The Marmaray—Excavations of The Archaeological Museums in Istanbul revealed innumerable artefacts which include important glass find. During the excavations at Sirkeci hundreds of fragments of glass came to light (Fig. 1). These glass finds cover a period of two thousand years. In this area the glass finds date back to different periods of history from the Hellenistic age up to the end of the Ottoman Empire.

**Hellenistic Glass**

The oldest glass find from the Sirkeci excavations is a lower part of an amphoriskos. This knob-based amphoriskos has white festoon motifs on an olive green background. It dates to the Hellenistic period.1

**Roman Glasses**

The most important discoveries at Sirkeci are fragments of Ennion cups (Fig. 2). These light blue fragments belong to the three different cups. One of those pieces has a tabula ansata with a Greek inscription that reads 'Ennion made me'.2

Other Early Roman examples are brightly colored flasks. These piriform, globular or fusiform flasks are all free-blown, and some are decorated with opaque white threads.3

One of the most beautiful examples from Sirkeci is an almost intact ribbed bowl. In addition to that, other ribbed bowl and grooved bowl sherds were found. The grooved bowls usually have thick walls and wheel-cut decoration. The most common type has one or more rows of cut grooves. In addition to greenish examples produced from finely refined and pure material there are examples with amber, yellowish, bluish, veined, olive and opaque white glass.

Late Roman material consists mainly of cut glass. These colorless and deep purple glasses have thick walls and also wheel-cut decorations. Among them the most common types are oval and circular facets.4

**Byzantine Glasses**

Numerous examples of Byzantine glass were excavated at Sirkeci. The majority consists of Early Byzantine examples (fifth to eighth centuries). Lamps, goblets, tumblers, bracelets, and window panes are the examples for daily use.

The lamps have various shapes. This item of daily use has a wide repertory of forms in the Byzantine period. Usually the colors are shades of green and yellow. Stemmed, hollow-stemmed, handled or knob-based lamps are plentiful.

Conical lamps (which could have been used as drinking vessels as well), in particular, exhibit a very high craftsmanship and are made of high quality glass. Some are grooved horizontally, and some others are dotted with cobalt blue glass blobs.

The most common glass form from the Marmaray excavation is the goblet; however, only fragments of stems and bases have survived but none from the bowls. These goblets were also produced in eye-catching colors and seem to have targeted two different groups of customers, because we found both fine examples and coarser ones. The high quality goblets were produced

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4. Canav 1985, 41, no 30; Akat et.al. 1984, Fig. 27.
Fig. 1: Map (Janin 1950, Map No. 1).

Fig. 2: Ennion cup.
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by grasping and drawing the glass from the bottom of the bowl with tongs to form the stem and foot\textsuperscript{10}.

Careless examples of lower quality, however, were shaped by different methods. First, a gob of hot glass was attached to the bottom of the goblet and shaped with tongs. In this case tool marks are visible on both sides of the foot\textsuperscript{11} (Fig. 3). Another way is rather more complicated: a second paraison is attached to the bottom of the cup and is formed into the stem and foot\textsuperscript{12}.

This difference was perhaps based purely on fashion, not quality; furthermore, it is not possible to date the finds precisely. Parallel examples may suggest the 6\textsuperscript{th} and 7\textsuperscript{th} centuries for a date but as the forms were continuous over long period of time, the same forms may have been produced at later dates as well.

We can also mention window glass. The window panes are cast, cylinder-blown and crown glasses. The cast glasses are colorless or greenish and very thick and bubbly. Some have edges shaped on the wheel.

There are examples which will complete a semicircle or a triangle and their thicknesses vary from 3 to 5 mm. These pieces must belong to an important building in Sirkeci area. Crown panes are very rare and usually light green\textsuperscript{13}.

The most common type of window glass is cylinder-blown. Fragments have parallel rows of bubbles\textsuperscript{14}. They are produced in shades of yellow and green with a thickness of 1 to 3 mm. Extensive parallel bubbles are characteristic of these pieces. Cylinder-blown and cast glass pieces are translucent and thicker than crown-glass ones.

Many bracelets were found. Most of them are plain and have circular or D-shaped cross sections. Others are twisted\textsuperscript{15}. One piece is both twisted and painted with silver-stain (Fig. 4).

The most interesting examples are mosaic-glass\textsuperscript{16} (Fig. 5) and gold-glass wall plaques\textsuperscript{17} (Fig. 6).

\textsuperscript{10} Hayes 1992b, fig. 150 nos 18-20; Gill 2002, 65 fig. 1/5; 170: fig. 2/4; 171 fig. 2/5.
\textsuperscript{11} Gill 2002, 64, fig. 1/4; 66 fig. 1/6; 170 fig. 2/3; Von Saldern 1980, fig. 24.
\textsuperscript{12} Özgümuş 2008, Tafel XXVII fig. 3.
\textsuperscript{13} Ousterhout 1999, 153; Harrison and Gill 1986; Gill 2002, fig. 2/43; Von Saldern 1980, 101 no 780.
\textsuperscript{14} Von Saldern 1980, 91; Gill 2002, 225 nos 816-820.
\textsuperscript{15} Gill 2002, 182 fig. 14.
\textsuperscript{16} Von Saldern 1980 fig. 16 no 657.
\textsuperscript{17} Lightfoot 2007, 192; Oliver 1980, 150 no 268; Philippe 1970 54, 56; Özgümuş 2008, pl. XXVII fig. 4.
The largest group of Byzantine glass consists of chunks and wasters (Fig. 7). Several kilograms of olive, amber, green, turquoise, cobalt-blue, light blue, yellow-green or blue-green chunks were found. Those items may have been brought here to be remelted and formed into finished objects.

Another issue, which is related to the raw glass found at Sirkeci is the 'Gate of Glassmakers' which has not been located yet18. There are several ruins recently discovered in the same neighborhood which may be considered as a part of this famous gate but it is too early to identify them with certainty as the Gate of Glass makers. Work is still in progress to locate this gate somewhere near our trenches.

**OTTOMAN GLASSES**

Excavations at Sirkeci yielded a large quantity of material which has tremendous importance for the history of Ottoman glass production.

Until very recently it was impossible for us to recognize Ottoman glasses except nineteenth century examples: in other words, Beykoz glassware. A small group of Ottoman glass was found in the Sarachane excavation (ancient St. Polyeuktos church), but it has not been yet studied properly. Indeed, we used to follow the development of pre-nineteenth-century Ottoman glasses through the illuminated books, travelers’ memoirs, in heritage records and tax records.

Hundreds of fragments of Ottoman glass dating back to the fifteenth and to the seventeenth centuries were found at Sirkeci, some of which can be restored.

The fifteenth- and sixteenth-century glass includes spirally ribbed piriform lentoid bottles. The production technique of these bottles is named by Goldstein as half-post; but Hayes calls them double-paraison. As for the neck shape and production method, they resemble Abbasid glass19. But their colors are very much like Byzantine examples. The fabric of olive, brown and yellow glasses is almost the same with Byzantine goblets and chunks. This shows that Ottoman and Byzantine craftsmen were not in different worlds but quite close.

In time, bottles became taller as well as their color turned into turquoise. Those turquoise bottles were very lively pictured in the sixteenth century Ottoman miniature called Surname-i Hümayun (Fig. 8). We found a lot of pieces belonging to that kind of bottles. Some of them plain, some others diagonally ribbed (Fig. 9). All turquoise glasses have a homogenous fabric. Their bottoms are plain, kick based or ring-based.

Some later examples are almost identical with those depicted in the eighteenth century Ottoman miniature Surname-i Vehbi and in the carvings on the fountains of Ahmed the Third (Fig. 10). Devitrificated objects and production wastes which were found together with them show the signs of local production (Fig. 11).

Nineteenth century glasses at Sirkeci are different in comparison to the examples mentioned above. They are decolorized Beykoz-ware. Especially a number of pad-bases attracts more of our attention20.


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Fig. 9: Ottoman flask sherds.

Fig. 10: Ottoman flask.

Fig. 11: Devitrified Ottoman glasses.
VENETIAN GLASSES

The last group of finds are the Venetian glasses (Fig. 12). These glasses most probably were daily goods of Italian families settled at Sirkeci. Italians from Venice, Genova, Amalfi and Pisa had their own trade districts in Constantinople from the 12th century on. They had special concessions granted by the emperor and the presence of Italians in the city continued in the Ottoman time. All these Italian settlements were located near the two major harbors of the city, Neorion and Prophorianon. Phosphorianon is nowadays our excavations area and producing a lot of Italian glasses mostly Venetian from the 6th and 17th centuries. Before the Marmaray Project in Istanbul we used to know the existence of these glasses in the Topkapi Palace Museum in Turkey21. Very few sherds were reported from the Saraihane excavations also22.

The finds from Sirkeci are typical Venetian examples the 16th and 17th centuries23 (Fig. 12). The sixteenth century examples are almost identical with the glass cargo of Galigni Wreck. The largest group of them is the filigrana glass. This group consists of necks, high or low bases and lamps. Opaque white threads on these examples are very irregular. Later examples are more colorful and the threads are regular.

Surprisingly, some circular window glasses were also found. Their colors are amber, emerald, green and pale green. These mould-blown panes have honeycomb reliefs24 (Fig. 11).

23. Lazar and Wilmott 2006, 28, 34, 37; Hettes 1960 fig. 20, 21, 30, 36-37; Caluve 2005, fig. 64; Barrera 1990, fig. 10, 12; Fontaine 2005, fig. 69; Medici 2005, fig. 5.
CONCLUSION

The Marmaray-Project is not only going to settle Istanbul’s heavy public transportation problem but also will uncover many historical treasures of the city. The glass findings obtained from those excavations is a proof that glass items had a two thousand year use uninterruptedly in this city.

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