ROMAN AND BYZANTINE GLASS WORKSHOPS IN CARIA

An Assessment of New Finds and Evidence

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Keywords: *Caria • Glass Production • Glass Workshops • Roman Glass • Byzantine Glass*

Abstract: Publications on Carian glass constitute only a small portion of all publications about ancient Anatolian glass. Glassworks mostly find their place within general publications and in the frame of all excavation findings; publications that focus exclusively on glass are rare. Nevertheless, the limited research that has been conducted on glass, excavation reports, and publications on the glass held in collections of Carian museums do offer valuable information about the importance of Caria in the history of glass. Because glass workshops were small centers whose detection and identification in the archaeological record is difficult, key factors that may help determine the importance of Carian innovation in the history of glass still elude researchers. It is significant that, while very few glass workshops have been identified across Anatolia, a remarkable number of these centers are in Caria. This paper analyzes a wide variety of evidence concerning glass workshops in Caria to demonstrate the importance of Caria in the history of glass.

KARIA BÖLGESİ ROMA VE BİZANS DÖNEMLERİ CAM ATÖLYELERİ

Yeni Buluntu ve Kanıtların Değerlendirmesi

Anahtar Kelimeler: *Karia Bölgesi • Cam Üretimi • Cam Atölyeleri • Roma Dönemi Camcılığı • Bizans Dönemi Camcılığı*

Öz: Karia Bölgesine Anadolu antik camları konusunda yapılan yayınlarda pek az değinilmektedir. Bölgede yapılan kazılarda ele geçen buluntuların genel olarak ele alındığı yayınlarda camlara da yer verilmektedir. Ancak bunlar cam odaklı çalışmalar olmaktan uzaktır. Kısıtlı sayıda yapılan cam çalışmaları, kazı cam buluntuları ve müze cam koleksiyonları üzerine yapılan yayınlar Karia Bölgesi'nin camcılık tarihi açısından önemine ilişkin oldukça kıymetli bilgiler içermektedir. Bununla birlikte, antik cam üretimi yapılan atölyelerin oldukça küçük çaplı merkezler olmaları ve bu nedenle bu merkezlerin saptanmalarında güçlük ve tanımlanmalarında sorunlar yaşanması camcılık tarihi açısından bölgelerin önemini önemli ölçüde etkileyecek bulgulardan uzak kalmamıza neden olmaktadır. Bu nedenle Anadolu'nun geneli değerlendirildiğinde hala oldukça az sayıda merkezin tespit edildiği ve tespit edilen bu merkezlerin hatırı sayılır miktarının Karia Bölgesi'nde toplanmış olduğu dikkati çekicidir. Bu makale Karia bölgesinin cam tarihi içerisindeki önemini ortya koymak amacıyla, Karia cam üretim merkezlerini buluntu çeşitliliği içerisinde analiz etmektedir.

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The time interval of this study covers the Roman Imperial Period, when glass production became an independent market open to new technological development. Geographically, the study is concerned with Ancient Caria, which was situated in the region bounded by the Büyük Menderes River (Maiandros) in the north and the Dalaman River (Indos) in the south. The focus of this study is the Carian glass workshops within the aforementioned period and region.

Glass became a widespread commodity after around 50 BC, when its production no longer depended on the auspices of the royal families or wealthy elite of Greek cities. As a result of this new independence, glass production expanded. Workshops have been unearthed in large quantities and in a wide range of forms in almost all Hellenistic settlements. The most concrete development that influenced the rapid spread of glass production in the Roman Imperial Period was the realization that glass could be shaped by blowing through a tube. That is to say, the invention of "glassblowing."

The effects of this new technique can be observed in Anatolia, and specifically in Caria. The majority of glass finds, which are gathered from excavations in Anatolia or preserved in museums and private collections, belong to the Roman Imperial Period and subsequent eras. This is indicative of the widespread usage of blown glass after the technique was developed. Without doubt, this proliferation of glass points to both an increase in local production, and the development of an overseas commerce network. While only a few prominent ancient Anatolian glass workshops have been recorded because of limited study on the subject, today new archaeological evidence, including furnaces and other remains associated with production, shows that glass manufacturing had been occurring for a long period in many Anatolian cities. Considering the overall number of identified glass workshops in Anatolia and the fact that this count is far from complete, it is remarkable that a considerable number of these centers are in Caria.

Caria is located at the crossroads of many ancient trade routes, which is reflected in its exceptionally rich material and cultural heritage. For this reason, it is very intriguing that we did not have concrete evidence of glass production in Caria until recently. Evidence including furnace remains, remnants of production, raw glass, and epigraphic documents prove that Caria housed a significant number of glass production centers.

Aphrodisias, a city in northeast Caria, is one such center. The first tangible evidence in the city related to glass workshops was unearthed in the Hadrianic Bath, which were built in the 2nd century AD within the city center. Glass artists probably used the furnace of this bath instead of another separate one devoted exclusively or originally to glass manufacture[1]. Moreover, a sarcophagus was found in 1994 in Aphrodisias with two glassblowers on it[2].The Aphrodisias

1 Tek 2005, 114.

2 Although this figure was interpreted as an iron-forging scene by R. R. R.Smith (Smith 1995, 1888, Fig. 7), A. T. Tek claimed that the scene

sarcophagus is extremely important with its scene in terms of this study, not only because it was found in Caria, but also because it is one of the very few depictions of Roman glassblowers[3].

Yet the most substantial piece of archaeological evidence related to glass production in Aphrodisias is the small glass furnace, which dates to the 5th – 7th centuries AD. The base of the fire chamber is constituted with stone and tile and a large number of glass drops were unearthed in the easternmost room of the South Portico[4]. Although the glass-working related results of this excavation have not yet been published, the author of this paper has found an opportunity to analyze the glass containers in the Aphrodisias Museum, which belong to the Late Roman or Early Byzantine Era and are as such parallel to the dating of the furnace. The political and cultural dominance of the city also support it as having been one of the major centers of glass production in Caria and in all of Anatolia.

In considering the importance of Aphrodisias in the history of Carian and Anatolian glass, we must take into account *The Edict of Diocletian Fixing Maximum Prices*, written in Antioch in 301 AD. Copies of the edict were inscribed in Latin or Greek on marble panels and posted in prominent places. Fragments of one such copy, written in Latin, were found at Aphrodisiasin the Portico of Tiberius[5]. Fragments of the section on the prices for glass found in Aphrodisias between 1970 and 1972 are the most significant ancient sources of information on Late Roman glass[6]. This edict announced prices for a multitude of different goods and services. It refers to two different kinds of glass, Alexandrian and Judaean, and describes two categories of each, raw glass and undecorated vessels. It also describes two categories of window-glass, all of which were priced by weight[7].

Ancient Nysa, which lies a few kilometers beyond the present day village of Sultanhisar on the southern slope of Mt. Messogis, is another Carian center where glass workshops have recently been found. At the northeast corner of the agora, three shops were found in the north stoa in the 2007 Nysa excavation campaign. A water channel ran between the back wall of the shops and the back wall of the stoa. The easternmost shop had a rubble floor in the latest phase. The second shop was a glass workshop. A large number of window-glass pieces, fragments of glass vessels, glass clinkers,

illustrated glass-blowing (Tek 2005, 117, foot note 72).

3 There is only two other depictions of a Roman glassblowers are known: The first one is found on a fired clay oil lamp of the 1st century AD from Asseria, Croatia (now in Spalato Museum, inv. nr. 1094/30) (Stern 1999, 446, Nr. 22.) Another lamp from Ferrara, Italy, has the same design (Museo Archeologico Nazionale, Ferrara, inv. nr. 52196)(Baldoni 1987, 22-29).

4 Lauvers – Degryse – Waelkens 2007, 2-3; Smith – Ratté 1998, 238.

5 Roueché 1998, 265-318; Stern 1999, 460-465; Erten 2012, 77-88.

6 With the Edict of Prices, Diocletian made a series of changes in the administrative system (Erten 2000, 172-174; Erten 2012b, 77-88). It was Diocletian's attempt to curb inflation, attain economic stabilization, and balance the increasing prices via price controls (Erim – Reynolds – Crawford 1971, 176; İznik 2011, 107-108).

7 Price 2009, 179; Lightfoot 1989, 89.

and melting pots were found here. In addition to these finds, archaeologists unearthed several chunks of raw glass in the northeast corner of the room and the remains of a glass furnace[8], which indicate the presence of a workshop. In the third shop was found a long amphora datable to the 4th-5th century AD as well as an unguentarium, a lamp and a pottery kiln[9].

Late Roman and Byzantine Era glass furnaces have also been found at Tralleis, a neighbor of Nysa. These furnaces were unearthed within the 13 industrial workshops, which are located along the north side of the gymnasium.

Amongst these workshops, the easternmost was the first to be discovered in the 2007 campaign[10]. Remains of a glass furnace were found in the southeast corner of this workshop. From the spherical brickwork of these remains, an original dome shape for the furnace can be inferred[11]. Glass rods, which were going to be processed in the furnace, have been found over the Late Roman or Byzantine brick base slab in workshop number 2, along the same row of rooms as the Eastern Glass Workshop.

These pen-shaped glass rods have sharp pointed edges and polygonal sections with four, five, or six faces. They differ in length and thickness. Although purplish and yellow traces can be seen on some of the rods, most are colorless and transparent. The discovery of the glass rods, not within the workshop with the furnace but instead three rooms away, brings to light an additional aspect of production. Moreover, the presence of window-shaped gaps in the wall of some of the workshops corroborates the idea of teamwork or communication between workshops about their craft[12]. The place called "7th Workshop," which is directly to the west of the city center, was also used as a glass workshop during Late Antiquity.

The Kaunos Glass Research Project has been carried out by Dr. Çiğdem Gençler Güray[13]. The material from Kaunos, which consists of 1,500 glass pieces, proved that the city housed a range of glass containers dating to between the 2nd century BC and 7th century AD. In the context of her research aims, Dr. Gençler Güray did find evidence of glass production[14] even though archaeologists have not yet found any remains of a furnace[15]. Her findings

8 İdil – Kadıoğlu 2008, 502-503.

9 http://www.une.edu.au/about-une/academicschools /school-of-humanities/study-areas/archaeology/current-archaeology-in-turkey/sites/l-m-n-o/nysa-ad-meandrum.

10 Yaylalı 2008, 24; Kavaz 2011, 57.

11 On the North side of the furnace, which has a diameter of 1.83m., there is a lid opening with 0. 60m. width. On the southeast corner of the workshop, opposite to the furnace, there is a 1 x 0.70 m. rectangular sink. It is plastered with thick lime mortar. The sink has a recess over its surface, in the middle of its narrow side. This recess is for placing an iron bar that holds the frit, softened with hot ember in the sink (Kavaz 2011, 54).

12 Yaylalı 2008, 25.

13 Ç. Gençler, oral communication.

14 I am grateful to Dr. Çiğdem Gençler Güray for sharing her own study results,which have not been completely published yet.

15 Finding of a glass furnace is not a fundamental requirement to prove glasswork production, because in the ancient times places like baths also

present a significant contribution to the field of Anatolian glass history, which is rat her understudied.

Kaunos, which is on the border between Caria and Lycia, is also notable as one of the Anatolian cities to have yielded Achaemenid glass finds. Scholars have argued that local glass artists and craftsmen under Persian rule could have created their works by adapting their traditional style to Achaemenid taste[16]. When it is considered that a great number of Achaemenid-style cultural items have also come from Caria,[17] and that Kaunos is one of the most important cities amongst Achaemenid centers in the region, the question should be asked whether glass production goes back to this period or not. I have demonstrated that Kaunos was one of the richest cities in terms of number of glass finds in Caria[18]. If it is true that glass production in Kaunos does go back to the Achaemenid period, then the quantitative dominance of Kaunos amongst all Carian glass production centers would be explained.

Briefly stated, ancient Aphrodisias, Nysa, Tralleis and Kaunos are the Carian cities in which glass production has been corroborated materially. However, in excavations, it has not always been possible to find furnace remains that would conclusively indicate glass production. Because some baths and copper workshops had furnaces that were adaptable for glasswork production, these could have been preferred as temporary glass workshops[19]. The presence of traveling glass artists, whose existence is accepted today,[20] may be another reason for a lack of remains of permanent furnaces and workshops in several of the cases.

In addition to these centers where glass production has been proven by the presence of furnaces and other remains related to glass production, other ancient Carian sites including Iasos, Labraunda and Alabanda are also being considered as glass production centers by researchers. This is due to the abundance of glass recovered in archaeological work, and in relevant architectural ruins and epigraphic documents.

A large number of workshop remnants have been identified in the Iasos agora and in the buildings within the agora, especially in the *bouleterion*. It is very likely that one of these workshops would have been allocated for a glass furnace[21].

During the excavations of the Sanctuary of Zeus Labraundos in ancient Labraunda,[22] which looks out over the Milas lowlands and Güllük Bay, a great number of glass fragments and raw glass chunks were recorded by Dr. Jesper Blid. Dr. Blid has concluded from these

had a temperature that was enough for glass production.

16 Erten 2012a, 193.

17 In a statistical study by D. Igniatiadou, the relative intensity of Carian Achaemenid glass containers amongst the ones found in Anatolia is indicated (Ignatiadou 2005, 423 tab. 39.1, 39.2).

18 Çakmaklı 2012, 149-150.

19 Tek 2005, 108-123.

20 Lightfoot – Arslan 1992, 6.

21 Contardi 2009, 124.

22 I am thankful to Lars Karlson and Jesper Blid for their courtesy in allowing me to carry out research on the Labraunda glassworks.

excavation finds that there may have been a glass production center in Labraunda in Late Antiquity[23]. Moreover, Despina Ignatiadou of the Archaeological Museum at Thessaloniki studied previously excavated glass from Labraunda in 2005 and suggested that the Late Antique examples did come from a local production center because the quality of the workmanship was rather coarse.[24]

Pliny the Elder uses the expression "*liquatur igni funditurque ad usum vitri*"[25] for a kind of mineral extracted from Alabanda, which he calls *almandine*, even though he did not remark specifically on glass production there. Almandine is made useable through processing in a furnace, much like glass. Thus, the existence of a furnace in the city for smelting almandine seems possible.

Besides centers like Iasos, Labraunda and Alabanda, which have already been investigated by glass researchers, a number of cities especially from Late Antiquity have not yet been excavated; these should be examined as potential glass production centers as well.

As a consequence of becoming an independent sector and gaining a huge productivity due to technological developments in the Early Imperial Period, it was inevitable that in Caria, too, there would be glass production at local and regional scales[26].

A large number of glass *unguentaria* belonging to the Early Imperial Period and having similar characteristics such as colour and shape were transferred from Stratonikeia to the various museums at Caria. The similarity between glass finds from the necropolei of Stratonikeia, Akdağ, and Kabasakız (within the city center of Stratonikeia) has also attracted attention[27]. This similarity is also noted in centers like Idyma and Mylasa, located in inland Caria. The similarity between these glass containers and their geographical restriction to inland Caria should point to glass production in Stratonikeia and thereby the existence of regional production for daily usage.

In brief, Caria is abundant in glass, both from excavations and preserved in museum collections. Additionally, the centers of production uncovered there increase the importance of Caria in the history of glass, not only with respect to Anatolia, but also internationally. Beyond doubt, forthcoming excavation campaigns and continued research will bring new evidence to light and enhance the importance of Caria as a major region of glass production and innovation.

23 Blid 2009, 139; Blid 2012, 152-153.

24 Blid 2012, 152.

25 "smelted over fire, like glass productio." (Pl. N.H. XXXVI, 62.) Almandino, is a red granite, which contains a high amount of silica.

26 It is stated that Caria also contains some original glassware forms and local productions (Çakmaklı 2012, 152).

27 Tubular unguentaria, pear-shaped unguentaria, spherical unguentaria and candelstick unguentaria are the dominant forms that could easily be observed in this similarity. The shades of gren are the most common colours between these forms.

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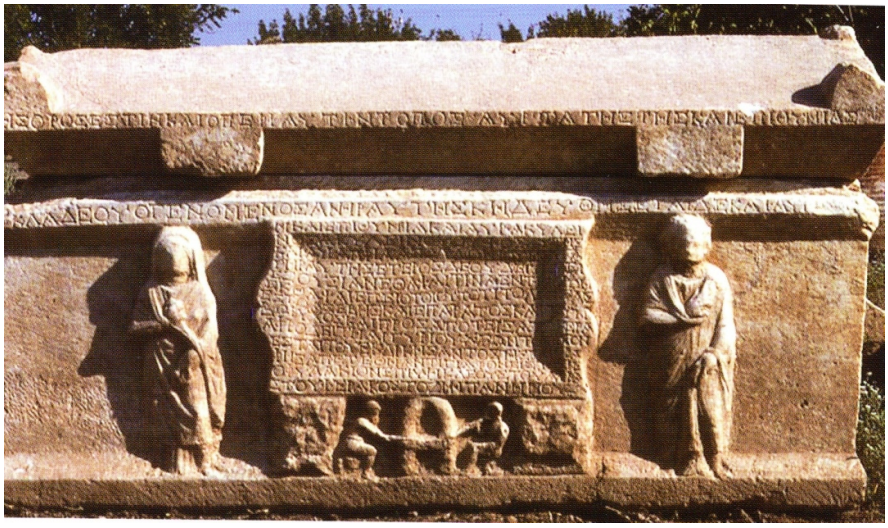

Figure 1

Figure 2

Figure 3