Periodico di Mineralogia (2015), Special Issue, 84, 1, 91-106 DOI: 10.2451/2015PM0006

PERIODICO di MINERALOGIA
established in 1930

An International Journal of
MINERALOGY, CRYSTALLOGRAPHY, GEOCHEMISTRY,
ORE DEPOSITS, PETROLOGY, VOLCANOLOGY
and applied topics on Environment, Archaeometry and Cultural Heritage

Iranian Bowl from Biliar: Complex Research and Conservation

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Abstract

The article represents the experience of complex research and conservation of an outstanding specimen of medieval Islamic fine wares - Iranian 12th century bowl found in archaeological excavations in Biliar, a capital of Volga Bulgaris in the 11th - beginning of the 13th centuries. Main methods of investigation are morphological, technological and semantic analyses. Chemical composition of ceramic body and glaze was determined by Scanning Electron Microscopy (SEM). The bowl is shaped by pressing into a mold with added foot-ring. 14 lobes of the bowl are decorated with 14 differing feminine faces in headdresses (crowns?), 13 of which are adorned with paired confronted birds: doves, falcons, partridges, ducks, geese, and swans. The walls of the bowl are pierced along the edges of the faces, with tiny holes filled with transparent glaze, so the walls are translucent against the light. The bowl is coated with glaze all over except the foot-ring and adorned by underglaze splashes of cobalt. The bowl was previously treated in the field, where it was assembled of 22 fragments, and we had to deal with its full retreatment. Conservation approach was developed individually on the basis of characteristics of body and glaze, peculiarities of manufacture, damages and deterioration of ceramic and restoration materials. The whole conservation process is represented in the article. The process of edges cleaning was the most time-and effort demanding one, while desalination and loss compensation turned out to be most difficult in terms of taking correct conservation decisions. As a result of full re-treatment, the item was thoroughly investigated, its body released off excessive chloride salts and consolidated. The bowl got aesthetical appearance worth both its historical value and artistic merits and can be successfully presented on the exposition of renowned university museum on the rights of the "pearl" of its collection.

Key words: Conservation; Scanning Electron Microscopy; fritware; Iran; Biliar.

Introduction

In the beginning of the 10th century an official adoption of Muslim religion in Volga Bulgaris took place. Judging from materials of burials during X - XI centuries Islam had spread over all the main area of Volga Bulgaris. At this very time a process of urban Islamic culture formation was being in progress there; for reasons of ideology, getting familiar with cultural values of the East was to serve to the success of the process. Years of excavations on the site of Biliar - the capital of Volga Bulgaris in the 11th - first third of the 13th centuries - provided a rich collection of pieces of medieval Near Eastern art, ranging from Mesopotamian lusterwares of the 10th - beginning of the 11th centuries (Valiulina, 2010) to Iranian luster- and "mina-i" decorated vessels of the end of 12th - beginning of the 13th centuries (Valiulina, 1997). The fact that Iran occupied special place in contacts of Volga Bulgaris with the Near East, may no less convincingly than by faiences be proved by mass production of Islamic glassmaking found in Biliar (Valiulina, 2005).

One of the most prominent items of the Kazan University archaeological collection is a fritware bowl found in 1978 in the central part of the settlement of Biliar in archaeological excavations headed by A. Kh. Khalikov. The bowl has been preserved fragmentarily in the upper horizon of the cultural layer of the 12th - early 13th centuries which was affected by long-term plowing. In Biliar, a few fragments of similar vessels come from the upper horizon of the cultural layer (12th - early 13th centuries). Ceramic finds of this group are also known from ancient towns of Kiev, Suzdal, Staraya Ryazan (Koval, 2010, p. 67).

The aim of present paper is a thorough investigation of the unique find from Biliar (Figure 1). Apart from morphological, technological and semantic analyses, results of conservation of the item are represented, which also led closer to deeper and more precise understanding of distinguishing traits of the piece. Such a detailed investigation of a single item is conditioned by the fact that it is the results of study of best specimens that allow to judge on the level of ceramic industry of given region and period as a whole.

Morphology, Technology and Semantics

The body of the vessel is a fine fritware

Figure 1. Before conservation.

containing 73.41% of silica (Table 1: 1a). The color of the body is a light ivory one, close to white. As indicated by many scholars, introduction of such a ceramic body by the mid of late 11th century at the Near East was an "almost 'revolutionary' step" in the pottery production of the region (and, one may add, in the whole history of ceramic production): "a new body material was introduced with the intention of coming as closely as possible to Chinese porcelain and stoneware" (Fehervari, 2000, p. 95). Primarily, the whiteness and translucency of porcelain was sought for by Near Eastern ceramists, and new material was as close to these qualities as possible. According to Fehervari's classification, the bowl discussed belongs to a class of so-called 'Seljuq white' wares, the type perhaps "closest and best compared to the contemporary Sung period 'ch'ing-pai' porcelain" (Fehervari, 2000, p. 96). Moreover, such a ceramic material allows extremely thin walls almost free of deformation in drying and firing, thus making possible new ways of shaping and decoration.

The vessel is shaped by pressing into a mold with added foot-ring made separately (Fehervari, 2000, p. 335-341; Watson, 2004, p. 134, 147). The shape of the bowl, "the so-called pedestal bowl, or cup bowl, was a popular type during the 'Seljuq' period in Iran" (Fehervari, 2000, p. 101). 14 lobes of the bowl are decorated with 14 differing feminine faces in headdresses (crowns?), 13 of which are adorned with paired confronted birds, and one represents a square panel instead (Figure 2). Distinguishing features

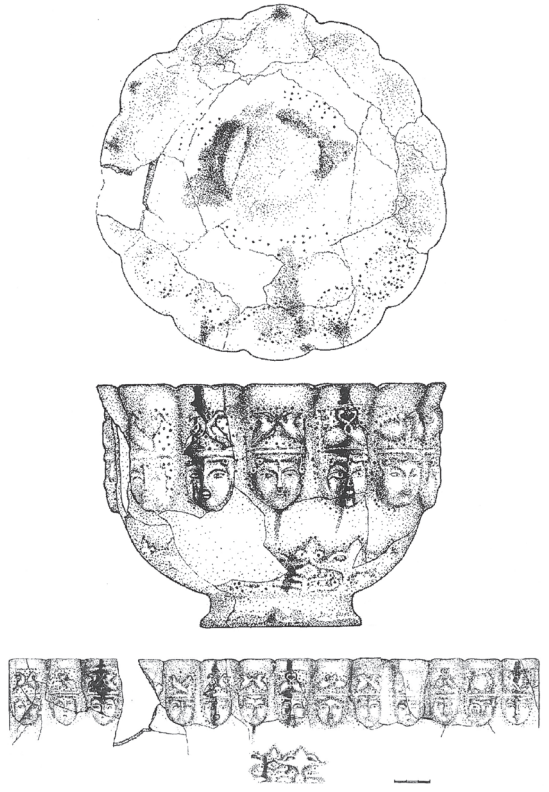
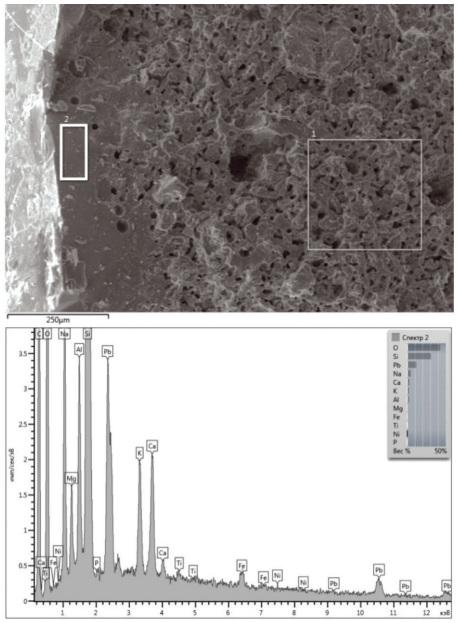


Figure 2. Graphic reconstruction of the bowl.

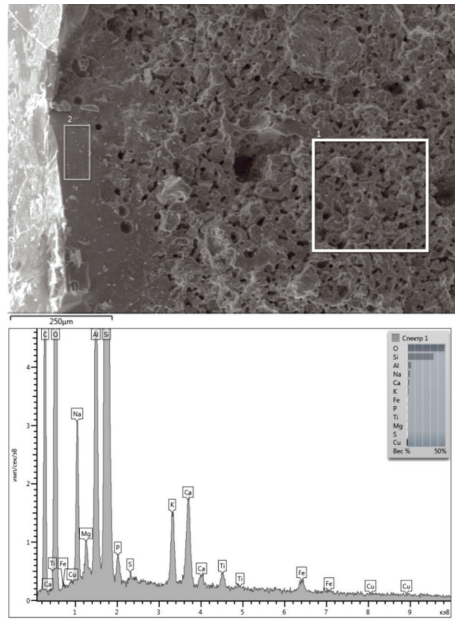
Table 1. Results of the chemical composition analysis of the glaze and fritware body by SEM-EDS. In figures (below) are reported the areas of analysis and related microchemical spectra for samples 1 and 1a

№	Name	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	K_2O	CaO	TiO_2	FeO	NiO	PbO	CuO	SO_3
1	Bowl with masks. Biliar. AKУ-307/1. Glaze	6.35	1.87	4.27	61.01	0.16	2.92	4.04	0.36	1.17	0.13	12.73	-	-
1a	Bowl with masks. Biliar. AKУ-307/1. Fritware	5.06	0.95	9.88	73.41	1.57	2.52	3.95	1.10	1.13	-	-	0.12	0.30
2	Fragment. Biliar. AKУ-285/4592. Glaze	8.11	1.72	4.38	65.40	0.11	2.21	3.99	0.22	1.08	0.09	12.61	-	-
3	Fragment. Biliar. AKУ-295/54. Glaze	7.85	1.56	3.97	64.71	0.23	2.62	4.37	0.13	0.92	0.17	13.97	-	-

Glaze (1)



Fritware (1a)



of the faces are soft rounded oval shape, long arched eyebrows, characteristic fold along the forehead, widely open, slightly slanted eyes, straight, rather broad nose and small mouth. The upper part of the face, temples and forehead are framed by curls - headdress detail or hair (?).

Master molds for making such vessels are well known; an example of a clay master mold for producing molds to shape a very similar lobed vessel with feminine faces, is reproduced by Watson (Watson, 2004, p. 140, 141, Cat. Af. 3). Walls of the Biliar bowl are pierced along the edges of the faces, with tiny holes filled with transparent glaze, so the walls are translucent against the light (Figure 3). The bowl is coated with glaze all over except the foot-ring. The lower part of the body is decorated with repeating floral design in light relief. The bowl is colored with cobalt splashes under the glaze on both its inner and outer sides. Added decoration inside the bowl is lost, as being made as superimposed molding, it proved to be nondurable after firing. Perhaps, the lost image could provide the key to reading the entire artistic composition or function of the item. One can assume the presence of vertical tube-stand for a wick or candle inside the bowl, at the bottom, like in simple ceramic lamps. In this regard, a bowl would look like metal lamps with openwork decoration or perforation, such as a suspended lamp from the Museum of Turkish and Islamic Art in Istanbul (Sahin, 2009, p. 52).

Apart from the decorative diagram of the bowl, it is essential to characterize slight imperfections of its manufacture. For example, a straight vertical indentation on the rim, a crown and a face of one of the lobes is most likely an impression into wet ceramic body (Figure 4).

Bowl proportions strictly comply with the principle of the "golden section". As a module - contingent dimensional unit of structural elements coordination - diameter of the pan equal to 1 cm was adopted by the master, height of bowl is 10 cm, i.e. equal to diagonal of a square, the side of which is equal to the module. Measuring the received diagonal along one side of the square (10 cm), we obtain a rectangle, the diagonal of which is 14 cm (diameter of the rim without lobes). The rule for calculating proportions by constructing a square and regular rectangle was one of foundations of the medieval East art

Figure 3. Pierced holes filled with glaze.

Figure 4. Technological imperfection: slight indentation on the lobe to the left.

(Rempel, 1978, p. 157, 158).

Chemical composition of glaze and body of the bowl and glaze of two fragments of similar vessels from Biliar was determined by scanning electron microscopy in the Laboratory of the Institute of Geology and Oil and Gas Technologies of Kazan University (analyst A.A. Trifonov); the results allowed to clarify the earlier conclusion (Valiulina, 2007, p. 176) - the glaze of all the three samples is a lead-alkaline one (Table 1: 1, 2, 3). Studies were carried out on auto-emission scanning electron microscope Merlin, combined with energy dispersion spectrometer INCA X-MAX with resolution 127 eV and detection limit 1500-2000 ppm. Accuracy of measurement is 0.01-1 %, depending on state of an object. Surface morphology shooting was carried out at accelerating voltage of 5 keV to increase the depth of image contrast. The analysis was performed at accelerating voltage of 20 keV and working interval of 9 mm, thus allowing to avoid least errors possible. Probing depth is less than 1 micron.

One can find vessels that combine all the decorative techniques Biliar find is decorated with, in museums and private collections of the world (Lane, 1948, Figure 37). Dimensions and proportions of some of them are exactly the same as of the Biliar bowl (Azamoush-Maillard,1978, № 15). The cup from the collection of Edmund Unger is decorated with relief inscription, naskh handwriting, and birds surrounded by holes filled with colorless glaze; the item is, presumably, a 12th century production of Rhea (World Ceramics, 1968). The 12th century bowl from a private collection in Milan (height 105 cm, diameter 13 cm) is decorated with relief epigraphic inscription and underglaze holes is the production of Kashan (Curatola, 2006, p.79). Vessels could be decorated only with openwork border of floral ornament and sparse small drops of cobalt colorant (Pancaroglu, 2007, p. 93. № 50). Iranian bowl of the second half of the 12th - early 13th century (height - 10.8 cm, diameter - 14.9 cm), from the collection of Louvre, is especially beautiful: it is decorated with all the artistic techniques inherent to this group of vessels, but the main ornamental composition is the scene of equestrian aristocracy lions hunting, made in high relief. There exists an opinion that the cup was a prize or a gift to reward the luckiest hunter (Les Arts de L'Islam au Musee du Louvre, 2012, p.18, 48).

G. Fehervari believes that products with a carved ornament arose as imitation of Chinese porcelain vessels "ch'ing-pai" of Sung period. The researcher suggests evolution of this group of wares basing his research on the material of the Tareg Rajab Museum collection (Fehervari, 2000, p. 96-98. № 98-105). According to his opinion, the earliest samples, were of simple form and significantly worse than Chinese wares of the same period. Small red clay vessel with two-sided transparent colorless glaze with a green tint is proposed as an earliest example (Fehervari, 2000, p. 96. № 98). The next vessel - a pitcher, has a relief lobed surface of the body and is covered with a colorless glaze, with crackle mesh and vertical underglaze cobalt streaks (Fehervari, 2000, R. 98. № 104); decoration is enriched by embossed or stamped images of running animals, relief rolls, inscriptions, blue splash and holes. The pitcher belongs to a final phase of decoration techniques development of the studied group of wares. The last sample in the evolutionary series is fragmentarily preserved, lobed-shaped vessel, each lobe of which is decorated with facial images. This cup is the closest analogy to Biliar find: besides decorating techniques, both cups have same dimensions (Fehervari, 2000, P.101. № 111). It can be argued that Biliar cup is the most perfect example of all currently known wares of this group. G.Fehervari dates the "final samples", which combine the whole decorative techniques complex - openwork, stamped facial images, cobalt streaks, transparent, colorless glaze - by the 12th century and believes that

they could be made in Kashan and/or in Geran (Afghanistan) (Fehervari, 2000, p. 98).

Turning to the aspect of semantics of decoration, we can assume that Pari - Peri, evil or good spirits in Iranian-Persian mythology, are represented on the bowl (Myths of the peoples of the world 1992, p. 286). In their zoomorphic version, kind peri appear as beautiful birds. In anthropomorphic image, friendly peri are beautiful girls or women in white, blue or red clothing. In some Turkic myths peri are connected with water element and are "water hostesses" (Myths of the peoples of the world 1992, p. 287). If regarded as a single image, beautiful faces and pairs of birds are associated with fravashi - fravarti, considered in Iranian mythology the essence of the soul. Fravashi have a female appearance, and "hover in the sky" (Myths of the peoples of the world 1992, p. 571). Karshiptar also appears in Iranian myths in the image of a winged creature - the lord of water element, the king of birds in this world. Karshiptar image goes back to the archaic Eurasian myth about the Demiurge deity in its water bird's personification (Myths of the peoples of the world, 1992, p. 625). According to the Qur'an, beautiful houris are waiting for the righteous in ever blossoming paradise garden. On medieval miniatures, in particular, to the text of "Mi'radzh-name", "angelic" headdress in shape of two wings can be seen on houris' heads, as well as birds sitting on heads of some them (Bertels, 1997, p. 385).

In Armenian mythology, the cult of birds is also of great importance. Group of birds: dove, stork, pheasant, eagle-griffin, peacock, swan, duck - is preferentially bound to heavenly worship, symbolizing the immortality of the soul (Kalantaryan, 1982, p. 35). Paying attention to the fact that poly-semantic image of a bird has different connotations in medieval art, V.P. Darkevich indicates that images of paired birds on bowls are amorous symbols, images of prosperity and happiness in family, i. e. these images were regarded as apotropaic, dissolving the evil (Darkevich, 1975, p. 230). In this regard, paired images of birds with necks bound together and beaks touching, as if for a "kiss", deserve special attention. Analyzing these images in medieval Armenian miniature painting, I.A. Orbeli indicates a very early analogy of this composition in the art of ancient Mesopotamia and reports that the symbolic meaning of this scene "was discovered, or at least explained in miniatures, by the prominent Armenian scholar, preacher and poet of the 13th century - John Erznkatsi: he defined these bound-necked water birds, pelicans with touching beaks as a symbol of love" (Orbeli, 1968, p. 118). This motif of Eastern origin was also known in Byzantium (Darkevich, 1975, p. 312). In the Far East of Tang period, "so-called wedding mirrors, the ornament of which consisted of paired birds that symbolized happy marriage" were widespread (Lubo-Lesnichenko, 1975, p. 19). Paired images of water birds with intertwined necks are also found on Chinese glass ornaments of Ming Dynasty (Han 1998, p. 40).

The motif of pairs of birds with bound necks is also represented in architectural decoration, for example, in a church in Uncastillo (built in 1135-1155) and in the church of St. Andre de Pecharroman in Segovia, one of Spanish provinces once exposed to strong Arabic influence (Volkov, 2013, p. 63). G.K. Wagner noted Eastern origin of the similar plot on the west facade of the Dmitry cathedral in Vladimir (Wagner, 1969, p. 174).

Apart from the scene and personal symbolism, numerical and color symbolism is obvious in decoration of the bowl. 14 faces (lobes) of the bowl suggest the number of seven, a sacred number in Islam: "the Prophet flies through seven heavens, goes into them through the seven gates, then descends into the hell, where passes the seven circles". Multiplying the number seven gives multiplicity and versatility (Bertels, 1997, P. 377). Some allegory probably could

be explained by application of irregular blue streaks on the otherwise almost white surface of the bowl. For example, according to the system of color symbolism of Sufism, the "veil" of life origin has blue color (Bertels, 1997, p. 302).

Researchers have repeatedly noted that relief images of human heads on ceramic vessels in the East have been known since ancient times; they were made as imitation of metal vessels and had religious-magical function. In its meaning, anthropomorphic images echo with numerous benedictory inscriptions on the same vessels. The same wishes of prosperity, power, happiness, strength, intelligence, wealth, prosperity to vessel's owner are expressed but in allegorical way. Zoomorphic images in ceramics convey the same idea (Lunina, 1962, p. 341).

On the basis of dated technology and decor analogies, as well as from the finding conditions, it can be concluded that the bowl was made in Iran in the 12th century. Currently, Biliar collection of Eastern fritware dishes consists of more than 300 finds that, along with glass other items reflects the extensive trade and cultural links with the countries of Volga Bulgaria with Middle East countries. At the same time, unique character of Biliar bowl suggests that it came to Biliar as an expensive item, probably, as a wedding gift.

Conservation

In 2013, Biliar bowl from the collection of the Archaeological Museum of Kazan Federal University was treated at the State Hermitage Museum's Scientific Conservation Department.

The bowl was previously treated in the field by the member of excavation team George V. Frolov who we should be grateful to for assembling 22 separate pieces of the bowl together. Nevertheless, 35 years past the vessel needed to be retreated for reasons concerning both aesthetic and safety aspects: due to ageing of old restoration materials previous treatment could not correspond both criteria. Joints lacked mechanical strength, as was indicated by tapping the walls. A long all-thickness deep crack in the bottom was in dangerously unstable, moving condition (Figure 5). Losses of about one fifth of the whole surface were partly filled with hoarse-grained plaster of poor quality. Joints were stepped and uneven, and areas along them covered with dark glue. The surface of the bowl was contaminated with old glue and plaster (Figure 6, 7). Also there were brownish-yellow stains under the glaze on the edges of fragments, and genuine light color of ceramic body preserved just in the middle of shards (Figure 8). Such condition of the bowl suggested the necessity for its full retreatment.

Primarily, the surface was cleaned with water and alcohol mixture in equal parts. To disassemble the bowl, it was necessary to examine the glue so as to find out a proper solvent. A small sample of glue was exposed to the action of different solvents and appeared to be soluble in alcohol. As a result of investigation held immediately in the conservation laboratory, the glue was identified as butvar-phenolic adhesive.

Disassembly was made by "piece-by-piece" method, with the use of alcohol semi-dry compresses, and the whole process being under constant control (Figure 9). As fragments were

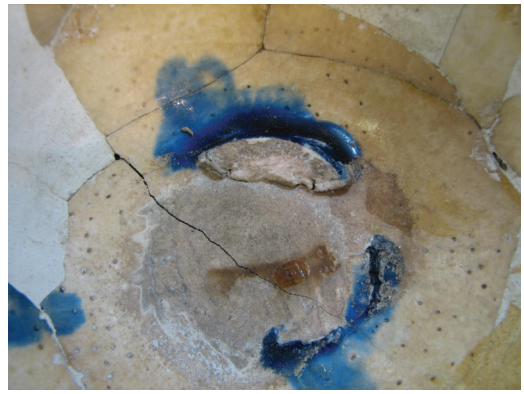


Figure 5. Before conservation: crack in the bottom.

carefully being dismantled one after another, the bulk of glue was being removed off the edges with semi-dry alcohol swabs. Such care was strictly conditioned by the nature of frit body, probably, the most tricky type of ceramic material in terms of conservation. Being artificially composed of fine-grained components, it used to be fired at temperatures lower than required to get them fused and so remained porous (Allan, 1973, p. 111-120). Due to this it is extremely subject to contamination of every kind. The action of solvent might cause spread of glue deeper into the body unless disassembly process carefully controlled and the amount of solvent minimized (unlike another case study of conservation of a well known lustre painted Seljuk ewer with

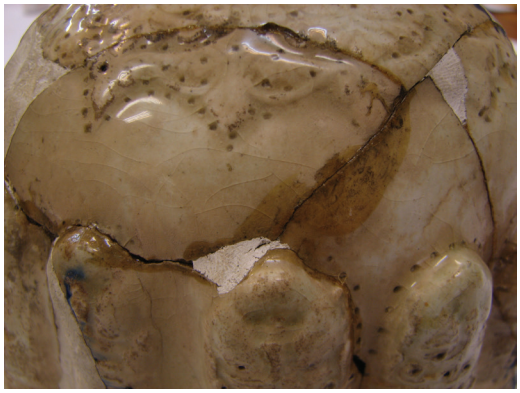


Figure 6. Before conservation: surface and joints contaminated with glue.

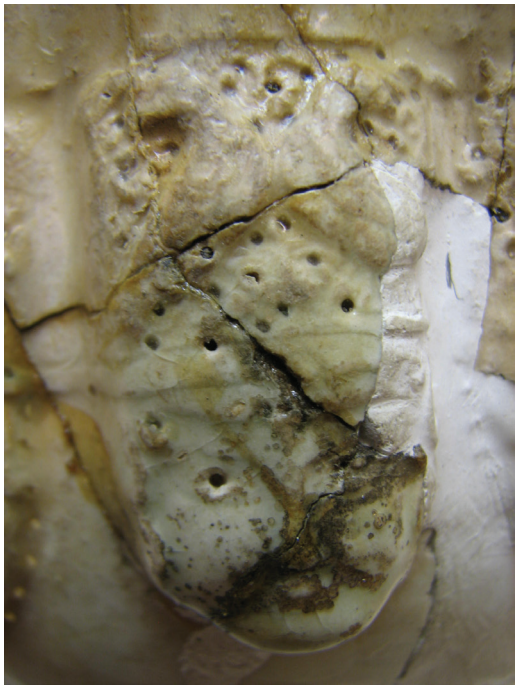


Figure 7. Before conservation: surface and joints contaminated with glue.

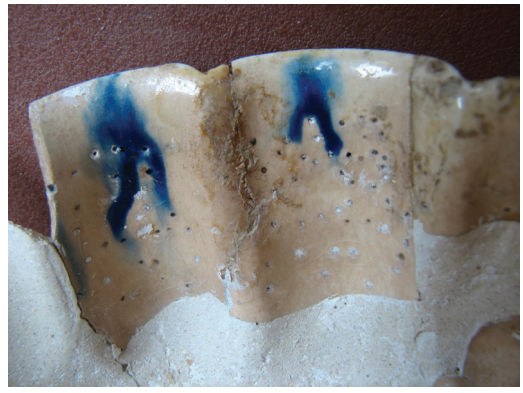


Figure 8. Before conservation: surface and joints contaminated with glue and plaster.

Figure 9. Conservation in progress: disassembly.

animal composition from the Freer gallery in Washington: the ewer was disassembled via immersion in solvent, but it has another kind of glaze, a white opaque one (Koob, 1999, p. 158, 159). Fragments bordering plaster were released mechanically with remnants of plaster left on their edges (i.e. without any mechanical contact to them), so as to be carefully cleaned off afterwards without any damage to ceramic body.

After disassembly it came to be possible to take precise measurements of thickness of the walls of the bowl. It was considered previously that it measured 2-3 mm, but disassembly revealed that in fact it varies from 0.5-0.6 to 5-6 mm, the thinnest on the joints of masks with the walls along pierced holes, the thickest on the lower part of faces. The process of final cleaning the edges was one of the most time and effort demanding. This was conditioned by the structure of the body, fine-grained and porous, by the character of contamination, with glue penetrated deeply in pores, and by impossibility to get fine joints unless the edges are thoroughly cleaned. The edges were cleaned mechanically, with a thin pin, under magnification, with no solvents (Figure 10).

As it was reasonable, taking into consideration archaeological origin of the bowl, to suggest the presence of chloride salts in the body, a qualitative chloride test was performed. A small glazed fragment with stains evenly distributed under the glaze, i. e. without any risk to change its appearance was immersed in distilled water for a while. The test with the use of 0.1 normal Ag_2NO_3 solution (one drop per a test tube of water) proved insignificant presence of chloride salts. One might suggest higher concentration of salts in the bottom of the bowl, as while being buried it was not protected from their penetration by the glaze like the walls. To check this, a local compress of distilled water was

Figure 10. Conservation in progress: 22 fragments of the bowl after disassembly and cleaning.

applied to unglazed surface of the foot-ring. A similar test (one drop of Ag_2NO_3 per a test tube of water extracted from the compress) proved the presence of chlorides.

Usually ceramics desalination is performed via immersion in distilled water with its periodic changes until salts are completely extracted out of ceramic body as a result of diffusion process, or, to be more precise, extracted to a safe level close to zero. In this particular case, the use of this method might cause spread of underglaze stains all over the surface of fragments, so as genuine color of the bowl would be distorted, or, which is virtually the same in the case, lost. Other known methods of desalination (pulp applications, electrodialysis) imply wet conditions as well and so do not exclude the risk discussed above. Therefore a question arose what is pivotal in the case, to release the bowl off salts or to preserve its genuine color. It was necessary to borne in mind that any changes to the appearance of the item might be irreversible, whereas the possibility of its desalination remained available in the future regardless any circumstances.

In any case, it was obvious that a more precise test, i.e. a quantitative one was necessary. Such a test was performed by leading researcher of the Technical expertise department of the State Hermitage Museum, Dr. Nina G. Gerasimova. We would like to express Dr. Gerasimova our deepest gratitude, for the results of her research were of key importance to final desalination decision. Investigation of a small glazed fragment proved insufficient presence of chlorine ions - 0.01% of the weight of the shard. Testing of pulp applied to the unglazed part of the bottom indicated their high concentration -0.26% of the weight of the pulp (there was no possibility to determine their concentration towards the weight of the fragment itself because of impossibility to apply a wet pulp to glazed parts of the bottom). These results corresponded approximate data of previous qualitative test based on visual evaluation of degree of opalescence of test water (Semczak 1977, p. 40, 41). According to the results of tests the decision had been made to extract excessive salts just from the unglazed lower part of the bowl by pulp application (Figure 11). Unlike desalination via immersion, this method is based on the physical process of advection, when the dissolved ions are transported by the moisture flow from ceramic body into the pulp in the process of drying; this is usually a much faster process than diffusion-based desalination (Sawdy et al., 2010, p. 27). Processes of qualitative analysis of salts presence in the

Figure 11. Conservation in progress: pulp application.

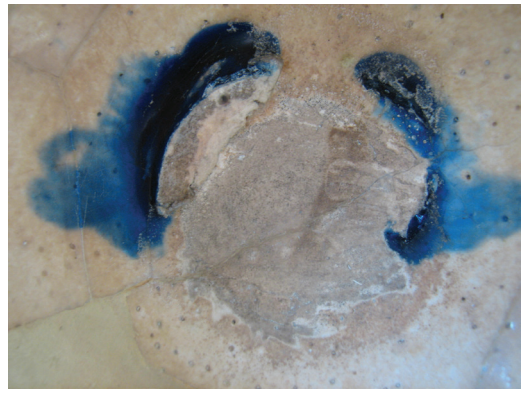


Figure 12. Conservation in progress: consolidation of the crack in the bottom.

pulp and desalination itself were simultaneous. After the first pulp application the process was repeated. Examination of the second pulp indicated that the presence of chlorine ions is 0.024% to the weight of the pulp, which was considered safe (for example, safety "threshold" for cuneiform tablets is 0.04% to weight of an item) (Gerasimova and Vinogradova, 1980, p. 87). Therefore, the bulk of chlorides was extracted by the first pulp application.

The crack in the bottom was consolidated via multiple injections of 2% polyvinylbutiral (PVB) solution in alcohol until full saturation (Figure 12; Conservation of Museum Ceramics, 1999, p. 39,40). The bowl was assembled by "piece-by-piece" method from the bottom upwards (Figure 13). 10% solution of PVB in alcohol was used as an adhesive (Conservation of Museum Ceramics, 1999, p. 58). Before the assembly the edges of fragments (?) were isolated with a 2% PVB solution in alcohol. Two fragments of the upper part of the bowl, assembling together, but with a small joint area to the bowl itself, were left separately to be put in place later in the process of loss compensation, for the reason of safety. Added detail inside the bowl was not reconstructed because of absence of analogies. Four big gaps were filled with fine plaster with the use of soft two-component mass molds. Two of the losses of lower areas decorated with repeating floral ornament were filled with the use of molds taken off analogous parts of the bowl. Compensation of two other losses posed greater difficulties. For example, there was a loss of a lobe with about a half of the face and crown above it, so as just a small part of the latter preserved. Whereas the way of reconstruction of half of the face was clear, as another half could serve as analogy, the question of compensation of a crown lost was a controversial one, and later we will discuss the way it was dealt with.

Technically, it was most difficult to fill the biggest loss because of its position between two parts of the bowl, the bowl itself and a part of the rim, with small joint area between them. The gap was filled in several stages. Losses of lower parts of faces on a separate part of the rim were filled with the use of molds (Figure 14). After this the whole piece was adhered in place, and the loss between the faces and the bottom was filled with the use of mold taken off the inner part of the wall. The mold served as a support, as a small joint area did not allow mounting the piece neither correctly, nor safely.

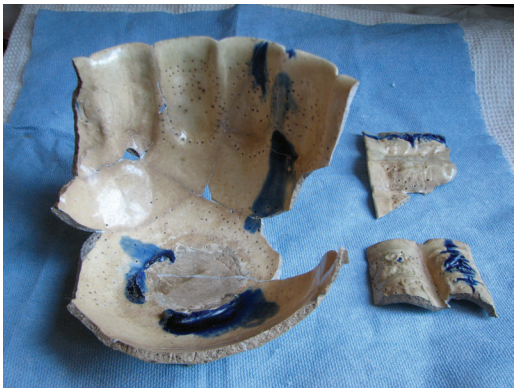


Figure 13. Conservation in progress: assembly.

Figure 14. Conservation in progress: loss compensation.

As for compensation of another part of this big loss and one more separate loss mentioned above, we had to deal with reconstruction of crowns, and a question arose what kind of birds should be represented. Birds on crowns preserved are doves, falcons, quails, ducks, geese and swans. Doves, swans and falcons are represented twice each, and geese are repeated trice. It is supposed that there must had been representations of one more pair of ducks and partridges, respectively, on the lobes lost (Valiulina, 2007, p. 176). One cannot be absolutely convinced of this, but it is this version that appears to be the most appropriate. Reconstructing the decorative diagram, we had to decide which of the gaps were proper places for ducks and which for quails, respectively. Birds are represented on the bowl in the following order (Do – doves, S – swans, G – geese, Du – ducks, F – falcons, Pa – partridges, P – panel):

Do – S – G – ? (Pa or Du) – F – Do – G – S – Du – G – ? (Pa or Du) – Pa – P – F

As pairs of different birds on the bowl alternate and do not follow one another directly, it is the following scheme that was considered correct:

Do – S – G – Pa – F – Du – G – S – Du – G – Du – Pa – P – F

(otherwise, two "partridge" crowns would be neighboring each other thus interrupting with the whole decorative scheme). But a reconstruction, however convincing may it be, is never a complete matter of fact, moreover, there is a distinct difference between a virtual reconstruction (which may be argued or corrected without any harm to an object) and one completed in reality. In this particular case, there was only one representation of paired ducks and one of partridges to serve as analogies. In this respect, peculiarities of execution of birds and faces should be taken into consideration: some of them are thoroughly elaborated, whereas others have a more generalized appearance.

This can be partly explained by the nature of ceramic manufacture, for example ceramic materials retain every touch of potter's hand and tool, and tend to reveal them when dried and fired. This is the case with insufficient technological defect on one of lobes discussed above, with a pair of partridges - slight impression on ceramic body made the representation less legible. Apart from this, both genuine representations of ducks

Figure 15. Conservation in progress: loss compensation.

and partridges are executed in a soft, generalized manner, which served as great advantage for casts, as it is extremely conventionalized representation that the reconstruction demands. So this particular version of reconstruction is not a categorical, it merely hints what kind of birds are represented on reconstructed areas. Such approach corresponds to one of central principles of conservation declaring distinct difference between genuine and reconstructed parts of an object (Figure 15).

As even analogous elements of decoration are not repeating, all the molds needed to be corrected in place. This was done with acrylic putty, as well as filling of joints. Reconstructed areas were toned in neutral "white" approximating genuine color, with a slight decline to lighter and colder "greenish" tone of the glaze (Figure 16). This was done to reveal genuine whiteness and translucency of the bowl as much as possible. Runs of cobalt were not imitated but on small areas of joints, in order not to interfere with the integrity of the appearance of the bowl.

As a result of full re-treatment, the item was thoroughly investigated, its body released off excessive chloride salts and consolidated. The bowl got aesthetical appearance worth both its historical value and artistic merits and can be successfully presented on the exposition of renowned university museum on the rights of the "pearl" of its collection.

Conclusions

Historical and cultural context of the Biliar find allows to draw a firm conclusion that the fact of its presence in Biliar is not a matter of accident, but reflects tastes and possibilities of Bulgarian aristocracy, and, in general, the level of urban culture of Volga Bulgaris by the moment of Mongol invasion. Being a part of numerous Iranian imports in Biliar, the bowl serves as another emphatic evidence of Volga Bulgaris cultural and economic links with Iran.

The study of morphology and technique of manufacture of the bowl, the circle of analogies revealed, stratigraphic conditions of the find provide necessary evidence to confirm its

Figure 16. After conservation.

Iranian origin and date it to the 12th century (probably no earlier than the end of the century).

Study of analogous pieces in diverse museum collections demonstrate that, in spite of uniform artistic devices and, often, coincident sizes and proportions, every single item is unique and was probably made as individual commission. There exists a version that the mentioned above bowl with representation of aristocratic competition hunting from the Louvre collection might be a prize or memorial piece for the luckiest, the winner. Semantic analysis of the Biliar bowl's decoration allows to suppose its symbolic event function as a wedding gift.

Iranian bowl from Biliar is undoubtedly an extremely pronounced historical source and unique piece of medieval Islamic art at the same time. This is the reason why its thorough investigation, as well as conservation provides deeper understanding of the whole phenomenon of medieval Iranian ceramic industry.

As for the conservation, apart from purely practical tasks ranging from partial desalination and consolidation to final aesthetic appearance of the item, certain scientific results were obtained; for example, precise data on the character of ceramic body on the edges, and on the thickness of walls were obtained. Conservation program in its desalination part was developed individually for the item, with taking in consideration its peculiarities and possible risks. The experience of treatment of the bowl demonstrates that one of aspects of conservation is as well a scholarly interpretation of an object. This was pronouncedly evident in the process of loss compensation, namely developing of convincing scheme of alteration of diverse representations of birds on the lobes of the bowl. One may state that the experience of treatment of the bowl is a contribution both to the study of the item and to the methodology of conservation. In general, the experience of complex research and conservation of the bowl confirms the fact that at present a cross-disciplinary approach and collaboration of specialists in different fields is the only prolific way of study and preservation of pieces of ceramic art.

Acknowledgements

*The reported study was partially supported by RFBR, research project № 13-06-00686.

We would like to express our deepest gratitude to our colleagues Natalia L. Pavlukhina, Dana E. Norris, Alexander A. Trifonov and Sergey V. Khavrin. Our special gratitude is addressed to Dr. Oliver Watson, as well as to all the reviewers and editors of the paper.

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Submitted, November 2014 - Accepted February 2015