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Medieval glass vessels from the necropolis's excavations of the XI–XIII cents. on the territory of the St. Sophia Cathedral in Kyiv: restoration research

abstract: The article highlights the results of the restoration research into the five glass goblets which were found in burial sites during the archaeological excavations on the territory of the National Museum "Sophia of Kyiv" in 2014. The composition of the glass conical beakers has been analyzed and their complete form has been restored and an interpretation of the archaeological context of the glass objects has been proposed.
keywords: Sophia of Kyiv, restoration, archaeological glass, glass funnel beakers, burials.

abstrakt: Artykuł przedstawia wyniki badań konserwatorskich pięciu szklanych kielichów, które znaleziono na cmentarzu podczas badań archeologicznych na terenie Muzeum Narodowego „Soboru Mądrości Bożej, Soboru Sofijskiego" w 2014 roku. Przeanalizowano skład szklanego pucharu stożkowatego, przywrócono jego pełną formę i zaproponowano interpretację kontekstu archeologicznego dla przedmiotów szklanych.
słowa kluczowe: Sobór Mądrości Bożej, Sobór Sofijski, renowacja, szkło w archeologii, szklane puchary lejkowate, pochówki

One of the topical objectives of modern medieval studies is a deep research involving as many as possible source studies, both written and material, with a maximum of historical information. The above mentioned is true for those fields of the medieval studies which are based on the study of the medieval human beings' material world. Subsequently, employing the variety of the other sources, the researcher is trying to describe the separate facts of individuals' daily routines which influenced the forming of their perception of the surrounding world. In the end this approach will help the scientist to realize a more objective reconstruction of the medieval society's mentality, economic relations, trade relations, etc. It will contribute to a better understanding of the historical processes in these and other historical periods of the society and country.

The conservation and restoration research, which are closely connected with the exact sciences, and exist on the basis of the search and study of the material sources, give considerable assistance in the completion of the above-mentioned tasks that are connected with the sphere of the scientific interest of archaeology. The finds which are being obtained while restoring allow not only to recreate the

whole form of the ruined object but also to define the features of its composition, the specifics of its functionality and the character of the damage it has sustained, along with features of their further use, reasons for their damage etc. The information defines more exactly a possible functional meaning of the archaeological find, and its chronological and geographical origin.

Exact research has been made by us while restoring five glass goblets which were found during the excavations by joint archaeological expeditions of the Archaeological Institute of the National Academy of Sciences of Ukraine and the National Reserve "Sophia Kyivska" in 2014. The excavations were carried out on the territory of the "Sophia Kyivska" — in the north western part of the former Metropolitan's Garden. The archaeological finds are being kept in the Scientific Funds Department of the National Museum "Sophia Kyivska". To definitely identify the goblets, we are going to mention the number of the Scientific Help Fund, which is given to each object while it is registered in the fund. It allows other scientists to easily find the required goblet which will be submitted again to the Fund's Collection after its restoration as an object of the Main Storage Fund.

The territory of the finds had been researched by archaeologists in 1909–1910, after an expedition of the Imperial Archaeological Commission headed by D. Mileiev. During these archaeological research endeavours the rest of the foundation of the church of the XI c. and a big Christian necropolis around it which is dated within the XI–XIII c. was found [Mileiev 1910; Karger 1961: 226–232]. In 2014, archaeological research endeavours were aimed at studying the rest of the latest outhouse near the southern wall of the excavated church by D. Mileiev; the outhouse itself was not studied during the works of the years of 1909–1910 [Bobrovsky, Kozyuba, Tymoshenko 2015]. Also the excavated territory had burials which were situated near the southern wall of the XI century church and the mentioned outhouse of the XII century. Materials received during these archaeological research attempts require additional chemical and technological research of solution, a study of the anthropological material and a photogram metrical definition of the planography of the monument and its stratigraphy. The results of the research are going to be published in other publications, including a monograph, in which the restoration research of five glass funnel beakers are to be presented. During the excavations of 2014, the archaeological glass was sent to the scientific restoration workshop immediately from the excavations with the soil monolith, as the objects were in bad condition. They were broken into lots of small pieces and infected by thorough corrosion (SHF 5804) and covered with irrigating crust of different times. And this is why the objects require operative conservative intervention. Preventive conservative measures foresaw both a previous photo fixation and impregnation of the glass, broken by the deep erosion, with the soil monolith with 5–10% solution of Paraloid B-72 in ethyl acetate (SHF 5804, SHF 5802, SHF 5803). After this the ground surfaces of the glass fragments

were cleaned with the help of a blade and scalpel by eye, and it was made possible to get fragments of sufficient strength for the further restoration process of the complete form of the object. In the context of the definition of the methodology of the restoration of each object, preliminary typical research attempts have been carried out to identify similar analogies, and also we have done chemical analysis of each beaker and three cases of the surrounding soil. Chemical research has been done in two scientific centers: the Pranas Gudynas Restoration Centre (Vilnius, Lithuania) and the Institute of Geological Sciences of the National Academy of Sciences of Ukraine (Kyiv, Ukraine). In the Pranas Gudynas Restoration Centre optical microscopy was done, namely measuring of the pH of the glass surface and soil from the excavations, an IK-spectrum analysis, and electrodisperse microscopy / energy dispersive X-ray spectroscopy (SEM/EDX). During the research of the Institute of the Geological Sciences X-ray, spectral electron-probe microanalysis with the help of the raster electron microscope GSM–6490 LV and introspective spectrometer was used. All these measures were needed to provide optimal methods for the restoration of each object.

In the typological way, the five glass beakers can be divided into three main groups. The first group includes two funnel-shaped (or conical) beakers with astatic bottoms (SHF 5800 and SHF 5801), the second group includes a conical beaker (wineglass) with a stable concave bottom (SHF 5804), the third group includes two conical beakers each with a pallet (SHF 5802 and SHF 5803) [Schapova 1972: 37–41; Stolyarova 1997: 102].

***Conical vessels with a sharp bottom № 1* (*SHF 5801*).** The object was found in the burial (№ 28), to the right of the skeleton's legs, head orientated to the south west [Bobrovsky, Kozyuba, Tymoshenko 2015: 33–34]. The beaker was kept in a bad condition and had forty three fragments of different sizes, covered with blue white iristic crust fragments, and a surface which had pittings and microcracks. In the central part there were losses (5–7%); near the crown of the object there were losses up to 3%. Nevertheless, all these circumstances did not prevent a complete reconstruction of the glass beaker's form.

To implement the beaker's restoration, the original fragments were glued with 25% solution of glue PVB (g) in Ethanol. The losses were supplemented with the help of the two-component epoxy resin Araldite 2020; for this purpose losses were superimposed with sheets of paper, on which contours of the lost parts were transferred. The tracing papers were superimposed on a PVC film and templates for topping up were produced with Araldite 2020, which were glued onto the losses with the rubber glue. For pressurization, the edges of the PVC film were covered with the two-component silicone mass Platinum 30 (A/B). In the places of loss, the fillings were made with Araldite 2020, and after that the PVC film and silicone coating were dismantled, and an abrasive treatment of the surface of the additive with the help of a drilling machine with circles-nozzles with sandpaper

was done. After all the procedures, the surface of the beaker was covered with the acrylic varnish "Renesans".

The beaker (fig. 1) is 13.5 cm high. In the basic part there is a cone-shaped bottom with a break in the completed part, and in the upper part there is a wide straight crown with a diameter of 10 cm with a small roller on the edge. On the surface there is a relief of a wavy spiral-shaped ornament, the spiral has a direction from the bottom to the crown. The glass is of a transparent yellow green colour, and air bubbles are observed in the thickness of the glass mass. The top layer is irregular, but it is blissfully-transparent.

Fig. 1. Funnel-shaped vessel with sharp bottom № 1 (SHF 5801). After restoration; photo by Maksym Strykhar

Ryc. 1. Naczynie w kształcie lejka z ostrym dnem Nr 1 (SHF 5801). Po renowacji; fot. Maksym Strykhar

As a result of the various research conducted, the Restoration Centre of Pranas Gudynas defined that the pH of the surrounding soil of the beaker (loess with impurities and debris interspersed with plant matter) in the burial № 28 equals

7.64–7.82. The IK-spectral analysis indicated the presence of carbonate-silicate compounds in the alkaline soil which led to corrosion of the surface of the glass object due to the process of the alkaline hydrolysis. The pH of the irised glass layer was 6.53–6.52.

The elementary composition of irised glass was determined:

Name	C	O	Al	Si	K	Ca	Pb
Spectrum 1	10.7	43.6	0.4	21.2	8.1	0.4	15.7
Spectrum 2	9.4	41.3	0.4	22.4	9.1	0.5	17.0
Spectrum 3	9.6	40	0.4	22.5	9.1	0.4	17.0

And non irised glass:

Name	C	O	Mg	Al	Si	P	Cl	K	Ca	Ti	Fe	Pb
Spectrum 1	9.2	48.4	0.5	3.8	14.5	2.3	0.6	1.1	4.3	0.2	1.9	13.1
Spectrum 2	7.4	49.4	0.5	4.6	17.4	1.7	0.5	1.2	4.2	0.2	2.4	9.9

According to the research results of the Institute of Geological Sciences, the content of the main elements looks like this:

Spectrum 1.1.	Si	K	Pb	Total
Mean	49.15	17.21	33.64	100.00
Spectrum 2.1.	×	×	×	×
Mean	24.76	11.06	4.65	59.62
Spectrum 2.2.	×	×	×	×
Mean	22.98	14.28	31.23	31.51

The distribution of the main compounds looks like this:

Element %	Weight %	Atomic %	Compd %	Formula
Si K	23.23	24.95	49.69	SiO_2
K K	13.89	10.72	16.74	K_2O
Pb M	31.17	4.54	33.58	PbO
O	31.71	59.79	×	×
Totals	100.00	×	×	×

Received results of the chemical analysis prove that the glass matrix consists of lead-potassium glass. In the composition of the iris glass there are small impurities Mg, P, Fe and relatively large amounts of Al which is connected with the influence of the soil from the archaeological cultural layer.

Bell-shaped beaker with a sharp bottom № 2 (SHF 5800). The object was discovered in the filling of the burial pit (№ 15), near the northwest oriented skeleton [Bobrovsky, Kozyuba, Tymoshenko 2015: 27–28]. The beaker was in a broken condition, it consisted of twenty thin-walled fragments of a highly iris matte opaque glass of a white color (fig. 2). The burial also had two fragments of thick-walled glass of a yellow-green color not belonging to this vessel. Currently, only conservation measures have been taken, and the process of restoration is underway. However, the available fragments make it possible to establish precisely that the shape of this object is similar to the vessel mentioned above (fig. 3).

Fig. 2. Bell-shaped beaker with a sharp bottom № 2 (SHF 5800). The restoration process; photo by Maksym Strykhar

Ryc. 2. Puchar w kształcie dzwonka z ostrym dnem Nr 2 (SHF 5800). Proces renowacji; fot. Maksym Strykhar

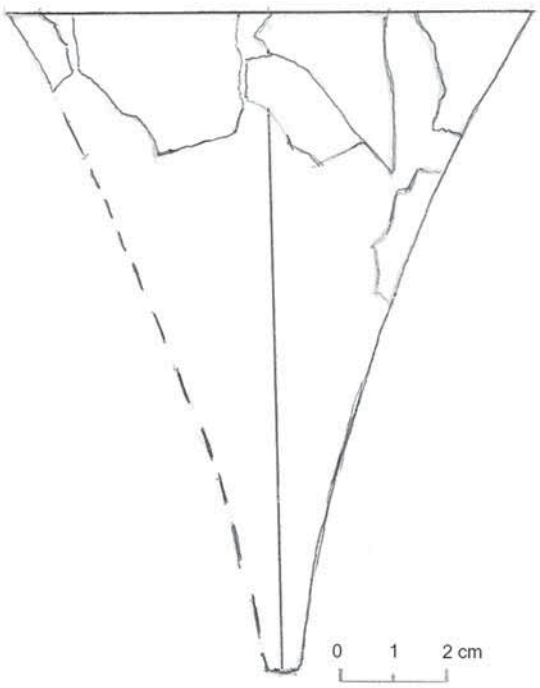

Fig. 3. Bell-shaped beaker with a sharp bottom № 2 (SHF 5800). Reconstruction; drawn by Maksym Strykhar

Ryc. 3. Puchar w kształcie dzwonka z ostrym dnem Nr 2 (SHF 5800). Rekonstrukcja; rys. Maksym Strykhar

The study of the chemical composition of the glass samples of SHF 5800, carried out at the Institute of Geological Sciences, gave the following picture of the distribution of the main elements:

Spectrum 1.1.	Si	K	Pb	Total
Mean	44.65	16.45	38.95	100.00
Spectrum 2.1.	×	×	×	×
Mean	23.95	11.27	5.63	59.16
Spectrum 2.2.	×	×	×	×
Mean	20.85	13.66	36.16	29.34

By compounds:

Element	Weight %	Atomic %	Compd %	Formula
Si K	20.88	23.75	44.66	SiO_2
K K	14.67	11.98	17.67	K_2O
Pb M	34.97	5.39	37.67	PbO
O	29.48	58.55	×	×
Totals	100.00	×	×	×

Thus, in this case, the results obtained during chemical investigations also indicate that the glass matrix consists of lead-potassium glass. The content of PbO and K_2O is almost the same, which together with the same sizes of form, can indicate that both beakers with a sharp bottom came out from one workshop or at least from one region at a similar time.

The conical beakers of thin glass with thin sharp bottoms, made by free blasting, having a height of 13.5–14 cm and a diameter of 10–10.5 cm along the crown, repeatedly occurred among the finds in the cultural layers of the XII–XIII centuries in medieval Kyiv [Zhurukhina 2017: 173], Novogrudka, Turov [Schapova 1972: 47–52] and Novgorod (fragments of the bottom part) [Schapova 1972: 41–47], though production of the vessels began in the XI century [Schapova 1972: 54–55].

Regarding their purpose, the assumptions about their usage as lamps, as examples of Byzantine lamps that were used to illuminate the temples, were expressed [Stolyarova 1997: 102], and also in the home for lighting the houses [Zhurukhina 2017: 175–176]. It should also be noted that vessels similar in shape were found during excavations of burial structures outside Rus-Ukraine, particularly in the graves № 577, 649 and 644 in Birka, but they are dated by early times — X c. [Arwidsson 1984; Poche 2001: Abb. 6, 8, 13, 15; Krueger, Wedepohl 2003: 97–98], and their shape is somewhat different from those found in Kyiv — they have a more pronounced transition from the broader part to the narrower, which is typical of conical beakers from Novgorod [Schapova 1972: 41–47]. The conical cubes discovered during excavations in Kyiv can be dated within the XII – to the first half of the XIII century, as the accompanying material in burial grounds is dated by approximately the same time [Bobrovsky, Kozyuba, Tymoshenko 2015: 27–28, 33–34].

Funnel beaker (goblet) with a stable concave bottom (SHF 5804) [Strykhar 2016]. The glass object of a light brown colour was found in the burial (№ 41), whose skeleton was not researched, because the bulk of the burial was located outside the excavation done in 2014 [Bobrovsky, Kozyuba, Tymoshenko 2015: 41–42]. The vessel was found in a collapsed state (fig. 4), it consisted of thirty one different sized fragments, on the surface of which there were traces of destruction and deformation of the glass due to damage through corrosion. To restore the complete form of the product, the fragments of the glass salts (the silicate base was completely destroyed) were percolated with a 10% solution of Poraloid B72 in ethyl acetate. Extracted from the soil monolith, the original fragments were glued in a 35% solution of PVB (g) glue in Ethanol, and the place of loss was supplemented with Araldite 2020 in the same way as during the reconstruction of the two conic-shaped beakers with a sharp bottom denominated above.

Fig. 4. Funnel beaker (drain) with a stable concave bottom (SHF 5804). Until restoration; photo by Maksym Strykhar

Ryc. 4. Puchar lejkowaty (otwór) z trwałym wklęsłym dnem (SHF 5804). Przed renowacją; fot. Maksym Strykhar

The study at the restoration center of Pranas Gudynos has made it possible to establish that the pH of the surrounding soil (a forest with impurities of construction waste and inclusions of substances of plant origin) in the burial is equal to 7.55–7.54. The IR spectral analysis indicated the presence in the alkaline soil of carbonate-silicate compounds, which led to the corrosion of the surface of the glass product due to the alkaline hydrolysis process. The pH of the irised glass layer: 6,38–6,33. SEM/EDX studies have identified the elemental composition of the glass, irised:

Name	C	O	Al	Si	K	P	Cl	Ca	Pb
Spectrum 1	5.6	52.9	0.3	22.8	1.2	–	–	–	17.0
Spectrum 2	7.5	43.7	0.2	22.6	8.5	–	–	–	17.5
Spectrum 3	8.6	57.2	0.2	17.2	5.2	–	–	–	11.5

And non irised:

Name	C	O	Al	Si	K	P	Cl	Ca	Pb
Spectrum 1	10.3	52.1	0.9	29.8	0.3	–	–	0.6	6.2
Spectrum 2	16.3	30.1	0.4	0.7	–	6.6	1.0	7.9	33.3
Spectrum 3	14.9	51.4	0.2	0.7	–	0.7	–	26.4	5.5
Spectrum 4	17.3	30.2	0.8	5.5	0.3	6.0	0.9	7.4	30.4

According to the results of chemical studies, we can conclude that the glass is predominantly lead silicate with a small fraction of potassium, and on the surface, as a product of irisation, white lead carbonate was formed. In the composition of the irisized glass there are small impurities P, Cl and Ca, which is probably due to the influence of soil from the archaeological cultural layer.

Permeable corrosion does not allow to determine the initial composition of the elements of the glass matrix, but one can assume that this object belongs to products of lead-alkaline glass Si-Pb-K (sand + lead + ash with the prerogative K). The restoration measures allowed to restore almost the full form of the beaker, which has a height of 12.5 cm, with a diameter of its bottom of 4.2 cm. Unfortunately, the crown and a part of the body were lost, which does not allow them to be confidently reproduced (fig. 5). However, similar products with flat bottoms, which were made by the same method of free blowing as the aforementioned sharp-bottomed vessels, with only one difference — the bark touched several times the flat surface — are repeatedly found among archaeological finds in the medieval Ukraine of the XI–XIII centuries including Kyiv [Schapova 1972: 58]. This type of glassware with a small projection has become widespread since the second half of the XII century [Stolyarova 1997: 102–103], which, obviously, should be recognized as the indicative time of burial of the dead person in whose grave this vessel was discovered; the archaeological data do not contradict such a date [Bobrovsky, Kozyuba, Tymoshenko 2015: 41–42]. Due to its stable shape, the beaker could have been used as a lamp, and purely for domestic purposes.

***A funnel beaker with a pallet № 1* (*SHF 5802*).** This item was found in the pit of burial (№ 27), at the feet of the skeleton (the lower part — near the left leg, the upper — at the right), the laying of which was headed to the southwest [Bobrovsky, Kozyuba, Tymoshenko 2015: 32]. The beaker was found in a collapsed state; it consisted of forty eight different sized fragments, on the surface of which there were significant traces of destruction and deformation of the glass, which was strongly damaged through corrosion (fig. 6). There was a loss of the crown (up to 20%), the body (60%) and the bottom (up to 5%), which however did not prevent the reconstruction of the full form of the subject. The surface of the artifact was a whitish-beige color.

Fig. 5. Funnel beaker (drain) with a stable concave bottom (SHF 5804). After restoration; photo by Maksym Strykhar

Ryc. 5. Puchar lejkowaty (otwór) z trwałym wklęsłym dnem (SHF 5804). Po renowacji; fot. Maksym Strykhar

During the restoration activities, the original fragments that were cleansed from the preservation solution and individual contaminants were glued with a 30% Polaroid B72 solution in acetone. In accordance with the drawing of the graphic reconstruction of the beaker, a silicone form was cast, on the surface of which the original glued fragments of the beaker were glued on with rubber cement. Further on, on the silicone surface in the places of loss, a solution of two-component epoxy resin Araldite 2020 was poured, as well as a dry pigment of paint (whitening zinc and ochre light). After removal of the silicone insert, the abrasive treatment of the surface of the additions was carried out with the help of a drilling machine with abrasive blades from sandpaper, after which the surface was covered with the acrylic varnish "Renesans". The beaker has a height of 12.5 cm, the base is a 3.1-cm-diameter leg, and a broad straight crown with a diameter of 10 cm is at the top. The bottom is round, wavy, and looks like a stylized flower (fig. 7). From the bottom in the direction of the crown, relief decorations are executed — 'ribs' that are 1.5 cm from the upper edge of the beaker (fig. 8–9). As a result of the research carried out by the Pranas Gudynos Restoration Centre, it was determined that the pH of the surrounding soil (a forest with admixtures of construction waste and inbred substances of plant origin) in the burial place

Fig. 6. A funnel beaker with a pallet № 1 (SHF 5802). Until restoration; photo by Maksym Strykhar
Ryc. 6. Puchar lejkowaty z paletą Nr 1 (SHF 5802). Przed renowacją; fot. Maksym Strykhar

was 7.98–8.1. The IR spectral analysis indicated the presence in the alkaline soil of carbonate-silicate compounds, which led to the corrosion of the surface of the glass product due to the alkaline hydrolysis process. The pH of the irised glass layer: 6.53–6.52. SEM/EDX research has identified the elemental composition of the irised glass:

Name	C	O	Mg	Al	Si	P	Cl	Ca	Ti	Fe	Pb
Spectrum	12.5	41.9	0.5	1.3	10.2	3.1	0.7	3.5	0.3	0.4	25.6

And the non irised glass:

Name	C	O	Mg	Al	Si	P	Cl	Ca	Ti	Fe	Pb
Spectrum	14.4	29.6	–	0.3	1.4	5.1	1.5	5.1	0.2	–	42.1

The studies carried out by the Institute of Geological Sciences gave the following distribution of the main elements:

Spectrum 1.1.	Al	Si	K	Ca	Pb	O
Mean	2.22	65.36	0.58	2.62	29.23	–
Spectrum 2.1.	×	×	×	×	×	×
Mean	1.16	29.04	0.33	1.25	3.50	64.73
Spectrum 2.2.	×	×	×	×	×	×
Mean	1.17	50.55	0.48	1.87	27.13	38.79

As for the main components:

Element	Weight%	Atomic%	Compd%	Formula
Si K	26.60	28.76	56.92	SiO_2
Ca K	1.77	1.34	2.47	CaO
Pb M	37.70	5.52	40.61	PbO
O	33.93	64.38	×	×
Totals	100.00	×	×	×

The obtained results of the studies allowed us to conclude that the glass is likely to be mainly lead silicate, and on the surface of it, as a product of irisation, a white lead carbonate has been created.

Fig. 7. A funnel beaker with a pallet № 1 (SHF 5802). Fragments of the bottom; photo by Maksym Strykhar

Ryc. 7. Puchar lejkowaty z paletą Nr 1 (SHF 5802). Fragmenty dna; fot. Maksym Strykhar

Fig. 8. A funnel beaker with a pallet № 1 (SHF 5802). After restoration; photo by Maksym Strykhar

Ryc. 8. Puchar lejkowaty z paletą Nr 1 (SHF 5802). Po renowacji; fot. Maksym Strykhar

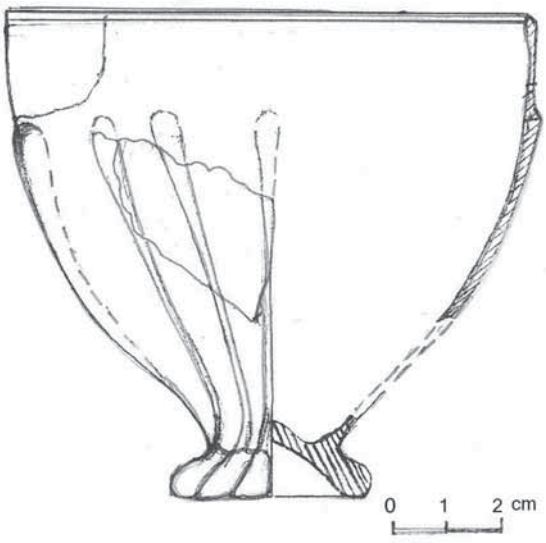

Fig. 9. A funnel beaker with a pallet № 1 (SHF 5802). Reconstruction; drawn by Maksym Strykhar

Ryc. 9. Puchar lejkowaty z paletą Nr 1 (SHF 5802). Rekonstrukcja; rys. Maksym Strykhar

***A funnel beaker with a pallet № 2* (*SHF 5803*).** Found in the pit of burial (№ 29), at the legs of the skeleton, head oriented south-southwest [Bobrovsky, Kozyuba, Tymoshenko 2015: 35]. The beaker, as in all other cases, was found in a highly destroyed condition; it consisted of eighty two different sized fragments, on the surface of which there are significant traces of destruction and deformation of the glass, strongly damaged by cross-corrosion. At the moment, the subject is in restoration, but the fragments preserved allow us to establish that its shape (fig. 10–11) is almost the same as a vessel having a SHF number of 5802. In this beaker the form is more "ascetic": there are no relief 'ribs' and a ring leg-pallet has a simple shape.

Fig. 10. A funnel beaker with a pallet № 2 (SHF 5803). The restoration process; photo by Maksym Strykhar

Ryc. 10. Puchar lejkowaty z paletą Nr 2 (SHF 5803). Proces renowacji; fot. Maksym Strykhar

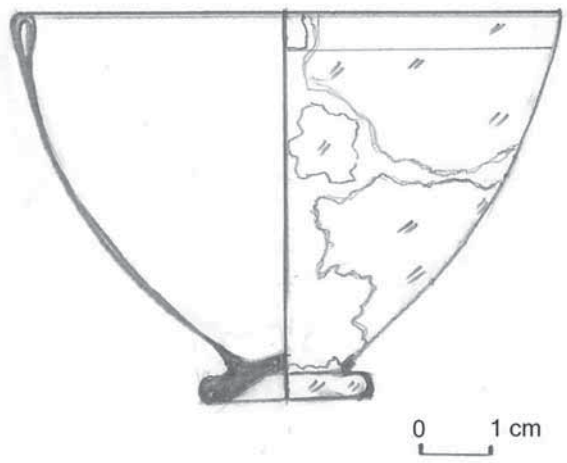

Fig. 11. A funnel beaker with a pallet № 2 (SHF 5803). Reconstruction; drawn by Maksym Strykhar

Ryc. 11. Puchar lejkowaty z paletą Nr 2 (SHF 5803). Rekonstrukcja; rys. Maksym Strykhar

The differences also are in the content of the glass, which, according to the research results of the Institute of Geological Sciences, has the following elemental composition:

Spectrum 1.1.	Si	K	Pb	O
Mean	47.32	17.64	35.04	–
Spectrum 2.1.	×	×	×	×
Mean	24.32	11.56	4.85	59.27
Spectrum 2.2.	×	×	×	×
Mean	22.12	14.65	32.53	30.71

The distribution of the main components looks like this:

Element	Weight%	Atomic%	Compd%	Formula
Si K	22.55	24.40	48.25	SiO_2
K K	15.15	11.78	18.25	K_2O
Pb M	31.10	4.56	33.50	PbO
O	31.20	59.26	×	×
Totals	100.00	×	×	×

Consequently, in this case, the results obtained during the chemical research indicate that the glass matrix consists of lead-potassium glass, so the different shape of the beakers and different composition can indicate their manufacture in different glass workshops, or at a remote time span.

Funnel-shaped beakers with a pallet had become widespread in medieval Ukraine; their appearance is determined by the second third of the XII century. They occur during this and subsequent centuries [Schapova 1972: 58–59; Stolyarova 1997: 103]. The significant distribution of such vessels indicates their distribution in the life of that time's population. Determining the time of the existence of these beakers allows one to date the burials number 27 and number 29 within the second third of the XII — and the first third of the XIII centuries.

The performed chemical analyzes allowed to establish that four out of the five beakers (SHF 5800, SHF 5801, SHF 5803, SHF 5804) belong to the group of products made from thin yellowish transparent silicon-lead-potassium glass, and one (SHF 5802) — to lead glass. The question of the place of production of the vessels remains open and requires further research with the databases of the chemical composition of glass products of medieval Europe, as well as further analyzes of the archaeological glass from the excavations on the territory of Ukraine, as nowadays the method of comparing forms of products without an analysis of the glass structure is still the main research method. In general, the current issue is the lack of a single base for comparing the structure of the objects discovered during the research.

It is interesting that all five glass beakers were found in the burials and were situated near the feet of the skeleton. This is why the archaeological finds are interpreted most likely as burial vessels, because, according to the ancient Christian tradition, on the body of the dead person, before the burial, they poured down sanctified chrism, which could be oil remaining from the last in the life of the person's extreme unction, or oil from the temple lamps. For example, according to the description of *The New Table Commandments*, quoting the work of the saints Dionysius and Simeon of Thessalonica (end of the XIV and early XV centuries), "…the dead are also anointed by the priest […] according to the example of that anointing with chrism which was accomplished before the saint's baptism […] And this anointing is a sign of Christ and the seal of those who went away in Christ…" [Veniamin 1992: 421–422]. Metropolitan Cyprian (1390–1405) writes about this feature of the burial order: "…and put it in a sepulcher, and a little wine was mixed with the old olive, the priest is pouring the first in a cross-shaped manner from the head, also on the feet, then from the right hand, and also to the left side; the beaker, with olive oil and wine, pours into the leg [to the bottom of the coffin — *Auth.*]; also having put the board, is filling up like any dead man…" [Kiprian 1880: col. 243–246; Panova 1987: 120].

There are also direct analogies of the use of glass vessels for the "wine of valkyrie" [Simpson 2005: chapter 9], used in the practice of burial in medieval Europe by representatives of the Scandinavian ethnic group [Hunter 1977; Harden 1978: 1–24; Arwidsson 1984; Poche 2001].

Perhaps the appearance of such vessels at the feet of the dead in burials in the territory of Rus-Ukraine should be associated with this tradition. If we compare

with the Scandinavian burial traditions, at least as an echo of those ancient traditions, the beakers could be used for ritual drinking during the funeral, and then they were broken down and in this condition placed into the coffin. At least, this explains the presence of fragments of a glass beaker in not always a compact collapse, as would have been expected if it was crushed by the collapse of the soil after the destruction of the grave, and in different parts of the burial. However, there is currently not enough information to substantiate or refute this thesis. So the research of five archaeological glass vessels dated by the 2014 excavations allows to define that medieval glass vessels were used for different purposes, as well as vessels for chrism or funeral vessels while drinking during the ceremony of burials — that opens to us another page of the functional purpose of the glass works of medieval Europe.

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Średniowieczne naczynia szklane odkryte na cmentarzu z XI–XIII wieku na terenie katedry św. Zofii w Kijowie: badania konserwatorskie

Streszczenie

Przeprowadzone przez autorów artykułu badania konserwatorskie i restauratorskie pozwoliły przywrócić pełną formę pięciu szklanym pucharom odkrytym podczas badań archeologicznych na terenie Narodowego Rezerwatu „Sofia Kijowska" w 2014 roku. Przeprowadzone analizy chemiczne pozwoliły ustalić, że cztery z nich należą do grupy wyrobów z cienkiego żółtawego przezroczystego szkła krzemowo-ołowiano-potasowego, a jeden — do wyrobów ze szkła ołowiowego. Umożliwi to w przyszłości dokładnie ustalić miejsce i czas produkcji tych naczyń oraz określić, w jaki sposób trafiły do Kijowa. Wszystkie pięć pucharów znaleziono w miejscach pochówku, na wysokości nóg zmarłych. Daje to podstawy do powiązania kontekstu archeologicznego z chrześcijańskim rytuałem pogrzebowym, podczas którego naczynia z olejem umieszczano w trumnie u stóp zmarłych. W tym celu nie używano specjalnych przyborów, lecz wykorzystywano te stosowane w życiu codziennym, na co wskazują odkrycia podobnych przedmiotów podczas wykopalisk w świątyniach lub budynkach mieszkalnych w różnych miejscach Rusi-Ukrainy. Jednocześnie możemy przyjąć, że takie naczynia występowały w skandynawskiej praktyce rytualnej we wcześniejszym czasie, gdy pito z nich wino rytualne, a następnie były one rozbijane i zostawały umieszczone w grobie. Takie powiązanie może wyjaśniać obecność szklanych pucharów w grobach na terytorium dziedzińca sofijskiego, których części nie są zdeponowanymi w całości naczyniami, odkrywanymi w postaci ułamków zalegających tuż obok siebie, lecz stłuczką rozmieszczoną swobodnie w obrębie jam grobowych.

Streszczenie z j. ukraińskiego tłumaczyła dr Olena Gomeniuk