THE ISLAMIC GLASS BEAKER WITH WHEEL-CUT DECORATION FROM RĀYA, SOUTH SINAI

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More than ten thousand pieces of Islamic glass were found from the fort of Rāya in the five excavations between 1987 and 2001 by the Middle Eastern Culture Center in Japan (directed by Dr. Mutsuo Kawatoko). An intact flaring beaker with the pseudo-script design by cut technique which was found in the upper part of Room No. 12-6 in the fifth excavation in 2001 is worthy to be called a masterpiece among them.

As a result of the examination, I have reached the following conclusions. 1) The flaring beaker excavated from Rāya can be dated to the second half of the tenth century by the composition of high potassium, the peculiar shape and style of decoration. 2) The close relationship between the flaring beaker and the long-necked bottle with cut decoration for the set of drinking vessels can be pointed out. Both of them were traded over a wide area, but unearthed in limited sites in local powerful cities of the Islamic period. On the other side, a cylindrical beaker and a coarse large bottle in pale bluish-green were used for practical use. 3) The Iraqi influences under the Abbasid dynasty and the technical traditions of Syro-Palestine can be seen in the Rāya finds, so it is worth noting that this beaker related to the Fatimid dynasty of the latter half of the tenth century appeared under these circumstances. This suggests that some power changes or changes of trading system occurred right in Rāya.

Keywords: Islamic glass, wheel-cut decoration, Rāya, South Sinai, maritime trade

(1) Glass from Rāya

Rāya was a port city located in the southeastern part of the Sinai Peninsula. The fort on the hill is in the Byzantine style, so it should have been built before the Islamic invasion. But the mosque, which was built in the early Islamic period, is located in the fort, and most of the artifacts date to between the end of the eighth century and the twelfth century. This is the transition stage for the

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Islamic society and the maritime trade relations between the East and West, so these artifacts are important discoveries that demonstrate the process of Islamization in the Sinai Peninsula under the strong influence of Christianity and the change in the maritime trade routes.

Concerning the glass, no reliable evidence has yet been discovered to show that glass had as yet been manufactured in this city. It is thought that the glass of these finds was brought from Egypt, Syria, or Palestine.¹

The number of registered glass vessels which were unearthed in the five excavations between 1998 and 2001 by the Middle Eastern Culture Center in Japan² exceeds ten thousand. They consist of large fragments and fragments with decoration. These are very important materials for Islamic glass studies because the number is large, they are in extremely good condition, the layers were not disturbed, and the date of the site is well established.³

Most of the glass finds are soda-lime-silica glass. As a result of the chemical analysis, they have been classified into two groups by the rate of potassium content:⁴ group A shows a low content of potassium and strontium, and group B shows a high content of potassium and strontium. This distinction was presumably caused by the cases in which either natron or plant-ash was used as the supply source of alkali (potash).⁵ There is also some high lead glass.

As for the color of the glass from Raya, the most popular is transparent pale bluish-green, which comprises about sixty percent of the whole. The second most is colorless, which is about twenty percent. Besides these, there is pale colored glass of green, blue or dark brown caused by impurities, and colored glass of deep blue, purple, or brown which is mainly in the decorative glass group.

As for shapes, the cylindrical deep dish or beaker type is the largest in quantity, comprising more than sixty percent of the total. Other kinds of bottles are about fifteen percent each. Although not many, fragments show other shapes to be cups, jars, plates, bowls, lamps, cupping vessels, and window glass, etc.

The decorative glass makes up a little more than ten percent of all the registered glass. In the order of quantity, the excavated glass is given as follows: tooled and impressed decoration (38%); molded (14%); stained (13%); wheel-cut (9%); incised (8%); stamped (3%); threaded (3%); and imbedded (2%).

As mentioned above, the glass finds from Raya present many aspects for considerations: a big change in composition; the influx of glass vessels into the port cities; the intended function as assumed from the shape; the transition in a variety of decorative glass which appeared as Islamic glass was changing, and so on. The materials are rich in possible considerations.
In this article I deal with a flaring beaker with cut decoration in order to clarify the problems on the high-quality colorless glass in Rāya.

(2) Flaring Beaker with Wheel-cut Decoration

The number of fragments with wheel-cut decoration totals 156, which breaks down as 38 facet cut, 79 linear-cut, six facet and linear-cut, 24 relief-cut, four cameo-cut and five molar-cut. The colorless type is 126, comprising over eighty percent of the total. Considering the fact that about sixty percent of the Rāya glass is pale bluish-green, glass with cut decoration includes a rather high percentage of the colorless type.

The most important object among them is an intact flaring beaker with linear-cut decoration excavated from the northwest part of the fort. It was found at an elevation of 10.299 m above sea level in the upper part of Room no. 12-6 in the fifth excavation in 2001 (figs. 1 & 2a, b). Thirteen fragments of decorated glass were unearthed in this room and all date to between the ninth and tenth centuries. The monochrome luster-stained and linear-cut glass beakers were found in the upper layer of the part where the above-mentioned intact beaker was unearthed. Glass fragments with pinched, stamped, orange luster-stained, incised, impressed and molded decoration were excavated from the lower layers. The intact flaring beaker came from the layer above that which yielded the orange luster-stained glass datable to the ninth century, or the glass with incised, impressed and molded decoration belonging to group A, which is compositionally characteristic of the early Islamic period. Judging from the relative observation of the strata, there is a high possibility that the flaring beaker dates to the tenth rather than the ninth century.

It is soda-lime-silica glass, the typical composition of Islamic glass. Similar to the other colorless, it belongs to group B and contains much manganese for the decolorizing effect. As J. Kröger also pointed out, it is thought to have been produced by the mold-blown technique because its interior is rounded and its thickness increases near the base. After it was taken out of the mold, it was attached to the pontil rod and cut off from the blowing pipe. Although the reheating treatment was usually applied to the rim of a vessel, no trace of it can be seen on the rim of this beaker, and it was just cut off. The base is flat and slightly thickened and the wall flares. The height is 10.0 cm, the diameter of the rim is 8.1 cm, and the diameter of the base is 5.4 cm. Based on the finds from Nishāpūr, Kröger divided the objects of this shape into two standard sizes: the common beaker is 10.0-11.0 cm in height and a larger version is 14.5-15.5 cm in height. Using this system, the Rāya flaring beaker is the
former size, but the wall of the Rāya beaker is curved while the examples from Nishāpūr and other sites are straight.

A horizontal grooved line is seen on the surface at 1 cm below the rim and the pseudo-script design is applied to the upper part of the body by the wheel-cutting technique. The grooved cut is shallow and rough to the touch. Seventeen of this cut decoration were found and seven of these are flaring beakers. The cutting technique of the pseudo-literal design is regarded as the intermediate style between the linear-cut style (U-shaped section) and the slant-cut style (check mark-shaped section). Some pseudo-letters resemble Arabic letters such as ١ (‘ain); ٧ (fā) or ٨ (qāf); and ٩ (kāf), but they make no sense as Arabic words.9

Except for the intact beaker eighteen fragments of a similar type were excavated from Rāya: four rim pieces; ten base pieces; four body pieces (table 1 & fig. 3). These were concentrated in the northeastern area of the fort (fig. 1). All are the clear colorless type. Their rims were not reheated, like the intact beaker. The bases are flat but can be divided into two types: one is right-angled on the outside but rounded on the inside and thickened (figs. 3-1,11,14,17), while the other is right-angled and its thickness is almost the same as the body (figs. 3-7,10,12,13,15,16). In diameter the rims are 7.0-8.5 cm, and the bases are 4.0-6.0 cm.

The decoration characteristic of these beakers is a dividing horizontal line. Usually, one or two grooved lines were made below the rim (figs. 3-1-4). They are 1 cm from the top inside the rim, and 2-3 cm below the top on the outside of the rim, or the lines may appear on both sides. The lines at the center of the body or near the base are the linear-cut style. The main motifs are geometric designs, in their simple type as combinations of double lozenges, ovals, short curves, etc, and in the complicated type as plant patterns in a hatching technique (figs. 3-5-17). Seven of the former and four of the latter were recovered. The cut of the latter type is deep and elaborate.

(3) Problems of the Date and the Origin of the Flaring Beaker

Similar examples of the flaring beaker with cut decoration were found from the sites of Şabra al-Manşūriyya, Şerçe Limanı and Nishāpūr (table 2). They prove that this type of beaker had been widely circulated in trade from the Mediterranean area in the west to the Central Asia in the east (see fig. 4). These finds reinforce my opinion that the date of the flaring beaker with cut decoration from Rāya belongs to the tenth century.

In the excavation at Şabra al-Manşūriyya in 1922, fourteen pieces of
almost intact glass vessels, including four flaring beakers, were found in a large earthen jar. There is a beaker with a pseudo-script design like the Rāya object, and G. Marçais interprets it as the word “baraka” (fig. 6-8). The other three have simple geometric patterns one of which is made by the cameo-cut technique in which the cut is made on the green glass attached to the ground (figs. 6-6,15).

Şabra al-Manṣūriyya was built at the gate of Qayrawān in A.H. 336 [A.D. 947] and was the residence of Fatimid Caliph Maṣūr. It was the capital of the Fatimid dynasty until A.H. 362 [A.D. 972]. After his successor Muʿizz transferred the capital to Egypt, it became the capital of the Zir dynasty. But, at the time of the capital relocation in A.H. 405 [A.D. 1014] the artisans and merchants were forced to migrate from Qayrawān to Şabra al-Manṣūriyya. Taking this opportunity they revolted and eventually the city was abandoned in A.H. 449 [A.D. 1057]. Therefore, the date of the flaring glass beakers can be assigned to the period between the second half of the tenth century and the first half of the eleventh century.

From a shipwreck between the island of Rhodes and Serçe Limanı in Turkey, two intact flaring glass beakers with cut decoration were recovered. One of them has a sequence of arch-like designs similar to the Nishāpūr examples (figs. 6-4,5). The other is slender, 14.0 cm in height and 7.5 cm in diameter at the rim, and has two lions with faces looking left etched between the two horizontal lines (fig. 6-1). This figure can be seen on the long-necked bottles from the above-mentioned shipwreck and the site of Şabra al-Manṣūriyya (figs. 6-2,3). It is a typical pattern often used in the products of the Fatimid period.

Because a glass weight dated to A.H. 415 [A.D. 1024/25] was found, it is thought that this ship was sailing from around Caesarea toward Constantinople about that year. However, judging from the style, the glass bottle can be dated earlier than that year.

Nishāpūr was constructed during the Sasanian period and the Abbasid governor resided there as an eastern administrative base in the early Islamic period. From the ninth century prosperity continued as a central city under the Tahrid, Saffarid, Ghaznavid and Seljuq dynasties. It is reported that twenty pieces of flaring beakers with cut decoration were found from the tenth century layers when the city reached its peak of prosperity. This is the largest number of excavated beakers of this type.

As mentioned before, Kröger classified the glassware into two types based on their height. There are eighteen of the common size between 10-11 cm high,
and two of a large version between 14.5-15.5 cm high. The intricate linear geometrical designs were made by the wheel-cut technique except for one piece of facet cut decoration in which small circles are arranged continuously (see table 2).\textsuperscript{13}

In addition to the above-mentioned finds, there is an example in the British Museum which is said to have been found at Madinat Habu, and some examples are owned by several other museums (see table 3).

As mentioned above, the dates of the finds from these three sites belong to the period between the late tenth century and the early eleventh century. The only example before the ninth century is one from Fustat.\textsuperscript{14} It is in the same proportions and with cut decoration: one line below the rim on the inside and two lines at the center of the body on the outside. But, the base is convex and the size is smaller. It is 8.5 cm in height, 5.3 cm in diameter at the rim and 3.5 cm at the base. So, it can be viewed as a prototype of the later flaring beakers. Sämrarrā is the representative archaeological site with dates limited to the ninth century. In addition to the fact that no flaring beakers have been found in this site,\textsuperscript{15} there is a wall painting in which two dancing girls hold drinking cups and bottles with some liquid being poured into them. The cups are not flaring beakers but bowls.\textsuperscript{16} This shows that this shape did not spread to Mesopotamia in the ninth century.

Examination of the shapes of glass vessels from sites where flaring beakers have been found shows that the flaring type is few in quantity and not common. Most of the drinking vessels from Rāya are cylindrical beakers or deep bowls comprising about sixty percent of the complete shapes. Their rims are rounded by the reheating treatment and their bases are slightly concave. In contrast, the flaring beaker type with cut-off rim is only nineteen, which is less than 1 percent of the whole, so it can be said that the flaring beaker is a minor kind among the Rāya glassware.

It was after the twelfth century that the shape of flaring beaker became established in Islamic glass. Flaring beakers with enamel-painted decoration appeared in the thirteenth century. But, there are no examples with cut decoration in these periods, and the shapes of the rims and bases are different. The rim is rounded by the reheating technique and the bases have either a tubular foot that is folded back with pincers or a ring foot formed by an attached string of glass.

Examples of flaring beaker already existed in Roman glass. They have been found at Karanis in the Fayyūm region of Egypt or Jalame in the north Palestine region.\textsuperscript{17} Moreover, it is known that they were exported to Begrām in
Afghanistan. However, these beakers are quite different in shape. Their bases are solid, pushed-in, or footed, and the rims are not cut-off. In other words, the shape exists in Roman glass, but the flaring beaker differs from these with cut decoration in the tenth century.

A flaring beaker from Syria of the Roman period is in the collection of the Middle Eastern Culture Center in Japan. It is more similar to the Islamic flaring beaker with cut decoration. But the rim is rounded by the reheating technique and the base is convex. The most resemblance is in the size and proportion of the curve from the middle of the body to the rim. It has a line by the thread decoration below the rim. Although the thread decoration and cut decoration techniques are quite different, both have a line applied below the rim (fig. 5).

In the examples of Sasanian glass, the flaring beaker is quite rare, while some kinds of bowls are popular. Therefore, this shape is thought to have originated in Roman glass in the Mediterranean world.

(4) Flaring Beaker and Long-Necked Bottle for Drinking

The flaring beaker is, needless to say, used for drinking. In several Fayyûm paintings between A.D. 300 and 400, the human figures are shown holding drinking vessels in their hands. Among them is an example depicting transparent red liquid in the cup, which shows that it is a glass cup containing red wine. There are many examples of human figures with a drinking vessel in Islamic wall paintings, in manuscripts, and on luster-painted pottery dating between the tenth and twelfth centuries. This stylized motif is later seen in the banquet scenes depicted on metal vessels, Mīnā’i-pottery or enameled glassware.

Moreover, a scene is also illustrated in which one or two persons pour some liquid from a bottle to a flaring beaker. The bottle shown in it has a globular body and a long neck. It is thought that such a long-necked bottle and a flaring beaker were used as a set of drinking vessels.

In fact, from the sites where the flaring beakers were found, a long-necked bottle with the rim bent outward was also found. In Şabra al-Manṣūriyya four flaring beakers were discovered in a big earthen jar, which also contained seven long-necked bottles with cut decoration. The fact that among fourteen objects four are flaring beakers and seven are long-necked bottles shows that this jar was used for storing the set of drinking vessels, a flaring beaker and long-necked bottle.

The close relationship between the flaring beaker and the long-necked bottle can be also pointed out in respect to the decorative motifs.
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The lion, commonly depicted in Fatimid Egypt, is seen on the flaring beakers and the long-necked bottle from the shipwreck off Serçe Limani, and it was also portrayed on the long-necked bottle from Şabra al-Manşūriyya (figs. 6-1~3). Şabra al-Manşūriyya was the capital of the Fatimid dynasty before the transfer to Cairo, and the ship is thought to have wrecked on the way to Constantinople, the capital of the Byzantine Empire. It shows that long distance trade of expensive glassware was conducted from the center of the Islamic world to the Mediterranean Sea world. Another flaring beaker from Serçe Limani has an arched frieze, but it is devoid of patterns (fig. 6-4). This similarity can be found in the flaring beaker and the long-necked bottle from Nishāpūr, which was the center of the eastern Islamic world (fig. 6-5).

Among the glass finds from Şabra al-Manşūriyya there is one flaring beaker and three long-necked bottles bearing a sequence of geometrical patterns consisting basically of cross stripes (figs. 6-6,7). They are regarded as a set. Another flaring beaker with pseudo-letters is paired with the long-necked bottle with the pseudo-letters of ʿ (alif) and ʿ (kāf) written repeatedly on the shoulder (figs. 6-8, 9). The beaker with a band applied on the upper part might be paired with the long-necked bottle with simple cut decoration (fig. 6-11). Kröger referred to the pattern of the band in which two lines cross regularly in his study of spherical bottles (fig. 6-12). He pointed out that this pattern does not appear on objects from Khurāsān, but is characteristic of objects from Syria and Egypt. This pattern is more similar to that of the phial excavated from Fustāṭ by the mission of Waseda University (fig. 6-13) and to the shallow bowl decorated in black pigments from Rāya (fig. 6-14). Finally, it is possible to say that by a process of elimination the most luxurious flaring beaker by the cameo technique was combined with the long-necked bottle with a lion motif (figs. 6-3,15).

Twelve fragments of the long-necked bottles with a bent rim, cylindrical body and flat base were found at Rāya (figs. 7-1~4). They consist of three necks, two bases and seven shoulders. As for color, nine are colorless, two are pale bluish-green, and one is deep blue. A neck fragment of deep blue has shallow cut by grinding and zigzag patterns between two lines. The others have about the same patterns, and the cut technique is also the general linear-cut. The clear and colorless fragment of neck is cut deeply and is of fine quality. The diameter of the rim is 6.8 cm; its outer edge is cut obliquely with a wheel. The neck part is as thick as 0.5 cm and has the simple geometric pattern in combination with lengthwise rectangles and herringbones separated by a thick line. A sequence of dots is on the corners of shoulder and base, and one or two
lines are etched close together.

The form of this bottle is supposed to resemble the bottles from Nishāpur\textsuperscript{30} and from the stupa of the Dule Temple in Tianjin that was reconstructed in 948.\textsuperscript{31} They have the similar facet cut decoration on their necks, like the Rāya object, and a sequence of dots and one or two lines on the corners of the shoulder and base. The body is plain. The former was found in the tenth century layer. The latter was in the Liao dynasty layer and is thought to have been buried in the second half of the tenth century. Judging from the similarity with these examples, most of the Rāya bottles belong to the tenth century.

However, the ratio of flaring beakers and long-necked bottles with cut decoration is quite low. In more than ten thousand glass finds from Rāya the flaring beakers are only nineteen and the bottles are only twelve. Also, the unpolished cut-off rim is of no practical use, because the edge is subject to damaging. The thick and large bottle which curves smoothly from the rim to the body and the cylindrical beaker, or deep dish, which are all bluish-green, were used mainly for drinking in Rāya (figs. 7-5~8). The number of large bottles is 271 and that of beakers and dishes is 4,267, so they are overwhelmingly in the majority. These facts show that the pale bluish vessels were generally for daily use, while the colorless vessels with cut decoration were imported to this city as special quality goods.

\textbf{(5) Conclusion}

As a result of the above-mentioned examination, I have reached the following conclusions.

The first point is about the dates of the decorative glass from Rāya. Although the pale bluish-green color is dominant in the Rāya glass, the flaring beaker with cut decoration dated to about the second half of the tenth century is colorless glass produced by the treatment of decolorization. It belongs to the minority which, by composition, comprises group B, while the decorative glass, including impressed, molded, stained and incised decoration, which, by composition, comprises group A, exceeds seventy percent of the total. As mentioned above, it has been clarified in the studies that the glass of group A which was descended from Roman glass, was gradually replaced by group B in Egypt and the Syro-Palestinian region, and the decorative glass of the group A composition can be dated to the ninth century in Rāya.

In Rāya, however, the difference between the decorative glass in pale bluish-green and the colorless glass with cut decoration cannot simply be attributed to their dates. Looking over the context in which the glass was
unearthed, the decorative glass in pale bluish-green and the cut glass of colorless material were sometimes found together, which shows that both materials coexisted. It is important to understand that Rāya was not an industrial but a port city, so that the changes in glass vessels did not occur locally but through imports in the trade system. Above all, flaring beakers with cut decoration can be recognized as prized imported goods from remote countries.

The second point is the existence of utilitarian and quality glass. In Roman and Sasanian glass of the pre-Islamic periods, glassware became a high-class article just because it was glass. But, in Islamic glass, in the process of expanded use of glass vessels, a clear line was drawn between mass-produced practical coarse glass and glass of special aesthetic value. The formative period of Islamic glass is between the ninth and the tenth centuries, which coincides with the flourishing period of Rāya.

As for a set of drinking vessels, a cylindrical beaker and a coarse large bottle in pale bluish-green were for practical use, while a flaring beaker and a long-necked bottle with cut decoration of colorless glass were intended for specialized or ornamental use: They are limited in quantity, in composition and in finds. Judging from the points that the intact object was unearthed and that the rim was unpolished and therefore unsuitable for practical service, it is unreasonable to think that it was frequently used, so that it should have been for special use.32

Moreover, it can be pointed out that flaring beakers were traded over a wide area, but were unearthed in limited sites in local powerful cities of the Islamic period, such as Şabra al-Manṣūriyya, a shipwreck off Şerçe Limanı which is thought to have been bound for Constantinople, Nishāpūr, and so on. The second half of the tenth century was the age of prosperity of the Fatimid dynasty whose capital was Cairo, and the Mediterranean trade and the Red Sea trade were also active. It cannot be determined, but the production center of glass vessels was probably in the Syro-Palestine area. It is likely, therefore, that the glass products of quality in the Fatimid dynasty were acquired by local powerful persons.

Finally, I will mention the meaning of the flaring beakers with cut decoration excavated at Rāya. Many artifacts from Rāya are concentrated in the period between the ninth and tenth centuries, and they reflect Iraqi influences under the Abbasid dynasty, while the glassware reflects Syro-Palestinian influences. It is worth noting that the trade goods related to the Fatimid dynasty of the latter half of the tenth century appeared under these circumstances. This suggests that some power changes or changes of trading system occurred right in
Rāya. But, judgment on this point should be made through further studies on the other kinds of artifacts and the overall context of the Rāya site.

Notes

1 In writing this article, I would like to express my sincere gratitude to Dr. Mutsuo Kawatoko, Director of the Islamic Archaeological Mission in Egypt of the Middle Eastern Culture Center in Japan, who permitted me to use unpublished materials and gave me much advice.

2 Kawatoko 2003. The excavations have been conducted by the Islamic Archaeological Mission in Egypt of the Middle Eastern Culture Center in Japan, directed by Dr. Mutsuo Kawatoko since 1997.

3 Shindo 2003. The research of the glass finds from Rāya is subsidized by the Grant-in-Aid for Scientific Research of the Japan Society for the Promotion of Science, the Takanashi Foundation for the Promotion of Science, the Kao Foundation for Arts and Sciences, the Pola Art Foundation, and the Murata Science Foundation.

4 Sawada et al. 2003.

5 In the Roman and the early Islamic periods, glass composed of low-magnesium and low-potassium was produced using natron which was available in Egypt. After the ninth century, the composition changed to high-magnesium and high-potassium by the use of plant ash; Brill 2001.

6 Kröger 1995, 124.

7 Kröger 1995, 121.

8 Kröger 1995. He proposed to change the term, the so-called “beveled style” to slant-cut for greater accuracy.

9 Salder 1974, no. 400; Marçais 1952, nos. 6 & 11; Bass 1984, fig. 2a; Tait 1991, no. 144 right; Carboni 2001, no. 2.19: There are some examples of the same period with the cut decoration. The most similar one is a jug in Kunstmuseum Düsseldorf: The present writer reads it “عَفِيْيَة (‘afiya)” and regards it as the owner’s name. The Allied flaring beaker was found in Sābrā al-Manṣūriyya. It is partially missing, so it is undecipherable, but the present writer takes it as a part of the word, سَرِيّكة (baraka). The design of ف (fā) is repeatedly cut in a similar manner on the shoulder of the long-necked bottle unearthed from Sābrā al-Manṣūriyya. It is reasonable to think that Arabic letters in the Kufic style, popular at that time, were used for a decorative effect, instead of attempting the forced decipherment. Similar designs are found in the artifacts from Sābrā al-Manṣūriyya and a shipwreck off Sèrçe Liman, and the cut decoration of a sequence of geometrical figures is etched on the bodies of the long-necked bottles in the British Museum and Kuwait National Museum collections, which are supposed to be derivative designs.

10 Marçais 1952, nos. 1-14.

11 Bass 1984. From the fact that amphorae from the coastal area of the Black Sea were loaded on the ship, it was presumably a Bulgarian merchant’s ship and the crew and the merchant were Christians.

12 Bass 1984. Bass states that it is the style of the tenth century.

13 Kröger 1985. See Table 2.


15 Lamm 1928.

16 original: Istanbul, Museum of Turkish and Islamic Art / replica: Berlin, Museum für Islamische Kunst.

17 Harden 1936, Class V; Wubberg 1988, nos. 162-200.

18 Musée Guimet.

19 MECCJ no. 8689; Wubberg 1988, no. 195. Similar examples were found from Jalame.

20 The most typical example is a bowl with facet cut decoration in the Shōsōin.
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21 Walker 2000 , no. 74, Musée du Louvre, Département des antiquités égyptiennes N 3408.
22 Meinecke-Berg, 1999, fig. 4. Cairo, Museum of Islamic Art, no. 12880.
23 Meinecke-Berg, 1999, fig. 6. Cairo, Museum of Islamic Art, no. 14987.
24 Marçais 1952, pls. LV, LVIII.
25 Kröger, 1999, 225. The similarity between the finds from the two sites has always been pointed out by some scholars, and they think that they were made in the Syro-Palestinian region.
26 Kröger 1995, the flaring beakers are nos. 210 & 211 (the latter: MMA 48.101.61), and the bottle is no. 209.
28 Kröger 1999, 225.
29 Shindo 1992, fig. IV-6-6-11; Shindo 2003, fig. 3-6.
31 An Jiayao 1991, fig. 16. It was found from the Dule Temple situated in Jixian, Tianjing.
32 It is also shown that the similar beakers from Šabra al-Manšūriyya were kept in a large jar.

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Source of illustration
Fig.1: Kawatoko 2003, Pl.4.
Fig.2: © iia
Fig.3: © iia
Fig.4: Marçais 1952, Pls.LVIII-LX1, Fig. 78.
   Bass 1984. Figs. 2a, b, 5a.
   Kröger 1995, nos. 171, 203, 211, 213, 220, 221.
Fig.5: MECCJ
Fig.6: 1, 2, 4: Bass 1984, figs. 2b, 2a, 5a.
   3, 6-11, 15: Marçais 1952, Pls. LVIII-LX1.
   5: Kröger 1995, no. 221.
   12: Kröger 1999, fig. 2.
   14: Shindo 2003, Fig. 3-6.
Fig.7: © iia
Table 1. Flaring Beakers from Rāya

<table>
<thead>
<tr>
<th>Reg. No.</th>
<th>Fig.</th>
<th>Room</th>
<th>Depth (m)</th>
<th>Part</th>
<th>Size (cm)</th>
<th>Color</th>
<th>Decoration</th>
<th>Patterns</th>
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<td>3-12</td>
<td>2-1</td>
<td>9.894</td>
<td>base</td>
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<td>colorless</td>
<td>wheel-cut (line)</td>
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<td>colorless</td>
<td>wheel-cut (line)</td>
<td>probably plant</td>
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<td>RO 2963</td>
<td>3-10</td>
<td>2-5</td>
<td>9.233</td>
<td>base</td>
<td>BD, ca. 6.4, Th 0.1</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
<td>geometry</td>
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<td>RO 3036</td>
<td>3-14</td>
<td>13-7</td>
<td>9.998</td>
<td>base</td>
<td>BD, 5.0, Th 0.15</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
<td>arch</td>
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<tr>
<td>RO 1143</td>
<td>3-11</td>
<td>1-1</td>
<td>base</td>
<td>BD, 5.0, Th 0.25</td>
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<td>wheel-cut (line)</td>
<td>geometry</td>
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<td>RO 5355</td>
<td>3-17</td>
<td>8-6</td>
<td>8.224</td>
<td>base</td>
<td>Th 0.1</td>
<td>colorless</td>
<td>wheel-cut (grooving)</td>
<td>line</td>
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<tr>
<td>RO 7937</td>
<td>3-9</td>
<td>2-1</td>
<td>10.021</td>
<td>body</td>
<td>Th 0.1</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
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<tr>
<td>RO 7785</td>
<td>3-6</td>
<td>2-1</td>
<td>9.861</td>
<td>body</td>
<td>Th 0.15</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
<td>geometry</td>
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<tr>
<td>RO 4166</td>
<td>3-2</td>
<td>2-2</td>
<td>9.872</td>
<td>rim</td>
<td>RD, ca. 7.0, Th 0.1</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
<td>line</td>
</tr>
<tr>
<td>RO 6420</td>
<td>3-8</td>
<td>2-5</td>
<td>10.199</td>
<td>body</td>
<td>Th 0.15</td>
<td>colorless</td>
<td>wheel-cut (line)</td>
<td>probably plant &amp; cross-butching</td>
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<tr>
<td>RO 4259</td>
<td>3-13</td>
<td>2-5</td>
<td>9.723</td>
<td>base</td>
<td>Th 0.1</td>
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<td>line</td>
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<tr>
<td>RO 4827</td>
<td>3-16</td>
<td>2-12B</td>
<td>9.14</td>
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<td>BD, ca. 6.2, Th 0.2</td>
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<td>line</td>
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<td>RO 5136</td>
<td>3-4</td>
<td>15-84</td>
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<tr>
<td>RO 6270</td>
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<td>-</td>
<td>9.406</td>
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<td>RO 6369</td>
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<td>10-16</td>
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<td>RO 7116</td>
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<td>19-4</td>
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<td>base</td>
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<td>line</td>
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<td>RO 9648</td>
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<td>12-6</td>
<td>10.507</td>
<td>rim</td>
<td>RD, ca. 9.5, Th 0.15</td>
<td>colorless</td>
<td>wheel-cut (grooving)</td>
<td>line</td>
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Table 2. Flaring Beakers from the Excavated Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>No.</th>
<th>Reg. No.</th>
<th>Shape</th>
<th>Size (cm)</th>
<th>Color</th>
<th>Decoration</th>
<th>Patterns</th>
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<tbody>
<tr>
<td>Nishapur</td>
<td>26</td>
<td>MMA 39.40.47</td>
<td>A 10C</td>
<td>H, 10.3, BD, 4.5, RD, 7.5</td>
<td>colorless: greenish tinged</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Nishapur</td>
<td>26</td>
<td>MMA 39.40.46</td>
<td>A 10C</td>
<td>H, 10.3, BD, 4.5, RD, 7.5</td>
<td>colorless: greenish tinged</td>
<td>wheel-cut (intermediate)</td>
<td>probably animal</td>
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<tr>
<td>Nishapur</td>
<td>220</td>
<td>ISM 20753</td>
<td>A 10C</td>
<td>H, 10.3, BD, 4.5, RD, 7.5</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>geometry</td>
</tr>
<tr>
<td>Nishapur</td>
<td>244</td>
<td>MMA 40.102.267 a-c</td>
<td>A 10C</td>
<td>H, 10.3, BD, 4.5, RD, 7.5</td>
<td>colorless: yellowsgreen</td>
<td>wheel-cut (intermediate)</td>
<td>cross-cutting &amp; wheel-cut</td>
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<tr>
<td>Nishapur</td>
<td>204</td>
<td>MMA no number</td>
<td>A 10C</td>
<td>H, 4.4, BD, 4.7</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>geometry</td>
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<tr>
<td>Nishapur</td>
<td>212</td>
<td>MMA 40.101.55</td>
<td>A 10C</td>
<td>H, 10.3, BD, 7.2, RD, 6.5</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>line &amp; cross-cutting</td>
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<tr>
<td>Nishapur</td>
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<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>geometry</td>
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<tr>
<td>Nishapur</td>
<td>207</td>
<td>Discarded</td>
<td>A 10C</td>
<td>H, 5.7, Th, 5.1</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>geometry</td>
</tr>
<tr>
<td>Nishapur</td>
<td>219</td>
<td>Discarded</td>
<td>A 10C</td>
<td>H, 6.7, BD, 4.5</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>geometry</td>
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<tr>
<td>Nishapur</td>
<td>206</td>
<td>MMA 40.100.138</td>
<td>A 10C</td>
<td>H, 10.5, BD, 4.5, RD, 7.5</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Nishapur</td>
<td>204</td>
<td>MMA 40.100.226</td>
<td>A 10C</td>
<td>H, 10.3, BD, 6.5, RD, 7.5</td>
<td>colorless: yellowsgreen</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Nishapur</td>
<td>204</td>
<td>MMA 40.100.246</td>
<td>A 10C</td>
<td>H, 9.2, BD, 5.1</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<td>Nishapur</td>
<td>219</td>
<td>Discarded</td>
<td>A 10C</td>
<td>H, 9.9</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>animal, bird, geometry</td>
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<tr>
<td>Nishapur</td>
<td>222</td>
<td>Discarded</td>
<td>A 10C</td>
<td>H, 5.3, BD, 4.5</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Nishapur</td>
<td>11</td>
<td>MMA 40.100.155</td>
<td>A 10C</td>
<td>H, 15.4, BD, 7.6, RD, 11.2</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Nishapur</td>
<td>224</td>
<td>IBM</td>
<td>A 10C</td>
<td>H, 14.4, BD, 7.7</td>
<td>colorless</td>
<td>wheel-cut (intermediate)</td>
<td>animal</td>
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<td>Nishapur</td>
<td>221</td>
<td>Discarded</td>
<td>A 10C</td>
<td>H, 10.3, BD, 4.5, RD, 7.1</td>
<td>color unknown</td>
<td>wheel-cut (intermediate)</td>
<td>line</td>
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<tr>
<td>Sabzevar</td>
<td>11</td>
<td>Bazar M</td>
<td>A 10-11C</td>
<td>H, 8.9, BD, 6.1, RD, 6.1</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>pseudo-letters</td>
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<tr>
<td>Sabzevar</td>
<td>8</td>
<td>Bazar M</td>
<td>A 10-11C</td>
<td>H, 11.3, BD, 5.4, RD, 6.2</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>geometry</td>
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<tr>
<td>Sabzevar</td>
<td>10-11</td>
<td>Bazar M</td>
<td>A 10-11C</td>
<td>H, 7.1, BD, 3.0, RD, 5.2</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>line</td>
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<tr>
<td>Sirjan</td>
<td>9-4</td>
<td>Bazar M</td>
<td>A 10-11C</td>
<td>H, 10.5, BD, 4.5, RD, 6.0</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>pale brown</td>
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<tr>
<td>Sirjan</td>
<td>9-1</td>
<td>Bazar M</td>
<td>A 10-11C</td>
<td>H, 14.6, BD, 8.7</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>line</td>
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IBM® © Iranistan Museum

Table 3. Flaring Beakers in Various Museums

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<tr>
<th>Museum</th>
<th>Reg. No.</th>
<th>Shape</th>
<th>Region</th>
<th>Date</th>
<th>Size (cm)</th>
<th>Color</th>
<th>Decoration</th>
<th>Patterns</th>
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<tr>
<td>Blue</td>
<td>1329</td>
<td>A</td>
<td>Iron</td>
<td>10C</td>
<td>H, 6</td>
<td>colorless: green</td>
<td>wheel-cut</td>
<td>geometry</td>
</tr>
<tr>
<td>Berlin</td>
<td>1347</td>
<td>A</td>
<td>Iron</td>
<td>11C</td>
<td>H, 4</td>
<td>colorless: green</td>
<td>wheel-cut</td>
<td>geometry</td>
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<tr>
<td>Berlin</td>
<td>12280</td>
<td>A</td>
<td>Iron</td>
<td>10C</td>
<td>H, 10.5, BD, 7.7</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>geometry</td>
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<tr>
<td>Berlin</td>
<td>1348</td>
<td>A</td>
<td>Iron</td>
<td>10C</td>
<td>H, 8.5, BD, 7.5</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>geometry</td>
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<tr>
<td>Iran National Museum</td>
<td>30-15</td>
<td>A</td>
<td>Gypsum/Haplar</td>
<td>9-10C</td>
<td>H, 12.5</td>
<td>colorless</td>
<td>wheel-cut</td>
<td>fish, geometry</td>
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<td>Kazvin</td>
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<td>116</td>
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<td>Iron</td>
<td>10C</td>
<td>H, 10.5, BD, 7.5</td>
<td>colorless</td>
<td>wheel-cut</td>
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<tr>
<td>Iran National Museum</td>
<td>217</td>
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<td>Iron</td>
<td>10C</td>
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<td>geometry</td>
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<td>Tehran</td>
<td>2178</td>
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<td>Iron</td>
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<td>Iron</td>
<td>10C</td>
<td>H, 3.8</td>
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<td>pseudo-letters</td>
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<td>27</td>
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<td>Iron</td>
<td>10C</td>
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<td>31</td>
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Fig. 1. Finding Spots of the Flaring Beaker with Cut Decoration in the Raya Fort
Fig. 2a. The Flaring Beaker Excavated in Room No.12-6

Fig. 2b
THE ISLAMIC GLASS BEAKER WITH WHEEL-CUT DECORATION FROM RĀYA, SOUTH SINAI

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Fig. 7