandibles are more robust and therefore likely to be better preserved and that the number of their teeth (22) is higher than of ruminants (16). It must also be borne in mind that pig heads were used for a wide variety of dishes in Hungarian culinary culture. The frequency of ribs is identical to that of cattle, while the bones of the dry limbs and limb ends resembles that of small ruminants *(Table 2)*.

[11] *Teichert 1975*.

[12] *Chaix – Méniel 2001; von den Driesch 1976* 77, Table X.

Fig. 7. Medullary bone tissue in domestic hen femora

It would appear that the dismemberment of pig carcasses required more effort than in the case of small ruminants: we found chop and cut marks made by cleavers and knife on twice as many bones than on sheep (and perhaps goat) bones. The cleaving of the skull and of the leg joints as well as the chopping of the ribs probably meant more work for the kitchen staff engaged in food preparation *(fig. 3)*.

Similarly to sheep, most of the remains reflect the butchery of pigs ranging from few-month-old piglets to two-year-old pigs, although the occasional older, 4–5-year-old animal is also attested. We identified a few remains of a cca. 107-day-old foetus in the 14th-century assemblage.[13] In this case, it is impossible to determine the season when it was killed because under favourable conditions pigs may have two litters per year.[14]

1.4. Hen

The assemblage from Esztergom is dominated by hen, accounting for more than one-quarter of the bones (27.1%). In contrast to the mammals described in the foregoing, this high proportion can be explained by the absolute number of skeletal remains, rather than by the cutting up of certain body parts or the fragmentation of the finds. Compared to mammals, far fewer chop and cut marks can be seen on hen, and generally on fowl bones. These can usually be found on the larger joints (shoulder, elbow, pelvic and ankle joints) and when the wing ends were removed *(fig. 3)*. Besides the obvious primacy of the meaty limbs and the bones of the trunk, the frequency of the dry limbs and the bones of the rear is quite striking.

The estimated minimal number of individuals based on epiphyseal fusion, the preservation and the right and left positions is 52 individuals, of which 19 were young and 33 were adult animals. Among the latter, we could identify 12 hens and 17 roosters based on the medullary bone tissue associated with eggshell formation *(fig. 7)* and the presence or lack of a spur on the tarsometatarsus. Given that medullary bone tissue is only present during the laying period in the post-cranial bones, its lack more likely indicates a lull in egg laying during the late autumn and early winter period rather than the smaller proportion of hens.[15]

A comparison of the size proportions of intact tarsometatarsals after sexing can offer clues as to whether a particular assemblage contained the remains of more than one domestic hen breeds. This is also apparent in the Esztergom assemblage: the proportions of one tarsometatarsal are visibly different than the ones in the cluster of the majority of roosters on the scattergram, indicating the presence of a hen-sized, but squatter breed *(fig. 8)*. The sizes of the majority correspond to the bone sizes of the domestic hens found in Buda Castle and the Baj manor house, while the larger ones compare well with the specimens from the 15th-century layers of the Dominican monastery in Buda *(Table 4)*.[16]

[13] *Chaix – Méniel 2001; von den Driesch 1976* 77, Table X; *Prummel 1987* 21–41, figs 1–21.
[14] *Bartosiewicz 2006* 108.
[15] *Gál 2008* 45–46.
[16] *Matolcsi 1977* 185; *Matolcsi 1981* 235, Table 17; *Bartosiewicz 2010* 356.

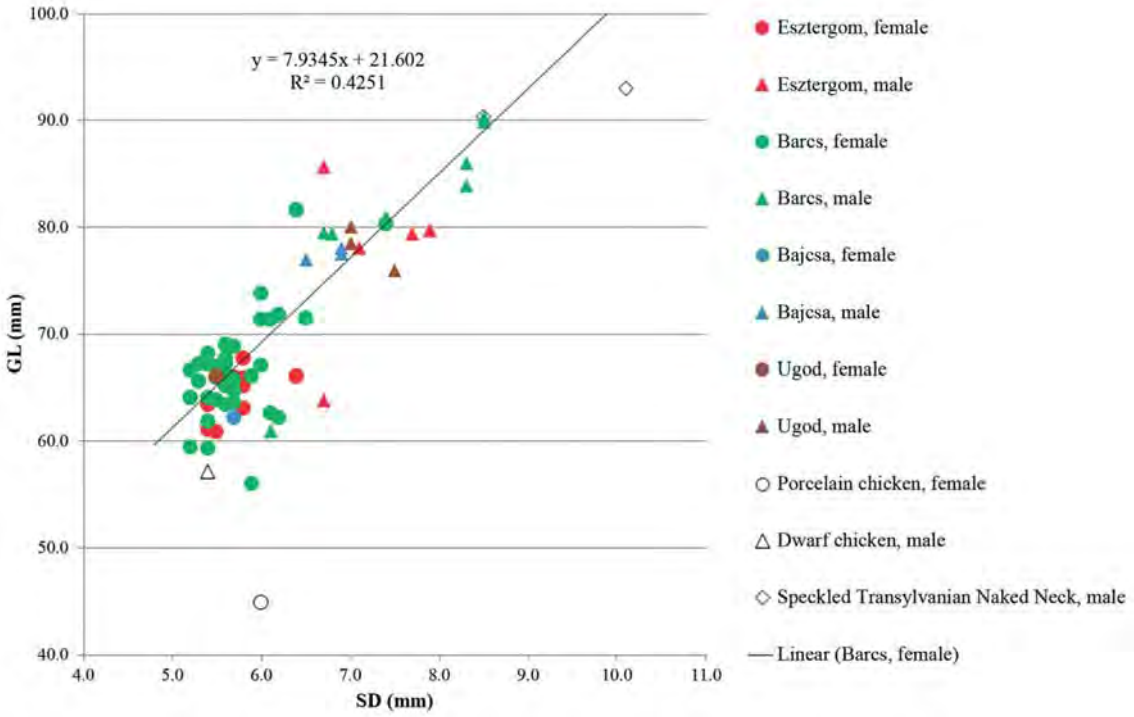

Fig. 8. Scatterplot of the maximum length (GL) to the smallest width of the corpus (SD) of the tarsometatarsus in medieval, early modern and recent domestic hen

1.5. Domestic pigeon

Although widespread in medieval Europe, this fowl is rarely attested in the Hungarian bone assemblages.[17] At Esztergom, pigeon accounts for a minimal proportion (0.3%) of the material. The 22 post-cranial elements representing the entire body aside from the head come from two young and three fully-developed specimens.

1.6. Other domesticates

Besides the species kept for their meat, the assemblage contained the occasional dog, cat and rodent bones. The five dog bones from the 15th-century layer probably come from the same individual, which, judging from the fusion of the vertebrae, was around one year old.[18] The six cat bones, all recovered from the 14th-century layer, represent one or two grown individuals.

As a result of sieving, the material contains an unusually high number of rodent bones, which according to the preliminary assessment come from mouse and rat *(Table 1).* Similar finds are rarely attested in the bone samples from previous medieval excavations. A rat skull was identified in the 16th century layer of the Dominican monastery of Buda, and the post-cranial bones of several rats and other murids were recovered from a 14th–15th-century cistern and pit at the Vác-Piac utca site. Evidence for the 14th–15th-century presence of black rat has been reported from the Remetehegy rock shelter in the Buda Mountains and from the Teleki Palace in Buda Castle.[19]

[17] *Bökönyi 1974* 426; *Bökönyi 1982* 150.
[18] *Chaix – Méniel 2001.*
[19] *Matolcsi 1981* 239, fig. 21; *Kovács 2014.*

Fig. 9. Proximal phalanx from brown bear next to a recent counterpart

2. Wild animals

The remains of wild species yielded surprising results, both regarding mammals and fowl. At Esztergom, there is nothing to indicate the consumption of cervids and boar, the popular and frequent hunting booty in castles and other royal residences during the medieval period.[20] Boar is entirely lacking, while red deer and roe deer are only represented by their antlers and terminal bones *(Tables 2–3).* The third large-bodied mammal, brown bear, was identified from a phalanx in the 15th-century material *(fig. 9),*[21] making brown hare the most frequent wild mammal in the Esztergom bone assemblage *(Table 1).* The distribution of the skeletal elements likewise reveals that hare was a popular dish in the archiepiscopal palace since all body regions are represented in the assemblage and, similarly to the domestic mammals, the finds were dominated by the bones of the trunk and the meaty limbs *(Table 2).* The age distribution indicates that mainly fully-grown individuals were eaten, alongside a few juveniles.

In contrast to the hunted mammals, there is a striking variety of wild birds, among which at least twenty species could be identified, alongside the possible presence of greylag goose and mallard.[22] Most bird species are represented by a few bones only, suggesting opportunistic hunting *(Table 1).* In contrast, grey partridge yielded a remarkably high number of finds: the 239 bones account for 3.3% of the entire assemblage and come from eleven adult and nine young specimens.

Northern goshawk and sparrowhawk represent the birds of prey, whose remains are attested in the 15th-century assemblage. The goshawk phalanx is a rare find and in the lack of comparative bone sizes, the bird could not be sexed. In contrast, it could be clearly established that the sparrowhawk carpometacarpus came from a female *(Table 4).*

3. Goose and duck

The duck bones falling into the size range of geese and mallard constitute a separate group both in terms of their amount (117 pieces, 1.6%) and in terms of their interpretation. Although their frequency eclipses that of the other wild birds identified in the assemblage (the only exception being grey partridge), they fit into the variety of hunted species in the broader Esztergom area. In fact, besides Turdidae, Anatidae have the greatest variety with four different species *(Table 1).*

At the same time, the bone assemblage clearly indicates that poultry occupied a prominent place in the provisioning of the archiepiscopal palace: in addition to the two domestic hens with different body size, pigeons were kept, and we cannot exclude the breeding of partridge. Aside from the secondary products such as eggs and feathers, the breeding of domestic goose and domestic duck is also suggested by the presence of the post-cranial bones of young individuals of both fowl species. The incidence of chicks needs no explanation in the case of bred animals, while it does not make economically sense to kill them during hunting.

[20] *Bökönyi 1963* 397; *Matolcsi 1977* 185–86; *Daróczi-Szabó 2009.*

[21] I am grateful to department head Dr. Tamás Görföl for his permission to study the comparative bone material in the Mammal Collection of the Hungarian Natural History Museum. The recent phalanx shown in the photo (Inv. no. 95.14.1) comes from a roughly four-year-old Russian male specimen.

[22] I am grateful to curator Dr. Mihály Gasparik for providing access to the comparative bird bone collection in the Department of Palaeontology and Geology of the Hungarian Natural History Museum.

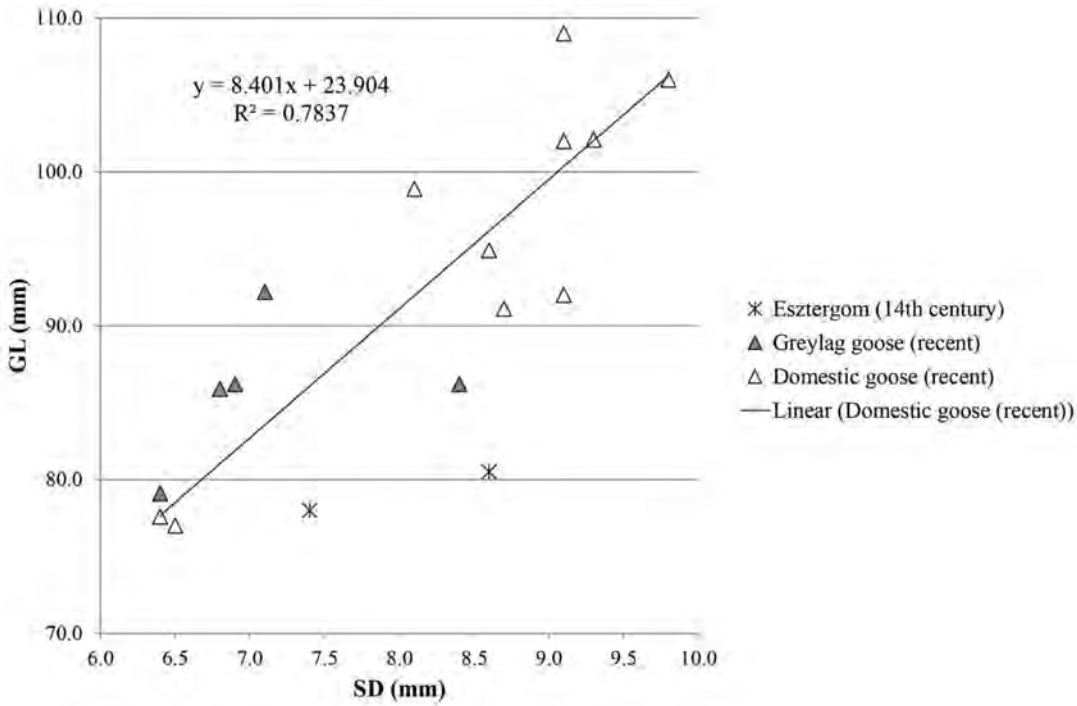

Fig. 10. Scatterplot of the maximum length (GL) to the smallest width of the corpus (SD) of the tarsometatarsus in greylag goose and domestic goose

It is impossible to determine using traditional archaeozoological methods whether the goose and duck remains originate from wild or domestic animals. There are no differences in bone morphology, while in the case of size differences, the differences from the sexual dimorphism of the species in question must also be taken into consideration: in other words, the size ranges of the wild males are roughly identical with those of domestic females. However, conclusive results cannot even be expected from genetic analyses since cross-breeding between domestic and wild individuals cannot be ruled in the Carpathian Basin. At the same time, there can be sites on which the outstandingly high number of remains can be confidently assigned to one or another type in view of the find context and the frequencies of domestic species. For example, the refuse accumulated in Well 8 of the Teleki Palace contained an even higher number of goose than hen bones and their frequency roughly matched that of cattle and small ruminants, therefore these were assigned to domestic goose.[23]

The articulated skeletal elements in the Esztergom material enable the comparison of size proportions as well as a discussion of the above issue despite the methodological reservations. Compact tarsometatarsals survived in highest numbers and thus I compared the smallest breadth/greatest length distribution with the corresponding sizes of recent wild and domestic geese in Hungarian and foreign collections.[24] The diagram reveals that the two size types are strongly correlated ($R^2 = 0.783$), while the divergences are rather large compared to the linear trend line ($y = 8.401x + 23.904$). The size proportions of the strikingly squat finds from Esztergom fall closest to the smaller wild and domestic geese, which obviously does not solve the wild/domestic issue

[23] *Daróczi-Szabó 2004* 257, fig. 6.

[24] I am grateful to Dr. Mihály Gasparik (Department of Palaeontology and Geology of the Hungarian Natural History Museum), Dr. Andrea Kőrösi (Museum of Hungarian Agriculture) and Dr. Günther Karl Kunst (VIAS Universität Wien) for providing access to the collections and enabling comparative bone measurements.

Fig. 11. Bones displaying pathological conditions. 1. exostosis on the cotyla medialis of tarsometatarsus in domestic hen; 2. traces of fracture on cattle rib; 3. gingivitis in sheep mandible

(as anticipated), but does make for reliable sexing because conforming to the sexual dimorphism of the Anseriformes, females are considerably smaller than males *(fig. 10).*

The sizes of the mallard and greylag goose remains from Buda Castle fit in nicely with the size of the finds from Esztergom *(Table 4).*[25] At the same time, Sándor Bökönyi described the goose bones brought to light on earlier excavations in Buda as coming from a "small, at the most medium-sized, primitive breed".[26] The humerus identified as originating from domestic goose in the Segesd assemblage is more robust than the two goose humeri from Esztergom.[27]

4. Pathological alterations

A few post-cranial bones bore traces of pathologies. Their low number (13 pieces, 0.2%) can be attributed to the fact that most of the animals earmarked for consumption were slaughtered at a young age. Similarly to the number of finds, domestic hen dominated the pathological remains: mechanical trauma, healed fractures, exostosis and inflammation could be noted on six limb bones *(fig. 11. 1).*

[25] *Matolcsi 1977* 186; *Matolcsi 1981* 240.
[26] *Bökönyi 1963* 411.
[27] *Bartosiewicz 1996* 210.

The next most frequent pathology affected the ribs (four pieces). More-or-less healed rib injuries could be equally found among cattle, sheep and pig bones. The callus formation on the cattle rib shown in *fig. 11. 2* indicates that either the bone had healed to some extent, but did not completely fuse (i.e. only a loose pseudo-joint was formed) or that it had been broken shortly after the ossification owing to its loose structure. The chop marks and injuries on cattle ribs can be regarded as being representative in the assemblage because these are large and well-preserved skeletal elements that are nevertheless increasingly prone to injuries when these animals are herded or driven.[28]

Finally, we identified three dental pathologies in the 15th-century material: the tip of a dog canine broke off during the animal's life, an upper cattle molar is unevenly worn and traces of the inflammation of the gum (gingivitis) could be seen on a sheep mandible *(fig. 11. 3)*. Large samples from both prehistoric and historic times have shown that in the case of sheep, this pathology is most frequent in the region of the fourth premolar (LP4) and the first molar (LM1).[29]

5. Worked bone

Although the overwhelming majority of the bone assemblage from Esztergom is made up of food remains and kitchen waste from the preparation of various dishes, a few bone and antler fragments bearing manufacture and use-wear traces also came to light among the refuse. The following section contains a list of these bone and antler finds according to their type, together with their find context and date as well as their dimensions.[30]

5.1. Bone needles

Trench I, SU 5 (14th century): needle, made from a sheep or goat long bone *(fig. 12. 1)*. GL. 3.7 mm; GW. 9.0 mm; GD. 3.5 mm; diam. of eye 3.5 mm.

Trench I, SU 5 (14th century): needle fragment lacking the head, made from sheep or goat long bone. GL. 66.6 mm; GW. 7.4 mm; GD. 3.7 mm.

Trench I, SU 18 (14th century): needle fragment lacking the head, made from sheep or goat long bone. GL. 60.3 mm; GW. 4.9 mm; GD. 3.4 mm.

5.2. Bone knife handles

Trench I, SU 18 (14th century): handle fragment, carved from a cattle long bone diaphysis with rounded surface, very shiny. GL. 101.2 mm; GW. 19.6 mm; GD. 6.8 mm. There are two perforations on the fragment: diam. 4.0 mm and 1.5 mm.

Trench I, SU 3 (15th century): handle fragment, carved from a cattle long bone diaphysis with rounded surface. GL. 83.0 mm; GW. 15.8 mm; GD. 7.8 mm. There is a broken perforation on the fragment: diam. 3.3 mm.

5.3. Belt mount

Trench I, SU 17 (15th century): fragment of a belt mount, carved from an ungulate (probably cattle) long bone diaphysis with greenish bronze patina. Rivet holes were drilled in the centre of the raised disc and the two antithetic leaf motifs *(fig. 12. 2)*. GL. 19.0 mm; GW. 10.1 mm; GD. 4.3 mm.

[28] *Gál – Kunst 2018* fig. 4. 7.

[29] *Bartosiewicz – Gál 2013* 178–179, fig. 147.

[30] The abbreviations used in the descriptions are as follows: SU: stratigraphic unit, GL: greatest length, GW: greatest width, GD: greatest depth (thickness).

5. 4. Crossbow fittings

Trench I, SU 4/A (14th century): fragments of nut and arrow base plate, both carved from red deer antler *(fig. 12. 3)*. Dimension of the nut: GL. 32.0 mm; GW. 12.5 mm; GD. 12.1 mm; diam. of perforation 5.1 mm.

Trench I, SU 18 (14th century): fragment of an arrow base plate, carved from cattle metatarsal. GL. 22.7 mm; GW. 13.1 mm; GD. 7.0 mm; diam. of perforations 3.9 mm.

Trench I, SU 22 (14th century): fragments of arrow base plates, carved from red deer antler. Dimension of the larger fragment: GL. 29.9 mm; GW. 15.6 mm; GD. 5.0 mm. Dimensions of the smaller fragment: GL. 23.0 mm; GW. 13.6 mm; GD. 3.8 mm; diam. of perforation 4.6 mm.

Trench I, SU 23 (14th century): fragments of arrow base plates, carved from red deer antler *(fig. 12. 4)*. Two specimens survived intact: GL. 44.7 mm; GW. 24.2 mm; GD. 6.1 mm; diam. of perforation 5.0 mm; GL. 51.0 mm; GW. 22.8 mm; GD. 5.4 mm; diam. of perforation 5.5 mm. Only fragments survived of four other exemplars: diam. of perforations 4.0 mm, 4.1 mm, 5.0 mm.

Trench I, SU 3A (15th century): fragments of two arrow base plates, carved from red deer antler. Larger fragment: GL. 33.3 mm; GW. 18.2 mm; GD. 6.3 mm; smaller fragment: GL. 8.1 mm; GW. 23.3 mm; GD. 5.6 mm; diam. of perforations 3.9 mm.

5.5. Other bone plaques and stiffeners

Trench I, SU 4/A (14th century): fragment of a slender stiffening plate with several perforations and traces of rivets and corrosion *(fig. 12. 5)*. GL. 86.3 mm; GW. 5.8 mm; GD. 4.0 mm.

Trench I, SU 23 (14th century): plaque carved from red deer antler with three perforations (diam. 4.0 mm, 4.2 mm, 5.5 mm). The perforation closest to the pointed end retains a *ca.* 12 mm long rivet *(fig. 12. 6)*. GL. 59.6 mm; GW. 15.8 mm; GD. 7.1 mm.

5.6. Bone pipe

Trench I, SU 3 (15th century): small tube cut from a bird (probably goose) ulna diaphysis *(fig. 12. 7)*, without any other visible traces of working. GL. 50.4 mm; GW. 9.5 mm; GD. 7.4 mm.

5.7. Bone carving

Trench I, SU 3 (15th century): leaf-shaped ornament, probably carved from an ungulate long bone diaphysis *(fig. 12. 8)*. GL. 54.1 mm; GW. 10.5 mm; GD. 3.2 mm.

5.8. Toy

Trench I, SU 3 (15th century): toy made from a pig proximal phalanx by grinding the edges on the proximal and distal epiphyses and perforating the bone in a dorso-ventral and medio-lateral direction *(fig. 12. 9)*. GL. 34.7 mm; GW. 15.2 mm; GD. 14.8 mm. The perforations are slightly irregular, diam. 4.0 mm.

5.9. Other antler implements

Trench I, SU 6 (14th century): plaque carved from red deer antler beam. The spongy tissue was removed from the beam split lengthwise, two oblique openings were made on the cortical surface and the section between them was carved flat, perhaps for guiding a strap or some similar fabric *(fig. 12. 10)*. GL. 70.2 mm; GW. 29.0 mm; GD. 3.6 mm.

The 11 bone and 15 antler implements account for a very small portion (0.4%) of the find material. Most of the bone items were made from cattle long bones, from the metacarpals and metatarsals that were useless in terms of meat and were removed during the primary processing, indicated also by the sawed ends of the bones *(fig. 13. 1–2)*. The long, regular form and thick walls of these bones made them an ideal raw material for carving larger items such as knife handles,

Fig. 12. Bone and antler artefacts, 1. needle; 2. belt mount; 3. fragment of crossbow nut; 4. arrow base plate in crossbow; 5. bone stiffener; 6. antler cover with nail; 7. bone tube; 8. bone decoration; 9. toy made from pig phalanx; 10. antler belt driver (?)

Fig. 13. Workshop debris, 1–2. distal ends of cattle metatarsals; 3. half-made or failed object made from red deer antler; 4. end of crown tine in red deer antler; 5. piece of red deer antler with trace of rust; 6. red deer antler slat cut to size

arrow bases and larger plaques.[31] In contrast, sheep and goat bones with their thinner walls were excellent raw material for slender needles. The even lighter and more fragile bird bones were generally fashioned into flutes and other musical instruments.[32]

Aside from the implements, the find included several dozen semi-finished artefacts and workshop waste such as sawn bone and antler terminals as well as filed antler plaques cut to the appropriate size, indicating that the archiepiscopal palace received not only finished utilitarian and decorative objects, but that there was a bone and antler workshop in its immediate proximity *(fig. 13. 3–6).*[33]

[31] *Bartosiewicz 2006* 197–198, fig. 169; *Kováts 2008* 113.
[32] *Gál 2005* 326–330, figs 2–3 and 5–8; *Kovács 2005* 314, fig. 4. 2–4.
[33] *Csippán 2010* 32.

Meat distribution and processing

The quantitative and qualitative indices of the animal bone assemblage both suggest that the refuse deposited from various activities in the archiepiscopal palace's kitchen was predominantly made up of the waste from the preparation and consumption of various dishes, while a smaller portion represented household refuse and the remains of animals scavenging refuse heaps.

The species and bone distribution clearly reveal that there were certain preferences regarding the meat arriving to the kitchen: in addition to the general traits of animals – for example, large-bodied wild animals were apparently shunned, while so-called white meat (fish and poultry) were preferred – some body parts were obviously more preferred than others. Accordingly, only those part of the domestic mammals was used after the primary (slaughterhouse) dismemberment and distribution that were needed for particular dishes, while poultry arrived with only the head removed at most. However, it is also feasible that since poultry keeping required neither too much space, nor too much labour, they were raised within the castle, similarly as in the Őcsény-Oltovány castellum.[34] In this case, their blood was also used for cooking. Called "black juice" in medieval times, it appears in many of the period's cook-books among the recipes not only for poultry, but also for other meats.[35]

The dietary value of animals depends on the useful (meat and fat) and the less useful (tendons and bones) parts typical for the body regions and their proportion relative to each other. Hans-Peter Uerpmann classified skeletal parts into three grades: the best-quality meat ("A") is represented by the vertebral column (excluding the tail), the upper leg bones, the bones of the shoulder and the pelvic girdle, medium-value meat ("B") by the lower leg bones and the skull (with brain and jaw musculature) and mandible (jaw musculature and tongue), and the ribs and sternum, while lowest-value meat ("C") by the face bones, the tail and the feet (including ankle joints).[36] This classification reflects the meat value of the bones since what constitutes delicacies differs from one culture to the next and also depends on personal taste as well as on culinary fashion.

It seems instructive to examine the four most frequent mammalian species at Esztergom from this aspect since the distribution of body regions reveals that only the head was cut off in the case of poultry before they were processed. The same holds true for hare, the only difference being that the limb extremities did not always reach the kitchen, but were often chopped off after the hunt *(Table 2).*

The dominance of ribs reflects the frequent consumption of medium-value ("B") meat, followed by best-quality ("A") meat of ruminants and hare, while in the case of pig, there was a preference for the head and the feet, the lowest-value meat ("C") *(Table 3).* It must nevertheless be borne in mind that genuine meat consumption was in all likelihood more diverse than suggested by the quantitative indices of the surviving animal bones since no osteological evidence has remained of the consumption of fillet cuts.

The high fragmentation characterising the Esztergom material was also noted in the assemblages from other high-status sites. The sharp chop marks on the vertebrae of the 14th–15th century finds from Buda Castle are a reflection of the butchering practice of the Buda butchers to cleave the animal carcass in half.[37] Heavy chop marks were identified on the medieval cattle bones from Segesd and the cutting of the elbow joints on the forelegs of ruminants.[38] In addition to the customary dismemberment of cattle in the Baj manor house, the frequent chop

[34] *Bartosiewicz 2016* 170.
[35] *Lakó 1983; Benda 2009* 57.
[36] *Uerpmann 1973.*
[37] *Matolcsi 1977* 180–181.
[38] *Bartosiewicz 1996* 186, 194, Table 4.

marks on the limb extremities indicate the presence of active tanneries, confirmed also by other archaeological evidence in the find material and on the settlement itself.[39]

Unlike the alternating frequencies of chop and cut marks, the taphonomic traits indicate that heat effects and gnawing affected the bones of domesticates to a similar extent *(fig. 4).* The low proportion of the latter would suggest that kitchen waste and left-over food were dumped in a location that was inaccessible to cats and dogs relatively quickly after the preparation of the dishes and their consumption. Moreover, despite the documented presence of rodents, the bones do not bear their gnaw marks. One possible explanation is that the bones thrown into the refuse were still covered with soft tissues (cartilages, meat, tendons).

Distribution of species

Three peculiarities can be noted in the Esztergom assemblage in terms of the identified species, namely the frequency of fish and of domestic and wild fowl. The poultry supply of the archiepiscopal palace was quite clearly based on hen keeping, which could be practiced in a relatively small space even within a castle's walls. Domestic hen represents the earliest domesticated fowl species, attested since the Late Bronze Age in Europe.[40] Hen is an undemanding, highly fertile species and its eggs, available for the greater part of the year, are an important source of protein. Its meat and eggs could be consumed even on fast days during the medieval period.[41]

The number of wild birds is outstanding; previously, the number of species known from one or another sit was under ten. This is the first medieval assemblage containing the remains of gadwall, little bustard and various songbirds such as common blackbird, redwing, song thrush and spotted nutcracker.[42] The natural habitats of the twenty different bird species reflect the diversity of the natural environment in the broader Esztergom area. Mallard and glossy ibis reflect the hunting of waterfowl and wading birds on the Danubian floodplain. Grey partridge, common quail and little bustard prefer arable land and grassy plains. Pheasants and rooks thrive in shrubland and parkland, although pheasants were kept as tamed birds, too.[43] The earliest medieval osteological evidence for this species, repeatedly introduced to the Carpathian Basin, comes from the 13th-century layers of Buda Castle,[44] while later it is attested both in urban (Visegrád-Kálvária, 14th century), elite (Visegrád-Palota, 14th–15th centuries) and rural environments (Sümeg-Sarvaly, 15th–16th centuries).[45]

Although rooks are birds of cultivated fields, they regularly appear on human settlements for foraging.[46] These birds, moving in large flocks, are generally viewed with mistrust owing to the damage they cause and their clamour; at the same time, several corvid species were kept as pets, either in a cage or raised from a young age for personal enjoyment.[47]

Jay, starling and blackbirds live in forests and shrubland. Spotted nutcrackers do not nest in Hungary, but are winter guests, and fieldfare is similarly mostly to be found in winter. According to the account book of archbishop Hyppolite d'Este, seven fieldfares were among the delicacies served at a banquet he gave in Buda on February 19, 1520.[48] Common teal passes

[39] *Bartosiewicz 2010* 328–338; *Petényi – Bartosiewicz 2010.*
[40] *Kyselý 2010.*
[41] *Lakó 1983; Serjeantson 2001* 263.
[42] *Bökönyi 1974; Matolcsi 1977* 191, Table 1; *Gál 2015.*
[43] *Kordos 2006* 171.
[44] *Matolcsi 1981* 241.
[45] *Bökönyi 1974* 424, 426; *Matolcsi 1982* 233, Table 1.
[46] *Hume 2003* 369.
[47] *Bartosiewicz 1995* 69; *Gál 2003* 130; *Serjeantson 2009* 332.
[48] *Zolnay 1977* 311.

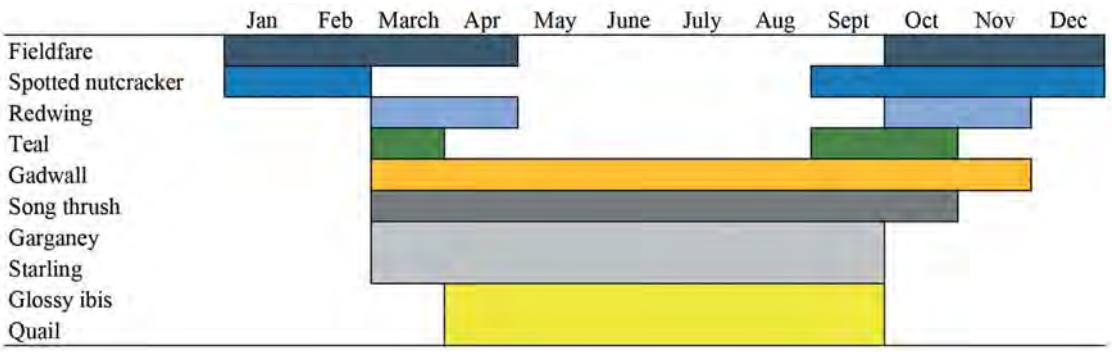

fig. 14. The seasonal presence of wild birds identified in the assemblage in Hungary

through Hungary in larger flocks in spring and autumn, similarly to redwing, which sometimes winters here.[49] The evidence on the seasonal presence of non-resident species indicates that the persons provisioning the archiepiscopal palace could hunt birds in every season *(fig. 14)*. Birds of prey are in fine condition during their autumn-winter passage and migration and can be hunted more easily because they fly in large flocks.[50] In Anna Bornemisza's 16th-century cook-book (essentially a translation and slightly revised version of the cuisine of the 16th-century royal sovereigns of Central Europe), mistle thrush appears as a royal dish that could be consumed during fasts, too.[51]

Goshawk and sparrowhawk nest in trees on forest margins near open meadows and cultivated land, and also make an appearance near humans, particularly in winter, when both are unwanted guests owing to the damage they cause. At the same time, these two diurnal predators were popular in hawking. The females, larger than the males, were trained for short-distance, i.e. hawking on foot.[52]

Given that most of these birds fall into the small game category, they were hunted with guns, crossbows or nets and boughs smeared with honey.[53] Neither can the use of trained birds of prey be wholly excluded, especially since goshawk and sparrowhawk are both represented in the bone assemblage and since there is evidence for hawking from the Árpádian Age onward in Hungary, both in charters and in place-names.[54] Both species have a predilection for low-flying smaller birds and goshawk can also be trained to hunt medium-sized prey such as pheasants and hares *(Table 4)*.[55]

Published in England in 1486, the chapter on hawking in *The Boke of Saint Albans* describes the different birds of prey associated with social status: yeomans had goshawsk, priests had sparrowhawks, holy water clerks had muskets and knaves had kestrels. Although medieval English social values can hardly be projected onto medieval Hungary, it does nevertheless indicate that despite being church dignitaries, the social class nearer to the common folk did not possess rare and valuable, possibly imported species (such as peregrine falcon and gyrfalcon), but hunted with easily acquirable Accipitriformes that could be trained for hunting birds and smaller fur creatures.[56]

[49] *Peterson et al. 1977; Hume 2003.*
[50] *Woolgar 1999* 114–115.
[51] *Lakó 1983* 57–59.
[52] *Zolnay 1977* 95; *Mulkeen – O'Connor 1997; Prummel 1997* 336; *Duhay 2000* 88.
[53] *Csőre 2000.*
[54] *Somlyói Tóth 1985* 12.
[55] *Duhay 2000* 88.
[56] *Bartosiewicz 2018* 115–118.

Goshawk and sparrowhawk are mentioned in 14th-century Hungarian written sources.[57] Although there is no direct, conclusive archaeozoological evidence for hawking in Hungary, the osteological record nevertheless suggests that these two bird species can be associated with this hunting activities.[58] Both species are attested in several medieval European assemblages;[59] in Hungary, the earliest occurrence of both species is the 12th–13th-century assemblage from Budapest-Kánafalu, where the most frequent hunted wild bird was grey partridge.[60] The finds from Esztergom represent the first instance of their presence in a late medieval assemblage; goshawk and sparrowhawk have also been reported from the Ottoman Turkish-period material from Bajcsa-Vár and the 16th–18th-century bone assemblage from Pilisszentkereszt Monastery,[61] while sparrowhawk has been identified among the Ottoman Turkish-period finds from the Carmelite monastery in Buda Castle (Színház utca 1–11).[62]

Goshawks preyed on grey partridge and brown hare, and thus hunting with these two predatory birds would explain the frequency of these two species, both living in open areas and nesting on the ground, among the wild animals. At the same time, the numerous grey partridge remains – representing different age groups – in the animal bone sample also raises the possibility that similarly to poultry, this species was kept and bred in a human environment, a practice attested in medieval England.[63] Whichever the case, grey partridge is the most frequent wild bird species on medieval settlements.[64] If the specimens in the Esztergom assemblage reached the palace as hunting prey, the presence of young birds reflects early summer hunts.[65]

It is quite certain that pigeons were bred at Esztergom (or nearby), despite the low number of finds (22 pieces in all, representing 0.4% of the assemblage). Regarded as a delicacy, domestic pigeon increased the dishes made from small birds that were regarded as luxury dishes and could be served at any time of the year.[66] In addition to its meat, pigeon also provided feathers, while pigeon guano was utilised as manure and was also used in tanning in medieval times. Pigeon droppings were a source of saltpetre needed for gunpowder production once the use of fire-arms became widespread and thus its value increased manifold across Europe. Pigeons were possibly also kept as ornamental birds in Esztergom Castle. It would appear that the training and use of carrier pigeons became general during the Ottoman Turkish rule in Hungary.[67]

Until recently, pigeon remains dating from the medieval period were only known from the 14th–15th-century bone assemblage of Visegrád-Palota that contained one lone specimen.[68] In the wake of more recent excavations and the assessment of their finds, we now have a much clearer picture of the distribution of this species *(fig. 15)*. Osteological evidence for pigeon from late medieval contexts is known from the villages of Hódmezővásárhely-Gorzsa and Tiszagyenda-Morotva part (two and twenty bones, resp.)[69] as well as from Solt-Tételhegy, where a juvenile specimen was found.[70] Mention must also be made of the finds of the bones of a juvenile and fully-grown individual from the Ottoman Turkish (16th-century) levels of the "amulet pit" uncovered on

[57] *Rácz 2012*.
[58] *Prummel 1997; Gál 2012a*.
[59] *Mulkeen – O'Connor 1997* 444, Table 2.
[60] *Daróczi-Szabó 2013* 12–13, fig. 3.
[61] *Gál 2002; Gál 2012a; Gál 2015*.
[62] Kind personal communication from Dr. Márta Daróczi-Szabó.
[63] *Woolgar 1999* 114.
[64] *Bökönyi 1963* 416; *Bartosiewicz et al. 2018* 69.
[65] *Hume 2003* 151.
[66] *Gál 2020a*.
[67] *Marton 2007; Marton 2014*.
[68] *Bökönyi 1974* 426.
[69] *Lyublyanovics 2018* 142, 154.
[70] *Biller 2014* 205.

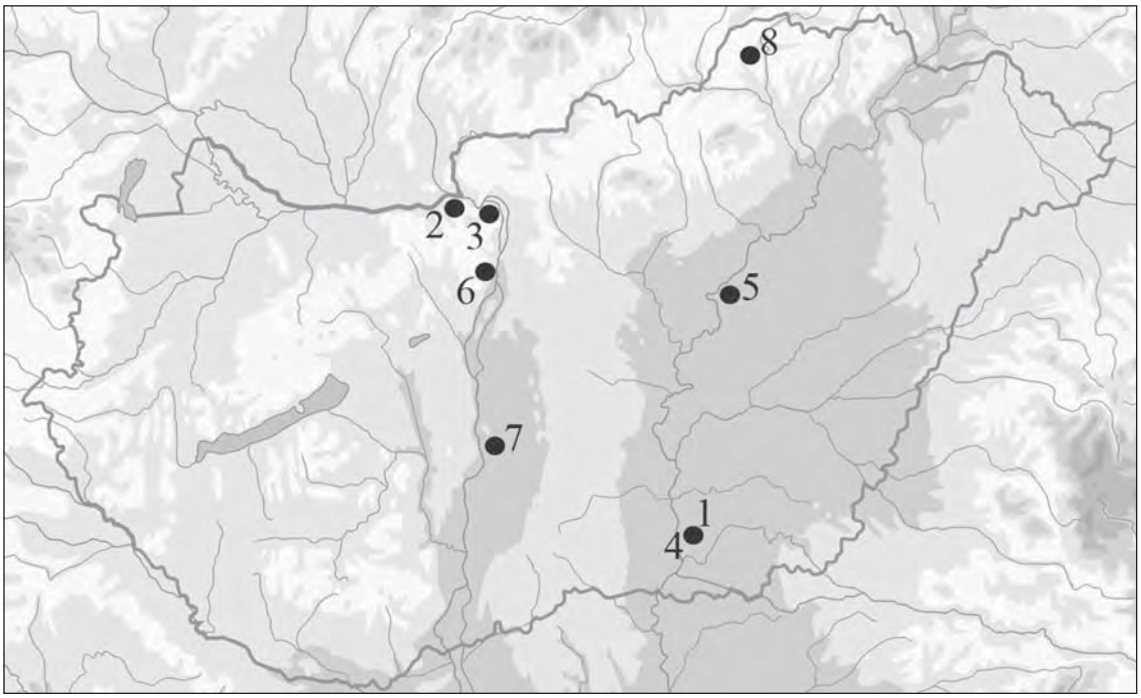

Fig. 15. The chronological distribution of domestic pigeon in medieval Hungary,
1. Hódmezővásárhely-Gorzsa (10th–13th century); 2. Esztergom, Várhegy-Kőbánya (14th–15th century);
3. Visegrád-Palota (14th–15th century); 4. Hódmezővásárhely-Gorzsa (14th–16th century);
5. Tiszagyenda-Morotva (14th–16th century); 6. Buda, Szent György tér (16th century);
7. Solt-Tételhegy (10th–16th century); 8. Szendrő-Kastély (17th century)

Szent György tér in Buda Castle[71] and of the four bones, probably from the same individual, from Szendrő-Felsővár, dating from the 17th century.[72] An earlier report describing the material culture of the settlements on the Hungarian Plain ravaged by the Ottoman Turks in all likelihood also refers to remains from this period. According to the description, a pigeon skeleton was discovered in a cooking pot in a pit of a house at (Lajos)Mizse.[73] Knowing that the house in question was a simple building in a rural milieu, it seems more likely that the bird was a domestic pigeon rather than a dish made from a wild pigeon species. However, since this piece of information does not come from an osteologist, I have not included the site on the distribution map of domestic pigeons.

Similarly to grey partridge, the frequency of hare bones raised the possibility that some actually represent the domestic rabbit and that they had perhaps been bred. Brown hare and domestic rabbit (the domesticated variety of coney) can only be distinguished from each other based on a few skeletal elements and smaller bone dimensions are also an indication of domestic rabbit. These bones are in a poor state of preservation in the Esztergom material; however, the exemplars on which the morphological traits enabling a distinction between the two species could be observed rather suggested brown hare, which was also underpinned by the bone dimensions *(Table 4)*.[74]

Although the Romans kept (fattened) wild rabbits in pens enclosed with stone walls or in parks *(leporarium)* from where the animals were unable to burrow their way out, the domestication and breeding of this species only began during early medieval times in south-western France.[75]

[71] I am grateful to Dr. Péter Csippán for allowing the publication of this still unpublished data.
[72] *Daróczi-Szabó 2009.*
[73] *Szabó 1938* 86.
[74] *Callou 1997* 14, fig. 2.
[75] *Irving-Pease et al. 2018.*

At first, domestic rabbits were solely to be found in religious institutions because they could be more easily kept in stone buildings. Following their spread in German religious and noble milieus, they also reached Central Europe. The first osteological evidence in Hungary comes from the 16th–17th-century layers of Visegrád-Salamon torony. In this assemblage, the roughly one hundred rabbit bones account for 1.19% of the entire assemblage.[76] Anna Bornemisza's cook-book has twenty recipes for hare/rabbit, although without specifying whether wild or domestic. The last recipe mentions the capture of a pregnant hare, suggesting that this species was acquired by hunting, which also seems to be confirmed by that the recipes for hare are found among the ones for the preparation of deer and wild boar dishes.[77]

As already mentioned in the above, one of the most striking traits of the Esztergom assemblage is the lack of bones from large-bodied game indicating their exploitation for meat. There were no wild boar remains, while the terminal bones of cervids and bear could have been part of cured hides taken to the palace. The dominance of limb extremities among the deer bones from the manor house investigated at Baj, Öreg-Kovács-hegy is also an indication that they reached the settlement together with the hides. Very little of the skeletal elements of the meaty regions of the deer killed during the hunt were brought back; the filleted meat was wrapped in the hide and then transported to the manor house.[78]

According to medieval sources, bear meat was not consumed; instead, this species was valued for its hide from which royal carpets, carriage blankets and the like were made. The 15th-century painting on the ceiling of the Szmrecsány church in Slovakia, lying some 200 km north of Esztergom, depicts a hunter killing a bear and we know that archbishop Hyppolite d'Este organised a bear hunt in the Mátra Mountains in 1518, on the occasion of his birthday.[79] Thus, we cannot exclude the possibility that bear meat was served in the archiepiscopal palace. Bear paw and bear foot are known to have been delicacies, even though there are few sources specifically mentioning this from the Carpathian Basin, despite the many indirect references.[80] The 16th-century cook-book already cited in the foregoing has a recipe for the preparation of bear foot (and bear head).[81] In medieval Poland, bear paw as well as bear ham and smoked bear tongue were popular delicacies. Aside from these body parts and the bear's skinned hide, the remainder of the carcass was left in the forest.[82]

Osteological evidence for bear is rare in Hungary. Of the 45 sites yielding bear bones mentioned in a recent overview, 35 are prehistoric.[83] A bear radius fragment is known from one of the houses of the 11th–12th-century settlement of Esztergom-Szentgyörgymező, which, being part of a meaty limb, can be regarded as food remain.[84] Less is known about the three late medieval bear finds from urban and high-status sites.[85] The 14th-century layer of Visegrád-Kálvária and the 14th–15th-century layers of Visegrád-Palota yielded one and five skeletal elements, respectively,[86] but nothing else is known about these finds, similarly to the single bear

[76] *Bökönyi 1963* 416; *Bökönyi 1974* 334–336, 429.
[77] *Lakó 1983* 123–125; *Bartosiewicz et al. 2010* 87–91, Table 2, fig. 3.
[78] *Bartosiewicz 2010* 341.
[79] *Zolnay 1977* 84–88.
[80] *Zolnay 1977* 90.
[81] *Lakó 1983* 128.
[82] *Dembińska 1999* 95.
[83] *Bárány 2011–2013* 26.
[84] *Vörös 1989.*
[85] It has since been demonstrated that the intermaxillary bone from the 14th-century layer of Segesd, listed as the fourth late medieval site in Annamária Bárány's study (*Bartosiewicz 1996* 185) does not come from brown bear, but from leopard *(Bartosiewicz 2001; Bartosiewicz 2015).*
[86] *Bökönyi 1974* 424, 426.

find from the 14th–15th-century layer of Buda Castle, mentioned in an earlier publication.[87] The closest anatomical analogy to the bear find from Esztergom is the first phalanx recovered from Pit 3 of the Bronze Age settlement investigated at Füzesabony-Öregdomb. The exostosis on the proximal part suggests that it came from an older individual.[88]

Bone and antler working

None of the antler pieces in the Esztergom assemblage had any skull fragments attached to them and thus their presence does not in itself indicate deer hunting. Representing either worked pieces or raw material and workshop waste, the antlers could equally well have been gathered in forests after the stags had shed them.

The bone and antler implements listed in the above were quotidian utilitarian artefacts, some of which represent late medieval mass-produced items made using the same techniques.[89] These include the simple knife handles, needles, the crossbow nut, the belt mount, the pipe made from bird bone and the possibly unfinished antler implement,[90] whose counterparts are known from the 14th–16th-century assemblages brought to light at Visegrád, Buda and Baj.[91] Disc-shaped and rectangular mounts have been found at Nagylak (which reached the collection of the Hungarian National Museum through an antiquities dealer) and in the churchyards of the southern Balaton region (Balatonszabadi-Pusztatorony and Kötcse-Pócapuszta).[92]

One good analogy to the toy made from a perforated phalanx comes from the 14th–16th-century layers of the Szent György tér-Királyi istálló site in Buda Castle, another one from the Baj manor house.[93] They best resemble the so-called bone foals in the ethnographic material: children used pairs of ungulate phalanxes and "harnessed" them.[94]

As regards finished products, most represent the fittings of crossbows (13 pieces), a weapon that became widely used in Hungary during the 14th century, while no more than one to three pieces came to light of other implement types. The number of finished antler products, 14 in all, is eclipsed far by the antler fragments that can be interpreted as raw material or workshop waste. The lack of pieces or of waste indicating the production of bone beads, mainly used for stringing into rosaries,[95] is striking, since one would reasonably expect their production in an ecclesiastic centre.

In the light of the above, it seems likely that the small workshop was not designed for producing a large variety of articles or for mass-producing certain items, but rather for manufacturing certain types and for repairs, for example specialising in making replacements for easily damaged crossbow fittings.[96] A similar workshop can be cited from Viljandi in Estonia, where workshop waste was found not in the bone material of the medieval town, but in the 13th–16th-century layers of the castle overlooking the settlement, where the waste was five times as much compared to the finished products. The latter represented two major groups: crossbow fittings and articles for leisurely pastimes such as dice, chess pieces and flutes. The assemblage included an antler plaque

[87] *Bökönyi 1964* 369.
[88] *Bárány 2011–2013* 32, 37, fig. 5. 2.
[89] *Kováts 2008* 113.
[90] *G. Sándor 1963* 110–111, fig. 3. 3.
[91] *Gál 2005* 328–330, fig. 8; *Kovács 2005* 312–313, figs 2–4; *Kováts 2005* 296–299, figs 3 and 10; *Bartosiewicz 2010* 338.
[92] *G. Sándor 1959; Magyar 2010* 146–150, figs 1 and 5–7.
[93] *Csippán 2007* fig. 3; *Bartosiewicz 2010* 339.
[94] *Magyar Néprajz VI* 545, fig. 6.
[95] *Kováts 2008* 113–115, fig. 2.
[96] *Gál 2020b.*

with a row of perforations resembling the slender bone plate shown in *fig. 12. 6*, which on the strength of the ethnographic record was probably a bag fitting.[97]

Evidence for the activity of an itinerant bone-worker came to light in Guetrat Castle near Salzburg, occupied during the 12th–13th centuries. It would appear that the artisan only travelled to the castle periodically with the necessary raw material and made bone needles, handles, crossbow nuts and gaming counters for his customers.[98] The clientele of the 14th–15th-century crossbow workshop in Vilnius came from the ranks of the aristocracy.[99] Another remarkable assemblage from Vilnius containing over 1700 bone and antler artefacts came to light from the 13th–18th-century layers of the castle: the finds include several utilitarian and decorative objects (such as knife handles, needles, toys, crossbow fittings and carved bone plaques) which are also attested in Esztergom.[100]

Medieval elite sites

Even though the sediment was not sieved when collecting the 14th–15th-century animal bones at Visegrád Castle, and the full assessment of the bone assemblage has not been completed, the material from this site shares the most similarities with the Esztergom assemblage in terms of species frequencies *(fig. 16)*. Hen was the most frequent among domestic species, while brown hare among wild species; the number of fish and grey partridge remains was noteworthy and pigeon, thrush and brown bear, all delicacies during the period, were also represented. Cattle, small ruminants and pig, the three most frequent meat species, each accounted for 15–25% of the entire assemblage.[101]

Most of the archaeozoological assemblages from high-status sites were brought to light in Buda Castle. The number of poultry exceeds that of mammals and brown hare is the most frequent wild species. The number of domestic poultry rose dynamically in the 14th century compared to the 13th century and continued to retain its high proportions. The proportion of hunted species also rose, as did that of imported species such as oyster, the latter generally explained by the royal court's Italian connections.[102]

In contrast, sheep dominated the 14th–16th-century assemblage from the Dominican monastery in Buda.[103] A similarly high frequency of sheep has only been reported from the queenly centre in Segesd among the elite sites.[104] In contrast, small ruminants are less frequent in the material from the 14th–16th-century monastery of Visegrád, Rév utca-Beneda, dominated by cattle, similarly to the Baj, Öreg-Kovács-hegy manor house.[105]

Although a geographically distant parallel, it must nevertheless be mentioned that pig, the third meat species, was the most frequent in the 14th-century assemblage from the Franciscan monastery of Marosvásárhely. However, none of the species eclipsed the other ones. Domestic hen was amply represented and the presence of domestic pigeon and fish – both fitting neatly into a clerical milieu – is noteworthy.[106]

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97 *Haak et al. 2012* 310–330, figs 14–31.
98 *Lang 2010.*
99 *Rackevičius 1999.*
100 *Luik et al. 2019.*
101 *Bökönyi 1974* 426.
102 *Bökönyi 1958* 457; *Bökönyi 1963* 396, 416, fig. 14. is based on the aggregate of the animal bone finds recovered during three successive excavation seasons.
103 *Matolcsi 1981* 210.
104 *Bartosiewicz 1996* 197, Table 1.
105 *Bökönyi 1974* 428.
106 *Gál 2012b* 698–699, Table 1.

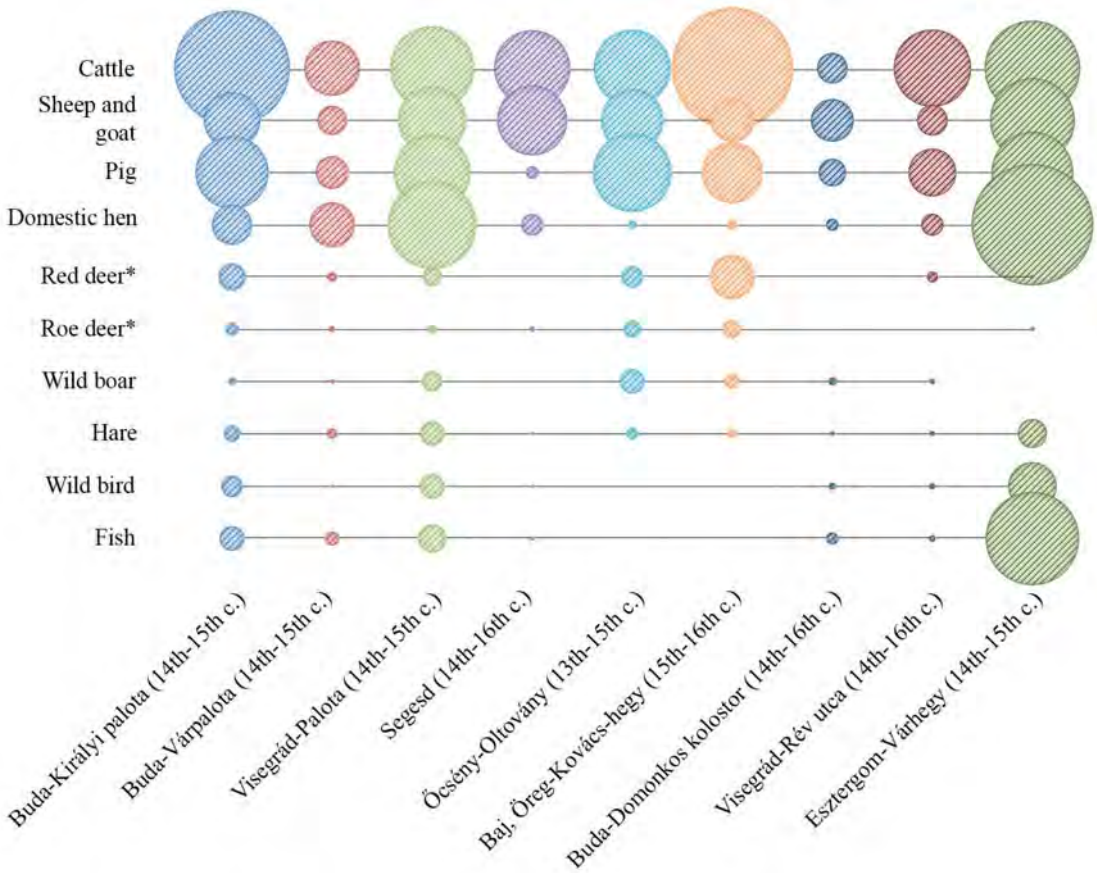

Fig. 16. Share of remains from the main meat-providing species in high status settlements from late medieval Hungary (* data regarding the bone and antler remains from cervids were not separated in early publications, therefore their proportions may show distortion)

The medieval elite sites excavated in England are characterised by the joint frequency of fish and birds, particularly on sites where sieving was employed to recover the animal bones. St. George's Priory in Canterbury yielded almost 5000 fish and 672 bird bones. Fowl are predominantly represented by medium- and small-sized birds, while thrush and lark were identified among songbirds, alongside even smaller species. These were probably caught with nets and traps; however, the partial skeleton of a common kestrel was also found in the monastery, and knowing that this species can be trained to hunt smaller birds,[107] it is possible that the monks or even the abbot engaged in hawking.[108]

Conclusion

In consequence of the sieving employed during the investigation of the Esztergom, Várhegy-Kőbánya site, a fauna assemblage rich in fish, bird and rodent bones was recovered, which is outstanding among the other contemporaneous assemblages and again proves the importance of sieving and flotation on excavations. The remains of gadwall, little bustard, common blackbird, redwing, song thrush and spotted nutcracker have been identified for the first time in a Hungarian medieval bone assemblage.

[107] *Duhay 2000* 20–21.
[108] *Serjeantson 2001.*

The composition of the 14th–15th-century kitchen waste from the archiepiscopal palace clearly reflects an elite cuisine: in addition to an abundance of fish, the primacy of fowl (reflecting a distinct preference for white meat), the slaughter of young animals and a preference for certain body regions (ribs, spinal columns, head, limb extremities and the variety of dishes that could be prepared from them (rib chops, pork feet stew, aspic, brawn and the like). It seems likely that in addition to pigeon and various small birds, bear paw was also served as a delicacy.

At the same time, there is no osteological evidence for the consumption of large-bodied game, although this does not exclude the possibility that filleted meat was occasionally brought to the palace kitchen. The skeletal elements of the wild mammals nevertheless suggest that the hides and shed antlers were utilised. In addition to these, the bones of domestic mammals also served as raw material for the manufacture and repair of household and hunting implements, decorative objects and toys. The amount of raw material and workshop waste, exceeding by far the number of finished products, as well as the finished products themselves, rather suggests a small workshop specialising in certain artefact types.

Before being consumed, domestic and wild fowl were exploited in many different ways: eggs, feathers and guano, and some individuals of wild species were no doubt tamed for amusement, and were kept as pets or trained for hunting.

These traits of the assemblage fit in nicely with our current image of animal exploitation and meat consumption of late medieval elite and monastic households, adding a host of new details to our knowledge. Excavations employing refined collection strategies and various analytical procedures as well as the publication of the finds will no doubt add new insights into the environment, lifeways and activities of ecclesiastic centres.

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APPENDIX

Species	14th century		15th century		14th and 15th century	
	NISP	%	NISP	%	NISP	%
Cattle *(Bos taurus)*	775	15.82	443	18.50	1218	16.69
Sheep *(Ovis aries)*	43	0.89	15	0.63	58	13.15
Sheep and goat (Caprinae)	591	12.06	310	12.94	901	
Pig *(Sus domesticus)*	612	12.49	282	11.77	894	12.26
Dog *(Canis familiaris)*	3	0.06	5	0.21	8	0.11
Cat *(Felis catus)*	6	0.12	0	0	6	0.08
Domestic mammal total	**2030**	**41.44**	**1055**	**44.05**	**3085**	**42.29**
Domestic hen *(Gallus domesticus)*	1368	27.92	612	25.55	1980	27.14
Domestic pigeon *(Columba domestica)*	17	0.35	5	0.21	22	0.30
Domestic fowl total	**1385**	**28.27**	**617**	**25.76**	**2002**	**27.44**
Red deer *(Cervus elaphus)*	0	0	2	0.08	2	0.03
Roe deer *(Capreolus capreolus)*	2	0.04	0	0	2	0.03
Brown bear *(Ursus arctos)*	0	0	1	0.04	1	0.01
Hare *(Lepus europaeus)*	70	1.43	41	1.71	111	1.52
Wild mammal total	**72**	**1.47**	**44**	**1.83**	**116**	**1.59**
Glossy ibis *(Plegadis falcinellus)*	0	0	1	0.04	1	0.01
Eurasian teal *(Anas crecca)*	0	0	1	0.04	1	0.01
Gadwall *(A. strepera)*	0	0	2	0.08	2	0.03
Garganey *(A. querquedula)*	0	0	1	0.04	1	0.01
Tufted duck *(Aythya fuligula)*	1	0.02	0	0	1	0.01
Goshowk *(Accipiter gentilis)*	0	0	1	0.04	1	0.01
Sparrow hawk *(A. nisus)*	0	0	1	0.04	1	0.01
Partridge *(Perdix perdix)*	170	3.47	69	2.87	239	3.28
Quail *(Coturnix coturnix)*	1	0.02	3	0.13	4	0.05
Pheasant *(Phasianus colchicus)*	6	0.12	3	0.13	9	0.15
Little bustard *(Tetrax tetrax)*	1	0.02	0	0	1	0.01
Fieldfare *(Turdus pilaris)*	6	0.12	3	0.13	9	0.12
Blackbird *(T. merula)*	3	0.06	0	0	3	0.04
Redwing *(T. iliacus)*	2	0.04	0	0	2	0.03
Song thrush *(T. philomelos)*	4	0.08	4	0.17	8	0.11
Mistle thrush *(T. viscivorus)*	8	0.17	2	0.08	10	0.14
Starling *(Sturnus vulgaris)*	1	0.02	0	0	1	0.01
Jay *(Garrulus glandarius)*	1	0.02	0	0	1	0.01
Spotted nutcracker *(Nucifraga caryocatactes)*	1	0.02	0	0	1	0.01
Rook *(Corvus frugilegus)*	0	0	3	0.13	3	0.04
Perching bird (Passeriformes sp. indet.)	7	0.15	4	0.17	11	0.16
Wild fowl total	**212**	**4.33**	**98**	**4.09**	**310**	**4.25**
Domestic goose/Greyleg goose *(Anser domesticus/A. anser)*	67	1.38	33	1.38	100	1.38
Domestic duck/Mallard *(Anas domestica/A. platyrrhynchos)*	10	0.20	7	0.29	17	0.23
Galliform (Galliformes sp. indet.)	29	0.60	17	0.71	46	0.63

Species	14th century		15th century		14th and 15th century	
	NISP	%	NISP	%	NISP	%
Rodent (cf. *Mus musculus/Rattus rattus*)	60	1.21	24	1.00	84	1.15
Red deer antler	70	1.41	32	1.34	102	1.40
Roe deer antler	1	0.02	1	0.04	2	0.03
Large ruminant	14	0.28	2	0.08	16	0.22
Small ruminant	81	1.67	18	0.76	99	1.36
Small mammal	5	0.10	5	0.21	10	0.14
Mammal	10	0.20	2	0.08	12	0.16
Bird	85	1.74	40	1.68	125	1.72
Fish*	**768**	**15.68**	**400**	**16.70**	**1168**	**16.01**
Total identifiable	**4899**	**100.00**	**2395**	**100.00**	**7294**	**100.00**

*The fish remains will be discussed by László Bartosiewicz in a separate study within this volume.

Table 1. Mammalian and bird species identified in the settlement and their distribution within the bone assemblage (NISP: number of identified specimens)

Bone type	Cattle	Sheep and goat	Pig	Hare	Domestic hen	Partridge
cornus		1				
neurocranium	10	5	26		6	
viscerocranium	5	4	24		7	
mandibula	16	12	28	12	9	
linguale	1	4				
dentes	15	13	31	7		
atlas			7			
axis		2	1			
Head	**47**	**41**	**117**	**19**	**22**	**0**
vert. cervicalis	33	16	14	3	69	2
vert. thoracalis	21	78	40	4	1	
vert. lumbaris	61	41	22	2	6	
os sacrum	1	3	1		3	
clavicula					53	17
coracoid					158	27
sternum	7				90	6
costa	716	299	448	22	140	3
Trunk	**839**	**437**	**525**	**31**	**520**	**55**
scapula	58	59	16	5	130	36
humerus	14	55	16	6	143	25
radius	23	57	11	4	188	24
ulna	33	29	14	11	143	23
pelvis	31	23	22	6	92	4
femur	17	28	17	7	105	15
patella		1	2			
tibia	21	75	12	10	190	26
fibula			18		27	

Bone type	Cattle	Sheep and goat	Pig	Hare	Domestic hen	Partridge
Meaty limb	**197**	**327**	**128**	**49**	**1018**	**153**
carpalia	10	2	7			
metacarpalia	11	19	23	1	41	10
calcaneus	6	8	8			
astragalus	3	11	4	1		
centrotarsale		4				
metatarsalia	13	10	26	6	138	14
Dry limb	**43**	**54**	**68**	**8**	**179**	**24**
vert. caudalis	4	4	4	1		
ph. proximalis	8	17	16	2	125	4
ph. media	12	19	19		115	3
ph. distalis	12	5	13		1	
Terminal bones	**36**	**45**	**52**	**3**	**241**	**9**
Long bone	45	54	3	1		
Flat bone	11	1	1			
Total	**1218**	**959**	**894**	**111**	**1980**	**239**

Table 2. The distribution of skeletal parts in the main species

Skeletal element	Cattle	Sheep and goat	Pig	Hare
atlas			7	
axis		2	1	
vert. cervicalis	33	16	14	3
vert. thoracalis	21	78	40	4
vert. lumbalis	61	41	22	2
os sacrum	1	3	1	
vert. caudalis	4	4	4	1
sternum	7			
scapula	58	59	16	5
humerus	14	55	16	6
pelvis	31	23	22	6
femur	17	28	17	7
A (High-value meat)	**247**	**309**	**160**	**34**
frontale	8	3	1	
neurocranium	2	2	25	
mandibula	16	12	28	12
linguale	1	4		
costa	716	299	448	22
radius	23	57	11	4
ulna	33	29	14	11
patella		1	2	
tibia	21	75	12	10
fibula			18	
B (Medium-value meat)	**820**	**482**	**559**	**59**
cornus		1		

Skeletal element	Cattle	Sheep and goat	Pig	Hare
viscerocranium	3	1	19	
maxilla	2	3	5	
dentes	15	13	31	7
carpalia	10	2	7	
metacarpalia	11	19	23	1
ph. proximalis	8	17	16	2
ph. media	12	19	19	
ph. distalis	12	5	13	
calcaneus	6	8	8	
astragalus	3	11	4	1
centrotarsale		4		
metatarsalia	13	10	26	6
C (Low-value meat)	**95**	**113**	**171**	**17**
Long bone fragment	45	54	3	1
Flat bone fragment	11	1	1	
Total (A+B+C)	**1218**	**959**	**894**	**111**

Table 3. The distribution of skeletal parts according to the meat value categories *(Uerpmann 1973)* introduced by Hans-Peter Uerpmann

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
***Bos taurus* Linnaeus, 1758**											
scapula	sin				52.2	46.6	37.1			I	4/A
radius	sin				69.4	35.6				II	3
radius	sin				69.5	37.5				I	19
metacarpus	dex				57.7	35.3	32.6			II	3
metacarpus	sin							61.0	29.5	II	4
phalanx 1 anterior			51.9		25.2		23.0	23.6		I	23
phalanx 1 anterior			53.0		25.4		20.7	22.3		I	4/A
phalanx 1 anterior			56.9		27.3		22.4	26.1		II	3
phalanx 1 anterior			61.2		22.7		18.7	21.1		II	4
calcaneus	sin		123.4		39.0					I	19
calcaneus	dex		125.3		41.4					II	3
metatarsus	dex							61.6	31.1	II	3
phalanx 1			47.0		25.3		21.7	23.1		II	3
phalanx 1 posterior			51.6		22.7		19.4	20.5		II	19
phalanx 1 posterior					30.0		26.0	29.7		II	3/A
phalanx 2			32.1		23.8		18.9	20.0		I	6
phalanx 2			33.6		26.1		19.3	22.1		I	5
phalanx 2			34.2		25.3		19.9	22.9		II	3
phalanx 2			34.5		25.9		19.6	20.9		I	3
phalanx 2			36.8		27.3		20.7	21.9		II	4
phalanx 2			37.5		29.2		20.8	21.9		II	3
phalanx 2			37.6		29.0		22.2	23.3		I	5
phalanx 2			40.3		31.0		22.4	25.1		II	3/A

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
phalanx 3			53.9		42.9		18.7			I	22
phalanx 3			57.7		44.0		19.6			I	20
phalanx 3			61.7		41.6		19.4			I	23
phalanx 3			70.0		54.8		23.6			II	3
***Ovis aries* Linnaeus, 1758**											
scapula	sin				29.9	18.3				I	22
scapula	dex				31.2	18.7	19.8			I	23
scapula	sin				31.7	19.2	17.0			I	22
radius	dex				30.2	15.4	15.1			I	20
radius	sin				31.9	16.2	16.9			I	23
radius	dex				34.6	17.2				I	4/A
pelvis	dex	female			26.4					I	4/A
pelvis	dex				30.4					I	4/A
tibia	dex						14.5	26.1	21.1	I	23
tibia	dex						15.0	26.4	21.5	I	22
tibia	sin						15.3	25.1	20.4	I	19
astragalus	sin		27.8		15.8	15.5		17.5		II	4
astragalus	dex		31.4		17.5	18.3		20.0		I	6
calcaneus	dex		52.6		17.6					II	3
calcaneus	dex		57.0				19.7			I	22
calcaneus	sin		58.9		18.9					II	3
calcaneus	dex		60.7				20.6			II	4
metatarsus	dex	female; WH=53.71 cm	119.1		19.7	19.4	11.2	23.1	15.2	II	4
Caprinae Gray, 1821											
radius	dex				27.5	16.4				II	3
pelvis	dex				26.4					I	20
centrotarsale	dex		21.2							I	23
centrotarsale	dex		24.7							II	4
centrotarsale	dex		25.1							I	4/A
astragalus	sin		28.1		15.0	15.6		17.6		II	4
astragalus	dex		30.0		17.5	17.2		19.3		II	3
phalanx 1			34.2		11.7		9.6	10.8		I	23
phalanx 1			35.1		12.2		9.5	10.5		I	23
phalanx 1			36.7		11.2		9.0	10.1		I	22
phalanx 2			21.5		11.4		8.2	9.7		I	23
phalanx 2			25.5		10.9		7.5	8.3		II	3
***Sus domesticus* Erxleben, 1777**											
dens (UM3)	sin		32.5		14.1					I	22
dens (LM3)	dex	male	40.3		16.8					II	4
humerus	dex							39.4		I	20
radius	dex				26.6	17.9				I	4/A
radius	dex				27.0		17.0			II	4
metacarpus IV	sin		77.6		15.0	14.7	11.2	14.7	15.5	I	19
metacarpus IV	dex				15.6	15.3				I	17

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
pelvis	dex				30.0					II	19
tibia	sin							31.4	24.9	II	3
astragalus	sin		41.3							II	3/A
phalanx 1			33.6		16.5		13.0	15.3		I	4/A
phalanx 1		worked bone	34.3		14.5	14.8	12.9	14.1		I	3
phalanx 1			34.3		15.5		12.5	14.6		II	3
phalanx 1			36.4		17.2		13.4	16.4		II	3
phalanx 1			37.1		15.4		12.2	14.2		I	3
phalanx 2			20.4		13.9		10.9	12.4		I	6
phalanx 2			22.7		16.3		13.3	14.8		I	23
phalanx 3			31.5		28.9		12.5			I	23
***Canis familiaris* Linnaeus, 1758**											
atlas			41.9		82.7	20.5				II	3
patella	sin		21.4		11.3					II	3
astragalus	dex		16.6							II	3/A
phalanx 1	sin		23.0		9.6	9.8	6.5	6.9		I	23
***Felis catus* Linnaeus, 1758**											
atlas			23.5		53.1	8.2				II	4
canine			23.3							I	5
***Gallus domesticus* Linnaeus, 1758**											
coracoideum	sin		46.6		44.3		4.7	12.3	10.4	I	23
coracoideum	dex		49.4				4.4	12.7	10.3	I	4/A
coracoideum	sin		43.7	42.7			3.9	11.9		II	6
coracoideum	dex		45.4		43.4		4.1			I	23
coracoideum	dex		45.9		44.0		4.6	11.5		I	3
coracoideum	dex		46.8	44.6			4.4			I	5
coracoideum	sin		47.6	45.7			3.7			I	5
coracoideum	sin		48.0	45.6			4.2		10.3	II	4
coracoideum	dex		48.3				4.6	13.6	11.1	II	3
coracoideum	sin		48.6	46.7			4.3			II	3/A
coracoideum	dex		48.7	47.0			4.2	13.0	10.0	II	3/A
coracoideum	dex		48.8	46.9			5.2			I	5
coracoideum	sin		49.0	46.7			4.2			I	6
coracoideum	sin		49.2				4.9	12.6		II	4
coracoideum	dex		49.5	47.0			4.4			I	3
coracoideum	dex		49.8	47.2				13.4	10.3	II	3
coracoideum	dex		49.9	46.4			5.1			I	5
coracoideum	sin		50.3	48.3			4.6			I	3
coracoideum	dex		51.2				4.8			I	6
coracoideum	dex		51.3		49.3		4.5	13.8		I	18
coracoideum	sin		53.4	50.8			5.1			II	3/A
coracoideum	dex		53.6	50.7			4.7			I	5
coracoideum	sin		55.7	53.6			5.3	14.8	11.3	II	4
coracoideum	dex			47.6			4.1			II	4
coracoideum	dex			45.6			4.1			I	23

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
coracoideum	dex						4.8	12.7	10.6	II	3
coracoideum	sin						4.8	14.3	11.8	II	19
coracoideum	dex			51.2			4.8			I	5
coracoideum	dex			52.4			5.1			II	4
coracoideum	sin							15.9			17
scapula	sin		55.2		8.9			3.3		II	4
scapula	sin		58.9		10.4			4.4			17
scapula	sin		61.0		10.4			4.4		I	20
scapula	dex		61.7		11.1			4.6		I	23
scapula	sin		64.4		10.6			4.5		I	3
scapula	sin		66.3		11.5			4.5		II	4
scapula	sin		69.9		12.4			5.5		I	3
scapula	dex		70.7		12.1			5.2		I	5
scapula	dex		72.3		12.3			5.3		I	5
scapula	dex		75.6		13.4			5.7		I	6
scapula	sin				10.4			4.0		II	19
scapula	sin				10.4			4.8		I	6
scapula	sin				10.5			4.2		I	22
scapula	sin				10.5			4.5		II	3
scapula	dex				10.6			3.9		II	3/A
scapula	dex				10.6			4.2		II	19
scapula	dex				10.6			4.2		II	3
scapula	sin				10.7			4.3		II	4
scapula	dex				10.9					I	6
scapula	sin				11.0			4.1		II	4
scapula	sin				11.1			4.5		I	5
scapula	dex				11.2			4.5		I	3
scapula	dex				11.2			4.6		II	4
scapula	sin				11.3			4.3		I	23
scapula	sin				11.3			4.6		II	4
scapula	sin				11.4			4.7		II	3
scapula	dex				11.4			4.9		I	3
scapula	sin				11.5			4.7		I	18
scapula	sin				11.7			5.0		I	6
scapula	dex				11.8			5.0		II	3
scapula	dex				11.9			5.1		I	18
scapula	dex				11.9			5.3		I	18
scapula	sin				11.9			5.4		I	5
scapula	dex				12.1			5.0		I	3
scapula	sin				12.2			5.2		II	3
scapula	dex				12.3			5.2		II	3
scapula	dex				12.3			5.3		I	3
scapula	sin				12.4			4.9		II	4
scapula	dex				12.4			5.1		I	3
scapula	dex				12.6			5.4			17
scapula	dex				12.6			5.5		I	5

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
scapula	dex				12.7			5.0		I	6
scapula	sin				12.7			5.3		I	23
scapula	sin				12.8			4.6		I	5
scapula					12.8			6.0		I	6
scapula	sin				12.9			4.8		II	4
scapula	sin				13.0			5.5		II	4
scapula	sin				13.3			5.4		I	3
scapula	dex				13.8			5.3		I	5
scapula	sin				14.2			4.9			23
humerus	dex		59.4		17.2		6.1	13.6		II	3/A
humerus	dex		61.7		17.6		6.7	13.4		II	4
humerus	dex		62.4		18.4		6.2	14.0	7.7	I	20
humerus	sin		62.5		18.1		6.3	13.9		I	18
humerus	dex		63.5		17.6		6.3	13.5		I	3
humerus	dex		63.7		17.3		6.2	13.4			17
humerus	dex		67.0		18.4		6.7	13.6		II	3A
humerus	sin		68.2		19.5		7.3	14.6		II	3
humerus	sin		73.7		20.2		7.0	15.7		I	5
humerus	dex		76.8		23.0		8.2	17.2		II	3
humerus	dex				17.7		6.6			I	5
humerus	dex				17.7					I	3
humerus	sin				17.8					I	20
humerus	sin				17.9					I	3
humerus	dex				18.0						17
humerus	dex				18.3		6.5			I	4
humerus	dex				18.5		6.7			I	5
humerus	dex				19.1		7.7			II	19
humerus	dex				20.6					I	18
humerus	sin				20.6					II	3
humerus	sin				21.4		7.3			I	19
humerus	dex				21.8					II	3
humerus	sin						6.0	13.2		II	3A
humerus	sin						6.1	13.3		I	3
humerus	sin						6.1	13.8		I	5
humerus	dex						6.2	13.5	7.2	I	6
humerus	sin						6.4	15.0	7.4	I	5
humerus	sin						6.8	14.1		I	3
humerus	sin						6.9	14.2		II	4
humerus	sin						6.9	15.4	8.5	II	3
humerus	dex						7.3	15.6	9.0	I	3
humerus	dex							13.2		I	20
humerus	dex							13.4	7.4	II	3
humerus	dex							13.6	7.2	I	4/A
humerus	sin							13.6	7.2	I	17
humerus	sin							16.3	8.8	I	4/A
humerus	sin							16.4	9.1	I	4/A

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
radius	sin		51.8		4.5		2.7	6.0		I	3
radius	sin		52.5		4.6		2.4	5.9		I	6
radius	sin		53.0		4.8	5.1	3.0	6.3		I	4/A
radius	sin		54.1				2.2	5.6		II	3/A
radius	sin		54.5		4.6	5.4	2.5	5.6		I	4/A
radius	dex		54.5		4.7		2.6	6.0		II	4
radius	dex		54.7		4.6		2.8	6.0		II	3/A
radius	dex		54.7				2.6	6.5		II	3
radius	dex		55.0		4.3		2.8	5.7		I	5
radius	sin		55.3		4.6		2.5	6.0		II	4
radius	dex		55.3		4.6		2.6	6.1		I	3
radius	dex		55.3		4.8		2.7	6.3		I	4
radius	sin		55.5		4.8		2.6	5.8		I	3
radius	sin		55.7		4.5		2.9	5.9		II	3
radius	sin		56.0		5.0		2.6	5.9		II	4
radius	sin		56.3		4.4		2.7	6.0		I	6
radius	sin		56.3				2.7	6.0		I	3
radius	dex		56.4				2.8	6.3		I	4
radius	dex		56.7				2.7	5.9		I	20
radius	sin		56.9		4.5		2.7	5.9		II	4
radius	dex		56.9		4.5		2.8	6.1		II	4
radius	dex		57.0		4.6		2.8	5.8		II	3
radius	sin		57.0		4.8		2.4	6.3		II	4
radius	sin		57.0				2.6	6.0		I	17
radius	sin		57.6		4.6	5.0	3.1	6.2		I	23
radius	dex		59.5		4.5		2.7	6.3		I	3
radius	dex		60.0		4.9		3.0	6.6		I	6
radius	sin		60.3				2.7	6.5		II	3
radius	sin		60.8		5.0		2.6	6.5		I	22
radius	dex		61.3		5.0		3.2	6.3		I	5
radius	sin		61.7		5.3		3.0	6.6		I	5
radius	sin		61.9				2.8	6.3		II	3
radius	dex		62.2		5.4		2.7	6.7		II	3/A
radius	sin		62.4		4.9	5.2	2.8	6.8		I	4/A
radius	dex		62.6				3.1	6.9		II	3/A
radius	sin		63.7		5.4		2.7	6.8		I	3
radius	dex		64.5		5.1		3.4	7.3		II	4
radius	dex		65.4		5.4		3.4	6.9		I	5
radius	dex		65.6		5.5		3.0	7.5		II	3
radius	sin		66.2		5.2		2.7	6.7		II	3
radius	dex		67.3				3.2	7.6		I	4
radius	sin		67.5		5.8		3.3	7.4		II	4
radius	sin		70.2				2.7	6.2		I	3
radius	dex				4.7		2.6			II	4
radius	sin				5.3		3.3			I	5
radius					5.4		3.3			I	4

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
radius	dex						2.0	5.9		I	6
radius	dex						2.5	5.4	3.0	II	3
radius	dex						2.7	5.9		I	4
radius	dex						2.7	5.9		I	20
radius	dex						2.7	6.2		I	17
radius	dex						2.7	6.8	3.7	I	3
radius	dex						2.8	5.7		II	3
radius	sin						2.8	5.7		I	5
radius	sin						2.8	5.9		II	4
radius	sin						2.9	6.1		I	23
radius	sin						2.9	6.3	3.4	II	3
radius	sin						2.9	6.5	4.1	II	3/A
radius	dex						3.0	6.3		II	3
radius	sin						3.0	7.0		II	3
radius	sin						3.1	6.6		I	6
radius	sin						3.1	6.7	4.0	II	3/A
radius	dex						3.1	7.0		I	5
radius	sin						3.1	7.1	3.8	II	4
radius	sin						3.1	7.2		I	5
radius	dex						3.1	10.0		I	18
radius	dex						3.2	6.2		I	6
radius	sin						3.2	6.3		I	5
radius	sin						3.3	6.2	3.6	I	6
radius	sin						3.3	6.4		I	6
radius	sin						3.4	6.9		I	5
radius	sin							6.6	3.8	I	6
radius	dex							7.1		II	3
ulna	sin		59.1		8.8	11.9	3.8	8.6		II	3/A
ulna	dex		59.3		8.0	11.0	3.5	8.6		I	18
ulna	sin		59.9		8.1	11.4	4.0	8.4		II	3/A
ulna	dex		60.0		8.4		4.0	8.7		I	6
ulna	dex		60.3		8.1	11.7	3.4	8.6		II	4
ulna	dex		61.4		8.5	11.7	3.8	8.7		I	4/A
ulna	sin		61.5				3.7	8.4		I	3
ulna	dex		62.3		8.0		3.6	8.6		II	6
ulna	sin		62.3		8.9	12.3	3.6	8.7		I	5
ulna	dex		62.4		8.0	11.3	4.0	8.8		I	3
ulna	dex		64.6		9.0	12.3	3.9	8.8	6.6	II	4
ulna	sin		65.4		9.0	12.3	3.9	9.0		I	22
ulna	sin		70.1		14.0		5.4	9.9		I	3
ulna	sin		70.4		9.3	13.7	4.4	10.0		I	17
ulna	sin		70.8		10.0	13.7	4.2	9.8		I	23
ulna	dex				7.8	11.6	3.9			II	4
ulna	dex				8.3	11.6	3.6			II	3/A
ulna	dex				8.3	11.7	3.5			II	3/A
ulna	sin				8.3		3.6			I	3

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
ulna	dex				9.3	14.1	4.6			I	4/A
ulna	dex				9.4	13.4	4.2			II	3
ulna	sin				9.4	13.9				I	3
ulna	dex						3.3	8.3		I	3
ulna	sin						3.4	8.6		I	3
ulna	sin						3.5	8.4			17
ulna	sin						3.6	8.6		I	4/A
ulna	sin						3.7	8.5		I	6
ulna	sin						3.7	8.6	6.5	II	3
ulna	sin						3.8	8.7		I	22
ulna	sin						3.8	8.8		I	3
ulna	dex						3.8	8.9		II	3
ulna	sin						3.8	8.9			17
ulna	dex						3.8	9.2		I	6
ulna	sin						3.9	8.7		I	5
ulna	dex						3.9	9.0		I	22
ulna	sin						4.0	8.7		I	5
ulna	sin						4.1	10.0		I	18
ulna	dex						4.2	9.9	6.2	I	4
ulna	sin						4.3	10.5	7.8	I	5
ulna	sin						4.4	10.6	7.3	II	4
ulna	dex						4.6	10.2	7.6	II	3
ulna	sin						4.6	10.3		I	6
ulna	dex						4.7	10.4			17
ulna	sin						5.2	8.8		I	4
ulna	sin						5.3	9.9	7.4	I	5
ulna	sin							8.5	6.8	I	20
ulna	sin							8.5	6.2	I	3
ulna	dex							8.6		I	18
ulna	sin							8.9	6.7	II	4
ulna	dex							9.0			17
ulna	dex							9.1	6.4	I	3
ulna	sin							10.0		I	18
ulna	dex							10.6	8.2	II	19
carpometacarpus	sin		31.4		10.8			7.7		II	4
carpometacarpus	dex		32.1		10.3			7.4		I	4/A
carpometacarpus	dex		32.3		9.7			7.0		I	3
carpometacarpus	dex		32.5	30.4	10.4			6.0		II	3
carpometacarpus	sin		33.0	30.9	10.8			6.2		II	3
carpometacarpus	sin		33.1		10.6			6.7		II	3
carpometacarpus	sin		33.1		10.8		3.5	7.2		I	4/A
carpometacarpus	dex		33.2		10.5			7.0		I	5
carpometacarpus	dex		33.2		10.9			6.7		I	23
carpometacarpus	sin		33.4		10.5			7.0		II	4
carpometacarpus	dex		33.4		10.5			7.6		I	5
carpometacarpus	sin		33.4					6.7		II	3/A

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
carpometacarpus	dex		34.1		11.4			7.4		II	3/A
carpometacarpus	dex		34.2		11.3			7.3		I	23
carpometacarpus	dex		34.4	32.0				11.1	6.5	II	3
carpometacarpus	dex		34.7					6.9		II	4
carpometacarpus	sin		35.1		11.4			7.2		II	3
carpometacarpus	dex		35.3		10.9			7.7		I	4/A
carpometacarpus	sin		35.3	32.6	11.0			6.4		II	19
carpometacarpus	dex		35.5	33.3	10.9			6.3		II	3
carpometacarpus	sin		35.6	32.8	10.9			7.0		II	4
carpometacarpus	sin		36.7	33.9	12.2			6.7		II	4
carpometacarpus	dex		39.4		12.4			7.8		I	4
carpometacarpus	sin		40.5		12.2			7.8		I	22
carpometacarpus	sin				10.2					II	3/A
carpometacarpus	dex				10.9					I	4
carpometacarpus	dex				11.1			8.5		I	4
carpometacarpus	sin				12.4					II	3
carpometacarpus	sin				13.5					I	4
carpometacarpus	sin							7.5		I	4/A
phalanx 1 digiti 2			14.4							I	6
femur	dex		66.7	62.9	13.9	9.4	5.8	12.8	10.8	I	4
femur	sin		66.8	62.1	14.9		6.1	12.9	10.8	II	3
femur	sin		67.1		13.2		5.9	13.0		II	3
femur	dex		68.0		62.6	9.9	6.1	13.6		II	4
femur	dex		68.8	63.7	14.4	10.6	6.3	13.6	10.9	II	3
femur	sin		70.0	65.0	14.0	9.2	6.0	13.7	11.4	II	4
femur	sin		70.9	65.8	14.1	10.1	6.0	14.0	11.7	II	3/A
femur	sin		71.7	67.0	14.5	10.0	5.9	14.3	11.4	I	3
femur	dex		73.5	68.1	15.3	11.1	6.5	14.2	11.7	I	6
femur	dex		74.4	68.6	15.2	10.7	6.6	14.0	11.8	I	23
femur	dex		79.0	73.0	17.0	12.0	6.7	16.2	12.9	II	4
femur	sin		81.9	76.1	16.7	11.5	7.3	15.7		I	6
femur	sin		83.1	77.1	16.7		7.6	16.4	13.4	I	4/A
femur	dex				13.8					I	18
femur	dex				13.9	10.1	5.9			I	3
femur	sin	female			14.1	9.3	6.5			I	3
femur	dex				14.3	8.4				I	20
femur	sin				16.2		7.2			I	23
femur	dex				16.5					I	3
femur	dex				16.6	10.7				I	23
femur	sin				16.6	10.9				II	4
femur	sin				16.8	10.2				I	6
femur	dex				18.0	11.9				I	3
femur	sin	female					5.6	13.1	10.6	II	3
femur	dex						6.0	13.5	11.2	II	4
femur	sin	female					6.0	14.0	11.0	I	17
femur	sin	female					6.1	13.4	10.5	I	5

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
femur	sin	female					6.2	14.4	11.9	II	4
femur	dex	female					6.4	13.4	11.0	II	3
femur	dex						6.5	14.2	10.9	II	3
femur	sin						7.1	15.7	12.5	II	4
femur	sin						8.2	19.6		II	3
femur	sin							13.0	10.1	I	4/A
femur	dex							13.4	10.9	I	22
femur	sin							13.6	11.0	I	5
femur	sin							14.1	10.2	I	3
femur	sin							15.4	12.2	II	3/A
femur	dex							17.1	11.8	II	4
tibiotarsus	sin		89.8		17.2		5.4	9.9	9.4	II	3/A
tibiotarsus	dex		93.2		17.4		5.2	9.2		II	4
tibiotarsus	dex		94.2		18.1		5.6	9.7		I	23
tibiotarsus	sin		95.1		18.3		5.3	10.2	10.7	II	3A
tibiotarsus	dex		115.1		21.8		7.2	12.3	12.7	I	17
tibiotarsus	sin				17.1		5.2			II	3
tibiotarsus	dex				17.2					I	3
tibiotarsus	sin				17.5					I	18
tibiotarsus	sin				17.7					I	5
tibiotarsus	sin				18.0					II	3
tibiotarsus	dex				18.4		5.0			II	4
tibiotarsus	dex				18.7	5.9				I	3
tibiotarsus	sin				18.7		5.3			II	3
tibiotarsus	dex				18.9		5.6			I	18
tibiotarsus	sin				21.2		7.1			II	4
tibiotarsus	dex				21.6		6.5			II	3
tibiotarsus	dex				22.4		6.9			II	3
tibiotarsus	sin				22.5					II	3
tibiotarsus	sin				22.8		7.6			I	22
tibiotarsus	dex				22.9		7.8			I	3
tibiotarsus	sin				24.2						17
tibiotarsus	dex						5	9.3	9.1	II	3
tibiotarsus	dex						5.0	9.9		I	3
tibiotarsus	sin						5.0	10.0	10.1	II	4
tibiotarsus	sin						5.0	10.3	10.0	I	3
tibiotarsus	dex						5.1	10.6	10.3	II	3
tibiotarsus	dex	female					5.2	10.0	10.3	II	4
tibiotarsus	sin						5.4	10.5	11.0	II	4
tibiotarsus	dex						5.4	10.9	11.3	I	3
tibiotarsus	dex						5.6	10.4	9.9	II	3
tibiotarsus	dex	female					5.7	10.7	10.9	II	3/A
tibiotarsus	sin						5.8	10.8	11.1	II	3A
tibiotarsus	sin						5.9	10.8	11.1	I	3
tibiotarsus	dex						5.9	11.0	12.0	II	19
tibiotarsus	sin						5.9	11.1	12.1	I	5

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
tibiotarsus	dex						6.0	10.1	10.2	II	4
tibiotarsus	sin						6.4	11.1	11.9	I	23
tibiotarsus	sin						6.7	11.1	12.0	II	19
tibiotarsus	sin						6.7	11.5	12.8	II	3
tibiotarsus	dex						7.4	12.2	12.3	I	4
tibiotarsus	sin						7.4	13.0	14.1	II	3
tibiotarsus	sin						7.9	12.7	13.6	I	4/A
tibiotarsus	dex							9.6	9.7	I	19
tibiotarsus	sin							9.7	10.3	I	5
tibiotarsus	dex							9.7	10.5	I	4
tibiotarsus	dex							9.8		I	3
tibiotarsus	dex							9.9	11.1	I	18
tibiotarsus	dex							10.0	10.2	II	4
tibiotarsus	sin							10.0	10.3		17
tibiotarsus	sin							10.1	10.5	I	4
tibiotarsus	dex							10.2	10.5	II	3
tibiotarsus	dex							10.2		II	3/A
tibiotarsus	dex							10.6	10.8	II	3
tibiotarsus	dex							10.7	10.8	II	3
tibiotarsus	dex							11.1	11.3	I	20
tibiotarsus	sin							12.0	11.5	II	3
tarsometatarsus	sin	female	60.8		12.3		5.5	12.0		I	6
tarsometatarsus	sin	female	61.1		11.1		5.4	11.3		I	6
tarsometatarsus	sin	female	63.0		12.3		5.8	11.6		II	4
tarsometatarsus	sin	female	63.4		11.3	10.7	5.4	11.2		I	6
tarsometatarsus	sin	male	63.8		12.3		6.7	12.3		II	4
tarsometatarsus	sin		65.1		11.9	10.7	5.8	11.9		I	3
tarsometatarsus	sin	female	65.8		11.9		5.8	12.2		II	3
tarsometatarsus	sin	female	65.9		11.3		5.7	12.0		II	6
tarsometatarsus	dex	female	66.0		12.0		6.4				17
tarsometatarsus	dex	female	67.7				5.8			I	23
tarsometatarsus	sin	male	78.0		14.2		7.1	14.8		I	5
tarsometatarsus	sin	male	79.4				7.7	15.1		II	4
tarsometatarsus	sin	male	79.7		14.4		7.9	13.7			17
tarsometatarsus	dex	male	85.7		14.6		6.7	15.0	11.3	II	3
tarsometatarsus	sin				11.0	9.7				II	3
tarsometatarsus	sin				11.3		6.0				17
tarsometatarsus	sin				11.4	11.5	5.7			II	3
tarsometatarsus	dex				11.4		5.7			II	3
tarsometatarsus	sin				11.6					II	3
tarsometatarsus	sin				12.1					I	4
tarsometatarsus	dex				12.6					II	3
tarsometatarsus	dex				13.3					I	23
tarsometatarsus	sin	male			13.9		7.4	14.7		I	5
tarsometatarsus	sin	male			14.8	14.9	8.1			II	3/A
tarsometatarsus	sin				16.8	14.0				I	4/A

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
tarsometatarsus	dex						5.5	12.1		I	22
tarsometatarsus	dex	female					5.7	12.8		I	23
tarsometatarsus	dex						5.8	13.5		I	5
tarsometatarsus	dex						5.9	12.7	9.5	I	3
tarsometatarsus	sin						6.2	13.0	7.8	II	3
tarsometatarsus	dex	male					6.3	12.7	9.4	II	3
tarsometatarsus	sin	female					7.0	13.7	10.4	II	3
tarsometatarsus	sin							11.5		II	3/A
tarsometatarsus	sin							12.0	8.9	II	3
tarsometatarsus	dex							12.0		I	6
tarsometatarsus	dex							13.4	10.5	I	4/A
tarsometatarsus	dex							13.8		II	4
tarsometatarsus	dex							14.0	8.9	I	3
tarsometatarsus	dex							15.0	11.2	I	4
tarsometatarsus	dex							15.9	11.6	I	4/A
***Columba domestica* Gmelin, 1789**											
coracoideum	dex		27.4	25.7			2.7		6.8	II	3
coracoideum	dex		27.5	25.8			3.0		7.5	I	6
coracoideum	sin		35.0	33.3			3.8	13.6	9.7	II	4
coracoideum	sin			26.7			2.7			I	3
coracoideum	sin							14.9	9.9	II	3
humerus	sin		40.8		13.1		4.8	9.6	6.3	II	4
humerus	sin		45.2		18.5		5.4	11.1		I	22
ulna	sin						3.2	5.2	4.0	II	4
femur	dex		36.6	34.0	6.9	4.2	2.5	7.2	5.2	II	4
femur	sin						3.7	7.5	6.2	I	6
tarsometatarsus	sin		30.7		7.3	6.9	3.2	7.9	5.3	I	5
***Cervus elaphus* Linnaeus, 1758**											
phalanx 1			57.1		22.3		17.3	20.7		II	3
phalanx 2			44.6		20.1		15.1	15.9		II	3
***Capreolus capreolus* Linnaeus, 1758**											
phalanx 1 posterior			34.1		10.3		8.2	10.4		I	23
phalanx 3			29.6		23.5		5.9			I	23
***Ursus arctos* Linnaeus, 1758**											
phalanx 1			40.7		16.0	14.7	12.5	12.7	9.6	II	3
***Lepus europaeus* Pallas, 1778**											
scapula	sin				15.7	11.9	8.2			II	19
humerus	sin						6.6	12.7	10.4	II	3
humerus	dex							13.0	9.7	II	3/A
radius	dex				9.6	5.9				I	18
ulna	dex					12.4	11.4			I	5
metacarpus 2	dex		20.6		5.4		3.5	4.8		II	3
pelvis	sin		76.0				10.2	20.0		II	4
pelvis	sin		100.0				11.8	24.5		II	4
femur	dex		94.4		22.0	11.5	7.9	20.3		II	4

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
tibia	dex				21.8	23.0	9.5			I	18
astragalus	sin		17.7							I	6
metatarsus 2	sin		57.9				4.6	6.5		II	3/A
metatarsus 3	sin		59.5		6.1	9.4	4.6	6.6		II	3/A
metatarsus 4	sin		56.6				4.4	6.0		II	3/A
metatarsus 4	dex		60.8				4.1	6.2		II	4
metatarsus 5			48.9		9.1		3.9			II	3
***Plegadis falcinellus* Kaup, 1829**											
humerus	sin							15.1	8.5	II	3
***Anas querquedula* Linnaeus, 1758**											
coracoideum	sin		40.5	38.1			3.8	13.6		I	3
***Anas strepera* Linnaeus, 1758**											
coracoideum	dex		48.0	43.5			4.9		19.4	II	3
tibiotarsus	sin						3.7	7.4	7.5	I	3
***Aythya fuligula* Linnaeus, 1758**											
tibiotarsus	dex						4.0	7.8	8.2	II	4
***Accipiter gentilis* Linnaeus, 1758**											
phalanx pedis 2 digiti 2			23.9		7.6	5.8	5.1	5.7	5.5	II	3
***Accipiter nisus* Linnaeus, 1758**											
carpometacarpus	sin	female			10.0					I	3
***Perdix perdix* Linnaeus, 1758**											
coracoideum	sin		35.4				3.2			I	4
coracoideum	dex		36.7	34.5			3.6			II	4
coracoideum	sin		37.2	34.9			3.6		9.8	I	6
coracoideum	sin		39.7	36.9			3.3	13.3	9.4	II	4
coracoideum	dex			34.2			2.8			II	3
coracoideum	sin						3.5		9.0	I	5
scapula	sin		49.1		8.2			3.2		II	3A
scapula	sin		53.9		8.5			3.3		I	18
scapula	dex		54.1		8.6			3.2		II	4
scapula	sin				8.3			3.4			17
scapula	sin				8.7			3.2		II	4
scapula	sin				8.7			3.9		I	23
scapula	dex				9.9			3.9		I	23
scapula	sin				10.1			4.1		I	18
scapula	sin				10.1			4.2		I	4/A
humerus	dex		50.3		13.4		4.6	9.5	5.1	I	18
humerus	dex				11.5					I	4/A
humerus	dex				13.1					I	3
humerus	dex						4.2	9.6	5.2	II	3
humerus	sin						4.4	10.0	5.7	II	3/A
humerus	sin						4.8	9.8			17
humerus	dex							9.5	5.0	II	3A
humerus	dex							9.6	5.2	II	4

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
humerus	sin							9.7	5.5	I	3
humerus	sin							10.9		I	6
radius	sin		38.5				1.8	4.7		I	5
radius	sin		39.3		3.3		1.8	4.5		I	22
radius	dex		40.7		3.3	3.9	1.9	4.7		I	4/A
radius	dex		42.4				2.0	4.9		I	4/A
radius					3.6	3.2	1.8			II	4
radius	dex				3.9	3.3	1.8			II	3
radius	sin						1.8	4.5	2.3	I	6
radius	sin						2.0	4.6		I	3
radius	sin							4.6	3.2	II	4
ulna	sin		44.8		6.1	8.0	2.6	6.0	4.2	II	4
ulna	dex		45.9		5.7	8.5	2.6	6.5	4.6	II	4
ulna	dex		46.6		5.8	8.3	2.7	6.5	4.5	II	3
ulna	dex				5.9	8.1	2.6			II	4
ulna	sin				6.3	8.6	2.6			II	19
ulna	sin						2.6	6.5	4.3	I	22
ulna	sin						2.6	6.5		I	17
ulna	sin						2.9	6.6		II	4
ulna	sin							5.1		II	4
carpometacarpus	sin		25.9	23.8	7.5			5.0		I	4
carpometacarpus	dex		26.1	24.5	7.6			5.3		II	4
carpometacarpus	sin		27.0	24.9	7.6			5.3		I	20
carpometacarpus	sin		27.2	25.5	7.7			5.1		I	6
carpometacarpus	sin		27.5	25.7	7.6			5.6		I	3
carpometacarpus	sin		27.5	25.6	7.7			5.6		I	3
carpometacarpus	dex		27.6	25.9	7.8			5.7		I	4
carpometacarpus	sin		27.7	25.7	8.0			5.0		I	3
carpometacarpus	sin				7.9					II	4
phalanx 1 digiti 2			12.8								17
femur	sin		54.9	52.8	10.1	6.1	4.0	9.5	7.6	II	3/A
femur	sin		55.1	52.4	9.9	6.4	3.7	9.5	7.7	II	3
femur	dex		55.1	52.1	10.7		4.1	9.1	7.4	II	3
femur	sin		56.5	53.0	10.4		4.1	9.3		I	17
femur	dex				9.5	6.3				I	23
femur	dex				9.8	6.6				I	6
femur	dex				10.4	7.0	3.9			II	4
femur	dex						4.3	9.2	7.4	II	3/A
tibiotarsus	sin		67.0				3.4			I	4/A
tibiotarsus	sin		67.1		10.0		3.5			I	4/A
tibiotarsus	sin		70.8		10.5		3.6	6.8	7.1	II	4
tibiotarsus	dex				10.8					II	4
tibiotarsus	sin				11.6		3.7			I	23
tibiotarsus	dex						3.4	6.7	6.5	II	3
tibiotarsus	dex						3.5	6.6	6.5	II	4
tibiotarsus	dex						3.6	6.6	6.3	II	3

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
tibiotarsus	dex						3.7	6.6	6.6	II	4
tibiotarsus	dex						3.9	6.9	6.4	II	3/A
tibiotarsus	dex						3.9	7.2	7.2	I	17
tibiotarsus	sin							7.0	6.0	I	5
tarsometatarsus	dex		29.3		6.0	6.1	2.5	5.9	4.3	II	3
tarsometatarsus	dex		41.0		7.6	7.6	3.6	8.1	5.9	II	3/A
tarsometatarsus	sin		42.1		7.6	7.3	3.5	8.3		I	5
tarsometatarsus	dex				7.1					II	3
tarsometatarsus	dex				7.8	7.5	3.7			I	3
tarsometatarsus	sin				8.0	7.7				I	23
tarsometatarsus	dex						3.3	7.7	5.1	I	22
***Coturnix coturnix* Linnaeus, 1758**											
furcula			27.0							II	3
ulna	sin						1.5	3.7	2.7	II	3
carpometacarpus	dex		19.5	19.1	4.9			3.4		II	3/A
tibiotarsus	sin						2.3	4.8	4.7	II	4
***Phasianus colchicus* Linnaeus, 1758**											
coracoideum	sin		44.6	43.2			4.0		8.3	I	23
coracoideum	dex		44.7				4.1		10.2	II	4
coracoideum	dex	male	51.8	48.8			4.5		10.6	I	20
carpometacarpus	sin		31.3	29.0	9.8			5.2		I	23
carpometacarpus	sin		33.4	30.6	10.5			6.8		II	3
tarsometatarsus	dex	female	64.1		10.5	9.9	4.7			II	3A
***Tetrax tetrax* Linnaeus, 1758**											
scapula	dex	male			11.4			4.4		I	4
***Turdus pilaris* Linnaeus, 1758**											
humerus	sin		31.0		10.0		3.0	7.5	4.2	II	3/A
humerus	sin							6.8	3.7	II	3
ulna	dex						2.4	4.7	3.4	II	3
femur	sin		31.2		5.7	3.4	2.6	5.6	4.2	I	23
tibiotarsus	sin						2.3	4.3	4.1	II	3
tarsometatarsus	dex		33.0		4.2		1.5	3.4		II	4
tarsometatarsus	dex				4.4	4.6	1.8			I	22
***Turdus merula* Linnaeus, 1758**											
ulna	sin				4.8	5.6	2.2			II	4
tarsometatarsus	sin		32.8		5.0		1.7	3.8		I	4
tarsometatarsus	sin		34.4		4.6		1.8	3.9		I	18
***Turdus philomelos* Brehm, 1831**											
humerus	dex				8.2					II	3/A
tarsometatarsus	dex		32.0		4.4		1.4	3.2		I	3
tarsometatarsus	sin		32.2		4.5		1.6	3.7		I	22
tarsometatarsus	sin		32.6		4.0	4.3	1.7	3.4	1.8	II	3
tarsometatarsus	dex		33.4		4.0		1.6	3.3		I	22
tarsometatarsus	dex		33.7		4.1		1.5	3.3		I	22

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
***Turdus viscivorus* Linnaeus, 1758**											
humerus	dex		32.1				3.2	7.6	4.2	I	5
humerus	sin						3.3	7.7	4.1	I	17
humerus	sin						3.4	7.5	4.1	I	23
carpometacarpus	sin		23.3	20.7	5.9			5.1		I	23
carpometacarpus	sin		24.2	21.9	5.5			4.9		I	5
femur	sin							5.4	4.0	II	4
tibiotarsus	sin						2.4	4.8	4.8	II	4
tarsometatarsus	sin		32.7		5.0	4.5	1.6	4.0	2.0	I	4
***Sturnus vulgaris* Linnaeus, 1758**											
coracoideum	sin			25.1			1.5		4.4	II	4
***Garrulus glandarius* Linnaeus, 1758**											
coracoideum	sin		29.8	28.4			1.7		5.5	I	4
***Nucifraga caryocatactes* Linnaeus, 1758**											
tarsometatarsus	sin		40.5		5.9		2.4	4.5		I	18
Corvus* cf. *frugilegus											
carpometacarpus	dex							11.2		I	3
phalanx 1 digiti 2	dex		23.5		6.5	4.6	6.8	6.5		I	3
Anser anser/A. domesticus											
coracoideum	dex		69.8		61.7		8.8	27.8		I	3
scapula	sin		90.1		19.3			7.3		II	3
scapula	sin				19.5			7.2		II	3
scapula	dex				19.8					I	3
humerus	sin							20.7		I	22
humerus	sin							23.8	13.3	I	23
radius	dex		142.7		7.9		4.8	10.1		II	4
radius	sin						4.8	10.1	5.3	II	3
radius	sin							9.3		I	19
radius	sin							10.0	5.0	II	4
radius	dex							10.2	5.6	II	3
radius	sin							10.8	5.3	I	3
ulna	dex				15.5	19.6	8.2			I	5
ulna	sin					18.8				I	22
ulna	dex							14.0	11.1	II	3
ulna	sin							15.4		I	3
carpometacarpus	sin		77.5		18.9			11.0		I	20
carpometacarpus	sin		85.4		20.1		10.0	10.9		II	4
carpometacarpus	dex		86.4		20.5			11.8		II	3
carpometacarpus	sin		88.8	82.4	21.2			11.6	7.5	I	3
carpometacarpus	sin				20.1					II	4
carpometacarpus	sin							10.1		I	22
phalanx 1 digiti 2			34.3							I	5
phalanx 1 digiti 2			35.6							II	3
phalanx 1 digiti 2			37.0		8.9		4.6	9.9		II	4
phalanx 1 digiti 2			37.6		9.3		4.8	10.1		II	4

Bone type	Side	Note	GL[a]	Lm	BP[b]	DP[c]	SB[d]	BD[e]	DD	Square	SU
phalanx 1 digiti 2			37.8		10.0			9.7		I	3
femur	dex				19.1		8.3			I	3
tibiotarsus	sin						7.5	15.5	14.8	II	3
tarsometatarsus	dex		78.0				7.4			II	4
tarsometatarsus	dex		80.5		18.1		8.6	19.6	13.8	I	23
Anas platyrrhynchos/A. domesticus											
coracoideum	dex		47.0	42.5			5.2		18.5	II	4
scapula	sin				11.2			4.3		II	4
humerus	dex				19.0		6.9			II	3
humerus	dex				22.0		7.6			I	4/A
humerus	sin						6.1	14.4	7.7	II	4
humerus	dex						6.4	13.6	7.8	II	3
humerus	dex						6.6	14.4	8.5	II	4
ulna	dex		75.4		9.4	11.8	4.6	9.4	6.5	I	3
carpometacarpus	dex		50.8		11.6			7.3		I	3
phalanx 1 digiti 2			20.7							II	3
tibiotarsus	sin		88.3		13.6		4.5	9.4	9.6	II	4

Table 4. Bone measurements (mm) following the standard given in Driesch 1976 *(von den Driesch 1976)* (a L in teeth and DLS in the distal phalanx; b GB in the atlas, patella, calcaneus and centrotarsale; B in teeth,, GLP in the scapula, BPC in the ulna, LA in the pelvis, Dl in the astragalus, and LD in the distal phalanx; c BFcr in the atlas, LG in the scapula, DPA in the ulna, Lfo in the pelvis, and Dm in the astragalus; d BG in the scapula, SDO in the ulna, SB in the pelvis, and MBS in the distal phalanx; e SLC in the scapula and SH in the pelvis). Acronyms: SU=stratigrafic unit; UM3=upper 3rd molar; LM3=lower 3rd molar

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