

GOLD-GILDED GLASS ARTIFACTS PRODUCED WITH THE SANDWICH GOLD-GLASS TECHNIQUE: FINDINGS FROM PISIDIA ANTIOCHIA

SANDWICH GOLD-GLASS TEKNİĞİYLE ÜRETİLMİŞ ALTIN YALDIZLI CAM ESERLER: PİSİDİA ANTİOKHEİA BULUNTULARI

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Abstract**

The glass artifacts decorated with gold leaf found in the Ancient City of Pisidia Antiochia, located in Yalvaç District, Isparta Province, constitute the subject of the present study. Within the scope of the study, 1 wall covering/panel made using the Sandwich Gold-Glass technique and glass tesserae made using this technique were evaluated. This study aims to reveal how these artifacts, which constitute one of the unique and special find groups, were used in architecture and particularly within a local context in Anatolia, by examining their forms, production techniques, areas of use, and comparisons with similar examples. First, the wall covering/panel was evaluated. First, the wall covering/panel was evaluated. This piece, made in the Sandwich Gold-Glass technique for now, is the only example found in the city. First, the form was defined and the production technique was discussed. Then, based on similar examples and the find context, an attempt was made to date it. The second group of glass tesserae features applied gold gilding decoration. To date, 1012 tesserae produced using this technique have been found at Antioch. All of them were unearthed in the church located on Aedilicus Hill. The church, known to have two phases, underwent its first phase during

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the reign of Emperor Justinian and was destroyed by an attack during the reign of Caliph Walid (713 AD). 9th century AD. In the middle of the century, in order to build the new church, the ruins of the old church were filled in and leveled out to create a flat surface. The gold-leaf tesserae found within this fill layer must have adorned the walls and ceiling of the church's initial phase. For these gilded mosaic tiles, a date range of the 6th-7th century AD can be given. In addition to its contributions to regional archaeology In addition to its contributions to regional archaeology, the study also sheds light on glassworking in Anatolia from the perspectives of production and function.

Keywords: Pisidia Antiokheia, Byzantium, Aedilicus Hill Church, Gold-Glass, Wall Covering / Plate, Tessera

Özet

Isparta İli, Yalvaç İlçesi'nde yer alan Pisidia Antiokheia Antik Kentinde bulunan, Altın Varak süslemesiyle yapılmış cam eserler, çalışmanın konusunu oluşturmaktadır. Çalışma kapsamında, Sandwich Gold-Glass tekniğinde yapılmış 1 adet duvar kaplaması/levhası ve bu teknikte yapılmış cam tesseralar değerlendirilmiştir. Ünik ve özel buluntu gruplarından birisini oluşturan bu eserlerin; formları, üretim teknikleri, kullanım alanları ve benzer örneklerle karşılaştırmaları yapılarak, mimaride ve özellikle Anadolu'da yerel bağlamda nasıl kullanılmış olduklarını ortaya koymak amaçlanmıştır. İlk olarak, duvar kaplaması/levhası değerlendirilmiştir. İlk olarak, duvar kaplaması/levhası değerlendirilmiştir. Bu parça, şimdilik Sandwich Gold-Glass tekniğinde yapılmış, kentte bulunan tek örnektir. Öncelikle form tanımlaması yapılarak, üretim tekniğine değinilmiştir. Sonrasında benzer örnekler ve buluntu kontekstinden yola çıkılarak tarihlendirmeye çalışılmıştır. Altın yaldız süslemesinin uygulanmış olduğu ikinci grup cam tesseralardır. Antiokheia'da şimdiye kadar, bu teknikte üretilmiş 1012 tane tessera bulunmuştur. Tamamı Aedilicus Tepesi'nde yer alan kilisede açığa çıkartılmıştır. İki evresinin olduğu bilinen Kilisenin ilk evresi; İmparator Justinianus Dönemine ait olup Halife Velid Döneminde (MS 713) yapılan saldırıyla yakılıp yıkılmıştır. MS 9. yüzyılın ortasında yeni kilisenin yapılabilmesi için eski kilisenin yıkıntıları, alttaki yapıların içine doldurularak düzleştirilmiştir. Bu dolgu tabakasının içerisinde bulunan altın varaklı tesseralar kilisenin, ilk evresine ait olan duvarlarını ve tavanını süslüyor olmalıydı. Altın varaklı bu tesseralar için MS 6.-7. yüzyıl tarih aralığı verilebilir. Çalışma, bölgesel arkeolojiye sağladığı katkıların yanı sıra Anadolu'daki cam işçiliğine üretim ve işlev açısından da ışık tutmaktadır.

Anahtar Kelimeler: Pisidia Antiokheia, Bizans, Aedilicus Tepesi Kilisesi, Altın Cam, Duvar Kaplaması/ Levhası, Tessera

Glass artefacts is one of the densest groups of finds unearthed during the excavations of Pisidia Antiocheia. Among these, the fragment of wall revetment with gold-gilded decoration and tesserae are of particular significance. This study will first focus on the wall revetment, which was produced using the Sandwich Gold-Glass technique.

Although it is known that the use of gilding in glass decoration first appeared in the Hellenistic Period (Harden, 1968, p. 46-72), Dan P. Barag's study, "The Prelude to Hellenistic Gold-Glass", is supported by archaeological evidence that the origin of golden glass dates to the Phoenician art of the 8th century BC (Barag, 1988, p. 19-25). During the Hellenistic Period, 22 examples of this technique are known (Cesarin, 2018, p. 27). The most prominent examples known to have been preserved to this day are the Canosa group bowls, found at Canosa and dated to the late 3rd century BC (Harden, 1968, p. 21-47), a bowl found in the city mound of Gordion, dated to the second half of the 3rd century BC (Saldern, 1959, p. 45-48), another bowl found in Mozdok dated to the beginning of the 3rd century BC (Adriani, 1967, p. 105-127). This technique was further developed and continued to be applied in the Late Hellenistic and Early Roman Periods, as seen in gold strapwork bowls that combined colored glass and gold leaf (For exemplification, see Grose, 1982, p. 20-29; Grose, 1983, p. 43- 44.). The same technique was employed in the Late Roman and Byzantine periods; subsequently, it continued to be used on medallions depicting various religious and non-religious subjects and individuals (For examples of these medallions, see Mezzolani & Rini, 2023, p. 2-10).

A Fragment of Wall Revetment

During the conservation work carried out in 2014 in the area referred to as "Shop 6," located to the east of the square extending from the city's west gate (the main entrance) towards the north (Özhanlı, 2015, p. 5) (Fig. 1), a fragment of wall revetment produced using the gold-gilded glass technique was unearthed within the Wall (Özhanlı, 2015, p. 5, res. 4). This technique, known as Gold-Glass, Sandwich Gold-Glass, or Glass Revetment, is relatively uncommon and involves the placement of a thin gold leaf between two layers of glass (Baykan & Baykan, 2012, p. 30).



Figure 1

Western Gate, the Square, and Shops / Batı Kapısı, Meydan ve Dükkanlar

The piece examined within the scope of the study is the only example found in the city made in the Sandwich-Gold Glass technique (Fig. 2). As can be understood from the current state of preservation of the piece, it has a long, thin rectangular form: width: 5.8 cm, protected length: 6.1 cm, thickness: between 0.4 and 0.7 cm (Thickness increases from edge to the middle). The thickness of the glass under the lamination is 0.3-0.6 cm, while the glass thickness above the lamination is 0.1 cm, which is relatively thin. In the details seen on the edges of the broken wall parts (Fig. 3), these two layers and the thin gold leaf placed between them can be observed clearly. From the tool marks seen on the edges, it is understood that the glass placed on the upper or lower layer was shaped by pulling it. The piece is made of green glass, and a small number of bubbles can be seen inside and on its surface.



Figure 2

A Piece of Gold-Leafed Sheet / *Altın Varaklı Levha Parçası*



Figure 3

Gold leaf Sheet Fragment, Side View / *Altın Varaklı Levha Parçası, Yandan Görünüm*

The back surface is left rough, and mortar residues remain in these textured spaces. Leaving the back side rough can be interpreted in two ways. Anastasios C. Antonaras, while describing the production of this type of glass, molten glass is poured into a mold lined with sand and pulled with tongs to shape it into a rectangular shape. Then, gold leaf is placed on the surface, and a second layer is created by blowing thin colorless glass onto it while the glass is still hot (Antonaras, 2008, p. 301). According to this explanation, leaving the back side like this could be due to either the sand in the mold during the production phase or because it was used by gluing it to a surface.

Although only a small part of the piece is preserved, it is understood that its surface was decorated with an ornamental motif. The gold leaf decoration does not cover the entire surface of the plate. At the corner point, a semi-circle is created with blue color, and its edges are bordered with a dark color. Afterwards, gold leaf was placed, and then blue was placed again. There are traces of adhesive on the surface of the midpoint of the semi-circular shape in the corner. There was probably a glass or stone decoration placed on top of this area by gluing it in place.

When similar examples of the piece in question are examined, it becomes clear that these are glass plates used in wall decoration. It is known that they form a composition on their own, while sometimes they are cut into pieces and placed side by side to create an exceptional composition. Pieces made in a similar technique to the Antiochian example were found in the İznik (Nicaea) Theatre (Özgümüş, 2009b, p. 735, pl. XXVII/pic. 4, 732, tab. II/12), Excavations at the St. Polyeuktos Church in Istanbul (Harrison & Gill, 1986, p. 172, 174), in the Topkapı Palace Courtyard (Atik, 2009, p. 309-314), in the İstanbul/Marmaray Excavations (Özgümüş, 2009a, p. 328, fig. 6), in the Basilica of Paul the Apostle in Kefalari near Argos (Antonaras, 2008, p. 298-302), and the Basilica of St. Demetrios in Thessaloniki (Antonaras, 2012, p. 301-306).

In similar examples, two distinct date ranges are associated with these glass plates. 6-7th century AD and 9-12th century AD. However, the finding location and the layer complicate the situation considerably. It is challenging to date the piece, which was found in the fill soil used to repair the wall of a shop in Antioch for sales purposes during its last use, based on the location of the find. The piece was unearthed during conser-

vation work carried out to strengthen the walls of the shop. During the work, three coins and four pendant/necklace Anadolu Araştırmaları - Anatolian Research pendulums were also found on the wall, along with the glass plate piece in question (Fig. 4). These findings have been fascinating for the dating of the glass plate.



Figure 4

Find Layer / *Bulut Katmanı*

The form of pendant/necklace pendulums; there is a round hanging hole at the top, three groove decorations under the hole, and the body ends with a rounded shape starting from the bottom of the decorations (Fig. 5). A date range of 1-5 centuries AD is given for this style of pendant/necklace pendulums (Kutluer, 2021, s. 167-168, kat. no. 123-124; Garan, 2015, p. 81, ks. 5-7). One of the coins cannot be read because of the damage. The second coin belongs to Maximianus Herculeus (Augustus, 286-305; 307-308; 310)¹, and the third coin belongs to the Arcadius period (395-408)² (Fig. 6). When examining the dating of these findings, we encounter a very complex date range.



Figure 5

Four Pendant - Necklace Pendulums / *Dört Adet Pendant - Kolye Ucu*

Another issue that generates ambiguity concerns the provenance of the find. Detailed examination of comparable examples demonstrates that such objects were typically unearthed in the courtyards of private residences (Antonaras, 2008, p. 301.), or within prominent Byzantine structures, particularly churches. Accordingly, the likelihood that a piece of this nature was employed in an

¹ Mint of Heraclea
Follis, c. 295-299

Ö/ IMP C M A MAXIMIANVS P F AVG; Sun beam crowned, draped and armored bust of the emperor, facing right.

A/ CONCORDIA MIL-ITVM; Emperor standing facing right, holding a spear in hand; Jupiter standing facing left, holding a scepter in his left hand and a Victoria on a globus in his right hand, offering it to the emperor.
RIC VI, 581, No. 16b.

² Mint of Heraclea
Æ4, 388-392

Ö/ DN ARCADI-VS PF AVG; Pearl-diademed, draped and armored bust of the emperor, facing right.

A/ [SALVS] REI PVBLICAE; Victoria advancing left, holding trophy in right hand dragging captive to the left; cross in the left; SMHA.

RIC IX, 198, No. 26c; LRBC II, Salus Rei Publicae, Type 2.

(I would like to thank Hacer SANCAKTAR for her help in reading the coins.)

ordinary shop for commercial purposes appears highly improbable. Nevertheless, it is noteworthy that St. Paul's Church is situated to the northeast of the area where the shop is located. However, St. Paul's Church is located in the northeast of the area where the shop is situated. It may therefore be suggested that this distinctive glass plate fragment was originally employed in St. Paul's Church and, following the church's disuse, was redeposited within the fill subsequently utilized in the repair of the wall of "Shop 6". It is known that during his missionary expeditions, St. Paul visited the city of Antioch in Pisidia three times (between 46 and 58 AD) and laid the foundations of the Christian religion by delivering the first sermons in the town. For this reason, the largest church in the city was attributed to him. The church, built in the 4th century AD, is the largest early basilica-planned church in the Pisidia Region in terms of its dimensions. It is also essential because it functions as a "Pilgrimage Church" (Kahraman, 2023, p. 153-167). It is possible that the glass plate in question, which is a very special find, belongs to this church.



Figure 6

Coins / Sikkeler

It is challenging to determine the place of origin of this unique plate, decorated with gold leaf, found in Antioch. Anastasios C. Antonaras points out that such gold leaf decorated plates/pieces are a Syrian-Palestinian tradition and points to the Syrian-Palestinian coast as their production center (Antonaras, 2012, p. 305). For similar examples evaluated in her work titled "Three Byzantine gold-glass pieces", Şeniz Atik, does not specify a clear place about the production places of these types of ornaments, which are rare decoration elements, but states that the examples found in the capital Constantinople (such as Hagia Sophia, Polyuktos Church and imperial palaces) may have been produced in the capital (Atik, 2009, p. 313). In the studies conducted in the city so far, it has been determined that glass production was concentrated in four areas in Antioch during the Byzantine Period. In these areas, various forms were certainly produced for multiple uses, including lightning rods, daily use, and ornamental purposes (Uğuz, 2021, p. 29-41). However, there is currently no evidence for the production of gold leaf glass. The gold leaf tesserae which will be evaluated in the future within the scope of this study, are understood to have been produced using a similar technique. Given their abundance, it is likely that the production of gold leaf tesserae took place within the city.

Tesserae

The second group to apply gold foil decoration is glass tesserae. These tesserae were produced with a similar technique to the gold leaf plate fragment described above. Gold leaf is placed on the surface of the molten glass, which is then poured into a sheet-shaped mold. While the glass is hot, transparent thin glass, called cartellina (Loukopoulou & Moropoulou, 2009, p. 307), is blown over it and covered with a second layer that serves as protection. After the glass plate has cooled, tesserae are created by cutting it into small, square pieces.

During excavations carried out in Antioch, 1,012 tesserae produced using this technique were found. All of it was unearthed in the church on Aedilicus Hill³. Ten of them are triangular, the rest are all squares (Fig. 7). Dimensions vary between 1.5 x 1.0 x 0.5 cm and 0.4 x 0.6 x 0.5 cm. The majority of them are translucent green and light green, and a few are in light yellow and greenish-yellowish colors. In addition to well-preserved examples, there are also those whose thin upper layer has been removed (Fig. 8); the gold leaf placed between them has disappeared or is only partially preserved. Light yellow and light green colors were preferred to cover the upper layer, which is quite transparent compared to the lower layer. Their dimensions range from 0.1 cm to 0.2 cm. In some tesserae, although both the bottom and top layers were preserved, the gold leaf in between them has disappeared. How the second layer of glass was placed can be understood from the surface of some of the round-edged tesserae created by cutting from the edge of the plate (Fig. 9). The second layer of support glass ends before the edges of the tesserae. It is placed on it by combining it well. Yael Gorin-Rosen explains that the existence of the edges of these sheets, which were created to produce tesserae, is because they were produced locally as part of the process of making colored glass tesserae (Gorin-Rosen, 2015, p. 99). As a matter of fact, in some of the tesserae found in Antioch, it is seen that the thin glass placed to cover the upper layer has melted and become amorphous (Fig. 10). Possibly due to the sudden cooling that occurred during the placement of the second layer after the gold leaf was placed or the failure to form a thin layer, the upper layer remained in the form of large bubbles. The back surface of all the tesserae evaluated in this group was left rough.

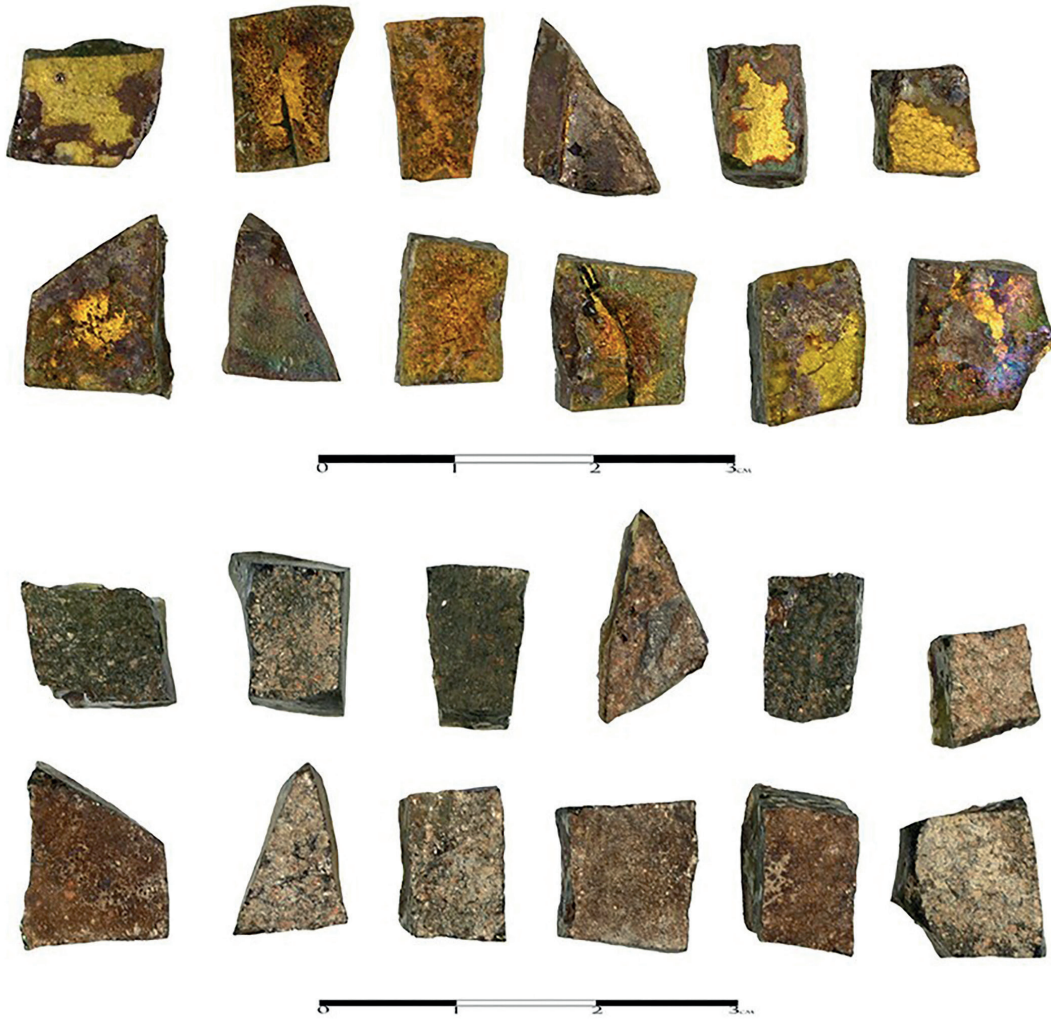


Figure 7

Gold Leaf Glass Tessera, Front and Back Sides / *Altın Varaklı Cam Tesseralar, Ön ve Arka Yüz*

³ Three other churches/buildings in the city may have been decorated with tesserae produced in gold leaf technique. However, as a result of systemic excavations in the church on Aedilicus Hill and meticulous examination of the glass findings, only tesserae produced in gold leaf technique can be seen among the glass findings of this church.



Figure 8
The Detached Top Layer of Gold Leaf Glass Tesserae / *Altın Varaklı Cam Mozaik Parçalarının Ayrılmış Üst Katmanı*



Figure 9
Gold Leaf Tessera Edge / *Altın Varaklı Tessera Kenar Kısmı*



Figure 10
Amorphous Tesserae, Front and Back Sides / *Amorf Tesseralar Ön ve Arka Yüz*

These tesserae, made in the Sandwich Gold-Glass technique, were used not to cover an entire wall but only in small sections for decorative friezes, bands, dividing lines, surface, and other vital parts (Saldern, 1980, p. 92; Kazhdan, 1991, p. 1413). Unlike the Antiochian examples, it is seen that some tesserae have dark, and linear decorations between the gold leaf decorations (Fig. 11). Another difference observed in some tesserae is that once again they were made with the Sandwich Gold-Glass technique, the surface of the tesserae was painted with blue color, gold leaf was placed on it and the upper surface was layered with a thin glass that again served as a protective layer (Fig. 12). The present group of findings does not constitute a composition on its own. As mentioned above, they were likely used to convey essential details within the fresco.



Figure 11

Examples of Linear Ornamentation / *Çizgisel Bezemelerin Olduğu Örnekler*



Figure 12

Painted Samples / *Boyalı Olan Örnekler*

It is known that glass began to be used as a decorative element on walls in the Late Republican Period of Rome. To decorate villas, caves, and Nymphaea with materials such as seashells and broken glass has been used. Glass tesserae from the first half of the 1st century BC began to be used in fountains, other water-related areas, and on the surfaces of walls, vaults, and domes (Dunbabin, 1980, p. 113). From the 4th century AD, it became a form of wall decoration frequently used to decorate the wall mosaics of churches and chapels (Kazhdan, 1991, p. 1413). Gold leaf tesserae, found together with glass tesserae in various colors, were widely preferred, especially in mosaics that covered the walls of churches. Gold leaf glass tesserae are defined as one of the flashy and expensive wall decoration elements (The cost of Hagia Sophia's mosaics was calculated, and a very high price was determined. For details, see.; Mango, 1992, p. 125-126). However, Marco Verità states that approximately six square meters of mosaic sheets can be made with 20 grams of gold (one cubic centimeter) (Verità, 2000, p. 68). Gold leaf tesserae are found not only in capital cities such as Rome and Constantinople, but also in rural churches, monasteries, and settlements, which shows that they do not require significant costs (Gorin-Rosen, 2015, p. 100).

Gold leaf tesserae, which are a part of the ostentation and magnificence of buildings, are finds that are not taken into consideration in excavation results and reports. Every ancient city where Christianity was observed has at least one church structure. It is one of the places that is admired both religiously and architecturally. For this reason, the most crucial ornamental element that adorns every church that can afford it should be glass tesserae. However, although this group of archaeological finds has not received the scholarly attention it deserves in excavation reports, existing publications indicate that gold leaf tesserae had a wide distribution. One of the earliest examples was found in Sardis and dates back to before 400 AD (Saldern, 1980, p. 92). Amorium (Lightfoot & Lightfoot, 2006, p. 89-92), Dereagzi Mastaura(?) (Morganstern, 1983, p. 81-93:) in Lycia, Anazarbus (Gough, 1952, p. 115), St. Polieuktos Church (Schibille-McKenzie, 2014, p. 114-127), and the most crucial finding area of all, Hagia Sophia (Şimşek, 2015, p. 10-11). In addition to these locations, it was used extensively in Ravenna and Rome (Muscolino, 2019, p. 119-132). These glass tesserae found in Antioch are similar to those found in these cities in terms of size, technique, and decoration. The walls of large and small churches dating between the 5th and 9th centuries AD are decorated with gold tesserae. It is understood from the gold glass mosaic inscriptions found in Bet Shean/Beysan during

the Umayyad period that the gold glass tesserae tradition, which was used to decorate essential buildings of Byzantium, continued in Islamic culture (Khamis, 2001, p. 159-176). Gold leaf tesserae were also used in Anıtkabir, the building complex that houses the mausoleum of Mustafa Kemal ATATÜRK is located in Ankara's Çankaya district. The fact that the walls and ceiling of the mausoleum are decorated with gold leaf tesserae (Fig. 13) indicates that this decorative element⁴, which first appeared in the 4th century AD, has continued to be used on the walls and ceilings of essential buildings to this day.



Figure 13
Anıtkabir Wall Decoration / *Anıtkabir Duvar Süslemesi*

The gold leaf tesserae evaluated in the study were unearthed during excavations carried out in the church on Aedilicus Hill and its surroundings within the 2024 excavations program. The vast majority of it was found in the trenches designated as AT 69+68 (Fig. 14). This area is located outside the south wall of the square-planned space in front of the arched door, situated in the southwest corner of the church. The context was documented as being filled with bricks, tiles, marble slabs, and mortar. Within this deposit, glass fragments attributable to a dense assemblage of handled oil lamps (approximately six large crates), as well as bronze-lead alloy wick stabilizers and bronze suspension fittings associated with these lamps, were identified (These glass lamps will be evaluated in a separate study.). As a result of the work done in the church so far, it's understood that the current church has two phases. The first church, which belonged to the reign of Emperor Justinianus, was burned and destroyed by an attack during the Caliphate Velid period (713 AD) (Özhanlı, 2017, p. 97), in the middle of the 9th century AD, the ruins of the old church were leveled by filling them into the structures below so that the new church could be built. The gold leaf tesserae found in this fill layer, along with glass lamp fragments, must have adorned the walls and ceiling of the church, which belonged to the first phase. Based on the excavation data of the area in question and other finds from the area, a date range of the 6th to 7th century AD can be assigned to the gold leaf tesserae evaluated within the scope of the study.



Figure 14
Church on Aedilicus Hill / *Aedilicus Tepesi Kilisesi*

⁴ (BBC Türkçe, 2023)

Conclusions

These gold leaf tesserae, unearthed from the church on the Aedilicus Hill, must have been produced locally. There is data that glass production was made in four different areas in Antioch during the Byzantine period. One of these areas is the church on the Aedilicus Hill. Although no furnace or crucible remains have been found in the church so far, finds for glass production have been unearthed in the surrounding buildings (These findings are amorphous, foams, and slags of glass.). It is misleading to think that the church, a complex structure, did not have a glass furnace in the early period, based solely on the late destruction (Uğuz, 2021, p. 40-41). Additionally, from written sources, it is revealed that during the construction of religious public buildings, such as churches, glaziers set up small facilities. It is known that they produced the church's mosaic glass and oil lamps locally and then dismantled the ovens (Keller, 2010, p. 183-198). Considering the structures surrounding the church and the presence of a wall, it can be easily assumed that this could be a city monastery. Apart from all this, the abundance of glass finds in the church also shows that the tesserae may have been locally produced. As a result, the tesserae evaluated in the study must have been made either in a special workshop producing colored glass belonging to the church or locally by temporary glass masters coming to the church. The fact that numerous production errors and amorphous finds were also discovered during the excavations supports this idea.

Although the church is almost preserved at a basic level today, archaeological findings are sufficient to enable us to imagine the splendor of the church in its first phase of use. In addition to the gold-leaf glass tesserae adorning the walls and ceiling of the church, the plaster and column capitals are also decorated with gold gilding. This reveals the magnificent structure and historical significance of the church during its time of use.

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