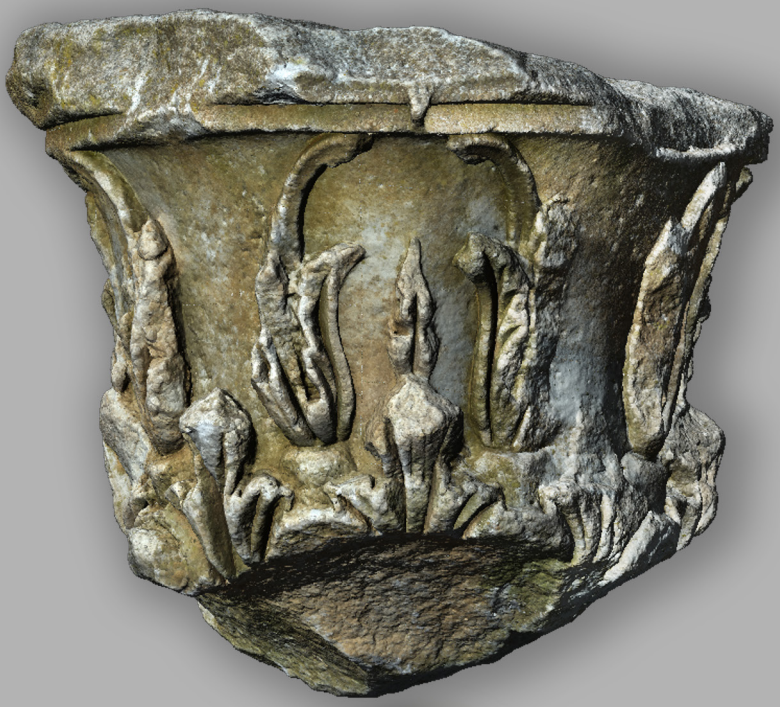
International Journal of Propontic Archaeology

PROPONTICA

Uluslararası Propontis Arkeoloji Dergisi
International Journal of Propontic Archaeology

Cilt/Volume: 2 Sayı/Number: 4 Yıl/Year: 2024 Eylül/September



e-ISSN: 2980-132X

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ONDOKUZ MAYIS ÜNİVERSİTESİ

PROPONTICA

ULUSLARARASI PROPONTİS ARKEOLOJİSİ DERGİSİ

INTERNATIONAL JOURNAL OF PROPONTIC ARCHAEOLOGY

e-ISSN: 2980-132X
Volume/Cilt: 2 Issue/Sayı: 4
Eylül/September 2024
Samsun

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Arkeoloji Dergisi

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Amaç ve Kapsam

Antik Çağ'da Marmara Denizi'nin isminden esinlenerek Marmara Denizi (=Propontis) Propontica olarak adlandırdığımız dergimizin amacı, ağırlıklı olarak Marmara Denizi (=Propontis) olmak üzere Trakya, Akdeniz ve Karadeniz kültürlerinin Prehistorik Çağlardan Geç Antik Çağ sonuna kadar olan zaman dilimini konu alan; Prehistorya, Protohistorya, Klasik Arkeoloji, Sualtı Arkeolojisi, Eski Çağ Dilleri ve Kültürleri, Eskiçağ Tarihi, Erken Hristiyanlık ve Bizans Sanatı, Numismatik, Antropoloji, Arkeometri ve Kültür Varlıklarını Koruma ve Onarım alanlarında yazılmış özgün sonuçlar içeren bilimsel makaleleri akademi dünyasının ilgisine sunmaktır.

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The International Journal of Propontic Archeology, deriving its name from the Sea of Marmara (Propontis), aims to bring scientific articles to the attention of the academic sphere whose focus will mainly be on the cultures around the Sea of Marmara together with others from the Thrace, Mediterranean and the Black Sea basins. To do so, it welcomes any paper written on the subjects of Protohistory, Classical Archaeology, Underwater Archaeology, Ancient Languages and Cultures, Ancient History, Early Christian and Byzantine Art, Numismatics, Anthropology, Archeometry and Conservation and Restoration of Cultural Properties and spanning periodically from the Prehistoric Ages to the end of Late Antiquity.

The International Journal of Propontic Archeology is an international peer-reviewed journal that is published twice a year in March and September. It accepts original and qualified articles, either written in Turkish or English, that promise to bring innovation to its field or fill a gap in its field, offer new approaches or recommendations, evaluate studies addressed with a scientific method or offer new insights into previously published studies.

Articles are published in Turkish and English.

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e-ISSN: 2980-132X
2024 Cilt: 2 Sayı: 4

PROPONTICA
INTERNATIONAL JOURNAL OF PROPONTIC ARCHAEOLOGY
e-ISSN: 2980-132X
2024 Volume: 2 Issue: 4

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Yayın Yeri ve Tarihi/Publication Place and Date
Samsun, Eylül/September 2024

Yazışma Adresi/Corresponding Adress
Ondokuz Mayıs Üniversitesi, İnsan ve Toplum Bilimleri Fakültesi, Arkeoloji Bölümü, Kurupelit Kampüsü, Atakum/SAMSUN

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Yayın Yeri ve Tarihi/Publication Place and Date: Samsun, Mart/March 2024

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EDİTÖR NOTU

Çanakkale; stratejik önemi, tarihi, kültürü ve sosyal değerleriyle kadim Anadolu kültürünün en önemli halkalarından biridir. Bu zengin tarih ve kahramanlık kokan topraklarda Parion kazıları olarak 2005 yılında başlayan serüvenimiz Kültür ve Turizm Bakanlığı Kültür Varlıkları ve Müzeler Genel Müdürlüğü, Türk Tarih Kurumu, Ondokuz Mayıs Üniversitesi ve İÇDAŞ AŞ'nin katkılarıyla geçen 20 yıl içerisinde interdisipliner çalışma sistemi, alt yapısı ve yetişmiş kaliteli insan gücüyle günümüzde ülkemizin en üretken bilimsel çalışmalarından birine dönüşmüştür. Bu bilimsel üretkenliğin en önemli halkalarından biri de dördüncü sayısını bilim dünyasına sunacağımız "Propontica" dergisidir. Ağırlıklı olarak Propontis (=Marmara Denizi) çevresi olmak üzere Trakya, Akdeniz ve Karadeniz bölgelerinde yer alan kültürlere ait arkeoloji, kültürel miras, arkeometri, kültür varlıklarını koruma, antropoloji, numismatik ve eski çağ tarihi konularında özgün çalışmaları kabul ettiğimiz Propontica dergisinin, alanında yerli ve yabancı saygın bilim insanlarından oluşan yayın kurulu ve editörleri, bilimsel kriterlerden ödün vermeyen ilkesel bakışı ve çok titiz bir şekilde işletilen kör hakemlik sistemi ile alanına ciddi bir katkı sağlayacağına ve her sayıda artan bir çalışma sayısına ulaşacağına yürekten inanıyoruz. Disiplinli bir ekip çalışmasıyla dördüncü sayısını yayınlayacağımız Propontica dergisinin yayın aşamasına gelmesinde büyük katkıları olan editörlerimize, yayın danışma kurulumuza, dördüncü sayımıza değerli çalışmalarıyla katkı sunan yerli ve yabancı bilim insanlarına ve yoğun mesaileri arasında bile dergimizin dördüncü sayısına gönderilen çalışmaları titizlikle değerlendiren hakemlerimize sonsuz teşekkürlerimizi sunarız. Propontica dergisi olarak her biri alanına katkı sunacak özgün çalışmalar ile nice sayılara ulaşmak umudu ve kararlılığıyla...

Prof. Dr. Vedat KELEŞ
Editör

FROM THE EDITOR

Çanakkale is one of the most important links of ancient Anatolian culture with its strategic importance, history, culture, and social values. Our adventure, which started in 2005 with Parion excavations in this rich, historical, and heroic land, has turned into one of the most productive scientific studies of today's Türkiye with its interdisciplinary working system, infrastructure, and trained and qualified workforce thanks to the contributions of the Ministry of Culture and Tourism General Directorate of Cultural Heritage and Museums, Turkish Historical Society, Ondokuz Mayıs University and İÇDAŞ AŞ in the last 19 years. The journal "Propontica" constitutes a most critical aspect of this scientific productivity. Its third issue will soon be presented to the scientific world. We will accept original studies on archaeology, cultural heritage, archaeometry, cultural heritage conservation, anthropology, numismatics, and ancient history of the cultures in Thrace, the Mediterranean, and the Black Sea regions, mainly around Propontis (= Marmara Sea). We sincerely believe that it will make a serious contribution to the field and will reach an increasing number of studies in each issue with its editorial board and editors consisting of respected local and foreign scientists in the field, its principled approach that does not compromise scientific criteria, and meticulous blind refereeing system. Endless thanks to our editors and editorial board, who contributed significantly to the publication of the third issue of Propontica with disciplined teamwork; to the Turkish and international scientists who contributed to our third issue with their invaluable studies; and to our referees who meticulously evaluated the studies even during their busy work hours. With the hope and determination to publish many more issues with original studies, each to contribute to the field...

Prof. Dr. Vedat KELEŞ
Editor

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International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, Eylül 2024, 2 (4): 177-197

City and Countryside in Byzantine Anatolia: Amorium

Bizans Anadolusu'nda Şehir ve Kırsal Bölge: Amorium

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 8 Ağustos/August 2024
Kabul Tarihi/Accepted: 17 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 177-197

Atıf/Cite as: Lightfoot, C.S. "City and Countryside in Byzantine Anatolia: Amorium" Propontica, 2 (4), Eylül 2024: 177-197.

Etik Kurul Beyanı/Ethics Committee Approval: Regarding the Ethics Committee authorisation; the authors and reviewers of this study have declared that there is no need for Ethics Committee authorisation.

https://doi.org/10.56170/propontica.1530180

CITY AND COUNTRYSIDE IN BYZANTINE ANATOLIA: AMORIUM

ABSTRACT

Amorium is a key site for the period AD 700-900 owing to its historical importance as the capital of the Anatolic Theme. The well preserved remains provide an exceptional opportunity to study the layout and function of the Byzantine city and its excavation sheds light on the transition, modification, and continuity of the settlement between the Late Roman and Byzantine periods. The evidence from twenty years of excavation points to the existence of a large and prosperous city during Early and Middle Byzantine times, where various trades and crafts were practised and which served as the centre of a vibrant rural community engaged in agriculture as well as animal husbandry. The destruction layers from the capture of Amorium by the Arabs in 838 create a fixed horizon and reference point for the entire archaeology and material culture of early to mid-ninth century Anatolia. Pottery and coin finds in particular provide good indicators of the level and nature of economic activity. In this study some conclusions are drawn from that material, and discussion of it is set in the context of other sites and the interpretation of finds there. The evidence from Amorium presents new insights that appear at odds with accepted views of the Byzantine world in the Early Middle Ages.

Keywords: Byzantine, Anatolia, Amorium, Pottery, Coinage.

❋❋❋

BİZANS ANADOLUSU'NDA ŞEHİR VE KIRSAL BÖLGE: AMORIUM

ÖZ

Amorium, Bizans Anadolu Teması'nın başkenti olarak tarihi önemi nedeniyle MS 700-900 dönemi için seçkin bir arkeolojik alandır. İyi korunmuş kalıntılar, Bizans şehrinin planını ve işlevini incelemek için olağanüstü bir fırsat sağlıyor ve burada yapılan kazılar, yerleşimin Geç Roma ve Bizans dönemleri arasındaki geçişine, değişimine ve sürekliliğine ışık tutuyor. Yirmi yıllık kazılardan elde edilen kanıtlar, çeşitli ticaret ve zanaatların uygulandığı ve hayvancılığın yanı sıra tarımla da uğraşan canlı kırsal topluluğun merkezi olarak hizmet veren Erken ve Orta Bizans dönemlerinde büyük, gelişen ve zengin bir şehrin varlığına işaret ediyor. Amorium'un 838'de Araplar tarafından yağma edilmesinden sonraki yıkım katmanları, dokuzuncu yüzyılın başlarından ortalarına kadar Anadolu'nun tüm arkeolojisi ve maddi kültürü için sabit bir tabaka ve verimli bir referans noktası oluşturuyor. Özellikle çanak çömlek parça ve bakır alaşımı sikke buluntuları ekonomik faaliyetin düzeyi ve doğası hakkında iyi göstergeler sağlar. Bu çalışmada

Amorium'da bulumuş olan materyalden bazı sonuçlar çıkarılmış ve diğer sit alanları ve oradaki bulguların yorumlanması bağlamında tartışılmıştır. Amorium'dan elde edilen kanıtlar, Erken Ortaçağ'da Bizans dünyasına ilişkin şimdiye kadar kabul edilen bilimsel görüşlerle çelişen yeni bilgiler sunuyor.

Anahtar Kelimeler: Bizans, Anadolu, Amorium, Seramik, Sikke.

❋❋❋

INTRODUCTION

The fact that there is no comprehensive handbook on the history and archaeology of Byzantine Anatolia is a good indication of the complexity and magnitude of the subject. Such a study would encompass a period of more than a millennium (taking the foundation of Constantinople in AD 330 and the city's conquest by the Ottomans in 1453 as its basic timeframe) and include a vast array of different sites and monuments.[1] Certain aspects have been more thoroughly studied and published than others. For example, in chronological terms, the Late Antique/Early Byzantine period (end of the 5th to the mid-7th century AD) is relatively well documented and, with regard to types of archaeological remains, churches and fortifications have often attracted the most attention. Much scholarly interest has also been shown in recent years in the subject of change, continuity, and transition in the Byzantine period, most especially, in the context of the survival or disappearance of cities.[2] Yet, there is still little consensus about what all this diverse and disparate evidence means.

The site of Amorium (Fig. 1), located in ancient Phrygia (the modern Turkish province of Afyonkarahisar), offers a rare opportunity to investigate many of the perplexing questions about Byzantine Anatolia. The site's importance for this period of Byzantine archaeology had already been recognised by 1993.[3] In particular, the excavations there have provided good evidence for urban continuity during the Byzantine Early Middle Ages (also known as the 'Dark Ages') from the mid-7th to the mid-9th century AD. The size and vitality of the city during this

* This paper was first presented at a Byzantine conference held in Nicosia, Cyprus in 2011. The promised publication of the Proceedings entitled *Byzantium in Transition: The Byzantine Early Middle Ages, 7th-8th Centuries*, edited by Athanasios Vionis, has never materialised. This version sadly contains only references to works before 2014, at which time it had been accepted for publication. I wish to thank Prof. Dr. Zeliha Demirel-Gökalp for her kind permission to publish this article. Since 2013 Prof. Demirel-Gökalp has been directing the ongoing excavations at Amorium on behalf of the University of Anatolia, Eskişehir.

1 The most comprehensive list of Byzantine sites is provided by the Tabula Imperii Byzantini series of publications; for additional information, see http://tayproject.org/TAYBizansMar.fm.

2 See, most recently, Dally – Ratté 2011. The papers on Anemurium and Amorium that were presented at the conference held at the University of Michigan on January 8-10, 2008 were omitted from this publication. For Amorium, see now Demirel-Gökalp – Tsivikis 2022.

3 Sodini 1993, 150.

period implies a robust infrastructure based on rural activity and production, despite the frequent Arab incursions across Anatolia between the 640s and AD 838. The latter date is crucial for the history and archaeology of Amorium, which converge with irrefutable proof for the siege and destruction of the city by the forces of the caliph al-Muʿtaṣim in August of that year. However, the city recovered from this disaster and again enjoyed considerable prosperity during the 10th and 11th centuries before it was abandoned by its Byzantine inhabitants in ca. 1080-1100.[4]

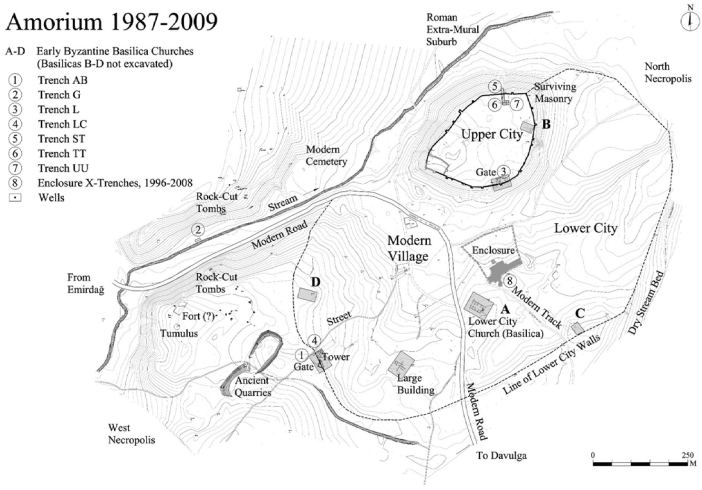

Fig. 1. Topographical site plan of Amorium, showing excavation areas. Plan © Amorium Excavations Project 1993-2013.

THE EVIDENCE FROM AMORIUM

Much of the evidence has come from the so-called Lower City Enclosure, the modern name given to a Middle Byzantine fortified area located at the centre of the site.[5] In addition to the Lower City, there is a large prehistoric mound, known as the Upper City, which also continued to be occupied throughout the Byzantine period and probably served as a fortified citadel, especially in Middle Byzantine times. The entire area of the Upper and Lower City had been furnished with a massive circuit of walls, probably in the late 5th century.[6] These fortifications were maintained and were still in use when the city was besieged and sacked in AD 838. Within the walls there are at least four churches-three in the Lower City and one on the Upper City Mound.

4 Ivison 2000, esp. 13-18, 27; Lightfoot 2012c, 473-74.

5 Ivison 2012, esp. 60-65.

6 For a discussion of other early Byzantine fortifications in Anatolia, see Niewöhner 2011, esp. 111-12. See also Crow 2001, 98-100 and fig. 6, drawing a direct comparison between triangular gate towers at Amorium and Thessaloniki.

The Byzantine Early Medieval settlement therefore covered some 70ha, making it almost as large as the walled Late Antique city of Carian Aphrodisias.[7]

Various other intra-mural areas of the site have also been investigated and, contrary to the views expressed by some scholars, the archaeological findings have not provided any evidence for the existence of open spaces within the circuit of Lower City walls that could be interpreted as gardens, waste ground, or plots converted for burial use during the Byzantine Early Middle Ages.[8] The only building that can be shown to have been abandoned at this time was the large polygonal hall or *apodyterium* attached to the bathhouse in the Lower City Enclosure, and this was left as a derelict and gradually decaying building after it had been stripped of its marble floors and wall revetment.[9] Moreover, it seems that the extra-mural cemeteries continued in use throughout this period, implying that even after the mid-7th century room was not readily available within the city for such use.[10] In one tomb (Fig. 2), for example, a hinged belt buckle was found (Fig. 3); elsewhere in Anatolia and in mainland Greece similar belt buckles have been dated to the 8th century AD.[11]

Fig. 2. Rock-cut tomb 90, West Necropolis, excavated in 2007. Photo © Amorium Excavations Project 1993-2013.

7 The mid-4th century fortifications at Aphrodisias enclose an area of ca. 80ha; Ratté 2001, 126. Suggestions that Amorium should be regarded as a Byzantine site that was different and more complex than a village settlement but 'not necessarily implying a larger size' are ill founded; *pace* Vionis et al. 2009a, 201.

8 See, for example, Brubaker–Haldon 2011, 541; see now also Yılmazyaşar–Demirel-Gökalp 2021, 1025.

9 Lightfoot–Lightfoot 2007, 131-32, with illustrations.

10 Yaman 2012.

11 Compare Davidson 1952, 271-72, nos. 2191-2194, pl. 114; Frantz 1965, 198, fig. 12 (bottom left); for examples from the Byzantine cemetery at Ilıpınar in Bithynia, see Roodenberg 2009, 155, fig. 8, nos. 1-2.

Fig. 3. Bronze belt buckle found in tomb 90. SF7989, length 4.48 cm. Photo © Amorium Excavations Project 1993-2013.

The same tomb also produced a copper alloy decanummium of Constantine IV, dated to AD 674-85.[12] Admittedly, a number of Early Byzantine epitaphs has been recovered during excavations at the Lower City church but, since they had been reused as *spolia* in the construction of Middle Byzantine (10th-11th century) tombs, there is no way of knowing where they were originally set up.[13] However, other earlier funerary inscriptions and monuments, dating from Roman imperial times, had clearly been brought in from the city's ancient necropolis for reuse in the Middle Byzantine period. For example, another Middle Byzantine tomb at the Lower City Church, tomb 62, was constructed of reused Roman funerary doorstones (Fig. 4), which must at some point have been brought from the ancient necropolis outside the city.[14]

12 SF7990: Yaman 2010, 52-53, no. 6, fig. 4.

13 *Ivison 2010, 321 and fig. 13, 323 and fig. 16.*

14 Lightfoot 2009, 144, fig. 12; Lightfoot et al. 2010, 134, pl. 1 (in both citations wrongly numbered as tomb 57); Lightfoot 2012a, 180, fig. 7.3 (wrongly numbered as tomb 65). For an overview of Phrygian doorstones at Amorium, see Yaman 2008.

Fig. 4. Roman double doorstone in the north side wall of tomb 62, area A13, south of the Lower City Church, excavated in 2008. Photo © Amorium Excavations Project 1993-2013.

Within the Lower City walls evidence has been found for construction work carried out during the Byzantine Early Middle Ages that encroached on paved courtyards around both the bathhouse in the Enclosure area and the Lower City church. Many of the buildings were apparently dwellings and/or workshops with stone footings and mud-brick superstructures, but in the Enclosure area a chapel was also inserted into the angle formed by the junction of the rectilinear bathhouse and the polygonal hall.[15] Despite its small size it was decorated with polychrome wall frescoes. Likewise, some elements of the installations that have been recognised as wine presses are of an impressive size and would have required considerable skill and dexterity in mounting in place. For example, the front of the pressing tank in installation G is formed by a single, monolithic limestone slab of remarkable size, measuring 3.9 m. long, 0.9 m. high, and 0.25 m. thick (Figs. 5-6); the weight of the block can thus be calculated as being about 2,200kg (2.425 tons).[16] Such elements are not the usual sort of material used in 'squatter' construction during the process known as the 'ruralisation' of urban sites. Indeed, the existence in the very centre of the city of numerous installations for the production of wine in commercial quantities remains something of a puzzle. They were built, used, and indeed dismantled or converted into storage silos while the city walls, the basilica church and the bathhouse, all of which had been constructed in the late 5th

15 Ivison 2012, 45.
16 Ivison 2012, 44.

or 6th century, were still standing in the early 9th century AD.[17] The wine installations cannot therefore be interpreted as anything but part of the fabric of the city.[18] So, at Amorium (and, by inference, in the surrounding countryside), we can observe a phenomenon that is contradictory to one postulated for the Byzantine countryside around Sagalassos in Pisidia. There, it is argued, the settlement pattern for Medieval Anatolia is based on hamlets and villages, which 'superseded the Classical city-state as the dominant unit of social and commercial organization, and cities themselves became large or minor villages.'[19] The publication of the Aphrodisias Regional Survey, on the other hand, suggests that the evidence there indicates that, in conjunction with the large-scale abandonment of Aphrodisias in the early 7th century, the rural population of the region also seems to have declined.[20] The case of Balboura and its territory remains ambiguous with no noticeable decline in urban or rural population levels in the 'Early Byzantine period' (i.e. 7th and 8th centuries) and abandonment of both occurring only in the 9th century.[21] No systematic regional survey for Amorium has as yet been carried out, but it can be assumed that large areas of the surrounding countryside must have been cultivated and therefore inhabited, even in the 8th and 9th centuries, in order to supply the Byzantine city with enough agricultural produce to satisfy its needs.[22]

Figs. 5-6. Wine press installation G in trench XE-08, excavated in 2007, with large slab (length 3.90 m.) in the front wall of the pressing tank. Photo © Amorium Excavations Project 1993-2013.

17 It should be noted that the winemaking installations had gone out of use some time before their destruction in AD 838; pace Brubaker – Haldon 2011, 462

18 For detailed discussion, see Ivison 2012, esp. 49-50; Lightfoot 2007, 274; see now also Tsivikis et al. 2023.

19 Vionis et al. 2010b, 430.

20 Ratté – De Staebler 2012, 36.

21 Coulton et al. 2012, vol. 1, 169, 174-76. This, however, is largely based on Armstrong's late dating of some of the pottery; see infra n. 52. Incidentally, Coulton mistakenly dates the sack of Amorium to AD 844; Coulton et al. 2012, vol. 1, 164. Likewise, Armstrong dates the 'restoration of Orthodoxy' to AD 787, not 842; Coulton et al. 2012, vol. 2, 65.

22 For Byzantine rural settlement and rock-cut monuments in Phrygia, see Olcay Uçkan [nd].

EARLY MEDIEVAL AMORIUM: A SPECIAL CASE?

The apparent contradiction between these different sites and surveys (and indeed between large sites such as Amorium and refuge places such as the area of the former temple of Antoninus Pius at Sagalassos) only serves to highlight that excavation and field survey can produce dramatically different results and conclusions.[23] In reality, the state of affairs that existed in Byzantine Anatolia probably lay somewhere between the two extremes of urban and rural settlement as the dominant component. They were, after all, often mutually dependent. The situation, however, is further complicated by attempts to trace the affects of climate change on settlement patterns and agricultural production in Byzantine Anatolia.[24]

Associated with the study of historical geography is the increasing amount of information provided by archaeobotanical and archaeozoological research. This is slowly changing perceptions of land use and agricultural wealth so that it is no longer acceptable to maintain that during the Byzantine period the production of wine and grain, the two basic staples needed for the supply of the Byzantine army, was restricted to the coastal areas of Anatolia, while the central plateau was fit only for stock rearing, mainly sheep and goats.[25] Evidence now exists to show that large areas of central Anatolia, even during the Byzantine Early Middle Ages, were give over to grain production, cattle rearing, and cash crops, notably vineyards for winemaking.[26] It would seem that Anatolia continued to be the source of surplus agricultural produce, and it was that wealth that essentially kept the Byzantine state running during the difficult times of the 7th and 8th centuries. It should also be remembered that Anatolia at that time formed the main land mass of the Empire.

The study of shipwrecks and amphorae provides good evidence for maritime trade and coastal activity. Indeed, the distribution of mass-produced Roman or Medieval pottery has been discussed principally in terms of maritime trade, where tablewares were a secondary item of cargo, used as ballast in ships' holds.[27] Little, on the other hand, has been done to document the substantial evidence that exists in Turkey both on the ground and in museum collections for such things as stone press weights and terracotta pithoi (Fig. 7, see Ivison 2012, 55).[28] Both are well attested in Byzantine contexts at Amorium, whereas amphorae are scarse.[29] At

23 See Vionis et al. 2009.
24 See Brubaker – Haldon 2011, 460-63; Coulton et al. 2012, vol. 1, 179-80.
25 For the traditional view, see Decker 2008, 255-56, fig. 23; Wittke et al. 2010, 246-47.
26 For the evidence from Amorium, see Giorgi 2012; Ioannidou 2012.
27 Armstrong 2009, 158.
28 For the press weights at Amorium, see Lightfoot 2003, 73-79, and further discussion in Ivison 2012, esp. 47-48; for Aphrodisias, see Ratté - De Staebler 2012, 209-10, apparently assuming the use of press weights in olive oil production and ignoring the evidence from Amorium, see also Lightfoot 2013, 843-45; for Balboura, see Coulton et al. 2012, vol. 1, 106-7, 109-111, and table 5.1.
29 For an example from the 838 destruction, see Böhlendorf-Arslan 2012, 155, no. 22, fig. 4.1.

Amorium, the latter have yet to be studied in depth, but both intact examples and a large number of fragments have been found in contexts ranging from the Early to Middle Byzantine periods.[30] Indeed, no serious attempt has yet been made anywhere to classify and date Byzantine pithoi-a remarkable fact, given that amphorae have attracted so much scholarly interest.[31]

Fig. 7. Pithos (height 0.81 m.), from trench XE-05 context 950, excavated in 2005. Photo © Amorium Excavations Project 1993-2013.

THE AMORIUM POTTERY

The study of Byzantine pottery in general has focussed largely on the fine wares, and the common or kitchen wares have been relegated to a minor role, despite the fact that in terms of quantities (by number or weight) such finds greatly outnumber sherds of wares that are variously described as luxury, imported, or glazed

[30] Lightfoot 2007, 277-78, figs. 8-9 (with refs.); Böhlendorf-Arslan 2010, 354-55, figs. 8.2 and 9.5; for Middle Byzantine pithoi found at Hierapolis, see Cottica 2007, 263, fig. 12, 1-6. Large numbers of Byzantine pithoi have also been recovered during the excavations at Pessinus; Devreker et al. 2003, 358-60, figs. 205-8; 369-74, figs. 232-37; for Sagalassos, see Vionis et al. 2010, 442-44, figs. 16-17; for 'undated' pithoi from the Balboura survey, see Coulton et al. 2012, vol. 2, 63-64 and 297, nos. 4403-4410.

[31] Ken Dark, for example, mentions pithoi only once in his survey of Byzantine pottery in contrast to his many references to amphorae; Dark 2001, 44 and 159 (Index, s.v. amphorae). Likewise, Vroom mentions pithoi only in her introductory outline but not in her survey of Byzantine pottery; Vroom 2005, 19 and fig. 6. Pithoi are, of course, much more common than ceramic beehives (although two examples of the latter have tentatively been identified at Amorium); for beehives, see Vroom 2005, 50-51.

https://doi.org/10.56170/propontica.1530180

tablewares.[32] For example, finds of Cypriot Red Slip Ware (CRS) from the survey at Pednelissos in Pisidia during the 2003 and 2004 field seasons amounted to only 2% of all the sherds collected-and this is despite the fact that in the 2008 season wasters and other kiln debris were found in the vicinity of the site, indicating local production of CRS-type wares, although sadly no kiln sites were excavated.[33] The study from Pednelissos therefore ignores 93% of the material and gives no indication of its date or type beyond stating that on the basis of the pottery the settlement at the site lasted from the 2nd century BC to the 12th century AD.[34] At Saraçhane in Istanbul, however, it is reported that cooking wares are present 'in much the same quantities as the fine red-slipped and lead-glazed tablewares,'[35] while at Sagalassos cooking pots reach 27% of the Early Medieval assemblage by count (both wheelmade and, significantly, handmade vessels) from the former Temple of Antoninus Pius, and another 27% of the Middle Byzantine assemblage by count from Alexander's Hill.[36]

Social and economic interpretations for the use of specific types of vessel are highly speculative. For example, one study has argued that cooking pots with flat bottoms were associated with a rural way of life, whereas round-bottomed pots reflect an urban setting.[37] However, at Amorium the cooking pots are as a rule of the flat-bottomed variety. An intact example (Fig. 8) was found in 2009 in the winemaking installation attached to the north side of the Lower City church in a destruction level that can be attributed to the sack of the city in AD 838.[38] Similar cooking pots have been found at Kalenderhane in Istanbul, although there they are dated between the late 11th and the first half of the 13th century.[39] Other flat-bottomed cooking pots dated to the Middle Byzantine period have been found elsewhere. [40] Likewise, according to John Hayes, Constantinopolitan cooking wares in terms of quality of manufacture 'stand in stark contrast to the domestic pottery current elsewhere in the Byzantine Empire…' and represent the 'products of a sophisticated urban industry.'[41] It is worth considering the Amorium cooking wares as examples of a similar, if much smaller, local urban industry.

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32 For Byzantine coarse wares, including amphorae and lamps, see Dark 2001, 31-52. He discusses Middle Byzantine lamps briefly, assuming them to have used olive oil as fuel; Dark 2001, 44. Contrast the numerous finds from Amorium; Gill 2003; Lightfoot 2010, 44-47; Lightfoot 2012d.

33 Kenkel 2007, 134.

34 Kenkel 2007, 133; see also Vandeput and Köse 2008, 33; Armstrong 2009, 158; Vandeput et al. 2012: 277-279, 284-285, fig. 13 (no date is given to these finds of Late Roman D Ware); Jackson et al. 2012.

35 Hayes 1992, 53.

36 Vionis et al. 2009: 150-154, 161, table 2; Vionis et al. 2010: 431-433, table 1, fig. 6

37 Bakirtzis 1989, 41; see also Hayes 1992, 53. For the advantages of round-bottomed over flat-bottomed cooking pots, see Joyner 2007, 189 (with refs.).

38 Lightfoot et al. 2011, 49, pl. 5; for other examples, see also Lightfoot – Ivison 1996, 106, fig. 7 (mistakenly identified as Seljuk); Böhlendorf-Arslan 2007, 282-84 and fig. 9, nos. 42-44; Böhlendorf-Arslan 2010, 350-51, fig. 4, 6-7; 353, fig. 7, 4. 6-7; fig.8, 6; fig. 9.2.

39 Striker – Doğan Kuban 2007, 96-97, nos. 263-267, fig. 57.

40 At Hierapolis, see Cottica 2007, 262, fig. 11, 1; Saraçhane, see Hayes 1992, 56, fig. 20; Sagalassos, see Vionis et al. 2010, 442; and several sites in Greece, see Papanikola-Bakirtzi 2002, 346-48, nos. 395-99.

41 Hayes 1992, 53.

Fig. 8. Cooking pot from trench A17 at the Lower City Church, excavated in 2009. Photo © Amorium Excavations Project 1993-2013.

Pottery, especially common ware, is crucial for a better understanding of the Byzantine Early Middle Ages, but it is generally difficult to date the material accurately. This is true not only of Anatolia but other areas of the Byzantine world. So, for example, Palaipaphos in Cyprus has been described as a site that 'was inhabited at least into the 7th century… [but] for the period from the 8th to the 11th century no positive settlement evidence has been recovered.' The apparent abandonment, however, cannot convincingly be explained as the result of Arab raids; rather, 'it seems far more likely that the [occupation] gap represents nothing but our imperfect knowledge of local Byzantine pottery.'[42] The same could be said for mediaeval sites in Anatolia but on a much larger scale.

Amorium presents a unique opportunity to advance the study of Byzantine ceramics in terms of establishing both a corpus of common wares and a secure chronology. Pottery from the 838 destruction layers within the Enclosure have recently been studied and provide a good 'overview of the range of pottery types in use at Amorium in the latter part of the 8th and the early 9th century.'[43] The contemporary wares included examples of *Burnished Ware*, *Red Painted Fine Ware* and *Amorium Glazed Ware* (Fig. 9), as well as small fragments of Constantinopolitan

[42] Maier 2004, 28.
[43] Böhlendorf-Arslan 2012; see also Böhlendorf-Arslan 2010.

Glazed White Ware,[44] but the assemblages also contained residual late Roman pottery and wares of the 7th and 8th centuries. The detailed study and analysis of this material is ongoing and will doubtless be supplemented by further finds. Nevertheless, a number of significant conclusions can be drawn from this large corpus of well-dated pottery. The picture drawn by Brubaker and Haldon both of the ceramic assemblage at Amorium and, more generally, of pottery production and distribution in Byzantine Anatolia should be treated with care and needs refinement as well as correction.[45]

Fig. 9. Fragment of an Amorium Glazed Ware chafing dish. Photo © Amorium Excavations Project 1993-2013.

Firstly, it should be stated that the entire corpus of cooking and tablewares at Amorium comprises wheel-made pottery (in contrast to the handmade medieval pottery at Sagalassos mentioned above), most of which seems to have been produced in local workshops.[46] Secondly, the Amorium potters produced a variety of different wares, which implies a relatively large and sophisticated industry, supplying a sizeable market. The ability of local workshops to provide a wide selection of wares most likely lessened the need for imported pottery, and it is this factor, more than any supposed impoverishment of the local population, that may lie behind the lack of significant quantities of Constantinopolitan wares in the archaeological record at Amorium. Likewise, the virtual absence of transport amphorae at Amo-

[44] Böhlendorf-Arslan 2004, vol. 1, 223-24; vol. 2, 424-25, nos. 391-397; vol. 3, pl. 104; see now also Demirel-Gökalp-Kurt 2023, 243, 248, no. 2, fig. 4.2. For a general survey of Byzantine pottery from Amorium, see Böhlendorf-Arslan 2010.

[45] Brubaker–Haldon 2011, 502-4.

[46] For 'Handmade Ware' of the 7th-9th centuries, see Dark 2001, 46-47.

rium can be explained by its inland location and the greater suitably of wooden casks for use in overland transportation.[47] The multi-handled pots (Fig. 10), found in an 838 destruction layer in trench LC behind the Lower City walls, attest to the production of wares for some, as yet undetermined, specialised use.[48] Those strange vessels, however, are not unique to Amorium. An equally bizarre multi-handled jar, now in the Jordan Archaeological Museum, has been dated to the 8th century.[49] A close parallel to the Amorium pots, acquired between 1937 and 1947 by the Istanbul Archaeological Museum, is recorded as coming from Kastamonu in Paphlagonia, and three similar vessels are to be found in the local museum, all of which are said to come from the village of Hacimuharrem about 10 km. northwest of Kastamonu.[50] One example, seen on display, is of the same shape and size as the Amorium jars and has eight loop handles arranged in two rows around the body, but there are three little knob feet around the base and two cross-shaped bars over the mouth to the cylindrical chamber that runs vertically through the jar.

Finally, at other sites and in other areas it has been argued that red-slipped pottery, known either as Late Roman D Ware or Cypriot Red Slip Ware (CRS), continued after the end of antiquity, with its production extending well into the 8th century AD. This is implied by Joanita Vroom, who defines 'Early Byzantine' as continuing through to the middle of the 9th century, although she dates the production of CRS Ware as lasting from the late 4th to the late 7th (and, possibly, 8th) century.[51] Pamela Armstrong, however, is the leading advocate for dating CRS Ware production 'into the 8th century and most possibly beyond.'[52] Consequently, Armstrong dates some of the Balboura survey finds to the 7th and 8th centuries.[53] Her arguments for such dating have been accepted as 'convincing.'[54]

47 Lightfoot 2009, 143.
48 Böhlendorf-Arslan 2010, 357-58, fig. 11.
49 Evans – Ratliff 2012, 144, no. 92.
50 Inv. no. 12637. İstanbul 1949, 32 and fig. 17 (recorded as coming from the ilçe of Araç). This example was kindly brought to my attention by Dr. Marlia Mango. I would also like to extend my sincere thanks to Nimet Bal, then director of the Kastamonu Museum. The vessels in Kastamonu remain unpublished.
51 Vroom 2005, 15, 39; see also Vroom 2007, 263, 287, suggesting that CRS Ware 'did not suddenly disappear in the late seventh century... but probably remained in use for a longer period.'
52 Armstrong 2006; Armstrong 2009.
53 Coulton et al. 2012, vol. 2, 60, 275-85, nos. 4103, 4107, 4116, 4127-4130, 4133, 4144-4145, 4153-4155, 4202-4205, 4209, 4222.
54 Vionis et al 2009b, 160.

Fig. 10. Pottery found in 1998 in trench LC behind the Lower City fortification wall, including some of the multi-handled pots. Photo © Amorium Excavations Project 1993-2013.

Finds in Cyprus in the late 1950s at various 'Early Byzantine' sites are seen by Armstrong as crucial evidence, especially those from a rescue excavation at Panayia on the outskirts of the village of Kormakiti in the northwest of the island, where CRS of Hayes's Form 9 is reported from a destruction layer that also contained a silver coin (*miliaresion*) of Artavasdus and Nicephorus, dated to AD 742/3.[55] However, at the time the work that produced those finds was described as a 'limited excavation' of a large site that had been 'occupied continuously from the 5th century BC until the middle of the 8th century AD.'[56] Moreover, Megaw makes no reference to the presence of CRS Ware, while later Hector Catling did not associate the coin find with the presence of CRS Ware at the Kormatiki site.[57] The significance of this single coin may be overestimated, especially if, as a result, it is claimed that 'a coin could reasonably be assumed to have had a life-span of at least fifty years,' thereby allowing the occupation of the site and, by association, the use of CRS Ware to be extended 'to the very end of the 8th century.'[58] Armstrong connects the Panagia [sic] dating evidence to the finds from the Kornos cave, also in northwest Cyprus, but strangely ignores the coins from the latter site. These comprise 17 copper alloy coins (*folles*), which should be regarded as more reliable indicators of occupation than a single silver coin. They comprise issues of Heraclius

55 Armstrong 2006, 22-23; 2009, 160-61.
56 Megaw 1959, 30 (wrongly cited by Armstrong as pages 34-35); Armstrong 2009, 159, fn. 12.
57 Megaw 1959, 30 and 34; Catling 1972, 79.
58 Armstrong 2009, 161.

(seven coins), Heraclonas (eight coins) and Constans II (two coins, one of which could be dated to year 3 of his reign, i.e., AD 643/4).[59] Thus, the coin evidence provides a mid-7th century date, whereas Armstrong argues that some types of pottery found in the Kornos cave 'are known only from the 8th century,' citing coin evidence from 'Ain el Jedīde in Palestine.[60] In fact, this Palestinian site produced only one coin, described as a late Umayyad bronze coin of the 8th century, found 'laying high up in the debris filling room C.'[61]

At Amorium, however, such continuity has been difficult to find and red-slipped pottery is poorly represented among the wares excavated in Byzantine Early Medieval contexts.[62] This should not be the case at a large, thriving urban centre, if indeed red-slipped pottery was made in significant quantities after ca. AD 650. It should come as no surprise therefore that small and impoverished 'squatter' settlements, such as those attested in two temple site areas at Sagalassos, have produced little evidence for sustained production of red-slipped pottery.[63] Despite this, there is a desire to push Sagalassos Red Slip Ware (SRSW) in its last phase-Phase 9-beyond the 650 barrier.[64] Examples of this ware recovered from 'the domestic area' at Sagalassos appear to include large fragments that preserve their entire profiles, whereas at Amorium no such well-preserved pieces of red-slipped ware have been recovered from contexts immediately predating AD 838 in the Lower City.[65] Most of the red-slipped sherds are small and worn, indicating that they had existed as residual detritus for a considerable time before deposition.[66] In short, the abundant pottery assemblage recovered in twenty years of excavations at this major Byzantine city provides no support for the view that red-slipped ware continued to be produced and used there in the late 8th or early 9th century. The apparent absence of contemporaneous CRS Ware or imitative local tablewares cannot be explained simply by Amorium's location in landlocked central Anatolia. Instead, it has to be admitted that red-slipped ware had been supplanted or replaced by other types of Byzantine pottery, including glazed wares, in the households and daily lives of the inhabitants of the city.

59 Catling–Dikigoropoulos 1970, 52, 62.
60 Armstrong 2009, 163 and fn. 16.
61 Hamilton 1935, 117.
62 For references to red-slipped ware finds at Amorium, see Harrison et al. 1991, 226-68, fig. 7, 1-2; Harrison et al. 1992, 216, fig. 5; Böhlendorf-Arslan 2007, 275-77 and fig. 3.
63 Vionis et al. 2009b, 159: 'no phase 9 SRSW has been retrieved from the excavations of AK or AP' (the two temple sites).
64 References to the presence of this ware are ambiguous and confusing; see preceding note and Vionis et al. 2009b, 160: 'phase 9 SRSW is mostly absent from the temple sites.'
65 Vionis et al. 2009b, 160, figs. 12-13.
66 Böhlendorf-Arslan 2007.

https://doi.org/10.56170/propontica.1530180

EARLY MEDIEVAL BYZANTINE COINAGE

The coin evidence at Amorium is also highly unusual and forms a pattern that contradicts that found at many other sites across the Byzantine Empire.[67] Over fifty years ago, George Ostrogorsky published a seminal article about Byzantine cities in the Early Middle Ages, laying out the arguments and the evidence then available to support two diametrically opposed views-those of continuity and of collapse in the 7th century AD. The article first discussed the case of coinage and pointed out that 'there have been very few publications or studies of coin finds made in Asia Minor.'[68] Amorium has now been able to fill some of this gap, showing that low denomination base metal coinage continued to circulate there after the reign of Constans II (Figs. 11-12).[69] The numbers are not large, admittedly, amounting to 50 identifiable specimens dating between the reigns of Constantine IV (AD 668-685) and Leo V (AD 813-820), but the fact that some coins of the late 7th century were picked up as surface finds indicates that they were not uncommon.[70] Such coins must exist elsewhere in Anatolia but they have simply not been found, recorded, or collected by the local museums. Naturally, they would occur most frequently at sites that retained a sizeable population and sustainable monetary economy, but few such urban centres, apart from Amorium, have been investigated in a thorough, on-going manner.[71] Yet, despite the numismatic evidence from Amorium it is still possible to find statements that conclude 'coins of the period extending from Constantine IV (AD 668-685) up to Theophilus (AD 829-842)… are in general rare, and on almost all Anatolian or European regional archaeological sites of whatever size *virtually or entirely* absent' (my italics).[72]

Figs. 11-12. Copper alloy coins: SF8227, surface find 2008, follis of Constantine V, dated AD 751-769; SF8466, from trench A20, Lower City Church, follis of Leo V, dated AD 813-820, excavated in 2009. Photos © Amorium Excavations Project 1993-2013.

67 Katsari et al. 2012, esp. 116-18; see also Lightfoot 2012a, 180-82 and table 7.1.
68 Ostrogorsky 1959, 49.
69 SF8227: Yaman 2010, 53, no. 9, fig. 5; SF8466: Lightfoot et al. 2011, 53, pl. 8.
70 Katsari et al. 2012, 136-40, nos. 157-206, found between 1987 and 2006. A further 7 coins belonging to the same period, including the two illustrated here (figs. 11-12), were recovered from the site during the 2007, 2008, and 2009 seasons.
71 Pace Brubaker-Haldon 2011, 472. There are no 'similar sites from which comparable evidence is available.'
72 Hendy 2007, 175, and see also 179-82.

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There has been a marked reluctance to date other categories of material recorded as finds in Anatolia to the Byzantine Early Middle Ages. This is noticeable with the metalwork from Beycesultan, which is placed in either Early or Middle Byzantine times but not in the intervening period of the mid-7th to mid-9th centuries.[73] Several bronze and iron vessels found at Amorium in the 838-destruction layers contradict this traditional dating.[74] Indeed, it would be well to compare such material with contemporaneous items from Islamic sites in the former Byzantine regions of Syria, Palestine, and Egypt, like the two bronze jugs found in excavations at Umayyad palatial complexes in Jordan.[75] Significantly, perhaps, an inscribed bronze ring weight was found in the very first year of excavation and was published in that year's preliminary report as possibly Umayyad, dated *ca*. AD 690-750.[76] The weight has therefore be highlighted as one of a very few items found at Amorium that can be identified as coming from the Arab world. Recent research has shown that it is inscribed with the name of the Emir al-Sarī, who was the Abbasid governor and financial controller of Egypt in AD 816 and again from 817 until his death in 820.[77] It seems likely that the ring weight also comes from an 838 destruction context, but there is no way of telling whether it was being used by the Byzantines before the siege or was lost by the Arabs during the capture of the city. If the former is the case, then the weight would provide striking evidence for trade between Egypt and Anatolia in the early part of the 9th century, thus significantly predating the evidence of the Cairo Geniza documents.[78]

CONCLUDING REMARKS

This paper has shown the necessity to reappraise the role played by Anatolia in the survival of the Byzantine Empire. The picture was not as bleak as Leo of Synada in the 10th century would have us believe nor as most modern Byzantinists would want us to accept.[79] The wealth of archaeological evidence that is now slowly coming to light suggests that the infrastructure of communities and communications may have been more robust and sustainable than has previously been recognised. Despite the frequent Arab incursions in the second half of the 7th and throughout the 8th century, some urban centres remained in Anatolia and the countryside continued to provide the basic resources not just for subsistence but also for surplus wealth. The focus here has been on Amorium, and I make no apology for that fact

[73] Wright 2000, 165-70; Wright 2007, 146, figs. 18-19. For additional comments, see Lightfoot 2007, 282 and esp. n. 44.
[74] Koçyiğit 2012, 323-27, figs. 3-4, 6-9, and 12.
[75] Evans - Ratliff 2012, 219, no. 151A, B (with refs.).
[76] Harrison 1989, 171, 173-74, no. 4, pl. xlviii(b).
[77] Lightfoot 2012b, 383, no. 17, pls. 11/11-13 and fig. 11/8.
[78] See Goitein 1999, 211 and 214.
[79] Lightfoot 2009, 139; Lightfoot 2012a, 184; see also Coulton et al. 2012, vol. 1, 179.

https://doi.org/10.56170/propontica.1530180

since it is one of very few sites in Anatolia that not only provides us with rich evidence of Byzantine occupation but also a wealth of material that can be dated on solid archaeological grounds because of the sealed 9th-century destruction layers. The challenge now is to prove or refute this evidence by investigating similar levels of the Early Middle Ages at other major Byzantine settlements in Anatolia.

Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

Acknowledgements

I would like to thank Prof. Dr. Zeliha Demirel-Gökalp.

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PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, Eylül 2024, 2 (4): 199-242

The Idea of 'Loosening the Bond Between Ground and Structure' in Antiquity and Archaeological Evidence on Antiseismic Foundations

Antik Çağda 'Yapı ile Zemin Arasındaki Bağı Gevşetme' Düşüncesi ve Antisismik Temellere Arkeolojik Kanıtlar

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 3 Nisan /April 2024
Kabul Tarihi/Accepted: 17 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 199-242

Atıf/Cite as: Kaplan, D. "The Idea of 'Loosening the Bond Between Ground and Structure' in Antiquity and Archaeological Evidence on Antiseismic Foundations" Propontica, 2 (4), Eylül 2024: 199-242.

https://doi.org/10.56170/propontica.1464273

THE IDEA OF 'LOOSENING THE BOND BETWEEN GROUND AND STRUCTURE' IN ANTIQUITY AND ARCHAEOLOGICAL EVIDENCE ON ANTISEISMIC FOUNDATIONS

ABSTRACT

Antiseismic structures in antiquity are often overlooked or disputed by those working in the field, even though they are not mentioned in written sources. At the very least, it should be recognized that some of the traditional structures and building techniques of ancient cultures in Anatolia and surrounding regions were antiseismic before today's concrete structures. In fact, these techniques were sometimes applied over a wide geographical area and sometimes in a narrower region, as if under the control of a central government, administration or idea, and continue to be used for a long time. Archaeological studies reveal that some construction methods were widely used to support structures affected by dynamic loads. Such methods were applied and developed by engineers, architects and artisans who were fully aware of the effects of earthquakes on structures. Therefore, antiseismic structures must have emerged due to awareness of earthquake hazards. Wood in foundations and walls in Anatolia in the Bronze Ages, sand in Mesopotamia and Egypt, sand, ash, coal and lime in Greek architecture, and opus caementicum in Rome were applied in and under the foundation in more durable or long-lasting building construction techniques. Undoubtedly, wood and wood foundations have been known and used since the Bronze Age. Unfortunately, with the emergence of new materials and technologies, the traditional architectural understanding of Anatolia was almost wholly removed from construction practice. As in modern constructions, in archaeological studies, attention is paid to the structures' above-ground units, while the underground foundation sections are overlooked. Data about the use of wood in the groundwork is sometimes discovered by chance. This article demonstrates that the idea of loosening the bond between structure and ground was known in ancient times. Although the technical solutions used in the past match the principles of base insulation, it is arguable whether they are genuinely antiseismic as they are today.

Keywords: Antiquity, Building Foundations, Antiseismic Foundations, Structure and Ground, Earthquake.

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https://doi.org/10.56170/propontica.1464273

ANTİK ÇAĞDA 'YAPI İLE ZEMİN ARASINDAKİ BAĞI GEVŞETME' DÜŞÜNCESİ VE ANTİSİSMİK TEMELLERE ARKEOLOJİK KANITLAR

ÖZ

Antik çağda antisismik yapıların varlığı, yazılı kaynaklarda ifade edilmese de, arazide çalışanlar tarafından çoğu kez gözden kaçırılmakta veya tartışma konusu yapılmaktadır. En azından günümüz beton yapıları öncesi Anadolu'da ve çevre bölgelerde sürgün vermiş kadim kültürlerdeki bazı geleneksel yapıların ve yapı tekniklerinin antisismik olduğu kabul edilmelidir. Hatta bu teknikler, bazen geniş bir coğrafyada bazen de daha dar bir bölgede, sanki bir merkezi yönetim, idare veya düşüncenin kontrolü altında uygulanmış gibidir ve uzun süre kullanılmaya devam eder. Arkeolojik çalışmalar, dinamik yüklerden etkilenen yapıların desteklenmesi amacıyla bazı inşa tekniklerinin yaygın olarak kullanıldığını ortaya koymaktadır. Bu tür teknikler, depremlerin yapılar üzerindeki etkilerini kesinlikle farkında olan ve bilen mühendis, mimar ve ustalar tarafından uygulanmış ve geliştirilmiştir. Dolayısıyla antisismik yapılar, deprem tehlikesinin bilincinde olan bir düşüncenin sonucu ortaya çıkmış olmalıdır. Bronz Çağlar'ında Anadolu'da temeller ve duvarlarda ahşap, Mezopotamya ve Mısır'da kum, Yunan mimarisinde kum, kül, kömür ve kireç, Roma'da opus caementicum, daha dayanıklı veya uzun ömürlü yapı inşaat tekniklerinin temel ve temel altındaki uygulamalarıdır. Elbette ki ahşap ve ahşabın yer verildiği temeller Bronz Çağı'ndan beri bilinmekte ve kullanılmaktadır. Ne yazık ki yeni malzemelerin ve teknolojilerin ortaya çıkmasıyla Anadolu'nun geleneksel mimari anlayışı neredeyse tamamen inşaat pratiğinden çıkarılmıştır. Modern inşaatlarda olduğu gibi arkeolojik çalışmalarda da yapıların, göze gelen temel üstü birimlerine dikkat edilirken, toprak altında kalan temel bölümlerine dikkat edilmemektedir. Alt yapıda ahşap kullanıldığına dair bilgiler ise bazen rastlantı sonucu keşfedilmiştir. Bu makale antik çağda yapı ile zemin arasındaki bağı gevşetme düşüncesinin bilindiğini göstermektedir. Geçmişte kullanılan teknik çözümler, taban yalıtımı ilkelerine uysa da, bugünkü gibi gerçek anlamda antisismik düşünceye sahip oldukları ise tartışılabilir.

Anahtar Kelimeler: Antik Çağ, Bina Temelleri, Sismik Temeller, Yapı ve Zemin, Deprem.

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INTRODUCTION

Two significant earthquakes centred in Kahramanmaraş (06.02.2023) brought the consideration of building materials and construction techniques back to the agenda. In developing better designs to protect buildings from earthquake damage, site selection, materials and especially foundation isolation have emerged as solutions. At the same time, in recent years, there has been a great deal of interest in the seismic history of ancient monuments, especially the remains uncovered by archaeological studies. The reason for this interest in past structures and the secret of their survival is how to build durable structures that will protect against future earthquakes. For this purpose, the need to be careful from land selection to load-bearing elements and to live a happy life with solid and reinforced structures comes to the fore. This need brings migration to rural areas and horizontal architecture to the fore.

Wood, the oldest building material, is also the primary material of buildings that offer a healthy and happy living space. Although it has not survived to the present day, wood was the primary material for buildings with deep foundations, as seen in early examples from the Bronze Age. In time, stone, then concrete and steel came to the fore. Nevertheless, wood continues to be widely used as a building material. Numerous architectural examples show that, excluding fires, wooden structures are generally more durable, more natural, and the most renewable and cheapest building material.

Although earthquakes are simply remembered for their destructive characteristics, they actually bring about change. This change, in turn, differentiates cities into rural and central areas and buildings according to their materials and techniques since earthquakes often allowed the building of new houses, palaces or religious structures in a newer or more fashionable style in antiquity. However, this depended on political, social and financial stability. The evidence suggests that ancient architects and builders, at least in some periods and regions, were aware of the effects of earthquakes on buildings, their weaknesses and the precautions that should be taken to prevent earthquake damage. Even today, the first reaction after an earthquake is to build buildings with fewer storeys, that is, low-rise buildings where wood is used frequently to resist earthquakes. Accordingly, buildings with wooden beams and girders were common in Anatolia until the advent of reinforced concrete buildings[1].

[1] The types of masonry structures that survive and continue to be used in Anatolia today are made with logs or large-sawn timber. These timbers and logs were fastened using a method called "çantı", and sometimes wooden nails were used only at the joints. There are two types of wooden structures: log and hewn-sawn timber. The bark was peeled or roughly hewn into four or six faces in log structures and used in its natural state. Timber frame buildings are seen in two common types, filled or unfilled, depending on the seismicity of their geographical location and the abundance of building materials. Masonry buildings made only of wood may show architectural and structural differences according to climatic and economic conditions. The load-bearing systems of wooden buildings, which are generally located in earthquake zones, are of two types:

https://doi.org/10.56170/propontica.1464273

Since the beginning of human history, first natural shelters were preferred to protect human life, and then artificial shelters were built. These artificial shelters have been constructed using natural materials for thousands of years. Diverse in their methods and materials, such structures have been constantly tested by destruction through human hands or natural disasters. Only the best examples of buildings have survived earthquakes and the test of time. From the past to the present, Anatolia has been applying old methods to build traditional structures with the same natural and artificial materials, which are very simple and convenient to produce. The ancient architecture of this geography is, in fact, a living tradition, and it is with this intention that construction activities are carried out.

The necessity of resisting seismic effects in Anatolia and its environs had existed in the building construction tradition long before the scientific approach to the problem began, and earthquake engineering methods were introduced. From the beginning, earthquake-resistant solutions were developed empirically by learning from the behaviour of buildings, as emphasized in post-earthquake damage studies. The need to develop strategies to resist earthquakes is a constant challenge, and from early times, learning from the past has been an excellent way to improve the quality of buildings. Anatolia, Mesopotamia, Iran, Egypt, and the Aegean cultures and the systems used in their various structures offer remarkably nuanced solutions[2].

These examples refer to construction techniques and systems that have been continuously improved after each earthquake and are still effective while offering interesting suggestions for new designs. Examples are the interlocking of stones and walls, regularity in plan and height, and reduction of dead loads. This study presents early examples of earthquake-resistant systems, highlighting the most meaningful aspects of the basic techniques of ancient buildings compatible with modern seismic design concepts. These examples deserve special attention as they can inspire new constructive strategies to deliver effective and environmentally compatible results with existing sustainability principles. This fact is fundamental as cultures adjacent to the Mediterranean are in earthquake zones.

Anatolia has faced many severe and destructive earthquakes for thousands of years due to its location in the Mediterranean earthquake zone. Wooden structures, which are light in structure and have been proven safe against earthquakes with their flexibility, have always been preferred in this geography, aware of their importance[3]. The nature of the Mediterranean appeals to the human eye and adds

filled (hımış) and unfilled (bağdadi). Today, the buildings and parts of the buildings in Anatolia where wood or timber is used are human living spaces, while the stone-bearing lower floor or masonry stone foundation on which these buildings sit serves as stables or for other needs of the family.

2 Kirikov 1992.

3 The rate of use of timber in buildings is directly proportional to earthquake zones and forested areas. Therefore, this traditional material of Anatolia is generally subject to two different systems such as all-timber or timber-masonry. In these types of systems, the building material is natural materials such as wood, stone

to this taste the aesthetic beauty of the buildings it builds. Therefore, this situation has made us forget the dangers arising from the Mediterranean geology and climate from time to time. Perhaps the earthquakes show that the Mediterranean, particularly Anatolia, is not a paradise freely available for human enjoyment. For this reason, it has paved the way for living and building here, despite its difficulties-rather than other geographies. Of course, building types in Anatolia and the surrounding geographies depend on the geographical characteristics of the region (forested, rainy, dry, etc.), the culture of life, and the economic conditions mentioned. Archaeological excavations and artistic and philological documents provide essential clues about the use of wood in buildings and river stones in foundations from the Neolithic[4] to the Classical Period[5].

Layered river stones were used in Anatolian Bronze Age building foundations to prevent moisture from reaching the building or to absorb earthquake forces before they reached the building. Although it is challenging to find concrete traces of the use of wood, which is weak against climatic conditions and fire, in foundations in archaeological sites, traces of burnt wood have been found in the gaps and holes of beams and uprights in foundations and walls. This is because engineers, architects, and professional workers in the field of construction can understand the causes and effects of earthquakes by observing the damage to structures. Those lacking this observation, as the visible parts of the structures attract more attention, are still victims of earthquakes.

In general, a building has two parts. The visible part, the part above ground, is the superstructure. The other, often overlooked, is the foundation, which can take several forms (foundations, walls, slabs, piles, caissons, etc.) and be as costly as the superstructure. To properly design a foundation, the engineer in charge must have a detailed knowledge of the soil and geological conditions at the site; this is today realized by taking samples of the elements in the ground. This is because the soil properties greatly influence the earthquake characteristics and behaviour of the structure itself since, during an earthquake, a so-called compression process occurs between the soil and the structure, which can aggravate or mitigate the earthquake effect. This fascinating, unpredictable and ever-changing movement was probably recognized by the ancient builders, who paid much attention to the preparation of the ground of a structure. However, a building should have structural principles such as weight and distribution according to the centre of gravity, proportionality, lightness and low centre of gravity, flexibility (especially in materials) and closedness (horizontally and vertically). In line with these principles, devices that reduce the intensity of the oscillation reaching the structure from the ground (seismic shock isolation) and earthquake-resistant foundations with sufficiently

and mud ("mudbrick" etc.).

4 Vann 1976, 107-108.

5 Ulrich 2007, 61, 72-89.

deep, flexible (ductile) bearings, abiding by the principle of robustness, are essential. Were these principles necessary for earthquake-resistant structures applied in ancient buildings? Of course, except for rare examples, there are no preserved drawings or models of ancient buildings. Such structures, dismantled down to their foundations, as seen at archaeological sites, have often been turned into ready-made quarries to reuse the material; many yielded only scant information or remains. However, some have survived to the present day and demonstrate the excellence of their construction. Therefore, it is often impossible to know the thoughts of the ancient architects who created excellent buildings, what design decisions they made to protect them against earthquakes, and how they put into practice the experience of their predecessors. Nevertheless, it is clear that the instructors of the builders were natural phenomena, especially earthquakes and earthquake experiences.

The experience of earthquakes implies an awareness of a natural phenomenon that is constantly active. The origins of human sensitivity to this problem are, therefore, as old as the art of building. The Mediterranean region, where the ancient building tradition is often associated with seismic activity, is an effective observation point in this regard. From the beginning, builders and the local population were directed to carefully analyze the earthquake phenomenon using the essential tools available: observation and experience. This is why, over time, local communities, faced with frequent and destructive earthquakes, have adopted specific construction methods and preferred to stay in the same place rather than change or abandon their habitat[6].

Mediterranean peoples, especially Anatolian settlers, accepted the possibility of a major earthquake at any time and chose their construction techniques accordingly since they were the builders themselves. So, what are the ideas and principles underlying this absorber foundation design? The principles of earthquake-resistant construction are not very diverse[7]. In fact, they have been known in the past and are still practised. The solution is generally seen as a 'change in the type of structure and construction materials' because you can change both the structure and the techniques, just as a change in people and their thinking. However, because the laws of nature remain unchanged, like solid foundations, the principles of designing earthquake-resistant structures never change.

6 Seneca, Natural Questions, VI.

7 An earthquake-resistant building is one that ensures life safety and prevents material damage during an earthquake. Unfortunately, this requirement is often far from reality. In antiquity, despite some design deficiencies, poor workmanship or lack of knowledge, this expectation was almost fully met. It is necessary not only to protect oneself from a collapsing building or a falling building element or object, but also to think that it is better to stay in the building than to leave it, and to work until it is put into practice. This will lead to buildings with excellent construction quality, excellent design, durable, lightweight and flexible materials, and real resistance to earthquake loads and shocks.

Laying solid foundations, even without the correct ground, was one of the most severe problems of antique construction as it is today. From the Neolithic Period, builders did not stop developing building technologies to add strength, durability and longevity to their works. While they initially lived in simple dwellings, public buildings such as palaces and monumental buildings serving religious purposes, as is the case today, began to apply these monumental architecture and technologies with growing cities. Most of these ancient structures are located in active regions of Anatolia and on terrain with poor bearing capacity. Despite this, archaeological evidence shows that people did not abandon their living spaces, and the destruction of these spaces by natural disasters such as earthquakes did not lead them to abandon their cities. On the contrary, they lived in the same place, sometimes attaching symbolic or religious values to their hometowns[8]. Instead of abandoning the destroyed site, they strived to solve the problems. For this purpose, they tried to understand the problem, find methods to deal with it, raise awareness about more accurate ground conditions and problems, and continue to come up with solutions.

In the first stage, they checked whether the soil structure of the area where the building will be built, such as hardness-softness and moist-dry, was suitable to carry the load distribution; not every structure rising from the ground may have the appropriate technique and material for the ground structure. Therefore, they also focused on the level between the ground and the structure. In this level, often referred to as the sub-foundation, applications related to the interaction between the ground and the foundation were prioritized. Many of the basic features of ancient infrastructure systems are also the source of modern antiseismic technologies. Foundation isolation, considered a saviour, especially today, is often mentioned as a new idea to prevent damage caused by movements in earthquake zones and is frequently tried to be made use of[9].

Before discussing the use of wood in foundations, it may be understandable to look at how the antecedents of this logic called 'foundation isolation' emerged. The antecedents or prototypes of foundations built according to geotectonic movements are more evident from the methods of transportation of construction materials than from the constructions themselves. These prototypes are pillow foun-

[8] Mounds are the best examples of rebuilding a living space on top of a destroyed or damaged occupation layers. The reason behind why cities are not abandoned as a result of natural or man-made destruction, especially earthquakes, is not always symbolic in meaning or religious. Geography and location have always been taken into account. There are various reasons such as dominance over agricultural lands, water resources and river transportation, being located on trade routes or at intersections, security, etc.

[9] Tsuneo Okada of the University of Tokyo stated after the Kobe earthquake that there are two basic approaches to avoid earthquake damage. One method is to build as many strong structures as possible. He states that "This gives you more lateral strength; it prevents a building from collapsing on people on the first floor.". The other approach is to "make a building somehow flexible. Then, when the earthquake hits, part of it will sway, like a tree bending with the wind. They are made sort of like a pendulum". One way to achieve this, according to some experts, is to isolate the foundation from the surrounding soil by placing it on rubber, steel, etc. plains that dampen ground movement. Reid 1995.

https://doi.org/10.56170/propontica.1464273

dations consisting of timbers embedded between stone blocks or bricks. In this system, the walls are isolated from the ground. Another type of foundation is the trench foundation dug under the wall. They, therefore, knew how to move a stone block or tree trunk on the ground or drag it to the cart, as seen in the depictions of art from Egypt, Mesopotamia, and Anatolia (Fig. 1). However, this knowledge does not explain how to bury a large mass of several stones or a large block of stone. This is why the first monuments consisted of permanently erected stones. It was understood that the reason why a planted stone remained standing for a long time was the change in depth. But the prototypes of wooden foundations, which appeared in the form of a grid, may possibly have been bases made of primitive logs. These early types must have been used on grounds such as damps, wet and lakeside areas. The use of such early types improved the quality of life and made it possible to stay in the same place for a longer period. In general, where wood was readily available, the ground was very soft and wet. The wooden base or floor provided a certain degree of insulation and also helped to strengthen the dwelling.

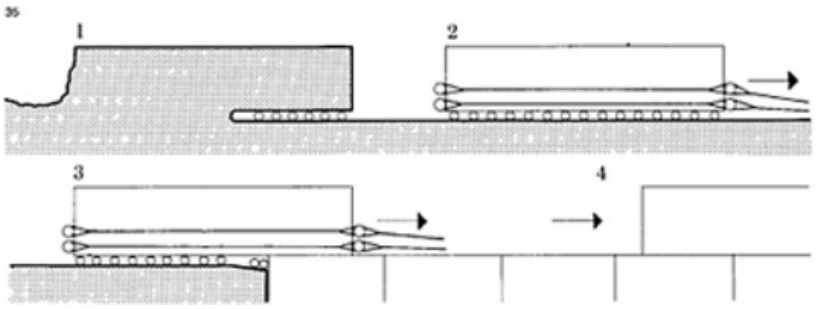

Fig. 1. Reconstruction showing megaliths from Baalbek being transported on round logs (Adam 1994, Fig. 35).

Although "seismic isolation" is presented as a recently emerging term in scientific circles and communication (press and media) tools and accepted as a new "concept", it should be remembered that the idea is not new in human history[10]. When archaeological documents and evidence are examined, it will be seen that

[10] Today, modern research continues on the development of architectural and technical designs to protect buildings from earthquake damage, and on foundation isolation to reduce seismic energy. There are also preliminary studies on the origins of such developments and the approaches and developments in ancient civilizations. The work of B. Carpani is the first collective evidence that the basic idea behind foundation isolation is far from being a modern development: Carpani 2014; Carpani 2017. With more careful and purposeful excavation and research studies, as the number of examples increases, the pioneers of foundation isolation will be given their due, and the idea of loosening the bond between the ground and the structure, such as placing layers of sand or clay under the foundations, will contribute to today's anti-seismic practices by making the old common again.

base isolation is not a new and modern system[11]. Nevertheless, people have abandoned the technical developments they have tried and advanced for the abovementioned reasons. Therefore, works that require keeping the connection between the ground and the structure flexible, such as placing sand and clay layers and timber under the foundation, date back to the Bronze Age[12].

The most common earthquake protection system was to place a thin layer of sand under foundations to achieve a "slip isolation" system. "Foundation isolation" represents a new approach to developing better design methods and protection technologies to reduce earthquake effects, especially in the field of seismic engineering, including the last quarter of the last century. Although "seismic isolator", or "seismic isolation"[13] as it is referred to, is described as a modern or innovative technology, the basic concept behind foundation isolation and its application is far from being a new development. In fact, the idea of "decoupling the movement between the structure and the ground or loosening the bond between the two", in the modern sense, began in the 19th century or so. Yet its antecedents go back as far as the Bronze Age. In ancient times, the central concept of earthquake protection was to stop or prevent seismic waves from damaging structures. However, while these ancient practices of foundation isolation are technical solutions, they do not necessarily indicate a perfect understanding of everything. Various human endeavours have searched for different techniques to construct more durable buildings. After all, one might imply that the words and material-related technical thinking about 'decoupling the movement between the superstructure and the ground' in general terms are also new. However, careful research reveals that while the state of the art may be new, the application of the idea may be much older[14]. It is, therefore, worth noting that the concept of isolation was adapted and used in ancient times. Because without a solid foundation system, these structures would not have survived for centuries.

Several types of foundations built to withstand seismic movements include large cut stones, beds of small stones, direct placement on bedrock and large 'orthostats', especially connected stone blocks. Especially under the columns or walls, or even on the rocks, some flat small stones were laid as a cushion to absorb the first shock of the earthquake forces on the soil prepared in advance in the foundation pits; this system continues uninterruptedly from the Bronze Age to ancient Rome and is even used in rural Anatolia today. Some large foundation stones (orthostats) were placed on these small stones, usually without mortar, where the walls

11 For the history of seismology, see Ben-Menahem 1995.
12 Carpani 2017, 9.
13 Stevenson 1868, 557-566; Barbat – Bozzo 1997, 154-155.
14 F. Milizia, when describing earthquake-resistant houses, recommends building a wooden structure, not exceeding in height its width, not anchored to the ground, but free-standing on a stone platform, strongly connected to each other. In an earthquake, he concludes, a house designed in this way can only tremble but never collapse, because "this house is a chest": Milizia 1781, Chapter 10; Stevenson 1868, 557-566.

https://doi.org/10.56170/propontica.1464273

were built (Fig. 20). During earthquakes, a slight shift or movement occurs as these small stones move. The orthostat stones are left empty around the perimeter to ensure the better functioning of this foundation. The orthostat stones also prevent moisture from penetrating into the structure. In Anatolia today, placing small flat stones under pillars, columns, and walls is a tradition that serves the same purpose. Since the technique was introduced early on, it was adapted to other areas. As in the method of moving blocks on wooden logs[15] (Fig. 1), using small round stones placed underneath to move or turn large blocks of stone on a flat surface is still the most common method used by stonemasons today. However, it must be recognized that the movement of the ground beneath a building during an earthquake is the most critical issue and that this movement is very complex. In the modern era, this is explained by mathematics and functions. Still, in reality, during an earthquake, the ground motion beneath the building is caused by several types of waves, which have their own lengths, oscillation periods, amplitudes and speeds of motion simultaneously. As a result, all points of the ground and the foundation of the building move differently, although sometimes in slightly different ways. Therefore, each earthquake or ground motion is different and is not repeated in the case of the next earthquake. In this sense, what are the fundamental and innovative applications that are very important for a structure?

Besides the building foundations in Anatolia and Syria, innovative practices are also known from the Aegean[16]. The palaces of Crete[17], most notably Knossos and Malia[18], and the houses in the Akrotiri settlement supply good examples of wood use. In the buildings of this period, mudbrick, stone and wood were used together[19]. In the following periods in Greek architecture[20], apart from wooden beams and crepidoma, the connection of stones with dowels and clamps[21]and support with wood or metal[22] emerged with the same logic. The Greeks used the ordinary construction method of joining blocks together without mortar. Egypt first used this technique, and the Romans borrowed it from the Greeks[23]. This method was designed to withstand possible movements and seismic shocks. However, in these examples, it is seen that the walls were reinforced rather than the foundations[24]. This was because the most damage occurred in the load-bearing elements, while problems caused by the ground required the reconstruction of the building. If the building had proper foundations, such systems and measures were unnecessary.

15 Adam 1977, 31-63, Fig. 14; Adam 1994, Fig.35.
16 Lloyd – Mellaart 1956, 122.
17 Thompson 1960, 59; Marthari 1990.
18 Evans 1928; Palyvou 1988; Palyvou 1990.
19 Mainstone 1975, 167.
20 Livadefs 1956; Martin 1965.
21 Martin 1965, 22-9.
22 Dinsmoor 1922; Martin 1965, 240.
23 Adam 1994, 96.
24 Dinsmoor 1922; Martin 1965.

The reason is that the pressure is transmitted vertically only through the columns and walls. Therefore, the effect of clamping can be mentioned against the slips caused by trussless roof systems. As a result, earthquakes' destructive effects have led to the prevalence of these reinforced structures. It was also common knowledge that earthquakes around the Mediterranean created such effects. Because as will be mentioned, Greek engineers and architects knew the techniques and antiseismic functions they inherited from the East and Egypt, such as metal reinforcement[25], and used them consciously. The only thing that is unknown is the lack of clear written documentation explaining why architects and builders chose certain types of structural designs to prevent collapse due to seismic shocks.

The prevalence of various construction materials in a region enables the emergence of building characters and types[26]. When the time interval between significant earthquakes is long, people seem to forget about earthquakes and their destructive effects and no precautions are taken. However, constantly recurring earthquakes keep human memory alive and strong, ensuring that antiseismic constructions are not forgotten, and they also lead to the emergence of new techniques. It is possible to see these changes in archaeological documents. Therefore, seismicity can be a factor that strongly affects building style and history in certain areas, the best example of which is the Mediterranean Seismic Zone Cultures. However, because the threat of earthquakes is not constant, expensive and architecturally annoying structural restraints are sometimes ignored or relegated to oblivion.

In this case, what needs to be done is to put soil, sand, ash, etc., between the ground and the structure[27], as is the case today. The aim is to consider the elements that make ancient structures earthquake-resistant, such as layer placement, from today's perspective and to analyze them according to today's attitude. Although some structural tips used by ancient builders to increase the earthquake resistance of their structures are overlooked, overall earthquake-resistant construction experiences can be evaluated for today's buildings. Questions such as How many people died due to faulty structures? How much material-economic loss was experienced? Rather than numerical results such as, what are the ancient anti-earthquake techniques and practices that reduce the destructive effects of earthquakes, and what are the symptoms of these practices? should be taken into consideration. Therefore, the impact of the earthquake on structures and the precautions taken should be known.

25 Martin 1965, 238.

26 Roman mortar, for example, originated in Italy with volcanic material that could be found in the east. In the Cyclades, preservation of wood was at the forefront of stone architecture. There are adobe bricks in the inner regions of Anatolia. In Samos, many things remain the same for a long time, especially due to the continuity of earthquakes, in the architectural area with its convenient location, economic and political shelter.

27 Doudoumis et al. 2002; Xiao et al. 2004, 3-4.

In short, many essential elements of construction technology that can provide seismic resistance can be seen in buildings from the Bronze Age to the Roman period. However, it is vital to appreciate that the seismic-resistant design elements inherent in classical Roman structures are little more than a coincidence. For this purpose, the article discusses 'foundation isolation'; that is to say, it focuses on the gap between the foundation and the ground, and antiseismic designs are mentioned.

It is worth emphasizing this point first on the Bronze Age building foundations. The types and development of buildings in Anatolia, according to region, generally depend on the construction material. Security, economy, political and ideological reasons, the complex structure of society, religious tendencies, traditions, etc., can also be added to the reasons for this diversity. In other words, the structure was produced by utilizing the available materials. However, even this material shows that the Anatolian engineers, architects and artisans who continued to settle in the same area did not forget one thing: They experienced significant earthquakes, and the recurrence intervals between these disasters were very short. If the time interval between earthquakes exceeds a human life, earthquake-related problems are generally forgotten quickly, indicating no precautions are taken. However, if people constantly face repeated earthquakes, like the people of Anatolia, this creates a strong earthquake memory in the community and, more importantly, on the minds of the persons involved in construction activities. As a result, it is seen that earthquake-resistant, that is, antiseismic construction techniques are not forgotten or ignored. Therefore, seismicity is a factor that controls the building style, technique and historical development of construction in certain areas. However, it should also be noted that sometimes, since the threat of devastating earthquakes is not constant as it is today, it is economically expensive. That is, in terms of construction cost, architectural and structural limitations and suggestions could sometimes be ignored and forgotten. The predecessor peoples of Mesopotamia, Egypt, Anatolia and the Aegean were able to determine which structures were earthquake-resistant and left behind both archaeological and historical evidence that shows us that they were able to build such structures.

In this study, it is primarily emphasized that earthquakes were a determining factor in the prevalence of antiseismic structures and techniques in the early period, namely the Anatolian Bronze Age and Aegean cultures, and even in determining the building style and examples from neighbouring cultures, such as Mesopotamia and Egypt, and in the Classical period, Greek and Persian, were presented.

BUILDING FOUNDATIONS IN BRONZE AGE ANATOLIA

During this period, masters and builders raised the foundations of the buildings on pillow stones dug into the bedrock to prevent the houses from sinking into the ground. In fact, loading the weight directly on the stones rather than the soil was the first step towards creating modern foundations. Wood-log-based structures and the origin of this technique go back approximately three thousand years. It should not be surprising that these ancient examples are found in the Middle East. This geography not only houses the oldest traces of humanity's past but also regularly experiences the most shocking earthquakes. Similar earthquakes continue to occur in the same geography. Therefore, searching for new systems today is necessary, just like the ancient people, engineers, architects and artisans.

R. Naumann, in his work "Old Anatolian Architecture", draws attention to the presence of dense wood content in the structures of the Bronze Age settlements in Anatolia. Of course, there are other materials, such as stone and mudbrick. The exception is the structure built entirely of stone[28]. However, wood is frequently used for reporting purposes and on walls[29]. The use of wood on the roof is in the form of a triangular box that extends from bottom to top and is also flexible. Using these wooden beams or logs in the foundations and superstructure until they were bent had only one purpose: to increase the resistance against comprehensive earthquakes and to provide durability to the structure.

In this early period, foundations continue to be excavated until a solid ground is found in architecture. Their foundation structures vary depending on the soil characteristics they sit on. If the bedrock is close to the surface, the foundation sits directly on this rock without levelling the stone ground or after levelling the bedrock separately for each stone foundation. If the mudbrick wall rests on the rock, as in Boğazköy, a bed made of wooden beams is placed between the bedrock and the mudbrick wall[30]. Wood was used in stone foundations even in very early periods. Even today, it can be understood from the fact that wood is frequently preferred in buildings, how flexible it is in earthquakes as a building material and that it is a safe building material against earthquakes.

[28] Naumann 1998, 58.

[29] The construction technique in which timbers are used in walls is achieved through a three-dimensional wooden frame embedded in the stone wall to connect the various structural parts and contribute to the overall seismic resistance. In general, such an application protects the entire building by absorbing the effects of seismic ground movements. This technique, called *opus craticium*, spread throughout the Mediterranean during the Roman period. This system was developed in the 18th century under the name *la casa baraccata* in Italy, *pombaline gaiola* in Portugal, *himiş* in Turkiye. Many different names given to same method can be found almost all over the world. This system, which has even spread to geographies without earthquakes, has often been used in northern Europe, Central Asia or Japan, America and North Africa, including countries in earthquake zones. They are examples of how a solid structure is built, not only from an artistic perspective: Özgüç 1966, 29-52; Langenbach 1989, 30-43; Abdessamed-Foufa – Benouar 2010, 270-293.

[30] Naumann 1998, 58-59; Mielke 2009, 81-106.

https://doi.org/10.56170/propontica.1464273

One of the earliest examples of using wood in foundations is Beycesultan, and the other is Acemhöyük Palace[31]. In Acemhöyük, this Bronze Age settlement of Anatolia, wooden logs were used on stone slabs to strengthen the structure and provide seismic insulation (5th-4th millennium BC)[32]. This tradition continues to be used in rural areas in Anatolia for a long time. In both settlements, monumental buildings such as palaces rose in parallel with the level of prosperity. The extensive use of wood in these settlements and the foundation system indicate that it had a particular application for strengthening foundations.

The basic structures of Beycesultan Palace provide remarkable information (Figs. 2-4). Wooden logs were placed transversely after laying the stone rows in the foundation pits. In the Early Bronze Age, transverse wooden beams were also used between the stone walls in Beycesultan (Layer IV). In this settlement, a different foundation was unearthed in one of the rooms of the palace in the 5th layer (beginning of the 2nd millennium BC). Deep holes were dug and round wooden logs were placed side by side at intervals at the bottom, and some of the timbers were filled with broken stones and nailed to the ground[33]. This foundation grid was reinforced first by placing transverse logs on top, then another course of longitudinal logs on top of them, and again boards on top of all. This grid, with a thickness of 80 cm., is completed with a stone floor.

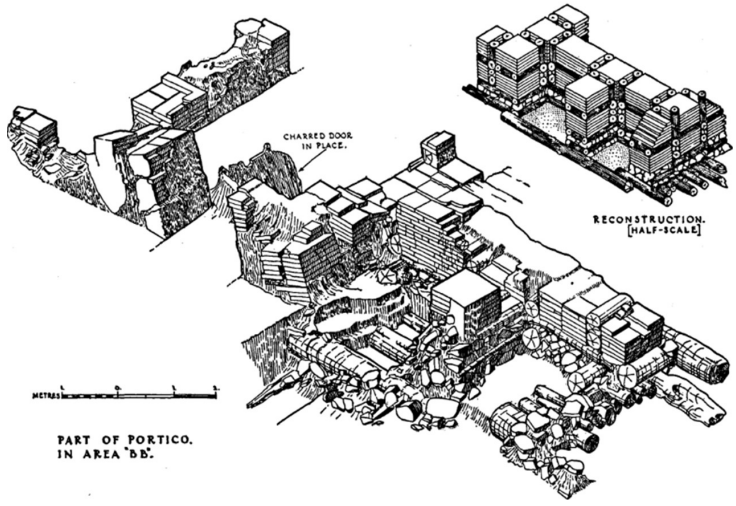

Fig. 2. Beycesultan. Architectural remains of room 32. (Lloyd 1960, Fig.3).

31 Carpani 2014, 1-14.
32 Carpani 2014, 2-3.
33 Lloyd 1960, 31-41; Naumann 1998, 61, Fig. 35a-b; Newton-Kuniholm 2004.

Fig. 3. Wooden foundations on the south wall of room 28 in Beycesultan. (Lloyd 1960, Fig.3).

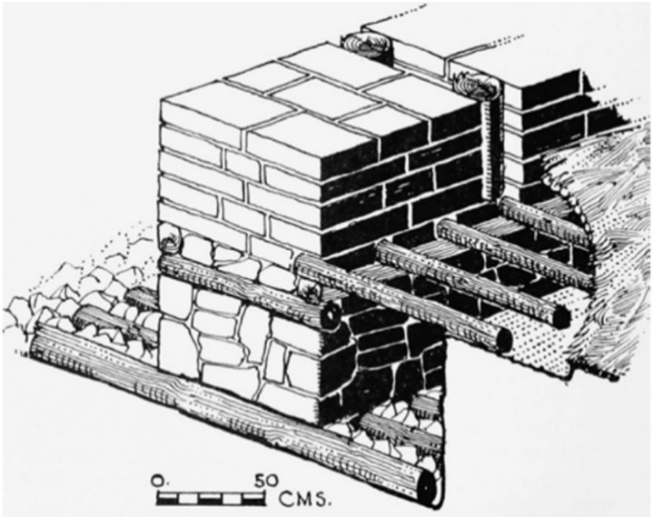

Fig. 4. Beycesultan. Plate V. Palace wall. (Naumann 1998, Fig. 35b).

Another example of a building with similar infrastructure to Beycesultan is the Acemhöyük palace. A similar foundation system is seen here (Fig. 5). However, compared to Beycesultan, the foundations of Acemhöyük (1774 BC) have a slightly different and interesting structure. Here, the wooden logs are on a layer of protruding limestone base slabs set directly into the ground[34]. Wall thicknesses are generally four meters wide. The primary purpose of this regulation is to prevent concussions.

Apart from these two examples, another example showing that Anatolian builders successfully passed the tests with the ground is Troy (Fig. 6). An unnoticeable antiseismic system was placed under the walls that visitors admire with admiration as they pass by today. These walls, built of large square-shaped stones, belong to the 1st layer of the settlement VI (1700-1300 BC) and are without towers. However, they attract attention with their small saw-shaped protrusions on the exterior. Additionally, the slight inclination of the stones and walls increases their durability. An interesting feature of this structure is that its foundations do not reach the bedrock. According to the excavation report, ancient builders deliberately left a layer of hard soil ranging from 20 to 120 cm between the bedrock and the wall. Experts have interpreted this sub-base preparation as "an earth cushion" that acts as an antiseismic device, a simple "shock absorber"[35].

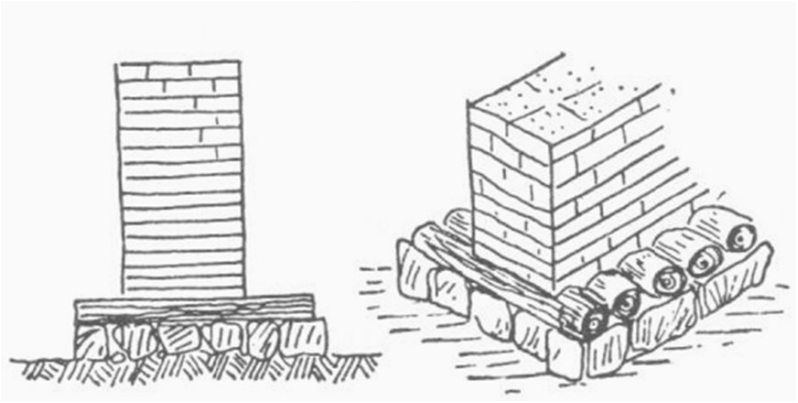

Fig. 5. Acemhöyük. Wooden grill under adobe walls (2000-1900 BC) (Naumann 1998, Fig.36).

[34] Özgüç 1966, 36; Naumann 1998, 61, Fig. 36; Carpani 2014, 3.
[35] Blegen et al. 1953; Rapp 1982, 43-58; Carpani 2014, 4.

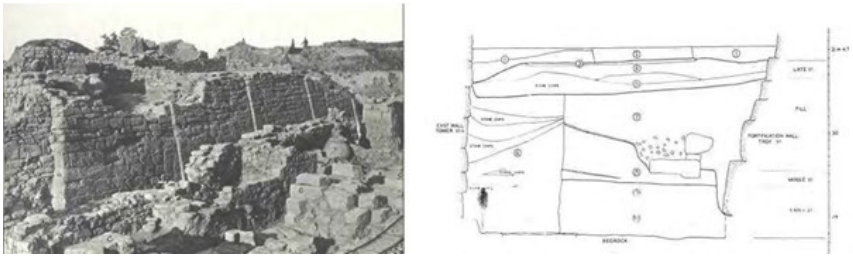

Fig. 6. Troy city walls. View (Dörpfeld 1902) and Section (Blegen 1953).

The origins of these foundation systems discussed are unknown. However, it can be said that such practices originate from traditional knowledge regarding the use of wood. The use of timber survived for a long time, from the Bronze Age to the Roman period and today's countryside. Therefore, the long experience using wood and wood-component structures may represent a system created and developed as a solution by an administration or traditional construction thought. Because, as will be stated, a similar background can be expressed in the architecture of the islands and the Minoan culture. In addition, this construction culture wants the memory of seismic events and awareness of damage not to be lost, which means that the turnaround time of events in terms of work experience is close to a generation time. Such awareness encourages local communities not to forget and abandon construction criteria but to analyze, maintain and improve them. Differently, in cases where earthquakes are rare, people and artisans will lose consciousness and forget seismic solutions over time or even prefer misleading interpretations (as is the case today).

TEMPLE FOUNDATIONS IN MESOPOTAMIA AND EGYPT

A method similar to the one used on the city walls of Troy is also evident in the foundations of the Oval Temple (3rd millennium BC) located in Tutub (Khafajah) east of Baghdad in Mesopotamia (Figs. 7-8)[36]. It is seen that the foundations of this large ellipse-shaped religious structure (Oval Temple, Early Dynastic II: 2750-2600 BC) rest on a huge sub-base. After the foundations were excavated, a sand bed (64,000 m2) with a thickness of approximately 8 m was created. Because it has been determined that there is no sand at any point other than the temple foundations, the sand is relatively pure, there is no trace of organic matter, and therefore it was most likely brought from outside the settlement. Before the construction of the temple, the entire area was excavated and filled with sand. After the filling was completed, the surface was carefully levelled, and on sand, the wall foundations were made of sun-dried bricks to a height of 1.20-1.40 m. Above the sands, the

[36] Delougaz 1940, 11; Schaudig 2010, 144-147; Carpani 2014, 4-5.

space between the foundations was filled with compacted clay, forming a thick and hard mass in which the foundations were embedded. A brick wall was built on top of the clay layer. Different suggestions have been put forward and debated on the purpose of such a tremendous amount of labour. However, it is understood that the purification of the temples started with the materials.

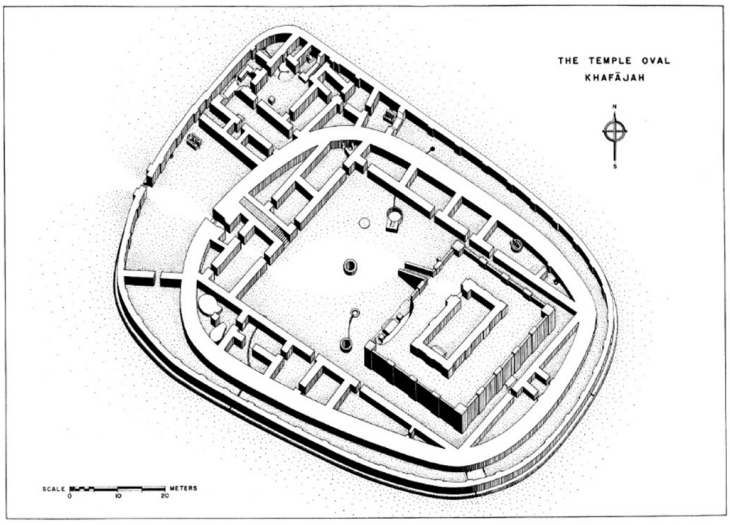

Fig. 7. Oval Temple (Delougaz 1940, Pl.V).

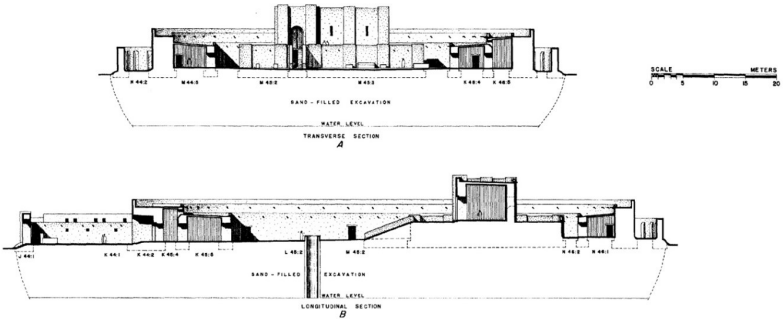

Fig. 8. Oval Temple. Sections ((Delougaz 1940, Pl.VI).

Written documents regarding Mesopotamian temple construction and restoration also clarify the subject. According to these documents, using pure and clean sand (soil)[37] in the foundations of buildings, especially temples, is linked to belief. Since temples were man-made sacred places, they had to be purified. In this context, they had to be constantly protected against human pollution and disrespect since the moment of construction. For this reason, votive inscriptions were placed on the foundations of the buildings, and care was taken when selecting materials to construct the foundations of the buildings. Therefore, a temple is not just a stone, sun-dried brick or brick.

A similar practice can be observed in the Oval Temple in Lagash[38], built in the same period as the Khafajah Oval Temple, with the same method and logic. In addition, the same practice was repeated in the Harbor temple built by Nabonidus in Ur[39]. In fact, King Nabonidus, one of the first archaeologists, mentions that, apart from this temple, he had the foundations of the temple in Sippar-Anunitu filled with clean soil from outside the city[40]. In Mesopotamia, a layer of sand under the floor of the Temple of Ninurta in Babylon and cylinder seals belonging to Nabopolassar were unearthed inside[41]. The other temple with a sand layer is the Ishtar Temple in Agade[42]. Additionally, as can be seen from the Troy example, sand under the foundation provides adequate protection and is one of the most accurate methods for equal load distribution (since there is no volumetric change). Also, under certain conditions, a sand layer can reduce the impact of seismic shocks. But whatever the reason, archaeological evidence shows that the construction process of the Khafajah Oval Temple complex was carried out according to a detailed plan and well-developed technical knowledge. Although the presence of a sand layer is a practical construction technique, it is more of a ritual practice.

Unlike ritualic Mesopotamia, the building foundations at Tell Jemmeh in Israel[43] (Fig. 12) also have antiseismic insulation. Possibly, the use or application of this clean sand dates back to 10 BC. It is a common feature of 19th-century foundation pits. Before the first row of bricks, a 3-5 cm thick layer of sand was laid, and the foundations were placed on this layer. Once the masonry foundation reached ground level, the foundation trench was further backfilled with clean sand.

Laying sand beds under foundation walls was a common construction method in ancient times. This system was used in Ancient Egypt in buildings located on

37 Ellis 1968, 10, 15.
38 Hansen 1980-1983, 424.
39 Heinrich – Seidl 1982, 324-325.
40 Schaudig 2001, 44-63.
41 Ellis 1968, 104, 108-124.
42 Ellis 1968, 15.
43 Beek 1996, 1-8.

the alluvial Nile floodplain[44]. Much more important are the foundations, or rather the ground preparation under a foundation, which the Egyptians attached great importance to. Even in the modern age, it can be seen that in many places, the intricacies of soil mechanics, which were not yet understood, were also used by the Egyptians, and their functions were not well understood. In Egypt, the ground bed was prepared in accordance with the nature of the place where the temple would be built. If a building was to be built on flat land with soft soil, then traditional foundations would be changed. Later generations widely used the method of amending soft soils, but its first practitioners can be said to be Egyptians.

Once a foundation pit, or a trench, was dug, the Egyptians took the soft soil and filled the pit with sand to create a necessary layer, as at Medinet Habu (Fig. 9) and Tell Belim (Figs. 10-11)[45]. In fact, compacted sand is part of the foundation because it resists compression so well. If a building was to be built on a rock, the area required for the building to be built was levelled. For this purpose, unnecessary rocks were cut and shaved, and cavities or depressions were filled with gravel and sand[46]. The temple of Ramses IV at Der el-Bahri was erected on a rock protruding into the surface in the form of a hillside. The rock was levelled to obtain a horizontal surface to prevent the foundation from slipping during an earthquake. First, a pit was dug, and then this stepped base was filled with dry sand. After this arrangement, the foundation blocks were placed on the sand filling. In other words, sand filling has always been between the foundation and the bedrock. This system is not widely practised today, but it was the sub-foundation practice of the Egyptians and all subsequent ancient builders.

Fig. 9. View from the Medinet Habu-Royal Palace Excavations. The sand layer used under the columns (Hölscher 1941, Pl. 29).

44 Carpani 2014, 6.
45 Josephson 2005, 403-406.
46 Hölscher 1941, 11-12, 38, 51, 53-55; Spencer 2011, 31-49; Spencer 2017, 37-52.

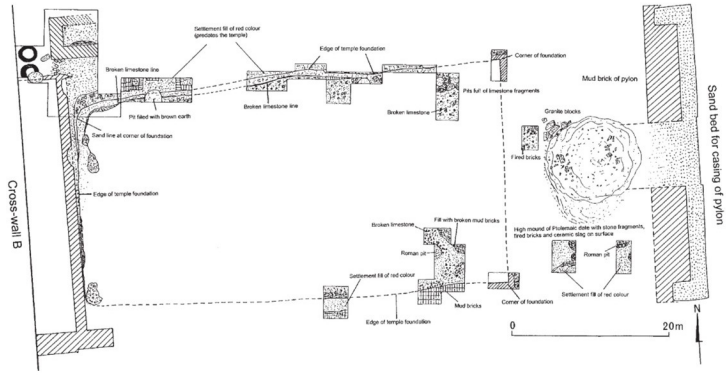

Fig. 10. Temple plan and sand beds at Tell Belim. (Spencer 2017, Fig.4).

Fig. 11. Sand bed foundations of the temple at Tell Belim (Spencer 2017, Pl. X.2).

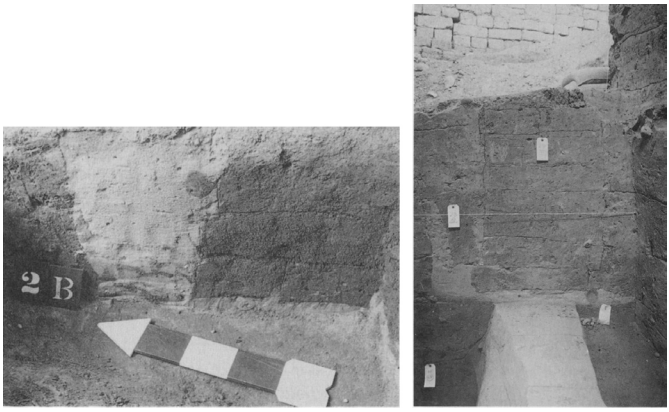

Fig. 12. Sand base layer and sand-filled foundations at Tell Jemmeh (Beek 1996, Figs. 6-7).

Preparing the foundation bed with sand has two purposes. On the one hand, the load is transmitted to the ground in one piece, so there is evenly distributed settling of the building weight and no stress concentration in the foundation. On the other hand, it functions as a seismic insulation system that absorbs earthquake shocks and allows the structure to slide on the sand relative to the moving ground during the earthquake. Almost beyond any doubt, the Egyptians knew very well the importance of preparing the ground foundation for a building. In any case, during the Middle Kingdom (late 3rd millennium BC to 17th century BC), sand barriers up to 80 cm thick were placed under the columns[47]. The thickness of the sand fill depended on the weight of the structure standing on it. In the city of Ramesseum in Upper Egypt, the thickness of the bedding under a heavy column was twice that under a traditional wall. The foundations under the massive columns named after the pharaoh Takhark in the courtyard of the Great Temple of Amon have an interesting design. The foundation pit for the column foundations was dug, and the foundation was filled with 10-20 cm thick sand beds. In general, the New Kingdom Age saw significant progress in establishing solid foundations. The foundations were deepened to 5-6 meters, and the traditional limestone was replaced with sandstone. Thus, the foundations were tried to be made more monolithic and were formed by assembling tightly placed large blocks

Placing sand under foundations was also used, especially in temples of the Ptolemaic period[48]. The black sand layer under the temple foundations of the Ptolemaic-Roman Period in Tell Timai (Fig. 15) is another example of the sub-foundation applications of this period[49]. Here, the depth of the stone foundations reflects the builders' and architects' ability to find a suitable ground surface on which to lay the foundations, as well as the ancient builders' awareness of ecological conditions. As mentioned above, reaching the base for foundations, blocks based on a commonly placed sand bed, is a feature of temples in the Late Period and Ptolemaic-Roman construction. During the excavations that were carried out next to the stone foundations, the last row of stones resting on a very thin sterile ground and a layer of black sand were identified. This fine sand layer was used both to level the ground horizontally and to strengthen the foundations.

An interesting example of this type of sub-foundation technique in its well-developed form is in Mendes[50], within a substantial sacred building dating to the mid-6th century BC. Here, in the absence of bedrock, this method ensures that

47 Petrie 1897, 11; Karakhanyan et al. 2010.

48 For the mythological and cultic meaning of the use of clay in Egyptian architecture, see Spencer 1979; Ritner 1993. In Egypt, the use of sand was associated with the primitive mound on which the first temple was built and was thought to have purifying qualities. Additionally, the role of sand in Egyptian and Mesopotamian founding rituals was important. See Weinstein 1973, 420-3, 434; Spencer 1979; Ritner 1993, 155; For Mesopotamian rituals, see. Ellis 1968, 10, 13-16; Ambos 2004, 78-79; Ambos 2013.

49 Bennett 2019, 220, Fig. 4.

50 Carpani 2014, 6.

the bearing pressure of the construction is evenly distributed over the alluvial soil. Since sand is a good drainage material, it prevents the settling of the building and significantly protects it from the destabilizing effect of annual floods. A similar practice exists in Tanis and Karnak[51]. Since the foundations on which the column base of the Great Hypostyle Hall in Karnak rested were seated on a sand bed, one of the columns fell sideways[52]. A similar situation also took place at the temple of Amenhotep in Luxor[53].

In short, it is understood that including sand layers in the foundations of buildings, especially temples, in Mesopotamia, Egypt, and even the Levant is ritualistic (to place votive materials) but, at the same time, an engineering project and preparation for the foundations of the building.

In addition, the geographical context in which these architectural traditions emerged and took root and the economy on which their societies were founded profoundly influenced building design. Economic activities based on maritime trade moved to other regions by constantly travelling throughout the Mediterranean basin, which was affected by a homogeneous and strong seismic hazard. This movement necessitated the development of the carpentry industry while allowing us to learn what solutions were used by other cultures. The solution to foundation problems against earthquakes has also been developed experimentally. This experimental approach, based on careful examination of building behaviour and material damage, constitutes the primary source for developing and identifying earthquake resistance solutions used by the Bronze Age cultures.

In Aegean Bronze Age architecture, it is seen that several antiseismic practices developed early, in recognition of the fact that earthquakes destroyed settlements[54]. Especially in Minoan palaces and villas and in the settlement of Thera-Akrotiri, lighter walls were superimposed on the stone walls built in the basement or ground floors. They built wooden frames in which stone and brick elements were integrated, using vertical, horizontal and transverse beams, and clay and plaster were later applied to them[55]. Particularly in Crete, great importance was given to preparing floor coverings for buildings. Even the most minor irregularities in the ground layer are completely smoothed or cut out. Depressions and crevices were filled with construction materials. Flat surfaces in the form of steps were created on the slopes where the buildings were built. A sand-gravel layer is placed between the ground layer and the building foundation. One of its functions was to distribute the foundation load evenly and absorb earthquake shocks. The most interesting

51 Legrain 1900, 121-140; Clarke – Engelbach 1990, 72.
52 Carpani 2014, 6, Fig. 8.
53 Carpani 2014, 6.
54 Tsakanika 2006.
55 Shaw 2009, 101, especially 170; Hnila 2021.

aspect of the Knossos palace is that the masonry is thoroughly reinforced with wooden beams in vertical and horizontal directions. This system made the wall monolithic and elastic so that it worked as a unified whole. Likewise, stone blocks and wooden beams were used to connect the walls, creating a unified closed system that made the building earthquake-proof. Another interesting aspect of this palace is its columns. They were wider at the top, narrower at the bottom, and looked unusually shaped. However, when thought carefully, it shows that this is a correct application. The beams are supported by the upper end of the column, and its end forms the column capital, corresponding to the load-bearing parts of the beams. A hinge is already formed at the column's base, allowing the column to operate so that it can be compressed rather than bent. The buildings of Knossos were at least three stories high. As a rule, the ground floor is built deeper into the ground and has a more significant number of longitudinal and transverse interconnected walls than the upper floors. All this provided a strong and reliable foundation for the upper floors.

Evaluation of all that evidence shows how widely these techniques have spread, not only on walls in Greece but also on infrastructures and foundations in Anatolia. The frequent occurrence of earthquakes in Mesopotamia, Anatolia or the Aegean region and especially the fact that Crete is located in the most active seismic region also prove that there are efforts in this direction. Accordingly, these regions have been devastated by frequent earthquakes. Even the Palace of Knossos shows that despite all the precautions and the earthquake prevention improvements used here, it was not enough to save the palace.

As can be seen, the construction techniques of the Bronze Age civilizations, especially the foundation and sub-foundation works, show that people actively struggled against the effects of earthquakes. Still, from then until our day, there has always been a problem with earthquake-resistant construction. This gap in knowledge and application continues. Nevertheless, the foundations of such a study were laid at that time. Studying and understanding these systems is both crucial and urgent, not only to advocate or preserve ancient traditions but also to learn from them. All these techniques create an environmentally compatible tangible heritage and are promising options for sustainability in the context of adaptation to earthquake geography. The aim is to produce earthquake-resistant construction through the use of local materials with little energy. This type of architecture can be a starting point for sustainable revitalization projects of extraordinary examples at risk of being lost, with the participation of local workers and artisans. Examining such real and accurate examples is essential, as they are much more transparent and more understandable in today's building construction. Such local cultural heritage elements represent the concrete expression of a tradition that has been refined over time in parallel with the disasters affecting our geography and region. As a result, it shows that the builders in the Bronze Age and later in the Mediterranean basin, mainly in Anatolia and Greece, where earthquakes were frequent, were aware of seismic behaviour and frequently encountered it.

FOUNDATIONS IN ANCIENT GREEK TEMPLES AND DIFFERENT BUILDINGS WITH CERTAIN INTERESTING DESIGNS

The influence of Greek thought and practice spread throughout Greece (the south of the Balkan Peninsula), as well as Hellenic cities and colonies along the Mediterranean coast, the Black Sea coastal region and Asia Minor. In the 4th century BC, the troops of Alexander the Great, king of Macedon, defeated the Persians in Egypt and Syria and established a series of Greek-eastern monarchies, extending the conquests eastward to India. With their influence spreading over such a wide area, it is clear that the Greeks not only introduced their culture and construction skills to other peoples but also absorbed all the helpful knowledge they learned in the conquered countries. What they didn't integrate was the dependence on mortar to connect the dome, vault, and walls. As will be stated, the newest and most costly technical applications were applied in the temples of the gods whose powers they feared. Despite these extensive sources of information in early civilizations, which frequently referred to natural disasters in texts from classical genres such as poetry and history, ancient societies appear to have lacked knowledge about the nature of catastrophic events. They often associate these natural disasters with gods or superstitions. For example, in Greek mythology, Zeus was responsible for droughts, and Poseidon, the god of the sea, was the creator of earthquakes[56]. Despite these false assumptions, ancient civilizations gradually developed solutions to reduce the destructive effects of the environment and end crises in their lives. Walls from structures that varied from defensive structures to bridges and temples are various examples of these efforts. With these structures that have been examined, adopted and developed, we have learned the seismic construction techniques of the Ancient Age[57].

Ancient Greek builders had their own theories of construction, including those of earthquake-resistant construction, which they followed by using or rejecting specific construction techniques that existed at the time. The best examples of this are seen in temples. The most striking element in Greek temples is the beam-column system, which is ductile and dominant in the Archaic and Classical periods. The load-bearing elements, namely the walls and columns, were provided by iron dowels and clamps closed with lead, as similarly attested in Egypt.

The fact that the ancient Greek builders tried to give enough flexibility to the structure of their unique temples is confirmed by the construction of their foundations. Foundations and load-bearing columns placed under the walls are separate elements. Accordingly, unequal settling of the foundations did not cause stresses in the building elements. Each architectural element is connected to the other. Reasons such as the light structure of the Ionic order, when compared to the Doric

[56] Grant-Hazel 2002, 441-443
[57] Stiros 1995, 725-736; Stiros 1996, 129-152.

order, krepis, and the thickness of the outer columns can be called innovations utilized against the damages of the earthquakes. Despite the flexible structure of the walls and columns, the weight of the superstructure is the main reason why temples collapse during earthquakes. However, tholos structures of the same culture are more perfect in terms of seismic stability than a rectangular structure. It can be said that the symmetry of round-designed structures is ideal. Foundations consist of closed deep rings designed separately under the outer columns and separately under the walls and inner columns.

Interestingly, the Greeks were aware of the importance of a solid foundation when building their earliest temples. The Temple of Hera at Olympia (6th century BC) was built on the bad alluvial ground carried by the river on the Peloponnesian peninsula. It was also built on a specially made platform due to the presence of groundwater close to the surface and frequent earthquakes. The Tegea Athena Temple in the Arkadia region (4th century BC) was also destroyed because they could not implement the earthquake-resistant improvements of the time. The reason is that even though the stones on the walls of the temple, which carry heavy loads, are connected, the building still has shallow foundations on the alluvial ground.

In ancient Greek engineering, placing sand, gravel or clay layers between the ground and foundation was a well-known method, as it was in Mesopotamia and Egypt. In fact, as stated, some of the Greek temples were protected by a basic insulation system. Thus, the structures could more easily cope with the problems arising from geotectonic movements. However, placing sand on building foundations and placing votive materials inside are also seen in Greek architecture (such as Ephesus, Delos, Akragas and Naxos). In these examples, sand was chosen for purification purposes, as in Mesopotamian examples. In fact, the coal used in the construction of the temple in Samos (Temple D), the ruins in the Pergamon Z building[58] and the frequent use of coal in constructions by Theodoros of Samos were all practices that had parallels in Mesopotamian rituals.

One of the best-studied examples of Greek engineering is the magnificent Doric building Athenaion at Paestum[59] (Fig. 16). It was built at the end of the 6th century BC. Deep excavations were made to reach the travertine bedrock into which the trenches were opened to lay the foundations under the columns and cella walls. These trenches on the bedrock were later filled with a 0.50 m thick layer of sand. The foundations were formed by laying large travertine plates measuring 1.85-2.35 m on the sand. A modern geotechnical analysis clearly shows that this foundation system is very well designed and is highly safe even in the event of a seismic load. As mentioned, this basic technique was used systematically not only at Paestum[60]

58 Radt 1994, 419-421.
59 Giuffrè 1988.
60 Pescatore – Viggiani 1991, 29-42.

(e.g., archaic Temple of Hera-550-540 BC), but also in the broader area, including Metapontum, where the earliest applications were found (e.g., Temple AI, 570-560 BC). The fact that both cities were Achaean colonies suggests that this basic practice was probably imported from the motherland, namely Greece[61].

The sand was also used in the foundations of structures such as the Artemision of Ephesus[62] and Samos Heraion[63], both built on marshy ground for earthquake protection.

The Temple of Artemis in Ephesus, one of the seven wonders of the Ancient World, which took one hundred and twenty years to build, also has an interesting infrastructure arrangement[64]. A swampy area was chosen for the location of the temple[65] (Fig. 13). On the other hand, to prevent the foundations of a large mass from resting on a loose and mobile bed, layers of coal were placed underneath, and fleece and wool were placed on top[66]. This anecdote may also have referred to a ritual performed before or during the temple's establishment. Because this expression also reminds us of the 'sacrifice of blessing'[67].

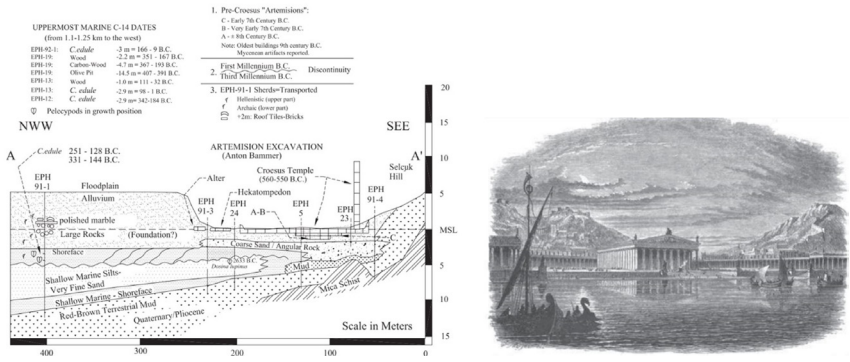

Fig. 13. left: Section of Artemisin according to excavations, (Kraft et al. 2007, Fig.5); right: Ephesus Temple of Artemis and harbor according to Falkener (Kraft et al. 2007, Fig. 7).

The precautions in these monumental temples were clearly taken against earthquakes. In particular, these layers of coal and wool are an early example of a seismic foundation isolation system. During the 6th century BC, Greek colonies on

61 Carpani 2014, 7.
62 Bammer 1984.
63 Kienast 1991; Kienast 2001, 38; Carpani 2017, 9.
64 Pliny, NH 2, 201, 36.95.
65 Kraft et al. 2007, 121-149.
66 Pliny, NH 2, 201, 36.95.
67 Schaber 1982, 19.

the west coast of Asia Minor had begun to build massive temples on a scale never before attempted in their major religious centres. The construction of Artemision started at the mouth of the Kraistos River between 550 and 540 BC. The sediments carried by the river, the swamp and the alluvial landscape formed due to frequent floods created technical problems that seemed impossible for engineers and architects in ancient times. Until then, foundation-laying methods were based on solid foundations that were constantly under the load-bearing elements (columns and walls). However, for the first time, a vast stone platform was built here, 112 m long, 57 m wide and approximately 1.15 m thick[68]. Accordingly, hundreds of tons of load on the temple superstructure are evenly placed on the foundations.

According to researchers, during the excavations, the 0.10-0.20 m thick clay layer mentioned by Pliny was discovered under the temple foundations[69]. This layer was spread evenly on the base and levelled. Ash and charcoal were detected at the bottom. Both clay and charcoal were chosen as waterproofing layers. It is noteworthy that the foundations are made of materials that are effective in preventing water ingress and also have shock absorbing properties. It is known from the statement of Diogenes Laertius (Lives II.103) that this feature of coal was well known in this period. The construction of the Heraion temple, whose chief architect was Theodoros, started a few years before Artemision (560-550 BC). Theodoros, who was also known in Ionia, probably suggested that this practice be carried out in Artemision.

Aside from the fact that Artemis of Ephesus was depicted with a mural crown on her head to protect the city in difficult times[70] and the relevant gods were worshipped to protect the ground and foundations against earthquakes[71], as in the improvements in the Roman Age prytaneion building[72], the Ionians knew that they had to deal with problems in a region where earthquakes were frequent[73]. However, they still built the temple in both the Archaic and Hellenistic phases in the same place rather than on a more solid ground. The reason for this is either religious or, as Pliny[74] stated, ground knowledge. Of course, Greek philosophers tried to

68 Bammer 1984; Bammer – Muss 1996; Carpani 2014, 7-8.
69 Hogarth 1908.
70 Rogers 2012, 6-7.
71 Rogers 2012, 237-238.
72 These so-called "Themelioi" gods may have helped guarantee the strength of the ground and building foundations against earthquakes. Rogers 2012, 305-306.
73 Perhaps in these difficult situations, they were pursuing beneficial knowledge rather than the gods. Such an approach to disasters like earthquakes or events that put society in trouble was not due to the lack of religiosity of the ancient people. On the contrary, it seems that the piety and pragmatic attitudes of the Ephesians and Ionians were a result of the general conditions of the harsh world in which the Ephesians operated. The Greeks and Romans had no choice but to resort to practical and beneficial action as their world was plagued by wars, droughts, earthquakes and plagues. For example, according to recent research, most people in imperial cemeteries around Rome died between the ages of twenty and forty, and very few people reached what we now consider middle age. see Catalano et al. 2001; Dysson 2010.
74 Pliny, NH 2.201, 36.95.

understand earthquakes[75] and interpreted them differently[76], the most interesting of which is that earthquakes are seen to be associated with large underground caves. Still, they must have seen the sedimentary layers as a precaution against the destruction caused by the earthquakes caused by underground forces. Despite this, we can discuss the foundation arrangement related to waterproofing rather than seismic problems. However, in the basic structure of the temple, clay is a solution, but wool alone is not the solution; it can perhaps be considered a binder. Thus, it is understood that the Ephesus Artemision was designed to float on muddy alluvial ground. However, some researchers argue that this idea is wrong[77].

In Samos, an Ionian colony, the Temple of Hera (Fig. 14) attracts attention with its enormous dimensions and by being built on swampy ground, like the Ephesus-Artemision. Geotechnical problems arose from the marshy ground here, too. Construction of the first major dipteral temple began around 575 BC under the direction of the Samian architects Rhoikos and Theodoros and was probably completed in 550 BC. As mentioned before, Theodoros further suggested placing a coal layer under the Artemision of Ephesus foundations. For this reason, he became famous as a genius of his time and went down in history as an 'expert in fundamentals'. However, shortly after the temple was completed, it was realized that its foundations were inadequate[78]. This is mainly due to the weight of the 12 m high columns and the roof standing on them, which creates severe pressure on the soil[79]. In the end, this pressure exceeds the carrying capacity of the soil by two times. Therefore, around 540-530 BC, the temple was dismantled and built approximately 40 m further west. This second dipteros, of even larger dimensions, was never finished, but the effort made in the foundations to increase the strength of the structure is remarkable. Here, the solid stone foundations consist of limestone slabs with a total height of 2.50 m and a width of 4 m at the bottom. This foundation rests on a 20 cm layer of gravel covering a 1 m deep trench filled with pure white sea sand (Fig. 14).

[75] Early historical records provide information on earthquakes dating back to 2000 BC. However, most of this information is of little value to modern seismologists. There are often exaggerated narratives about earthquakes. Some even attribute it to supernatural powers. However, some of the ancient philosophers such as Thucydides, Aristotle, Strabo, Seneca, Livius and Pliny, tried to express the natural causes of earthquakes within the earth by going beyond mythological narratives. In fact, Aristotle (ca. 340 BC) divided earthquakes into six types according to the nature of the place.

[76] Ammianus Marcellinus, 17.7.9; See also Guidoboni 1982, 42-53.

[77] Karwiese argues that the temple burned down after being struck by lightning. Karwiese 1991, 87-95; Karwiese 1995, 57-59; Herostratos was held responsible for the "crime" so that he would not be held responsible for Artemis' failure to protect her home. Knibbe proposes a different theory: The temple was demolished on the orders of the temple itself. Realizing that the old temple was sinking, the administration itself said that there was soft sand under its foundations and that a new temple should be built. "Angry" Herostratos was the fall man of the temple administration. Knibbe 1998, 88-89.

[78] Kienast 1998, 111-131.

[79] Kienast 1991, 125; Kienast 1998, 124-126.

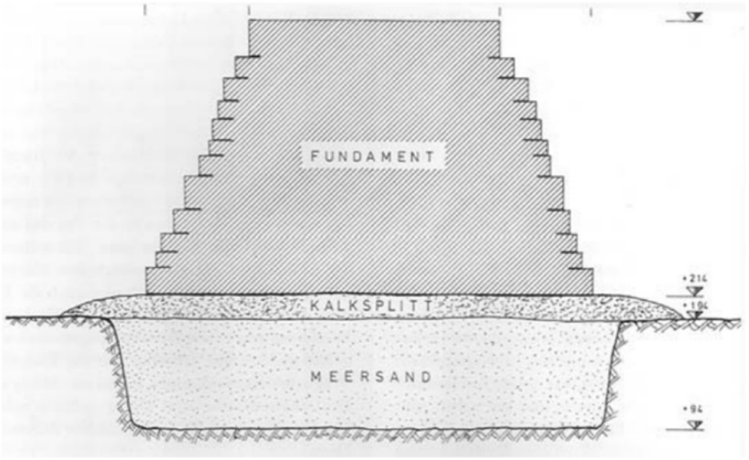

Fig. 14. Sand foundations of the Temple of Hera (phase III) in Samos. Schematic drawing (Kienast 2001).

Fig. 15. Black sand under the temple foundations of the Ptolemaic-Roman Period at Tell Timai (Bennett 2019, Fig. 4).

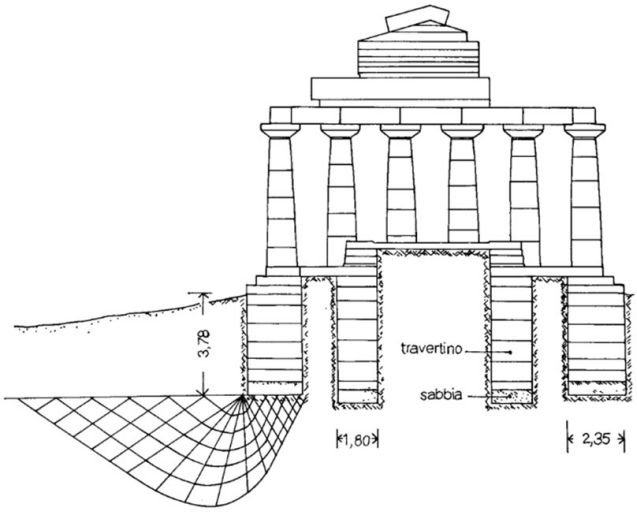

Fig. 16. Paestum Athenaion. Sand bed under foundations. (T. S. Pescatore–C. Viggiani 1991, Fig. 12).

Apart from the cults, another influence of Egypt on the architecture of Samos, along with dimensions and units of measurement, is the use of technically imported sand in the foundations. However, in Egypt, using sand in foundations was not only a construction method but also had cultic meaning. This idea is an essential element among the founding rituals in Egyptian architecture. It is unknown whether the foundation's failure in Samos was due to a gradual collapse process or a sudden disaster and possible seismic reasons. As a result, it is understood that the various materials such as clay and sand under the foundations of the temples of Samos and Ephesus did not come with alluvial floods, but were the result of a conscious application. Because the tradition of placing votive materials on the foundations, seen in Egypt, is also seen in Sardis, apart from Samos and Ephesus[80]. An extraordinary example of coal use in Sardis and the region can be seen above the ceiling of the Alyattes tumulus[81]. This application should be directly related to insulation. However, as in Ephesus and Samos, the use of sand, coal and ash in the foundations has both a ritual[82] and practical function.

The Temple of Apollo in Naxos, the Temple of Apollo in Bassae[83], the Temple of Athena in Troy/Ilion and the Temple of Zeus in Olbia[84] can also be added to that

80 Butler 1925; Gruben 1961; Hanfmann-Frazer 1975.
81 Ratté 1993, 3.
82 Sinn 1985, 132; Furtwängler 1984, 100.
83 Cooper 1996, 7-11; Carpani 2017, 10.
84 Wasowicz 1975, 89, 102, Fig. 69.

list. The famous Bassae Temple of Apollo (Fig. 17) was built in a remote area from the Arkadia mountains (today's northeastern Messenia) at an altitude of 1,130 m above sea level. It was built in the middle of the 5th century BC. The temple structure largely survives not only because of the location but despite the seismicity of the site. The temple's structural integrity testifies to its builders' ability to design and build an earthquake-resistant structure. Additionally, the temple is located on a hill, with poor, sloping ground, characterized by significantly weakened folded rock with low beds. The foundations were built with a mixed system of gravel soil held by retaining walls, with a mat foundation consisting of thick layers of limestone slabs and rock. This layer isolates the walls from the bedrock. The spread foundations of the columns were placed in this mass. Ancient builders placed a layer of soil of various thicknesses and densities between the *euthynteria* and the bedrock[85]. A clay layer was also found on the bedrock; in some places, the cracks on the bedrock were filled with the same clay. In fact, it caused the clay structure to deteriorate. According to the archaeological report, the successful survival of the temple is due to the quality of its foundations, which provide optimum pressure distribution, good drainage and a seismic foundation isolation design.

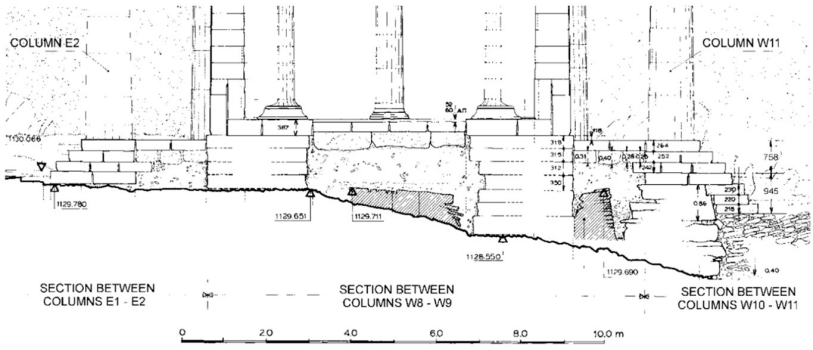

Fig. 17. Bassae Temple of Apollo Temple of Epikourios, section of the filling under euthynteria. (Papadopoulous 2010, Fig. 2).

Another example is the foundations of the temple of Athena in the city of Troy/Ilion, which had an antiseismic design on its walls in the Bronze Age[86] (Fig. 18). The foundations of the Hellenistic temple, situated at the top of the Troy mound, were built on a sand bed. Its construction started in the mid-3rd century BC. Since mounds like Troy are artificial hills, it is challenging to reach the natural solid ground; more precisely, it is not possible to reach until the bedrock. For this reason, ancient engineers, architects and builders built the temple on 5.40 m high massive

[85] Papadoupoulos 2010, 248-251; Figs. 2,17-18.
[86] Dörpfeld 1902.

foundations resting on a 3.70 m high sand bed. In this context, it can be said that there was a constant awareness in the city of Troy about loosening the bond between ground and structure from the Bronze Age to the Hellenistic Period.

A great example of developing technical innovation or technical skill and capacity can also be seen in the Greek colonies on the northern coast of the Black Sea. In particular, the excavations carried out in the ancient settlement of Olbia in today's Ukraine provide one of the most beautiful evidence of an imposing and original foundation application, the temple of Zeus. The city was founded by colonists from the Ionian city of Miletus at the end of the 7th century BC. While stone beds are not seen as frequent geological formations in and around this settlement, with unique geological features, clayey and loess soil beds are commonly attested[87]. Loess is known for turning into very fertile soil (it probably influenced the site selection of the city). Still, it is also the main reason for a very problematic foundation structure. Its most significant feature is that it causes crashes. Therefore, to increase durability, the place where the foundations will be built should not be saturated with water or should be kept away from moisture.

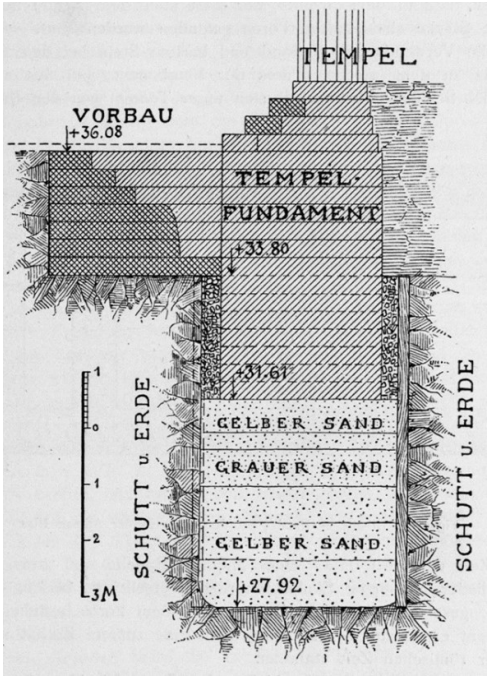

Fig. 18. Ilion Temple of Athena foundation, detail. Sand layers under foundations (Dörpfeld 1902, Fig. 85).

87 Wasowicz 1975, 25-26; Carpani 2014, 11-12.

In this geography, very skilful mitigating measures were taken to balance the moisture content, or rather to increase the structural durability of the foundations, and a new method for building foundations was developed starting from the early 4th century BC. This is the use of soil layers moistened with water, mixed with ash, and compacted[88]. Ash and coal were turned into a solid block, which, in the end, formed a waterproof coating. A continuous drainage system is also provided in the foundations. All structures in the city, such as temples, agora, walls, etc., were built on this foundation arrangement, which proved extraordinarily strong. This man-made base was often used in cases where the construction was planned on weak soils.

One of the examples of earthquake-resistant foundations is found in Pontikapea, another Black Sea Greek colonial city[89] founded in the 6th century BC. As has been stated previously, much attention was paid to the foundation by the builders of ancient times. In the city of Pontikapea, when building foundation structures, builders encountered complex ground conditions. They had to erect buildings on hill slopes formed by layered sandstone rocks that easily gave way to settling and slides. First, a row of gravel sand was laid. The rectangular-shaped limestones of the first row, placed along the edge, were fitted together precisely. The second row, consisting entirely of similar rectangles, was placed on top of the first row, but this time flat on the bed. The third and fourth rows of stone blocks were laid on a layer of small stones. Small stones in the joints between the blocks help the foundation blocks to share the monolithic load and ensure that the blocks slide relative to each other in the event of an earthquake, which reduces earthquake loads.

A different application in the same geography was used in Chokrak[90] (Fig. 20). In this town, on the shores of a bay of the Sea of Azov, the foundations of a large building that may have been a temple were excavated. The ruins of this structure indicate that, according to historical data, a severe earthquake occurred in this region in the 3rd century BC. First, a thick layer of sand was placed, and then medium-sized natural stones were laid, followed by foundation blocks on a flattened minor stone backfill. The purpose of such a structure is to distribute the load evenly and reduce the effects of earthquakes.

88 Wasowicz 1975, .89, 102, Figs. 69-70.
89 Noonan 1973, 77-81.
90 Barbat – Bozzo 1997, 155.

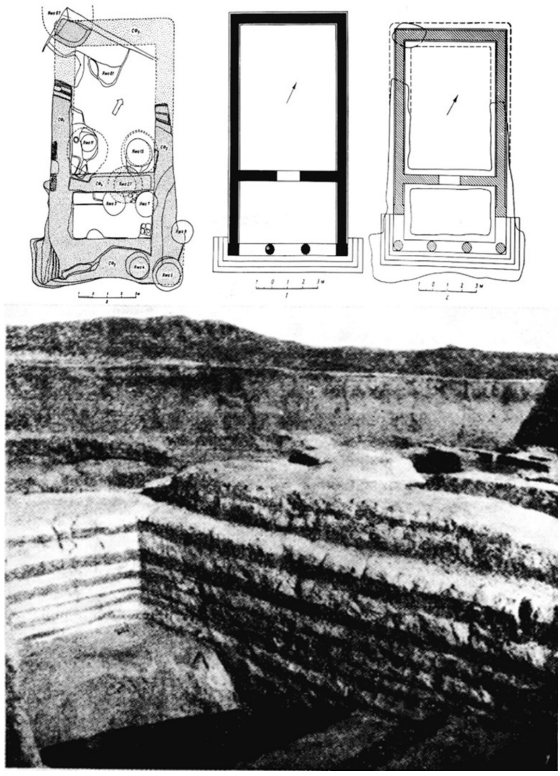

Fig. 19. Plan and foundations of the Temple of Zeus in Olbia (Wasowicz 1975, Figs.67-69; Carpani 2014, Fig. 20).

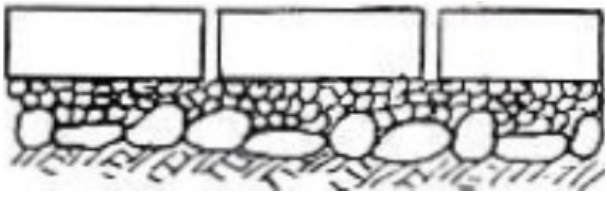

Fig. 20. Seismic insulation and foundation blocks from Chokrak (Kirikov 1992, Fig. 26).

As a result, there is clear archaeological evidence that different geographies such as the Middle East, Italy-Sicily, the Aegean and the Black Sea and the ancient cultures that prevailed in these regions developed an awareness of the problems arising from ground movements and the risks associated with them. Almost all of

this evidence was obtained from archaeological excavation sites, and some of it was obtained from ancient texts.

To sum up, ancient Greeks implemented various structural improvements to build earthquake-resistant structures, especially temples. They used only beam-column designs, which represent an earthquake-resistant development. Most of the temples have rectangular or round, symmetrical mass arrangements in accordance with their geometric symmetry. There are seismic stability zones at the lower and upper elevations. The base binding is made in the form of a stylobate consisting of large blocks of hard stone connected with metal fasteners. The columns are directly supported by the stylobate, the upper floor of the three-step krepidoma. In the upper section, the binding is made in the form of double beams connected by clamps extending from column to column, known as architraves. Another earthquake-resistant development is that its entire structure consists of stone blocks fitted together precisely and attached with metal clamps and dowels fixed in place with lead. The contacting surfaces of the blocks are fully finished to provide greater friction. Connecting the blocks in this way increases the strength of the entire wall, preventing local stress concentration and, therefore, damage. In contrast, the increased friction between the blocks reduces the shaking amplitude of the entire building. In addition, the most remarkable earthquake-resistant measures are the comprehensive compression of ground beds and foundations made in the form of separate foundation elements under vertical load-bearers.

The Eastern Mediterranean was under Greek influence or in contact with Greece from the 4th century BC, and Asia Minor from the 8th century BC. However, Asia Minor combined Greek art with Persian, Parthian and Sasanian influences, bringing it to a further stage. One of the predecessors of this unity is the Halicarnassus Mausoleum. In terms of its arrangement, it is very similar to the tomb of the Persian king Cyrus the Great (built in the 6th century BC). Cyrus, referred to in the Bible[91], says in his decree regarding God's Temple in Jerusalem: "Let the foundation be laid for the reconstruction of this temple for sacrifice. Lay three rows of large stones and one row of beams. Let its height and width be sixty cubits (about 27 meters). "Let the expenses be covered by the palace."[92]. A foundation similar to the one described in the orders given for the temple is also found in the tomb of Cyrus[93].

For the stability of the tomb, a small rectangular (in plan) burial chamber was raised on a six-stepped pedestal platform. All elements of this burial vault are made of large limestone blocks. The pyramid-like base, consisting of steps decreasing in area with height, has made this tomb resistant to all earthquakes for more than 2500 years. In other words, Cyrus's tomb meets all the earthquake-resistant cons-

91 Isaiah 45.1.
92 Ezra 5.6.
93 Motamedmanesh 2021, .9-16.

truction principles. These are the principles of strict symmetry, low centre of gravity, appropriate dimensions, and a total height not exceeding 11 meters, except perhaps for weight reduction. More precisely, this tomb also copied the ancient Iranian temple architecture[94] (Fig. 21).

The Halicarnassus Mausoleum did not meet seismic resistance principles. First, it is known as one of the Seven Wonders of the World, not only because of its fanciful architecture but also because of its size. Secondly, the main reason is that the peripteral fragile colonnades and cella walls could not support the high pyramid-like body of the ceiling, and the structure was too heavy. As a result, earthquake-induced loads and their effects overloaded the foundation and deep foundation. According to archaeological research, the monument was destroyed by an earthquake. As seen in these examples, everything is vital to complying with earthquake resistance principles. As a result, Persian written sources show that similar to Greek and Roman thought, the royal architects were also seeking healing technical information, even though they saw the source of the earthquakes that caused destruction differently. Examples from Northern Iran[95], where wood was used in foundations, also prove that this awareness was formed in the early period.

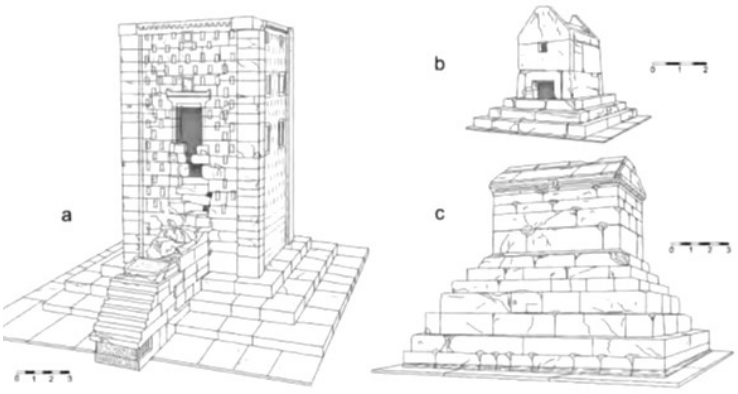

Fig. 21. Achaemenid structures sitting on a stepped podium: a. Pasargade, b. Bozpar, c. Kyrus' tomb (Motamedmanesh 2021, Fig. 2).

Diodorus of Sicily give another, more interesting preemptive example of these ancient sources[96]. According to him, Alexander the Great's magnificent hearse used a suspension system that did the job of the shock absorber system (actually not fully understood, but cleverly placed). Thanks to this system, the funeral-ceremony chariot, the work of Arrhidaeus, could travel through rough places without being affected by shocks.

[94] According to J.Boardman, Cyrus's tomb is of Lydian-Ionian origin in terms of architecture. Boardman 2000, 53-60.
[95] Nazidizaji et al. 2014, 63-82.
[96] History 18-27.3-4.

The ancient buildings located in the old city centre of Istanbul and still standing today reveal the existence of some engineering concepts that have been adapted to their structures from the past to the present. Apart from monuments such as Hagia Sophia, located in earthquake-prone regions such as Istanbul, the Theodosius and Örmetaş obelisks (Fig. 22) are different examples of these concepts and applications[97]. Both monuments show the existence of seismic methods used in the past and that they have damping properties by transmitting earthquake forces through isolation levels. The stone layers under the Örmetaş monument have such a mechanism. As stated before, this system was applied to the tomb structure of the Persian King Cyrus the Great in the 6th century BC. The Örmetaş monument is placed on a marble base superimposed on three layers of orthostat stone. These three layers of stone served to absorb the earthquake waves that intensify at the first moment and cause less movement to be transmitted to the superstructure. There are many examples using the three-step arrangement, primarily in ancient Greek peripteral temples, which were structures with tall columns. The reason behind the widespread use of three-layered stones can be explained by their durability even after many centuries and various earthquakes. Therefore, it is emphasized that such foundations are the key to earthquake protection. In this layered system, the earthquake waves approaching the structure are first partially damped between the three-layered mortarless stones and later changed direction, preventing the earthquake's shock transitions direct effects.

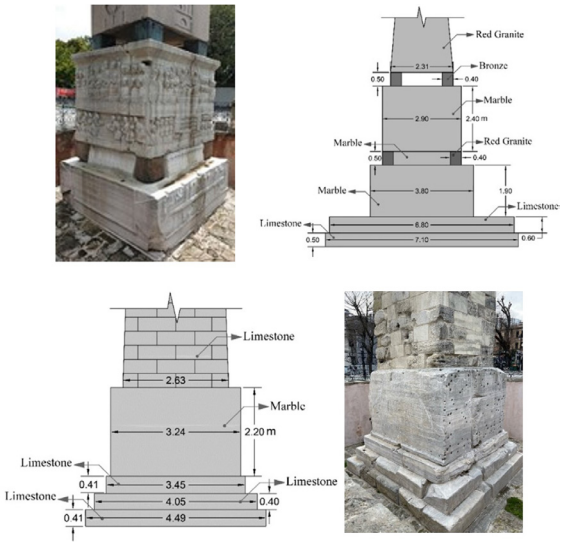

Fig. 22. Istanbul Obelisks. Upper: Theodosius Obelisk, bottom: Knitted Obelisk (Hoseyni et al. 2005, Figs. 2-4.).

97 Hoseyni et al. 2022, 1-32; Bayraktar et al. 2012, 1-9.

The main idea in all the examples is to perfectly anchor the foundations of the structures that will shake with the ground in an earthquake. It can easily be seen that such an effort existed in ancient times. However, from time to time, they tried not to fix the structures to the foundation, but generally, they did the opposite.

In short, the need to build monumental structures on unfavourable foundation grounds is seen in every period. However, even if they fail, they have contributed to the development of ingenious applications that demonstrate both a good understanding of the foundations against geotectonic movements and the capacity for innovation. What's even better is that many of the techniques and regulations practised and described in antiquity are consistent with today's know-how. For example, soil improvement techniques to control moisture content in the construction base and improve the bed capacity of soil and foundation materials are widely used today. Among these, laying sand or clay bedding and artificial layers under the foundations is reminiscent of foundation isolation, also seen in modern antiseismic techniques. These are activities to improve the earthquake performance of buildings. Thus, it confirms the robustness of many of the old methods described above, such as using pure sand layers and clay in the substructure, such as friction foundation insulation or soil liquefaction foundation insulation. In fact, not only the sand layer under the foundation but also the hydraulic insulation made to protect the walls from water and moisture is a seismic reinforcement. For this reason, a coating or a small drain is used to prevent water from entering under the wall and into the soil floor and filling the foundation. Although these interventions and applications may seem like small building elements, they play a significant role in a building's resistance to earthquake loads. In this sense, the earthquake resistance problem was solved by a series of structural techniques along with other multi-purpose measures. For example, a layer of sand placed under the foundation as a cushion can absorb earthquake shocks and additionally help to remove water from the structure.

Another problem is that the stronger and more solid the bond between the building and the shaking ground, the higher the earthquake loads occur in the building because the shaking is transmitted from the ground to the building more strongly. So, what will be the result of reducing these loads by weakening the bond between the ground and the building? For this purpose, various earthquake protection elements, such as sand layers and clay pillows, are used. This approach existed in ancient times and is actively used in many countries today, as it makes it possible to build affordable, effective and reliable earthquake-resistant structures. Perhaps it would be correct to call this current a passive earthquake protection system. This practice is the oldest method of protecting buildings from earthquakes. However, the Romans, who ruled the entire Mediterranean region, took the construction of buildings to a further stage with a building material of their own invention, a material that we call mortar (*Opus caementicium*).

CONCLUSION

From the Bronze Age until the Roman Period, it is seen that ancient engineers, architects, and builders first took into consideration the ground of the buildings and placed wood, sand, gravel or clay between the ground and foundations. Anatolian settlements provide sufficient examples of these practices. Similar foundation systems are seen in the Beycesultan and Acemhöyük palaces. In these examples, wooden logs were preferred in the foundations and between the ground and the foundation. The foundation timbers and the thick walls were designed and implemented to prevent tremors. Likewise, the presence of a thick layer of sand under the foundations of buildings in Egypt and Mesopotamia can be clearly stated in connection with a religious ritual. In Greek foundation engineering, numerous examples show some of the technical solutions used to confront geotectonic problems. Among these, the Artemision in Ephesus, one of the monumental archaic (6th century BC) temples on the western side of Anatolia and one of the Seven Wonders of the ancient world, and the Heraion in Samos, built in the same period, rest on ditches filled with clean sand. According to Pliny the Elder (NH. 36.95), who refers to an antiseismic solution, he states that the temple was built on marshy ground to protect it from earthquakes, and layers of coal and wool fleece were laid under the foundations to cope with the adverse conditions of the soft ground. Excavations have shown that a large foundation stone platform "floats" on a layer of clay mixed with coal. In other Greek temples, Paestum, a layer of sand was laid between the bedrock of the temple of Athena and its massive stone foundations. At Bassae, a different approach was used for the temple of Apollo, where a type of mat foundation consisting of thick limestone slabs and gravelly soil separated the platform from the bedrock. One of the most interesting examples of Greek temples comes from Olbia, a Greek colony on the northern coast of the Black Sea, produced with an exceptional technique. Local materials were used here in the temple of Zeus and other buildings dating back to the 4th century BC. Here, a new foundation-laying method was developed, consisting of layers of loess wetted and compressed alternately with ash and charcoal. A better example is the temple of Athena in Ilion, built on a 3.70 m high sand bed.

As a result, it is understood that the idea of loosening the bond between the ground and the structure and "separating the movement between the superstructure and the foundations" was known in ancient times. Although these technical solutions comply well with the basic principles of base insulation, this does not mean that early builders fully understood the potential antiseismic effectiveness of their techniques. Today, foundation insulation has been developed with a more innovative technology. However, it took over a century for this system to emerge as a mature and efficient technology, and it has not been implemented in many geographies. It can be accepted that the reason for this depends on the society's level of knowledge, priority needs, economic reasons, and technological and cultural de-

velopment level. In fact, the cultural structure of the society and its ability to accept innovations is an issue that resists for various reasons depending on economic, political and social factors. However, the best approaches are either to import the latest technology or to benefit from your geography's proven traditional approach and construction experience. It should be known that earthquakes are the main reason that creates our geography, and others depend on this. With this awareness, the needs and studies for the development of antiseismic methods in a constantly moving piece of land need to be understood and accelerated at least as much as the people of ancient times.

Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

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PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, Eylül 2024, 2 (4): 243-269

Nysa Antik Kenti Cam Örneklerinde Arkeometrik İncelemeler

Archaeometric Examinations of Glass Samples from Nysa Ancient City

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 24 Temmuz/July 2024
Kabul Tarihi/Accepted: 18 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 243-269

Atıf/Cite as: Torgan Güzel, E., Akyol, A. A., Polat, R. "Nysa Antik Kenti Cam Örneklerinde Arkeometrik İncelemeler" Propontica, 2 (4), Eylül 2024: 243-269.

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https://doi.org/10.56170/propontica.1521384

NYSA ANTİK KENTİ CAM ÖRNEKLERİNDE ARKEOMETRİK İNCELEMELER

ÖZ

Batı Anadolu'da bulunan ve Aydın ilinin Sultanhisar ilçesi yakınında yer alan Nysa antik kenti kazı çalışmalarında ele geçen cam buluntuların kimyasal içeriklerinin belirlenmesi amacıyla arkeometrik incelemeler gerçekleştirilmiştir. Anadolu'da cam üretimi ve teknolojisi ile ilgili çalışmalar oldukça sınırlıdır. Anadolu coğrafyasında bulunan cam örneklerin tarihçesi, durumu, üretim teknolojisi ve kimyasal kompozisyonunun belirlenebilmesi için örneklerin çeşitli analitik yöntem ve teknikler kullanılarak bilimsel olarak incelenmesi gereklidir.

Bu çalışmada, cam buluntuların öncelikle fiziksel durumları incelenmiş, kalınlıkları belirlenmiş, renkleri kromametrik olarak tanımlanmış ve fotoğraflanarak belgelenmiştir. Örnekler, polarize edilmiş enerji dağılımlı X-ışını spektrometresi (PED-XRF) ve enerji dağılımlı X- ışını taramalı elektron mikroskobu (SEM-EDX) kullanılarak incelenmiştir. Böylece örneklerin yapı ve kimyasal kompozisyonları tanımlanmıştır. Cam örneklerin üretim teknolojileri hakkında bilgiler için SEM ile dokuz ayrı cam örnek yüzeyinden farklı büyüklüklerde görüntüler elde edilmiştir. Bu görüntülerden cam örneklerin serbest üfleme, silindir üfleme ya da döküm teknikleri ile üretildiği belirlenmiştir. Kimyasal içerikleri olarak her iki analizde de düşük oranda SiO_2 belirlenmesine rağmen camların tipik bir silis-soda-kireç camı olduğu tespit edilmiştir. Aynı zamanda ergitici madde olarak sodaca zengin minerallerin (natron, sodyum karbonat, vb.) kullanıldığı saptanmış ve camların üretiminde aynı hammaddenin kullanılmış olduğu belirlenmiştir. Ayrıca, analiz edilen cam örneklerine renk veren maddenin Fe^{2+} ve Cu^{2+} iyonları olduğu saptanmıştır.

Anahtar Kelimeler: Nysa Antik Camları, Arkeometri, Karakterizasyon, PED-XRF, SEM-EDX.

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ARCHAEOMETRIC EXAMINATIONS OF GLASS SAMPLES FROM NYSA ANCIENT CITY

ABSTRACT

Archaeometric examinations were carried out to determine the chemical contents of the glass finds recovered during the excavations of the ancient city of Nysa, located near the Sultanhisar district of Aydın province in Western Anatolia.

https://doi.org/10.56170/propontica.1521384

In this study, the physical conditions of the glass samples were first examined, their thicknesses were determined, and their colors were defined chromametrically and documented by photography. The samples were examined using polarized energy-dispersive X-ray spectrometry (PED-XRF) and energy-dispersive X-ray scanning electron microscopy (SEM-EDX), thus identifying the structure and chemical composition of the samples. To obtain information about the production technologies of glass samples, images of different sizes were obtained from nine glass sample surfaces with SEM. From these images, it was determined that the glass samples were produced by free-blowing, cylinder-blowing or mold-blowing techniques. Although low amounts of SiO_2 were determined in both analysis methods, the glasses were determined to be a typical silica-soda-lime glass. At the same time, it was determined that soda-rich minerals (natron, sodium carbonate, etc.) were used as fluxes and the same raw material was used in the production of glasses. In addition, it was determined that the substance that gave color to the analyzed glass samples was Fe^{2+} and Cu^{2+} ions.

***Keywords*:** Nysa Ancient Glasses, Archaeometry, Characterization, PED-XRF, SEM-EDX.

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GİRİŞ

Anadolu'daki cam üretiminin tarihçesi, yapısal özellikleri, yapım teknolojisi ve üretim merkezleri oldukça az bilinmektedir. Bunun nedeni de bu konudaki sistematik çalışmaların azlığıdır. Bugüne kadar gerçekleştirilen sınırlı sayıdaki çalışmalarda cam buluntular görsel özellikleri üzerinden arkeoloji ve sanat tarihi yönleri ile incelenebilmiştir.[1] Anadolu'daki cam buluntuların yapım teknolojisinin anlaşılması, hammadde kaynaklarının belirlenmesi ve kimyasal içeriğinin tanımlanması amacıyla arkeometrik yönden ele alınması gerekmektedir.[2] Son yıllarda Roma, Bizans ve Osmanlı dönemlerine ait camlar arkeometrik yönden ele alınmaya başlanmıştır.[3] Uygulanan yöntemlerle arkeolojik ve tarihi camların hem üretim teknolojileri hem de kimyasal yapıları ve hammadde kaynakları hakkında bilgilere ulaşılmaya çalışılmaktadır.

Cam nesnelerin bozulmaları üzerine yapılan çalışmaların azlığının yanı sıra, camın hammaddesi ve çeşitliliği üzerine yapılan çalışmalar da oldukça sınırlıdır. Aynı döneme ait Levant ve Mısır camları çok iyi araştırılmışken, Anadolu camları ile bağlantıları kurulamamıştır. Bunun nedeni ise Türkiye'deki arkeolojik

1 Akyol – Kadıoğlu 2015, 29; Bakırer 1985, 61-67.
2 Aydın et al. 2015, 1; Akyol – Kadıoğlu 2015, 29.
3 Akyol et al. 2009; Akyol et al. 2012; Beşer et al. 2010; Rasmussen 2012.

kazılardaki işliklerin, arkeolojik buluntuların ve arkeometrik çalışmaların henüz bu konuya tam olarak hizmet edememesidir.[4]

Tüm malzemelerde olduğu gibi cam malzemelerde de bazı bozulmalar görülebilmektedir. Cam harmanının iyi karıştırılamadığında camda kırılma, çatlama ve leke oluşumu gibi bozulmalar gözlenebilmektedir.[5] Antik camların üretildiği andan bulunduğu ana kadar geçen süreçte bozulmalar meydana gelmektedir ve bu bozulmalar üç evrede incelenebilmektedir. Birinci evrede yani camın üretildiği andan itibaren maruz kaldığı bazı nedenlerden dolayı cam nesneler bozulmaya açık hale gelir. Camı oluşturan maddeler ve bu maddelerin oranları, ergime derecesi, fırın sıcaklığı ve fırın içerisinde kaldığı zaman bozulmada etkili olabilmektedir. İkinci evre olan toprak altında kaldığı süreçte bulunduğu toprağın yapısı, ortamdaki su, sıcaklık ve bağıl nem seviyesi, ortamdaki tuz ve/veya asitlerin varlığı, mikroorganizmaların varlığı, basınç, pH, vb. etmenler bozulmaya neden olabilmektedir. Üçüncü evre olan ve camın toprak altından çıkarıldıktan sonra başlayan süreçte ise gerekli önleyici koruma müdahalelerinin yapılmaması ve hatalı koruma ve onarım uygulamaları bozulmaya neden olan başka bir faktör olarak karşımıza çıkmaktadır. Bu bozulma türlerinden biri veya daha fazlası bozulma mekanizmasının hızını ve türünü değiştirebilmektedir. Cam malzemelerde görülen yüzey bozulmaları sedef oluşumu, matlaşma, süt beyazı/mine aşınma, çukur oluşumu ve yarık oluşumu olarak sınıflandırılabilmektedir.[6]

Boncuk ve bilezik gibi küçük cam objeler yapma yeteneğinin dünyanın bazı bölgelerinde MÖ 3000 yıldan beri var olduğu bilinmektedir, ancak MÖ 2. binyılda cam üretilmeye başlanmıştır.[7] Cam yapımının ilk olarak nasıl keşfedildiği kesin olarak söylenemez.[8] Cam genellikle işlevsel nedenlerden ziyade dekoratif amaçlar için kullanılmış ve çoğu zaman değerli taşların yerine geçmiştir. Camdan *yapay lapis lazuli* olarak bahseden eski Mezopotamya çivi yazısının kayıtları bulunmaktadır.[9] Cam yapımıyla ilgili yaygın bir teori olarak hammaddenin Orta Doğu'daki birincil atölyelerde veya merkezlerde üretildiği ve daha sonra Akdeniz'in diğer bölgelerine ve Avrupa'nın başka yerlerine ticaretinin yapıldığı yönündedir. Bu camlar, daha sonra çeşitli cam nesneler oluşturmak için ikincil atölyelerde de kullanılabilmektedir.[10] Filistin'de bulunan ve büyük ölçekli birincil cam üretimi için kullanılmış olabilecek bir dizi fırının kalıntıları bu söylevi desteklemektedir. Ayrıca, Levant'ın önemli bir cam kaynağı olduğundan bahseden antik coğrafyacı Strabon (MÖ 64) ve Romalı filozof Plinius (MS 23) gibi antik yazarların belgelenmiş kaynakları da bulunmaktadır.[11]

4 Akyol – Kadıoğlu 2015, 29; Bakırer 1985, 61-67.
5 Baykan 2014, 52.
6 Büyüksoy 2020, 2.
7 Henderson 2000, 52.
8 Luckner 1994, 79.
9 Henderson 2013, 9-10.
10 Huisman et al. 2009, 414.
11 Freestone 2009, 77; Huisman et al. 2009, 414.

Hammaddelerin ve özellikle cam örneklerdeki iz elementlerin analizi yoluyla, camın hangi kaynaktan üretilmiş olabileceği konusunda daha fazla bilgi edinilebilmektedir. Çünkü bu faktör coğrafya ve jeolojiye göre değişmektedir. Antik camın en karmaşık ve ustalıkla işlenmiş örneklerinden bazıları Mısırlılar tarafından yapılmıştır ve bu teknoloji muhtemelen Suriye'den Mısır'a getirilmiş olmalıdır.[12] Mısırlılar tarafından cam üretiminde kullanılan kumun yüksek bir demir içeriğine sahip olduğu bilinmektedir ve alkali kaynağı büyük ihtimalle ülkede bol miktarda bulunan natrondan ($Na_2CO_3.10H_2O$) gelmektedir.[13] Kısmen reaktif olan karbonatlar ve klorürler içeren natron veya trona ($Na_2CO_3.NaHCO_3.2H_2O$) ve diğer sodaca zengin mineraller, büyük evaporitik göllerden toplanmış ve antik çağda cam üretiminde kullanılmıştır. Plinius'a göre Romalılar, MÖ 1000 ve MS 1000 tarihleri arasında natronu tercihen *Mısır sodası* olarak yaygın şekilde kullanmışlardır. Bu dönemde Yakın Doğu'nun en önemli kaynağı olan Wadi Natrun'dan natron temin edilmiştir.[14] Natron bileşimi aynı bölgede bile değişkenlik gösterebilse de esas olarak karbonatlar, bikarbonatlar, sülfatlar ve klorürler gibi sodyum bileşiklerinden oluşmaktadır.[15]

Yüksek kaliteli cam üreten ve cam yapımına büyük katkı sağlayan bir diğer tarih öncesi uygarlık Roma İmparatorluğu'dur. Roma dünyası muhtemelen MÖ 63'ten başlayarak Suriye ve Mısır'ın fetihlerinden sonra camla tanışmıştır.[16] Hızlı ve ucuz cam üfleme yöntemini MÖ 50 dolaylarında geliştirenler de Romalılar olmuştur.[17]

Antik çağda yapay cam; silika, kireç ve bir alkali olmak üzere üç gerekli bileşenden oluşmaktadır.[18] Bu camlar silis-soda-kireç camları olarak adlandırılmaktadır. Bilimsel bir bakış açısından, antik camın bileşimi tipik olarak yaklaşık %73 SiO_2, %22 Na_2O ve %5 CaO element bileşimine sahip bir soda-kireç camıdır.[19] Ek olarak cam, kasıtlı veya kasıtsız olarak çeşitli renklendirici maddeler veya opaklaştırıcılar içerebilir. Bazen toplam erime noktasını düşürmek için kırık cam parçaları da eklenmiştir.[20] Bu bileşenler 1300-1500°C arasında ısıtıldığında camı oluşturur. Partideki en yüksek miktara sahip olan silika, kumun, ezilmiş kuvarsın veya ezilmiş çakmaktaşının ana bileşenidir. Eski cam yapımcıları kumu deniz kıyısından veya nehir yataklarından tedarik etmişlerdir.[21]

12 Tait 1991, 26.
13 Lambert 1997, 110; Henderson 2000, 26.
14 Verità et al. 2002.
15 Jackson et al. 2016.
16 Lambert 1997, 110.
17 Renfrew – Bahn 2004, 345.
18 Goffer 2007, 124; Wight 2011.
19 Aerts et al. 1999; Arletti et al. 2006; Degryse – Schneider 2008; Fermo et al. 2016; Foster – Jackson 2009; Goffer 2007; Gratuze – Janssens 2004, 665; Sayre – Smith 1961; Silvestri et al. 2005; Verità 2004.
20 Goffer 2007, 124.
21 Wight 2011.

Cam, birkaç nedenden dolayı işçiliği zor bir malzeme olarak bilinir. Birincisi, ihtiyaç duyduğu ana hammadde olan kum, kaynağın topografik bölgesine bağlı olarak çok farklı ve değişen miktarlarda mineral ve kaya parçacıklarından oluşabilmektedir.[22] Farklı kaynaklardan gelen camların birbirine eklenmesi ve karışıma eklenen cam kırıntısı olarak bilinen herhangi bir renklendirici veya kırık camın etkisinin de işlemi daha da karmaşık hale getirme olasılığı bulunmaktadır.[23] Herhangi bir cam örnekte, tüm bu potansiyel değişkenler kaynağının bulunmasının zor olduğunu gösterir. Diğer bir neden de, erimiş camın genellikle içinde bulunduğu herhangi bir kabı kısmen akıtarak daha fazla safsızlık getirebilmesidir.[24]

Antik cam örnekleri üzerinde çok sayıda arkeometrik çalışmalar yürütülmüştür. Bu çalışmalar hem cam örneklerinin üretim teknolojisini tespit etmede yardımcı olurken hem de kullanılan hammaddelerin ve olası cam üretim merkezlerinin hangi bölgelerde yapıldığını anlamamıza olanak sağlamaktadır.[25]

Camların kimyasal yapısı X-Işını Fluoresans Spektroskopisi (XRF) yöntemiyle aydınlatılabilmektedir.[26] XRF analizi, söz konusu malzemedeki atomların bir birincil X-ışınları demeti ile iyonlaşmasına dayanan kalitatif ve kantitatif analiz yöntemidir. Malzeme tarafından yayılan karakteristik radyasyonu analiz ederek, mevcut elementlerin varlığını ve miktarını sayısal olarak belirlemek mümkündür.[27] Yalnızca kum ve eritici maddeler gibi ana hammaddeleri değil, aynı zamanda renklendirici ve opaklaştırıcı gibi katkı maddelerini de tanımlamak için kullanılabilmektedir. Bu da cam üretiminde kullanılan teknoloji hakkında bilgi sağlayabilmektedir[28]. XRF cihazının farklı konfigürasyonlarından biri de Polarize Enerji Dağılımlı X-ışını Floresansı (PED-XRF)'dır.[29] Polarize X-ışını radyasyonunda, örnek doğrusal polarize X-ışını ile uyarılır ve örnekten sadece floresans radyasyonu yayılır, örnekten herhangi bir birincil radyasyon saçılmaz. Floresans radyasyonu, dedektöre uygun pozisyonda ulaşır. PED-XRF yönteminde ışın, saçılımlı ışın ve floresans ışın, birbirleriyle dik açılarda tasarlanmıştır.[30] Polarize ışın, örneğin yapısındaki elementlerin karakteristik X-ışınlarını uyarmak, örnekten saçılmayı azaltmak için kullanılır. Polarize olmayan radyasyonun aksine, spektral arka plan oldukça düşüktür. PED-XRF çok elementli analiz kabiliyetini düşük tespit limitleri

22 Wilson – Pollard 2005, 513.
23 Pollard – Heron 2008, 183.
24 Wilson – Pollard 2005, 513
25 Brems – Degryse 2014; Degryse v Schneider 2008; Freestone et al. 2000; Freestone 2003; Freestone et al. 2003; Ganio et al. 2012; Henderson et al. 2010; Jackson 2005; Nenna 2014; Paynter 2006; Schibille et al. 2017; Wedepohl – Baumann 2000.
26 Johnson et al. 1999; La Tour 1989; Pollard – Heron 1996; Shackley 2011.
27 Janssens 2004, 129.
28 Stuart 2007, 238.
29 Lipták 2003, 1345; Mantler – Schreiner 2000, 3-4.
30 Stephens – Calder 2004, 90-95.

ve minimum örnek hazırlığı ile birleştirmektedir.[31] Antik camların PED-XRF ile analiz edilmesine dair literatürde birden fazla çalışma raporlanmıştır.[32]

SEM-EDX hafif elementler içeren iletken olmayan malzemenin kantitatif mikro analizini yapabilmesi nedeniyle sıklıkla tercih edilmektedir. Yöntem, yaklaşık % 0,1'den daha yüksek derişimlerde camdaki elementlerin sodyuma kadar yarı kantitatif analizine izin vermektedir. Genellikle, temel ve az elementlerin belirlenmesi için SEM-EDX kullanılabilir, ancak eser elementleri belirlemek için çalışmanın daha hassas bir yöntem ile desteklenmesine ihtiyaç vardır.[33] SEM-EDX yöntemi kullanılarak antik cam örnekler üzerine rapor edilmiş birçok çalışma bulunmaktadır[34] ve bu yöntem halen en çok kullanılan yöntemlerin başında gelmektedir.

NYSA ANTİK KENTİ VE CAM ÖRNEKLEMELERİ

Nysa Antik Kenti, Aydın ilinin 30 km doğusundaki Sultanhisar ilçesinin yaklaşık 3 km kuzeyinde yer almaktadır. Kentte yürütülen kazı ve araştırma çalışmaları sonucunda kentin Hellenistik, Roma ve Bizans dönemlerinde yerleşim gördüğü tespit edilmiştir.

Nysa, Mesogis (Aydın-Cevizli) Dağı'nın güney yamacında, Meandros (Menderes) Nehri'nin kuzeyinde yer almaktadır (Fig. 1, 2). Dağlardan gelen sel sularının oluşturduğu derin bir vadi üzerine kurulmuş olan kent, vadinin iki yakasına yayılmaktadır. Doğu ve batı yakadaki yerleşim alanları arasındaki bağlantıyı Roma İmparatorluk Dönemi'ne ait üç adet köprü sağlamaktadır. Karia Bölgesi'nde, Asia Eyaleti'nin önemli kentleri arasında sayılan Nysa ad Maeandrum'u döneminin ünlü coğrafyacısı Strabon (MÖ 64 – MS 24) Geographika-Coğrafya adlı eserinde çift yakalı kent olarak tanımlamaktadır. Kentin tarihçesi, yapıları ve Nysa Gymnasium'unda eğitim veren ünlü kişileri sayarken Strabon, kendisinin de gençken Aristodemos'un tüm derslerine Nysa'da devam ettiğinden söz etmedir.[35]

[31] Kramar 1999
[32] Akyol et al. 2009; Akyol et al. 2012; Akyol et al. 2014; Akyol – Kadıoğlu 2015; Akyol-Erten 2016; Akyol – Kadıoğlu 2017; Akyol – Kadıoğlu 2021; Akyol et al. 2021; Büyüksoy et al. 2021; Büyüksoy et al. 2023; Akyol – Koçak 2024.
[33] Wagner et al. 2008, 416-421.
[34] Aydın et al. 2015, 2; Knappet et al. 2011, 219-232; Kursula 2000, 111-118; Shortland – Eremin 2006, 581-603.
[35] Diler – Öztaner 2021, 185.

Fig. 1: Nysa antik kentinin bugünkü Türkiye sınırları içinde konumu[36]

Fig. 2: Nysa antik kentinin kuşbakışı görünümü.[37]

Antik dönemde yoğun olarak kullanılan önemli bir ana yol, Anadolu'nun iç bölgelerinden gelerek Nysa'dan geçmekte ve buradan Karia ve İonia Bölgeleri'nin diğer kentlerine ulaşmaktadır. Dolayısıyla kent önemli ulaşım ve ticaret yolları üzerinde bulunmaktadır.[38]

Antik kentte gerçekleştirilen kazı ve araştırma çalışmaları sonucunda, kalıntıları açığa çıkarılan yapıların tamamına yakını Roma ve Geç Roma Dönemi'ne ait-

[36] https://www.haberlerturkiye.com.tr/turkiye-haritasi-siyasi-renkli-turkiye-nin-illeri-haritasi-sehir-isimleri-listesi/37267/.
[37] Diler – Öztaner 2021, 186.
[38] Öztaner 2022, 230.

tir. Kentin kuruluş dönemine ait Hellenistik Dönem yapıları, kentte ağırlıklı olarak görülen Roma ve Geç Roma Dönemi mimarisinin altında kalmıştır. Geç Roma ve Bizans Dönemleri'nden MS 13. yüzyıla kadar, kentte yaşamın devam ettiği ortaya çıkarılan kalıntılardan anlaşılmaktadır. MS 13. ve 14. yüzyıllarda Aydın Bölgesi'ne Selçuklular ve Anadolu Beylikleri'nden Menteşe ve Aydınoğulları Beylikleri hâkim olmuş, 15. yüzyıldan itibaren ise Nysa terk edilerek, güneyindeki günümüz modern yerleşimi olan Sultanhisar'da yaşanmaya başlanmıştır.[39]

Nysa antik kenti, 20. yüzyılın başlarında birçok araştırmacının ilgisini çekmiş bir kent olmuştur. Alman Walther Von Diest 1907 ve 1909 yılları arasında, arkeolog ve haritacılardan oluşan bir ekiple Nysa'da kazı ve araştırma çalışmalarını sürdürmüş, ardından 1921 yılında Yunanlar tarafından alanda çalışmalar gerçekleştirilmiştir. İzmir Arkeoloji Müzesi, 1960'larda Gerontikon ve Tiyatro'da kazı çalışmaları yürütmüş, Aydın Arkeoloji Müzesi de 1980'li yıllarda Tiyatro'nun sahne binasında kısa süreli çalışmalar gerçekleştirmiştir. 1990 – 2010 yılları arasında, Nysa'daki araştırma, kazı ve restorasyon çalışmaları, Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Arkeoloji Bölümü Öğretim Üyesi Prof. Dr. Vedat İdil'in başkanlığını, Prof. Dr. Musa Kadıoğlu'nun başkan yardımcılığını yürüttüğü ekip tarafından gerçekleştirilmiştir. 2012 yılından itibaren ise çalışmalar Aydın Arkeoloji Müzesi başkanlığında, Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Arkeoloji Bölümü Öğretim Üyesi Doç. Dr. Serdar Hakan Öztaner'in bilimsel danışmanlığında gerçekleştirilmektedir.

2007-2008 yıllarında yapılan arkeolojik kazılarda Nysa'daki başlıca yapı kalıntıları arasında yer alan agoranın kuzey portikosundaki alanın, sonradan basit duvarlarla yan yana 4 ayrı mekâna ayrıldığı belirlenmiştir.[40] Bu mekânlardan ele geçen arkeolojik buluntular ve mimari kalıntılar, mekânların işlik ve depolama alanları olarak kullanıldığını göstermektedir. 1. ve 3. mekânlarda yapılan kazılarla belirlenen taş döşemeli tabanın üzerinde, yoğun miktarda pencere camı parçaları ile çeşitli formlarda yapılmış cam kâse, ayaklı kadeh ve kandil parçaları bulunmuştur. Bu mekânlarda bulunan cam çekirdek parçası ve cam cüruflarının yanı sıra her iki mekânda da dörtgen formlu ve ocak kalıntılarının varlığı bu iki mekânın cam üretiminde kullanıldığına dair önemli verileri oluşturmaktadır. Cam kaplara ait parçalar (Fig. 3a) ile yine aynı tabakadan bulunan Geç Roma Dönemi'ne tarihlenen pişmiş topraktan günlük kullanım kapları ile *sigillata* örnekleri ve Geç Roma Dönemi *unguentarium*'larına ait parçalar (Fig. 3b) ile bu mekânların yaklaşık olarak MS 6-7. yüzyıllarda cam işliği olarak kullanıldığını göstermektedir (Fig. 3c, d).[41]

[39] İdil – Kadıoğlu 2009, 500-501; İdil et al. 2010, 271-272.
[40] İdil – Kadıoğlu 2009, 502-503; İdil et al. 2010, 272.
[41] İdil et al. 2010, 272-273.

Fig. 3: Nysa antik kenti **(a)** cam buluntuları, **(b)** Geç Roma Dönemi pişmiş toprak buluntularından *unguentarium*'lar**, (c)** ve **(d)** cam buluntu yerleri (Agora 4. dükkân).

MALZEMELER VE YÖNTEMLER

Cam Örnekler

Nysa antik kenti kazısından etütlük olarak ayrılmış 9 adet cam örnek (Fig. 4) üzerinde arkeometrik incelemeler gerçekleştirilmiştir. Çalışma boyunca örnekler öncelikle görsel olarak değerlendirilmiş, fotoğraflanarak belgelenmiş ve her bir örnek ayrı ayrı kodlanmıştır. Ayrıca, cam örneklerin kalınlıkları bir dijital kalınlık ölçer kullanılarak belirlenmiştir (Tablo 1).

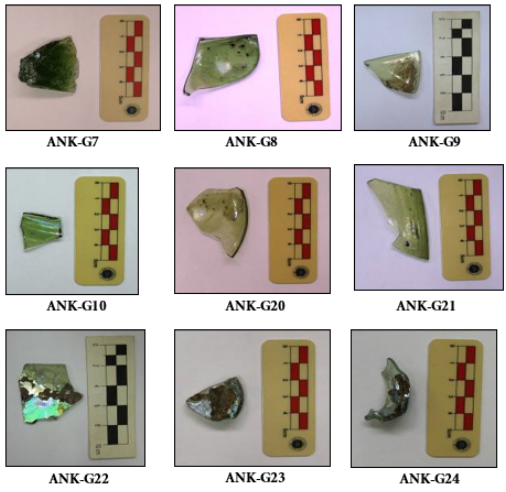


Fig. 4: Nysa antik kenti cam örnekleri.

Tablo 1. Nysa antik kenti cam örneklerinin özellikleri, kalınlıkları ve renk değerleri.

Örnekler	Açıklamalar	Lokasyon	Örnek Formu	Kalınlık (mm)	Görünen Renk	Renk Koordinatları		
						L*	a*	b*
ANK-G7	Chunk glass	Agora 4. dükkân	Üretim	amorf	koyu yeşil	13,08	-13,09	13,56
ANK-G8	-		Form	3,52	yeşil	52,30	-22,72	34,56
ANK-G9	-		Form	2,52	sarı-yeşil	71,50	-11,58	24,52
ANK-G10	Gövdesi kaburgalı parça		Form	3,53	yeşil	53,58	-24,27	34,04
ANK-G20	Kase parçası		Form	2,00	yeşil	69,49	-14,08	21,66
ANK-G21	Yuvarlatılmış ağızlı parça		Form	3,42	yeşil	65,85	-15,71	21,43
ANK-G22	-		Form	3,47	yeşil	74,82	-16,85	20,43
ANK-G23	Tüp biçimli halka kaide		Form	5,78	yeşil	66,59	-20,33	26,17
ANK-G24	Üretim artığı		Üretim	amorf	yeşil	70,06	-18,22	13,60

Renk Ölçümü

Renk analizleri, standart CIEL*a*b* (Commission Internationale de L'Eclairage) renk sistemi kullanılarak yapılmıştır. CIEL*a*b* renk uzayına göre; 0 ile 100 değerleri arasında değişen (L*) değeri rengin açıklık/koyuluk değerini (beyaz: 0 ve siyah: 100), (+a*) değeri renkteki kırmızı yoğunluğunu, (-a*) değeri rengin yeşil yoğunluğunu, (+b*) değeri rengin sarı yoğunluğunu ve (-b*) değeri de rengin mavi yoğunluğunu göstermektedir[42] (Tablo 1). Bu çalışma için Pro System III yazılıma sahip ColorQA PocketSPEC CIEL*a*b* spektrofotometresi kullanılmıştır.

SEM-EDX

SEM-EDX yardımıyla yapılan görüntüleme ve elementel analizler ile bu analizler için örnek hazırlama süreci Turkish Cultural Foundation (TCF), Cultural Heritage Preservation and Natural Dyes Laboratory (DATU Laboratuvarı)'nda gerçekleştirilmiştir.

[42] Ohno 2007, 101-132.

Örnek Hazırlama

SEM-EDX ile analizler 15 ve 20 keV enerji seviyelerinde ve yüksek vakum altında gerçekleştirilmiştir. Yüksek vakum altında çalışılacağı için cam numuneler analiz sonucunu etkilemeyecek şekilde karbon bir banda yapıştırılarak numune tutucuya sabitlendirilmiştir. Cam örneklerin yüzeylerinden görüntülerin yüksek çözünürlükte elde edilebilmeleri için tüm örnekler karbon ile kaplanmış ve görüntüler ikincil elektron (SE) dedektör kullanılarak elde edilmiştir. Örnekler üzerindeki karbon kaplamanın elementel analiz sonucuna etki etmemesi için karbon elementi tüm analiz sonuçlarından ihmal edilmiştir (Tablo 2).

Cihaz Donanımı

Bu çalışmada, TESCAN VEGA3 SBU Easy probe markalı, Bruker X-Flash 410-M dedektör uyumlu (Yazılım: Esprit 1.9) EDX detektör ile BSE ve SE dedektörlere sahip bir taramalı elektron mikroskobu (SEM-EDX) kullanılmıştır. Ayrıca elektron kaynağı olarak termiyonik emisyonlu tungsten lambalı bir filaman kullanılmıştır. EDX dedektörü sayesinde elementel analizler atomik ve ağırlıkça yüzde olarak yarı kantitatif olarak elde edilmiştir. Kalitatif mikroanaliz, çok elementli bir malzemedeki her bir elementin konsantrasyonunun eşzamanlı olarak belirlenmesine olanak tanıyan ve matriks etkisinin düzeltilmesine dayanan ZAF yöntemi kullanılarak gerçekleştirilmiştir. Bu yöntem, sırasıyla elektron penetrasyonunun bileşimi ve derinliği tarafından üretilen X-ışını yoğunluğu düzeltmesini, absorpsiyon düzeltmesini, floresans düzeltmesini ve ikincil floresans yoluyla her bir elementin atom numarası etkisini sağlamaktadır.

PED-XRF

PED-XRF yardımıyla yapılan elementel analizler ve bu analizler için örnek hazırlama süreci Ankara Üniversitesi, Yer Bilimleri Uygulama ve Araştırma Merkezi (YEBİM)'nde gerçekleştirilmiştir.

Örnek Hazırlama

Analiz için en az 1,5-3,0 g ağırlığa sahip etütlük cam örnekler agat havan kullanılarak toz haline getirilmiştir. Toz halindeki örnekler 32 mm'lik disk peletler haline getirilmiştir. Daha sonra her bir disk XRF analizinde kullanılan reçine ile karıştırılarak PED-XRF'in örnek bölgesine yerleştirilmiş ve analizler gerçekleştirilmiştir. Analizde USGS (United States Geological Survey) standartları kullanılmış ve GEOL, GBW-7109 ve GBW-7309 referans alınmıştır.

Cihaz Donanımı

Bu çalışmada, X-LAB 2000 model PED-XRF spektrometresi kullanılmıştır. PED-XRF yıkıcı bir analiz yöntemi olmakla birlikte bilgilendirici bir analiz tekniğidir. X-Lab 2000 PED-XRF spektrometresi atom numarası 11 olan sodyumdan (Na), 92 olan uranyuma (U) kadar olan elementleri analiz edebilme özelliğine sahiptir. Cihazın duyarlık sınırı ağır elementlerde 0,5 ppm ve hafif elementlerde ise 10 ppm kadardır. PED-XRF analizi, yüksek sıcaklıklarda (950°C) ağırlık kaybına bağlı olarak kaybolan bor, lityum ve flor dışında, incelenen cam örnekleri karakterize eden tüm kimyasal bileşenlerin belirlenmesine olanak sağlamıştır.

BULGULAR VE DEĞERLENDİRME

Nysa antik kentinde yapılan kazılar sırasında ele geçen cam örnekler arkeometrik yönden incelenmiştir. Bu çalışmada, fiziksel olarak incelemede CIEL*a*b* spektrofotometresi ve kalınlık ölçerden faydalanılırken, kimyasal analizler için X-ray spektroskopisi yöntemlerinden SEM-EDX ve PED-XRF yöntemleri kullanılmıştır.

Renk Ölçüm Sonuçları

İnsan gözü rengi tam olarak ölçemez, ancak renk tonları arasındaki farklılıkları belirler. Bu farklılıkları renk ismi olarak ifade etmek özneldir, ancak numuneler arasında renk farklarının değerlerle ifade edilmesi[43] tüm renkli malzemelerde olduğu gibi cam malzemelerde de oldukça önemlidir. Bulunan antik cam örnekleri tekstil, kâğıt veya diğer bazı malzemeler gibi düz olmadığından ve saydam yapıda olduğundan ölçüm yaparken (cihazın konfigürasyonundan dolayı) renk kaybı yaşanılabilir, ancak çok sayıda cam örneklerin renk değerlerini karşılaştırmak için renk ölçüm sonuçları gerekli ve önemlidir. Renk ölçüm sonuçları ile insan gözünün gördüğü çoğu renk birbirleriyle uyumludur.

Bu çalışmada, cam örneklerin renkleri kromametrik olarak analiz edilmiş ve renk değerlerinden örneklerin yeşil renk ve tonlarına sahip olduğu belgelenmiştir (Tablo 1). Renk ölçümünde parlaklığın veya renk açıklığının ifadesi olan L* değeri, renk koyulaştıkça azalmakta, açıldıkça yükselmektedir. Örnekler içinde en koyu renkli olan ANK-G7 örneğinin L* değeri diğer tüm örneklerden daha düşük değerde bulunmuştur. (-a*) değeri yeşil rengi ifade etmekte olup, tüm örneklerin a* değeri incelendiğinde negatif (-) değerde olduğu tespit edilmiştir (Tablo 1). Cam örneklere ait temel renk değerlerinin (L*, a* ve b*) karşılaştırılabilmesi için Fig. 5 grafiği oluşturulmuştur.

[43] https://www.blabmarket.com/blog/icerik/renk-olcumu-nedir-kolorimetre-nasilcalisir?srsltid=AfmBOoq0WoZOxQJLCEV9ImiE819ZY6QKtJ2dEJyBQ6BYFdPIpkewKE-b

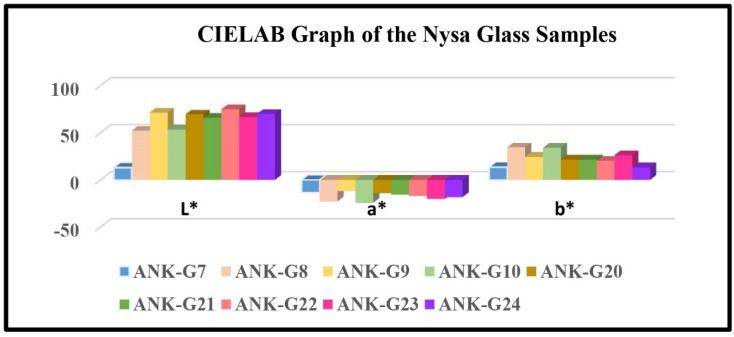
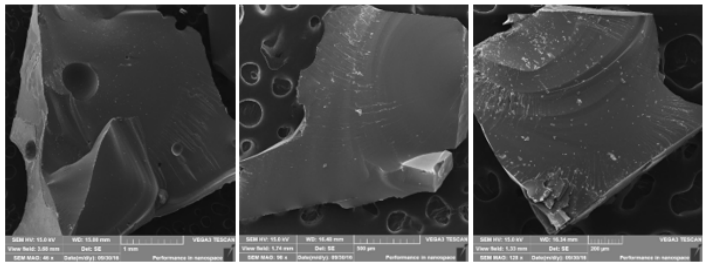


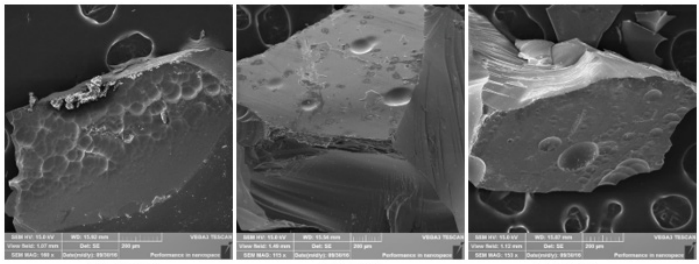
Fig. 5: Cam örneklere ait renk değerlerine ait grafik.

SEM-EDX SONUÇLARI

SEM-EDX yöntemi kullanılarak cam **örnek**lerin hem SEM altında üretim yöntemleri hem de elementel analizler gerçekleştirilerek kimyasal kompozisyonu belirlenmeye çalışılmıştır. Buna göre, SEM ile farklı büyüklüklerde elde edilen görseller Fig. 6'da gösterilmiştir.



ANK-G7 ANK-G8 ANK-G9



ANK-G10 ANK-G20 ANK-G21

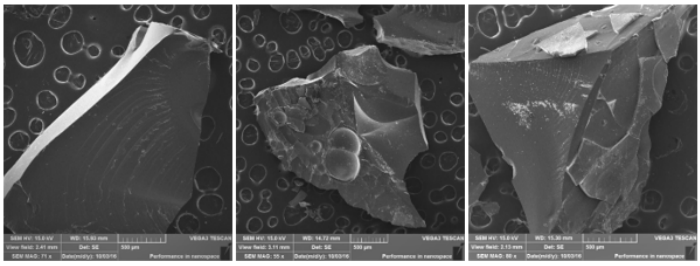


Fig. 6: Cam örneklerine ait SEM görüntüleri.

Fig. 6'da elde edilen SEM görüntülerine göre ANK-G7, ANK-G10, ANK-G20, ANK-G21 ve ANK-G23 örneklerinde iri habbeli yapılar tespit edilmiştir. Bu sonuç da bu örneklerin üretimlerinde serbest üfleme, silindir üfleme ya da döküm teknikleri uygulanmış olduğunu göstermektedir.

Camın bileşiminde cam oluşturucu olarak bulunan ve ana malzeme olan SiO_2 miktarının yüksek olması, camın mekanik direncinin ve dayanıklılığının yüksek olduğunu, aynı zamanda camın erime noktasının da yüksek olduğunu göstermektedir. SiO_2 ile birlikte cama sağlamlaştırıcı etki olarak eklenen CaO miktarının mevcut üretim oranlarından daha az olması camın dayanıklılığını azaltmakta ve bozulmaya karşı direncini düşürmektedir[44]. Tablo 2'de SEM-EDX ile elde edilen sonuçlara göre, camı oluşturan temel unsur olan SiO_2 miktarı % 59,30-% 65,25 arasında değişiklik göstermekte olup, ortalama bu değer % 62,48'dir. Tipik bir silis-soda-kireç camı ile karşılaştırıldığında bu oran düşüktür. Bu sonuç da camların yapısında bir bozulma olduğuna işaret etmektedir.

[44] Akyol et al. 2014, 16-17.

Tablo 2. Nysa antik kenti cam örneklerinin SEM-EDX analizi sonuçları.

ELEMENT OKSİT YÜZDELERİ	ANK-G7	ANK-G8	ANK-G9	ANK-G10	ANK-G20	ANK-G21	ANK-G22	ANK-G23	ANK-G24	Ortalama
Na_2O	21,51	19,97	24,44	21,32	23,80	16,93	23,91	25,11	23,61	**22,29**
MgO	1,39	1,30	1,31	1,93	1,28	1,25	1,04	1,27	1,22	**1,33**
Al_2O_3	2,94	3,00	3,73	3,80	3,77	3,31	2,94	3,09	3,25	**3,31**
SiO_2	64,17	65,25	61,30	62,19	61,39	62,99	62,87	59,30	62,83	**62,48**
P_2O_5	0,08	-	0,10	0,20	0,10	-	0,11	0,05	-	**0,07**
SO_3	0,19	0,10	0,50	0,27	0,36	0,27	0,24	0,39	0,13	**0,27**
Cl	0,88	0,85	0,76	1,13	0,72	1,13	1,16	1,10	1,31	**1,00**
K_2O	0,31	0,33	0,34	0,44	0,43	0,49	0,24	0,33	0,26	**0,35**
CaO	5,83	6,08	4,43	5,64	4,88	7,72	5,93	6,37	5,47	**5,82**
TiO_2	0,21	0,24	0,22	0,35	0,27	0,59	0,06	0,09	0,14	**0,24**
Cr_2O_3	0,06	-	-	-	0,03	0,22	-	-	-	**0,03**
MnO	1,50	1,76	1,72	1,75	1,92	2,44	0,75	0,94	0,98	**1,53**
FeO	0,92	1,04	0,86	0,89	0,91	1,15	0,69	1,50	0,82	**0,98**
Co	-	-	0,03	0,02	-	0,25	-	-	-	**0,10**
Cu	-	-	0,09	0,03	0,08	0,17	-	-	-	**0,04**

Ca, Mg ve Al gibi dengeleyici ve dayanım arttırıcı elementlerin eklenmesi cama sağlamlık kazandırmaktadır. Al ilavesi, camın şekillendirme ve biçimlendirme sırasında çalışma özelliklerini arttırmaktadır[45]. Bu nedenle, toprak alkali katyonlar camı daha güçlü, daha dayanıklı ve nispeten çözünmez hale getirmektedir. Antik çağlarda kalsiyum, kumdaki küçük kabuk parçaları olarak silika kaynağındaki safsızlıklar veya kireç taşından elde edilen kalsiyum içeren bitkiler olarak soda kaynağının kalıntıları cama istenmeden eklenmiştir[46]. Na_2CO_3 olarak da bilinen soda, yüksek sıcaklıklarda CO_2 salarak ayrışır ve Na_2O oluşturur. Antik camda en yaygın ikinci maddedir ve camın havalandırılmaması durumunda soda içeriği % 15-23 civarındadır[47]. Tablo 2'de cam örneklerde Na_2O miktarları incelendiğinde en düşük oranın % 16,93, en yüksek oranın ise % 25,11 olduğu tespit edilmiştir ve bu sonuçlar dokuz örnek için ortalama % 22,29 değerindedir. Bu durum ergitici alkali olarak natron, soda veya sodyumca zengin başka bir mineralin kullanıldığını göstermektedir. Özellikle bölgenin jeolojik yapısı gereği, seramik sanayinin de ana hammaddesi olan albit bileşimli ($NaAlSi_3O_8$) feldispatların cam üretiminde kullanılmış olması kuvvetle muhtemeldir. Albit bileşimli feldispatların kullanılmış olması kimyasal analiz sonuçlarında da belirlenen Na ve Al değerlerinde görülen yüksekliği de açıklayabilmektedir.

45 Goffer 2007, 117-120.
46 Whitehouse 2012, 9-120.
47 Shortland 2012, 97-119.

Kireç ve alümina, cam yapım kumunu yansıttığı için genellikle cam gruplarını ayırmak için kullanılmaktadır[48]. Örneğin; Roma natron camları kumda bulunan feldspattan dolayı % 1,7-3,5 arasında alümina içermektedir[49]. Tablo 2'de SEM-EDX ile elde edilen sonuçlar incelendiğinde, MgO miktarının %1,04-%1,93 aralığında ve ortalamanın % 1,33 oranında olduğu görülmektedir. MS 1. ila 6. yy, bitki külü esas olarak Mezopotamya'da cam yapımında hammadde olarak kullanılmış, Roma ve Geç Antik cam buluntularının arkeometrik çalışmalarında ara sıra rapor edilmiştir[50].

Cam üretiminde dayanım arttırıcı olarak kullanılan CaO oranı Tablo 2'deki verilere göre, % 4,43-% 7,72 arasında değişen miktarlarda olup ortalama değer % 5,82'dir. Bu sonuç da göstermektedir ki tipik bir soda-kireç camı ile Nysa anti kenti cam örneklerinde bulunan üç temel bileşenin (SiO_2, Na_2O ve CaO) oranları SiO_2 dışında birbiri ile uyuşmaktadır.

Camın üretiminde kullanılan Al_2O_3, genellikle silis kaynağı olarak kullanılan hammaddeden ileri gelmektedir. Tablo 2'deki Al_2O_3 oranlarına bakıldığında tüm örnekler için sonuçların birbirine çok yakın olduğu görülmektedir. Bu da kullanılan kum ve/veya kuvarsın aynı kaynaktan olabileceğini göstermektedir[51].

Camı oluşturan renk ile ilgili bileşenler Cr, Mn, Fe, Co, Ni, Cu, As, Sn, vb. geçiş metalleridir[52]. Nysa antik kenti cam örneklerinin element içerikleri incelendiğinde, özellikle Fe elementinin tüm örneklerde bulunduğu saptanmış olup, ortalama değerin ise yaklaşık % 1.00 olduğu belirlenmiştir (Tablo 2). Örneklerde Fe^{2+} iyonlarının varlığı cama sarı renk kazandırmaktadır. Çözeltide Fe^{2+}/Fe^{3+} oranı azaldıkça renk yeşile doğru gitmektedir. Fe^{3+} iyonlarının varlığı cama sarı ve kırmızı renk vermektedir[53]. Demirin cama bilinçli olarak mı konulduğu yoksa kullanılan hammaddelerin içinde safsızlık olarak mı bulunduğu tartışma konusudur. Elde edilen bu sonuçlardan safsızlık olarak bulunmasının daha düşük bir olasılık olduğu görülmektedir.

Cama mor rengini veren ve renk giderici olarak da kullanılan Mn, SEM-EDX analiz sonuçlarına göre % 0,75 ile % 2,44 arasında bulunmuştur. Mn oranının % 0,4'ten fazla olması cam yapımı sırasında bilinçli olarak eklendiği anlamına gelmektedir[54]. Normalde cam renklendiriciler fırında indirgenmiş koşullarda görünür, ancak demiri oksitlemek için partiye Sb_2O_3, MnO ve As eklenmektedir[55]. Jackson ve Paynter'in araştırmasına göre (2016)[56], ağırlıkça % 0,6 Fe içeren yük-

48 Schibille et al. 2017, 1224-1239.
49 Henderson 2013, 320-325.
50 Freestone 2006, 201-216; Silvestri et al. 2018, 331-341.
51 Freestone et al. 2002, 257-272.
52 Henderson 2000, 67.
53 Bamford 1962, 189-202.
54 Brill 1988, 257-294.
55 Davison 2003, 1-16.
56 Jackson–Paynter 2016, 68-90.

sek manganlı (% 1'den fazla) cam mavi-yeşil bir renkle sonuçlanabilir. Silvestri'ye (2008)[57] göre, MnO'nun Fe_2O_3'e oranı % 2'den büyük olmadıkça Mn etkili bir şekilde renk açmaz. Bu durumda fırın atmosferi oldukça indirgeyicidir ve Mn renk giderimini engelleyen bir oksidan olarak düzgün etki göstermemektedir. Bu çalışmada, Mn ortalama % 1,53 oranında bulunmasına rağmen incelenen örnekler arasında renksiz cama rastlanmamıştır. Bu durum cam içeriğinde ortalama % 0,98 (% 0,69–1,50 arası) oranına sahip olan Fe'nin cama mavi veya yeşil tonlar vermesi ile açıklanabilmektedir.

PED-XRF SONUÇLARI

Bu çalışmada, diğer X-ışını spektrometresi yöntemlerinden biri olan PED-XRF ile çalışılmış ve cam **örnek**lerin elementel analizi gerçekleştirilmiştir. Buna göre, ağırlıkça yüzde olarak tespit edilen ana oksit element içerikleri Tablo 3'de, ppm seviyesinde tespit edilen iz element içerikleri ise Tablo 4'de sunulmuştur.

Tablo 3. Nysa antik kenti cam örneklerinde PED-XRF ile tespit edilen ana oksit element içerikleri.

Element Oksitler (%)	ANK-G7	ANK-G8	ANK-G9	ANK-G10	ANK-G20	ANK-G21	ANK-G22	ANK-G23	ANK-G24	Ortalama
SiO_2	64,22	57,88	53,04	60,32	43,06	51,04	62,01	51,84	59,60	**55,89**
Na_2O	14,92	11,24	10,76	11,66	7,59	8,59	13,10	10,13	10,73	**10,97**
CaO	5,90	5,41	3,82	4,41	3,54	5,19	5,07	5,45	5,08	**4,87**
MgO	0,937	0,733	0,468	0,891	0,267	0,671	0,583	0,407	0,670	**0,625**
Al_2O_3	0,974	0,685	0,820	4,89	0,490	0,737	0,851	1,02	1,73	**1,36**
P_2O_5	0,049	0,015	0,002	0,011	0,002	0,002	0,027	0,065	0,050	**0,025**
SO_3	0,197	0,128	0,282	0,088	0,180	0,092	0,175	0,205	0,108	**0,162**
Cl	0,974	0,838	0,582	0,864	0,464	0,678	0,963	0,721	0,890	**0,775**
K_2O	0,536	0,556	0,548	0,459	0,582	0,424	0,519	0,580	0,727	**0,548**
TiO_2	0,321	0,378	0,348	0,383	0,331	0,272	0,119	0,208	0,302	**0,296**
V_2O_5	0,010	0,011	0,009	0,007	0,011	0,007	0,007	0,007	0,010	**0,009**
Cr_2O_3	0,008	0,008	0,007	0,008	0,005	0,003	0,003	0,003	0,004	**0,005**
MnO	1,70	1,77	1,83	2,07	1,78	1,93	1,02	1,26	1,20	**1,619**
Fe_2O_3	1,32	1,31	1,19	1,42	1,26	1,26	0,89	1,44	1,30	**1,27**

[57] Silvestri et al. 2008, 331-341.

Tablo 4. Nysa antik kenti cam örneklerinde PED-XRF ile tespit edilen iz element içerikleri.

Element (ppm)	ANK-G7	ANK-G8	ANK-G9	ANK-G10	ANK-G20	ANK-G21	ANK-G22	ANK-G23	ANK-G24	Ortalama
Co	17,5	23,2	11,6	20,7	16,2	24,4	18,2	24,8	16,3	**19,2**
Ni	14,8	13,7	14,2	16,5	12,3	15,2	13,3	15,9	15,1	**14,6**
Cu	655,4	70,3	29,3	39,9	33,3	43,3	30,2	62,2	62,1	**114,0**
Zn	8,4	22,3	15,4	22,9	19,0	23,8	11,9	17,6	20,2	**17,9**
Ga	1,6	3,2	4,1	4,6	3,8	4,1	2,8	2,5	4,3	**3,4**
Ge	0,3	0,5	1,0	1,3	0,4	1,0	0,3	1,0	1,0	**0,8**
As	4,1	3,4	3,6	3,7	3,0	3,1	5,1	9,4	3,3	**4,3**
Se	0,2	0,3	0,2	0,2	0,2	0,2	0,2	0,3	0,2	**0,2**
Br	7,0	6,9	7,5	5,5	8,6	4,3	7,2	9,5	9,3	**7,3**
Rb	7,4	5,4	6,6	5,5	6,5	5,5	5,5	6,7	9,4	**6,5**
Sr	495,1	494,8	350,2	423,5	393,6	535,3	385,0	466,7	428,8	**441,4**
Y	6,9	7,1	7,9	7,3	8,9	7,3	5,9	7,5	8,7	**7,5**
Zr	176,0	231,1	197,9	248,1	211,3	173,5	63,1	125,9	182,3	**178,8**
Nb	2,5	3,0	8,4	6,5	5,4	4,3	4,0	3,0	2,8	**4,4**
Mo	3,4	5,9	6,0	11,5	9,0	9,7	5,2	4,6	7,4	**7,0**
Cd	0,8	0,9	0,9	0,8	1,2	0,9	0,7	1,0	0,9	**0,9**
In	1,0	0,9	0,9	0,8	1,2	0,6	0,7	1,0	0,9	**0,9**
Sn	33,5	10,3	0,9	1,5	1,3	1,1	0,8	6,7	2,2	**6,5**
Sb	79,4	7,8	1,0	3,3	1,3	1,0	0,8	31,7	1,1	**14,2**
Te	1,2	1,4	1,4	1,3	2,0	2,2	1,1	1,7	1,5	**1,5**
I	2,2	2,6	2,4	2,4	3,5	2,6	2,0	2,9	2,8	**2,6**
Cs	3,6	4,6	5,3	4,4	6,6	4,9	3,5	5,3	4,7	**4,8**
Ba	425,0	421,4	403,2	644,3	410,7	590,0	194,5	510,4	524,4	**458,2**
La	8,4	12,9	23,0	10,1	26,5	15,5	11,9	26,2	21,9	**17,4**
Ce	17,9	17,3	20,3	19,0	46,0	18,9	15,3	35,0	15,0	**22,7**
Hf	15,0	10,8	6,6	5,9	8,9	6,3	3,3	6,2	3,9	**7,4**
Ta	12,0	4,2	2,9	3,4	3,3	3,4	2,8	4,1	4,2	**4,5**
W	2,2	1,9	1,8	1,9	2,1	2,1	1,6	2,0	2,2	**2,0**
Hg	0,6	0,6	0,6	0,6	0,7	0,6	0,5	0,6	0,7	**0,6**
Tl	0,4	0,8	0,6	0,6	0,6	0,6	0,6	0,7	0,7	**0,6**
Pb	121,3	117,9	5,5	6,1	6,2	9,0	8,1	46,0	15,8	**37,3**
Bi	0,7	0,7	0,5	0,5	0,5	0,5	0,4	0,6	0,6	**0,6**
Th	1,3	2,3	1,3	2,0	0,7	0,5	0,5	1,2	0,7	**1,2**
U	11,0	6,9	5,6	6,9	6,9	7,0	6,7	6,5	5,4	**7,0**

Tablo 3'de SiO_2 miktarı incelendiğinde, değerin % 43,06-% 64,22 arasında değişiklik gösterdiği ve ortalamanın ise % 55,89 olduğu görülmektedir. Elde edilen bu sonuç tipik bir soda-kireç camındaki orandan oldukça düşüktür ve bu da camın yapısında bir bozulma olduğuna işaret etmektedir. PED-XRF ile elde edilen bu sonuç ile SEM-EDX analizinden elde edilen SiO_2 miktarları karşılaştırıldığında oransal olarak değerlerin uyuşmaması ile birlikte her iki analizde de cam örneklerde bir bozulmanın olduğu açıkça tespit edilmiştir.

Tablo 3'deki Na_2O miktarı incelendiğinde en düşük miktarın % 7,59 ve en yüksek miktarın % 14,92 olduğu, bu değerin tüm örnekler için ortalamasının % 10,97 olduğu tespit edilmiştir. Tipik bir silis-soda-kireç camı ile bu sonuçlar karşılaştırıldığında PED-XRF analizinden elde edilen Na_2O değerinin oldukça düşük olduğu saptanmıştır. Yine, Tablo 3'deki sonuçlar incelendiğinde MgO değerinin % 0,267-% 0,937 aralığında ve ortalamanın ise % 0,625 olduğu belirlenmiştir. Bu sonuçlar, SEM-EDX ile elde edilen Na_2O ve MgO miktarlarından oldukça düşüktür.

Cam üretiminde dayanım arttırıcı olarak kullanılan CaO oranı % 3,82-% 5,90 arasında değişen miktarlarda olup ortalama değer ise % 4,87'dir. PED-XRF ile elde bu sonuç tipik silis-soda-kireç camındaki CaO değeri ile uyuşmaktadır.

Tüm analiz sonuçlarına göre, Nysa arkeolojik camlarının kimyasal analizinde, ana bileşenlerine bağlı olarak PED-XRF ile belirlenen cam tipini desteklemek için üçgen faz diyagramı (Triangle Plotting) kullanılmıştır. Camlar, numunelerin bulunduğu bölgeye bağlı olarak Na_2O, K_2O, MgO ve CaO bileşenlerine göre gruplandırıldığında (Üçgen çizim); 1 olarak kategorize edilen bölge "soda-kireç camları (Demir Çağı, Antik Çağ, Erken Ortaçağ ve Ortaçağ)"; 2 olarak kategorize edilen bölge "bitkisel kül soda-kireç camları (Orta-Geç Tunç Çağı (Mısır, Miken, Mezopotamya))"; 3 olarak kategorize edilen bölge "soda ve potas karışık alkali camları (Geç Tunç Çağı)" ve 4 olarak kategorize edilen bölge "orman bitkileri külü potas-kireç camlarını (Ortaçağ)" (Fig. 7A) temsil etmektedir. SEM-EDX ve özellikle PED-XRF sonuçları (Fig. 7B), beklenenden düşük silika ve sodyum içeriğine rağmen Enez camlarının tipik soda-kireç-silika camı olduğunu ortaya koymaktadır (Fig. 7).

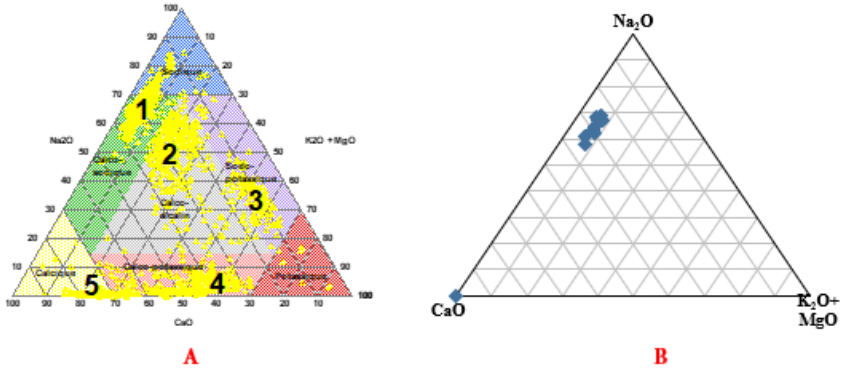


Fig. 7: A-Arkeolojik camların üretim tekniğine göre oluşturulan üçgen çizim diyagramı[58], B-İncelenen örnekler için PED-XRF üçgen çizim diyagramı.

Her iki yöntemle yapılan analiz sonuçlarına göre MgO ve K_2O ortalama değerleri % 1,5'dan düşük olduğu için[59] ergitici madde olarak natron, soda veya sodaca zengin bir mineralin kullanıldığı düşünülmektedir. Burada özellikle SEM-EDX analiz sonucunda ANK-G10 örneğinin MgO değeri % 1,93 olarak tespit edildiği için sadece bu örnek için bitki külü kullanılmış olabileceği düşünülmektedir.

Al elementi camda sık rastlanır ve bazı kumların doğal bir bileşenidir. Cama daha fazla dayanıklılık ve daha düşük genleşme katsayısı sağlamaktadır. Bununla birlikte çok fazla Al, camın viskozitesini arttırmakta, ergimeyi ve çalışılmayı zorlaştırmaktadır. Antik dönem cam yapımında alüminyum yaygın olarak kullanılmıştır. Muhtemelen potaya kasıtlı olarak eklenmemiştir. Bununla birlikte, genellikle cam harmanında diğer hammaddelerle birlikte bir safsızlık olarak düşük derişimlerde (ağırlıkça % 1-5) bulunmaktadır. Feldspat en önemli alüminyum kaynağıdır. Kuvars kumu kullanılması ile özellikle Al gibi diğer elementler önemli miktarda cama girmektedir[60].

PED-XRF analiz sonuçları incelendiğinde, cama renk veren madde olduğu bilinen Cu^{2+} elementinin analiz edilen dokuz örnekte de tespit edildiği, en yüksek değerin ise ANK-G7 örneğinde (655,4 ppm) saptandığı ortaya konulmuştur (Tablo 4). Yine tüm örneklerde kurşun (Pb)'un da varlığı söz konusudur. ANK-G7 ve ANK-G8 örneklerinde tespit edilen Pb değerleri diğer örneklerde bulunan Pb değerlerine göre nispeten daha yüksektir. Baskın yeşil renk elde etmek için cam harmanına Cu ile birlikte Pb konulduğu bilinmektedir[61]. Pb'un camın kimyasal

[58] Büyüksoy et al. 2021, 98.
[59] Freestone 2003, 111-115; Paynter 2006, 1037-1057.
[60] Goffer 2007, 119; Jackson – Cottam 2015, 139-148.
[61] Kadikova et al. 2017, 4, 5.

içeriğine bağlı olarak farklı düzeylerde bozulmaya neden olduğu da raporlanmıştır. Pb içeriği yüksek camlar, daha kararlı silika içeriğine sahip camların aksine en hızlı bozulma oranını göstermektedir[62].

Sr ve izotopları, antik camların hem hammaddelerini hem de kökenlerini belirlemek için güçlü bir yöntemdir. Camdaki stronsiyumun çoğu muhtemelen camdaki kireç içeren bileşenlerden gelir (kalsiyum karbonat veya kireçtaşı içeren bir deniz kabuğu, kireç bakımından zengin bitki külü). Sr ve Zr miktarları, üretimde kullanılan kumun menşei hakkında bilgi verebilir. Sr miktarının yüksek olması (> 400 ppm), üretimde kullanılan kumun büyük olasılıkla deniz kökenli olduğunu göstermektedir[63]. Karasal kumlarda Sr miktarının 150 ppm'den az, Zr miktarının ise 160 ppm'den fazla olması beklenmektedir[64]. Tablo 4'de PED-XRF sonuçlarından elde edilen Sr içeriği 350,2 ppm ile 495,1 ppm arasında değişmektedir. Ayrıca, örneklerde Ba içeriği incelendiğinde, bir örnek hariç (ANK-G22) 400 ppm'den fazla bir değere sahip olduğu belirlenmiştir. Aynı örneklerde Al_2O_3 içeriği de ANK-G8 ve ANK-G20 örnekleri hariç % 1'e çok yakın olduğu tespit edilmiştir. Bu sonuçlar, cam üretiminde alkali feldspatça zengin kum kullanıldığını düşündürmektedir[65] (Fig. 8).

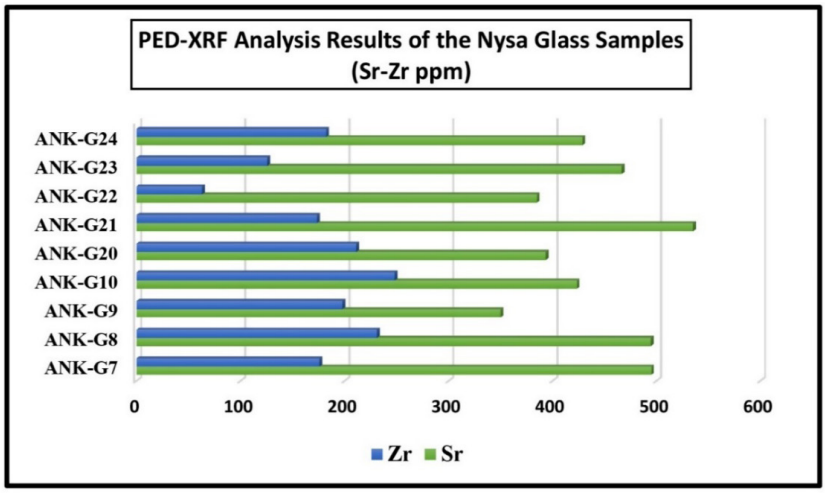


Fig. 8: Nysa cam numunelerinin Sr ve Zr elementlerine göre değişiminin PED-XRF analizi.

Klor (Cl), camda iyonik formda bulunmaktadır ve cam matriste çok küçük miktarlarda (tipik olarak soda-kireç-silika camında % 2'den az) çözünmektedir.

62 Palomar et al. 2020, 10.
63 Freestone et al. 2003, 19-32.
64 Akyol et al. 2014, 10; Freestone et al. 2003, 19-32.
65 Silvestri et al. 2008, 1489-1501.

Bozulmuş yüzeylerde klor iyonlarının varlığı, özellikle kütle ile ilgili artan değerler için yerinde oluşan tuzlarla açıklanabilir. Genellikle varlığı denizel ortamlarla ilgilidir[66]. Her iki analiz sonucunda da her bir örnek için klor elementi genel olarak % 0,40'ın üzerinde tespit edilmiş olup, ortalama ise % 0,65'in üzerindedir. Ortalama değerin % 0,65'in üzerinde olması da denizel etkiyi desteklemektedir.

Camın genel yapısında düşük olan SiO_2 miktarı SEM-EDX analiz sonucuna göre camın dış katmanında yani bozulma tabakasında daha yüksek bulunmuştur. Camın zamanla bozulması sonucu azalan SiO_2 içeriği, cam yüzeyinde görülen bozulmayı desteklemektedir. Bozulma ilerledikçe jel tabakasında Si zenginleşmesi meydana gelmektedir[67]. Örneklerin SEM-EDX analizi sonuçları, PED-XRF'e kıyasla daha yüksek SiO_2 içeriğine sahip olduğunu göstermiştir.

SEM-EDX ve PED-XRF ile elde edilen analiz sonuçları karşılaştırıldığında, genel olarak SEM-EDX analizinden elde edilen sonuçların PED-XRF ile elde edilen analiz sonuçlarından daha yüksek oranda bulunduğu tespit edilmiştir. Camın yapısı hakkında bilgi almamıza yardımcı olan temel bileşenlerden SiO_2, Na_2O, MgO ve Al_2O_3 oranlarında bu sonuç gözlemlenmiştir. Bu durum, özellikle SiO_2 ve Al_2O_3 miktarlarının bozulan camlarda SiO_2 ve Al_2O_3 içeriğinin artması ile ilişkilendirilebilmektedir. PED-XRF analizinde camdan alınan belli miktardaki numunenin toz haline getirilip, homojen hale getirilerek bir pelet oluşturulması ve bu peletin analiz edilmesi, SEM-EDX analizinde ise örnek üzerinde seçilen bir noktanın veya bir alanın analizlenmesi gerçekleştirilmektedir. Buradaki esas konu seçilen bölgenin ne kadar bozulma tabakasından uzak olup olmadığıdır. Bu çalışmada, SEM-EDX ile analizler sırasında temiz bir alan belirlenip en az üç kez olmak üzere analizler gerçekleştirilmiş ve ortalama sonuçlar elde edilmiştir. Cam örneklerde zamanla oluşan bozulmanın alt tabakalara kadar ilerlemesi mümkün olup, PED-XRF analizlerinde örnek hazırlama esnasında bir kısım bozulma tabakasının sonuçlara etki etmiş olabileceği düşünülmektedir.

SONUÇ

Batı Anadolu'da bulunan Nysa antik kentindeki kazılardan ele geçen dokuz adet cam örnek üzerinde öncül arkeometrik incelemeler gerçekleştirilmiştir. Yapılan incelemelerde kimyasal analizlerden elde edilen sonuçlar değerlendirildiğinde, cam örneklerin tipik bir silis-soda-kireç camı yapısında olmakla beraber SiO_2 içeriğinin beklenenden daha düşük olduğu tespit edilmiştir. Bu sonuç, cam örneklerin toprak altında uzun süre kalması ve zaman içinde olumsuz çevre koşullarından etkilenmesinden kaynaklı olarak cam yapısında bir bozulmanın oluşabileceğini göstermektedir.

[66] Gueli et al. 2020, 218-225.
[67] Akyol et al. 2012, 217-223; Akyol – Kadıoglu 2015, 27-36; Büyüksoy et al. 2021, 107.

Cam örneklerin SEM-EDX sonucuna göre benzer orandaki Al_2O_3 içerikleri, örneklerin benzer hammadde kaynağından elde edilmiş olacağına işaret etmektedir.

Sr ve Zr içerikleri değerlendirildiğinde (yüksek stronsiyum içeriği, düşük zirkonyum içeriği) cam üretiminde kullanılan silika kaynağının genel olarak deniz (kıyı) olduğunu göstermektedir.

Tüm **örnek**lerin yeşil renkli olduğu gözle görüldüğü gibi bu durum renk ölçüm sonuçları ile de desteklenmektedir. Cam örneklerine yeşil rengi veren ana elementin Fe^{2+} ve Cu^{2+} iyonları olduğu saptanmıştır. Cu^{2+} iyonlarının varlığı iz elementlerin tespitine izin veren PED-XRF analiz sonuçlarında tespit edilmiştir.

Camın üretim tekniği hakkında bilgi veren baloncuklar genellikle daireye yakın ve iri formlarda gözlenmiş ve buna bakılarak camların serbest üfleme tekniği ile üretildiği söylenebilmektedir.

Tarihi ve arkeolojik camlar son yıllarda gittikçe artan oranda ilgi görmektedir. Farklı dönemlere ait (Roma, Bizans, Selçuklu, Osmanlı) cam örneklerinin araştırılması Anadolu cam teknolojisinin anlaşılması için önemli ve gereklidir. Cam malzeme ve üretim teknikleri üzerinde yoğunlaşan arkeometrik araştırmalar sayesinde hem cam yapım yöntemlerindeki farklılıklar ve hammadde kaynaklarının belirlenmesi, hem de farklı dönemlere ait cam üretim teknolojilerinin daha ayrıntılı olarak ortaya çıkarılmasını mümkün kılacaktır. Bu da cam örneklerinin birbiri ile karşılaştırılabilmesine olanak sağlamaktadır.

Teşekkür

Yazarlar, T.C. Kültür ve Turizm Bakanlığı'na, Aydın Müze Müdürlüğü'ne ve Nysa kazı başkanı Prof. Dr. Serdar Hakan Öztaner'e teşekkürü bir borç bilirler. Aynı zamanda, SEM-EDX analizlerinin gerçekleştirildiği Turkish Cultural Foundation (TCF)-Cultural Heritage Preservation and Natural Dyes Laboratory (DATU Laboratuvarı)'na, PED-XRF analizlerinin yürütüldüğü Ankara Üniversitesi, Yer Bilimleri Uygulama ve Araştırma Merkezi (YEBİM)'ne ve Ankara Hacı Bayram Veli Üniversitesi, MAKLAB'da görev alan Gülşen ALBUZ GEREN'e teşekkür ederler.

Çıkar Çatışması

Yazarlar, makale kapsamında herhangi bir kurum veya kişi ile çıkar çatışması bulunmadığını ifade etmektedir.

Yazar Katkı Oranları

Çalışmanın tasarlanması (Design of Study): ETG (%50), AAA (%50)

Veri Toplanması (Data Acquisition): ETG (%35), AAA (%35), RP (%30)

Veri Analizi (Data Analysis): ETG (%50), AAA (%50)

Makalenin yazımı (Writing up): ETG (%55), AAA (%45)

Makalenin gönderimi ve revizyonu (Submission and Revision): ETG (%50), AAA (%50)

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PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, Eylül 2024, 2 (4): 271-294

Amorium Kazılarında Bulunan Madeni Haçlar

Metal Crosses Found During Excavations in Amorium

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 20 Ağustos /August 2024
Kabul Tarihi/Accepted: 20 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 271-294

Atıf/Cite as: Uygun Yazici, S. "Amorium Kazılarında Bulunan Madeni Haçlar" Propontica, 2 (4), Eylül 2024: 271-294.

https://doi.org/10.56170/propontica.1536503

AMORİUM KAZILARINDA BULUNAN MADENİ HAÇLAR

ÖZ

Bu makalenin konusunu Amorium Antik Kentinde 1988 yılından beri yürütülen arkeolojik kazılarda bulunmuş haçlar oluşturmaktadır. Haç, Hıristiyanlığın simgesi olarak İsa'nın çarmıha gerilmesini, çektiği acıları ve ölümünü, tüm insanlığı günahlarından kurtarışını simgeler. Hıristiyanlığın sembolü olan haç eserler, Bizans kültürel mirasında bir yer teşkil eder. Haç eserlerin sayısal çokluğu müze, kazı ve koleksiyonlarda yaygın olmasının nedenlerinden biri kullanım şeklinin çeşitliliğidir. Litürjik ve kişisel kullanımda her dönem tercih edilen haçlar, taşınabilir olmaları nedeniyle sıklıkla el değiştirir ve üretildikleri coğrafyanın dışına çıkabilir. Amorium Antik Kenti günümüzde Afyonkarahisar İli, Emirdağ ilçesi, Hisar Köyü'nde yer alır. M.Ö. 2000'li yıllarda başlayan tarihsel bir geçmişe sahiptir. Kesintisiz olarak yerleşimin görüldüğü kentte, Hitit, Frig, Helenistik, Roma, Bizans, Selçuklu ve Osmanlı izlerine rastlanır. Amorium Antik Kenti, Aşağı Şehir ve Yukarı Şehir (Höyük) olarak iki kısımda değerlendirilir. Eserler, Aşağı Şehir'de, Kilise A, Büyük Mekân, Kuzey ve Güneybatı Nekropol, Yukarı Şehir'de ise İç Sur ve Bazilika B'de ele geçmiştir. Haçlar, kentin farklı yerlerindeki dini, savunma, endüstriyel ve mezar gibi yapılarında bulunmuştur. Bu durum haçın farklı alanlarda yaygın kullanımının bir göstergesidir. Amorium kazılarında bulunan 21 eserin 13'ü pandantif, 3'ü röliker, 2'si tören, 1'i takdis, 1'i takdis/adak ve 1'i tören/takdis/adak haçıdır. Arkeolojik kazı çalışmalarında bulunan gümüş, bronz ve demirden üretilmiş haçlar Orta Bizans Dönemi'ne tarihlenmektedir. Haçların bezemelerinde kazıma ve kabartma tekniği kullanılmıştır. Yunan ve Latin haçı formunda olan eserler üslup özellikleri ve buluntu-mekân ilişkisine göre incelenip benzer örnekleriyle karşılaştırılmak suretiyle değerlendirilmiştir.

Anahtar Kelimeler: Ortaçağ, Bizans, Amorium, Metal Buluntular, Haçlar.

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METAL CROSSES FOUND DURING EXCAVATIONS IN AMORIUM

ABSTRACT

The subject of this paper relates to the crosses that have been discovered during excavations conducted in Amorium Ancient City since 1988. As a symbol of Christianity, the cross signifies the crucifixion of Jesus, the pains he sustained and his death, and salvation of the mankind from their sins. The cross artifacts as the symbol of Christianity have a place in the Byzantine cultural heritage. One of the reasons explaining the large number of cross artifacts and their prevalence in mu-

https://doi.org/10.56170/propontica.1536503

seums, excavation works, and collections is the diversity of their usage. Preferred in every period for ritual and personal uses, these crosses used to pass in other hands and could be taken out of their place of manufacturing frequently as they are portable. The Amorium Ancient City is located in Hisar Village, Emirdağ District, Afyonkarahisar Province. History of city was started around 2000 BC. In the city, which has been continuously settled, there are traces of Hittite, Phryg, Hellenistic, Roman, Byzantine, Seljuk and Ottoman settlements. Amorium Ancient City is evaluated in two sections; i.e., the Upper City and the Lower City. The finds have been unearthed from the Church A, Enclosure, North and Southwest Necropolis in the Lower City and from the Basilica B, and Inner Wall excavations sites in the Upper City. Crosses were found in religious, defence, industrial and tomb structures in different parts of the city. This is an indication of the widespread use of the cross in different areas. Out of 21 artifacts found in Amorium excavations, 13 are pendant crosses, 3 are reliquary crosses, 2 are ceremonial crosses, 1 is consecration / donary cross, and 1 is ceremonial / consecration / donary cross. The crosses which made of silver, bronze, iron discovered in Amorium are dated to the Middle Byzantine Period. Repousse and engraving techniques are used in the ornaments of these crosses. These artifacts, which are in Greek and Latin forms, have been studied as per their stylistic characteristics and find-place relationship and compared with similar examples.

Keywords: Middle Ages, Byzantine, Amorium, Metal Finds, Cross.

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GİRİŞ

Haç şekli, İsa'nın çarmıha gerilerek ölmesiyle sembolik bir anlam kazanır ve bu yüzden Hıristiyanlıkta büyük saygı görür[1]. Haçın kullanım alanları oldukça fazladır. Dini ve sosyal açıdan farklı sanatsal örneklerde sıklıkla karşımıza çıkar. Yaygın kullanım alanına sahip olması simgesel gücünün göstergesidir. Gündelik yaşam içerisinde, şehirlerin korunmasından, savaşların kazanılmasına, kötülüklerin defedilmesinden, şifa dağıtmasına; litürjik olarak kutsal olmasından, günahların affına, İsa'nın çektiği acılardan, inancın tazeliğini korumasına kadar geniş bir yelpazesi vardır[2].

Günümüzde Afyon İli, Emirdağ ilçesi, Hisar Köyü'nde bulunan Amorium Antik Kenti, M.Ö. 2000'li yıllarda başlayan bir tarihsel geçmişe sahiptir.

1 Podskalsky 1991, 549-550.

2 Haç ve Haç Kültü konusunu işleyen seçilmiş bazı yayınlar bkz. Altun 2020, 134-137; Acara-Eser 2010, 27-29; Elyiğit 2022, 176-184; Koçyiğit 2018, 111; Okuyucu 2023, 370-373.

Kesintisiz olarak yerleşimin görüldüğü kentte, Hitit, Frig, Helenistik, Roma, Bizans, Selçuklu ve Osmanlı izlerine rastlanır[3].

Amorium Antik Kentinde 1988 yılından beri sürdürülen arkeolojik kazı çalışmaları[4] sırasında farklı açma ve kontekslerde haçlar bulunmuştur[5]. Haçlar; Aşağı Şehir'de, Kilise A, Büyük Mekân, Kuzey ve Güneybatı Nekropol, Yukarı Şehir'de ise İç Sur ve Bazilika B'de ele geçmiştir (Fig.1).

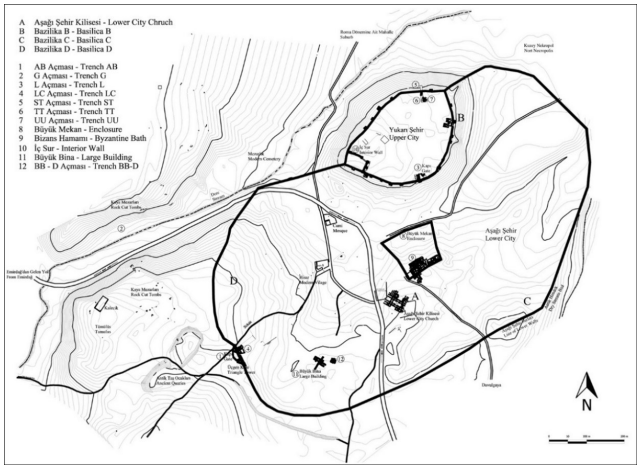

Fig. 1. Amorium Antik Kenti Planı (Amorium Kazı Arşivi)

Amorium kazılarında bulunan haçlar, pandantif (sarkaç), röliker, tören, takdis/adak ve tören/takdis/adak haçı olarak üç türdür. Bu türler içerisinde belirli ayrımlar vardır. Pandantif haç, boyna asılarak kullanılan, diğer haç örneklerine

[3] Amorium'un arkeolojik buluntuları, kentteki en erken yerleşimin Yukarı Şehir olduğunu kanıtlar. Roma senatosu tarafından Frigya bölgesinde para basmasına izin verilen kent, MS 4.-6. yüzyıllarda genişlemiştir. Bkz. Lightfoot - Lightfoot 2007, 33. MS 7. yüzyılın ortalarında Anatolikon Thema'sının başkenti olan Amorium, bu tarihten sonra askeri merkezdir. Bkz. Ivison 2007, 29. Önemli yolların kesişme noktasında olan kent, 644 yılı sonrasında Arap akınlarına maruz kalır. MS 838 yılında Halife Mu'tasım ve ordusu tarafından yağmalanan kent, Karanlık Dönem'de varlığını sürdüren kentlerden birisidir. Bkz. Belke–Restle 1984, 123; Ivison 2007, 25-59. Amorium'da, MS 10. ve 11. yüzyılın ortalarına kadar Bizans İmparatorluğu etkin bir biçimde varlık göstermiştir. MS 1156-1257 tarihleri Selçuklular, sonrasında Osmanlılar için önemli olan kentin ismi, dönem kaynaklarında Amurriye olarak geçer. Yukarı Şehir açmalarından gelen arkeolojik buluntular burasının özellikle Osmanlı döneminde etkin olarak kullanılmış olduğunu gösterir. Bkz. Lightfoot–Mergen 1997, 345; Demirel-Gökalp 2021, 102.

[4] Amorium'da ilk kez 1987 yılında Prof. Dr. Martin Harrison tarafından başlatılan çalışmalar, 1993-2009 yılları arasında Dr. Chris Lightfoot'un başkanlığında devam ettirilmiştir. 2013 yılında Amorium kazı çalışmaları T.C. Kültür ve Turizm Bakanlığı onayı ile Afyonkarahisar Müzesi Müdürü Mevlüt Üyümez Başkanlığında ve Anadolu Üniversitesi'nden Doç. Dr. Zeliha Demirel Gökalp'in Bilimsel Danışmanlığında sürdürülmüş, kazı çalışmaları 2014 yılından itibaren Bakanlar Kurulu'nun kararı ile Prof. Dr. Zeliha Demirel Gökalp'in kazı başkanlığında devam etmektedir.

[5] Makaleye konu olan haçların bazıları Kazı Toplantısı Sonuçları ve Schoolman'ın 2010 yılı yayınında tanıtılmıştır. Haçlar, bu çalışmada bütün olarak ele alınmış ve değerlendirilmiştir.

https://doi.org/10.56170/propontica.1536503

göre küçük yapılan, işlevleri arasında kötülüklere karşı koruyucu özelliği olduğuna inanılan, kişisel kullanımda sıklıkla tercih edilen haçlardır. Üzerinde geometrik, bitkisel ve figüratif bezeme bulunabilir. Haç kolları uç kısımlarda düz veya köşelerde palmet, damla, yassı küre, daire biçiminde olabilir[6]. Röliker haç, bir mekânizmayla birbirine bağlanan iki parçadan oluşur. İç kısmı oyuktur ve kutsal kişilere ait olan kemik ya da eşyalar[7] bu boşlukta muhafaza edilir[8]. Üzerinde geometrik, bitkisel ve figüratif bezeme bulunabilir. Figüratif bezemeli röliker haçlarda İsa, Meryem, aziz ve melek betimleri görülür ve ikonoklazma sonrasında üretimleri yaygındır[9]. Röliker haçlar, içerisinde taşınan kutsalla özdeşleşmiştir[10]. Tören/takdis/adak haçlarının boyutları diğer türlere göre büyüktür ve toplu ayinlerde tören alayının başında taşınır. Hıristiyan bayramlarında düzenlenen törenler sırasında kullanılan bu haçlar genellikle Latin haçı formundadır[11]. Merkezden uca doğru haç kollarının genişlediği ve kol uçlarının düz veya köşelerde palmet, damla, yassı küre, daire biçiminde sonlandığı bu tür haçların dikey haç kolunun alt kısmı diğer haç kollarına nazaran uzundur ve tören sırasında bir sap ile taşınır.[12]

Bu çalışmada Amorium kazılarında bulunan haçlar form, bezeme ve üslup özellikleri, buluntu-mekân ilişkisi göz önüne alınarak diğer kazı buluntularıyla, müze ve özel koleksiyonlardaki örneklerle karşılaştırılarak değerlendirilmiştir. Her dönem haçlara olan talebin fazla olması üretimin sürekliliğini sağlamıştır. Geniş bir yayılım ve kullanım alanı olan haçların, form ve bezemeleri sınıflandırılmalarında belirleyici unsur olsa da taşınabilir olmaları, dolaşım alanının genişliği, hac yolculuğunda sıklıkla el değiştirmeleri, hediye veya ganimet olabilmeleri nedeniyle tarihlendirilmeleri sorun olabilmektedir. Bu nedenle, arkeolojik kazı alanlarından çıkarılan ve belirli konteksten gelen haçların buluntu-mekân ilişkisi bakımından değerlendirilerek tarihlenmesinin ve benzer nitelikteki kazı buluntularıyla karşılaştırılmasının, müze ve koleksiyonlardaki örneklerle karşılaştırılmasına oranla daha sağlıklı sonuçlar verdiği düşünülmektedir. Dolayısıyla Amorium kazı buluntuları da ağırlıklı olarak buluntu-mekân ilişkisi çerçevesinde değerlendirilmiştir.

AMORİUM KAZILARINDA BULUNAN HAÇLAR VE ELE GEÇTİKLERİ ALANLAR

Amorium kazılarında bulunan haçların on üçü pandantif (kat.no. 1-13, Fig: 3-4), üçü röliker (kat. no. 14-16, Fig: 4), ikisi tören (kat.no. 17-18, Fig: 5), biri takdis (kat.no: 19, Fig: 5), biri takdis/adak (Kat. No: 20, Fig: 5) ve biri de tören/takdis/

6 Özdemir-Öztaşkın 2009, 489-499; Koçyiğit 2018, 115; Uygun-Yazıcı 2023, 620; Köroğlu 2004, 45.
7 Rölik, en genel tanımıyla kutsal olarak kabul edilen kişilere ait kemik veya eşyalardır. Bkz. Frazer-Cutler 1991, 1782-1783; Aydın 2009a, 2; Aydın 2009b, 66; Uygun-Yazıcı 2023a, 183-185.
8 Acara-Eser 2015, 167-168.
9 Çakmakçı 2021, 239-247.
10 Rölik ve rölik kültü için bkz. Ünal-Çakmakçı 2023, 671-673; Sıddıki 2023, 564-568; Aydın 2009b, 65-69.
11 Cotsonis 1994, 40.
12 Acara-Eser 2010, 28-29; Altun 2020, 136-137.

adak (kat.no. 21, Fig: 5) haçıdır. Haçların biri gümüş (kat.no. 7), ikisi demir (kat. no. 12, 13), biri bakır (kat.no. 11) ve diğerleri bronzdan üretilmiştir. Haçların üzerindeki bezemeler kazıma (kat.no. 2-6, 9, 14, 17-18, 20) ve kabartma (kat.no. 14) tekniğindedir. Bu bezemeler geometrik (kat.no. 2-6, 18), figüratif (kat.no. 14) ve çizgiseldir (kat.no. 9, 17, 20-21). Geometrik bezemelerde iç içe geçmiş dairesel motifler kullanılmıştır. Figüratif bezemede Çarmıhta İsa, Meryem ve Vaftizci Yahya tasviri dikkat çeker. Bazı haçlarda ise bezeme yer almamaktadır (kat.no. 1, 8, 10, 11-13, 15-16, 19).

Pandantif haçlar yassı (kat.no. 1-12), dörtgen (kat.no. 13) ve kübik (kat.no. 10) kesitlidir. Latin ve Yunan Haçı formunda olan yassı kesitli pandantiflerin haç kolları düz (kat. no: 1-3, 10-13), damla (kat.no. 4-5), dairesel (kat.no. 6, 8) ya da yarım daire (kat.no. 7, 9) biçiminde sonlanmaktadır.

Röliker haçlar tek parçadır ve Tip I olarak nitelendirilen türdedir[13]. Latin Haçı biçiminde olan bu tipte haç kolları kesişme noktasından dışa doğru genişlemektedir. Alt kol, üst ve yatay kollardan daha uzundur (kat.no. 14-16).

Tören/takdis/adak haçları olarak değerlendirilen örnekler yassı kesitlidir (kat. no. 17-21). Bu haçlar kazı çalışmaları sırasında kırık olarak bulundukları için haç kollarının nasıl sonlandığı hakkında kesin bir sonuca varılamamıştır.

Kilise A

Haçların 13'ü Aşağı Şehir'de yer alan Kilise A'da ele geçmiştir. Kilise A, Amorium'da bilinen dört kiliseden biridir[14]. Yapı, 1987 yılında başlayan yüzey araştırmasında "A Alanı" olarak belirlenen yerde 1990-2009 yıllarında yürütülen kazı çalışmalarıyla ortaya çıkartılmıştır[15]. Bu yapı Kilise A, Bazilika A ya da Aşağı Şehir Kilisesi olarak isimlendirilmiştir. Alandaki açmalara 1'den başlamak koşuluyla 36'ya kadar numara verilmiş, bu numaraların başına da "A Alanı" olduğunu belli etmek için A harfi konulmuştur (Fig. 2).

[13] Brigitte Pitarakis, 2006 yılındaki yayınında röliker haçları on tip içerisinde değerlendirir. Bu tipoloji oluşturulurken; haç kollarının biçimsel özellikleri ve bitiş şekilleri göz önüne alınmıştır. Bkz. Pitarakis 2006, 30-39.

[14] Amorium'da dört büyük kilisenin kalıntılarına rastlanılmıştır. Kentte yürütülen arkeolojik çalışmalar bu kiliselerden üçünün Aşağı Şehir'de (A, C ve D Kilisesi) birinin Yukarı Şehir'de (B Kilisesi) bulunduğunu gösterir. Aşağı Şehir'deki yapılardan Kilise A merkezde, Kilise C sur duvarının güneydoğusuna yakın bir yerde ve Kilise D surların batı kapısı yakınında yer alır. Tsivikis 2021, 206-207.

[15] Kentteki arkeolojik kalıntıları kilise olarak tanımlayan ilk kişi 1836'da Amorium'u ziyaret eden William J. Hamilton'dır. Bkz. Hamilton 1842, 450-51.

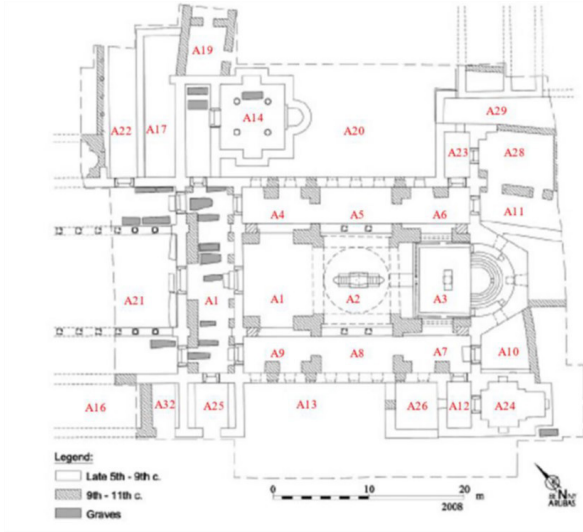

Fig. 2. Amorium, Kilise A (Amorium Kazı Arşivi)

Amorium kentinde kazı ve belgeleme çalışmaları yapılmış tek dini yapı olan Kilise A'nın ilk evresi 5.-6.yüzyıla tarihlenir ve kilise bu evresinde üç nefli, bazilikal planlıdır, kilisenin kuzeybatısında da vaftizhanesi vardır. Yaklaşık 650-838 yıllarına tarihlenen ikinci evresinde yapının bir dizi ciddi onarımlar geçirdiği ve yeni mekanların eklendiği görülmektedir. Geç 9.yy-11.yy. sonuna tarihlenen üçüncü evrede ise yapı kubbeli bazilikaya dönüştürülmüştür. Dördüncü ve son evresinde dini işlevini yitiren kilise Selçuklu Döneminde çiftlik evi olarak kullanılmış olmalıdır[16].

Kilise A'da farklı yıllarda A13, A16, A20, A21, A22, A24 ve A27 açmalarında gerçekleştirilen kazılarda 13 haç bulunmuştur. Haçlardan 4'ü kilisede tespit edilen mezarlarda *in-sitü* ele gelmiştir (kat.no.1, 2, 7, 9). A13 açmasında 62 nolu mezarda ele geçen pandantif haç (kat.no.7), Amorium Kazılarında bulunan tek gümüş haçtır. Kilise A'nın güneyinde yer alan A13 açmasında ayrıca dört büyük mezar[17] bulunmuştur. Bozulmadan günümüze ulaşan ve birçok bireyin üst üste gömüldüğü anlaşılan mezarlar buluntuları nedeniyle dikkat çekicidir. Narteks ve atriumda gün yüzüne çıkartılan mezarlarda bulunmuş tekstil parçaları gibi[18] A13 açmasında mezarlarda da tekstil parçaları, deri ve örgü kordon ele geçirilmiştir. Haçın bir yüzünde ΦΩC (ışık) ve ZΩH (hayat) ve diğer yüzünde K(ΥPI)E BOHΘH ΛEONTA (Tanrım Leo'ya yardım et) okunmaktadır. Mezar 62'den çıkartılan gümüş haç, bu-

[16] Ayrıntı için bkz. Harrison 1991, 211-224; Ivison 2010, 318-320; Lightfoot–Ivison 1997, 292; Ivison 2012, 65; Demirel-Gökalp 2021, 107.

[17] Bu mezarlar, 57, 62, 63 ve 64 nolu mezarlardır.

[18] Amorium'da Aşağı Şehir Kilise A'daki mezarlarda bulunmuş tekstil örnekleri için bkz. Linscheid 2012, 343-350; Linscheid 2007, 88-96; Linscheid 2004, 7-25.

luntu- mekân ilişkisi bağlamında Orta Bizans Dönemi'ne tarihlenmektedir[19]. Form olarak Thyateira Kazısı buluntusu[20], Sırbistan Macvanska Mitrovica Nekropolü buluntusu[21], Bulgaristan-Romanya buluntuları[22], İstanbul Arkeoloji Müzesi buluntusu[23], Belgrad Ulusal Müzesi buluntusu[24] gibi değişik coğrafyalardaki örneklerle karşılaştırılabilir. Söz konusu haçlar 10-12. yüzyıllara tarihlenmektedir.

A21 açmasında ise 5 haç mezarlarda bulunmuştur (kat. no. 1, 2, 3, 18 ve 21). Bu haçların üçü pandantif, biri tören haçı parçası diğeri de tören/takdis/adak parçasıdır. Kilisenin atriumu olarak tanımlanan A21 açmasının[25] ilk kullanım evresi MS. 6. yüzyıla, ikinci kullanım evresi MS. 9-10. yüzyıllar arasına tarihlenmektedir. Kilisenin ilk yapım evresinde inşa edilmiş olan Atrium, olasılıkla dikdörtgen planlı ve revaklıydı. Kuzey ve güneydeki açıklıklarla nartekse, batıdaki açıklıkla caddeye bağlanan atriumun mermer levhalarla kaplı olan zemininin 9. yüzyılda bir tahribata uğradığı düşünülmektedir[26]. Kilisenin kubbeli bazilikaya dönüştürüldüğü 9. yüzyılın sonu 10. yüzyılın başında ise A21 alanında zeminde söz konusu tahribat düzeltilmiş ve yükseltilen zemin farklı biçim ve kalitedeki gri mermer levhalarla tekrar döşenmiştir. A21'deki kazı çalışmaları sırasında üç mezar tespit edilmiştir[27]. 21 nolu mezarda bulunan 2 (kat.no. 1-2) ve 18 nolu mezarda bulunan 1 adet (kat. no. 3) Yunan haçı formlu ve üzeri iç içe geçmiş halkalarla bezeli pandandif haçların 5. yüzyıldan 13. yüzyıla kadar geniş bir tarih aralığında kullanılmış olduğunu söyleyebiliriz. Örneğin Atina Bizans ve Hıristiyan Müzesi'ndeki buluntular 5-7. yüzyıllara[28], Nevşehir Müzesi'ndeki bir örnek 6-9. yüzyıllara[29], Bandırma Müzesi buluntuları 6-13. yüzyıla[30], Denizli[31], Erzurum[32], Erimtan[33] ve Kırklareli[34] Müzesi örnekleri Orta Bizans Dönemine tarihlendirilmiştir. Kat. no. 1'deki örnek gibi üzeri bezemesiz olan haçın en yakın benzerlerinden Efes Arkeoloji Müzesi buluntusu[35], Troya mezar buluntusu[36], Ortahisar buluntusu[37] 10-12. yüzyıllara tarihlenmektedir. Kilise A'nın atriumu olarak tanımlanan A21 alanında tespit edilen 18 ve 21 nolu mezarlar, yapının kubbeli bazilikaya dönüştürüldüğü 9. yüzyılın sonu 10. yüzyılın

19 Lightfoot et al. 2009, 134.
20 Çakmakçı 2021, Kat. No: 4, 245.
21 Pitarakis 2006, Fig. No: 17, 36.
22 Pitarakis 2006, Kat. No: 178 ve 179, 239.
23 Pitarakis 2006, Kat. No: 173, 237.
24 Pitarakis 2006, Kat. No: 177, 239.
25 Lightfoot et al. 2008, 207-208.
26 Ligthfoot et al. 2007, 444.
27 Bu mezarlar, mezar 18, 19 ve 20 olarak isimlendirilmiştir.
28 Maremveliotaki 2002, Kat. No: 681-682, 499; Paisidou 2002, Kat. No: 683, 500.
29 Ünlüler 2019, Kat. No: 168, 191.
30 Altun 2020, Res. 5a-b, 140.
31 Özdemir-Öztaşkın 2009, Kat. No: 1, 3, 4 ve 7, Res. 1a, 3c, 4d ve 7g, 497.
32 Okuyucu 2023, G13, 380.
33 Koçyiğit 2018, Kat. No: 11, 121.
34 Uygun-Yazıcı 2023b, Kat. No: 9, 626-627.
35 Pitarakis 2006, Kat. No: 594, 374.
36 Pitarakis 2006, Kat. No: 589, 372.
37 Pitarakis 2006, Kat. No: 587, 372.

başında zeminin farklı biçim ve kalitedeki mermer levhalarla tekrar döşenmesinden sonra oluşturulmuş olmalıdır. A21 alanında 18 nolu mezarda bulunan ve 11. yüzyıla tarihlenen bir çift altın küpe, üç cam bilezik ve iki cam yüzük buluntusu da[38] dikkate alınırsa, A21 açmasında 21 nolu ve 18 nolu mezarlarda ele geçen haçlar da Orta Bizans Dönemi'ne yani 10.-11.yüzyıla tarihlendirilebilir[39]. A21 alanında ayrıca 1 tören haçı (kat.no.18) ve 1 tören/takdis/adak haçı (kat.no.21) parçaları kırık olarak ele geçmiştir. Bu haçlar kırık/eksik olduğu ve yeteri kadar veri sunmadığı için karşılaştırma örnekleri bulunamamıştır. Ancak buluntu-mekân ilişkisi ve konteks bilgilerine göre Orta Bizans Dönemine tarihlenebilir.

Kilise A'nın güneyinde A27 olarak tanımlanmış alanda 13 mezar tespit edilmiştir[40]. Bu mezarlar, A13 açmasında bulunan Orta Bizans Dönemi mezarlığının doğudaki devamı olarak kabul edilmektedir. A27'deki mezarlarda da A13'te olduğu gibi birçok bireyin üst üste gömüldüğü anlaşılmaktadır. 98 nolu mezarda bulunan pandandif haç (kat.no.9) cam bilezikler, dağınık halde cam boncuklar ve bakır takılar ile beraber bulunmuştur. Bu alandaki 97 nolu mezarda ahşap tabut kalıntıları, 112 nolu mezarda bir bireyin kolunda yedi cam bilezik ve 116 nolu mezarda pandantif haçla (kat.no.11), bir cam, iki bakır bilezik birlikte ele geçmiştir. [41] Tekstil ve deri kalıntılarına da rastlanan A27 açmasının mezar buluntuları oldukça etkileyicidir. 98 nolu mezarda bulunan pandandif haçın (kat.no.9) en yakın benzeri Ereğli Müzesi'nde yer almakta ve 9-12. yüzyıllara tarihlenmektedir[42].

Kilisede A'da bulunan bir diğer pandantif haç (kat.no. 10) A16 açmasında ele geçmiştir. A16, Kilise A'nın güneybatı köşesinde yer alan modern köy evinin yıkılmasıyla ortaya çıkan bir alandır. Bu alan, kuzey duvarındaki açıklıkla narteksе bağlanmaktadır. A16 kilisenin ilk evresiyle ilişkilendirildiğinden 5. yüzyıla tarihlenmiş olsa da Kilise A'nın geçirdiği onarımlar sonrasında bu alanın kullanımının Orta Bizans Dönemi boyunca sürdüğü anlaşılmıştır[43]. A16'da bulunmuş olan haç, mevcut bilgiler ışığında değerlendirildiğinde Orta Bizans Dönemi'ne tarihlenmektedir. Form olarak benzer örnekleri, Aksaray, Niğde ve Nevşehir Müzesinde bulunur ve 9-12. yüzyıllara[44], Denizli Arkeoloji Müzesi ve Boğazköy Kazısı buluntuları yüzyıl belirtilmeksizin Orta Bizans Dönemine tarihlendirilir[45].

38 Ligthfoot et al. 2007, 445-446.
39 Schoolman 2010, 377-378; Ligthfoot et al. 2007, 466; Lightfoot et al. 2008, 208.
40 Bu mezarlar 85, 96, 97, 98, 99, 100, 101, 111, 112, 113, 114, 115, 116 numaraları ile isimlendirilmiştir.
41 Lightfoot et al. 2010, 47-48.
42 Ünlüler 2019, Kat. No: 67, 89.
43 Lightfoot et al. 2008, 202-207; Aynı alanda bulunan 2 sikke MS 976/1030-35 yıllarına, 2007 yılında ele geçen bir stylus ise benzer örnekleri göz önüne alınarak 5.-6. yüzyıla tarihlenmiştir. Bkz. Demirel-Gökalp 2021, 108.
44 Ünlüler 2019, Kat. No: 81-82-83 ve 84, 101-106.
45 Özdemir-Öztaşkın 2009, Kat. No: 10, Res. 2d, 494 ve 498; Böhlendorf-Arslan 2012, Abb. 13-22, 364-365.

Kilise A'nın kuzeyinde, Vaftizhanenin doğusunda yer alan A20 olarak tanımlanmış alanda ise 1 takdis haçı parçası (kat.no. 19) bulunmuştur[46]. Kazı sonuçlarına göre etrafı çevrelenmiş A20'nin avlu, bahçe ya da mezarlık olabileceği düşünülmüştür. Kazılar sırasında ortaya çıkan mezarlar[47] ve dağınık halde bulunan iskeletler A20'nin geç 11. yüzyıla kadar mezarlık olarak kullanıldığını kanıtlamaktadır[48]. Bu alan aynı zamanda Kilise A'nın, 838 yılında işgal edilmesinin ardından yeniden inşa edilmesi sırasında, bir nevi şantiye olarak işlev görmüş ve A20 alanında harç havuzu olduğu öne sürülmüştür. Dolayısıyla alanın Orta Bizans Döneminde de kullanılmış olduğu düşünülmektedir. A20'de bulunan harç havuzunun altında tespit edilen yıkım tabakası üzerinde Orta Bizans dönemine tarihlenen sırlı bir kap[49] ve III. Mikhail'e (MS. 843-867) ait gümüş miliaresion sikkesi bulunmuştur. A20'de yıkım tabakası üzerinde gelen haçın, kırık olsa da mevcut ölçülerinden yola çıkarak Latin haçı formunda takdis haçı olduğu söylenebilir. Form olarak benzer örnekleri Kayseri ve Nevşehir Müzelerinde[50], Erimtan Müzesi'nde[51] ve Kütahya'da Tokul Kilise Kazısı buluntuları[52] arasında yer almaktadır. Söz konusu örnekler de Orta Bizans dönemine tarihlenmektedir.

Kilise A'da atriumun kuzeyinde yer alan A22 alanında ise 1 pandantif haç (kat. no.13) ve 1 Takdis/Adak haçı (kat.no. 20) bulunmuştur. A22'de gerçekleştirilen kazılarda bulunan *in-situ* beş sütun kaidesi ve ion-impost başlıklar burasının revaklı bir alan olduğunu, ancak Orta Bizans Döneminde sütunların aralarının doldurulup küçük bir apsis eklenerek işlevinin değiştirildiğini göstermiştir[53]. A22 açmasında bulunan haçlar da Orta Bizans Dönemi tabakasında ele geçmiştir. Haçlardan biri (kat.no. 20) mevcut ölçüleri, kalınlığı (1 cm) ve ağırlığı göz gönüne alındığında takdis/adak haçları arasında değerlendirilmiştir. Söz konusu haçın form ve haç kolu ucundaki bezeme dikkate alındığında en yakın örneği Orta Bizans Dönemine tarihlenen Boğazköy Kazısında ele geçen bir haç parçasıdır[54].

Kilise A'nın güneydoğusunda yer alan A24 açmasında da 1 adet tören haçı parçası bulunmuştur (kat.no. 17). 2007 ve 2008 yıllarında arkeolojik kazıların gerçekleştirildiği A24'ün Kilise A'nın ilk evresinde inşa edildiği, kuzey ve güney duvarında birer niş olan mekanın duvarlarının ve zemininin mermer kaplamalı olduğu

46 A20 açması büyük bir alandır ve kazı çalışmaları sırasında rahat çalışılabilmesi için beş ayrı birime (A, B, C, D ve E) bölünmüştür. Ayrıntı için bkz. Lightfoot et al. 2008, 202.

47 A20 açmasında 36 mezar bulunmuş, bu mezarlardan 128 bireye ait iskelet kalıntısı çıkarılmıştır. Yapılan incelemelerde doğum öncesi ve sonrasında hayatını kaybeden bireylerin oranı %42.9'dur. Bu mezarlar Orta Bizans Dönemi'ne tarihlenir. Bkz. Demirel 2013, 349-364.

48 Lightfoot et al. 2007, 477; Lightfoot et al. 2008, 203-204.

49 Lightfoot et al. 2009, 136.

50 Ünlüler 2019, Kat. No: 152-153-154, 74-176.

51 Koçyiğit 2018, Kat. No: 2, 120.

52 Demirel-Gökalp 2016, Kat. No: 7-8, 256.

53 Lightfoot et al. 2008, 208.

54 Böhlendorf-Arslan 2012, Abb. 3-3, 355.

ve bir hazine odası olarak kullanıldığı üzerinde durulmuştur[55]. Orta Bizans döneminde ise söz konusu mekanın bir şapel olarak kullanıldığı ve duvarlarının 10. yüzyılın sonunda duvar resimleriyle süslendiği anlaşılmaktadır[56]. A24 açmasında bulunan haç kırıktır ve parça halinde alt kolu günümüze ulaşmıştır. Bu kolun uç kısımları da kırık olduğundan ne şekilde sonlandığı anlaşılamayan haç parçasının toplam uzunluğunun 30-35 cm. olabileceği tahmin edilmektedir. Haç parçasının alt kısımda bir sapa takılmak suretiyle kullanılabileceğini gösteren izler vardır. Ön yüzünde bezemeler bulunan eserdeki kalıntılar değerli metalle kaplı olduğunu göstermektedir[57]. Haç parçası buluntu-mekân ilişkisi ve konteks bilgilerine göre Orta Bizans Dönemine tarihlenir. Haç, form olarak Orta Bizans Dönemine tarihlenen Boğazköy Kazısı buluntusu[58], Tokul Kilisesi buluntusu[59], Ankara Anadolu Medeniyetleri Müzesi'ndeki bir örneğe[60] benzemektedir.

Büyük Mekan

Aşağı Şehir Büyük Mekân XE-06 açmasında 2006 yılı kazı çalışmaları sırasında bir demir pandantif haç (kat.no.12) bulunmuştur.[61] Büyük Mekân, Kilise A'nın kuzeydoğusunda, Yukarı Şehir Höyüğünün güneyinde yer alır. Bu alanda 1996-2008 yılları arasında arkeolojik kazı çalışmaları yürütülmüştür. Büyük Mekân, 6. yüzyılda inşa edilen Bizans Hamamı, 7-9. yüzyıla tarihlenen endüstriyel işlevli yapılar ve 10-11. yüzyıllara tarihlenen Orta Bizans Dönemi kalıntıları[62] gibi farklı türdeki yapıların içerisinde bulunduğu alanın tümüdür. Büyük Mekân XE[63] açmasındaki kazı çalışmaları 2004 yılında başlamıştır. Bu mekânın güney duvarının kuzeye bakan yüzeyini açığa çıkarmak için başlatılan arkeolojik çalışmalarda geniş bir caddeye rastlanılmıştır. 2006 ve 2008 yıllarında alandaki çalışmalar yoğunlaşmıştır. XE-06 ve XE-08 açmalarında şarap üretim atölyeleri ortaya çıkarılmıştır[64]. XE-06 açmasında bulunan haç 6.-7.yüzyıla tarihlenen Erken Bizans Dönemi tabakasında[65] ele geçmiştir. Ancak bu haçın benzer örneklerinden Boğazköy kazılarında bulunanı Orta Bizans Dönemine[66], Sagalassos kazılarında bulunanı ise 9-12. yüzyıla tarihlenmektedir[67].

55 Lightfoot et al. 2009, 135; Lightfoot et al. 2008, 205.
56 Ivison 2010, 333-334.
57 Ivison 2010, 331-332.
58 Böhlendorf-Arslan 2012, Abb. 6. 3 ve 4 Abb. 4. 1 ve 3; 355-358.
59 Demirel-Gökalp 2016, Kat. No: 7, 264.
60 Acara-Eser 2010, Kat. No: 14, 38.
61 Yıldırım 2017, Kat. No. 28, 111.
62 Maniotis–Demirel-Gökalp 2021, 1282.
63 Kazı alanının stratigrafisinin anlaşılması için "Harris Matrix" sistemi kullanılmıştır. Bu sisteme göre tüm alan "X" olarak kabul edilmiştir. Açmalara ise sırayla harfler verilmiştir. Kazı yıllarının harflerin ardına eklenmesiyle isimlendirme tamamlanmıştır. Örneğin XA açmasının 1996 yılı kazılarını belirtmesi için XA-96 ifadesi kullanılmıştır. Bkz. Ivison 2012, 9.
64 Lightfoot et al. 2007, 448-450.
65 Lightfoot et al. 2007, 449.
66 Böhlendorf-Arslan 2012, Abb. 13-19, 364-365.
67 Cleymans–Talloen 2018, Fig. 5a.

Aşağı Şehir, Nekropol

Aşağı Şehir Kuzey Nekropol ve Güneybatı Nekropol kazılarında 2 röliker haç (kat.no.14-15) ve 2 pandantif haç (kat.no. 4 ve 6) bulunmuştur. Amorium kenti nekropol alanı oldukça geniş bir coğrafyaya yayılmıştır. Emirdağ'dan Hisarköy istikametinde giden modern yolun geçtiği vadinin iki tarafında farklı tiplerde mezarlar gün yüzüne çıkarılmıştır. Bu mezarlardan çıkan buluntular 2. yüzyıldan başlayıp Bizans Dönemine kadar geniş bir tarih aralığı sunmaktadır. Arkeolojik çalışmalar da söz konusu mezarların insanlar tarafından farklı yüzyıllarda defalarca kullanıldığını göstermektedir. Aynı zamanda kaçak kazı ve yağmaya da maruz kalan alanların devşirme malzemeyle yeniden inşa edildikleri ve kullanıldıkları anlaşılmaktadır[68]. Kuzey nekropolde kaçak kazıyla bir kısmı açığa çıkmış alanda 2005 yılında yapılan arkeolojik kazı çalışmalarında kapsamlı ve büyük bir gömü alanına ulaşılmıştır. Birbiriyle bağlantılı 4 ayrı odacıktan oluşan bölümler MZ94a-d olarak adlandırılmıştır. Yan yana konulan Roma Dönemi mezar taşları MZ94'ü haç şekli oluşturacak şekilde dört parçaya bölmüştür[69]. MZ94-d'de yapılan arkeolojik çalışmalarda en az 15 birey tespit edilmiştir. Açmanın dolgu toprağında bulunan cam ve seramik parçalar Erken Roma Dönemine işaret etse de kuzeydoğu odacıktan gelen iki kandil MS 6-7. yüzyıla tarihlendirilmiştir[70]. MZ94 açmasında bulunan haçlar, buluntu-mekân ilişkisi ve konteks bilgisine göre 10-11. yüzyıla tarihlenmiştir[71]. Tek parçası günümüze ulaşan röliker haçlardan biri (kat.no. 14), üzerindeki figüratif bezemeyle dikkat çekmektedir. Kazıma tekniğinde yapılan Çarmıhta İsa betimlemesine yatay haç kollarının uç kısmında Meryem ve Yahya eşlik etmektedir. İsa'nın çarmıhının üst kısmı, güneş ve ay simgeleri, kollarının altında yer alan Grekçe yazı haçın ayırt edici özelliklerindendir. Farklı coğrafyalarda çok sayıda örnekle karşımıza çıkan bu eserin benzerleri, Anadolu'da Manisa-Akhisar'daki Thyateira Kazısında[72], İstanbul Arkeoloji Müzesinde[73], Balıkesir Kuva-yi Milliye Müzesinde[74], Bursa Arkeoloji Müzesinde[75] ve Anadolu dışında Atina Canellopoulos Müzesinde[76], Belgrad Ulusal Müzede[77], William M. Milliken Özel Koleksiyonunda[78] bulunur. Mevcut örnekler 9-12. yüzyıl aralığına tarihlenmektedir. Aynı mezarda bulunan pandantif haçın (kat.no. 4) form ve bezeme açısından

68 Ligthfoot–Ligthfoot 2007, 154-161.
69 Ligthfoot–Ligthfoot 2007, 159-160.
70 Ligthfoot et al. 2006, 273-274; Ligthfoot–Ligthfoot 2007, 161.
71 Schoolman 2010, 377-378; Yaman 2012, 336-339.
72 Çakmakçı 2021, Kat. No: 3, 243.
73 Pitarakis 2006, Kat. No: 91 ve 113, 214 ve 221.
74 Sıddiki 2023, Kat. No: 6, 577.
75 Elyiğit 2022, G.7, 188-189.
76 Pitarakis 2006, Kat. No: 92, 215.
77 Pitarakis 2006, Kat. No: 118, 222.
78 Carr 1997, Kat. No: 119, 169.

benzerleri Komana Kazısı[79], Nevşehir Müzesi[80], Niğde Müzesi[81], Kayseri Müzesi[82] örnekleri arasında yer alır ve 9-12. yüzyıllara tarihlenir.

Güneybatı Nekropol, MZ090 alanında 2007 yılında gerçekleştirilen kazı çalışmalarında üç bölüme ayrılmış bir mezar odası tespit edilmiştir. Mezarlardan çok sayıda karışık iskeletin düzensiz gelmesi önceki dönemlerde mezarın açıldığını ve soyulduğunu göstermiştir. Mezar odasında 7. yüzyıla tarihlenen bir sikke, 6-7. yüzyıla tarihlenen bir kemer tokası ve bir haç bulunmuştur[83]. Benzer örnekleri göz önüne alındığında haç 10-11. yüzyıla tarihlenmektedir[84]. Haçın, İstanbul ve Kütahya Arkeoloji Müzesi'ndeki[85] benzerleri 10-11. yüzyıla tarihlenir. Bununla beraber Boğazköy ve Yumuktepe kazılarında[86], Erimtan, Denizli, Erzurum Müzesi'nde[87] ve Atina, Bizans ve Hristiyan Müzesi'ndeki[88] benzerleri 5. yüzyıldan 13. yüzyıla kadar geniş bir tarih aralığında değerlendirilmektedir.

Yukarı Şehir Bazilika B

Yukarı Şehir Bazilika B kazılarında bir adet pandantif haç (kat.no. 8) bulunmuştur. 2013 yılında arkeolojik çalışmaların başladığı Bazilika B, Yukarı Şehir'in kuzeydoğusunda, sur duvarının yakınında yer alır. Apsis ve batısında yürütülen çalışmalara göre Bazilika B dıştan yedi cepheli içten yarım yuvarlak apsisli, üç nefli bir bazilikadır. Kazı çalışmalarına göre Erken Bizans Dönemi bazilikasının farklı yapım ve kullanım evreleri olduğu, Orta Bizans Dönemi ya da öncesinde yangın, hasar, kasıtlı yıkım gibi çeşitli nedenlerle işlevini yitirdiği, yığma duvarlarla çeşitli mekânlara bölündüğü, doğu, kuzey ve güneyinin mezar alanına dönüştürüldüğü anlaşılmıştır[89]. Bazilika B Bg1 açmasının kesitinde bulunan haç parçasının (kat. no.8) dikey haç kolunun alt kısmı ve üst halkası, yatay haç konunun uçları kırıktır. Haç parçası konteks özellikleri dikkate alınarak Orta Bizans Dönemine tarihlenebilir. 10-11. yüzyıla tarihlenen benzer örnekleri Efes Müzesi[90], Atina Benaki Müzesi[91] ve Bibliothèque Nationale de France Müzesi'nde[92] ve 9-12. yüzyıla tarihlenen bir benzeri de Aksaray Müzesi'nde bulunmaktadır[93].

79 Acara-Eser 2019, Kat. No: 13, 89.
80 Ünlüler 2019, Kat. No: 41,44, 45,46, 63-66-67-68.
81 Ünlüler 2019, Kat. No: 42 ve 43, 64-65.
82 Ünlüler 2019, Kat. No: 47, 69.
83 Lightfoot et al. 2008, 210.
84 Schoolman 2010, 377-378.
85 Pitarakis 2006, Kat. No: 104 ve 106, 218-219.
86 Böhlendorf-Arslan 2012, şekil 13, fig. 21, 365; Köroğlu 2010, şekil 1, fig. 3.
87 Koçyiğit 2018, No: 11-12, 121; Özdemir-Öztaşkın 2009, Kat. No: 5 ve 7, 479; Okuyucu 2023, No: 12, 380.
88 Maremveliotaki 2002, Kat. No: 681-682, 499.
89 Demirel-Gökalp et al. 2023, 491; Erel 2022, 256.
90 Pitarakis 2006, Kat. No: 233, 261.
91 Pitarakis 2006, Fig. 15, 34.
92 Pitarakis 2006, Kat. No: 574, 368.
93 Ünlüler 2019, Kat. No: 75, 97.

Yukarı Şehir İç Sur

Yukarı Şehir İç Sur kazılarında 1 adet bronz röliker haç bulunmuştur (kat.no. 16). İç Sur, Amorium'da Yukarı Şehir'i kuşatan sur sisteminin güneybatı köşesinde yer almaktadır. Yürütülen arkeolojik çalışmalarda payanda ve kuleleriyle güçlü bir Bizans savunma yapısı olarak ortaya çıkarılan İç Sur, kentin 11. yüzyıl sonu Bizans Dönemi sonrası Türk-İslam Dönemi kullanımına ışık tutan zengin buluntularıyla dikkati çekmektedir[94]. Bununla beraber İç Sur'un inşası sırasında açıldığı düşünülen zorunlu temel kazıları, Höyükteki aşınma, Bizans ve Türk dönemlerinde höyük üzerinde gerçekleştirilen teraslama çalışmaları farklı kültürlere ait arkeolojik buluntuların aynı kontekste bir arada gelmesine neden olmaktadır. Röliker haç Türk-İslam dönemine tarihlenen tabakada ele geçmiştir. Röliker haçın üzerindeki korozyon tabakasında rastlanılan tekstil kalıntıları, haçın dağılmış bir mezardan bu alana gelmiş olabileceğini düşündürmektedir. Söz konusu haç tek taraflı olarak gümünüze ulaşmıştır. Form olarak en yakın benzer örneği 11-12. yüzyıla tarihlenmekte ve Korint Arkeoloji Müzesinde bulunmaktadır[95].

Amorium'da, 2006 yılında, yüzeyde bulunan pandantif haçın alt koluna ait olan parça (kat.no.5) diğer buluntular göz önüne alınmak suretiyle (kat.no. 2-4, 6) Orta Bizans Dönemine tarihlenebilir.

DEĞERLENDİRME VE SONUÇ

Amorium'da 1988-2023 yılları arasında gerçekleştirilen kazılarda 21 madeni haç ve parçaları bulunmuştur. Makaleye konu olan bazı haçlar periyodik olarak Kazı Sonuçları Toplantısı ciltlerinde ve Schoolman'ın 2010 yılı yayınında tanıtılmış olsa da ilk defa bu çalışmada bütün olarak ele alınmış ve değerlendirilmiştir. Haçların 1'i gümüş, 2'si demir, 1'i bakır ve 17'si bronzdur. Bu haçların 13'ü pandantif (kat.no.1-13), 3'ü röliker (kat.no.14-16), 2'si tören (kat.no. 17-18), 1'i takdis (kat.no. 19), 1'i takdis/adak (kat.no.20) ve 1'i tören/takdis/adak haçı (kat.no. 21) olarak tanımlanmıştır. Latin ve Yunan Haçı formunda olan pandantif haçlar yassı (kat.no. 1-12), dörtgen (kat.no. 13) ve kübik (kat.no. 10) kesitlidir. Röliker haçlar tek parçadır ve Latin Haçı formundadır. Tören/takdis/adak haçları olarak değerlendirilen örnekler ise yassı kesitlidir. Haçlar; Aşağı Şehir'de Kilise A, Büyük Mekân, Kuzey ve Güneybatı Nekropol, Yukarı Şehir'de ise İç Sur ve Bazilika B'de ele geçmiştir. Amorium Kazısında bulunan madeni haçlar ve parçaları için, buluntu-mekân ilişkisi, üslup özellikleri, benzer örnekleri göz önüne alınarak tarihlendirme önerilerinde bulunulmuştur.

[94] İç Sur kazılarında Türk-İslam Dönemi yerleşimiyle ilişkili mekânlar ve buluntularla ilgili bkz. Demirel-Gökalp et al. 2016, 202-203; Demirel-Gökalp et al. 2019, 567-568; Demirel-Gökalp et al. 2020, 570; Demirel-Gökalp et al. 2022, 508; Yılmazyaşar–Demirel-Gökalp 2021; Kurt 2022a, 17-18; Kurt 2022b, 334.

[95] Pitarakis 2006, Kat. No: 172, 237.

Bizans dünyasında haça yüklenen sembolik anlam, haçın yaygın kullanımını ve üretimin sürekliliğini sağlamıştır. Amorium'da da dini, savunma, endüstriyel ve mezar gibi yapı bakiyelerinde ele geçen haçlar, haçın farklı alanlardaki yaygın kullanımının bir göstergesidir. Bununla beraber haçların 13'ü Aşağı Şehir'de Kilise A'da 3'ü Nekropoldeki mezarlarda ele geçmiştir. Mezarlardan gelen haçlar, ölen kişinin iyi bir Hıristiyan olduğunun göstergesi sayıldığından ve koruyuculuğuna inanıldığından, Kilise A ve Nekropoldeki mezarlarda *in-situ* ve dağınık bulunan haçlar buluntu-mekân ilişkisi bakımından anlamlı, Kilise ve Nekropolün kullanım evreleriyle ve ölü gömme gelenekleriyle de uyumludur. Amorium buluntuları içerisindeki tören, takdis, adak türündeki haç parçalarının da Kilise A'da bulunmuş olması rastlantısal değildir. Söz konusu buluntular yapının yortu günlerinde düzenlenen toplu ayinlerde kullanıldığına işaret ediyor olmalıdır. Aşağı Şehir Büyük Mekan'da ele geçen pandantif haç aksesuar olarak kullanılmış günlük kayıplar arasında değerlendirilebilir. Ancak Yukarı Şehir İç Sur'da Türk-İslam tabakasında bulunan röliker haç parçasının üzerindeki tekstil kalıntıları, haçın alanın tesviyesi sırasından dağılmış bir mezardan gelmiş olabileceğini düşündürmektedir.

Katalog[96]

1. Pandantif Haç, Bronz, Yük: 7,1 cm. Gen: 4,8 cm. Kal: 0.2 cm., 8075, Kilise A (A21-Mezar 21, 2007), Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Yunan Haçı formunda olan eserin haç kolları merkezden uca doğru genişler. Dikey haç kolunda halka bulunur. Ön ve arka yüzü bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl). Schoolman 2010, 377-378.

2. Pandantif Haç, Bronz, Yük: 3,2 cm. Gen: 2,1 cm. Kal: 0,2 cm., 8109, Kilise A (A21-Mezar 21, 2007), Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Yunan Haçı formundaki eserin haç kolları merkezden uca doğru genişler. Dikey haç kolunda halka bulunur. Ön yüzde biri merkezde, dördü haç kollarının uçlarında olmak üzere iç içe geçirilmiş beşer daireden oluşan kazıma tekniğinde yapılmış bir bezeme yer alır. Bu bezemeler yatay haç kollarında tamamlanamamıştır. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl). Schoolman 2010, 377-378; Ligthfoot, Koçyiğit ve Yaman 2007, 466.

3. Pandantif Haç, Bronz, Yük: 4 cm. Gen: 2,4 cm., Kal: 0,6 cm., 7317, Kilise A (A21, 2006), Tanım: Yassı olan haç döküm tekniğinde yapılmıştır. Yunan Haçı formundaki eserin haç kolları merkezden uca doğru genişler. Dikey haç kolunda bir halka yer alır. Ön yüzde iç içe geçirilmiş üçer ve ikişer daireden oluşan kazıma tekniğinde yapılmış bezeme vardır. Bu bezemelerin biri merkezde yer alırken dördü haç kollarına denk gelecek şekilde simetrik bir dağılıma sahiptir. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl). Schoolman 2010, 377-378; Lightfoot, Ivison, Yaman ve Şen 2009, 207-208.

[96] Katalogda sırayla önce katalog numarası, haçın türü, malzemesi, ölçüleri, kazı envanter numarası, buluntu yeri ve buluntu tarihi, tanımı, önerilen tarih ve varsa yayın bilgisi yer almaktadır.

4. Pandantif Haç, Bronz, Yük: 5,5 cm. Gen: 3,4 cm. Kal: 0,1 cm., 6726, Kuzey Nekropol (Mezar 94-d, 2005) Tanım: Yassı olan haç döküm tekniğinde yapılmıştır. Haç kolları merkezden uca doğru genişler ve dikey haç kolunda bir halka yer alır. Haç kollarının uçları sağ ve solda dışa taşkın belirgin damla şeklinde sonlanır. Ön yüzde kazıma tekniğinde yapılmış on sekiz küçük bezeme vardır. İç içe geçmiş dairesel bezemelerin içleri oyuktur. Eserin arka yüzü düz ve bezemesizdir.

Orta Bizans Dönemi (10.-11. Yüzyıl). Schoolman 2010, 377 ve 379; Ligthfoot, Koçyiğit ve Yaman, 2006, 273-274, Çizim:2; Yaman 2012, 339

5. Pandantif Haç, Bronz, Yük: 3 cm. Gen: 3,2 cm. Kal: 0,1 cm., 7212 Aşağı Şehir (yüzey buluntusu, 2006) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır ve günümüze tam olarak ulaşamamıştır. Merkezden uca doğru genişleyen haç kolu yarım ve kırıktır. Haç parçasının uç kısmında, sağ ve solda dışa taşkın damla formunda çıkıntılar bulunur. Bu kısımların üzerinde birer, kırık haç kolunda ise iki olmak üzere toplam dört bezemesi vardır. Kazıma tekniğinde yapılan bezemeler iç içe geçmiş ikişer daireden oluşur. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi

6. Pandantif Haç, Bronz, Yük: 4,5 cm. Gen: 3,3 cm., Kal: 0.2 cm., 7972, Güneybatı Nekropol (MZ090, 2007) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Yunan Haçı formunda olan eserin haç kolları merkezden uca doğru genişler. Kolların uçları daire biçiminde sonlanır. Dikey haç kolunda bir hakla bulunur. Ön yüzde biri merkezde, dördü haç kollarının uçlarında olmak üzere iç içe geçirilmiş ikişer daireden oluşan kazıma tekniğinde yapılmış bir bezeme yer alır. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10.-11. Yüzyıl). Schoolman 2010, 377-378; Lightfoot, Ivison, Yaman ve Şen 2008, 210.

7. Pandantif Haç, Gümüş, Yük: 2,95 cm. Gen: 1.88 cm. Kal: 0,5 cm., 8342 Kilise A (A13, Mezar 62, 2008) Tanım: Yassı olan haç döküm tekniğinde yapılmıştır. Dikey haç kolunda bir halka yer alır. Haç kolları yarım yuvarlak, uçlarda (sağ ve solda) dışa taşkın damla ile sonlanır. Haçın her iki yüzü de yazılıdır. Bir yüzde, ΦΩC (ışık) ve ZΩH (hayat) diğer yüzde K(ΥPI)E BOHΘH ΛEONTA (*Tanrım Leo'ya yardım et*) yazar. Orta Bizans Dönemi (10-11. yüzyıl). Schoolman 2010, 377 ve 380; Lightfoot, Ivison, Yaman ve Şen, 2009, 134.

8. Pandantif Haç, Bronz, Yük: 5,5 cm. Gen: 7 cm. Kal: 0,5 cm., AMR22-81, Bazilika B (Bg1, 2022). Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Merkezden uca doğru genişleyen haç kolları uçlarda dairesel formda sonlanır. Haç kollarının sağ ve solunda da dışa doğru dairesel çıkıntı yapan kısımları vardır. Dikey haç kolunda bulunan halka, aynı haç kolunun alt kısmı, yatay haç kolunun sol tarafında yer alan dairesel çıkıntılar kırıktır ve günümüze

ulaşamamıştır. Yatay haç kolunun bir tarafı korozyonludur olan eserin ön ve arka yüzünde bezeme bulunmamaktadır. Orta Bizans Dönemi

9. Pandantif Haç, Bronz, Yük: 3,7 cm. Gen: 2.81 cm. Kal: 0,2 cm., 8503, Kilise A (A27, Mezar 98, 2006) Tanım: Yassı olan haç döküm tekniğinde yapılmıştır. Haç kolları merkezden uca doğru genişler. Dikey haç kolunda bir halka yer alır. Yunan haçı formunda yapılan eserin haç kolları uçlarda dışa taşkın üçer adet yarım daire ile sonlanır. Ön yüzünde kazıma tekniğinde yapılan çizgisel iç bükey bezemeler vardır. Merkezde ise dışa taşkın dairesel bir kabartma vardır. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl).

10. Pandantif Haç, Bronz, Yük: 2,8 cm. Gen: 1,8 cm. Kal: 0,8 cm., 8141, Kilise A (A16, 2007) Tanım: Pandantif haç döküm tekniğinde yapılmıştır. Dikey haç kolunda yer alan halka eğiktir. Haçın merkezi kübik, merkezden devam eden haç kolları çokgendir. Uçları konik biçimde sonlanan haç, bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl). Schoolman 2010, 377 ve 379.

11. Pandantif Haç, Bakır, Yük: 3,9 cm. Gen: 2,6 cm. Kal: 0,1 cm. 8557, Kilise A (A27, Mezar 116, 2009) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Eserin haç kolları birbirine eşit değildir ve bazı noktalardan kırıkları mevcuttur. Tahrip olan eser korozyonludur. Dikey haç kolunda ve haçı asmak için sonradan yapıldığı düşünülen bir delik yer alır. Her iki yüzü de düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl).

12. Pandantif Haç, Demir, Yük: 4 cm. Gen: 2,5 cm. Kal: 0.2 cm., 7269, Büyük Mekan (XE , 2006) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Haç kolları birbirine eşit olmamakla birlikte özensiz bir işçiliğe sahiptir ve düz sonlanır. Dikey haç kolunda yer alan halkanın arka tarafı kırılmıştır. Haç kollarının merkezinde dört köşeli düzgün olmayan delik bulunur. Deliğin köşeleri haç kollarının eksenini dik keser. Ön ve arka yüzü bezemesizdir. Orta Bizans Dönemi. Yıldırım, 2017, 111

13. Pandantif Haç, Demir, Yük: 4,1 cm. Gen: 2,8 cm. Kal: 0,5 cm., 8357, Kilise A A22, 2008) Tanım: Dörtgen kesitli olan eser döküm tekniğinde yapılmıştır ve korozyonludur. Latin haçı formunda üretilmiş, dikey haç kolunun üst kısmı kısa, alt kısmı uzun, yatay haç kolları birbirine eşit yapılmıştır. Dikey haç kolunda olması muhtemel halka ve bağlantısı görülmemektedir. Haçın iki yüzünde de bezemesi yoktur. Orta Bizans Dönemi (10-11. yüzyıl).

14. Röliker Haç, Bronz, Yük: 8,45 cm. Gen:6,5 cm. Kal: 0,6 cm., 6680, Kuzey Nekropol (Mezar 94-d, 2005) Tanım: Ön yüzü günümüze gelebilen röliker haç döküm tekniğinde yapılmıştır. Latin Haçı formunda üretilen eserin haç kolları merkezden dışa doğru genişler. Üzerinde kazıma tekniğinde yapılmış Çarmıhta İsa figürü yer alır. İsa'nın başında haç motifli halesi, el ve ayakla-

rında çivi izleri görülür. Dikey haç kolunun üst tarafında güneş ve ay simgesi yer alır ve aynı haç kolunun ucunda sonradan açılan bir delik bulunur. Yatay haç kollarının uç kısmında sağda Meryem solda Vaftizci Yahya vardır. İsa'nın kollarının altına yazılan Grekçe yazıda "Ιδε *ο υ*(ιο)ς σου/Ιδου *η* μητηρσου" yazar. Yuhanna İncili 19:26-27'de bahsedilen olay "*işte oğlun/işte annen*" şeklinde kısaltılarak yatay haç koluna işlenmiştir. Orta Bizans Dönemi (10.-12. Yüzyıl). Schoolman 2010, 375; Ligthfoot, Koçyiğit ve Yaman 2006, 273-274, Resim:3; Yaman 2012, 339.

15. Röliker Haç, Bronz, Yük: 6 cm. Gen: 3,2 cm. Kal: 0,2 cm., 6505, Kuzey Nekropol (Mezar 94-b, 2005) Tanım: Tek yüzü günümüze gelebilen röliker haç döküm tekniğinde yapılmıştır. Latin haçı formunda yapılan eserin haç kolları merkezden dışa doğru genişler. Üzerinde bezeme olmayan eser sadedir. Orta Bizans Dönemi (10-11. yüzyıl). Ligthfoot, Koçyiğit ve Yaman 2006, 273-274; Schoolman 2010, 375- 377; Yaman 2012, 336

16. Röliker Haç, Bronz, Yük: 5,4 cm. Gen: 3,9 cm. Kal: 0.4 cm., AMR18-19, İç Sur (İS-9, 2018) Tanım: Tek yüzü günümüze gelebilen röliker haç döküm tekniğinde yapılmıştır. Dikey haç kolunda bir halka bulunur. Aynı haç kolunun alt tarafı kırıktır. Yatay haç kolun bir yüzünde sonradan yapıldığı düşünülen delik vardır. Deforme olan haç bezemesizdir. Orta Bizans Dönemi. Yılmazyaşar ve Demirel-Gökalp 2021, 1028 ve 1044.

17. Tören Haçı, Bronz, Yük: 21 cm. Gen: 6 cm. Kal: 0.2 cm., 7927, Kilise A (A24, 2007) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır ve günümüze kırık olarak ulaşmıştır. Boyutu itibariyle tören haçı olabilecek nitelikteki kırık parçanın altında tören sırasında taşındığı nesneye takılan kısım vardır. Dolayısıyla kırık parça haçın dikey kolunun alt tarafıdır. Mevcut parçadan yola çıkarak haç kollarının merkezden uca doğru genişlediği söylenebilir. Üzerinde kazıma tekniğiyle yapılan çizgisel bir bezeme bulunmaktadır. Orta Bizans Dönemi (10-11. yüzyıl). Ivison, 2010, 331-333.

18. Tören Haçı Bronz Yük: 10,2 cm. Gen: 3,2 cm. Kal: 0.2 cm., 7407 Kilise A, (A21, 2006) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Eser günümüze tam olmayan tek haç kolu şeklinde kırık olarak ulaşmıştır. Mevcut parça haç kollarının merkezden uca doğru genişlediği izlenimi verir. Haç kolunun merkeze yakın kısımda kazıma tekniğinde yapılmış dairesel bezeme yer alır. Eserin arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl).

19. Takdis Haçı, Bronz, Yük: 8,50 cm. Gen: 3 cm. Kal: 0,3 cm., 8472, Kilise A (A20, 2009) Tanım: Yassı olan haç döküm tekniğinde yapılmıştır ve günümüze tam ulaşamamıştır. Üç parça halinde olan ve yatay haç kollarından birisi yoktur. Latin haçı formunda, dikey haç kolu diğerlerine oranla uzun olan haçın aynı haç kolunun alt tarafında bir delik bulunur.

Belirli yerlerde korozyon olan haçın bezemesi bulunmamaktadır. Orta Bizans Dönemi (10-11. yüzyıl).

20. Takdis/Adak Haçı, Bronz, Yük: 6 cm. Gen: 3 cm. Kal: 1 cm., 8045, Kilise A (A22, 2007) Tanım: Yassı olan eser döküm tekniğinde yapılmıştır. Kırık olan eserin günümüze gelen bölümü haç kolunun uç kısmıdır. Kırık olan haç parçasının kalınlığı ve ağırlığı diğer eserlere nazaran fazladır. Ön yüzde haç kolunun kenarları kazıma tekniğinde yapılan bordürle çevrelenmiştir. Bordürün üzerinde yer alan bezemeler çizgiseldir. Haçın arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl).

21. Tören/Takdis/Adak Haç Parçası Bronz Yük: 6,5 cm. Gen: 4.4 cm. Kal: 0,3 cm., 7284, Kilise A, A21, 2006) Tanım: Yassı olan haç döküm tekniğinde yapılmıştır ve günümüze tam ulaşamamıştır. Mevcut kısım haçın merkez bölümüdür. Ön yüzde, kazıyarak yapılmış izler, iki haç kolundan çapraz bir şekilde gelen ve alt kolda birleşen, birleştikleri yerde ise yatay düzlemde kesişen bir hatla sonlanır. Merkezde, bu izlerin orta kısmında dairesel olduğu düşünülen bir başka iz görülür ve üst kolda 'V' şekli mevcuttur. Bu nedenle haçın aplike edilmiş olabileceği düşünülmektedir. Haçın arka yüzü düz ve bezemesizdir. Orta Bizans Dönemi (10-11. yüzyıl).

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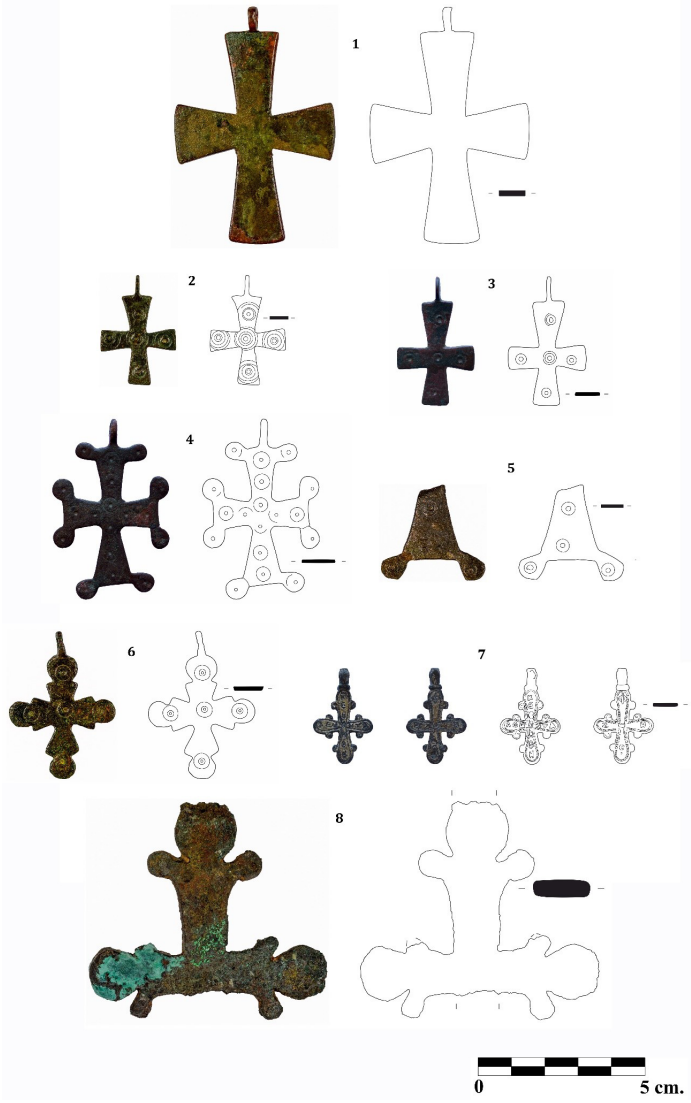

Fig. 3. Pandantif Haçlar

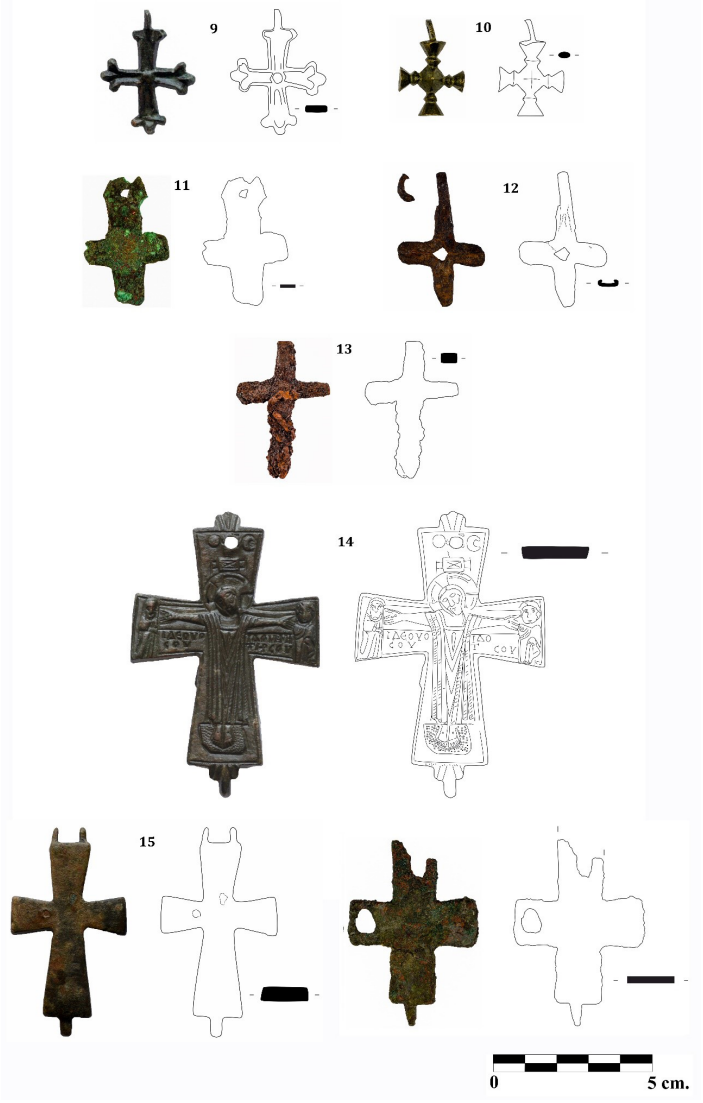

Fig. 4. Pandantif ve Röliker Haçlar

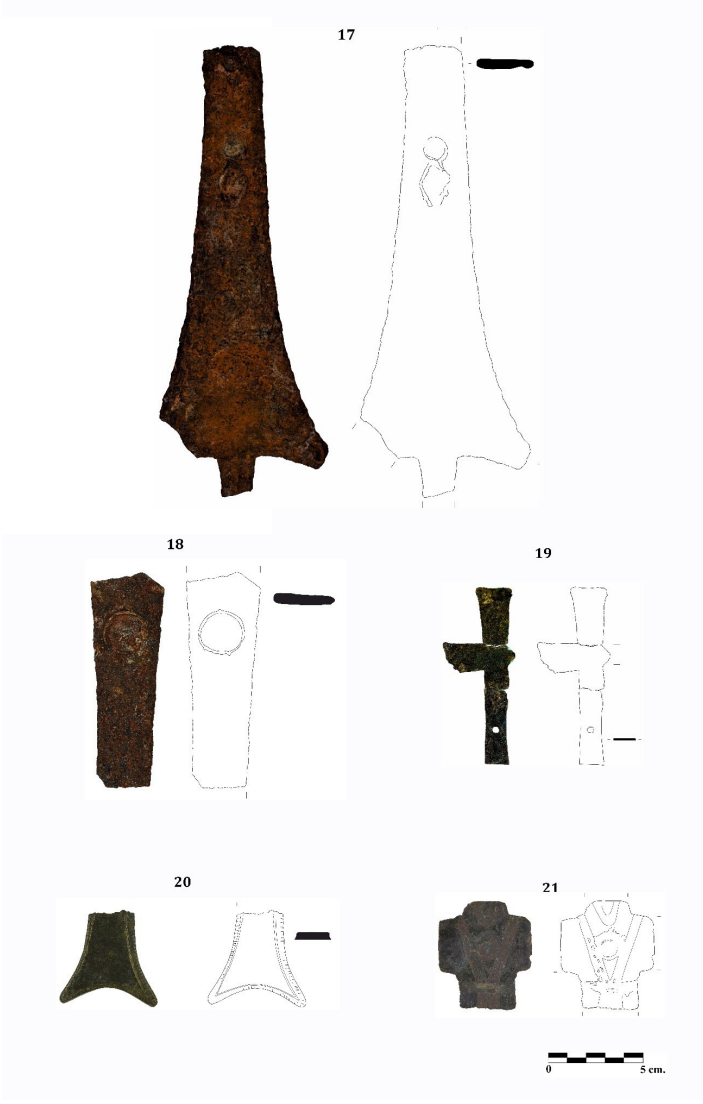

Fig. 5. Tören/Takdis/Adak Haçı Parçaları

PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, September 2024, 2 (4): 295-307

Lysander, Serapis and the School of Theophrastus

Lysander, Serapis ve Theophrastus Okulu

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 7 Mart/March 2024
Kabul Tarihi/Accepted:20 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 295-307

Atıf/Cite as: Psoma, S. "Lysander, Serapis and the School of Theophrastus" Propontica, 2 (4), September 2024: 295-307.

https://doi.org/10.56170/propontica.1448369

LYSANDER, SERAPIS AND THE SCHOOL OF THEOPHRASTUS

Polymnia Athanassiadi vale!

ABSTRACT

The aim of this article is to draw attention to two stories found in the works of Plutarch. These are Lysander's last efforts to obtain oracles and overthrow the Spartan Constitution and the Sinopic tradition about the aetiological myth of the introduction of Sarapis' cult in Alexandria. There are several common points between the two: Plutarch, kingship, the young boy and his divine paternity, the Black Sea area, the travel by sea, Delphi, Apollo and oracles. After analyzing and comparing these common points, we argue for a shared cultural background in the early Hellenistic period. This background consists of the work of a historian and a philosopher of this period, Theophrastus, the successor of Aristotle in the Peripatetic School. Plutarch mentions that the story he narrated in *Lysander's Life* about the admiral's last effort to obtain oracles from Delphi and to make a change in the Spartan constitution by introducing the election of the king from the*aristoi* goes back to a philosopher and historian. We know that he considered Theophrastus to be both a philosopher and a historian. The most famous pupil of Theophrastus, Demetrius of Phaleron, moved to Alexandria after 307 BC, became a worshipper of Serapis and wrote books about Serapis. Other students of Theophrastus were also great worshippers of this newly created god. This combined evidence permits us to advance the hypothesis that the story of Lysander served as a model for the construction of the Sinopic tradition about the introduction of Serapis' cult in early Ptolemaic Egypt.

Keywords: Lysander, Delphic Oracles, Apollo, Black Sea, Serapis, Theophrastus.

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LYSANDER, SERAPİS VE THEOPHRASTUS OKULU

ÖZ

Bu makalenin amacı Plutarkhos'un eserlerinde bulunan iki hikâyeye dikkat çekmektir. Bunlar Lysander'in kehanetler elde etmek ve Sparta Anayasası'nı yıkmak için gösterdiği son çaba ile Sarapis kültünün İskenderiye'ye girişine dair etiyolojik mit hakkındaki Sinop geleneğidir. İkisi arasında bir dizi ortak nokta vardır: Plutarkhos, krallık, genç oğlan ve genç oğlanın tanrısal babası, Karadeniz bölgesi, deniz yolculuğu, Delphi, Apollon ve kehanetlerdir. Bu ortak noktaları analiz edip karşılaştırdıktan sonra, erken Helenistik dönemde ortak bir kültürel arka plan olduğunu savunuyoruz. Bu arka plan, bu dönemin tarihçisi ve filozofu, Peripatetik

Okulu'nda Aristoteles'in halefi olan Theophrastus'un çalışmalarından oluşmaktadır. Plutarkhos, Lysander'in Yaşamı'nda anlattığı, amiralin Delphi'den kehanetler elde etmek ve kralın thearistoi'den seçilmesini sağlayarak Sparta anayasasında bir değişiklik yapmak için gösterdiği son çaba hakkındaki hikayenin bir filozof ve tarihçiye dayandığını söyler. Theophrastus'u hem bir filozof hem de bir tarihçi olarak gördüğünü biliyoruz. Theophrastus'un en ünlü öğrencisi Phaleronlu Demetrius MÖ 307'den sonra İskenderiye'ye taşınmış, Serapis'e ibadet etmeye başlamış ve Serapis hakkında kitaplar yazmıştır. Theophrastus'un diğer öğrencileri de bu yeni yaratılan tanrıya büyük bir inançla tapmaktaydı. Bu bir araya getirilmiş kanıtlar, Lysander'in hikayesinin, erken Ptolemaios Mısır'ında Serapis kültünün tanıtılmasıyla ilgili Sinop geleneğinin inşası için bir model olarak hizmet ettiği hipotezini geliştirmemize izin vermektedir.

Anahtar Kelimeler: Lysander, Delphi Kehanetleri, Apollon, Karadeniz, Serapis, Theophrastus.

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INTRODUCTION

The aim of this article is to draw attention to two stories found in the works of Plutarch, present their common points, argue for a shared cultural early Hellenistic background and show that the first one served as a model for the second. The two stories are: (a) Lysander's last effort to obtain oracles and overthrow the Spartan Constitution and (b) the Sinopic tradition about the aetiological myth of the introduction of Sarapis' cult.[1]

Lysander

Although Xenophon, most probably following Lacratidas' advice to Agesilaus,[2] chose not to say a word,[3] the conspiracy of Lysander to overthrow Spartan kings-

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The author of the present study had the good fortune to be among Professor's Athanassiadi students, to attend her courses and become part of Polymnia's "learned world". A great researcher and an inspired teacher, à la manière d'Apollonius of Tyana, Professor Athanassiadi was then and still is a very much talented speaker. Attending her courses was for me an experience comparable to that of her favorite people, the inhabitants of Asia Minor, while hearing Aelius Aristides. It is with gratitude and respect that I offer these few pages in honor of my teacher on a subject that I hope will interest her. I am very grateful to my colleague and friend Eleni Fassa for precious comments and discussion.

1 For Lysander's plans see Shipley 1997, 249-265. For the Sinopic version of the introduction of the cult of Sarapis see Fassa 2011, 153-156. See also Fassa 2013, 114-139; Larson 2016, 345- 354.

2 Ephorus FGrH 70 F 207 (Plut. Lys. 30); Mor. 229f. See Mor. 212c : τις τῶν γερόντων.

3 Xenophon is very discreet as far as the royal families of Sparta and Spartan military nobility are concerned. He reproduced the dialogue of Agesilaus and Leotychides but omitted the love affair of Leotychides' mother with Alcibiades. He also omitted Lysander's efforts to overthrow the Spartan constitution. See Flower 1988, 127; Cawkwell 1979, 33-38 (list of omissions).

hip was well known in the 4th century BC Greece. Aristotle mentioned the story twice but quite vaguely.[4] Ephorus offered more details and was the source of both Diodorus and Plutarch.[5] What we learn is that Lysander's plan was to elect the king from the *aristoi*: ποιεῖσθαι τὴν αἵρεσιν (sc. τοῦ βασιλέως) ἐκ τῶν ἀρίστων.[6] Lysander visited Delphi[7] and Dodona[8] but failed to persuade the priests to collaborate with him.[9] He also tried with the priests of Ammon in the Libyan desert because his family had ties with the royal family of Libya.[10] He offered them a lot of money, but the priests of Ammon refused to collaborate with the Spartan general and denounced him.[11] Only after Lysander's death did King Agesilaus II learn about this conspiracy.[12] This was the part of the story for which Ephorus was Plutarch's source. Plutarch narrated another story: Lysander's last hope was a young boy from Pontus, whose mother claimed he was Apollo's son.[13] This part of the story occurs in the 26th chapter of Plutarch's *Life of Lysander*. This was the story:

Plut. *Lys*. 26: (1)Ἦν γύναιον ἐν Πόντῳ κύειν ἐξ Ἀπόλλωνος φάμενον, ᾧ πολλοὶ μέν, ὡς εἰκὸς ἦν, ἠπίστουν, πολλοὶ δὲ καὶ προσεῖχον, ὥστε καὶ τεκούσης παιδάριον ἄρρεν ὑπὸ πολλῶν καὶ γνωρίμων σπουδάζεσθαι τὴν ἐκτροφὴν αὐτοῦ καὶ τὴν ἐπιμέλειαν. ὄνομα δὲ τῷ παιδὶ Σειληνὸς ἐκ δή τινος αἰτίας ἐτέθη. ταύτην λαβὼν ὁ Λύσανδρος ἀρχήν, τὰ λοιπὰ παρ› ἑαυτοῦ προσετεκταίνετο καὶ συνύφαινεν, οὐκ ὀλίγοις χρώμενος οὐδὲ φαύλοις τοῦ μύθου συναγωνισταῖς, (2) οἳ τήν τε φήμην τῆς γενέσεως τοῦ παιδὸς εἰς πίστιν ἀνυπόπτως προῆγον, ἄλλον τε λόγον ἐκ Δελφῶν ἀντικομίσαντες εἰς τὴν Σπάρτην κατέβαλον καὶ διέσπειραν, ὡς ἐν γράμμασιν ἀπορρήτοις ὑπὸ τῶν ἱερέων φυλάττοιντο παμπάλαιοι δή τινες χρησμοί, καὶ λαβεῖν οὐκ ἔξεστι τούτους οὐδ› ἐντυχεῖν θεμιτόν, εἰ μή τις ἄρα γεγονὼς ἐξ Ἀπόλλωνος ἀφίκοιτο τῷ πολλῷ χρόνῳ καὶ σύνθημα τοῖς φυλάττουσι τῆς

4 Arist. *Pol.* 1301b19-20: ἔτι πρὸς τὸ μέρος τι κινῆσαι τῆς πολιτείας, οἷον ἀρχήν τινα καταστῆσαι ἢ ἀνελεῖν, ὥσπερ ἐν Λακεδαίμονί φασι Λύσανδρον τινες ἐπιχειρῆσαι καταλῦσαι τὴν βασιλείαν καὶ Παυσανίαν τὸν βασιλέα τὴν ἐφορείαν; 1306b31-33: ὅταν τινὲς ἀτιμάζωνται μεγάλοι ὄντες καὶ μηθενὸς ἧττους κατ' ἀρετὴν ὑπό τινων ἐντιμοτέρων, οἷον Λύσανδρος ὑπὸ τῶν βασιλέων.

5 Ephorus *FGrH* 70 F 206 (Plut. *Lys*. 25); Nepos *Lys*. 3.2-4; Diod. Sic. 14.13.5-8; Ephorus *FGrH* 70 F 207 (Plut. *Lys*. 30); Plut. *Ages*. 20.3; *Mor*. 212c, 229f. See also Schepens 1993: 169-203 and esp. 200 with n. 89; 1999: 148.

6 Ephorus *FGrH* 70 F 207 (*Lys*. 26 and 30). Cf. Plut. *Ages*. 20.2-3; *Mor*. 212c and 229f; Diod. Sic. 14.13.8. See also Arist. *Pol*. 1301b19-20; 1306b31-33.

7 Lysander was not the first to try to receive oracular predictions and attract a favorable tradition of prophecy. Cylon attempted his coup after receiving an oracle promising him the tyranny of Athens. Cylon misinterpreted the oracle and the attempt failed (Hdt. 1.126). The Heraclids of Lydia had their power approved by an oracle (Hdt. 1.7) as did Gyges (Hdt. 1.13). Cypselus had his rule of Corinth prophesied by the oracle at Delphi (Hdt. 5.92b, 92e). Battus of Cyrene received the approval of Delphi that confirmed his position and that of his family (Hdt. 4.155). His descendant Arcesilaus had his position confirmed by Delphi (Hdt. 4.163). Miltiades received oracular support for his leadership of the Dolonci (Hdt. 6.34).

8 For Dodona see Meyer 2013.

9 Ephorus *FGrH* 70 F 206 (Plut. *Lys*. 25).

10 Diod. Sic. 14.13.5-8. See also Malkin 1990: 541-5 with n. 1-2.

11 See supra n. 9.

12 Ephorus *FGrH* 70 F 207 (Plut. *Lys*. 26, 30); *Ages*. 20.2-3; *Mor*. 212c, 229f; Diod. Sic. 14.13.8.

13 For Shipley 1997, 251 ad *Ages*. 20.3: "Plutarch omits this in Agesilaos, since it was planned before the accession of Agesilaos and failed before his return from Asia".

γενέσεως γνώριμον παρασχὼν κομίσαιτο τὰς δέλτους ἐν αἷς ἦσαν (3) οἱ χρησμοί. τούτων δὲ προκατεσκευασμένων ἔδει τὸν Σειληνὸν ἐλθόντα τοὺς χρησμοὺς ἀπαιτεῖν ὡς Ἀπόλλωνος παῖδα, τοὺς δὲ συμπράττοντας τῶν ἱερέων ἐξακριβοῦν ἕκαστα καὶ διαπυνθάνεσθαι περὶ τῆς γενέσεως, τέλος δὲ πεπεισμένους δῆθεν ὡς Ἀπόλλωνος υἱῷ δεῖξαι τὰ γράμματα, τὸν δὲ ἀναγνῶναι πολλῶν παρόντων ἄλλας τε μαντείας καὶ ἧς ἕνεκα τἄλλα πέπλασται τὴν περὶ τῆς βασιλείας, ὡς ἄμεινον εἴη καὶ λώϊον Σπαρτιάταις ἐκ τῶν ἀρίστων πολιτῶν αἱρουμένοις τοὺς βασιλέας. (4) Ἤδη δὲ τοῦ Σειληνοῦ μειρακίου γεγονότος καὶ πρὸς τὴν πρᾶξιν ἥκοντος, ἐξέπεσε τοῦ δράματος ὁ Λύσανδρος ἀτολμίᾳ τῶν ὑποκριτῶν καὶ συνεργῶν ἑνός, ὡς ἐπ› αὐτὸ τὸ ἔργον ἦλθεν, ἀποδειλιάσαντος καὶ ἀναδύντος. οὐ μὴν ἐφωράθη γε τοῦ Λυσάνδρου ζῶντος οὐθέν, ἀλλὰ μετὰ τὴν τελευτήν.

There was a woman in Pontus who declared that she was with child by Apollo. Many disbelieved her, as was natural, but many also lent an ear to her, so that when she gave birth to a male child, many notable persons took an interest in its care and rearing. For some reason or other, the name given to the boy was Silenus. Lysander took these circumstances for his foundation, and supplied the rest of his cunning fabric himself, making use of not a few, not yet insignificant, champions of the tale, who brought the story of the boy's birth into credit without exciting suspicion. They also brought back another response from Delphi, and caused it to be circulated in Sparta, which declared that sundry very ancient oracles were kept in secret writings by the priests there, and that it was not possible to get these, not even lawful to read them, unless someone born from Apollo should come after a long lapse of time, give the keepers an intelligible token of his birth, and obtain the tablets containing the oracles. The way being thus prepared, Silenus was to come and demand the oracles as Apollo's son, and the priests who were in the secret were to insist on precise answers to all their questions about his birth, and finally, persuaded, forsooth, that he was the son of Apollo, were to show him the writing. Then Silenus, in the presence of many witnesses, was to read aloud the prophecies, especially the one relating to the kingdom, for the sake of which the whole scheme had been invented, and which declared that it was more for the honour and interest of the Spartans to choose their kings from the best citizens. But when at last Silenus was grown to be a youth, and was ready for the business, Lysander's play was ruined for him by the cowardice of one of the actors, or co-workers, who, just as he came to the point, lost his courage and drew back. However, all this was actually found out, not while Lysander was alive, but after his death. (trsl. B. Perrin)

Sarapis

To begin with, we need to stress that the cults of the Egyptian deities first appeared at Sinope, a city of Paphlagonia in the Pontus, only after the 2nd century AD.[14]

[14] Podvin 2012, 207-212.

However, different sources, mainly from the Roman period, tell how Sarapis' cult was introduced to early Hellenistic Egypt from Sinope.[15] Three of these sources briefly mention Serapis' relation to Sinope.[16] The other three, Plutarch, Tacitus and the Scholia in Diogenes Periegeticus, present a very similar version. The Sinopic version of the introduction of the cult of Serapis is to be found in two works of Plutarch: in *De Iside et Osiride* and *De Sollertia Animalium*. Tacitus dedicated a chapter of the fourth book of his *Histories*. This was also the case of one of the versions of the Scholia to *Oikoumenes Periegesis* of Dionysius Periegetes.

Plut. *De Iside et Osiride* 28 (*Mor*. 361f): Πτολεμαῖος δὲ ὁ Σωτὴρ ὄναρ εἶδε τὸν ἐν Σινώπῃ τοῦ Πλούτωνος κολοσσόν, οὐκ ἐπιστάμενος οὐδ᾽ ἑωρακὼς πρότερον οἷος ἦν τὴν μορφήν, κελεύοντα κομίσαι τὴν ταχίστην αὐτὸν εἰς Ἀλεξάνδρειαν. ἀγνοοῦντι δ᾽ αὐτῷ καὶ ἀποροῦντι, ποῦ καθίδρυται, καὶ διηγουμένῳ τοῖς φίλοις τὴν ὄψιν εὑρέθη πολυπλανὴς ἄνθρωπος ὄνομα Σωσίβιος, ἐν Σινώπῃ φάμενος ἑωρακέναι τοιοῦτον κολοσσόν, οἷον ὁ βασιλεὺς ἰδεῖν ἔδοξεν. ἔπεμψεν οὖν Σωτέλη καὶ Διονύσιον, οἳ χρόνῳ πολλῷ καὶ |μόλις, οὐκ ἄνευ μέντοι θείας προνοίας, ἤγαγον ἐκκλέψαντες.

Ptolemy saw in a dream the colossal statue of Pluto in Sinope, not knowing nor having ever seen how it looked, and in his dream the statue bade him convey it with all speed to Alexandria. He had no information and no means of knowing where the statue was situated, but as he related the vision to his friends there was discovered for him a much travelled man by the name of Sosibius, who said that he had seen in Sinope just such a great statue as the king thought he saw. Ptolemy, therefore, sent Soteles and Dionysius, who, after a considerable time and with great difficulty, and not without the help of divine providence, succeeded in stealing the statue and bringing it away. (trsl. F.C. Babbitt)

Plut. *De sollertia animalium* 36 (*Mor*. 984a8-b9): ἱστοροῦσι δὲ καὶ τοὺς πεμφθέντας εἰς Σινώπην ὑπὸ Πτολεμαίου τοῦ Σωτῆρος ἐπὶ τὴν Σαράπιδος κομιδήν, Σωτέλη καὶ Διονύσιον, ἀπωσθέντας ἀνέμῳ βιαίῳ κομίζεσθαι παρὰ γνώμην ὑπὲρ Μαλέαν, ἐν δεξιᾷ Πελοπόννησον ἔχοντας, εἶτα ῥεμβομένους καὶ δυσθυμοῦντας αὐτοὺς προφανέντα δελφῖνα πρῴραθεν ὥσπερ ἐκκαλεῖσθαι καθηγούμενον εἰς τὰ ναύλοχα καὶ σάλους μαλακοὺς ἔχοντα τῆς χώρας καταμένειν ἀσφαλεῖς, ἄχρις οὗ τοῦτον τὸν τρόπον ἄγων καὶ παραπέμπων τὸ πλοῖον εἰς Κίρραν κατέστησεν. ὅθεν

[15] Plut. *Mor*. 361f; 984a8-b9; Tac. *Hist*. 4.83; Clemens *Protrepticus* 4.48.1-6; Cyrillus (of Alexandria) *Ad Iulianum* 1.16.1-16; Scholia ad Dion. Perieg. 255.1-28; Theophilus *Ad Autolyc*. 1.9.

[16] Clemens *Protrepticus* 4.48.1-6: Οἳ μὲν γὰρ αὐτὸν (sc. τὸν Αἰγύπτιον Σαάραπιν) ἱστοροῦσιν χαριστήριον ὑπὸ Σινωπέων Πτολεμαίῳ τῷ Φιλαδέλφῳ τῷ Αἰγυπτίων πεμφθῆναι βασιλεῖ, ὃς λιμῷ τρυχομένους αὐτοὺς ἀπ᾽ Αἰγύπτου μεταπεμψαμένους σῖτον [ὁ Πτολεμαῖος] ἀνεκτήσατο, εἶναι δὲ τὸ ξόανον τοῦτο ἄγαλμα Πλούτωνος; Cyrillus of Alexandria *Ad Iulianum* 1.16.1-16: Ἑκατοστῇ εἰκοστῇ τετάρτῃ ὀλυμπιάδι, Πτολεμαίου τῆς Αἰγύπτου βασιλεύοντος τοῦ ἐπίκλην φιλαδέλφου, τὸν Σάραπιν ἐν Ἀλεξανδρείᾳ φασὶν ἐλθεῖν ἐκ Σινώπης, τὸν αὐτὸν δὲ εἶναι τῷ Πλούτωνι ; Thphr. *Ad Autolyc*. 1.9: … καὶ Σάραπιν τὸν ἀπὸ Σινώπης φυγάδα εἰς Ἀλεξάνδρειαν γεγονότα…

ἀναβατήριον θύσαντες ἔγνωσαν ὅτι δεῖ δυεῖν ἀγαλμάτων τὸ μὲν τοῦ Πλούτωνος ἀνελέσθαι καὶ κομίζειν τὸ δὲ τῆς Κόρης ἀπομάξασθαι καὶ καταλιπεῖν.

They also relate that Soteles and Dionysius, the men sent by Ptolemy Soter to Sinope to bring back Serapis, were driven against their will by a violent wind off course beyond Malea, with the Peloponnesus on their right. When they were lost and discouraged, a dolphin appeared by the prow and, as it were, invited them to follow and led them into such parts as had safe roadsteads with but a gentle swell, by conducting and escorting the vessel in this manner, it brought them to Cirrha. Whence it came about that when they had offered thanksgiving for their safe landing, they came to see that of the two statues they should take away the one of Pluto, but should merely take an impress of that of Persephone and leave it behind. (trsl. H. Cherniss and W.C. Helmbold)

Tac. *Hist*. 4.83: *Origo dei nondum nostris auctoribus celebrata: Aegyptiorum antistites sic memorant, Ptolemaeo regi, qui Macedonum primus Aegypti opes firmavit, cum Alexandriae recens conditae moenia templaque et religiones adderet, oblatum per quietem decore eximio et maiore quam humana specie iuvenem, qui moneret ut fidissimis amicorum in Pontum missis effigiem suam acciret; laetum id regno magnamque et inclutam sedem fore quae excepisset: simul visum eundem iuvenem in caelum igne plurimo attolli. Ptolemaeus omine et miraculo excitus sacerdotibus Aegyptiorum, quibus mos talia intellegere, nocturnos visus aperit. atque illis Ponti et externorum parum gnaris, Timotheum Atheniensem e gente Eumolpidarum, quem ut antistitem caerimoniarum Eleusine exciverat, quaenam illa superstitio, quod numen, interrogat. Timotheus quaesitis qui in Pontum meassent, cognoscit urbem illic Sinopen, nec procul templum vetere inter accolas fama Iovis Ditis: namque et muliebrem effigiem adsistere quam plerique Proserpinam vocent. sed Ptolemaeus, ut sunt ingenia regum, pronus ad formidinem, ubi securitas rediit, voluptatum quam religionum adpetens neglegere paulatim aliasque ad curas animum vertere, donec eadem species terribilior iam et instantior exitium ipsi regnoque denuntiaret ni iussa patrarentur. tum legatos et dona Scydrothemidi regi is tunc Sinopensibus imperitabat) expediri iubet praecepitque navigaturis ut Pythicum Apollinem adeant. illis mare secundum, sors oraculi haud ambigua: irent simulacrumque patris sui reveherent, sororis relinquerent*.

The origin of this god has not yet been generally treated by our authors: the Egyptian priests tell the following story, that when King Ptolemy, the first of the Macedonians to put the power of Egypt on a firm foundation, was giving the new city of Alexandria walls, temples, and religious rites, there appeared to him in his sleep a vision of a young man of extraordinary beauty and of more than human stature, who warned him to send his most faithful friends to Pontus and bring his statue hither; the vision said that this act would be a happy thing for the kingdom and that the city that received the god would be great and famous: after these words the youth seemed

to be carried to heaven in a blaze of fire. Ptolemy, moved by this miraculous omen, disclosed this nocturnal vision to the Egyptian priests, whose business it is to interpret such things. When they proved to know little of Pontus and foreign countries, he questioned Timotheus, an Athenian of the clan of the Eumolpidae, whom he had called from Eleusis to preside over the sacred rites, and asked him what this religion was and what the divinity meant. Timotheus learned by questioning men who had travelled to Pontus that there was a city there called Sinope, and that not far from it there was a temple of Jupiter Dis, long famous among the natives: for there sits beside the god a female figure which most call Proserpina. But Ptolemy, although prone to superstitious fears after the nature of kings, when he once more felt secure, being more eager for pleasures than religious rites, began gradually to neglect the matter and to turn his attention to other things, until the same vision, now more terrible and insistent, threatened ruin upon the king himself and his kingdom unless his orders were carried out. Then Ptolemy directed that ambassadors and gifts should be dispatched to King Scydrothemis – he ruled over the people of Sinope at that time – and when the embassy was about to sail he instructed them to visit Pythian Apollo. The ambassadors found the sea favorable; and the answer of the oracle was not uncertain: Apollo bade them go on and bring back the image of his father, but leave that of his sister (trsl. C.H. Moore).

Scholia *ad* Dion. Perieg. 255.1-28: Τῷ Λάγου Πτολεμαίῳ ἐπιφανείς τις δαίμων ἐκέλευσε πέμψαντα ναῦν κομίσαι αὐτόν. Αὕτη ἔστιν ἡ αἰτία δι᾽ ἣς τιμᾶται ἐν Ἀλεξανδρείᾳ ὁ Σινωπίτης Ζεύς. Βασιλεύς τις εἶδεν ὅτι ἐπέστη αὐτῷ δαίμων᾽ ὃς καὶ εἶπεν αὐτῷ· "Εἴσαξον με ἐν τῇ πόλει σοῦ." Διαπορούμενος οὖν ὁ βασιλεὺς περὶ τούτου διὰ τὸ μὴ γινώσκειν αὐτὸν πόθεν εἴη καὶ τις ἐστιν, ὕστερον ἐκοινώσατο τουτὶ καὶ τοῖς μεγιστᾶσιν αὐτοῦ# οἵτινες πρὸς λύσιν τῆς ἀπορίας τουτὶ προσεφθέγξαντο· "Ἔστω σοι βασιλεῦ ὅ τι καταλαβατω ναῦς τοῖς πελάγεσι, καὶ οὑτωσὶ φερομένη ἔνθεν κἀκεῖθεν ὑπὸ τῶν πνευμάτων ἔλθοι ἂν ἐκεῖσε ὅπου τὸ δαιμόνιον· ἔνεστι προνοία παντὸς τούτου». Οὕτως ἤδη τῆς νηὸς ἐπιβάντες τινὲς προστάξει βασιλικῇ ἐφέροντο ἐν τῇ θαλάσσῃ πλανώμενοι.Ἐλλιμνίσαντες οὖν ποτε καὶ χρησμολογηθέντες ἀπελθεῖν πρὸς τὴν Ποντικὴν Σινώπην παρεγένοντο ἐκεῖσε. Ἔνθα εὑρόντες τὸ ἴδιον ἄγαλμα ἐκόμισαν αὐτὸ εἰς τὴν τοῦ βασιλέως χώραν τὴν Ἀλεξάνδρειαν. Παρ᾽οὗ δημοτελὴς τετέλεστο ἑορτὴ, καὶ πολλῇ τιμῇ πρὸς τούτου τετίμητο, ἀλλὰ δὴ καὶ πρὸς τῶν ὑπ᾽ αὐτόν.

A god appeared to Ptolemy son of Lagus and ordered him to send a boat and bring him to Alexandria. This is the reason the Zeus Sinopites is worshipped in this city. A king had a dream that a god asked him "Bring me in your city". The king did not know who the god was and from where he came from. He asked his great men for advice and some of them tell him the following: "You should know you king that you should send a boat and the winds will bring her where the god is. There is provision for this". And in this way they occupied a boat and following the king's orders they were wondering in the sea. They anchored in a port and received an oracle telling them to go

https://doi.org/10.56170/propontica.1448369

to Sinope, a city in the Pontus. They went to Sinope and found there the same statue, and they brought it to the king's city, in Alexandria. And there was a public celebration, and he received many many honors (my translation).

According to these sources, King Ptolemy I, the son of Lagus, had a dream.[17] A youth of singular beauty counselled him to send to Pontus and fetch his effigy from the country.[18] Ptolemy asked for help identifying the god.[19] He then sent to Pontus and Sinope and brought to Alexandria the cult statue of Apollo's father, Zeus, according to Tacitus and the Scholia, or of Pluto, according to Plutarch.[20] Tacitus, Plutarch and the Scholia mention an oracle by Apollo of Delphi.[21]

There are some common points between the story narrated by Plutarch in the 26th chapter of his *Life of Lysander* and the Sinopic aetiological tale of the introduction of Serapis' cult.

1. Plutarch is the first common point. The story with the boy from Pontus and Lysander's last attempt to overthrow the Spartan double kingship occurs in the 26th chapter of his *Life of Lysander*. The Sinopic version of the introduction of the cult of Serapis in Egypt occurs in his essay about the worship of the Egyptian deities. The visit to Delphi to ask for an oracle during the trip to Pontus was narrated in his essay *On the Intelligence of Animals*, where he said that the boat of Ptolemy's friends Soteles and Dionysius was guided from cape Maleas to Delphi by a dolphin.

2. The second common point is kingship. Lysander wanted to obtain an oracle to overthrow the Spartan constitution and became king.[22] Ptolemy was about to set up in the newly built capital of his newly acquired kingdom, when he saw the dream, and a kingship full of prosperity was promised to him.[23] The god Serapis and his cult were further linked to the kingship of Egypt under the Ptolemies.[24]

3. The third point in common is the young boy. A youth of singular beauty or a young man appeared to Ptolemy. In the 26th chapter of the *Life of Lysan-*

17 Tac. *Hist*. 4.83; Plut. *Mor*. 361e; Scholia *ad* Dion. Perieg. 255.1-28. For both Clemens and Cyrillus of Alexandria (see previous note), the cult was introduced by Ptolemy II Philadelphus. According to Clemens, Ptolemy II received the cult statue of Sarapis from Sinope as a gift of gratitude: the king sent them grain during a period of *limos*.

18 Tac. *Hist*. 4.83; Plut. *Mor*. 361e-362d; Scholia *ad* Dion. Perieg. 255.1-28.

19 See previous note.

20 See previous note.

21 Tac. *Hist*. 4.83; Plut. *Mor*. 984a8-b9. See also Scholia *ad* Dion. Perieg. 255.1-28.

22 Plut. *Lys*. 24.2-5.

23 Tac. *Hist*. 4.83.

24 Fassa 2013, 114-139; 2015, 133-153; Larson 2016, 345-354.

der the story begins with a woman pregnant with a boy and it was this boy who should read the oracles about Sparta's kings.[25]

4. The divine paternity of the youth is the fourth common point. The youth in the Sinopic narration is a god and a son of a god,[26] and in Lysander's story, the boy is the son of Apollo.[27]

5. Pontus is the fifth common point. The youth ordered Ptolemy to send his best friends to Pontus and Sinope to learn about his statue and cult.[28] The boy Lysander expected to read the oracles was born and lived in Pontus.[29]

6. The sixth common point is the travel by sea. Both Apollo's son and Sarapis were supposed to travel by sea. The boy was supposed to travel from Pontus to Delphi to read the old prophecies.[30] The cult and the statue of Sarapis should travel from Pontus to Alexandria.[31]

7. Delphi is the seventh common point. Dionysius and Soteles visited Delphi on their way from Alexandria to Pontus. At Delphi, the boy was supposed to read the old prophecies revealing how the kings of Sparta should be chosen.[32] Lysander was spreading rumours from Delphi about these oracles at Sparta.[33]

8. Apollo is the following common point. Ptolemy instructed the embassy he sent to Sinope to consult Apollo Pythios.[34] This is what they did, and they followed a dolphin that brought them from cape Maleas to Kirrha.[35] Apollo's prophecies should be read by his son to reveal the change in Spartan kingship.

9. Oracles are the last common point. The boy was to read the old prophecies while the envoys of Ptolemy I asked for an oracle.

25 Tac. *Hist.* 4.83; Plut. *Lys.* 26.1, 3, 4.
26 Tac. *Hist.* 4.83; Plut. *Mor.* 361e and 984a.
27 Plut. *Lys.* 26.1, 2, 3.
28 Tac. *Hist.* 4.83; Plut. *Mor.* 361e; Clemens *Protrepticus* 4.48.1; Thphr. *Ad Autolyc.* 1.9; Cyrillus of Alexandria *Ad Iulianum* 1.16.1-16; Scholia *ad* Dion. Perieg. 225.1-28.
29 Plut. *Lys.* 26.1.
30 Plut. *Lys.* 26.3.
31 See supra n. 34.
32 Plut. *Lys.* 26.3.
33 Plut. *Lys.* 26.2.
34 Tac. *Hist.* 4.83.
35 Plut. *Mor.* 984a.

Two of the meeting points of our two stories deserve two more words: Pontus and Apollo Pythios.[36] Pontus was considered an area on the margins of the inhabited world and, thus, an ideal place to deliver mysterious stories.[37] Apollo Pythios was the god of Delphi and a very significant deity in the Pontus area.[38] Greek cities founded colonies in this area following instructions and oracles of Apollo of Delphi.[39] It is time now to turn to the sources of Plutarch for the two stories.

The source of Plutarch's story about Lysander

For Lysander's life Plutarch relied on Hellenistic writers and Theophrastus, as he explicitly says.[40] For our story, Plutarch says that this was "the account of one who was both a historian and a philosopher."[41] As Plutarch did not name the philosopher and historian he followed, there were several attempts to identify him: (a) Ephorus, as was proposed in the Loeb edition and translation of 1916 by B. Perrin, (b) Poseidonius of Apamea, as was proposed by F. Jacoby, and (c) Theophrastus, as was proposed by J. Smits and R. Flacelière, who commented on Lysander's life.[42] Jakoby presented no arguments in favour of the identification with Poseidonios of Apamea and included the passage in his commentary on Ephorus *FGrHist* 70 F 206-208. However, the philosopher and historian could not be Ephorus because Ephorus was not a philosopher. One recalls that for Plutarch, Theophrastus was a historian and a philosopher.[43] We can thus follow J. Smits and R. Flacelière propose to identify the historian and philosopher with Theophrastus.

Theophrastus had ties with Ptolemy I and Alexandria. Ptolemy sent for him (ἔπεμψεν ἐπ' αὐτόν [sc. τὸν Θεόφραστον]), as we learn from Diogenes Laertius.[44] One of Theophrastus' students was Demetrius of Phaleron.[45] Demetrius established himself in Egypt after 307 BC and played a significant role in the organization of the kingdom. He was an enthusiastic pupil of Sarapis who healed his eyes. He wrote paians for the beloved god that were still popular many centuries later.[46] De-

[36] For an oracle of Autolykos, Sinope's oikist (Apollonius Rhodius *Argonautica* 2. 946-961), at Sinope see Strabo 12.3.50.

[37] For Pontus see Dana 2011: 341-343.

[38] Dana 2011, 355-370.

[39] See previous note.

[40] Fracelière 1971, 161-166; Bommelaer 1981, 40-45. For Theophrastus see See Plut. *Lys*. 13.2.

[41] Plut. *Lys*. 25.5: **τὴν δὲ ὅλην ἐπιβουλὴν καὶ σκευωρίαν τοῦ πλάσματος οὐ φαύλην οὖσαν οὐδὲ ἀφ' ὧν ἔτυχεν ἀρξαμένην, ἀλλὰ πολλὰς καὶ μεγάλας ὑποθέσεις, ὥσπερ ἐν διαγράμματι μαθηματικῷ, προσλαβοῦσαν καὶ διὰ λημμάτων χαλεπῶν καὶ δυσπορίστων ἐπὶ τὸ συμπέρασμα προϊοῦσαν, ἡμεῖς ἀναγράψομεν ἀνδρὸς ἱστορικοῦ καὶ φιλοσόφου λόγῳ κατακολουθήσαντες:** ...was no unsignificant, nor yet eagerlessly undertaken, but made many important assumptions, like a mathematical demonstration, and proceeded to its conclusion through premises which were difficult and hard to obtain".

[42] For Poseidonius see Jacoby 1926, 96. For Theophrastus see Smits 1939, 11, 232; Fracelière 1971, 162.

[43] Plut. *Alc*. 10.4: **ἀνδρὶ φιλικόῳ καὶ ἱστορικῷ παρ' ὀντινοῦν τῶν φιλοσόφων.**

[44] Diogenes Laertius 5.37.2-3. See also Fraser 1994: 180.

[45] Diogenes Laertius 5.39.10-11; 5.75.1-2.

[46] Diogenes Laertius 5.76.7-10: **λέγεται δ' ἀποβαλόντα αὐτὸν τὰς ὄψεις ἐν Ἀλεξανδρείᾳ, κομίσασθαι αὖθις παρὰ τοῦ Σαράπιδος· ὅθεν καὶ τοὺς παιᾶνας ποιῆσαι τοὺς μεχρι νῦν ᾀδομένους…**

metrius also wrote five books of dreams in which Serapis was involved.[47] Another student of Theophrastus was the poet Menander.[48] For Menander, Serapis was a σεμνὸς θεός.[49]

The link between Lysander's last effort to change Spartan Kingship and the Sinopic version of the introduction of Serapis and his cult is revealed with the identification of Plutarch's philosopher and historian as Theophrastus. The model used by the council of experts, convened by Ptolemy I and including Demetrius and Timotheus from Athens as well as the Egyptian Manetho for the Sinopic version of the introduction of Serapis was the story narrated by Theophrastus about Lysander's last effort to change Spartan kingship.[50] If Theophrastus is to be identified with the historian and philosopher behind the narration of Lysander's last attempt, the story with the boy from Pontus would have served as a model for the construction of the Sinopic version of the introduction of the cult of Sarapis.

The story was certainly well known in Alexandria, and this was the reason why Plutarch says that it "was not insignificant, nor yet eagerlessly undertaken, but made many important assumptions, like a mathematical demonstration, and proceeded to its conclusion through premises which were difficult and hard to obtain". Lysander could have inspired Ptolemy I, who gained kingship almost with the spear. Lysander was the first man in the Eastern Mediterranean to receive lavish honours from the oligarchs of Samos for bringing them back after 35 years of exile,[51] while the Rhodians awarded Ptolemy the title of Soter for helping them against Demetrius I.[52]

The story survived Ptolemy I and reached Plutarch. Under the reigns of Ptolemy II, III and IV, the kings of Egypt grew closer to the Spartan kings and supported them against the Antigonids of Macedonia. Areus I was endorsed by Ptolemy II against Antigonus Gonatas during the Chremonidean War early in the 360s. [53] Cleomenes III was an ally of Ptolemy III against Antigonus III. [54] After his defeat in Sellasia, Cleomenes sought refuge in Egypt and later committed suicide there under Ptolemy IV in 219 BC. One of his closest relatives and enthusiastic supporters, Hippomedon, son of Agesilaus of the royal house of the Eurypontids, was a high

47 Artemidorus 2.44.25-30: οὐδέ μοι πιθανὰ ἐδόκει ταῦτα, καίτοι Γεμίνου τοῦ Τυρίου καὶ Δημητρίου τοῦ Φαληρέως καὶ Ἀρτάμωνος τοῦ Μιλησίου τοῦ μὲν ἐν τρισὶ βιβλίοις τοῦ δὲ ἐν πέντε τοῦ δὲ ἐν εἰκοσι δύο πολλοὺς ὀνείρους ἀναγραψαμένων καὶ μάλιστα συνταγὰς καὶ θεραπείας τὰς ὑπὸ Σαράπιδος δοθείσας.

48 Diogenes Laertius 5.37.1.

49 Fr. 139 Körte, A., Thierfelder, A.

50 Larson 2016, 345t354.

51 Duris *FGrH* 71 and 26; Phot. s.v. **Λυσάνδρεια;** Hsch. s.v. **Λυσάνδρεια.** See also Habicht 1970, 3-6, 243-244.

52 Habicht 1970, 109-110.

53 For Areus I see Paschidis 2008: 256-259.

54 For Cleomenes III see Paschidis 2008: 260-262.

Ptolemaic official and general of Thrace and the Hellespont.[55] Hippomedon and his two grandsons from the wedding of his daughter with Archidamos were the closest relatives of the dead king. They deserved the Eurypontid throne of Sparta more than a certain Lykourgos, who paid the ephors with one talent each and thus became king and a Heraclid.[56] In the late 5th century BC, an *aristeia* was not enough, and Lysander, a Heraclid, needed Apollo and his oracles to become king. Still, in the late 3rd century BC all Lykourgos needed was money. This new world, part of which was Serapis, was undoubtedly built πλὴν Λακεδαιμονίων.

CONCLUSION

The similarities and common points between the Sinopic version of the introduction of Serapis' cult and the story about Lysander's last effort to overthrow the Spartan Constitution by using oracles can be explained with the help of literary sources. After collecting and comparing the literary evidence for both, what becomes clear is their common early Hellenistic cultural background. This background involves intellectuals active in the Ptolemaic court of the late 4th/ early 3rd century BC, such as Demetrius of Phaleron, who was a student of Theophrastus, as well as Theophrastus, the successor of Aristotle in his Peripatetic School. The last effort of Lysander to establish himself as king of Sparta is narrated by Theophrastus with all known details involving the young boy Silenus, a son of Apollo, born in the Black Sea, who was supposed to travel to Delphi and read ancient oracles supporting the election of the kings of Sparta from the best citizens. The story narrated by the teacher of Demetrius of Phaleron served for him as well as for other intellectuals of Alexandria to invent and shape the myth of the introduction of the *semnos theos*.

Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

Ethics

Regarding the Ethics Committee authorisation; the authors and reviewers of this study have declared that there is no need for Ethics Committee authorisation.

[55] For Hippomedon see Paschidis 2008, 259-260.
[56] Plb. 4.35.13-14.

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PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, September 2024, 2 (4): 309-316

The God of Earthquakes: Several Hypotheses Related to One Dedicatory Inscription to Poseidon Asphaleios From Mesambria on Pontus

Deprem Tanrısı: Pontus Mesambria'da Poseidon Asphaleios'a İthaf Edilen Bir Yazıtla İlgili Çeşitli Hipotezler

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 28 Şubat/February 2024
Kabul Tarihi/Accepted:20 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 309-316

Atıf/Cite as: Gyuzelev, M. "The God of Earthquakes: Several Hypotheses Related to One Dedicatory Inscription to Poseidon Asphaleios From Mesambria on Pontus" Propontica, 2 (4), September 2024: 309-316.

https://doi.org/10.56170/propontica.1444437

THE GOD OF EARTHQUAKES: SEVERAL HYPOTHESES RELATED TO ONE DEDICATORY INSCRIPTION TO POSEIDON ASPHALEIOS FROM MESAMBRIA ON PONTUS

ABSTRACT

This article aims to present to the scientific community a dedicative inscription to the God Poseidon in his capacity as Asphaleios -Securer, embedded in one of the churches in Nessebar (Bulgaria)–St. Paraskeva Church. The inscription was found in 2013 during conservation-restoration works in the church. It is published for the first time here, and comments have been made on its connection with earthquakes and seaquakes in Southeastern Europe during so-called Hellenistic Period. The inscription is in the Doric dialect in four lines built in as a *spolium* on a recess above the altar apse on the church's southern side in an upside-down position. Based on specific features of palaeography and orthography of the letters, the suggested dating is the second half of the 3rd and the beginning of the 2nd century BC. The epithet of the god in this inscription–Asphaleios is attested in other Dorian poleis; however, here, it cannot be connected with a temple to Poseidon. It was probably brought to Mesambria on Pontus from somewhere else; as exemplified with similar inscriptions originating from Kallatis (present-day Mangalia, Romania) and Dionysopolis (present-day Balchik, Bulgaria). The *epiklesis* in the mentioned inscriptions hints at the consequences of the seismic activity during the period comprising roughly the second quarter to the middle of the 3rd century BC that swept across Southeastern Europe and caused severe damage. Therefore, this inscription is another example of Poseidon being worshipped in his capacity of Securer and Earth-Stayer and being recognized as a symbol of hope for ancient people.

Keywords: Dedication, Poseidon Asphaleios, Black Sea, Earthquake, Epiclesis.

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DEPREM TANRISI: PONTUS MESAMBRIA'DA POSEIDON ASPHALEIOS'A İTHAF EDİLEN BİR YAZITLA İLGİLİ ÇEŞİTLİ HİPOTEZLER

ÖZ

Bu makale, Nessebar'daki (Bulgaristan) kiliselerden biri olan Aziz Paraskeva Kilisesi'nde bulunan ve Tanrı Poseidon'a Asphaleios-Koruyucu sıfatıyla ithaf edilen bir yazıtı bilim camiasına sunmayı amaçlamaktadır. Kilisedeki restorasyon ve konservasyon çalışmaları sırasında 2013 yılında bulunmuştur. Şimdi ilk kez yayınlanmakta ve Helenistik Dönem olarak adlandırılan dönemde Güneydoğu Avrupa'daki

depremler ve deniz depremleri ile bağlantılı olarak yorumlanmaktadır. Yazıt, Dor lehçesinde dört satır halinde, kilisenin güney tarafındaki sunak apsisinin üzerindeki bir girintiye *spolium* olarak baş aşağı yerleştirilmiştir. Harflerin paleografisi ve imlasının belirli özelliklerine dayanan tarihlendirme, M.Ö. 3. yüzyılın ikinci yarısı ile 2. yüzyılın başlarına dayandırılabilir. Bu yazıttaki tanrının sıfatı Asphaleios diğer Dor kentlerinde de görülmektedir, ancak burada Poseidon'a ait bir tapınakla ilişkilendirilmesi mümkün değildir. Büyük olasılıkla Pontus'taki Mesambria'ya başka bir yerden getirilmiştir; Kallatis (bugünkü Mangalia, Romanya) ve Dionysopolis (bugünkü Balçık, Bulgaristan) kökenli benzer yazıt örnekleri verilmektedir. Söz konusu yazıtlardaki *epiklesis*, kabaca M.Ö. 3. Yüzyılın ikinci çeyreği ile ortasını kapsayan dönemde Güneydoğu Avrupa'yı kasıp kavuran ve burada ciddi hasarlara yol açan sismik faaliyetin sonuçlarına işaret etmektedir. Dolayısıyla bu, Poseidon'a Koruyucu ve Yeryüzü Düzenleyicisi sıfatıyla tapınıldığının ve antik insanlar için bir umut sembolü olarak kabul edildiğinin bir başka örneğidir.

Anahtar Kelimeler: Adanmışlık, Poseidon Asphaleios, Karadeniz, Deprem, Epiclesis.

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INTRODUCTION

In 2013, during conservation-restoration works performed at the church of St. Paraskeva in the old town of Nessebar (Bulgaria), workers came across a marble block with an inscription in the Greek alphabet[1]. Two years later, the same inscription was mentioned in the book written by Ms. Evtelpa Theoklieva-Stoicheva[2]. There, she does not comment on the inscription itself but speculates on the presence of a temple of Poseidon in Mesambria -at the site of the later church. However, there is no archaeological evidence so far of an ancient sanctuary at or near the site in question. Without presenting any arguments, she dates the inscription back to the 5th century BC, concluding that among the temples in Mesambria, "*the most ancient one was dedicated to god Poseidon Asphaleos–protector of the polis from natural disasters, most of all from earthquakes*". After that, she cites other examples of temples dedicated to this god in the Aegean. I would like to quote verbatim her

[1] The circumstances surrounding the discovery of the inscription in question, as far as it is possible to understand from media publications, are as follows: In the first half of February 2013, in the church, which is a museum, the workers of the contractor company placed a metal scaffold and noticed the inscription. They notified their supervisor, and he, in turn, informed Evtelpa Teoklieva-Stoicheva, who at the same time was the Chief Expert at the World Heritage Department of Nessebar Municipality. Museum specialists were not notified, although archaeological research was being conducted simultaneously on the territory of the Architectural and Historical Reserve-Nessebar, and archaeologists from Nessebar, Burgas, and Sofia were present. In the press release, apart from the dating - "5th century BC, "the lady alleged that a temple had existed on the site of the church, and the epiklesis of the god was translated as "Protector of the polis." (A Nessebar archaeologist discovered and deciphered a valuable ancient Greek inscription (nessebar-news.com).

[2] Theoklieva-Stoycheva 2019, 29-30.

account related to the place of the epigraphical monument in St. Paraskeva Church[3]: *During conservation-restoration activities, a marble block bearing an ancient Greek inscription in Doric dialect, embedded into the eastern part of the temple* [St. Paraskeva Church–author's comment], *left of the apse, at a height of about 4 meters, was revealed. The inscription is dedicated to god Poseidon Asphaleos–Protector of the polis from natural disasters -earthquakes. Embedding the marble element into the newly built church is a ritual act related to the preserved ancient tradition commonly observed in Mesemvria-Nessebar in the Middle Ages. The medieval churches were erected upon the ruins of the ancient temples* [sic]. *And the embedding of older architectural elements is a phenomenon often occurring in Mesemvria. Analogical is the example with the embedding of the marble block with inscription, comprising Psalm 101, at the same place in the St. Sophia Basilica* [it is not exactly in the same place, and as a Christian text, it was probably deliberately embedded during the construction of this Nessebar basilica -author's comment]. *From a contemporary viewpoint, the marble block with inscription fits into the interior of the church as a ritual element of continuity between Antiquity and the Middle Ages.*" I leave aside these far-reaching conclusions, paying attention only to the fact that the inscription -this "ritual element of continuity", is located 4.28 metres from the floor of the apse, i.e. relatively high above the usual height for the people of modern times and even more so for those of the Middle Ages, which in turn limits to a great extent its functions postulated in this way. Moreover, it is built-in in an upside-down position. In addition, its upper (now lower) part had suffered so much from the chisels of the mediaeval stonemasons (directly responsible for the implementation of the "continuity") that only separate letters had survived from the first line of the inscription. Furthermore, traces of mortar used to plaster the stones of the church wall are still present in the inscription field.

EVALUATION OF THE INSCRIPTION

Our observations revealed[4] the inscription to be written in ancient Greek in four lines. It is so severely damaged in its lower part that the inscription field at that specific spot was effaced. In addition, when it was built into the wall of the church, it was abundantly covered with mortar, which, falling away nowadays, has revealed the writing. It is a rectangular block of marble (Fig. 1). Its metric characteristics are as follows: length: 0.51m; height: 0.15m; width: 0.18m; letters: alpha-0.02m; omicron-0.015-0.016m. The size of the inscription field cannot be determined precisely due to the damages the monument has suffered. Therefore, none of the photographs taken is good enough to show the inscription in its entirety. The text, in its present state, provides the following reading:

[3] Theoklieva-Stoycheva 2019, 158.

[4] I would like to thank Todor Marvakov, Director of the Historical Museum – Nessebar, for the opportunity I was given to publish this artefact. I would also like to express my gratitude to my colleagues Konstantin Gospodinov, an independent researcher, Martin Zhelev, and Stoyanka Dimova, both from the Historical Museum-Nessebar.

https://doi.org/10.56170/propontica.1444437

[..ο..…ο……..]

..τ.χάρης Διονυσίου

Χόρειος Ἡροδώρου

Ποτειδᾶνι Ἀσφαλεί·

..... / -chares, son of Dionysius / Choreios, son of Herodorus / to Poseidon Asphaleios

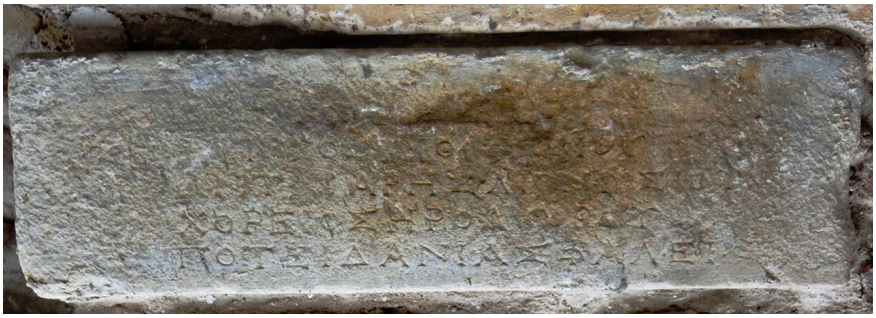

Fig. 1: View of the inscription (photo courtesy of Konstantin Gospodinov).

The Doric dialectic character of the inscription is especially evident in the name of the god. The palaeography and orthography of the source hint at the second half of the 3rd and the beginning of the 2nd century BC[5]. The spelling of the letters leads us to such a broad dating-e.g. alpha with a broken crossbar, the smaller size of o and ω, and also theta. Evidently, there was an attempt to align the letters, with 15 to 17/18 (?) letters on each line. Regarding the names of the dedicators, if by presumption there were other names and patronyms on the first line, this line is illegible at present. As for the name on the second line, and accepting the existence of the letter τ somewhere at the beginning of that line, the possible variants for restoration of the personal name are still quite a few–e.g. Αὐτοχάρης or Ἀντιχάρης[6]. The patronym on the second line is theophoric, and as such, it is widespread in the Ancient Greek world[7]. This can also be said about the patronym of the other person -Herodorus, from the following line. However, the name of the other dedicator, Χόρειος, is rare in Ancient Greek onomastics, and as such in the one of Mesambria too, where it is recorded for the first time[8].

5 See Larfeld 1914, 269-270. About palaeography of the Black Sea inscriptions see Boltunova – Knipovich 1962, 15 and Table II.

6 See Hansen 1957, 167.

7 I should mention that it is the late Prof. Alexandru Avram who gave me a hint about this reading of the patronym, for which I am very thankful.

8 See, IGBR I², 255-313; Velkov 2005, 159-191.

The inscription is located in St. Paraskeva Church, which according to a number of elements of its architectural plan, decoration of the facades, etc., with certain stipulations, belongs to the church construction of the 13th or the beginning of the 14th century[9]. It is built on a recess above the altar apse on its southern side (Fig. 2), which represents a unique architectural solution in the words of arch. Rashenov: *Dans la partieest de la nef se trouve le presbytère– l'abside de l'autel est circulaire à l'intérieur.* ***La courbe commence à 0.45 m. à l'intérieur****, ce qui a été fait peut-être dans le but d'augmenter l'espace du presbytère… L'abside de l'autel a une voûte sphérique qui commence à une distance de 0.45 m. de la paroi est de la nef. Par consequent, la partie supérieure du mur est supportée par une voûte construite dans le mur même et non pas par la meme voûte que l'abside*[10]. That is, our marble block was chosen to fulfil the construction goals of the mediaeval builders. A widespread practice in Nessebar churches is the embedding of smaller or larger marble blocks in their walls, which is visible to the naked eye in each of them. In this regard, the statement that there was probably an ancient temple on the site of the mediaeval church with a bell-tower is more than speculative. The same can be said about the original location and overall appearance of the monument itself. As such, to this day it remains just one of the many marble *spolia* used in the construction of the church.

Fig. 2: Interior of St. Paraskeva Church with the position of the inscription (top left).

9 The study by architect A. Rachenov is still the most trustworthy one with respect to the churches in Mesambria.
10 Rachénov 1932 (2006[2]), 26-27, 28.

However, once embedded in the wall of a mediaeval church, many questions arise regarding what and, above all, why this dedicative inscription appears in the polis of the Mesambrians. A possible answer to the problems posed in this way points us to the last line with the masculine Dative of the initiation –Asphaleios (Ἀσφαλεί[ωι]). Notably, his worshipping with this epithet is registered mainly in poleis with Dorian population[11], and among them is Mesambria on Pontus[12]. However, his cult, especially during the so-called Hellenistic Period, finds reception even outside the Doric cultural and religious circle. It is enough to point out its closest Black Sea parallel -the one from Dionysopolis (now the town of Balchik/ Bulgaria). One of the inscriptions from the stone archive of the temple (*metroon*) of the Pontic Mother of Gods, dated back to the 3rd–2nd century BC, is exactly a dedication to Poseidon Asphaleus[13]. In the commentary to the inscription, in addition to mentioning two epigraphic monuments from Kallatis (present-day Mangalia, Romania) with the same epithet of the god, his function as *a protector of sailors* and generally as *a patron of people related to the sea* is highlighted[14]. This categorically expressed opinion is essentially true, but the question arises whether, with respect to the Nessebar inscription, only this function of Poseidon in his quality of Asphaleios can be accepted.

His other function, of which we even have direct references in ancient literature[15], allows for another interpretation, namely his perception as the god of earthquakes and protector from them. A possible hypothesis is related to several dedications discovered so far with the same *epiklesis* of the god dated to the time after the middle of the 3rd century BC and in a relatively limited geographical region–the western part of Pontus. What could be the reason for this circumstance? A possible answer could be found in the seismic activity during the period comprising roughly the second quarter to the middle of the 3rd century BC that swept across Southeastern Europe. The hypothesis is supported by archaeological observations covering present-day North-Eastern Bulgaria and Dobrudja territory with the Black Sea coast of Bulgaria and Romania. A direct consequence of the damage inflicted by the earthquake, or rather the series of earthquakes, was the Celtic invasion of the Balkans and Asia Minor in particular. In addition to that, the date of the erection of the temple of the Pontic Mother of the Gods is placed after this destructive period[16].

11 See, Jessen 1896, RE II S. 1725.
12 Gyuzelev 2008, 200-201.
13 Lazarenko et al. 2010, 26, 34, Fig. 26
14 Lazarenko et al. 2010, 26, 34.
15 See, Jessen 1896, op.cit.
16 Orachev 2012, 66-69.

CONCLUSION

I would also allow myself another assumption based on the appearance of a celebration of Poseidon Asphaleios after the earthquake that was attested for certain, and perhaps also a seaquake in the last quarter of the same century, which struck the eastern part of the Aegean Sea, together with the Propontis, when, among other things, the Colossus of Rhodes crashed down[17]. After this devastation, a series of inscriptions dedicated to Poseidon with the same epithet were registered at the end of the century and the following one[18]. They probably mark a relatively large geographical area, including Asia Minor, the lands around the Propontis (including, for example, Cyzicus)[19], where the spread of dedications to Poseidon is remarkably distinct[20]. Therefore, such dedications appeared after catastrophic events both along the Western Pontus and the Aegean and also on the coast of the Propontis. It is possible that Mesambria also suffered from the earthquake, which destroyed or seriously damaged a considerable part of the West Pontic poleis and depopulated their territories.

On the other hand, based on the fact that we have no evidence yet of a temple dedicated to Poseidon in Mesambria and the Doric dialect of the inscription, we may seek other explanations about its presence here–that it was made in another Dorian *apoikia* and brought to the polis of the Mesambrians somehow.

A possible assumption is related to the probability that the inscription belongs to the group of the so-called *pierres errantes*, i.e. brought here in later times -used for ship ballast or as anchors, for example. Its relatively small size and well-worked surface make it suitable for this, which contributed to its being used later in the construction of the mediaeval church and thus surviving till present times. Such late use of artefacts is not uncommon–there is the notorious case of an inscription from the vicinity of Nessebar, originating from Kallatis[21].

Last but not least, however, I would like to recall Plutarch's words that Poseidon was worshipped in his capacity of Securer and Earth-Stayer on the eighth day of each month, eight reflecting the steady and unshakable power of this god[22]. Thus, Poseidon was recognized as a symbol of hope for ancient people. Furthermore, whatever the origin of this dedicative inscription is, one thing is certain: it ranks among similar ones and is also dedicated to gratitude for salvation from the wrath of sea and earth elements.

17 Guidoboniet et al. 1994, 140-142.
18 See for example, the bibliography provided by Ünver 2020, 469-470.
19 Ful 2022, 34-35
20 PHI (PHI Greek Inscriptions (packhum.org)); ERC MAP #503 (https://base-map-polytheisms.huma-num.fr/element/503).
21 IGBR I^2 311 bis. For more information, see Mihailov 2012, 167-168, 313.
22 Plutarch. *Theseus*, 36.

Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

Ethics

Regarding the Ethics Committee authorisation; the authors and reviewers of this study have declared that there is no need for Ethics Committee authorisation.

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PROPONTICA
Uluslararası Propontis Arkeolojisi Dergisi
International Journal of Propontic Archaeology

e-ISSN: 2980-132X, **PROPONTICA**, September 2024, 2 (4): 317-334

Towards a Study of the Architectural Decoration of Public Buildings in Parion During the Early Roman Empire

Erken Roma İmparatorluğu Döneminde Parion'daki Kamu Binalarının Mimari Süslemelerini İncelemeye Yönelik Bir Çalışma

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Makale Bilgisi/Article Information

Makale Türü/Article Types: Araştırma Makalesi/Research Article
Geliş Tarihi/Received: 1 Temmuz/July 2024
Kabul Tarihi/Accepted:21 Eylül/September 2024
Yıl/Year: 2024 | **Cilt – Volume:** 2 | **Sayı – Issue:** 4 | **Sayfa/Pages:** 317-334

Atıf/Cite as: Stoyanov, R. "Towards a Study of the Architectural Decoration of Public Buildings in Parion During the Early Roman Empire" Propontica, 2 (4), September 2024: 317-334.

https://doi.org/10.56170/propontica.1508438

TOWARDS A STUDY OF THE ARCHITECTURAL DECORATION OF PUBLIC BUILDINGS IN PARION DURING THE EARLY ROMAN EMPIRE

ABSTRACT

Parion was one of the principal centers of the Roman province of Asia, and the remains of several pub-lic buildings adorned with intricate architectural decorations have been uncovered and partially explored. Among these structures are a theater, an odeon, and thermae, all dating to the Roman Empire. In addition to these edifices, other public buildings in the central part of Roman-era Parion remain undiscovered, raising im-portant questions about the organization of public space and the architectural character of the city's core during the Early Empire. One of the most promising areas for further exploration is the "Agora" sector, bordered to the south by the odeon and to the north by the theater and thermae. This article offers an architectural and histori-cal analysis of the Corinthian order details found in this sector. The architectural elements discussed were un-covered during archaeological excavations conducted between 2015 and 2022 (Figs. 1-6). Although the availa-ble materials are insufficient to definitively identify the specific structures to which these decorative elements belonged, their forms, ornamentation, dimensions, and modules exhibit notable similarities to the architectural details of the southern façade of Hadrian's Gate in Ephesus. This resemblance suggests a commonality in their architectural compositions and, by extension, the types of structures they adorned. Consequently, it is plausible to infer that these architectural elements were part of a portico associated with a building complex in the Agora. The design of this complex (or at least part of it) likely reflects Hadrian's extensive building program in the Ro-man province of Asia.

Keywords: Parion, Agora, Architectural Decoration, Public Buildings, Early Roman Empire.

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ERKEN ROMA İMPARATORLUĞU DÖNEMİNDE PARİON'DAKİ KAMU BİNALARININ MİMARİ SÜSLEMELERİNİ İNCELEMEYE YÖNELİK BİR ÇALIŞMA

ÖZ

Parion, Roma'nın Asya eyaletinin başlıca merkezlerinden biri olup, titizlikle yapılmış mimari süsleme-lerle bezenmiş çok sayıda kamu binasının kalıntıları ortaya çıkarılmış ve kısmen keşfedilmiştir. Bu yapılar arasında hepsi Roma İmpa-

ratorluğu dönemine tarihlenen bir tiyatro, odeon ve hamam bulunmaktadır. Bu yapılara ek olarak, Roma dönemi Parion'unun merkezi kesimindeki diğer kamu binaları henüz keşfedilmemiş olup, Erken İmparatorluk döneminde kamusal alanın organizasyonu ve şehrin çekirdeğinin mimari karakteri ile ilgili önemli soruları gündeme getirmektedir. Araştırılması gereken en umut verici alanlardan biri, güneyde odeon, kuzeyde ise tiyatro ve thermae ile sınırlanan "Agora" sektörüdür. Bu makale, bu sektörde bulunan Korint düzeni öğelerinin mimari ve tarihsel bir analizini sunmaktadır. Ele alınan mimari unsurlar 2015-2022 yılları arasında yürütülen arkeolojik kazılar sırasında ortaya çıkarılmıştır (Res. 1-6). Mevcut malzemeler bu süsleme unsurlarının ait olduğu yapıları kesin olarak belirlemek için yetersiz olsa da, formları, süslemeleri, boyutları ve modülleri Efes'teki Hadrianus Kapısı'nın güney cephesinin mimari detaylarıyla dikkate değer benzerlikler sergi-lemektedir. Bu benzerlik, mimari kompozisyonlarında ve buna bağlı olarak süsledikleri yapı türlerinde bir ben-zerliğe işaret etmektedir. Sonuç olarak, bu mimari unsurların Agora'daki bir yapı kompleksiyle ilişkili bir porti-konun parçası olduğu sonucuna varmak akla yatkındır. Bu kompleksin (ya da en azından bir kısmının) tasa-rımı muhtemelen Hadrianus'un Roma'nın Asya eyaletindeki kapsamlı inşa programını yansıtmaktadır.

Anahtar Kelimeler: Parion, Agora, Mimari Süsleme, Kamu Binaları, Erken Roma İmparatorluğu.

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INTRODUCTION

Parion is located on the Anatolian side, where the Dardanelles widen at the entrance to the Sea of Marmara. The proximity to the straits and natural harbours endowed the ancient city with significant geopolitical importance. Its location in northwestern Mysia, at the crossroads of trade routes between the Propontis and the Hellespont, along with its proximity to Prokonessos and ancient centres such as Lampsacus, Kyzikos, Perinthos, and Byzantium, ensured Parion's prosperity throughout antiquity[1]. The city was one of the major centres of the Roman province of Asia. According to Vedat Keleş, based on the analysis of numismatic materials, it received the status of a Roman colony during the reign of Julius Caesar[2].

To date, the ruins of several public buildings with ornate architectural decoration have been discovered and partially explored in Parion. These structures, which include a theatre, odeon, and thermae, date back to the Roman Empire. According to Mustafa Sayar, based on the analysis of epigraphic sources, the beginning

1 Keleş 2014, 333.
2 Keleş 2009, 909911.

of the construction of the theatre dates back to the time of the reign of Emperor Vespasianus (6979[3]), and during the reign of Emperor Commodus (180-192), according to the Latin inscription on the blocks of the architrave of the proscenium, the structure was decorated and probably partially rebuilt for gladiatorial fights[4]. The Odeon's construction date is determined by the editors based on an analysis of archaeological contexts corresponding to the time of construction and functioning of the structure, as well as sculptural and architectural details between 135 and 150 AD[5]. The construction of the public thermae is determined within the second half of the 2nd century, based on finds of fragments of sculpture, architectural details and ceramic finds obtained during the excavation[6]. Thus, the construction activities associated with the organization of public spaces in the central part of the city date from the late Antonine dynasty to the reign of Emperor Commodus. The commencement of the theatre's construction dates back to the reign of Vespasian. This is primarily evidenced by an honorary inscription on a column discovered during the excavation of the site[7]. Additionally, the publishers noted that the reconstruction of the theatre's hyposcaenium utilized spolia — columns from earlier Roman structures, possibly linked to the theatre's initial construction phase[8].

It is quite evident that the public centre of Roman-era Parion included, in addition to the buildings mentioned above, other structures that remain undiscovered to this day. In this way, questions regarding the organization of public space and the appearance of public buildings in the central part of the city during the Early Empire remain highly relevant. One of the most promising areas in this regard is the section bordered to the south by the Odeon and to the north by the Theatre and thermae (Fig. 1, IV).

3 Hereinafter, all dates are given in AD unless otherwise noted.
4 Sayar 2016, 204, fig. 4; Sayar 2018, 181-182.
5 Kasapoğlu – Başaran 2021, 260262.
6 Başaran 2016, 119; Yılmaz – Sulan 2019, 3031.
7 Sayar 2015, 163-166; Sayar 2018, 181-182.
8 Başaran – Yıldızlı 2018, 3031.

Fig. 1. Photo of the public centre of Parion in Roman times: I: Odeon; II: "Agora" sector, highlighting the locations of architectural details: 1--column base; 2--capitals; 3--architrave frieze; 4--cornice; III: theatre; IV-V: thermae.

Regular archaeological surveys of the sector "Agora ve Ticari Yapılar"[9] began in 2011[10]. From 2021, research will be carried out here with a group of researchers from the Center for Classical and Oriental Archaeology, HSE University, as part of an international research project for the integrated study of the site. The definition of the boundaries, the architectural appearance, and the plan of the monumental

[9] For convenience, this sector will be conventionally referred to as "Agora" in the remainder of this publication, even though the Agora of Parion has not yet been found.

[10] Ergürer – Ayaz 2012, 353355.

agora building from the Roman period are among the main objectives of the research. The architectural decorations discussed in this article were found as a result of the archaeological excavations of the area from 2015 to 2022[11].

In 2016, two fragments of a shaft with a smooth facade were discovered in the western part of the excavation site during the investigation of rooms from the Byzantine period (Cat. 1; Fig[12]. 1: II, 1; 2: ab; 6: 1–2)[13]. The surface of both fragments is carefully smoothed but has small depressions due to the quality of the material. There are pinholes in the upper and lower surfaces. Both fragments could plausibly belong to a single monolithic shaft. Supporting this hypothesis is the ratio of the diameters of the upper and lower parts, where the upper diameter (435) is smaller than the lower diameter (527) by approximately 1/6. This ratio aligns with the standard tapering of the trunk of a column in the Corinthian order. The total height of such a column, reconstructed based on its module (MO 263), should be no less than 5260. This height corresponds to a ratio of 1:10 with its lower diameter.

The fragments in question belonged to the shafts of smooth columns of the Corinthian order, a common type in Roman architecture. They have numerous analogies among structures found in ancient monuments of the Eastern provinces of the Roman Empire. Therefore, in this context, the conformity of the shafts' form is less important than their metric characteristics and how these shafts relate to the architectural composition of the buildings to which they belonged. When searching for a building to which such a column could belong, one should first consider the public buildings of Parion that have already been discovered. Parts of similar column shafts supported the pulpit of the Hypeskenion Theatre. The rebuilding of the proscenium and hyposcenium dates to the second half of the second and beginning of the third centuries, which gives a terminus post quem for these elements, which were used in this structure as spolia, when the theatre was rebuilt into an arena for gladiatorial fights[14]. Analogies to the fragments from Parion, with similar design, metric characteristics and proportions, are given by the shafts of the facade design of the Skene Theatre in Sagalassos, the construction of which falls between 180 and 200 AD.[15] A close parallel to the shape of the fragments of the shaft under consideration are the shafts of the columns of the first and second tiers of the wall of the skene of the theatre of Nysa on the Maeander, the construction of

11 The author expresses gratitude to the director of Parion excavations Prof. Dr. Vedat Keleş for kindly providing an opportunity to study and publish the materials presented in the article.

12 Hereafter, all drawings are taken from the models made by the Remote Sensing and Spatial Data Analysis Laboratory (RSSDA Laboratory), directed by Yuri Svoyski and Ekaterina Romanenko. The following persons participated in collecting and processing of the data: Maria Bodrova, Idil Malgil, Anton Zaytsev and Ekaterina Romanenko. I'm very grateful to Yuri Svoyski and Ekaterina Romanenko for their kind permission to use the models in this publication.

13 Keleş et al. 2018, 192. According to Parion's coordinate grid, the squares are 6705/6710–5755.

14 Başaran – Yıldızlı 2018, 2931, figs. 1316.

15 Vandeput 1992, 105.

which dates back to the first half of the 2nd century[16]. At the same time, the columns of the second tier have the same ratio of the lower diameter to the trunk height as the Parion specimen. As Musa Kadıoğlu has pointed out, the columns of the Celsus Library at Hadrian's Gate in Ephesus, also dating from the first half of the 2nd century, have the same ratio[17]. When searching for the type of structure to which the column shaft fragments from Parion might have belonged, it is crucial to consider their proportional relationships within the building. In this case, attention should be drawn to the architectural composition of the Hadrian's Gate in Ephesus. The diameters of the lower parts of the engaged columns (530) and columns (512, 536) of the southern facade of this gate[18], with an allowable margin of error, are fully comparable to the diameter (527) of the column from Parion. With the same ratio of diameter to height (1:10) recorded for these columns, the difference in their heights does not exceed 2 cm, suggesting identical values for the modules of the architectural compositions.

The capital of the Corinthian order was found in 2019 at the level of the turf layer in the western part of the excavated area[19]. In terms of typology and style, it belongs to the common 1st and 2nd centuries type of triple-row capitals with a round calathus (Cat. 2; Fig. 1: II, 2; 3: af; 6: 4). The underside of the capital, most of which has not survived, was adorned with slender, fan-shaped acanthus leaves. The leaves featured deeply incised central lobes and prominent central ribs flanked by intricately pierced veins (Fig. 3: a-d). The long acanthus shoots in the third-row curve in an arc, forming a frame for the central part of the compositions of the facades. Three of these facades are decorated with a spiral of intertwined stems ending in curled tendrils, and the fourth, presumably the rear, has a single leaf with a wavy edge (Fig. 3: b). The abacus decorated with ornamental traces, which are visible on the specimen in question (Fig. 3: c), is also a characteristic element of the decoration of capitals of this type. Although the capital is highly fragmented, the only surviving dimension is the upper diameter of the calathos at the edge of the crown (550), which correlates with the lower diameter of the base of the column shaft's fragment (Cat. 1, b), at the edge of the base fillet (527). This error, which is acceptable in terms of preservation, allows us to consider the possibility that both elements belong to the same structure. Further confirmation is provided by the matching radii of the calathos circles (428) and the upper part of the column shaft (Cat. 1, a) along the lower edge of the astragalus (229), with an allowable margin of error corresponding to 5/6M (219).

This type of capital became widespread in Roman architecture during the 1st and 2nd centuries. One of the earliest examples can be found in the Temple of Cas-

16 Kadıoğlu 2002, 6466, 126, taf. 24, ab; 53, bd.
17 Kadıoğlu 2002, 127, fn. 332.
18 Thür 1989, 3637, pl. 912.
19 Keleş et al. 2023a, 9, fig.18. Squares are 6705/6710-5750.

tor and Pollux, one of the oldest temples in the Forum Romanum. The decorative elements of these capitals provide a foundation for studying the architectural features of the early Imperial period. Most scholars who have studied the capitals of this temple believe, based on convincing analogies and stylistic analysis, that they belong to the reign of Augustus.[20] Another example of an early variant of this form is found at the capitals of Octagon in Ephesus, attributed by Georg Plattner to the late reign of Augustus[21]. The development of the form and decoration of capitals of this type in the first half of the II century is demonstrated by the capitals of such temples as, for example, the temples of Hadrian, the Temple of Antoninus and Faustina, Hadrianeum in Rome or the so-called Temple of Hadrian in Ephesus[22]. A similarly shaped capital from the theatre at Nysa on the Maeander was published by Musa Kadıoğlu, who attributed it to the decoration of skenefrons and dated it to the first half of the 2nd century on the basis of analogies from Ephesus and Labranda[23]. Another analogy of this type is found within the capitals of the Trajaneum in Pergamon, completed during Hadrian's time[24]. Another similar form is also attested in the capitals of the eastern portico of the Agora of Iasos, dated between 136 and 138 AD, according to the inscription on the architrave[25]. During the excavation of the ancient theatre of Parion, three capitals were found, two of which were dated by Cevat Başaran to the second half of the 2nd century BC on the basis of stylistic analysis and analogies[26]. Apparently, they represent the evolution of this type of capital within the 2nd century.

Two fragments of a massive entablature (Cat. 3; Fig. 1: 3; 4: a–b, 6: 3, 5) were found in the western part of the sector "Agora" in 2014/2015. They were used as spolia in the construction of a Byzantine-era room discovered here. One fragment was used as a masonry block for the eastern wall, and the other as a threshold stone for the staircase leading to the room[27]. The entablature is an architrave carved in a single block with fluted doric cyma frieze, decorated with a high ornamental relief in the form of a belt of elongated leaves with outwardly curved U-shaped ends. It is well known that the Doric cyma frieze, which appeared in the late Classical period, is widely used in Roman Imperial architecture[28]. One of the earliest examples of the Doric cyma fluted frieze in Asia Minor is found on the Northeast Heroon at Sagalassos. Lutgarde Vanderput, through an analysis of the architectural decoration, dates its construction to the reign of Augustus.[29] The development

20 Strong – Ward-Perkins 1962, 12–18.
21 Plattner 2009, 102, abb. 2.
22 Stamper 2005, 212218, figs. 160, 162; Quatember 2010, 379382, fig. 1. On the design peculiarities of the form of capitals see: Wilson Jones 1991, 95100, fig. 4, iii; 5.
23 Kadıoğlu 2001, 156158, abb. 1, Nr. 5.
24 Rohmann 1998, 11-21, taf. 1-3, A1-A5.
25 Bianchi et al. 2018, 321, 326, fig. 1011.
26 Başaran – Yıldızlı 2018, 6970, fig. 31-32.
27 Ergürer et al. 2016, 31-32, res. 11. Squares 6705/6710–5755.
28 Kanellopoulos – Zavvou 2014, 368369, fn. 23.
29 Waelkens – Torun 2000, 554, figs. 25; Vanderput 2000, 577583.

of this form of frieze in the second half of the 2nd century is demonstrated by a monolithic block of architrave-frieze belonging to the entablature of the portico of the facade of the stage of the Sagalassos theatre, whose construction dates back to the end of the reign of Antoninus Pius and the beginning of the reign of Commodus (180–200 AD)[30]. The frize of the type under consideration from Macellum in Sagalassos also belongs to the period of the reign of the same emperor [31]. The entablature of the southern facade of Hadrian's Gate in Ephesus, also a monolithic block with an architrave-frieze, is the closest to the Parion specimen. The gate was part of a complex of buildings erected between 113/4 and 127/8 in connection with the emperor's visit to the city[32]. In this case, attention should be paid not only to the similarity in form and decoration but also to the close metric characteristics. The height of the architrave (375) and frieze (205), as well as the depth of the projection moulding (116) of the Ephesian entablature, correspond to the height of the architrave (338) and frieze (210) and the depth of the projection moulding (105) of the entablature from Parion.

Three fragments of a cornice (Cat. 4; Fig. 1: 4; 4: a–c; 6: 1) were found during the excavation of a complex of buildings from the Byzantine period in the western part of the sector "Agora" in 2014-2016[33]. They were at the same level as a fragment of the lower part of the column shaft, below the base of the walls of the rectangular room. All the fragments belonged to a massive cornice with dentils, the style of which can be considered standard in Roman architecture of the 1–3rd centuries. Such form, typologically correlated with the Ionic order, was also widely used in the composition of public buildings of the Corinthian order of the period of the early Roman Empire. Examples include the cornices of the Northeast Heroon at Sagalassos[34], the southern facade of Hadrian's Gate at Ephesus[35], the portico of the Agora at Gytheio[36], and the pediments of the stage facade of the theatre at Sagalassos[37]. A complete analogy of the element under consideration is the cornice of the lower level of the southern facade of Hadrian's Gate at Ephesus. Not only its form, all elements of which were made without additional decoration, but also its height (300–340) [38] is identical to the height of the cornice from Parion (338). Such a parallel suggests that the Ephesus and Parion cornices were executed in a similar manner and belong to the same chronological period.

30 Vanderput 1992, 114-116, pl. XXVII, b.
31 Vanderput 1997, 106, 214-215, pl. 48.1.
32 Thür 1989, 39, 7073, 101102, 133136, taf. 1819, pl. 15.
33 Ergürer et al. 2016, 31-32, res. 11; Keleş et al. 2018, 192. Squares are 6705/6710–5755.
34 The reign of Augustus (Waelkens – Torun 2000, 554, figs. 2 5).
35 Dated to 113/4–127/8 (Thür 1989, 4849, taf. 3944(H16)).
36 Dated to 2nd cent. AD (Kanellopoulos – Zavvou 2014, 370371).
37 Dated to 180200 (Vanderput 1992, 114116, pl. XXIX, c).
38 Thür 1989, 4849.

The architectural analysis of the order details from the sector "Agora" would be incomplete without addressing the obvious questions of whether they belonged to different buildings or could have been elements of a single structure. Despite all the elements discussed above originating from excavations of a single site, it is currently impossible to convincingly associate them with any specific building discovered in the area. All these fragments were found in a displaced state. Some were reused in Byzantine-era structures, while others were found below the floor level of these buildings, on a surface presumably associated with the functional level of Roman-era structures uncovered at the site[39].

Moreover, the sizes and proportions of these architectural details correspond to the modular proportions of the Corinthian order, which has analogies within a single building among public structures from the first half of the 2nd century. Therefore, it is reasonable to assume that all the examined details could have constituted the architectural composition of one building. Another indication supporting this possibility is that all these architectural details were found in close proximity to each other, within the same sector.

The ancient theatre is the only building discovered in Parion that can be tentatively correlated with the dating of the architectural details under consideration. It has been suggested that the initial phase of its construction dates to the period following the death of Vespasian[40]. Unfortunately, no architectural information from the theatre's first construction phase was found, and its architectural appearance remains unknown. Of all the architectural and construction elements belonging to the decoration of the scaenae facade, only the pedestals of the scaena frons were found in situ[41]. The cornices of the skene facade of the theatre, unlike the cornice from the sector "Agora", were richly decorated with ornamentation, and their dimensions differed significantly from the cornice discussed in this article. Along with other elaborately decorated architectural details of the skene facade discovered during the theatre's archaeological excavations, researchers have attributed them to the second half of the 2nd century[42]. During the excavations of other public buildings in Parion, no blocks of architrave-frieze decorated with Doric cyma in relief, similar to the one found at the sector "Agora", were discovered. This evidence suggests that the architectural details discussed in this article were most likely not related to the construction of the Theater, Odeon, or thermae. Instead, they likely belonged to another public building constructed in the central part of the city in the first half of the 2nd century AD.

39 Keleş et al. 2023b, 377378, res. 1011.
40 Sayar 2018, 181-182; Başaran – Yıldızlı 2018, 78.
41 Ergürer – Güleç Özer 2018, 38, figs.3 134.
42 Başaran – Yıldızlı 2018, 6569, figs, 2129.

Despite the lack of sufficient materials to definitively determine the type of structure to which these architectural decoration elements belonged, it is essential to note the similarity in their forms, decoration, sizes, and modules to the architectural details of the southern facade of Hadrian's Gate in Ephesus. This similarity suggests a correspondence in their architectural compositions and, consequently, the types of these structures. Therefore, it can be inferred that the architectural details discussed in this article likely belonged to a portico gate associated with a complex of buildings located in the Agora area. The architectural design of this complex (or at least a portion of it) was likely part of Hadrian's extensive construction program implemented in the Roman province of Asia. We hope that further research in the "Agora" sector will yield additional materials to aid reconstructing the layout and architectural appearance of the central part of the city's buildings during the early Roman period.

Catalogue[43]

1. Column Shafts (Fig. 2: ab). Marble. The preserved height of the upper part (a) is 637[44], and the lower part (b) is 1583. The restored height of the shaft is not less than 4440. The diameter of the upper part is 435, and the lower part is 527, with an outcrop of 30 in both the upper and lower parts.

The upper and lower profiles have numerous chippings; the facade shows extensive chipping and traces of weathering. The upper and lower parts of the shaft with smooth facades and thinning. The crowning profile is decorated with an astragal, height 52; the lower part is decorated with a shelf, height 86. In the middle of the upper and lower part of the column, there are rectangular recesses at an angle to the column's central axis with the dimensions of 88 x 44 (upper) and 45 x 45 (lower).

2. Capital (Fig. 3: a–f). Marble. Preserved height–461, restored height - not less than 549, the upper diameter of the calathos (on the edge of the crown)–550, restored length of the abacus - not less than 1052. The lower and upper parts are chipped, and the edges of the abacus and the lower row of leaves are chipped. There are numerous chips and traces of weathering on all facades.

Three-row diagonal capitals with round calathos, with a crown of straight profile. The lower part consists of two rows of acanthus leaves in five sections. The upper row had eight leaves with a recoverable length of at least 170; the leaves of the lower row are not preserved. The acanthus leaves of the third row form the compositions of the front facades. The centre of three of them (b-d) is a decorative

[43] Descriptions of architectural details are arranged in the following order: name, date, material, form, dimensions, state of preservation.

[44] Hereinafter all dimensions are given in millimeters.

element consisting of twisted trunks ending in inwardly curved volutes. The centre of three of them (b-d) is a decorative element consisting of twisted trunks ending in inwardly curved volutes. The centre of the fourth (a), the back of the façade, is a decorative leaf between inwardly curved leaves. Above this composition, there is a relief projection on the abacus and the crown of the calathos. The abacus was decorated with a fleuron, traces of which are preserved (c). On the upper plane of the capitals, at a distance of 151 from the rear facade, there are three hollows (Fig. 2, f, 1 3) with dimensions: (1) 36 x 54 x 23, (2) 77 x 20 x 38 and (3) 99 x 67 x 23. Another hollow (Fig. 2, f, 4) with dimensions 56 x 12 x 14 is located at a distance 224 from hollow 2.

3. Entablature. Architrave-frieze (Fig. 4:, ab). Marble, in two fragments 1778 (a) and 1354 (b) long. Preserved heights are 550 (a) and 571 (b). The restored height on the facade is 656. The surface has numerous chippings, scratches and weathering, the edges are chipped; (a) the lower part of the architrave is sawn off and rubbed due to use as a threshold stone, chipped on the sides. (b). The upper part of the frieze is chipped.

The entablature consists of an architrave-frieze carved from a single monolithic block. The architrave, measuring 338 in height, is composed of three fasciae separated by torus fillets. The crowning profile features a Lesbian cyma, accented below by two belts: the lower belt is designed as a quarter shaft, and the upper as a torus. The frieze, with a height of 211, showcases a Doric cyma and consists of reliefs in the form of leaves, divided by grooves. These leaves are elongated, concave inwardly, with rounded ends that curve and incline outwardly. The height and depth of the frieze's crowning profile are 105. This crowning profile takes the form of a shelf accented by a cavetto fillet.

4. Cornice in three fragments (Fig. 5: ac). Marble. Preserved maximum length and width: 1230 x 900 (a), 900 x 500 (b), 1400 x 1000 (c). Height–338; depth of corona–150. Total depth of profile –– 331. Twelve (a), six (b), and eight (c) dentils, measuring 58 x 68. On the facade portions, traces of polishing are noticeable; on the lower surface of the block, traces of tooling by toothed chisel. The surface exhibits numerous chips, scratches, and weathering marks, with all edges of the fragments worn.

The cornice with dentils. The transition to the outrigger is designed as an ovolo fillet. The depth of the dentil's projection is 146; the overall depth of the profiled projection is 270. Transitions from the slab to the denticle and from the denticle to the crowning section are embellished with ovolo fillets. The crowning section's profile is designed in the Doric cyma, ma, 88 in width.

https://doi.org/10.56170/propontica.1508438

Conflict of Interest

Within the scope of the study, there is no personal or financial conflict of interest between the authors.

Ethics

Regarding the Ethics Committee authorisation; the authors and reviewers of this study have declared that there is no need for Ethics Committee authorisation.

Fig. 2. a-b: Column Shafts.

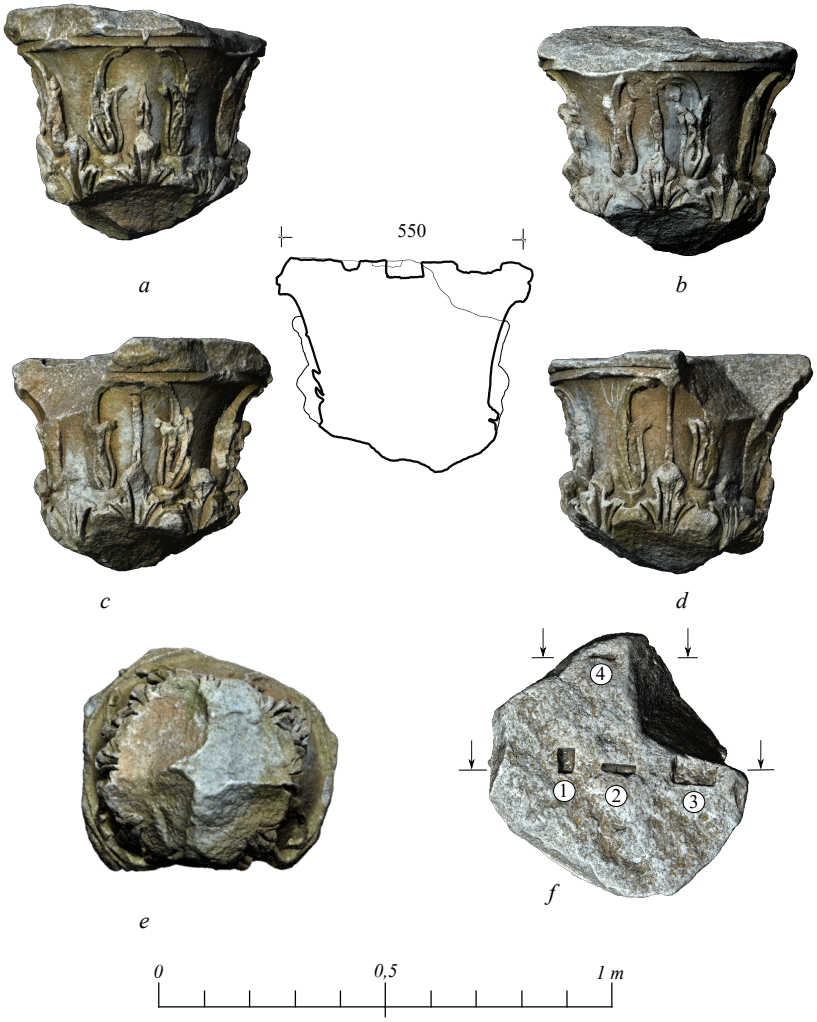

Fig. 3. a-f: Capital.

Fig. 4. a-b: Architrave-Frieze.

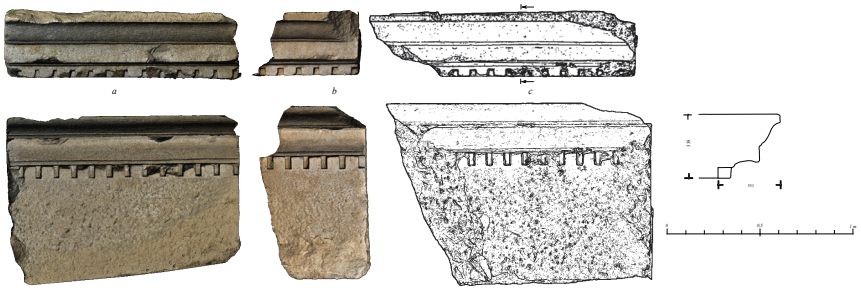

Fig. 5. a-c: Cornice.

Fig. 6. Architectural details: 1–2: fragments of the Column shafts; 3, 5: architrave–frieze; 4: capital.

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