Ceramic Matrix-Stamps of the Medieval Period from the Collection of the State Museum of the History of Uzbekistan

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Abstract: This article is devoted to the study of matrices used for the manufacture of stamped ceramics, which is stored in the archaeological fund of the State Museum of the History of Uzbekistan. These studies show the high level of skill of medieval ceramists of Central Asia.

Keywords: matrix - molds, molded ceramics, technological methods for manufacturing molded ceramic products, etc.

Topicality
Pottery is one of the most ancient and widespread handicrafts, and the history of its technology is closely linked to the history of production development.

In the archaeology of Central Asia much attention is paid to the issues of craft production, especially pottery. In pottery, an important issue is the tools of ceramic masters, in particular stamps or moulds (calyxes) for making pressed pottery.

Methodology
A variety of historical methods were used in writing the article. In particular, it aimed to conduct scientific research based on historical and comparative data analysis as well as partly problem-based approaches. This information served to highlight the development of pottery in Central Asia in the Middle Ages.

Research results
In Central Asia the use of special mould stamps as ornamental and moulding tools by potters was especially widespread in the medieval period. This method of making pottery flourished in the 11th to 12th centuries.

The archaeological fonds of the State Museum of the History of Uzbekistan holds 9 such stamps, most of which, unfortunately, do not know where or when they were found, and also have no information on their form. Most likely they came from old collections before 1917. Only two of the stamps have known locations. One was found in 1910 in Namangan district, and the other during archeological excavations in 1914 at Paikend settlement.

Finds of such stamps and dagger-forms are not very common, therefore their publication is of undoubted interest.

Here is a description of them:

1. Matrix (kalyb) in the form of a hemispherical bowl on a flat bottom. (Table I.1) It was used for imprinting the ornamentation of half of the jug body. Has thick walls, corolla slightly thickened inward, rim flat, straight cut. Inside, in the centre of the bottom part there is a small depression, with a circle in the form of a narrow band made up of two parallel lines, between which there is a row of oblique dashes. Above the circle are six ornamental elements in the form of two stylised trefoils facing in opposite directions, with a vertical diamond-shaped petal in the
middle. Between them are small point-like depressions and sprigs of fir trees. The next belt is represented by six one-dimensional circular medallions with edges in thin double lines; inside the medallions is a ten-petalled flower. The petals are elongated, with widened ends, laid closely together and diverging radially from the double circle in the centre. At the ends of the petals are small circles. Between the double medallion edging and the tentacle are small oblique strokes. The medallions are interconnected by double arcs and with double circles in the centre, imitating the shape of an eye. Above and below this element are two dotted indentations each. Above, in 2 places there are three circles with a hollow in the centre. Between them is a herringbone pattern. The edge of the matrix is bordered by one thin line and a band with the same herringbone ornament.

The matrix is made on a potter's wheel of yellowish clay.

**Dimensions**: Dm (diameter). –20 cm; height - 9 cm; dm. bottom–10 cm. The matrix was found in 1910 in the village Aim of Namangan district. It was given to the Museum by Yusufkhan. Coll. № 236/68.

2. **A matrix (kalyb) in the form of a shallow bowl. (Table I.2)** with smoothly sideways extending walls, which curve in the upper part and almost straight up, ending with a slightly tapered and slightly inclined inside rim. At the back of the matrix is a low, truncated conical tray with a cone-shaped cavity inside. The matrix may have served as an impression of the lid of a broad-necked vessel. There is a depression in the centre of the bottom which was used to imprint a handle in the form of a six-pointed star with ribbed rays.

From the star between the rays radially diverge 6 segments, the ends of which are bounded by a double circle. The middle broad part of the matrix is divided into four sectors in the form of ornamental compositions arranged in pairs against each other. Two of the sectors contain images of four paired spiral scrolls twisting in opposite directions. Between the curls on the top, peculiar icicles seem to be hanging down: a long one in the centre and two shorter ones on either side. In the next two sectors the field is filled with counter strips (seven on each side), which converge at the corner. The entire composition is bounded by a concentric narrow band, with a series of trapezoidal figures above it.

The matrix is made on a potter's wheel of pinkish clay, the engobe is brownish.

**Dimensions**: Dm. - 18.5 cm; height - 8 cm; dm. of pallet legs - 7.3 cm; The circumstances of the find are unknown. Inv. No. 3573. Col. No. 7/206.

3. **Matrix (kalyb) in the form of a hemispherical bowl (Table I.3)** on a low bell-shaped tray with a cone-shaped cavity inside. The matrix may have served to imprint an ornament on a hemispherical lid for a broad-necked vessel. There is a round depression in the centre of the bottom of the matrix, which has a truncated conical form with ten divergent slits in the centre, which give a cone-shaped handle to the lid with protruding angular ribs. A shallow groove with adjoining trapezoidal prongs surrounds this handle in a circle. Further along the whole field in a circle is an elegant wavy stalk with scrolls and diamond-shaped petals. Not reaching the edge is a band of pointed teeth. These rhythmically running prongs are interrupted in four places (four prongs each), extending beyond the general line.

The matrix is made on a potter's wheel of pinkish-brownish clay, the engobe is light.

**Dimensions**: Dm. corolla - 17 cm; height - 9.5 cm; dm. pallet-7cm. The circumstances of the find are unknown. Inv. No. 3513, coll. No. 7/146.

4. **Fragment of base of cup-shaped matrix (Table I.4)**. The base is flat, with an uneven, roughly worked surface on the outside. The preserved portion of the matrix yields an impression on the inner surface of which, in the centre of the bottom, a circle formed by two thin lines in relief is made, with a series of convex hemispheres circled between them. Next is a garland of overhanging arcs joined by two smaller and larger circles. The field between the band and the garland is filled with oblique strokes. Above there is a wide ornamental field of a series of heart-
shaped decorations made in relief and turned upwards. The lower contour lines of the hearts, curling to both sides, form three stylised two-leaflet, with a circle between the two petals. The lateral two-leaflet have the upper petals with a circle inside and are slightly larger than the lower ones. The two bipetals face in different directions and are curved. The third one between them is facing upwards. The margin between the contour of the heart and the two-leaflet is filled with oblique strokes. Relief contoured paired lines are visible on 2 sides of the heart, forming an angle, which is probably the apex of the heart described above, only upside down. In all likelihood, one band fringing the central composition consisted of the hearts described above looking upwards, while the band above consisted of the same hearts, but looking downwards.

The matrix is made of dense clay of a brownish color, the engobe is light brown.

*Dimensions:* Dm. bottom - 9.5-10 cm; The wall thickness is 0.9-1.8 cm. Col. No. 178/26.

5. A truncated conical matrix (Table II) for impressing the ornamentation on the neck or upper half of the tulle of a wide-necked vessel. It is half preserved. Plugs on both sides cut off directly. On the inner surface recessed relief, which was not stamped with separate dies, but was apparently stamped with one original die, the prototype of the future vessel. The die provides an impression on which there is a short band of epigraphic ornament in the form of an Arabic inscription, bounded by a concentric roller at the bottom. The lower part of the ornamental band is divided into lancet arches in the form of a dome with a pointed top. The points of the arches rest against a concentric band in relief. The fields of the arches are decorated with stylized floral ornaments, different for each arch. The broadest arch has a complex ornamentation of the motif in the form of a continuous shoot, the stems of which, being intertwined, form interconnected heart-shaped figures with inwardly twisted spiral-shaped upper ends and trefoils on them. In the middle underneath the scrolls are also shamrock images. On either side of the main stalks are curved shoots in the form of scrolls. The other two arches are decorated with ornaments in the form of woven stems that form large and small ovals with trefoils in the middle. The side spaces are filled with rounded scrolls. The inter-arc margins are decorated with a vertically flowing woven ornamentation, bordered on the sides by scalloped bands. Above the wicker pattern are two stems with trefoils between them, diverging to the sides. The side of one of the arches is incomplete. This may be a defect in the work of the craftsman.

The matrix is made on a potter's wheel from dense high-quality clay of gray color and good firing, gray engobe.

*Dimensions:* Dm. wide part - 16 cm; height - 8.5 cm; dm. narrow part - 11.5 cm; wall thickness 1.2 -1.6 cm. The circumstances of the find are unknown. Inv. No. 3632, coll. No. 7/266.

6. Fragment of a thick-walled matrix, (Table III,1) possibly cup-shaped. The preserved part of the matrix shows an impression on its inner surface below the rim with a thin relief line, from it downwards at a slope, towards each other with the same lines, intersecting to form triangles with three hemispheres inside. The triangle lines continue downwards, forming an ornamental element filled with hemispheres, as well as a figure imitating a herringbone-shaped cut. To the right is a strongly protruding relief of a curved and extended upward part of a stylised epigraphic ornament. Between the triangles is a band of two lines and a row of vertically aligned hemispheres. The rim of the matrix is cut straight.

The matrix is made of reddish-brown clay, the engobe is light.

*Dimensions:* Dm.-20 cm; wall thickness 1.2-1.6 cm. The circumstances of the find are unknown. Inv. No. 3630. Coll. № 7/264

7. Matrix for imprinting the heel-anchor of the chirag light handle. (Table III,2). The stamp gives an impression in the form of a toothed three-stepped subtriangular petal with a pointed apex and an elongated not wide foot with longitudinal relief lines. In the centre of the pentatuberous petal there is a stylised plant pattern in the form of stems woven into a figure of eight which ends, curving, are topped by shamrocks inscribed in the rings of the figure of eight.
Four rhombic petals (the upper ones are closed, while the lower ones have rhomboid-shaped depressions) depart from the rounded stalks of the figure on either side, at the level of the side teeth. Two stalks angle downwards, and three stalks ascend from above, similarly forming a truncated-rhombic shape with an elongated rhombus in the centre of the upper petal. The edges of the heel-supporting handle of the luminaire are highlighted with a contoured relief.

The matrix is made of pinkish clay, the engobe is light.

**Dimensions:** 7.9 x 6 x 1.7 cm. The circumstances of the find are unknown. Inventory No. 3499. Coll. № 7/132.

**8. A die for an impression of the heel of a lamp-shaped handle, a chiraga (Tab. III.3).** The stamp gives an impression in the form of a pointed heart-shaped petal with an elongated not wide foot with longitudinal relief stripes. The petal is bounded along the edge with small convex hemispheres in the form of grains. In the lower expanded part of the petal in the horizontal rectangular cartouche stamped on the entire height of the frame kufic Arabic script. In the field above the cartouche is a vegetal ornament in the form of two, placed next to each other oval-shaped bent shoots, the ends of which swirl inward, ending with trefoils. A larger trefoil is shown above the shoots in the middle. On either side of the cartouche is also a plant ornament in the form of shoots.

The cartouche is made of pinkish clay, the engobe is light. There is a crack and a chipping on the backside.

**Dimensions:** 8 x 5.6 x 1.5 cm. The circumstances of the find are unknown. Inventory number 3509. Coll. № 7/142

**9. Matrix for impressions of a fish. (Tab. III, IV).** Matrix in the form of a boat, hemispherical in cross-section in the middle and descending obliquely to the pointed ends. The top of the back side has a longitudinal projection, a handle, in the middle, similar to the configuration of the matrix itself. The front is cut straight and has an angled triangular notch in the cross section with an image of a fish in it. The fish is elongated and bordered with a raised line. In the middle, along the protruding torso, there is a straight edge that seems to divide the fish in two. Head is pointed, tail small, triangular, divided into two parts by two longitudinal lines. The eyes are cross-shaped with depressions. Around the eyes oval relief rings with short horizontal dashes on one side, possibly imitating gills. In the median part of the body, with the tip facing each other, there are triangles divided in half by a vertical line into two more triangles with low pyramidal projections inscribed in them. Similar projections are also on the head and tail of the fish. The remaining space of the fish is filled with small convex hemispheres imitating scales.

The matrix is made of brown clay, the engobe is light.

**Dimensions:** 15 x 5 x 3.4 cm. The circumstances of the find are unknown. Inventory No. 3496. № 7/129.

Production of pressed pottery in the 11th -13th centuries is known in many large centres of Central Asia (Afrasiab, Termez, Binket, Kuva, Andijan, Uzgen, Bukhara, Paikend, Shakhsenem, Zamakhshar, Merv, Nisa, Otrar and others), and in other regions - in Transcaucasia (Dvin, Ani and others), Middle East and Near East (Balkh, Nishapur, Kish, Ray, Kashan and others).

Finds of pottery forms, especially whole forms, are a rare chance for archaeologists. So far, on the territory of Central Asia, matrix-forms have been discovered during excavations of artisanal quarters of potters on sites of Munchaktepe, Afrasiab, Termez, Paikend, Zamakhshar, Daudankala, Merv and others.

Matrices for the ornamentation of upper and lower halves were found by V.F.Gaidukevich during excavations in 1943 at the fortress of Munchaktepe, which was located there during the construction of the Farkhad hydropower station. These are fragments of stamps with plant ornament in the form of twisted shoots, trefoil motif and cut-out ornamentation, which are stored...
in the funds of the Central Asia department of the State Hermitage Museum [8, 289; 2, 92-109]. There, in the Hermitage, are stored several fragments of kalibs from the X-XII centuries, found on the site of Afrasiab [8, 291].

In Bukhara oasis, during excavations of Rabat-i Malik, N.B.Nemtseva found vessels of various forms with stamped ornamentation and calves for their production. Among them are flasks, jugs, kettles, simobkuzachi (vessels for mercury) and others. In the author's opinion, the pottery workshop for the production of stamped pottery was situated somewhere close to Rabat-i-Malik, within the second ring of walls or outside of it [11, 73,76; 12, 55]. The fragments of stamps for relief ornaments of pottery vessels of IX - early XI centuries were also found in Paikend [5, 124, fig.10; 4, P. 91].

At Atlyntepe ancient settlement in Kashkadarya province, S.B. Lunina during excavations of potter's quarter of X-XII centuries found stamps with ornament in the form of rows of stars of various sizes, small multi-leaf star sockets, images of fishes, plant shoots and others [9, 84-85]. Jugs with stamped matrix-patterns were also typical of pottery in Khorezm in the XIII-XIV centuries. They were found in Yarbekir, Zamakhshar and Naq Daudankala for their ornamentation [1, 306, 308, 312, Fig. 25,26].

Many different stamps were discovered by Lunina during excavations of a pottery workshop at the site of Sultankala in Merv in 1954-1958. In the 12th century, Merv was a leading centre of production of highly artistic pressed ornamented pottery. The high art of Merv masters in making ceramics of this type was appreciated not only in Merv and its area, but also far beyond its borders. Here, a very interesting complex of stamped pottery was discovered. We also studied the structure of kilns, the process of making pottery and the methods of its ornamentation. The discovery of a whole set of stamps for ceramic ornamentation played a major role here. The most numerous group of stamps is represented by thick-walled trulls for ornamentation of upper and lower halves of vessels, some trulls were used for ornamentation of necks and also a set of small cone-shaped stamps for geometric, plant, zoomorphic and anthropomorphic images and ornaments. In addition, special stamps for the ornamentation of small hemispherical lids and children's toys were found [8, 286-297].

Important findings related to the manufacture of stamped pottery were made by Sh. R. Pidayev at the site of Old Termez. There, during excavations of the pottery quarter and the caravanserai, located in the northern part of the rabad, a complex of unique stamped pottery was discovered. (jugs, teapots, flasks with round and flat bodies), as well as stamps-calyxes for their production. These include stamps for the ornamentation of the body of jugs and hemispherical bowls. Besides the archeological tumblers, five small fragments of tumblers were also found there [13, 188-191, pp. 1-4].

Also in Surkhandarya region, during excavations of the Uzbek Art History Expedition in the cahristan site of Budrach settlement - the capital of medieval Chaganiyan, several stamps of the 10th-12th centuries were discovered. Among them are double-sided, coil-shaped, one-sided, heart-shaped and prismatic stamps, as well as cylinder-shaped stamps depicting four- and six-petalled rosettes, a six-petalled star, a lattice, a cross and an unreadable Arabic inscription [6, 244-245].


**Here is how E.V.Saiko describes the manufacture of matrix-cauldrons moulds:**

(a) the form was made on a circle and then ornamented with a set of stamps-prints, a knife point and other tools, i.e. the inner surface of the form was decorated by various technical methods. For the ornamentation of the forms could be used stamp impressions in the form of disks, belts, appropriate sizes and configurations in various combinations.
(b) the mould was made by overlaying a preliminary sample - a model with relief embellishment in different ways, using different tools. The initial sample for the mould was made of clay or wood. A layer of clay, moistened with water or, possibly, oil, was put on the sample, along the contour of the form, and pressed tightly to it, so that the entire relief of the pattern was filled with clay. Excess clay was then trimmed along the outer contour of the mold. After some drying, the matrix was carefully separated from the original mould-matrix pattern. Sometimes the outer surface of the mold-matrix was additionally treated with a trowel or cloth, in some cases adjusted on a potter's wheel. All this was done directly on the model, which was put on a potter's wheel, because after drying out the clay mass of the mould could not be processed on the wheel. The matrix thus obtained was fired and went into production. With its help the master could stamp a large number of ornamented items [16, 122-124].

The die-calybs were of different shapes and profiles. Among them dominated stamps in the form of bowls with straight and rounded walls for molding the upper or lower halves of the body of the vessel, the type of beveled shoulder of the vessel, for molding the upper part of the product, forms in the form of half a vessel divided vertically, elongated grooved molds for handles or drains, conical forms for necks or upper half of the vessel body. Among individual stamps there are also ornamented cylinders for rolling longitudinally, conical columns and thick sticks with single, high relief ornament on the extended end, coil-shaped double-sided stamps and others. Stamps were probably made by potters themselves or by specialised craftsmen. In her article about the stamped jugs from Afrasiab, E.A. Davidovich draws attention to the sources mentioning the workshops, where the calyxes were made and sold [3, 112].

Bowls, lids, and petals-fives for finger-holding chirag-lights were stamped in a single mould, while such types of pottery vessels as jugs and flasks were made of several parts in two or more moulds. These were usually the upper or lower halves of the body. Throat, handle, bottom, and sometimes the spout were made separately, also in molds or another technique. After moulding, assembling of the vessel was commenced and the joints of the parts were smoothed. The joints on the outside of the vessel were carefully and neatly grinded, but the seams on the inside were coarser.

Most researchers think that the motifs of decoration of stamped ceramics are similar to the ornamental designs on metal items: the finely engraved lines of the design are reminiscent of engraving and deepening of the chasing. For low-income people these ceramics, apparently, replaced expensive, unaffordable products of Torevts, thus satisfying the widest aesthetic demands. [15, 139; 16, 121; 13, 204].

**Conclusion**

In search of analogies for our material let us turn to the items discovered in Central Asia. Images similar in form and technique were found on the territory of Merv in Turkmenistan. First of all, it is an epigraphic ornament in the form of narrow ornamental belt in kufi or naskh pattern, which are most frequently found on Merv ceramics of the 10th - 12th cc. [14, 82; 8, 343-346]. Similar inscriptions are found on pottery jugs found on Afrasiab [3, 109-110, figure 27] and vessels from Rabat-i Malik [11, 73-76; 12, 56, figures 19, 20, 22].

Some elements of ornamentation have been also observed in Merv. Among them are stylized plant ornamentation in the form of interlaced spiral shoots with shamrocks, heart-shaped ornaments, multi-petalled rosettes, ornaments in the form of wattles, and images of fish. [14, 82, fig. 6; 8, 303-310, 317, fig. 56]. On the Merv ceramics we also find peculiar cutting the surface of the upper half of the vessel's body into vertical floral ornamented arches [14, 82, fig. 6]. A similar plot in the form of a wavy stalk with scrolls running down the circumference on one of our stamps for decorating the lid, we see on a lateral caliche for the ornamentation of a vessel from Merv [8, 290, fig. 36].

In Afrasiab they also used rosettes to decorate the pottery of X-XII centuries [17, 90-91, Fig.
The ornament, depicted on a fragment of our calyx in the form of stylised epigraphic letters and filling of background with hemispheres, is almost identical with the decoration on a stamped jug of XII c. from New Nisa [10, 67, fig. 27].

Epigraphic ornamentation, filling of background with hemispheres, ten-petal rosettes and embedded circles are also found on XIII-XIV cc. stamped pottery of Khorezm, which was discovered during excavations of pottery workshop in the vicinity of Yarbekir [1, 308-311, fig. 23, 24].

Some elements of ornamentation of our kalibs, in particular the built hemispheres, rows of hemispheres, which are limited by relief lines from both sides and others, find analogies in stamped ceramics of XI-XII centuries in medieval Khulbuk Tajikistan [16, 120, fig. 23, 24].

Thus, the considered ceramic stamps help to understand one aspect of technique of ornamentation of unglazed ceramics in Central Asia.

The researches allow to enter into a scientific turn, previously unpublished, new types of stamps-cauldrons, and, accordingly, new types of ceramics ornamentation, indicating a high level of professionalism and artistic skill of ceramists in the developed middle Ages.

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TABLE 3

Figure 1 - Fragment of cup-shaped matrix and impression from it. Circumstances and date of finding unknown.

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