



KRAJINOU ARCHEOLOGIE, KRAJINOU SKLA

PRAHA – MOST 2020

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Studie věnované PhDr. Evě Černé

Kateřina Tomková a Natalie Venclová (eds.)

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Through the Landscape of Archaeology, Landscape of Glass

Studies dedicated to PhDr. Eva Černá

Kateřina Tomková a Natalie Venclová (eds.)

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GLASS FINDS FROM THE MEDIEVAL GLASS WORKSHOP VISEGRÁD – RÉV U. 5 (HUNGARY)

Orsolya Mészáros

Abstract

The 2004–2005 urban archaeological excavations at Visegrád, seat of the royal court, brought to light, among other things, a glass workshop from the second half of the 15th century to the early 16th century. The structure was divided into two ateliers with round and rectangular glass furnaces. Typo-chronological analysis of glass objects found in the workshop began.

Keywords

glass workshop, rectangular and oval furnaces, glass panes, conical bottles, Angsters, beakers

THE FIND-PLACE: DESCRIPTION OF THE WORKSHOP

Visegrád, the capital of the Hungarian Kingdom from 1323 to the 1430s, created conditions for institutional and architectural development in the 14th century that was followed by a substantial wave of construction in the area of the settlement.¹ The buildings erected at this time stood until the Turkish wars of the 16th century, with some elements of these structures surviving until the 20th century. The 2004–2005 urban archaeological campaign brought to light several late medieval buildings on one of the plots in the town. One of them operated as a glass workshop from the second half of the 15th century to the early 16th century. The workshop was preserved in exceptionally good condition. It probably came into being in connection with the construction of King Matthias's royal palace in Visegrád in the 1470s to 1480s. On a 1700 m² plot about 700 meters to the south of the royal palace, in the core of the medieval town, remains of several 14th- and 15th-century houses were discovered. On the northwest side of the plot, on its street front, the stone paving of a medieval street came to light; directly next to

it to the south, we observed destruction layers of a 14th-century timber-framed house. To the south of it, we excavated the cellar of a 14th- or 15th-century stone building. On the east side of the plot, the remains of a building of medieval origin rose above the present surface. The excavation of this building has not yet taken place. A fourth edifice standing on the southwest side of the plot was built around the mid-14th century and was turned into a glass workshop in the 15th century. It operated in this capacity until the early 16th century, but the building itself, rebuilt many times, was standing until the end of the 20th century (*fig. 1*). In its late medieval form, it consisted of four rooms. It measured 29 x 10 m and the basement of a tower was located in the northwest corner. The walls of the house were 130 cm thick. Each room had a door that opened towards the east. Two outer rooms were connected by a doorway, but there was no doorway between the central two rooms. Three of the rooms had a brick floor. The building was divided into two workshops, each with two identically-sized rooms in which the design of the furnaces was the same. The following text describes the different rooms proceeding from south to north.

¹ On the late medieval urban development of Visegrád, see Buzás – Laszlovszky – Mészáros 2014, namely 45–73, 233–242.

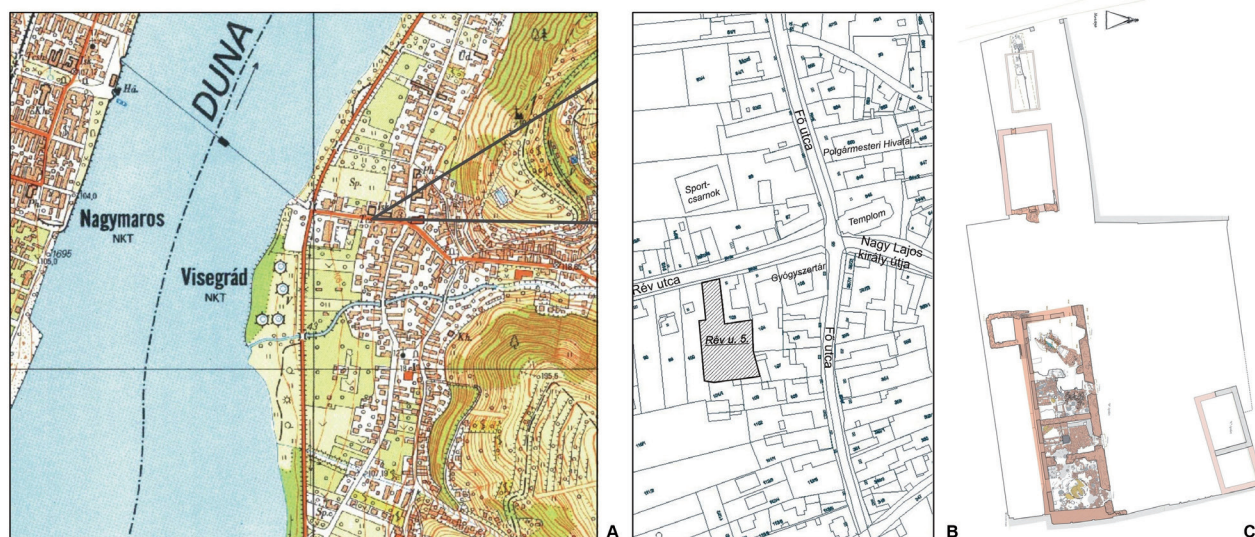


Fig. 1. Visegrád. A – location of the site in the town centre, B – the investigated plot, C – excavated buildings. After Mészáros 2010, Figs. 1, 5.

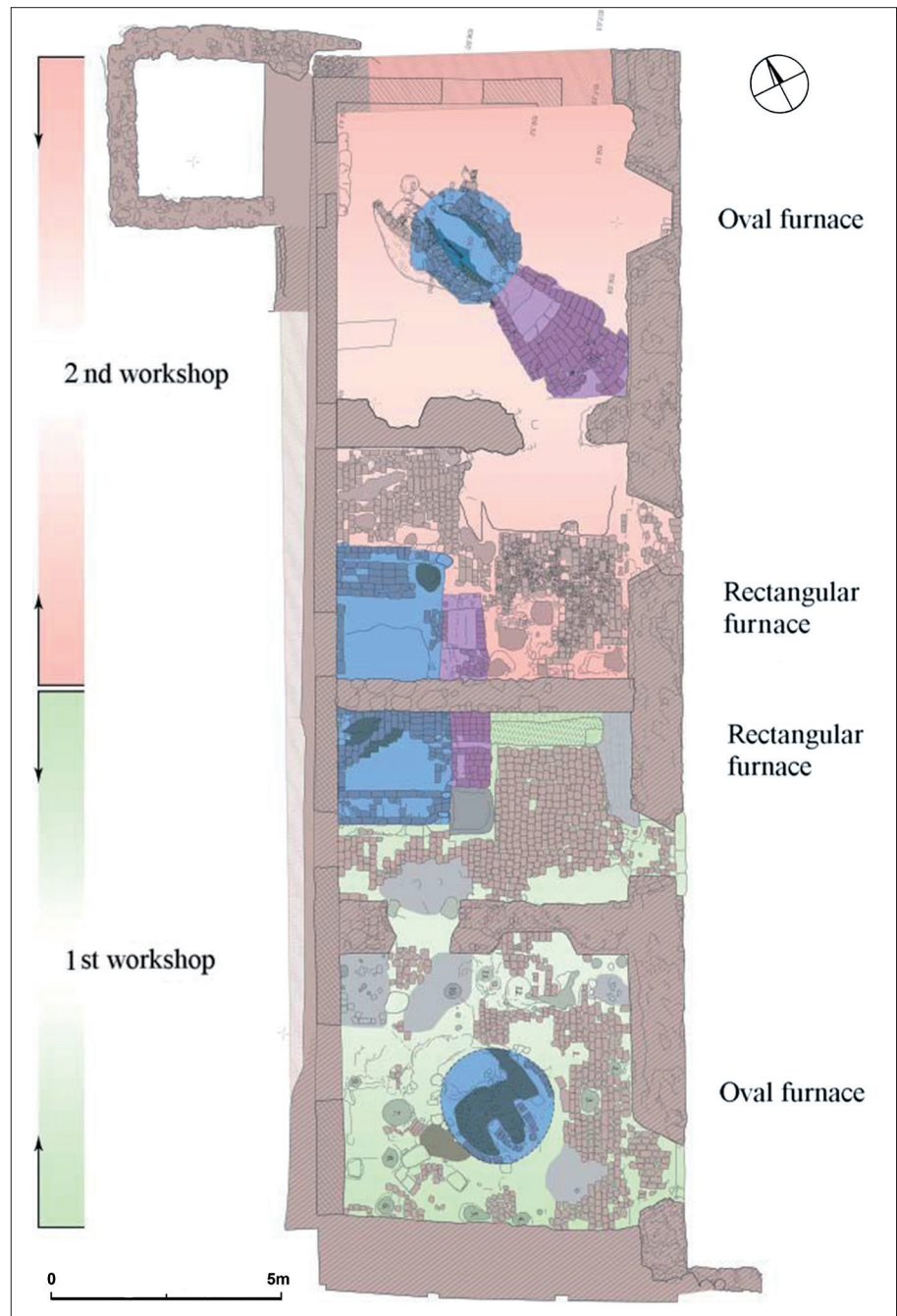
1. In the centre of the first room (6.3/7.5/ x 6.7 m), on the brick floor, stood a round-shaped furnace. The combustion tube was bordered on both sides by a curving double row of bricks. The east side of the furnace was flanked by post-holes in a semi-circle and elsewhere by flat stones. 2. A rectangular furnace (2.8 x 3 m) was placed in the northwest corner of the second room (4.5 x 6.8 m). It was built from brick, was asymmetrical in structure, had a narrow combustion tube and featured a large work surface. 3. In terms of both size and arrangement, the third room (5.5 x 6.7 m) was almost a mirror-image of the second room. A brick furnace was built on a rectangular base in its southwest corner. Its size and character matched those of the furnace in the second room. 4. The floor level of the fourth room (6.8 x 6.7 m) was lower than that of the other three and the floor itself was not covered in brick. In the centre of it was an oval-shaped furnace measuring approximately 3 m diagonally. The base of its exterior wall consisted of large bricks, while the interior part, the vault of the combustion tube was bordered by small heat-resistant bricks. On the hearth of the combustion tube we found melted glass, ash, fragments of iron tools and pieces of melting pots. The furnace had two openings. A trapezoid-shaped tiled foreground was joined to the southeast mouth (fig. 2, 3)².

² Publications of the field work campaigns and archaeological interpretation of the glass workshop are the following: Mészáros 2008; 2010.

A great part of the findings uncovered during the excavation were workshop waste. We found fragments of semi-finished and finished glass artefacts, spoiled and completed pieces: fragments of bottles, jugs, vials and numerous panes of glass. The majority had oxidised to a brown colour, but among them we also found transparent, multicoloured and patterned pieces. Based on their formal marks, they can be dated to the second half of the 15th century. They show similarities with glass finds from the royal palaces at Buda and Visegrád. Besides fragments of glass artefacts, metal implements came to light as well: knives, pincers, scissors, and blow-pipes (Mészáros 2018). We found many fragments of melting pots, with a bottom diameter of 30–40 cm. The finds and archaeomagnetic investigation of the furnaces date the workshop to the second half of the 15th century.

In order to interpret the furnaces, at the time when typological and chemical analyses of the finds had not yet been fully completed, we used descriptions and technological tractates by the contemporary masters Guasparre di Simone Parigini, Vannoccio Biringuccio, Georgius Agricola and some others. Comparing the excavated furnaces and the descriptions, the oval-shaped furnaces in the first and fourth room respectively can be interpreted as multichambered, vaulted glass-blowing furnaces, where the combustion tube and the working chamber above comprised spaces opening into each other. On

Fig. 2. Visegrád. Ground-plan of the workshop. After Mészáros 2010, Fig. 6.



the exterior brick wall of the furnace there must have been work openings for inserting the blow-pipes. The furnaces in the two middle rooms were probably not glass-blowing furnaces, and they may have had a role in the tempering of glass. The Visegrád building, then, must have held two glass-blowing and two tempering furnaces. The building was divided into two pairs of workrooms symmetrically formed: the first and second room comprised one of the workshops and the third and fourth the other. Each of the workshops had a glass-blowing furnace and a tempering furnace; there was no doorway

between the two workshops and there was no melting furnace in either workshop. This indicates differentiation in glassmaking technology: the preparatory work did not occur in the present workshop. The Visegrád workshop operated on a high technical level and was in line with the European technology proposed by masters working for the monarchs and princes of the age. In all likelihood, it worked for the Hungarian royal court, during the construction of the Visegrád palace; indeed, it may even have owed its existence to this project. Perhaps we can recognise in the operation of the workshop a related



Fig. 3. Visegrád. The workshop, Room 1, view from the south. Photo O. Mészáros.

date in a document from 1491. Preserved in Modena, an account-book that belonged to Hippolit d'Este, archbishop of Esztergom, records the work of a certain János (Johannes), a Visegrád glass master, in that year, who delivered 5,000 panes of glass to Esztergom, for which he was paid 13 forints and 25 denars.³ Because of the layout of the furnaces and their extraordinarily well-preserved remains, this 15th century workshop operating in the Hungarian royal capital ranks highly among European industrial archaeological heritage.

³ "Item per Iohannem vitriparem de Wisegrad pro vitris cinque milibus pro fenestris valentibus f XIII d XXV." Archivio di Stato di Modena, Italy. Codici d'Ippolito d'Este, Conti di Libri di Esztergom. Ms. 694. (Amministrazione dei Principi.) Fol. 48r. (Original copy at the Hungarian Academy of Sciences. Collection of Manuscripts: Ms. 4997, 8, p. 48.)

GLASS FINDS FROM THE SOUTHERNMOST ROOM 1 OF THE WORKSHOP

Since the excavations of 2004–2005, typochronological processing of glass fragments found in the southernmost room of the building has been performed.⁴ The study of finds discovered in the other rooms of the workshop and nearby is still ongoing. Below, the types of glass finds discovered in Room 1 are briefly discussed.

Glass panes (fig. 4). In all four rooms of the workshop and in its vicinity, fragments of glass panes were the most characteristic type of glass finds. In the southernmost room, approximately 50 items were found. This group includes the

⁴ Edit Megyeri analysed Room 1 in her MA thesis at Eötvös Loránd University, Budapest in 2015 under István Feld's guidance and my tutorial (Megyeri 2015). I express my gratitude to her for allowing me to use her results in this work. Compared to her results, new publications or different information resulted in the new identification and interpretation of some glass fragments.

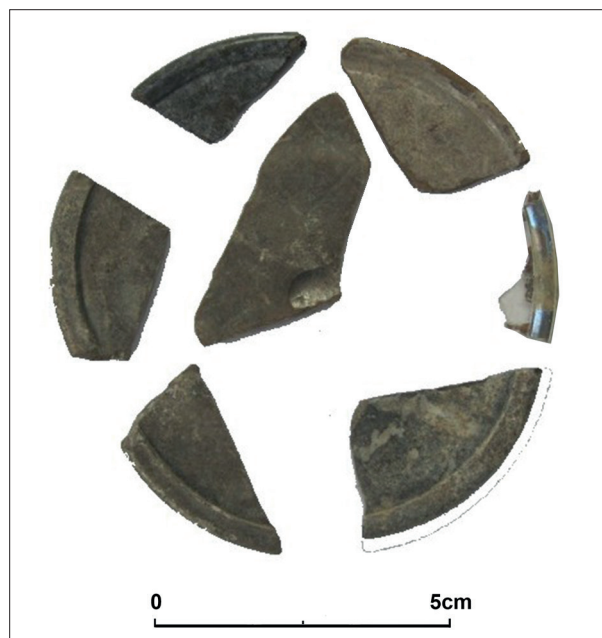


Fig. 4. Visegrád. Glass pane. Photo E. Megyeri.

smaller triangular panes which filled interstices between circular panes of glass set in lead frames. Circular panes were 8–11 cm in diameter. The exact number of window-pane fragments from elsewhere in the atelier cannot be given at present. They are, however, very numerous. In all likelihood, this was the workshop of the Visegrád window-making master referred to in the surviving written source from 1491.

Lamps (fig. 5: 1). A fragment of a glass lamp of the type placed in a holder came to light in Room 1. *Katalin Gyürky* (1989; 1991a) discusses this type in her treatment of material from Buda: it is a more complex lamp, to which she attributes a Byzantine origin. The upper part of the glass body, i.e. its cup, is flattish at the bottom, from the middle of which an oil reservoir, deep and narrow, extends downwards, ending in a small glass bulb. This type appeared in the 6th century; there are examples known today from the Monastery Church of St. John the Baptist in Samarra, Iraq. Later on, in the 12th century, lamps of this kind were made in Corinth; such lamps have also been found among the 12th- and 13th-century finds from Venice–Torcello. Gyürky has not come across this form in territories to the northwest of Hungary. She regards the pieces found in Buda as products based on an ancient Oriental design that were crafted in glassmaking workshops in Hungary

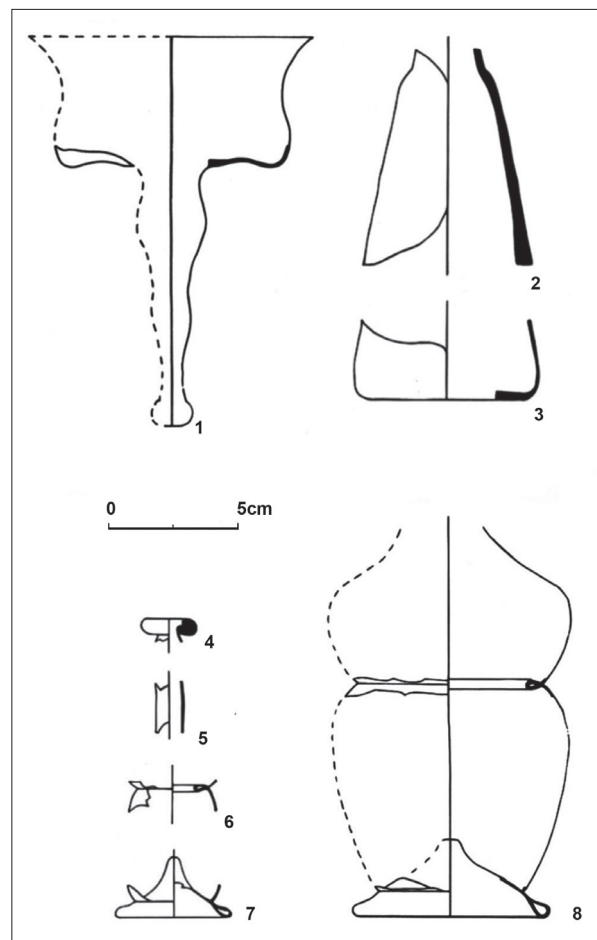


Fig 5. Visegrád. 1 – lamp fragment; 2–3 – simple bottles; 4–8 – conical bottles. After Megyeri 2015, Figs. 10, 18, 19, 22, 23, 24, 25, 26.

(Gyürky 1989, 30–31, type XI/2). More recently, lamp fragments similar to the one from Visegrád have come to light in Pomáz, not far from Buda (Megyeri 2015, 42; Hungarian National Museum, inv. no. 60.17.576; Megyeri 2014, 78–79, fig. 1).

Bottles. These include simple bottles, conical bottles and narrow-necked bottles called Angster bottles.

1. Simple bottles (fig. 5: 2–3). Only a few of the Visegrád fragments can be assigned to this category. The walls of such fragments are thicker and less crafted; they come from bottles whose bodies were spherical or which grew broader towards the base. It was a usual glass type, and examples from all around medieval Hungary are known, e.g. from Buda (13th–15th century), Visegrád (14th–15th century), and Kőszeg (15th–16th century).⁵

⁵ Buda and Kőszeg: Gyürky 1991a, 46–47, simple bottles: Fig. 51: 7; 48: 12, 13; Visegrád: Mester 1997, 14, 22, Fig. 30, 144, 145.

2. Conical bottles (fig. 5: 4–8) emerge as the type of glass vessel most common in the workshop. Katalin Gyürky, exploiting Hungarian specialised literature based on the numerous fragments in Buda and in the whole territory of Hungary known until 1991, established that the first 13th-century biconical bottles found in Hungary had Byzantine origins as regards their form. It is mostly characterised by the strong ring form (collar) on the neck, close to the mouth. The biconical bottles dated to the 14th century show a strong Venetian influence, while the fragments from the 15th century had a new distinct form compared to the items of the 13th–14th century. Biconical bottles made in Hungary during the 15th and early 16th centuries are characterised by a tubby lower body, a large bulbous upper part, a neck that narrows over a short section below the mouth (finish), and by a thick, tubby collar around the mouth. Contrary to earlier opinions, the origins of the biconical bottles point to Oriental and Italian forms, instead of the south German Spessart type. All the bottles were probably produced in Hungarian workshops, perhaps by Dalmatian masters, or those who had Venetian experience (Gyürky 1991a, 25–27). A late, 15th- or 16th-century type characteristic of Hungary shows an affiliation to finds from elsewhere in central Europe (Olomouc, Opava, and Cvilín: Sedláčková 2007, 210, Fig. 34: Cvi-002). As regards the bottle fragments from Visegrád – Rév u. 5, they can be also characterised by the above-mentioned features. The neck of one bottle is decorated with scarified, twisted glass threads. Similar pieces have come to light in Buda and Visegrád – Royal Palace, as well as in a cesspit in Visegrád.⁶ According to visual inspection, the bottles can be classified into two groups by their fabric: bottles made from colourless, clear glass that has been worked in a higher standard, more regular manner, and those that are deteriorated to a brown or greyish-brown colour. Those in the second group were probably also originally clear, but may have differed from those in the first group in fabric and workmanship. With regard to shape, the bottles which are now brown are similar to the clear ones, but are less fine and less

⁶ Buda: Gyürky 1989, 38 (n. 14), Fig. VIII: 4; Visegrád palace: Mester 1997, 13, Fig. 133; town of Visegrád: Gyürky 1991a, 54, Fig. 58: 13.

precisely executed: marks made by tools can often be observed on them. Confirmation of the differences between vessel types is possible only by means of a detailed investigation regarding fabric. The shapes of bottles were rather common, and parallels are known from the central parts of medieval Hungary. Such bottles are known from Buda, Vác, Solymár, Pomáz (from a glassmaking workshop contemporaneous with the one in Visegrád), and from Visegrád – Royal Palace.⁷

3. Narrow- and twisted-necked bottles with funnel-shaped mouths – Angsters (fig. 6: 1–2). Of Italian origin, this type of bottle spread to German territories and was also popular in medieval Hungary. A mouth opening in the shape of a splayed or straight-sided funnel is joined to the neck with one or more funnels. These funnels are sometimes decorated with strands of glass arranged parallel to one another. There is no foot ring on the spherical foot (Gyürky 1989, 45: bottle, Type 8). The lip of the mouth fragment from Room 1 of the Visegrád workshop is decorated with twisted optical strips and with parallel applied trails. The surface of the fragment is heavily corroded. Venetian pieces decorated in the same way but earlier, from the 14th century, are known from Buda Castle (Gyürky 1989, 43: bottle, Type 7, Fig. XV: 2, 3, 5). The Visegrád bottle qualifies as a 15th–16th-century imitation of this type. Fragments contemporaneous with the Visegrád bottle are known from several archaeological sites in Hungary as well as from a mid-15th century context in Brno and from early 16th-century layers in Vienna.⁸

Beakers (fig. 6: 3–5). After conical bottles, beaker fragments were the second most numerous. Beakers featuring drops were always popular: drops decorating the surface lent the vessels stability. After the burial of such beakers in the earth and their destruction, it was the parts decorated with drops that survived most easily. In most cases, the size, shape, and arrangement of the drops indicate the place and time of production. According to Gyürky, the flat-

⁷ In general: Gyürky 1991a, 25–27; Vác: Gyürky 1991b, Fig. 7: 6; Buda (bottle, type 1–2: Gyürky 1989, 38–39, Fig. XI: 2, 3; Pomáz, Cikó-udvarház (Castle): Gyürky 1991a, 51; Solymár-Vár (Castle): Megyeri 2012, 24, Fig. 43; 2014, 80..

⁸ Hungary in general: Gyürky 1991a, 25–27; Brno: Sedláčková 2007, 211; Vienna: Tarcsay 1999, 40.

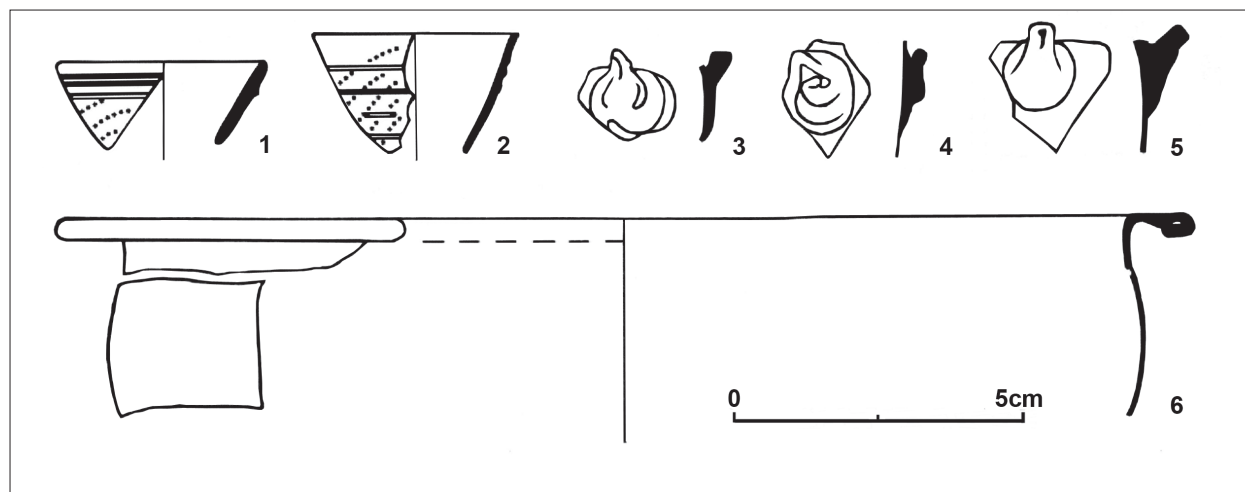


Fig. 6. Visegrád. 1–2 – narrow- and twisted-necked bottles; 3–5 – drops from beakers; 6 – bowl. After Megyeri 2015, Figs. 62, 63, 72, 73, 74, 84.

tish, tubby shape was still popular for drops in the 13th century, with pointed drops gradually gaining favour in the 14th century (Gyürky 1989, 56–57: beaker, Type 4). With regard to Visegrád workshop finds processed so far, the drops vary in shape: some are pointed, while others are flattened and drawn to a point. Footed beakers are notched around the foot. Foot edges were affixed from the 15th century; cross-sections of foot edges can assist in the dating process. Round edges were characteristic in the 15th century, giving way to leaf-shaped ones later on. Both types occur among the finds. The two types probably overlapped around 1500.

Goblets, footed beakers. A fragment of the wall of a goblet decorated with a raised rib was found. Formal parallels are known from the Royal Palace in Visegrád, Buda and Ozora.⁹

Bowls (fig. 6: 6). Two large, deep bowl fragments were recorded. One is from a splayed rim, the other is long and narrow. Both were fashioned by bending back the glass of the rim.

CONCLUSIONS

In sum, the finds from Room 1 consist mainly of window panes, followed by conical bottles and

beakers. Lamps, bottles with simple mouths, bottles with funnel-shaped mouths, goblets, footed beakers, and bowls are represented by only a few fragments. According to stratigraphic observations, ceramic material, archaeomagnetic investigations of furnaces and the above-mentioned written source, the workshop may have been established during the reign of King Matthias Corvinus (1458–1490) and abandoned during the first half of the 16th century. According to the types of glass artefacts found on the site, an affiliation is apparent with a partly excavated contemporaneous glassmaking workshop located not far away at Pilis–Nagykovácsi-puszta (Laszlovsky 2014; Laszlovsky et al. 2014; Megyeri 2014, 83, 86; 2015).

Detailed archaeometric investigation of the glass finds has not yet taken place. Ten pieces were examined by Eva Černá in 2014. According to this researcher, their chemical composition is related to glass made in the Czech Lands.¹⁰

Further processing of the archaeological site and finds is expected to generate important data on Hungarian glass production during the late 15th century, on raw materials and their use, the distribution of products, and the ties of the workshop to other glassmaking enterprises.

⁹ Visegrád: Mester 1997, 85, Fig. 135; Buda: Gyürky 1989, Fig. XXXVII: 2, 4; Ozora: Gyürky 1991a, 44, Fig. 40: 12.

¹⁰ Oral communication from Eva Černá.

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SKLO ZE STŘEDOVĚKÉ SKLÁRNÝ VISEGRÁD – RÉV U. 5 (MAĎARSKO)

Visegrád byl ve 14. století sídlem královského dvora a s ním souvisejících institucí. V uvedeném období prošel i významným architektonickým rozvojem. Archeologické výzkumy v letech 2004–2005 odhalily pozůstatky několika pozdně středověkých budov. V jedné z nich fungovala od druhé poloviny 15. století do počátku 16. století sklárna. Ve své pozdně středověké podobě sestávala ze čtyř místností. V budově

pracovaly dvě sklářské dílny ve dvou místnostech identické velikosti, v nichž se nacházely pece totálního typu. Uprostřed 1. a 4. místnosti stála kruhová sklářská pec, pece ve 2. a 3. místnosti měly půdorys čtvercový. Nejlépe zachována byla pec v místnosti č. 4: dvojúrovňová uprostřed otevřená pec s topným kanálem a komorou určenou pro foukání skla byla dvojnásobně zaklenuta cihlovou klenbou.

Značnou část nálezů získaných v průběhu výzkumu tvořil výrobní odpad. Kromě hotových a nedokončených artefaktů jsme nacházeli i zmetky. Většina střepů zoxidovala a získala hnědavou barvu, ovšem vyskytly se i zlomky průhledné, vícebarevné či zdobené. Kromě úlomků skla byly nalezeny i předměty z kovu – nože, kleště, nůžky a sklářské píšťaly, a také velký počet zlomků tavicích tyglíků.

Zlomky skla z nejjižnější místnosti 1 byly podrobeny typologicko-chronologickému rozboru. Ve všech místnostech sklárny i v jejím okolí byly nejčastějším nálezem zlomky plochého okenního skla. Drobné skleněné trojúhelníkové destičky vyplňovaly prostor mezi kulatými terčíky, které se zasazovaly do olověných rámečků. Z místnosti 1 pochází také úlomek skleněné lampy. Pravděpodobně jde o složitější typ svítidla byzantského původu. Obdobné nálezy jsou známy z paláců ve Visegrádu a Budě i z Pomázu.

Kategorie lahví zahrnuje lahve jednoduché, lahve kónické a lahve s úzkým hrdlem typu Angster. Nejrozšířenějším typem nádob vyráběných v této sklárně byly lahve kónické. Nepopíratelný je silný vliv benátské

sklářské tradice. Z území Maďarska pochází značný počet fragmentů kónických lahví, které patrně vyráběli místní skláři obeznámení s benátskými výrobními technikami - nejspíše pocházeli z území Dalmácie. Obdobné nálezy jsou známy i z dalších středoevropských zemí. Fragmenty lahví typu Angster pocházejí z jejich ústí, která byla zdobena zkroucenými skleněnými vlákny. Analogie jsou známy z Budy, Visegrádského paláce, Brna a Vídně.

Druhou nejpočetněji zastoupenou kategorií po kónických lahvích byly poháry. Nálepy na nich se liší svým tvarem, některé jsou zašpičatělé, jiné zploštělé. Dochoval se i zlomek poháru s reliéfním žebrem. Formální analogie jsou známy z paláců ve Visegrádu a Budě a z Ozoru. Z místnosti č. 1 pocházejí i dva fragmenty velkých, hlubokých mis.

Na základě stratigrafických pozorování, nalezené keramiky, výsledků archeomagnetického průzkumu pecí a zmíněného písemného pramene je možné předpokládat, že tato sklárna vznikla v období vlády Matyáše Korvína (r. 1458–1490) a přestala fungovat někdy v první polovině 16. století.

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