LANDSCAPE AND HISTORY IN THE LYKOS VALLEY: LAODIKEIA AND HIERAPOLIS IN PHRYGIA

LANDSCAPE AND HISTORY IN THE LYKOS VALLEY: LAODIKEIA AND HIERAPOLIS IN PHRYGIA

Edited by
Celal ŞİMŞEK
Francesco D'ANDRIA

Cambridge
Scholars
Publishing

LANDSCAPE AND HISTORY IN THE LYKOS VALLEY: LAODIKEIA AND HIERAPOLIS IN PHRYGIA

Edited by
Celal ŞİMŞEK
Francesco D'ANDRIA

Cover Design
Mustafa BİLGİN

First Edition

2016 Cambridge Scholars Publishing
ISBN

Cover Photos
Tops: Laodikeia
Bottom Left: Tripolis
Bottom Right: Hierapolis

Publishing

CONTENTS

PREFACE

The Upper Maeander basin in southwestern Anatolia stands out with its different, colourful, rich and vivid character. The River Maeander rises near Dinar (Kelainai / Apameia) and is joined by the Işıklı (Eumeneia) tributary and flows, nourishing many ancient civilizations on both banks for millennia, until it reaches the Aegean near Miletos. Thus, this geography steps forth with the richness of archaeological remains it houses.

The Kocabaş (or Denizli) Man, a Homo Erectus from the northeast of the Lykos Valley is dated to 1.2 million years ago, and this is important evidence of continuous human life in the Lykos landscape. This evidence is further verified by the recent surveys by Assoc. Prof. Dr. Kadriye Özçelik of Ankara University, recovering numerous hand axes dating from 750,000 to 250,000 BC. The density of settlements in the concerned region increased rapidly with acceleration in the Bronze Age. In the Upper Maeander Valley, Beycesultan, where the British Institute of Archaeology at Ankara (BIAA) started excavations in the 1950s, currently continued by Prof. Dr. Eşref Abay, is an important prehistoric site.

Kolossai in the Lykos Valley was an important settlement in the Classical period and earlier, but Hierapolis, Laodikeia and Tripolis appeared on the stage in the Hellenistic period. Particularly Laodikeia, located in the middle of the valley, assumed a very active part in trade, arts, culture and sports as a metropolis during the Roman Imperial period.

The Lykos Valley is also located at the crossroads of routes connecting southern, western and central Anatolia, and within the valley Laodikeia is situated as the main junction. This geographic location, fertile land,

favourable climate and the Lykos River, connected with a lake in the middle of the plain and flowing into Maeander River near Sarayköy on the west, all facilitated and contributed to the overseas trade of the region's cities.

With Christianity spreading rapidly in the Early Christian period, Laodikeia, Kolossai and Hierapolis assumed a leading position. Particularly, Laodikeia was one of the "Seven Churches" cited in the book of Revelation, and Hierapolis was the city where the Apostle Philip was martyred. In this period also the Church of the Archangel Michael was built at Kolossai. The cities of the Lykos Valley lost their importance due to seismic activities in the region, its location on the marching routes of armies, and epidemics of plague as of the seventh century AD.

Excavations at Hierapolis of Hellenistic and Roman periods have been undertaken by the Italian Archaeological Mission uninterrupted since 1957 and currently the head of excavations is Prof. Dr. Francesco D'Andria. Excavations at Laodikeia have been conducted by Prof. Dr. Celal Şimşek of Pamukkale University since 2003. A brand new excavation in the valley is the sit of Tripolis, undertaken by Assoc. Prof. Dr. Bahadır Duman since 2012. Excavations and research conducted at these three leading cities have made great contributions to the archaeology of the region.

Excavations and restorations conducted at Hierapolis, Laodikeia and Tripolis, the cities in the Lykos Valley, have paved the way for an enormous amount of new data to be obtained, interpreted and presented to academia. The present book, published by Cambridge Scholars Press, concentrates on Landscape and History in the Lykos Valley: Laodikeia and Hierapolis in Phrygia, by Celal Şimşek, presents the work and progress in Laodikeia; Francesco D'Andria presents the latest discoveries at the Ploutonion of Hierapolis; Bahadır Duman presents the data from the excavations of the tabernae in Tripolis; Tamer Koralay, Kıymet Deniz and Yusuf Kaan Kadıoğlu present their analyses of the polychrome travertine quarries near Tripolis and their use in the city; Erim Konakçı, Ali Ozan and Fulya Dedeoğlu focus on the prehistory and second millennium BC of the Lykos Valley; Giuseppe Scardozzi explores the origins of the marble used in Hierapolis through the analyses conducted within the frame work of the Marble Quarries in

Phrygia Project; and Girolamo Fiorentino presents the archaeo-botanic studies in Hierapolis. Each article here is as important as the other, and they also reveal the tight connections among the cities of the valley.

I would like to thank the contributing scholars as well as archaeologist Ayşegül Arığ and Cambridge Scholars Press team for their efforts in the publishing process.

Prof. Dr. Celal ŞİMŞEK
Laodikeia Excavation House
Denizli, TR 20160

URBAN PLANNING OF LAODIKEIA ON THE LYKOS IN THE LIGHT OF NEW EVIDENCE

*Celal ŞİMŞEK**

Geographic Location of the City

The ancient city of Laodikeia on the Lykos is located in the Lykos (Çürüksu) Plain in inner southwest Anatolia (Figs. 1-2). This plain is surrounded by the Babadağ (ancient Salbakos) range in the south, Mt. Çökelez in the north, Mt. Honaz (ancient Kadmos) in the southeast, and Buldan Mt. Sazak in the west (Figs. 3-4). The Maeander (Büyük Menderes) River, whose source is near Dinar (ancient Apameia), flows in the northwest of the plain and joins the Aegean Sea near Miletus in the west (Figs. 2-3).

The Lykos (Çürüksu) River[1], after which the plain is named, rises at the foot of the Mt. Honaz (Kadmos), and stretches from the east of the city to the north and northwest; it first flowed into the lake which once existed in the middle of the plain, then it joined the Maeander near Sarayköy. The

* Prof. Dr., Pamukkale University, Faculty of Science & Arts, Department of Archaeology, 20017 Denizli, Türkiye. E-mail: csimsek@pau.edu.tr.

[1] Many cities named Laodikeia were founded in the Hellenistic period; therefore, our Laodikeia was called Laodicea ad Lycum, i.e. Laodikeia by the Lykos River. Weber 1898, 178-179; Ruge 1924, 722; Gagniers 1969, 1; Traversari 2000, 11; Sevin 2001, 203.

city is also surrounded by two other minor creeks: the Kadmos (Gökpınar-Karakurt) coming from the Cankurtaran Valley in the southeast, and the Asopos (Gümüşçay-Goncalı) coming from the foot of Babadağ. These two streams flow into the lake in the middle of the plain (Fig. 5). On the other hand, the Kapros emerges in the valleys where Babadağ extends westward, and flows into the Maeander near Sarayköy. The Kapros also forms the administrative boundary of Laodikeia in the west[2]. In the east the city's boundary reaches Kolossai[3]. Overall, the Lykos plain was mainly within the territory of Laodikeia.

The lake that once existed in the middle of the plain facilitated raft-transport via the Maeander River down to Miletus (Figs. 2-3). The existence of the lake has been proven by an inscription discovered by Prof. Dr. Francesco D'Andria, the director of the Italian Mission at Hierapolis[4]. According to this inscription the Laodiceans asked for payment for fishing privileges from the Hierapolitans; the case was taken to the Emperor Hadrian by the Hierapolitans, and the emperor ruled in their favour. The lake, which can be attested in satellite images, actually existed until the previous century (Fig. 5). The name of Denizli comes from this lake and underground sources. For a tributary of the Lykos flowing east into the lake the locals still call it "the stream flowing into the sea"[5]. In addition, Turks also called the lakes as seas.

In ancient geography, the Lykos Valley lies in the western tip of Phrygia (Figs. 2-4). The Mt. Salbakos (Babadağ) range in the south actually separates Phrygia from Karia. In the northwest, the Maeander River is the border between Phrygia and Lydia. In the southwest, Mt. Söğüt before Anauva (Çardak and Beylerli) plain constitutes the border with Pisidia.

The Maeander route was one of the most important transit and commercial routes of antiquity and the Lykos Valley lies in its centre. Located in the middle of the plain Laodikeia is situated at the junction of routes leading to the west, east and south. Laodikeia connects to Apameia (Dinar) in the east,

[2] Ramsay 1895, 35-36.
[3] Jones 1971, 74.
[4] Scardozzi 2007, 86, Figs. 18, 19.
[5] Şimşek 2011a, 108-109.

to Perge and Side in the south via Kibyra (Gölhisar), to Ephesus end Miletus in the west, and to Sardis in the northwest (Fig. 2)[6].

Brief Chronological History of Ancient Laodikeia

Laodikeia, located within the boundaries of Eskihisar, Goncalı, Bozburun and Korucuk neighbourhoods 6 km to the north of Denizli town, was actually a Phrygian city. It rises on a platform surrounded by streams on three sides (Figs. 6-7). The urban areas stretch over an area 250-285 m. in altitude. The highest point is where the Water Distribution Terminal II is located – 291-293 m. above sea level (Fig. 13).

Evidence discovered in the ancient city of Laodikeia since 2003 has brought to light numerous data hitherto unknown. Above all, the earliest history of the city, traditionally attributed to the Hellenistic period, is now extended to the Early Chalcolithic period (5500 BC), based on findings from the West Necropolis – prehistoric Kandilkırı Settlement[7] (Figs. 8, 10) and Asopos Hill[8] (Figs. 9-11). Hellenistic Laodikeia was founded in the mid-third century BC by the Seleukid King Antiochus II on behalf of his wife Laodike[9]. In this case the foundation date of Laodikeia should be placed between 261 BC when Antiochus III ascended the Seleucid throne and 253 BC when he divorced her in order to marry Berenike, daughter of Ptolemaios.

Pliny (*NH* V.105) states that the ancient city's site was formerly occupied by a village called first Diospolis and then Rhoas[10] and that the Hellenistic city was founded by Antiochus II (r. 261-247 BC). The first name means "City of Zeus" and reveals the presence of a deep-rooted and very ancient sanctuary here. Zeus was venerated greatly as the leading founder and chief deity of the city through the Hellenistic and Roman Imperial periods.

---

6 Magie 1950, 127-128; Şimşek 2013a, 39, Figs. 37-38.

7 Oğuzhanoğlu 2014, 71-85, Figs. 2-23.

8 Şimşek 2013a, 47,70-77, 400-407; Konakçı 2014, 87-114, Figs. 1-28.

9 Ramsay 1895, 32; Anderson 1897, 409-410; Head 1906, Ixxiii; Ruge 1924, 722, Buckler – Calder 1939, x; Magie 1950, 127, 986-987, no. 23; Gagniers 1969, 1-2; Jones 1971, 42; Head 1977, 678; Bean 1980, 213; Belke – Mersich 1990, 323; Bejor 2000, 15-16; Texier 2002, 383.

10 Ramsay 1895, 35; Bean 1980, 213; Belke-Mersich 1990, 323; Head 1906, lxxiii; Ruge 1924, 722; Gagniers 1969, 1; Jones 1971, 42; Texier 2002, 383-384.

The name Rhoas, on the other hand, is a typical ancient Anatolian name as inferred from its etymology. In Pliny's statement, however, it should be corrected that the settlement was first called Rhoas and then Diospolis. The name was changed to Laodikeia in the mid-third century BC.

The name Laodikeia is first attested in Polybius (IV, 48.5 and V, 57.5). Thus, Seleukos III Soter (r. 225-223 BC) gave the duty of settling the border dispute with the Pergamene King Attalos I (r. 269-197 BC) to his general and nephew Akhaios. Akhaios had the upper hand over Attalos at Sardis. In 223 BC when Seleukos III was murdered Akhaios took advantage of the turmoil emerging; he first supported Antiochus III (r. 223-187 BC) but then revolted against him, proclaiming himself king at Laodikeia in 222-221 BC and minting coins in his own name. The new king could not deal with Akhaios right away as he was involved in suppressing other revolts in Syria but finally Akhaios was defeated and executed at Sardis in 213 BC[11]. Thus, Antiochus III restored Anatolia to his kingdom.

The Lykos (Çürüksu) Valley remained under Seleucid rule until the Battle of Magnesia between the Seleucids and Romans in 190 BC. Winning this battle with the help of the Pergamenes, the Romans left the Seleucid territory in this area to the Pergamenes with the Treaty of Apameia (Dinar) signed in 188 BC. With the annexation of the Pergamene Kingdom to Rome via the bequeathal of Attalos III on his death in 133 BC, western Anatolia became part of the Provincia Asia founded in 129 BC[12].

Laodikeia was besieged and destroyed by the Pontic armies during the First Mithridatic War (88-85 BC), just like the Lykos Valley and neighbouring towns. Laodikeia was defended by the Roman general Quintus Oppius. Laodikeia gained in wealth rapidly especially after the Mithridatic Wars[13]. Thereafter Strabo (XII 8.13) cites Laodikeia as one of the two biggest cities of Phrygia, the other being Apameia Kibotos.

During the Roman Imperial period Laodikeia paid its taxes regularly and assumed the title of *neokoros* in the reigns of Hadrian (r. 117-138 AD),

[11] Balbank 1957, 15-21.

[12] Strabo, XIII 4.2; Humann *et al.* 1898, 19-23; Magie 1950, 127, 986-987, no. 23; Gagniers 1969, 3; Magie 2001, 39-41, 67-68.

[13] Magie 1950, 213-214.

Commodus (r. 180-192 AD), Caracalla (r. 211-217 AD) and Alexander Severus (r. 222-235 AD), and thus was tax-exempted[14].

Laodikeia became one of the most important and developed commercial centres of Anatolia in antiquity. Wool production and trade brought great wealth to the city together with great fame[15]. The wool obtained from raven black sheep and textiles woven with it were the source of this wealth and fame (Cicero, *Letters to his Friends*, II, 17.4 ve III, 5.4; Strabo XII 8.16). Strabo (XII 8.16) states that Laodikeia produced sheep that were excellent, not only for the softness of their wool, in which they surpassed even the Milesian wool, but also for its raven-black colour. Pliny (*NH*, XXI, 9. 27 and XXV, 9. 67) states that actually this wool was dyed red or purple with red ochre obtained from Rubia Tinctoria. L. Vitruvius (VIII 3. 14), on the other hand, ascribes the whitish brown, grey and raven-black colors as well as the softness of the wool to the rotten-smelling water of the region. In the excavations, loom weights, a dyeing workshop, dye residue, and fabric fragments used as pipe-plugs have been discovered[16] (Figs. 11-12).

In the reign of Tiberius (r. 14-37 AD) Laodikeia was the grandest and richest city in Phrygia. The earthquake of AD 60 razed the cities in the Lykos Valley to the ground; Hierapolis and other cities were renovated with the help of the Roman Empire but Laodikeia restored itself on its own[17]. An inscription referring to water regulations has been discovered before Trajan's Fountain at the south end of Stadium Street and it refers to the city as the "most magnificent city" and "in the most magnificent city of the Laodikeians" attesting to the wealth of the city in the latter half of the first century AD[18]. The city centre extends over an area of 2.5 sq. km. and the insulae and the houses therein suggest that about 80,000 people lived in the city between the first and third centuries AD. Considering the expansion of the city in the close proximity, this population may add up to 200,000 people.

[14] Şimşek – Ceylan 2003, 148; Şimşek 2011a, 88; Şimşek 2013a, 57, 508.
[15] Magie 1950, 47-48; Jones 1971, 74.
[16] Şimşek 2013a, 392-394, 396-399, Figs. 518-520, 521-527.
[17] Şimşek 2013a, 56.
[18] Şimşek 2015b, 67.

Laodikeia was an important city and perhaps the capital of the Kibyra (Gölhisar) Conventus during the Late Republic and Early Roman Imperial periods. Cicero stayed for ten weeks in Laodikeia during his governorate of Cilicia (51-50 BC)[19] and saw to the cases with the notorious *publicani,* ruling justly[20].

That Diocletian (r. 284-305 AD) declared Laodikeia as the metropolis of Phrygia (after 290) reveals the importance of the city during the Late Roman and Early Byzantine periods[21]. Laodikeia hosted emperors Hadrian in 135, Caracalla in 215 and Valens in 370[22].

With the division of the Roman Empire into two, the city was encircled in 395-396 with fortifications following a decree issued by Theodosius (r. 378-395 AD) and Arcadius (r. 395-408 AD)[23]. However, the walls do not fully circumscribe the city (Fig. 13). In the construction of the fortifications, blocks of existing buildings were used and walls of the North (Sacred) Agora, theatres and stadium were incorporated (Fig. 13). Surveys across the city indicate that life outside the walls continued for a while after the construction of the fortifications (Fig. 14). Probably those living outside the walls took refuge within it at times of danger.

Laodikeia was razed to the ground by the earthquake in AD 494 and could never attain its former glory again. Thereafter, the settlement gradually shrank. Another earthquake in the reign of Emperor Focas (r. 602-610 AD) wiped out the city entirely. This time the waterways supplying the city from the springs at Başpınar, Denizli, were destroyed and security concerns arising from the Sassanids and Arabs paved the way for the relocation of the city to the foot of Mt. Salbakos (Babadağ) in the south, more favourable for defence and water sources[24] (Fig. 15). While a group of people settled at Kaleiçi, other groups settled at Bereketli, Hisarköyü and Asartepe (Hisar), building small fortresses for defence purposes. Excavations have shown that

[19] Cicero, Letters to his Friends, III, 7; IX, 25; XIII, 54 and 57; Letters to Atticus, V, 15, 16, 20, and 21; VI, 1, 2, 3, and 7; Against Verres, I, 30.

[20] Magie 1950, 391-392; Şimşek 2013a, 56.

[21] Şimşek 2011a, 91; Şimşek 2013a, 57.

[22] Şimşek 2013a, 57.

[23] Şimşek 2013a, 57.

[24] Şimşek 2007, 39-43, Res. 2, 4-17; Şimşek 2013a, 58.

the doors of shops and houses were deliberately blocked, clearly indicating that the inhabitants had hopes of returning.

Remains of fortresses at Denizli Kaleiçi, Bereketli Hisarköy and Asartepe have survived[25]. Bronze Age necropoleis are attested at Denizli Bağbaşı, İncilipınar, and Gümüşler mounds, whereas Hellenistic and Roman necropoleis have been found at the Pamukkale University campus site. It is plausible that some Laodiceans may have moved to Hierapolis (Pamukkale) as well. Laodikeia as mentioned in the sources starting in the seventh century actually means the settlement especially at Denizli-Kaleiçi and around. The region was conquered by Turks in 1206, and the name corrupted to Lâdik[26].

Favourable conditions in the Lykos Valley facilitated human habitation from very early times onward. The earliest evidence is a skull of *Homo Erectus* (Denizli-Kocabaş Man) found in a travertine quarry on the southeast foot of Mt. Çökelez dated to 1,200 millennia before present[27]. This discovery paved the way for archaeological excavations revealing the earliest data in the Lykos Valley. Pottery, either plain or decorated with geometric motifs in red ochre and dated to the Early Chalcolithic period (5500 BC), was discovered at the West Prehistoric Necropolis – Kandilkırı Settlement of Laodikeia[28] (Figs. 10, 16). Pithos burials discovered at this prehistoric necropolis cast light on the burial customs of the region during the Early Bronze Age[29] (Figs. 8, 17). Formerly Denizli Museum had conducted rescue excavations at Akhan Bronze Age Necropolis, used from 3000 to 1200 BC[30].

Solid evidence regarding Diospolis and Rhoas mentioned by Pliny (*NH* V.105) was found at the twin mounds of Asopos I-II to the west of Laodikeia (Figs. 9-11). Excavations at Asopos I-II brought to light data dating from

---

[25] For remains see Şimşek 2007, 38-43, Figs. 2-10, 12-17.

[26] Şimşek 2007, 38-40; Şimşek 2011a, 91-93; Şimşek 2013a, 58, 513.

[27] Çokaman 2008, 4-5.

[28] Şimşek 2012b, 586-590, Figs. 13-14; Şimşek 2013a, 27, 47, 467-470, Fig. 676; Oğuzhanoğlu 2014, 72-73, Figs. 2-3.

[29] Şimşek 2013a, 400-407; Oğuzhanoğlu 2014, 73-78, Figs. 4-14.

[30] Şimşek 2013a, 39, Fig. 44. In addition foundation excavations for a construction in Bağbaşı neighbourhood conducted by Denizli Museum Directorate brought to light pithos burials of the Bronze Age.

the Late Chalcolithic through the fifth century AD in seven strata[31] (Fig. 10). The Middle Bronze Age is not represented at Asopos I-II, but the concerned period as well as the Early Chalcolithic period are attested at the West Prehistoric Necropolis and Kandilkırı settlement[32] (Figs. 10, 16). Thus, excavations have clearly shown that the ancient city of Laodikeia was a typical Anatolian foundation and settlement.

Excavations at the Asopos Hill have cast light on the past of Laodikeia. Analyses of the Bronze Age obsidian pieces discovered at Asopos Hill I-II have indicated their origin as Central Anatolia for almost half of the material, and the Aegean islands for the rest (Fig. 18).

This shows that the city/settlement was already well connected commercially with the interior of Anatolia and the islands in the Bronze Age[33]. Loomweights of the Bronze Age (second millennium BC) reveal the early phases of the textile industry, which was to be of great importance for the Hellenistic and Roman city[34] (Figs. 11-12). Pottery kilns from the Middle-Late Bronze Age[35] and Hellenistic period also indicate local pottery production beside imported wares[36]. Pottery discovered in various sectors of the ancient city is proven to be local production through analyses of their clay, type, and temper content. Vessels, roof tiles and bricks produced locally bear various workshop monograms, stamps and marks[37].

Water Supply System

Due to the absence of any springs within the urban limits of Laodikeia, water supply was a major concern from the very beginning. Before the Hellenistic period water is thought to have been conveyed from the River Asopos

---

[31] Şimşek 2013a, 70-77, 467-476, Figs. 68-74, 671,682-689; Konakçı 2014, 89-104, Fig. 4.

[32] Şimşek 2013a, 400-407, 467-471, Figs. 529-536, 676-681. See Oğuzhanoğlu 2014 and Konakçı 2014.

[33] Şimşek 2011b, 449-450; Şimşek *et al.* 2014, 123-142, Figs. 7-15, Tables 1-3.

[34] Şimşek 2014a, 44, Fig. 10.

[35] Konakçı 2014, 95-99, Figs. 15-17.

[36] For Laodikeian type lamps see Duman 2010, 189, n. 486; Şimşek *et al.* 2011, 79-80, pl. 74/139-140; Şimşek 2013a, 72-75, 467-468, 476-478, Fig. 73, 671-672, 693; Şimşek – Duman 2013, 151-180.

[37] Şimşek *et al.* 2011, 14, 17-20, pl. 59-61; Şimşek 2013a, 467, Figs. 673-675.

(Gümüşçay-Goncalı). This is why the early settlements clustered around the River Asopos, which was suitable for supplying the Asopos Hill and West Prehistoric settlements (Figs. 6-7). Water was brought from the Mt. Salbakos (Babadağ) valleys some 18 km away during the Hellenistic[38], Roman and Early Byzantine periods; the water from Başpınar spring was stored in a basin, which is located within military territory today, and then conveyed via a system incorporating a network of open channels, aqueducts and pipes to the two water distribution centres within the city[39] (Figs. 15, 19). In the Hellenistic period, thick-walled terracotta pipes were used for conveying the water. In the Roman Imperial period the terracotta pipes were replaced with travertine pipes, which were more durable against high pressure, and the twin pipelines can be followed from the west side of Eskihisar Neighbourhood up to the Water Distribution Terminal I (Figs. 19-20). In the 2015 excavations, an inscription of thirty lines was discovered in front of the east side of the semi-circular shaped Trajan Fountain recently excavated at the south end of Stadium Street; this inscription, of utmost importance, addresses issues such as maintenance of the waterways to Laodikeia, their destruction, keeping the water uncontaminated and unlittered, and its use for orchard irrigation, and foresees severe fines for illegal use[40]. Two main water distribution terminals in the urban area provide the distribution to the individual structures (Fig. 13). Water Distribution Terminal I provided water to the Stadium, South Baths Complex, Bouleuterion and others in the vicinity (Figs. 7, 13); on the other hand, Water Distribution Terminal II supplied almost seventy per cent of the urban area. Terracotta pipes ran from these main terminals to the civic, public and religious buildings[41]. With the

[38] Due to ca. 50 m. level difference between the Eskihisar slopes and Water Distribution Terminal I, terracotta pipes were secured to each other with lead clamps against pressure during the Hellenistic period; however, in the Roman Imperial period these were replaced by twin travertine pipes. See Şimşek 2013a, 63-69, Figs. 51-64.

[39] Şimşek – Büyükkolancı 2006a, 83-89; Şimşek – Büyükkolancı 2006b, 137-144, Figs. 1-11; Şimşek 2013a, 63-70, Figs. 51-67. Within the urban texture are monumental fountains, street fountains, and street water distribution points (see op. cit. 69-70, Figs. 65-67).

[40] Şimşek 2015b, 67.

[41] According to Vitruvius (VIII.6.1/2) water terminals should have a distribution tank with three partitions, each of which is furnished with a pipe so that the overflowing water will flow into the central partition. The central partition should

decline and shrinking of the city starting in the fifth century new distribution points were built in the streets to supply the buildings still in use[42]. This phase developed around churches.

Urban Planning of Ancient Laodikeia

Surveys and excavations conducted at the ancient city have already cast light on the urban chronology, settlement density, and Hippodamic urban design[43] (Figs. 7, 13-14). Pottery attested in the course of surveys across the city shows a high density from Late Antiquity followed by the Roman and Hellenistic periods. Coins discovered in the twelve years of work conducted by the author and his team show an interesting distribution over the centuries: the biggest group dates to the fourth century AD, followed by the fifth-sixth centuries AD, third century AD, seventh century AD, and first-second centuries AD respectively. Among the legible coins, half are from the fourth century[44] (Fig. 21). This naturally indicates that the city was the most crowded in the fourth century AD before it was abandoned; however, the brightest period of the city was from the first to the third century AD.

The city, surrounded with rivers on three sides, does not contain any marble or travertine quarries within it; therefore, the material for architecture was procured from the foot of Mt. Çökelez in the north, Mt. Salbakos (Babadağ) in the south and Mt. Kadmos (Honaz) in the southeast (Fig. 3). Timber was procured mainly from Mt. Salbakos. As the region lies within an active seismic zone the buildings were rebuilt many times. Therefore, architectural blocks were reused in other buildings or after repairs (Fig. 2). The south part of the North (Sacred) Agora served as debris dump after the

serve all the basins and fountains via pipes installed; second partition should serve the baths in order to bring income to the state; and the third partition should serve private homes for the people because people cannot use the water of the other partitions if they are connected only to the central partition. This is why the water tank is partitioned; thus, citizens with water supplied to their houses would facilitate the procurement of water by contractors through the taxes they paid.

[42] For the water distribution points in the streets see Şimşek 2013a, 70-71, Figs. 65-67.

[43] For more information on the urban planning system of the city see Şimşek 2013a, 78-80, Figs. 75-77; Şimşek 2014a, 46-66, Figs. 4-5, 11, 15, 18, 20, 29, 36.

[44] Şimşek 2013a, 509, Fig. 766.

earthquakes in the reign of Diocletian (r. 284-305 AD) and in 494 (Fig. 23). The deposit here reaches 7 m. in thickness at places[45].

Excavations have shown that the insulae in the Hippodamic system to the north of Syria Street measure 42x51 m. In some cases they reach 52~54 m. (Figs. 13, 24-25). This layout has the rectangular insulae close to a square, reflecting Syrian influence. However, at Hierapolis a few miles north, the insulae are oblong rectangles (30x75 m.)[46]. Structures placed in this layout textured with main streets and side alleys indicate excellent planning. The main streets are flanked with porticoes and shops behind them. Some shops are designed with storage areas either behind or by them creating a commercial unity. The 2015 excavations showed that Stadium Street terminates in a rectangular plaza in the south, which is joined by diagonal streets at the northwest and southeast. This layout reveales that topography dictated variations in some areas (Fig. 26).

Syria Street

The decumanus extending for 904 m. westward from the Syria Gate to the junction with Stadium Street (cardo) at the city centre is called Syria Street. Excavations and ensuing restoration work have clarified the planning on both sides of the street (Figs. 7, 13, 24-26). Excavations clearly show that the street remained in use from the Early Roman Imperial period (first century AD) to the reign of Focas (r. 602-610 AD). The street was built in the Doric order together with the Syria Gate at its eastern end in 84-85 by Domitian's freedman Tiberius Claudius Tryphon and dedicated to the emperor and Zeus Magistos Soter[47]. The Frontinus Gate and Street in Hierapolis[48] as well as the main street in Tripolis[49] were also built in the Doric order about the same time. Syria Street comprises a paved way 7.30 m. in width, and porticoes rising on one or two steps with shops behind

[45] See Şimşek 2014b, 85-87, Figs. 4-6; Şimşek 2014c, 646, Figs. 10, 12; Şimşek 2016 (in press).

[46] D'Andria 2003, 34, 44-47.

[47] Buckler – Calder 1939, 1-2; Corsten 1997, 67-71, no. 24, Figs. 1-2; Şimşek 2013a, 95-97, Figs. 104-105.

[48] D'Andria 2003, 70-79, Figs. 43-53.

[49] Duman 2013, 189-193, Figs. 2, 6-8, 12, 15-17, Duman – Baysal 2014, 48-51, Figs. 5-6.

them. The widths of the porticoes vary from 3.70 m. to 4.30 m. They were covered with a lean-to roof in order to provide shelter from the sun and the rain[50].

Excavations and restoration work in Syria Street have been completed from the East Byzantine Gate up to the Caracalla Nymphaeum; traces of constant use and adjustments due to earthquakes are clearly attested by architectural finds. Columns and capitals of the Roman Imperial period found to have been reused in the portico walls, superstructure, and sewage covers indicate rearrangements after the earthquake of AD 494. This arrangement involves an order of two columns and one pier alternating to support the roofs of the porticoes up to the East Byzantine Gate. Bases and capitals of Doric, Ionic or Composite orders taken from various buildings of the Roman Imperial period were reprocessed and used in the street (Fig. 27). These columns and piers have traces of painted inscriptions on plaster and engraved inscriptions and signs like crosses. The capitals of the tetrapylon are decorated with crosses in low relief for it is located in the side street leading to the east side of the Church of Laodikeia. In late antiquity, column capitals, bases, or voussoirs were placed by the doorways of the shops, and they were used as seats or engraved with various gameboards like tic-tac-toe, checkers, and *duodecim scripta*[51]. This is a typical custom of the region still attested today. Patches of opus sectile and mosaic pavements are seen in places in the portico floors. On the north side of the street is a rectangular fountain between the portico columns, commonly known from Pompeii and Herculaneum.

Stadium Street

At the west end of Syria Street (*decumanus*) is Stadium Street (*cardo*) extending for 288 m. southward as excavated (Figs. 13, 24, 26). It terminates at the Trajan Nymphaeum and Plaza in the south (Fig. 28). The portico arrangement, pavements, and arrangement of shops behind Stadium Street are reminiscent of those in Syria Street[52]. However, the street suffered

[50] Şimşek 2013a, 112-124, Figs.129-133.

[51] Şimşek 2013a, 121, Fig. 145.

[52] Şimşek 2011b, 458-460, Figs. 10-12; Şimşek 2013a, 125-130, Figs. 150-156; Şimşek 2014a, 50-51, Figs. 21-22; Şimşek 2014c, 637-638, Figs. 1, 4, 6-7.

much damage for it served as a quarry after the abandonment of the city. Single arched passages like triumphal arches were built at certain intervals, underlining the street's importance. Statue postaments with inscriptions placed between columns, and statues indicate that the street was adorned with statues like Curetes Street in Ephesos[53] (Figs. 21-22).

The shops from the Caracalla Nymphaeum to the Central Baths on the east side of this street have vaulted storerooms at the back, which is quite practical for storing especially food during the hot summer months.

On the east side of the excavated and restored part of Stadium Street are the Caracalla Nymphaeum, Central Baths, Nymphaeum B and Latrina, whereas on the west side are shops and the Ephesos Portico[54] (Figs. 13, 26, 28). Further south is an east-west main street, which passes by the Water Distribution Terminal II further east. The 2015 campaign showed that this 6.50-meter-wide street was narrowed down to 4.03 m. with rearrangements made in the vicinity of the Trajan Nymphaeum in late antiquity (Figs. 13, 28). The campaign brought to light the original sidewalk pavement rising one step from the street with possibly a public structure with an apsidal south end behind it in the area stretching southward from the junction with the eastward main street. In this section of the street the west side is arranged differently: five marble columns flanked by two travertine piers carry brick arches; behind this arched portico are shops (Figs. 28-29). The columns of the portico look higher with these arches soaring over them and at the south end a fountain was built on the axis of the portico adjoining the back of the Trajan Nymphaeum, creating an impressive arrangement. Architectural elements of the portico were found to have toppled eastward together with their arches down into the street, due to an earthquake.

Ephesos Street Portico

The Ephesos Portico is an important ceremonial street extending east-west and joining the north-south Stadium Street on the west[55]. This 130-meter-long street extends west into Ephesos Street. It was 19.30 m. wide in the first phase; in a later phase pools of 1.85-1.90 m. width were built on the

[53] For Curetes Street in Ephesos see Scherrer 2000, 114-115, Figs. 1-2.
[54] Şimşek 2013a, 125-130, Figs. 150-152.
[55] Şimşek 2013a, 131-137, Figs. 157-166.

street adjoining the northern and southern porticoes, thus narrowing it down to 13.30 m.; the total width is 30.60 m. (Figs. 13, 24, 26). At the west end of the portico is an arched gateway. The portico is accessed via three steps down from Stadium Street. Its floor was built with mortared creek stones and then paved with marble slabs. Four travertine piers were built at the portico's junction with Stadium Street in a later period; their west sides were blocked with a north-south wall. The complex features pools on either side of the plaza, piers connected with arches, and galleries with a width varying between 5.60 and 6.00 m. containing statues (Figs. 30-31). At the back of the north and south galleries are the entrances to the shops with storerooms behind. The grandeur and width of this portico clearly reveal its function, hosting festivals, feasts and as a protocol site serving on special occasions. This special location is bounded with an arched gate on the west and Stadium Street on the east. Archaeological evidence indicates that the site was in use from the Late Hellenistic period; however, the highest frequency of use is attested from the third to the sixth century AD. To the west of the portico extends Ephesos Street, terminating at the triple-arched Ephesos Gate, which was built at the same time as the Syria Gate[56]. This gate leads to the western road to Ephesos.

Temple A East Alley

The side street leading north from Syria Street to the North Theatre has been entirely excavated and restored[57] (Figs. 13, 25). On the east side of this alley are, from south to north, the first insula encompassing civic houses with a row of shops in front, the second insula with the Church of Laodikeia, and the third insula with civic houses and shops. The doorway with a tympanum of brick *opus spicatum* of a house in this alley has been reerected[58]. On the west side of the alley is Temple A occupying one-and-a-half insulae. Between the naos wall of Temple A and the street are shops and work-areas. Then comes the Peristyle House with Oratory adjoining the North Theatre.

[56] Bejor - Bonetto 2000, 105-113, Figs. 1-10; Şimşek 2013a, 89-92, Figs. 94-97.
[57] Şimşek 2013a, Figs. 150, 329, 357-358
[58] Şimşek 2014a, 53, Fig. 25.

House A Alley

This alley leading north from Syria Street is bordered on the east side by the House A complex occupying a full insula, shop entrance, and entrance to a peristyle house of the complex[59] (Figs. 13, 24-25, 32). Along the east side of the alley is a sidewalk for pedestrians. At the southwest corner of the junction bordering this insula on the northwest is the Street Water Distribution Terminal of the Early Byzantine period. Triple pipes leaving this box on four sides supplied water to nearby buildings. The second insula on the west of this alley is occupied by the Church of Laodikeia, which has a fountain here. The alley reaches the North Theatre after the third insula, which has not been excavated yet.

Another parallel alley leading north from Syria Street borders the House A Complex on the east and has entrances to two peristyle houses in the complex. At the north end of the insula, on the east side of the junction is a balcony projection of another house built protruding into the alley in Late Antiquity[60].

East and West Alleys of S. Severus Nymphaeum

The monumental fountain dedicated to the Emperor Septimius Severus is an oblong rectangle positioned along the north side of Syria Street; it is bordered by two alleys leading north, on the east and west sides[61] (Figs. 13, 24-25). The eastern alley is accessed via steps from the main street and it is bounded by the courtyard wall of Temple A on the east. The west alley, on the other hand, leaves the main street through an arched pylon and it is bounded by the North (Sacred) Agora to the west. This alley communicated with the agora probably via two entrances, one of which has been discovered; the second one should be positioned further north. At the beginning of the alley is a row of rooms built adjoining the agora wall in the Early Byzantine period. On the east side of the alley is the Greens Clubhouse with a peristyle layout adjoining the S. Severus Nymphaeum.

[59] Şimşek 2013a, 318-319, Figs. 420-422, 431-432.
[60] Şimşek 2014a, 54, Fig. 27.
[61] Şimşek 2013a, 143-146, Figs. 182, 371.

Constructions Appearing with the Spread of Christianity in Laodikeia

Excavations have shown that Christianity started to spread in Laodikeia from the very beginning (Figs. 7, 13, 33), and accelerated after the Edict of Milan in AD 313[62]. The high number of churches built in the city and private oratories created within private houses reveal the importance of the new religion. The spread of Christianity in the city is also connected with the wealth gained from commerce, which is also true for the other cities of the Seven Churches mentioned in the book of *Revelation.* Above all, these cities had great wealth and honour brought by commerce. On the other hand they all had active Jewish communities, who were monotheist and involved in commerce[63]. Judaism with its monotheism facilitated the spread of Christianity in the cities of commerce[64]. This is why these cities are cited in the New Testament because money needed for the spread of the new faith was abundant there.

The buildings named as Peristyle House with Oratory and Central Church actually have one part of a residence converted to a private chapel (Figs. 33-35), reflecting an age-old Anatolian custom, which involves the presence of a room for the cult of the ancestors in paganism, replaced with private oratories of the new faith[65].

As of the fourth century AD, a Christian quarter developed around the Church of Laodikeia, whereas the pagan quarters gradually diminished and moved out of the city. The buildings flanking Syria Street in the centre were in constant use until the city was abandoned due to the earthquake in the reign of Focas, after which they were exploited as quarries for ashlars and lime (Figs. 13, 24-25, 37). With Christianity taking over, the pagan temples within the North (Sacred) Agora (possibly the Corinthian order temple dedicated to Athena, and the Ionic order temple dedicated to Zeus) were

[62] See Akşit 1970, 293-296; Brown 2000, 52-53; Şimşek 2012a; Şimşek 2015a; Franco 2012, 56-59, Figs. 1-2; Marcone 2012, 46-47.

[63] For the Seven Churches see Wilson 2010, 23, 183-188, 199-232, 245-254, 279-321.

[64] Şimşek 2006, 343-346, Figs. 2-3.

[65] Şimşek 2013a, 319-328, 360-372, Figs. 433-437, 468-477; Şimşek 2013b, 103-104, Figs. 2-3.

dismantled and their architectural elements were reused in the east and west porticoes[66], an act which also removed their sacredness (Figs. 13, 23-24). The fragments of a colossal Athena statue in the style of sculptor Pheidias discovered on the Asopos Hill suggest that the cult statue was smuggled out for protection by the temple staff[67]. This is clearly linked with rapid Christianisation of the city. As all the churches in Laodikeia are dated to the fourth through the end of the sixth century AD, their architectural features will cast light on the early period of Christian religious architecture[68].

The ancient city houses many churches within and outside the city walls[69] (Fig. 33). The churches whose remains have survived include the Church of Laodikeia, North Church, Southwest Church, and Stadium Church, which are basilican in layout. The Church of Laodikeia also has a corridor leading to the baptistery on the north side. Three Christian buildings with different appearance feature a rotunda with an octagonal interior in the east and a rotunda in the south[70]. In addition, some of the houses and Roman Imperial period structures had one of their sections transformed into an oratory [Peristyle House with Oratory and Central Church[71] (Figs. 34-35)]. On the west portico of Temple A is a chapel with a single apse dated to the fourth century AD[72] (Figs. 33, 36).

Location Preferences for the Public Structures

Public structures seem to be distributed all over the city of Laodikeia. This distribution is believed to have arisen from population density and accessibility. Four public baths are placed in four quarters of the city[73] (Figs. 7, 13, 24-27, 38). These baths are also connected with agorae.

---

66 Şimşek 2013a, 274-279.

67 Şimşek 2013a, 278-296, Figs. 376-403; Şimşek 2013b, 103-104, Figs. 2-3.

68 See Şimşek 2012a; Şimşek 2013a, 341-391, Figs. 453-516; Şimşek 2015a.

69 For the churches in Laodikeia see Sperti 2000, 93-97, Figs. 54-63; Şimşek 2012a; Şimşek 2013a, 341-391, Figs. 453-516.

70 Şimşek 2013a, 345-360, 372-383, 387-391.

71 Şimşek 2013a, 319-328, 360-372.

72 Şimşek 2013a, 263-265, Fig. 350.

73 For detailed information on the agorae and baths in Laodikeia see Sperti 2000, 54-62, 74-81, Figs. 18-25, 33-41; Bejor-Bonetto 2000, 114-124, Figs. 11-24; Şimşek 2013a, 179-185, 188-207, Figs. 233-274.

Between the Syria Gate and the East Byzantine Gate, to the north of the unexcavated portion of Syria Street are the East Baths, possibly connected with the East Agora to the west (Fig. 7). The Central Baths are connected with the Central Agora to the north (Figs. 7, 13). The West Baths located to the south of Ephesos Street are connected with the West Agora to the north (Figs. 7, 13). The South Baths are a twin baths structure and are connected with the South Agora located to the north. To the north of the South Agora is the Bouleuterion[74] (Figs. 7, 13, 38); therefore, the South Agora is the state agora. Starting from the south corner of the junction of Stadium Street with the east-west street leading to the Water Distribution Terminal II, along the east side are the original sidewalk pavement and a public structure likely to be the Basilica; at the south end of the street is the Trajan Fountain and Plaza with an administrator's building with an atrium at the far south end.

Monumental Fountains

Nymphaea in Laodikeia were built as single- or double-story structures in the main streets, at their corners, or in plazas (Figs. 6-7, 13, 24-26, 28). Nymphaeum B (Fig. 39) of the Early Roman Imperial period and the Trajan Nymphaeum (Fig. 13, 28) dated to AD 114 are single-story. With respect to urban planning, visual quality, accessibility, and distribution all over the city were the criteria for these nymphaea.

A total of seven fountains are known and have been discovered[75]: the Stadium Nymphaeum adjoining the Water Distribution Terminal I, the West Agora Nymphaeum in Ephesos Street, the Caracalla Nymphaeum at the corner of Syria Street and Stadium Street[76], the Septimius Severus Nymphaeum on the north side of Syria Street, Nymphaeum B designed together with a water tank and latrina[77] in Stadium Street, the Trajan Nymphaeum at the south end of Stadium Street, and the East Byzantine Nymphaeum located between the north tower of the East Byzantine Gate and the city wall (Figs. 6-7, 13, 24-26, 28, 39-40).

---

[74] Sperti 2000, 42-54, Figs. 9-13, 17; Şimşek 2013a, 240-243, Figs. 239-240, 318-322.

[75] For more information on the nymphaea in Laodikeia see Şimşek 2013a, 146-176, Figs. 180-228.

[76] For the Caracalla Nymphaeum see also Gagniers 1969.

[77] Şimşek 2013a, 177-179, Figs. 229-232.

Water Distribution Terminal I supplied the Stadium Nymphaeum whereas Water Distribution Terminal II supplied the West Agora Nymphaeum, the Caracalla Nymphaeum, the S. Severus Nymphaeum, Nymphaeum B, the Trajan Nymphaeum, and the East Byzantine Nymphaeum[78].

Stadium and Theatres

The Stadium, with double sphendones, is located next to the baths complex in the south part of the city (Figs. 6-7, 13, 38); thus, it has a physical connection with the baths, facilitating the athletes. The West Theatre is located in the northwest quarter while the North Theatre is on the north edge of the city centre. Both Theatres and the Stadium were built on hollowed out hillsides. The West theatre was built in the Hellenistic period but the North Theatre is dated to the second century AD (Figs. 6-7, 13, 41); and the Stadium is dated to AD 79 based on an inscription. The existence of two theatres and one of the largest stadia in Anatolia reveal the importance paid to sports, arts and culture as well as casting light on the population[79].

The North (Sacred) Agora is one of the most important monuments unearthed in Laodikeia (Figs. 6-7, 13, 23-24, 42). It is located in the flat area between the two theatres and Syria Street. It housed two temples – a Corinthian one probably dedicated to Athena, the goddess of weaving, and an Ionic one probably dedicated to the chief deity of the city, Zeus Laodikeus[80]. In Syria Street is Temple A, fully excavated and restored, dated to the Antonine period (Figs. 6-7, 13, 24-25, 42-43). According to the finds in excavations, Temple A was dedicated to Apollo, Artemis and the imperial cult[81]. In addition there was a temple to the south of the West Baths. All these temples were destroyed with Christianity gaining the upper hand in the fourth century AD. On the other hand, depictions on Roman-period civic coins of the city show that there were many temples in the city. Capitals of the Doric, Ionic and Corinthian orders attested in the course of excavations

[78] For more information on the nymphaea see Şimşek 2013a, 146-174.

[79] For detailed information on the stadium and theatres in Laodikeia see Sperti 2000, 29-42, 63-73, 81-91, Figs. 1-5, 17, 30-32, 42-51; Şimşek – Sezgin 2012, 103-128; Şimşek 2013a, 208-240.

[80] Şimşek 2013a, 274-285.

[81] Sperti 2000, 91-92, Figs. 52-53; Şimşek 2013a, 245-274, Figs. 326-370.

as spoliated indicate the presence of more temples[82]. Architectural evidence points to the fact that these temples were built mainly in the second and third centuries AD, which was the most successful period of the city. As of the fourth century the temples were replaced by churches.

Civic Residences

Civic houses in Laodikeia were built on the insulae not occupied by public and religious monuments. These houses can be categorised into those within the city and those outside. The Southern Roman Villa outside the city is a complex positioned to dominate over the Asopos (Gümüşçay) Valley and agricultural land. Part of the villa sits on an area filled and actually containing graves of an earlier period (Figs. 6-7, 44). The owners of this villa are believed to have not only cultivated the land but also manufactured and marketed other things such as glass, wine, and olive oil in the Late Roman Imperial period (third century to the first quarter of the fifth century AD). Coins of Attouda and Hierapolis as well as lead seals evince the commercial relations with these cities. Thus, this villa is a complex planned for agricultural and industrial production[83].

House A has been unearthed entirely whereas the Peristyle House with Oratory only partially[84] (Figs. 6-7, 13, 32, 34-35). The evidence thus obtained points to the high frequency of two-story peristyle houses. The building located at the southernmost end of Stadium Street features a tetrastyle atrium (with Ionic columns at the four corners with postament bases), frescoes on its walls, a mosaic pavement in the corridors, and a basin in the atrium; it should be an administrative building according to the inscriptions and statues discovered (Fig. 6-7, 13, 28). The blind arches on the upper floor of a house in the Temple A East Alley reveal the attention paid to static resistance against earthquakes. The protruding balcony attested in the east alley of House A indicates construction of balconies on the upper floors. The street sides of houses are arranged as shops, which served both for commerce and as dwellings. The peristyle tradition is also attested at

[82] Şimşek 2013a, 245-274, 298.
[83] Şimşek *et al.* 2011, 1074-1076; Şimşek 2013a, 299-307.
[84] Şimşek 2013a, 307-328, Figs. 420-438.

the Greens Clubhouse (Figs. 6-7, 13, 24-25), which features fountains and dining rooms around the peristyle courtyard[85].

Cult rooms in some houses were converted to oratories following conversion to Christianity (Figs. 13, 34-35). This is the influence of an ancient tradition on the monotheist religion. Division of the Empire into two paved the way for the economic decline of Laodikeia just like the entire western Anatolia; regular architecture was abandoned and rows of rooms were built either in streets or within existing structures, thus retaining vivacity and commerce. The earthquake of AD 494 was a turning point for the city, now transformed into a town rapidly declining. And the earthquake in the reign of Focas (r. 602-610 AD) ended the city altogether with only a few families remaining for some more time and the site was exploited as a quarry for stones and lime[86]. Excavations have clarified that the opus sectile floorings and marble revetments were removed deliberately (Fig, 45). Starting in the early thirteenth century the site of the ancient city served as a campsite for the nomads and as a stone quarry for the İlbadı Cemetery of Denizli[87]. Destruction of the remains and quarrying continued actually until the 1990s[88]. The city is surrounded by necropoleis on all sides housing a variety of burials[89]. Excavations have constructed an uninterrupted chronology from the Early Bronze Age through the seventh century AD. Excavations at the necropoleis have brought to light rich data regarding the tomb types and burial traditions.

[85] For more information on civic houses see Şimşek 2013a, 307-333.
[86] Şimşek 2013a, 435-438, Figs. 596-603.
[87] Şimşek 2013a, 15-20, Figs. 10-15, 17.
[88] Şimşek 2013a, 509-513, Figs. 763-770.
[89] For details on the necropoleis see Bejor *et al.* 2004; Şimşek *et al.* 2011; Şimşek 2013a, 400-434, Figs. 529-594.

ABBREVIATIONS AND BIBLIOGRAPHY

Anderson 1897	J.G.C. Anderson, "A Summer in Phrygia I", *Journal of Hellenic Studies (JHS) XVII*, London, 1897, 396-424.
Akşit 1970	O. Akşit, *Roma İmparatorluk Tarihi (M.S. 193-395)*, Istanbul, 1970.
Balbank 1957	F. W. Balbank, *Commentary on Polybius (Polybius, VIII)*, Vol. I, Oxford, 1957.
Bean 1980	G.E. Bean, *Turkey beyond the Maeander, an Archaeological Guide*, London, 1980.
Bejor 2000	G. Bejor, "Per una ricerce di Laodicea ellenistica", Laodicea di Frigia I, Rome, 2000, 15-23.
Bejor - Bonetto 2000	G. Bejor – J. Bonetto, "La ricognizione del 1999: dalla Porto Efesia all'Agorá Occidentale", Laodicea di Frigia I, Rome, 2000, 105-124.
Bejor et al. 2004	G. Bejor – J. Bonetto – S. Gelichi – G. Traversari (eds.), Laodicea di Frigia II, La Ricognizione 2000, Padova, 2004.
Belke – Mersich 1990	K. Bekle – N. Mersich, "Phrygien und Pisiden", Tabula Imperii Byzantini (TIB) 7 (Denkschr. ÖAW. phil. hist. Kl.211), Wien, 1990.
Brown 2000	P. Brown, Geç Antik Çağda Roma ve Bizans Dünyası, transl. by T. Kaçar, Istanbul, 2000.
Buckler – Calder 1939	W.H. Buckler – W.M. Calder, Monuments and Documents from Phrygia and Caria, Monumenta Asiae Minoris Antiqua (MAMA) VI, Manchester, 1939.
Cicero	The Letters to his Friends (with an English transl. by W. Glynn Williams, M.A.), London, First Printed 1929, Reprinted 1960; Letter to Atticus with an English Transl. by E.O. Winstedt, M.A., London, 1913;The Orations of Marcus Tullius Cicero, Orations for Quintius, Sextus Roscius, Qtjintus Roscius, Against Quintus Ecilius, and Against Verres Literally by C.D. Yonge, B.A., London, 1866.
Corsten 1997	Th. Corsten, "Die Inschriften von Laodikeia am Lykos", Teil 1, Inschriften Griechischer Städte aus Kleinasien Band 49, Bonn, 1997.
Çokaman 2008	E. Çokaman, "Tüm İnsanlar Afrika Kökenli mi?", A*ktüel Arkeoloji, 4*, 2008, 4-27.

D'Andria 2003	F. D'Andria, Arkeoloji Rehberi Hierapolis (Pamukkale), transl. by N. Fırat, Istanbul, 2003.
Duman 2010	B. Duman, Laodikeia Hellenistik ve Erken Roma Dönemi Seramiği (Selçuk Universitesi, Sosyal Bilimler Enstitüsü, Unpublished Phd Thesis), Konya, 2010.
Duman 2013	B. Duman, "Son Arkeolojik Araştırmalar ve Yeni Bulgular Işığında Tripolis ad Maeandrum (Tripolis Ad Maeandrum: The Latest Archaeological Research Results and New Finds)", CEDRUS I, 2013 (DOI: 10.13.113/CEDRUS20131685), 179-200
Duman – Baysal 2014	B. Duman – H. Baysal, "Tripolis Antik Kenti ve 2012 Yılı Kazı ve Restorasyon Çalışmaları Ön Raporu", Hierapolisli Bir Filozof Epiktetos (Yay. Haz. H.H. Erdem – M. Günay), Ankara, 2014, 41-58.
Franco 2012	L. Franco, "Costantino nelle fonti letterarie fra storia e mito", Costantino 313 d.C, exhibition (curated by P. Biscottini – G.S. Chiesa – M. Barbera), Milan, 2012, 56-59.
Gagniers 1969	J. Gagniers, "Introduction Historique", Laodicée du Lycos.Le Nymphée, Paris, 1969, 1-11.
Head 1906	B. Von Head, Catalogue of the Greek Coins of Phrygia, London, 1906.
Head 1977	B. Von Head, Historia Nummorum, A Manual of Greek Numismatics, London, 1977.
Humann et al. 1898	C. Humann – C. Cichorius – W. Judeich – F. Winter, Altertümer von Hierapolis, Berlin, 1898.
Jones 1971	A.H.M. Jones, Cities of the Eastern Roman Provinces, Oxford, 1971.
Konakçı 2014	E. Konakçı, "Laodikeia'nın İlk Yerleşimi: Aso pos Tepesi", 10. Yılında Laodikeia (2003-2013), Laodikeia Çalışmaları 3 (Edited by C. Şimşek), Istanbul, 2013, 87-122.
Magie 1950	D. Magie, Roman Rule in Asia Minor to the End of the Third Century After Christ, Vol. I-II, New Jersey, 1950.
Magie 2001	D. Magie, Anadoluda Romalılar I. Attalos'un Vasiyeti (transl. by N. Başgelen – Ö. Çapar), Istanbul, 2001.

Marcone 2012	A. Marcone, "L'Editto di Milano: Dalle persecuzioni alla tolleranza", Costantino 313 d.C, exhibition (curated by P. Biscottini – G.S. Chiesa – M. Barbera,) Milan, 2012, 42-47.
Oğuzhanoğlu 2014	U. Oğuzhanoğlu, "Laodikeia'dan Batı Anadolu Erken Tunç Çağı'na Yeni Katkılar", 10. Yılında Laodikeia (2003-2013), Laodikeia Çalışmaları 3 (Edited by C. Şimşek), Istanbul, 2013, 71-86.
Pliny	Naturalis Historia, V (transl. by H. Rackham), Edinburgh, Reprinted 1997.
Ramsay 1895	W.M. Ramsay, The Cities and Bishoprics of Phrygia, I, Oxford, 1895.
Ruge 1924	W. Ruge, "Laodikeia", Real Encyclopaedia (RE) XII.1, 1924, 722-724.
Scardozzi 2007	G. Scardozzi, "Ricerche topografiche e telerilevamento", Hierapolis di Frigia, Le attivita delle campagne di scavo e restauro 2000-2003 (Edited by F D'Andria – M. Piera Caggia), Istanbul, 2007.
Scherrer 2000	P. Scherrer, Efes Rehberi, Istanbul, 2000.
Sevin 2001	V. Sevin, Anadolu'nun Tarihi Coğrafyası I, Ankara, 2001.
Sperti 2000	L. Sperti, "Ricognizione Archeologica A Laodicea Di Frigia: 1993-1998", Laodicea di Frigia I (Edited by G. Traversari), Rome, 2000, 29-104.
Strabo	Coğrafya, Anadolu (Kitap XII, XIII, XIV) (transl. by M. Pektaş), Istanbul, 1991.
Şimşek 2006	C. Şimşek, "A Menorah with a Cross Carved on a Column of Nymphaeum A at Laodicea ad Lycum", Journal of Roman Archaeology 19, 2006, 343-346.
Şimşek 2007	C. Şimşek, "Laodikeia'dan Ladik'e Denizli", Uluslararası Denizli ve Çevresi Tarih ve Kültür Sempozyumu, Bildiriler 2 (6-8 Eylül 2006 Denizli), 2007, 38-50.
Şimşek 2011a	C. Şimşek, "Tarihin İçinden: Laodikeia'dan Ladik'e Denizli", Denizli Tanrıların Kutsadığı Vadi, Istanbul, 2011, 85-122.
Şimşek 2011b	C. Şimşek, "2009 Yılı Laodikeia Antik Kenti Kazıları", 32. Uluslararası Kazı, Araştırma ve Arkeometri Sempozyumu,vol. 3 (24-28 Mayıs 2010, Istanbul), Ankara, 2011, 447-474.

Şimşek 2012a	C. Şimşek, Kutsal Kent Laodikeia'nın Kiliseleri, Denizli, 2012.
Şimşek 2012b	C. Şimşek, "2010 Yılı Laodikeia Kazıları", 33. Kazı Sonuçları Toplantısı (23-28 Mayıs, 2011 Malatya), vol. 4, Ankara, 2012, 569-601.
Şimşek 2013a	C. Şimşek, Laodikeia (Laodicea ad Lycum), Laodikeia Çalışmaları 2, Istanbul, 2013.
Şimşek 2013b	C. Şimşek, "2011 Yılı Laodikeia Kazı ve Restorasyon Çalışmaları", 34. Kazı Sonuçları Toplantısı (28 Mayıs-1 Haziran 2012, Çorum), vol. 3, Ankara, 2013, 103-124.
Şimşek 2014a	C. Şimşek, "Lykos Vadisi İçinde Yer Alan Laodikeia", 10. Yılında Laodikeia (2003-2013), Laodikeia Çalışmaları 3 (Edited by C. Şimşek), Istanbul, 2013, 33-69.
Şimşek 2014b	C. Şimşek, "2012 Yılı Laodikeia Antik Kenti Kazı ve Restorasyon Çalışmaları", 35. Kazı Sonuçları Toplantısı (27-31 Mayıs 2013, Muğla), vol. 3, Ankara, 2014, 82-102.
Şimşek 2014c	C. Şimşek, "2013 Yılı Laodikeia Antik Kenti Kazı ve Restorasyon Çalışmaları", 36. Kazı Sonuçları Toplantısı (2-6 Haziran 2014, Gaziantep), vol. 3, Ankara, 2014, 633-660.
Şimşek 2015a	C. Şimşek, Laodikeia Kilisesi-Church of Laodikeia, Denizli, 2015.
Şimşek 2015b	C. Şimşek, "1900 Yıllık Su Yasası Bulundu", Tübitak Bilim ve Teknik, Kasım 2015, Yıl 49, Sayı 576, Ankara, 66-67.
Şimşek 2016	C. Şimşek, "2014 yılında Laodikeia'da Yapılan Kazı Ve Restorasyonlar", 37. Uluslararası Kazı, Araştırma ve Arkeometri Sempozyumu (11-15 Mayıs 2015, Erzurum),in press
Şimşek – Büyükkolancı 2006a	C. Şimşek – M. Büyükkolancı, "Laodikeia Antik Kenti Su Kaynakları ve Dağıtım Sistemi", Adalya IX, Istanbul, 2006, 83-103.
Şimşek-Büyükkolancı 2006b	C. Şimşek – M. Büyükkolancı, "Die Aqueduct und das Wasserverteilungssystem von Laodikeia ad Lycum", Cura Aquarum in Ephesus, Vol. 1, Leuven, 2006, 137–146.
Şimşek – Ceylan 2003	C. Şimşek – A. Ceylan, "Laodikeia'da Tespit Edilen Bir Deprem ve Diocletianus'a İthaf Edilen Bir

Yazıt (Lykos Laodikeia'sı)", Archivum Anatolicum/ Anadolu Arşivleri,vol. VI, no. 1, Ankara, 2003, 147-163.

Şimşek – Duman 2013 — C. Şimşek – B. Duman, "Laodikeia Tipi Kulakçıklı Kandiller", Olba XXI, Istanbul, 151-180.

Şimşek et al. 2011 — C. Şimşek - M. Okunak - M. Bilgin, Laodikeia Nekropolü (2004-2010 Yılları), Laodikeia Çalışmaları 1.1-1.2 (Edited by C. Şimşek), Istanbul, 2011.

Şimşek et al. 2014 — C. Şimşek – E. Konakçı – E. Pernicka, "Analyses of Origin for the Obsidian Found at Asopos Hill", 10. Yılında Laodikeia (2003-2013), Laodikeia Çalışmaları 3 (Edited by C. Şimşek), Istanbul, 2013, 123-144.

Şimşek – Sezgin 2012 — C. Şimşek - M.A. Sezgin, "The West And North Theatres In Laodicea", Restoration and Management of Ancient Theatres in Turkey, Methods, Research, Results (Edited by F. Masino – P. Mighetto – G. Sobra), Lecce, 2012, 103-128.

Texier 2002 — Ch. Texier, Küçük Asya, Coğrafyası, Tarihi ve Arkeolojisi, vol. II (Transl. by Ali Suat), Ankara, 2002.

Traversari 2000 — G. Traversari, "La situazione viaria di Laodicea alla luce degli Itinerari Romani", Laodicea di Frigia I, Rome, 2000, 9-14.

Vitruvius — Mimarlık Üzerine On Kitap (Transl. by S. Güven), Istanbul, 1990.

Weber 1898 — G. Weber, "Die Flüsse von Laodicea", Mittheilungen des Kaiserlich Deutschen Archaeologischen Instituts, Athenische Abtheilung (AM) XXIII, Athens, 1898, 178-195.

Wilson 2010 — M. Wilson, Biblical Turkey, A Guide to the Jewish and Christian Sites of Asia Minor, Istanbul, 2010.

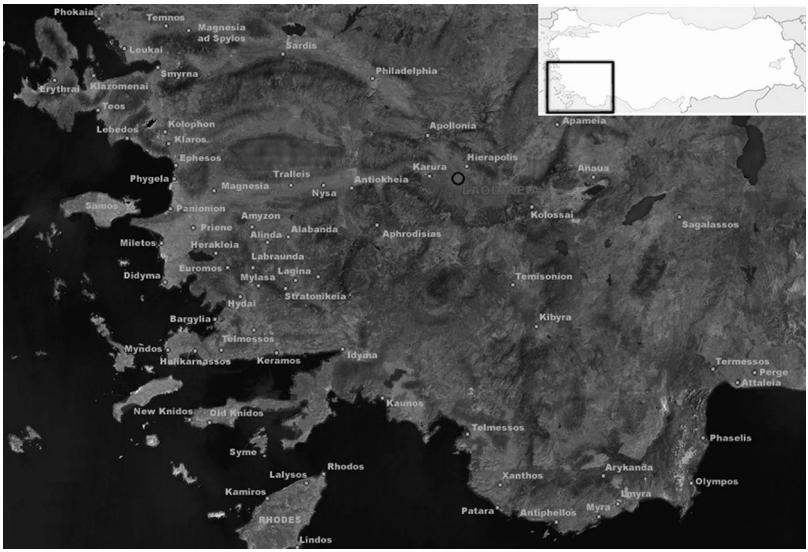

Fig. 1 Satellite map of southwest Anatolia showing ancient settlements

Fig. 2 Ancient settlements and Roman road system in southwest Anatolia

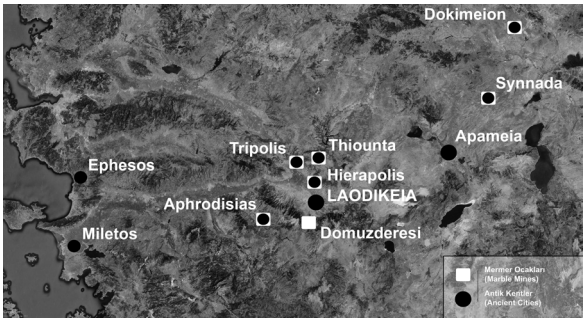

Fig. 3
Satellite map
of the Maeander
Valley and
ancient
settlements

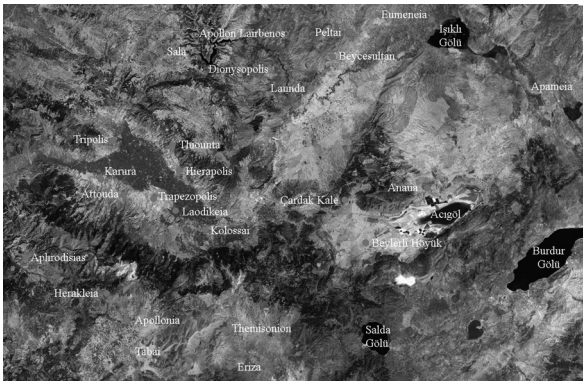

Fig. 4
Satellite map
of ancient
settlements in the
Lykos Valley and
environs

Fig. 5
Lykos Valley
lake appearing
after flooding
in 2015

Fig. 6 Satellite photos of Laodikeia and the rivers nearby: Asopos, Kadmos, and Lykos

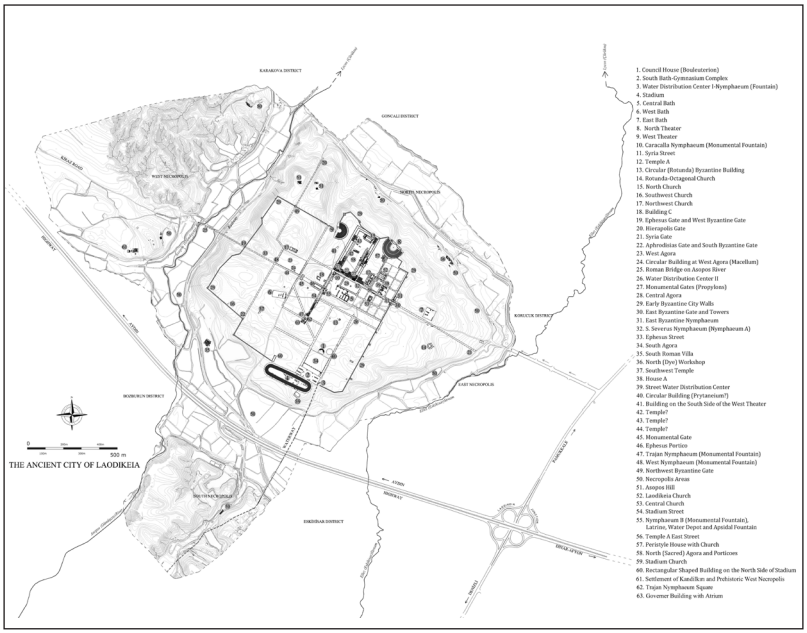

Fig. 7 Plan of Laodikeia and its buildings

Fig. 8 Pithos graves of the Kandilkırı settlement
from Laodikeia's West Necropolis

Fig. 9 Asopos Hills I and II
(Hierapolis Street and the gate in the center of the hills)

Fig. 10
Pottery from Kandilkırı Settlement (Early Chalcolithic) and Asopos Hill (Bronze and Iron Ages)

Fig. 11
Loom weights from Asopos Hill (Bronze Age)

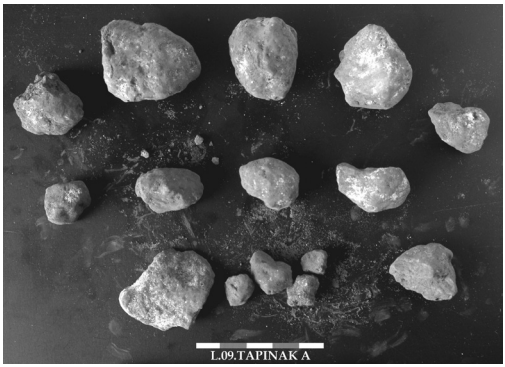

Fig. 12
Dye residue from Temple A (5th c. AD.)

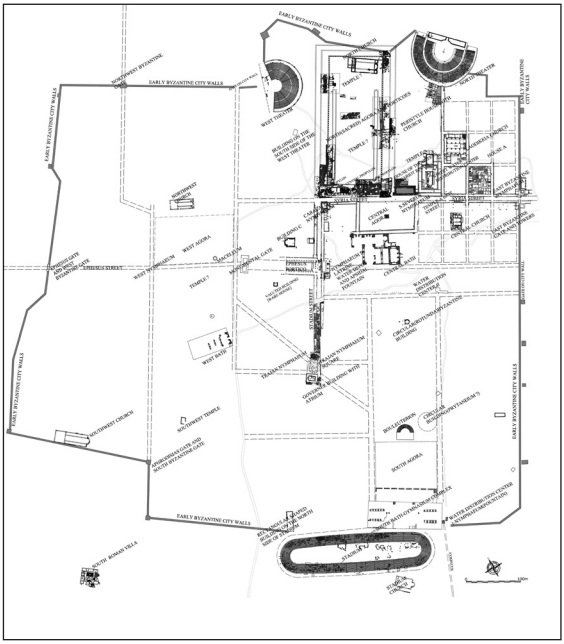

Fig. 13
Plan of Laodikeia

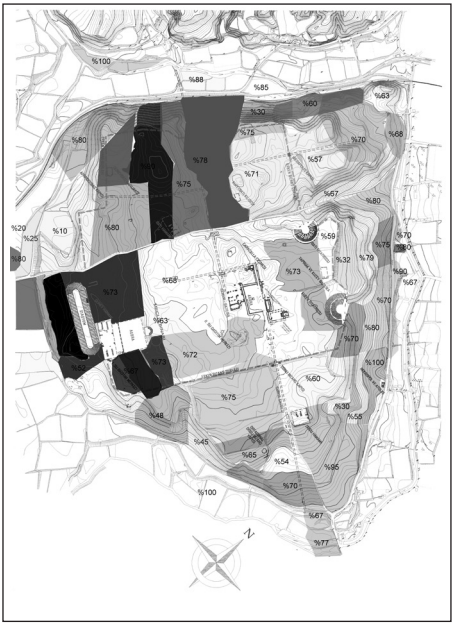

Fig. 14
Percentage and distribution of the potsherds from late antiquity

Fig. 15 Ancient aqueduct and nomads in the engraving by Laborde (1838)

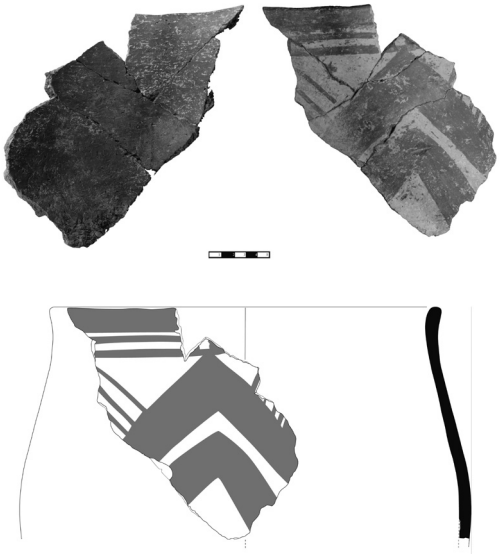

Fig. 16
Pottery fragment from
Kandilkırı Settlement
(Early Chalcolithic Age)

Fig. 17
Composite vessel from Kandilkırı Settlement (Early Bronze Age)

Fig. 18
Obsidian and flintstone finds from Asopos Hill (Middle Bronze Age)

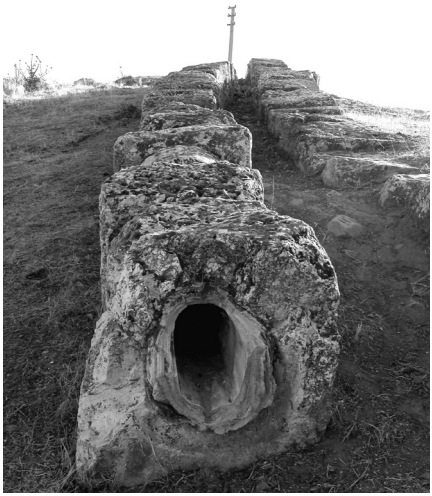

Fig. 19
Twin travertine pipes near Eskihisar

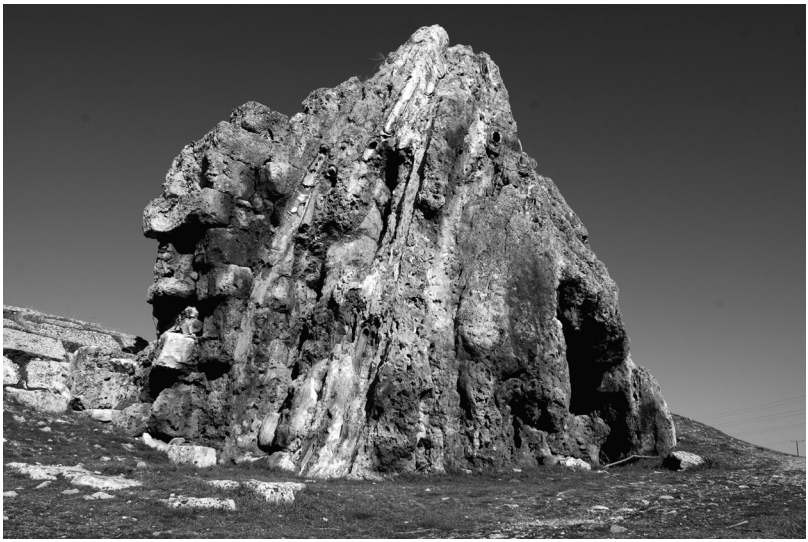

Fig. 20 Water Distribution Centre I

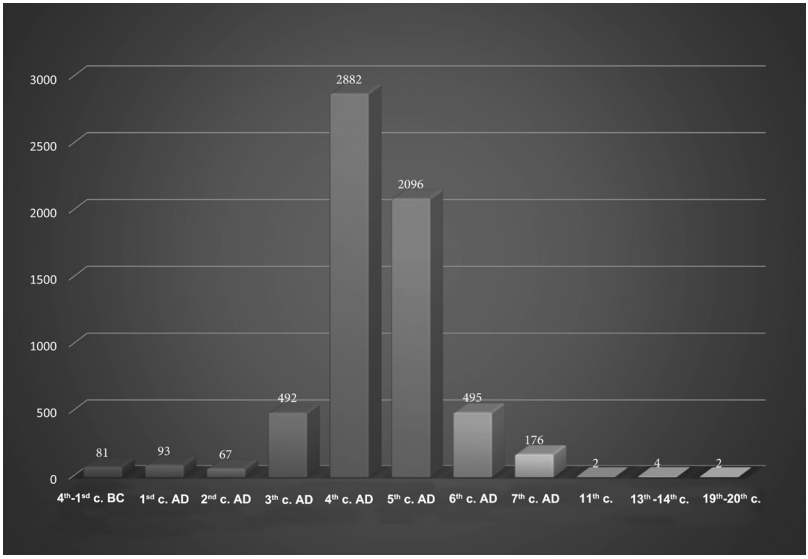

Fig. 21 Graphic of coin finds from 2012 to 2015

Fig. 22 Reused architrave block with decoration

Fig. 23 Excavation and restoration work at the North (Sacred) Agora, columns and walls of the West Portico fallen in the earthquake in AD 494

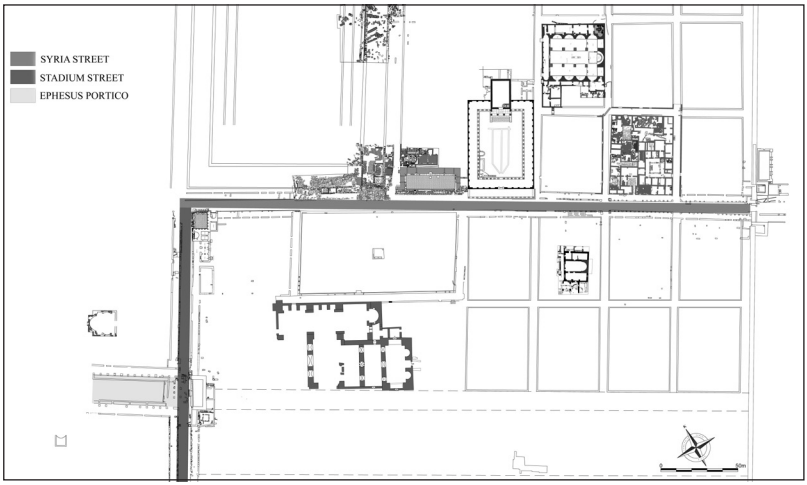

Fig. 24 Main streets (Syria and Stadium) and buildings on both sides in Hippodamic plan

Fig. 25 General view of Syria Street, the East Byzantine Gate, House A, Laodikeia Church, Temple A, the S. Severus Nymphaeum and the Clubhouse of the Greens in Hippodamic layout

Fig. 26 Corner of Syria Street and Stadium Street in Hippodamic layout

Fig. 27 Syria Street, seen from the west

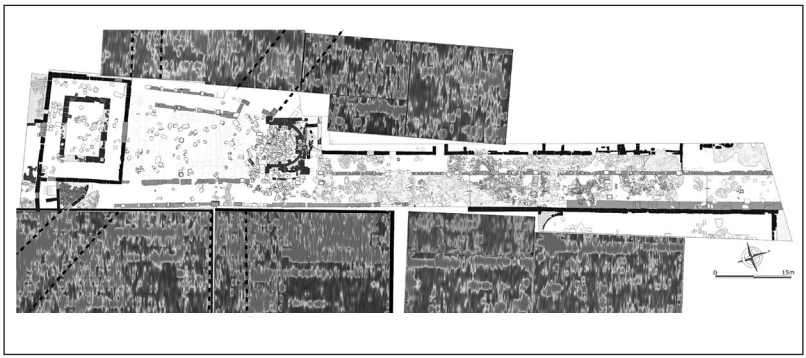

Fig. 28 Plan of Stadium Street: Trajan Nymphaeum and square, house with atrium

Fig. 29 Columns and arches fallen due to the earthquake in 494 AD on the West Portico of Stadium Street

Fig. 30 Portico of Ephesus

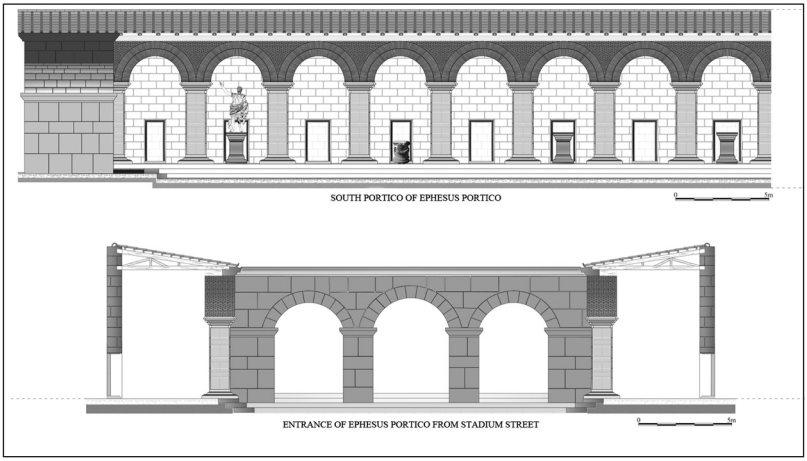

Fig. 31 AutoCad drawing of the Portico of Ephesus,
gate and south portico

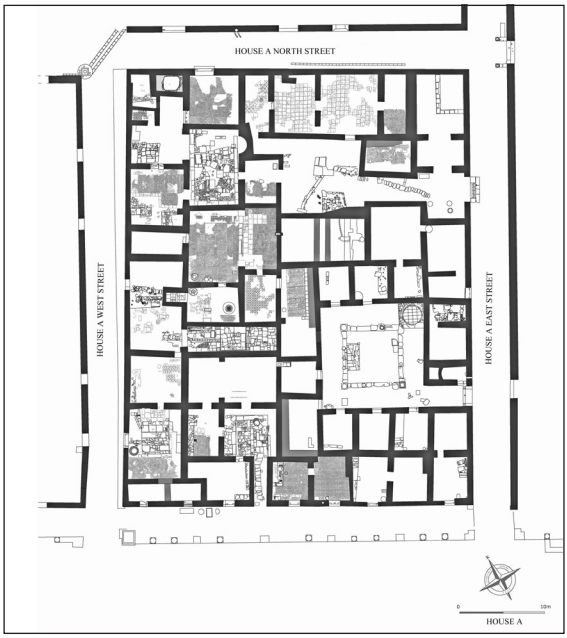

Fig. 32
Plan of House A

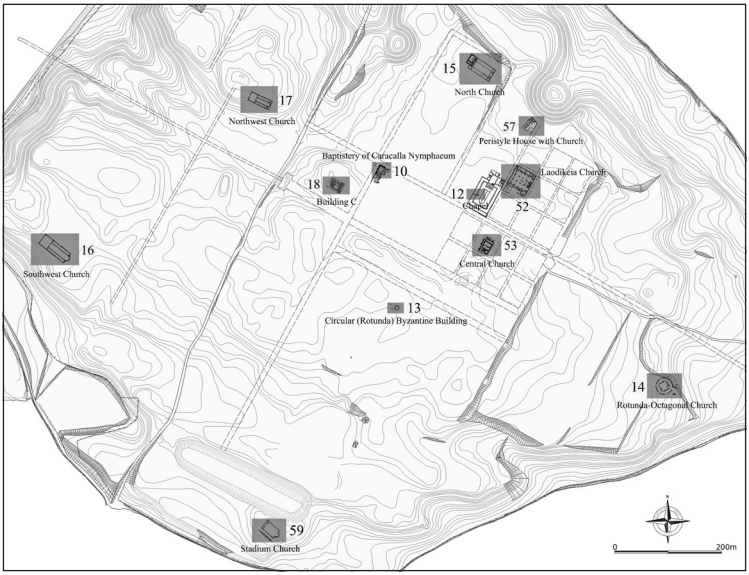

Fig. 33 Churches in the city plan

Fig. 34 Peristyle House with Oratory and North Theatre

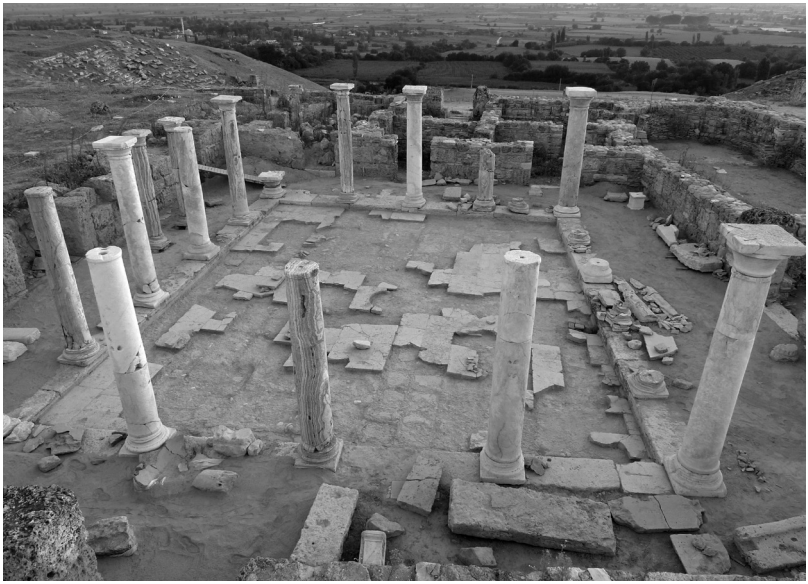

Fig. 35 Peristyle House with Oratory

Fig. 36 Chapel in the courtyard of Temple A

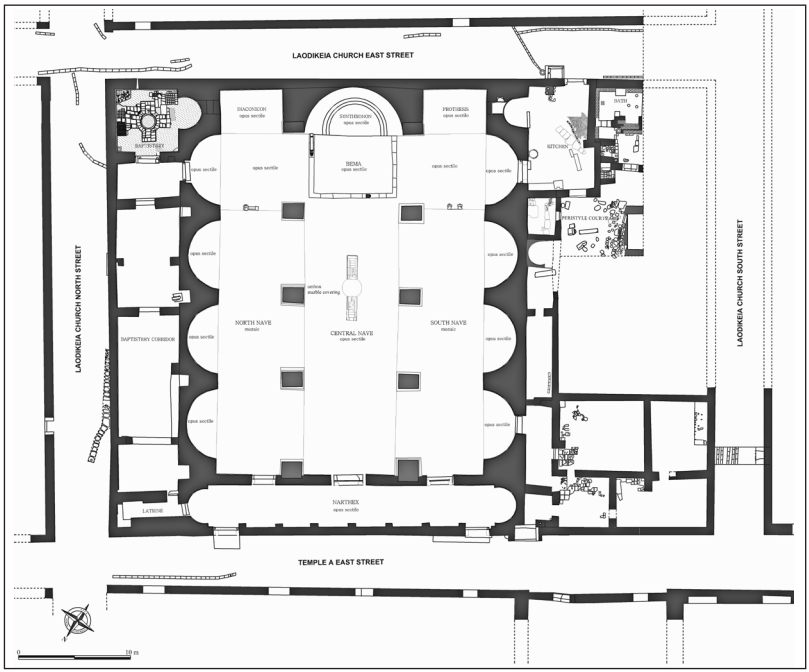

Fig. 37 Plan of the Church of Laodikeia

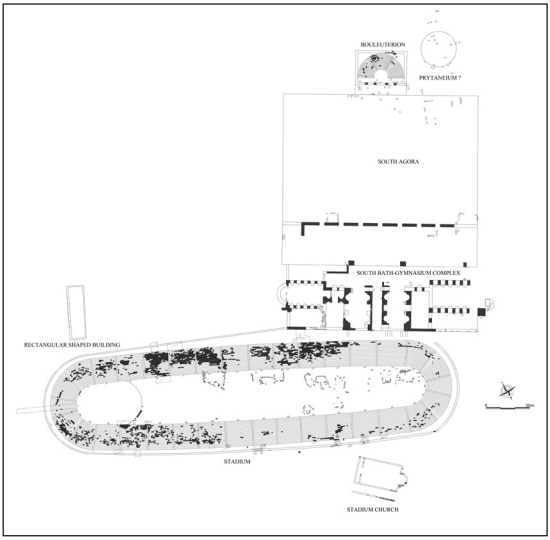

Fig. 38 Plan of the Stadium, the South Baths Complex, the South Agora and the Council House (Bouleuterion)

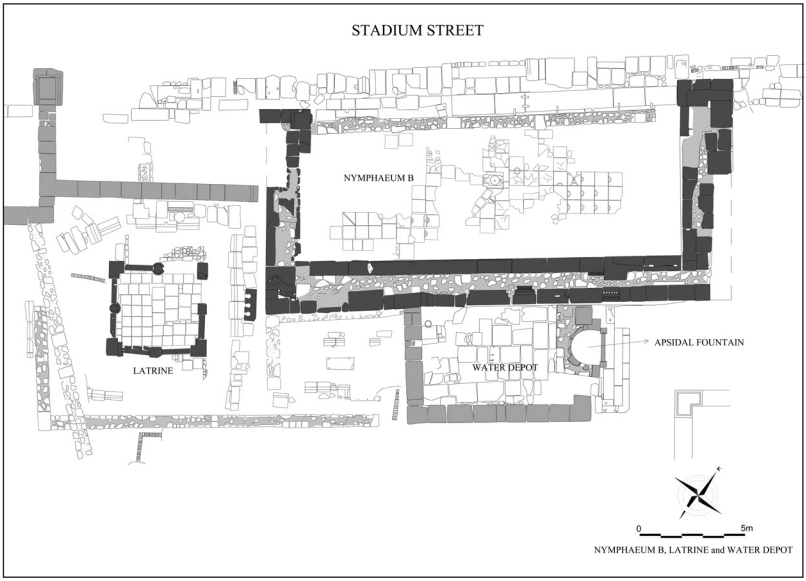

Fig. 39 Plan of Nymphaeum B, Latrines, Water Depot and Byzantine Fountain

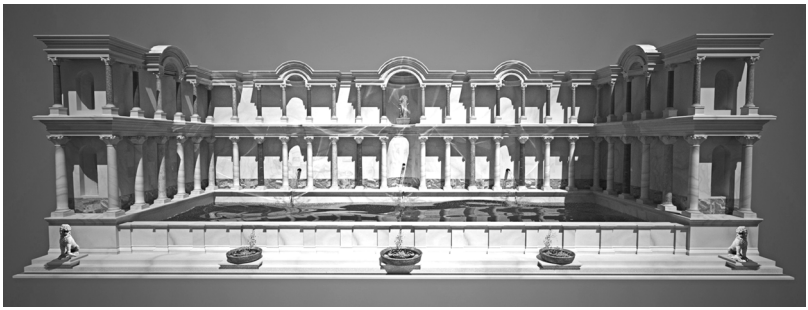

Fig. 40 3D reconstruction of the S. Severus Nymphaeum

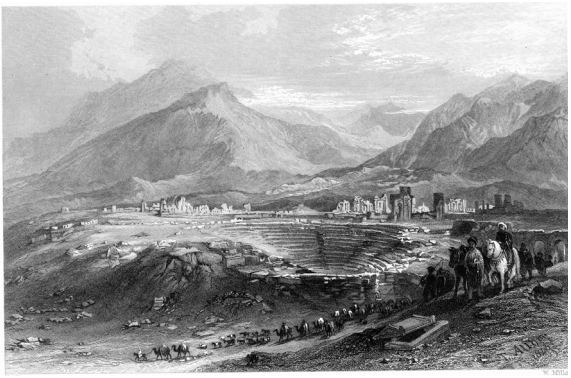

Fig. 41
West Theatre and nomads (engraving by Thomas Allom, 1846)

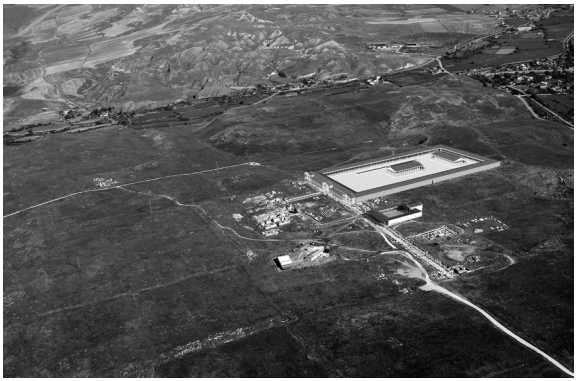

Fig. 42
3D reconstruction of Temple A and North (Sacred) Agora

Fig. 43
Temple A
(Antonine period)

Fig. 44 3D reconstruction of the South Roman Villa

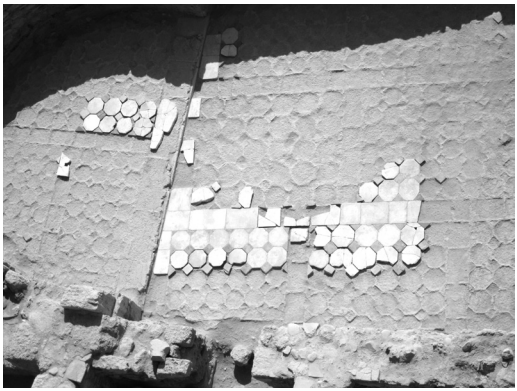

Fig. 45
Opus sectile from
Peristyle House
with Oratory

PREHISTORY OF THE LYKOS VALLEY

Ali Ozan – Fulya Dedeoğlu** – Erim Konakçı****

The Lykos Valley, also known as the valley or plain of Denizli, is a part of the Inland Southwest Anatolian river basin system. As one of these river basins, the Maeander River and Valley constitute a major artery, enabling transportation and communication from the Aegean coasts to the inner regions along an east-west axis. In the Çivril, Baklan, Çal provinces of Denizli, the Upper Maeander Basin, which occasionally winds across wide plains and from time to time passes through deep valleys, joins the Lykos River and Valley near Sarayköy. The rivers of Asopos (Gümüşçay) and Başlıçay also connect with the Great Maeander River and run through the west, towards the Aegean coasts. These valley systems generate a line of passage and communication among the Coastal Aegean, Inland Anatolia and Mediterranean[1]. The Lykos Valley is located in the center of these valley systems, at a point that enables transportation in almost every direction. This

* Asst. Prof., Pamukkale University, Faculty of Science & Arts Department of Archaeology, 20017 Denizli, Türkiye. E-mail: aliozan@pau.edu.tr

** Asst. Prof., Ege University, Department of Archaeology (Protohistory and Near Eastern Archaeology) , Izmir, Türkiye. E-mail: dedeoglufulya@hotmail.com

*** Asst. Prof., Pamukkale University, Department of Archaeology (Protohistory and Near Eastern Archaeology), 20017 Denizli, Türkiye. E-mail: ekonakci@pau.edu.tr

[1] Johnson 1950, 4; Demirkent 2002, map 1, 2, 3, 4.

continues particularly in an east-west direction, where the valley is not cut crossed by topographic obstacle[2]. Kocabaş and its vicinity form the eastern border of the valley, and Sarayköy, the area in which the Maeander River joins the Lykos River, constitutes the western border. On the other hand, it is isolated by the mountains of Honaz (Kadmos), Babadağ (Salbakos) and Çökelez to the north and south. Even though these mountains partly isolate the Lykos Valley from its surroundings, there are many large and small river valleys and ravines that connect with the Upper Maeander Basin which determines the main axis. These natural highways connect the Lykos Valley to its surroundings in the south-north axis.

The Lykos Valley, which is located in the center of these aforementioned natural highways, is also a large intermountain plain. It is known that a dry lake exists today between the ancient cities of Hierapolis and Laodikeia in the middle of this plain[3]. It is also known that the Lykos Valley, which is also nourished by many annual and seasonal rivers flowing from the mountains and hills around it besides the big rivers surrounding the plain, hosts many settlements from the prehistoric periods. Hence, it is possible to consider that the aforementioned geographical advantages could determine a preference for the valley as a living space by people from the beginning of the Lower Paleolithic Period.

Although the oldest material ruins go back to the Paleolithic Period, it is seen that the research into the settlement history of the valley mostly focuses on the ancient cities. The research, which started in the 17th century in the Lykos Valley, frequently centers upon the cities such as Hierapolis, Laodikeia, Kolossai mentioned in the ancient texts[4]. The first archaeological excavations were carried out in these cities and Hierapolis from 1887, Laodikeia from 1961[5] and Tripolis from 1992, and have continued, with interruptions, ever since. The excavation works investigating the prehistoric period have been carried out only on the Asopos Hill and in Kandilkırı, located on the borders of Laodikeia, one of these ancient cities. The results

[2] Göney 1975, 47 ff.

[3] Scardozzi 2007, 86, Fig. 18, 19.

[4] Spoon – Wheeler 1679, 268; Pococke 1745, 71 ff; Chandler 1971; Arundell 1975; Laborde 1838, 86 ff; Hamilton 1984; Cochron 1887, 242 ff; Weber 1898; Ramsay 1895, 32 ff.

[5] Gagnier *et al.* 1969, 1 ff.

of the excavations in these two settlements have put the start of the history of the valley back to the beginning of the Early Chalcolithic Period. However, it is possible to say that these excavations do not wholly reflect the historical and cultural process of the valley when the mounds which exist in the valley have been considered.

In this article, the historical and cultural progress of the valley up to the beginning of the Middle Bronze Age will be discussed by considering the settlements dated to the prehistoric period in the Lykos Valley (Fig. 1).

The Paleolithic Period

The Paleolithic Period is a process which is not well known not only in Inland Western Anatolia, but also throughout Anatolia. It has been seen that the findspots of the Paleolithic Period in the western half of Anatolia are densest around the Sea of Marmara, the hillsides of the Western Taurus to Mediterranean and in Middle Anatolia[6]. It might be said that this partly reflects the truth. However the research recently carried out in various regions of Anatolia, show that this condition is also partially a result of the inadequacy of research. Thus the findings which show that the Lykos Valley was open to settlement in the Lower Paleolithic Period are the most recent example of this. The Paleolithic Period findings of the Lykos Valley are significant in order to show on which routes people spread to Europe after they had moved from Africa.

A human skull fossil found inside travertine deposits in Honaz Kocabaş, is also the first Homo erectus cranium found in Anatolia. The cosmogenic nuclide concentration and paleomagnetic measurements of this sample have shown that the cranium belonged to an individual who lived at least 1.1 million years ago[7]. After the cranium of Homo erectus had been found, surveys were started to detect contemporary prehistoric finds with this skull and sites, and as a result of these surveys, some stone tools dated to the Paleolithic Period were discovered.

[6] Kuhn 2002, 200/Fig. 2.

[7] Lebetard – Alçiçek *et al.* 2014, 8 ff.

The Neolithic and Early Chalcolithic Periods

The first research into settlements dated to the Neolithic/Early Chalcolithic periods in the southwest of Anatolia was carried out in the 1950's[8]. In relation to these first surveys, the settlements dated to the subject periods were detected, and it was even possible to document the Neolithic/ Early Chalcolithic cultural sequence of the region with the help of the archaeological excavations in the Lake District at Hacılar.

The growth of surveys in the Lake District revealed the Upper Maeander Basin and the parts such as the Lykos Valley located in the center of this basin as intermediate areas in the periphery of the culture of Hacılar. Another phenomenon which corroborates this approach is that the Lykos valley and the others are considered as natural routes which played a role in transmitting the Neolithic-Early Chalcolithic cultures to the Aegean coasts and Europe[9]. Depending on this development and points of view, the valley systems which also include the Lykos Valley have generally been evaluated as intermediate areas. However the systematic surveys recently carried out in the plain and mountainous regions around the Lykos Valley such as Çivril, Çal and Baklan[10] show that the situation is more different than was thought. The 18 settlements recorded during these surveys show that the valleys we mention, have material cultural characteristics to be compared with the regions around them in the periods of Neolithic-Early Chalcolithic.

Actually, the first information about the Lykos valley being preferred by people as a settlement area in the Neolithic and Chalcolithic periods has already been known for last decades.

Some discoveries concerning the Late Neolithic and Early Chalcolithic, although they are limited, have been made in the Upper Maeander Basin, in Aphrodisias-Pekmeztepe[11]. In Tepecik-Çine Höyük, located in the same basin again[12], pottery samples, similar to Hacılar Painted, have been found. In the archaeological research conducted in the Latmos (Beşparmak)

[8] Mellaart 1954; Mellaart 1961.
[9] Özdoğan 2014, 36.
[10] Abay – Dedeoğlu 2005; Abay – Dedeoğlu 2007; Dedeoğlu 2010; Dedeoğlu 2014; Abay 2011; Dedeoğlu *et al.* 2015, 152.
[11] Joukowsky 1986, 59-61.
[12] Günel 2003, 719 ff; Günel 2006, 403.

Mountains on the margin of the Bafa Lake, a cave with many prehistoric wall paintings has been found, and during the excavations, potteries and various stone tools dated to the Late Neolithic-Early Chalcolithic have been encountered[13].

Besides the archaeological excavations, the surveys carried out in Aydın and its vicinity[14] also verify that the Maeander Basin hosted the cultures of the Neolithic-Early Chalcolithic period. In the subject centers, besides monochrome potteries, it was found that the examples named as "Hacılar Painted" existed.

As it is throughout the basin, there are some sites which were also settled in the Lykos Valley in the periods of Neolithic and Early Chalcolithic. Strong Roman and Byzantine levels exist in the majority of mound settlements in the Lykos Valley. When this situation is considered, it should not be ignored that the assemblages of the Neolithic and Early Chalcolithic levels which should be in a position especially close to the plain level, might not be detected by surveys in some settlements. Despite this possible issue, findings about the Neolithic and Early Chalcolithic periods in the Lykos Valley have been made in the Yenice (Akkaya) mound, which is in the distribution area of the ancient city of Tripolis, in Kandilkırı, located on the borders of the ancient city of Laodikeia in Hüseyince Tepe and in the Karakurt mound (Figs. 2: 1-2). Besides the red, cream and brown monochrome potteries known from the Lake District, the potteries of these three settlements show similar characteristics, with cream on red slip and red on cream slip painted pottery samples which are named Hacılar painted pottery.

A few S-profiled red slipped monochrome potteries in the Karakurt mound exist among the finds attributed to the Neolithic culture of the valley[15]. Clay has been well-depurated in potteries dated to the Late Neolithic-Early Chalcolithic Period in Yenice (Akkaya) mound. The slip on the exterior surface is generally red or cream color. The samples of the Yenice (Akkaya) mound have been classified into two groups by considering the exterior

[13] Peschlow – Bindokat 2006, 87.
[14] Akdeniz 1997; Akdeniz 1999; Günel 2003; Günel 2006.
[15] Konakçı – Duman 2007, 59.

surfaces of potteries. The red slipped and cream on red decorated samples form the first group whereas red on cream decorated ones form the other group.

Decorations include horizontal and vertical lines, square panels, telescopic reverse and straight "V" shaped decorations and telescopic zigzags. The majority of the painted decorated pottery in Yenice (Akkaya) Höyük belong to body parts of open and closed pots. In the settlement, bowls with a globular body and simple rim and a plain base form the shape repertoires besides jars with a simple rim[16].

In the Lykos Valley, another settlement in which the samples named Hacılar Painted exist is Laodikeia-Kandilkırı. Here on the bedrock was found a red decorated on cream slip potsherd with zigzag and band decoration. In the same area as this potsherd, a simple rim monochrome potsherd with a conical body has been found, and it is thought that this sample is also dated to the Early Chalcolithic Period[17].

The Middle and Late Chalcolithic Period

The first debates about the Chalcolithic Period in the Upper Maeander Basin in which the Lykos Valley is also located were conducted by J. Mellaart who carried out the excavations of Beycesultan and Hacılar. On the basis of the results obtained by these excavations. J. Mellaart correlated the settlement layers and dark faced potteries unearthed during the excavations of Beycesultan, with the new group of people coming from the north to the region[18]. According to this point of view, the Beycesultan Late Chalcolithic pottery continuously reflects the Chalcolithic process of the region with the Early Chalcolithic period painted decorated pottery of Hacılar. On the other hand, as many researchers point out, the Beycesultan Chalcolithic period levels are dated to the end of the period, the Late Chalcolithic[19]. Thus, the notion that the Beycesultan Chalcolithic period levels and pottery need to be dated to the Late Chalcolithic period has been discussed by C. Eslick, and the existence of an intermediate period which should take

[16] Konakçı 2016, in press.
[17] Şimşek 2013, 406, 467, 471, Res. 676; Oğuzhanoğlu 2014, 72, 74, Res. 3.
[18] Lloyd – Mellaart 1962, 71, 106.
[19] Düring 2011, 223-226.

place in the sequence of Beycesultan-Hacılar has been claimed[20]. C. Eslick, unlike J. Mellaart, depending upon his research in the plain of Elmalı[21], thought that the progression from the Hacılar Early Chalcolithic culture to the Beycesultan Late Chalcolithic culture could be completed with the material detected in Kızılbel and Bağbaşı[22]. He indicated that the material of Kızılbel and Bağbaşı showed similarities especially with the settlements of the Aegean islands, and he argued that it should be classed as belonging to the Middle Chalcolithic Period[23].

As understood from the evaluations above, the Early and Late Chalcolithic periods have a more visible appearance in Southwestern Anatolia in which the Lykos Valley also exists. However the process named as the Middle Chalcolithic Period was scarcely known until recently, especially in the Lykos Valley and its vicinity. On the other hand, this intermediate period has gained a more visible appearance in the regions which are directly or indirectly related to the Lykos Valley. Hence, pottery and architectural items dated after 5500 BC, have been detected at Aşağı Pınar in Thracia, at Gülpınar, Kumtepe Ia in the region of Troad, at Beşik Sivri Tepe, Ilıpınar, Aktopraklık, Toptepe; Kanlıtaş ve Orman Fidanlığı in Eskişehir and its vicinity; Can Hasan in Central Anatolia, Tigani and Emporio in the East Aegean islands; Ulucak, Ege Gübre and Yeşilova Höyük in the Coastal Aegean[24]. Thus, these settlements are actually indirect proof that the inadequate information on this period in the Lykos Valley arose from the insufficiency of research. In fact, the recent surveys and excavations in the Upper Maeander Basin have given us some results to support this approach. The data obtained from Asopos Hill enable us to make some evaluations at least about the first half of the 5th millennium BC in the Upper Maeander Basin. The finds dated to the Middle and Late Chalcolithic periods in the Lykos Valley have been encountered in Yenice (Akkaya) Höyük, Kolossai, Karakurt and Çukurköy Höyük besides Laodikeia Asopos Hill which has been researched by excavation.

---

[20] Eslick 1980, 7.

[21] Eslick 1980, 7 ff.

[22] Eslick 1978, 138.

[23] Eslick 1980, 10 ff; Eslick 1992, 83.

[24] Takaoğlu 2006, 289 ff; Caymaz 2010, 223-269; Düring 2011, 201 ff; Gabriel 2014, 991-993, 994-1005.

The data which can be evaluated for the 5th millennium BC have been found only on Laodikeia Asopos Hill in the subject settlements. It has been verified by archaeological excavations that the occupation was started in the Chalcolithic Period in this settlement with two cones in an area of approximately 2.1 hectares, and it continued in the Middle Bronze Age, Late Bronze Age, Iron Age, and the Hellenistic, Early Roman and Late Roman periods. In the settlement, the potteries belonging to the first phase of the building levels in the Chalcolithic period (level VIIb) have been found in an inlay of approximately 40 cm thickness just on the main soil. Scattered stone sets which do not have any plan represent the only architectural elements of this level. Many flints and obsidian tools have been found in this level besides potteries. The analyses have shown that the majority of the obsidians originated in Central Anatolia and Milos Island[25]. The majority of potteries found in this level are coarse and dark faced. Conical and hemispherical bowls and jars with simple and inverted rims are the vessel forms which are most frequently encountered. Moreover, variable handles, lugs and attachments also exist (Figs. 2: 3-11). The close analogues, especially of pots with inwardly rising rims and bowls with vertically rising rims and handles with knob decoration, which are found in the VIIb level in Asopos Hill, also exist in Kızılbel and Aşağı Bağbaşı, which are described as Middle Chalcolithic Period settlements[26]. The analogues of the knob decoration which is seen on handles have been found in the settlement of Kulaksızlar, and this assemblage has been accepted as a reflection of the interaction seen between the Aegean islands and Anatolia[27]. Small handles continuing under the rim to the body have been found in Tigani I and II[28]. The analogues of lugs rising on the rim are seen also at Tigani I[29] and Emporio X-VIII[30]. The handles placed on lugs rising above the rim constitute a known tradition in Tigani[31]. The potteries of the Chalcolithic period that have been found at the VIIb level in Asopos Hill show significant similarities rather with settlements such as Kızılbel and

[25] Şimşek *et al.* 2014, 123 ff.
[26] Eslick 1980, 9-10.
[27] Takaoğlu 2004, 2, 4, Fig 2: 1-3.
[28] Felsch 1988, Taf. 78.
[29] Felsch 1988, Taf. 52: 42, Taf 58: 164, Taf. 79, 3 h, 3i, 4a-c.
[30] Hood 1981, 281, Fig. 135: 331, 332, 334.
[31] Felsch 1988, Taf. 81: up 9.

Bağbaşı in Southwestern Anatolia and especially with the Eastern Aegean islands. The connection with the Aegean islands probably occurred via the Maeander Basin. All of these characteristics seen in the Asopos Hill VIIb level potteries indicate that the settlement is dated to the first half of the 5th millennium BC[32].

The Late Chalcolithic Period is represented by dark faced, irregularly fired pottery with intense straw inclusion in the Upper Maeander Basin. In fact, this type of pottery shows similar characteristics across an extensive area which also includes the Lake District.

The first center of the Late Chalcolithic Period determined by archaeological excavations was Beycesultan, which can be defined as a key settlement not only for this region, but for almost the whole of Western Anatolia. Moreover, at Aphrodisias-Pekmeztepe[33], and Çine-Tepecik Höyük[34], the levels dated to the Late Chalcolithic Period have been excavated. In the Lake District, on the other hand, well-defined Late Chalcolithic levels were detected at Kuruçay Höyük[35] and at Bademağacı Höyük[36] and during the surveys in the region[37], potteries dated to this period were confirmed. During the excavations carried out in Elmalı Ovası, in Bağbaşı, and also of the tumulus dated to the 8th century BC at Boztepe and Karaburun, the potteries which show the subject period's characteristics were found[38].

Besides the archaeological excavations, during the surveys carried out in the Maeander Basin, settlements that include Late Chalcolithic materials have been detected[39].

On the other hand, the Late Chalcolithic Period is better documented by the pottery in the Lykos Valley. It is possible to say that the potteries existing in the settlements on the valley show similarities especially with

---

[32] Konakçı 2016.
[33] Joukowsky 1986, 60-72, 522-560.
[34] Günel 2006b, 404.
[35] Duru 1996.
[36] Umurtak 2005, 53-69.
[37] Özsait 1983, 139-140; Özsait 1991, 36-38; Özsait 1993, 332-334.
[38] Eslick 1992, 52-56; Eslick 1978.
[39] Akdeniz 1997, 237, 240.

the ones found in the Late Chalcolithic Period levels of Beycesultan and Aphrodisias[40]. It has been seen that the potteries collected from the levels of the Lykos Valley settlements are mostly types of coarse ware. With coarse ware, many burnished dark faced potteries, have also been found. Most of the potteries including badly fired samples, usually have black surface colors, and also have surface colors such as brownish black or greyish black or brown. Shallow bowls, jugs and jars exist among the ware forms that are frequently seen (Figs. 3: 12-18).

The Early Bronze Age

It is known that many mounds in the Lykos Valley were settled in the Early Bronze Age. However the number of the settlements researched by excavations is limited. But in the regions around the close vicinity of the valley, the Early Bronze Age has been more accurately defined. In fact, in the mounds such as Beycesultan in Çivril[41], Aphrodisas-Pekmeztepe in Aydın[42], Kusura Höyük[43] and Kaklık Mevkii in Afyon[44], Karataş-Semayük in Elmalı Ovası[45], and Kuruçay[46] and Bademağacı in the Lake District[47], the settlement layers dated to the Early Bronze Age have been revealed. It has been shown from these mounds and undoubtedly from the many settlements in Western Anatolia that the Early Bronze Age of Western Anatolia is divided into 3 main phases. It is generally accepted that the Early Bronze Age Culture of Western Anatolia incrementally developed from the Late Chalcolithic Age, and the Late Chalcolithic Period has to be accepted as the pioneer of the Early Bronze Age. Although there are some differences of opinion about its borders, some cultural characteristics and naming the regions, another commonly-held approach is that Western Anatolia should be divided into sub-cultural regions in the Early Bronze

[40] Lloyd – Mellaart 1962,71-103; Joukowsky 1986, 523-560.
[41] Lloyd – Mellaart 1962, 27-68, 116-239.
[42] Joukowsky 1986, 72-74, 561-573.
[43] Lamb 1937, 4, 5-11, 16-28.
[44] Efe *et al.* 1995, 376-377; Topbas – Efe –ff. 1998.
[45] Warner 1994, 135.
[46] Duru 1996, 65.
[47] Duru 2008, 146.

Age I[48]. These regional differentiations, on the other hand, have been mostly defined by considering the pottery characteristics. The first one of the regions is the district of Troas, which includes the majority of Southwestern Anatolia, whose pottery characteristics can be followed throughout the coast up to İzmir[49]. The second region includes the Eskişehir Plain and its mountainous part and the Upper Sakarya Plain[50]. The last region, named as the Beycesultan Early Bronze Age 1 Cultural Region[51], involves the Upper Maeander Basin, and thereby the Lykos Valley.

It is seen that the Upper Maeander Basin, which is accepted as the core region of the culture of Beycesultan Early Bronze Age 1, is differentiated from the other cultural regions especially by its potteries. At this stage, the region includes unique pottery characteristics. Among these, red and black slipped potteries with intense craftsmanship become remarkable[52].

It has been thought that the cultural regions mostly maintained the cultural borders of the Early Bronze Age 1 during the shift to Early Bronze Age 2 in Western Anatolia, but the borders and regional differences of the pottery groups become more distinctive[53]. It has been seen that the majority of the main elements which form the culture of Beycesultan Early Bronze Age 1 disappear with the advent of the Early Bronze Age 2. Thin-edged and fluted decorated bright red/orange slipped wares, the characteristic pottery of the Early Bronze Age 1 disappear with this new process. A new thick slipped group with fluted, reliefed, grooved, white colored and incrusté decoration supplants them. Even though the subject potteries are seen with exaggerated decoration, they were produced much more imprecisely than the former process in terms of firing and surface operations[54].

The Early Bronze Age 3 is a period in which cultural regions lose their characteristics and potteries with similar characteristics are seen in the

---

[48] Bittel 1942, 186; Lloyd – Mellaart 1962, 183 ff; French 1969a, 49; French 1969 b, 41; Efe 1988, 89; Efe 2004, 17-23.

[49] Mellaart 1971, 372; French 1969b, 21-22, fig. 29 b.1.

[50] Mellaart 1971, 382; French 1969b, 26; Bittel – Otto 1939, 29; Bittel 1942, 6; Bittel 1950, 34; Efe 2003a, 89.

[51] Lloyd – Mellaart 1962, Map III.

[52] Dedeoğlu 2010, 207.

[53] Dedeoğlu 2010, 208.

[54] Dedeoğlu 2010, 209.

whole of Western Anatolia[55]. Particular ware forms and decoration elements are commonly used in an extremely wide geographical area in this period. One of the most distinctive characteristics of the period is the emergence of wheel-made potteries. Wheel-made plates (Trojan A1 and A2 plates), dephas and tankards, red coated wares, red wash wares, tripod cooking pots, backward leaning beak-spouted jugs and red cross wares are among the common pottery forms used during the Early Bronze Age 3[56].

In the Lykos Valley, settlements which were inhabited in every phase of the Early Bronze Age 3 have been found. It has been determined that the advancements briefly summarized above took shape in a similar manner in these settlements. The obtained data reveal that an increase in the number of settlements occurred in the Lykos Valley during the periods of the EBA 1 and 2 just as in the region of Çivril-Çal-Baklan, and a significant decrease was experienced in the EBA 3[57].

The discoveries dated to the Early Bronze Age 1 and 2 were made by the excavations of the settlement of Laodikeia-Kandilkırı (Western Necropolis) and Akhan Necropolis. Also in the settlements of Gök Höyük, Akhan Höyüğü, Colassae, Hüseyince Tepe, Emirazizli, Karakurt, İncilipınar, Kocabaş, Irlıganlı, Hamambükü, Yenice (Akkaya), Kumkısık, Beylerbeyi (Koca Höyük) Çukurköy, potteries dated to the Early Bronze Age 1-2 have been discovered (Figs. 4: 20-23, 19, 22, 24, 28, 29). Some of these settlements were abandoned in the Early Bronze Age 3 whereas others continued to be settled. The mounds where settlement continued uninterrupted are Laodikeia-Kandilkırı, Kolossai, Karakurt, Hüseyince Tepe and İncilipınar passing into the Early Bronze Age 3 (Figs. 4: 25-27).

In the Lykos Valley, in the aforementioned settlements, it has been seen that the exterior surface is commonly black, brown-black, red and red-brown on the potteries dated to the periods of the EBA 1 and 2 which have been detected by surveys. Burnishing of the exterior surface is frequent. It has been seen that the samples are well or medium fired. Generally, fine

[55] Lloyd – Mellaart 1962, 245.
[56] Dedeoğlu 2010, 241.
[57] Dedeoğlu 2010, 260.

sand, stone and straw temper have been added into the paste. Besides many monochrome samples, pieces with white geometric decoration have been detected.

One of the areas where the discoveries of the Early Bronze Age 1 and 2 periods have been examined by excavations in the Lykos Valley is the Akhan necropolis. In 2000, 60 pithos burials were revealed in the necropolis area excavated by the museum of Denizli. Inside the subject graves, bowls and jugs in various forms and bronze tools have been identified besides black slipped anthropomorphic pots[58].

The excavations carried out at the province of Laodikeia-Kandilkırı on the other hand have proved that this area was used as a necropolis in the EBA 2 and as a settlement in the EBA 2. The excavation works have shown that the second and third levels unearthed in this area are dated to the EBA 3 Period whereas the fourth level is dated to the EBA 2. In the works of the necropolis area, 6 simple earth graves, 3 pithos graves, 2 pot graves and 1 stone sided composite grave have been detected, making 12 graves in total. Also found was a votive pit which might be associated with burial rituals in the area of the necropolis, as well as various potsherds and residues of flint working. It has been shown that the potteries found in the necropolis area dated to the EBA II period are contemporary with the Beycesultan levels XIV-XIII, Elmalı-Karataş Semayük levels IV-V, Chios-Emporio levels III-II and the second level of Kuruçay[59].

The EBA 3 period has 2 phases in Laodikeia-Kandilkırı. In the levels dated to this period, a 4 roomed structure with apsis parts and 5 garbage pits have been unearthed. In these rooms and garbage pits, red and orange wash wheel made plates, red slipped tankard pieces and tripod potsherds have been found. The wares found at the third level between levels XIII-XII of Beycesultan have also been dated to this time. On the other hand, the second level of the settlement has been argued to be dated to a later phase of the EBA 3[60].

---

[58] Duman – Konakçı 2006, 85-86; Şimşek 2013, 471.

[59] Oğuzhanoğlu 2014, 73, 74, 78, Res 2. For detailed information about the votive pit Oğuzhanoğlu 2015, 423 ff.

[60] Oğuzhanoğlu 2014, 79, 84.

Conclusion

The archaeological evidence which has recently been obtained has shown that the Lykos Valley was preferred as an area of settlement by people from the Lower Paleolithic Period. The results of the archaeological excavations and surveys have indicated that the occupation of the valley continued to the end of Late Antiquity. The Lykos Valley's long period of settlement might be considered as evidence for the valley having environmental conditions suitable for life from the oldest dates. Its location in the center of the extent valley systems in Central Western Anatolia has also been seen as a key factor for the valley in terms of occupation. Another result of its central location is that the Lykos Valley shows connected development with the cultural regions around it almost in every period.

The periods in which such relations can clearly be followed are the Neolithic and Early Chalcolithic. Monochrome and painted decorated potteries indicate that the valley had relations both with the Coastal Aegean and the Lake District. In fact, in the early phases of the Neolithic, a culture represented by monochrome potteries was dominant in the region lying from the Lake District to the Coastal Aegean. The analogies among the pottery forms indicate a common cultural structure in this wide geographical area. In the 6th millennium BC, painted decorated potteries and ware forms unique to this period stand out in the Lake District at the beginning of the Early Chalcolithic Period whereas the monochrome tradition continued interrupted in the Coastal Aegean. The potteries collected from the mounds in the valley show that the Lykos Valley was a part of the region by the monochrome tradition in the first stage. In the Early Chalcolithic Period in which the tradition of painted decorated pottery began, on the other hand, the Lykos Valley became distinct from the Coastal Aegean and showed a parallel advancement to the Lake District.

In the period defined as the Middle Chalcolithic, it might be said that the cultural improvement of the valley became distinct from the Lake District between 5500-4000 BC and showed a similar advancement to the Aegean coasts. Thus, according to the information obtained from the excavations of Asopos Hill, the valley has common characteristics rather with the cultures of the settlements in the region of Troad and Aegean islands in this period. The effects of the Aegean islands and the Balkans are seen in the valley. However the pottery groups which are seen to be connected with Central

Anatolia have been detected in the settlements such as the cave of Killikin and Ekşi Höyük in Denizli-Çal, just south of the Lykos Valley, in the same period. These finds show that the Lykos Valley was open to the effects on the Maeander Valley in the Middle Chalcolithic Period, and should be seen as the meeting point of various cultures.

Although the Late Chalcolithic Period displays some regional characteristics in the Lykos Valley similar to those of its close vicinity, it has cultural characteristics seen in the majority of Southwestern Anatolia[61]. The valley culturally became a part of a wider cultural region in this period. As in the plains of Çivril, Çal and Baklan[62], the settlements are also located in the plain in the Lykos Valley, showing that agriculture played an essential part in the livelihood model. It has been observed that the settlements of the Late Chalcolithic Period became intensive in specific areas in the plains of Çivril, Çal and Baklan[63]. This development, seen just before the Early Bronze Age, was the precursor for the central settlements to begin to emerge in particular regions.

The Lykos Valley shows Beycesultan oriented development in the Early Bronze Age I-II periods. With the beginning of the Early Bronze Age, the Maeander Basin in which the Lykos Valley is also located stopped being a region that was defined by the cultures around it. Also in the Lykos Valley, it is possible to follow the characteristics of the Beycesultan Cultural Region in the Early Bronze Age I. The key settlement of this period is Beycesultan in the Çivril plain, just beside the Lykos Valley. The potteries collected from the settlements of the Lykos Valley indicate that the valley continued to be a part of the cultural region which is defined by Beycesultan in the Early Bronze Age II. The change seen throughout Western Anatolia in the Early Bronze Age III reflects on to the Lykos Valley. The Upper Maeander Basin and Lykos Valley, which had a central location in Western Anatolia during the periods of the Early Bronze Age I-II, became involved once again in the cultural advancements which are seen throughout Western Anatolia in the period of the Early Bronze Age III.

[61] Lloyd - Mellaart 1962, 103; French 1961, 103.
[62] Dedeoğlu 2010, 164-165.
[63] Dedeoğlu 2010, 164-165.

ABBREVIATIONS AND BIBLIOGRAPHY

Abay 2011	E. Abay, "Preliminary Report on the Survey Project of Çivril, Baklan, Çal Plains in the Upper Meander Basin, Southwest Anatolia", *Ancient Near Eastern Studies 48*, 2011, 1-87.
Abay – Dedeoğlu 2005	E Abay - F. Dedeoğlu, "2003 Yılı Denizli/Çivril Ovası Yüzey Araştırması", 2*2. Araştırma Sonuçları Toplantısı 2 (24-28 Mayıs 2004, Konya)*, Ankara, 2005, 41-51.
Abay – Dedeoğlu 2007	E. Abay - F. Dedeoğlu, "2005 yılı Çivril Ovası Yüzey Araştırması", *24. Araştırma Sonuçları Toplantısı (29 Mayıs-2 Haziran 2006, Çanakkale), Vol. 1*, Ankara, 2007, 277-293.
Akdeniz 1997	E. Akdeniz, "1995 Yılı Büyük Menderes Ovası ve Çevresi Yüzey Araştırmaları", *14. Araştırma Sonuçları Toplantısı (27-31 Mayıs 1996, Ankara)*, Ankara, 1997, 233-254.
Akdeniz 1999	E. Akdeniz, *Büyük Menderes Havzasının Demir Çağ Öncesi Kültürleri* (Ege Universitesi, Sosyal Bilimler Enstitüsü, Unpublished Phd Thesis), Izmir, 1999.
Arundell 1975	F. V. J. Arundell, *Discoveries in Asia Minor, Band 2*, New York, 1975.
Bittel 1942	K. Bittel, *Kleinasiatische Studien*, Istanbul, 1942.
Bittel 1950	K. Bittel, *Grundzüge der vor-und frühgeschichte Kleinasiens*, Tübingen, 1950.
Bittel – Otto 1939	K. Bittel – K.Otto, *Demirci Hüyük*, Berlin, 1939.
Caymaz 2010	T. Caymaz, *Yeni Buluntuların Işığında Orta Batı Anadolu Kalkolitik Dönem Kültürü* (Ege Universitesi, Sosyal Bilimler Enstitüsü, Unpublished Phd Thesis), Izmir, 2010.
Chandler 1971	R. Chandler, *Travels in Asia Minor 1764–1765*, London, 1971.
Cochron 1887	W. Cochron, *Pen and Pencil in Asia Minor or, Notes from The Levant*, London, 1887.
Dedeoğlu 2010	F. Dedeoğlu, *Neolitik Çağdan Erken Tunç Çağ Sonuna Kadar Yukarı Menderes Havzası: Kültürel, Sosyal ve Ekonomik Süreç* (Ege University, Sosyal Bilimler Enstitüsü, Unpublished Phd Thesis), Izmir, 2010.

Dedeoğlu 2014	F. Dedeoğlu, "Yukarı Menderes Havzası Neolitik ve Erken Kalkolitik Çağ Yerleşimlerinin Materyal Kültür ve İskân Düzeni Bağlamında Değerlendirilmesi", *Pamukkale Universitesi, Sosyal Bilimler Enstitüsü Dergisi 18*, Denizli, 2014, 33-56.
Dedeoğlu *et al.* 2015	F. Dedeoğlu - E. Konakçı - A. Ozan, "Yukarı Menderes Havzası Dağlık Kesim Yüzey Araştırması Projesi 2013 Yılı Çalışmaları", *32. Araştırma Sonuçları Toplantısı (02-06 Haziran 2014, Gaziantep), Vol. 2*, Ankara, 2015, 151-160.
Demirkent 2002	I. Demirkent, "XII. Yüzyılda Bizans'ın Ege Bölgesinden Güneye İnen Yolları Hakkında", *Anadolu'da Tarihi Yollar ve Şehirler Seminer*, Istanbul, 2002, 1-13.
Duru 1996	R. Duru, *Kuruçay Höyük II, 1978-1988 Kazılarının Sonuçları, Geç Kalkolitik ve İlk Tunç Çağı Yerleşmeleri*, Ankara, 1996.
Duman – Konakçı 2006	B. Duman – E. Konakçı, "Kolassai: Höyük, Kalıntı ve Buluntuları (Colassae: the Mound, Remains and Findings)", *Arkeoloji Dergisi VIII, 2006/2*, Izmir, 2006, 79-104.
Duru 2008	R. Duru, "M.Ö. 8000'den M.Ö 2000'e Burdur - Antalya Bölgesi'nin Altı bin Yılı", *Akmed 4,* Antalya, 2008.
Düring 2011	B. S. Düring, *The Prehistory of Asia Minor, from Complex Hunter-Gatherers to Early Urban Societies*, Cambridge, 2011.
Efe 1988	T. Efe, *Demircihüyük III, 2. Die Keramik 2 C: Die Frühbronzezeitliche Keramik der Jüngeren Phasen (ab Phase H)*, Mainz, 1988.
Efe 2003	T. Efe, "Pottery Distribution within the Bronze Age of Western Anatolia and its Implications upon Cultural, Political (and Ethnic?) Entities", *Güven Arsebük İçin Armağan Yazıları* (Edited by M. Özbaşaran – O. Tanındı – A. Boratav), Istanbul, 2003, 87-104.
Efe 2004	T. Efe, "Kültür Gruplarından Krallıklara: Batı Anadolu'nun Tarihöncesi Kültürel ve Siyasal Gelişim Profili," *Colloquium Anatolicum III*, Istanbul, 2004, 15-29.
Efe *et al.* 1995	T. Efe - A. Topbaş - A. İlaslı, "Salvage Excavations of the Afyon Archaeological Museum, Part I: Kaklık

Mevkii, A Site Transitional to the Early Bronze Age", *Studia Troica 5*, 1995, 357-399.

Eslick 1978 — C. Eslick, *The Neolithic and Chalcolithic Pottery of Elmalı Plain South-Western Turkey* (Bryn Mawr College, Unpublished Phd Thesis), Pennsyvlania, 1978.

Eslick 1980 — C. Eslick, "Middle Chalcolithic Pottery from Southwest Anatolia", *American Journal of Archaeology 84*, 1980, 5-14.

Eslick 1992 — C. Eslick, *Elmalı-Karataş I, The Neolithic and Chalcolithic Periods: Bağbaşı and Other Sites*, Bryn Mawr, 1992.

Felsch 1988 — R. Felsch, *Das Kastro Tigani: Die Spätneolitische und Chalcolitische Siedlung, Samos Band II*, Mainz. 1988.

French 1961 — D. French, "Late Chalcolithic Pottery in North-West Turkey and the Aegean", *Anatolian Studies 11*, 1961, 99-141.

French 1969a — D. French, "Prehistoric Sites in Northwest Anatolia-II, The Balıkesir and Akhisar/Manisa Areas", *Anatolian Studies 19*, 1969, 41-98.

French 1969b — D. French, *Anatolia and the Aegean in third Millenium BC* (University of Cambridge, Unpublished Phd Thesis), Cambridge, 1969.

Gabriel 2014 — U. Gabriel, "Die Keramik der Troadischen Fundorte Kumtepe IA, Beşik-Sivritepe und Çıplak Köyü im Kontext ihrer Überregionalen Vergleichsfunde", *Studia Troica Monographien 5, Teil 2* (Edited by E. Pernicka – C.B. Rose – P. Jablonka), 2014, 990-1057.

Gagnier *et al.* 1969 — J. des Gagnier – P. Devambez – L. Kahil – R. Ginouves, *Laodicee du Lycos*, Paris, 1969.

Göney 1975 — S. Göney, *Büyük Menderes Bölgesi*, Istanbul, 1975.

Günel 2003 — S. Günel, "Batı Anadolu Bölgesi Tarih Öncesi Dönemlerine Yeni Katkılar" *Belleten LXVII*, Sayı 250, Ankara, 2003, 719-738.

Günel 2006 — S. Günel, "A New Early Settlement on the Plain of Çine (Marsyas) in Western Anatolia: Tepecik Höyük in the Light of Surface Survey", *Hayat Erkanal'a Armağan, Kültürlerin Yansıması, Studies in Honor*

	of Hayat Erkanal, Cultural Reflections (Edited by A. Erkanal - Öktü *et al),* Istanbul, 2006, 401-410.
Hamilton 1984	W. J. Hamilton, *Researches in Asia Minor, Pontus and Armenia I-II*, NewYork, 1984.
Hood 1981	S. Hood, *Excavations at Chios 1938-1955. Prehistoric Emporio and Ayio Gala, Annual of the British School at Athens Supplement 15*, 1981.
Johnson 1950	S. E. Johnson, "Laodiceia and Its Neighbors", *Biblical Archaeologist 13, no 1*, 1950, 1-18.
Joukowsky 1986	M. Joukowsky, *Prehistoric Aphrodisias – An account of the excavations and artefact studies, Publications d'histoire de l'art et d'archeologie de l'Universite catholiquen de Louvain XXXIX; zugl. Archaeologia Transatlantics III*, Providence, 1986.
Konakçı – Duman 2007	E. Konakçı – B. Duman, "Yazılı ve Arkeolojik Kanıtlar Işığında Kolassai (Colassae with the Light of Archaeological and Historical Evidences)", *Uluslararası Denizli ve Çevresi Tarih ve Kültür Sempozyumu Bildiriler Kitabı, Vol. 2*, Denizli, 2007, 57-67.
Konakçı 2016	E. Konakçı, "A Group of Pottery from the Chalcolithic Period in Asopos Tepesi", *Olba XXIV*, Mersin, 2016, in print.
Konakçı in press	E. Konakçı, "Prehistorik Tripolis: Akkaya (Yenice) ve Hamambükü Höyük" *Tripolis Çalışmaları I*, Istanbul, in press.
Kuhn 2002	S. L. Kuhn, "Paleolithic Archaeology in Turkey", Evolutionary *Anthropology 11*, 2002, 198-210.
Laborde 1838	L. A. Laborde, *Voyage de la Syrie et de l'Asie Mineure*, Paris, 1838.
Lamb 1937	W. Lamb, *Excavations at Kusura near Afyon Karahisar*, London, 1937.
Lebetard *et al.* 2014	A.E. Lebetard – M.C. Alçiçek *et al*, "Dating the Homo Erectus Bearing Travertine from Kocabaş (Denizli, Turkey) at Least 1.1 Ma", *Earth and Planetary Science Letters 390*, 2014, 8-18.
Lloyd – Mellaart 1962	S. Lloyd – J. Mellaart, *Beycesultan Vol I, The Chalcolithic and Early Bronze Age Levels*, Ankara, 1962.

Mellaart 1954	J. Mellaart, "Preliminary Report on a Survey of Pre-Classical Remains in Southern Turkey" *Anatolian Studies 4*, 1954, 175-240.
Mellaart 1960	J. Mellaart, "Anatolia and Balkans" *Antiquity 34*, 1960, 270-278.
Mellaart 1961	J. Mellaart, "Early Cultures of the South Anatolian Plateau", *Anatolian Studies 11*, 1961, 159-184.
Mellaart 1971	J. Mellaart, "Anatolia, c. 4000-2300 BC", *The Cambridge Ancient History Third edition Volume 1, Part 2*, Cambridge, 1971, 363-416.
Oğuzhanoğlu 2014	U. Oğuzhanoğlu, "Laodikeia'dan Batı Anadolu Erken Tunç Çağı'na Yeni Katkılar (New Contributions to the Western Anatolian Early Bronze Age from Laodikeia)", *10. Yılında Laodikeia (2003-2013 Yılları)*, Edited by Celal Şimşek, Istanbul, 2014, 71-86.
Oğuzhanoğlu 2015	U. Oğuzhanoğlu, "Laodikeia Erken Tunç Çağı 2 Mezarlığından Bir Çukur ve Düşündürdükleri", *Mustafa Büyükkolancı'ya Armağan (Essays in Honour of Mustafa Büyükkolancı)*, Edited by C. Şimşek *et al.*, Istanbul, 2015, 423-435.
Özdoğan 2014	M. Özdoğan, "A New Look at the Introduction of the Neolithic Way of Life in Southeastern Europe, Changing Paradigms of the Expansion of the Neolithic Way of Life" *Documenta Praehistorica XLI*, 2014, 33-49.
Özsait 1983	M. Özsait, "Psidya Bölgesi'nde Yeni Prehistorik İskan Yerleri II", *Anadolu Arastırmaları IX*, Istanbul, 1983, 134- 166.
Özsait 1991	M. Özsait, "1989 yılı Gölhisar Çevresi Tarih Öncesi Araştırmaları" *8. Araştırma Sonuçları Toplantısı (28 Mayıs-1 Haziran 1990, Ankara)*, Ankara, 1991, 35-39.
Özsait 1993	M. Özsait, "1991 yılı Burdur-Çeltikçi ve Yeşilova Yüzey Araştırmaları", *12. Araştırma Sonuçları Toplantısı (30 Mayıs – 3 Haziran 1994, Ankara)*, Ankara, 1993, 331-344.
Peschlow-Bindokat 2006	A. Peschlow-Bindokat, *Tarih öncesi İnsan Resimleri Latmos Dağları'ndaki Prehistorik Kaya Resimleri*, İstanbul, 2006.
Pococke 1745	R. Pococke, *A Description of The East and Some Others Countries, Vol 1, 2*, London, 1745.

Ramsay 1895	W. M. Ramsay, *Cities and Bishoprics of Phrygia*, Oxford, 1895.
Scardozzi 2007	G. Scardozzi, "Ricerche topografiche e telerilevamento", *Hierapolis di Frigia, Le Attivita Delle Campagne Di Scavo e Restauro 2000-2003* (Edited by F. D'Andria – M. Piera Caggia), Istanbul, 2007.
Spoon – Wheeler 1679	J. Spoon – G. Wheeler, *Voyage de Dalmatie, de Grece, et Du Levant I-II*, Paris, 1679.
Şimşek 2013	C. Şimşek, Laodikeia (Laodicea ad Lycum), Istanbul, 2013.
Şimşek *et al.* 2014	C. Şimşek – E. Konakçı – E. Pernicka, "Analyses of Origin for the Obsidian found at Asopos Hill, Laodicea (Laodikeia Asopos Tepesinde Bulunan Obsidyenlerin Köken Analizleri), *10. Yılında Laodikeia (2003-2013), Laodikeia Çalışmaları 3* (Edited by C. Şimşek), Istanbul, 2014, 123-145.
Takaoğlu 2004	T. Takaoğlu, "Interactions in the 5th Millenium BC Eastern Aegean: New Evidence", *Anatolian Antiqua 12*, Paris, 2004, 1-6.
Takaoğlu 2006	T. Takaoğlu, "The Neolithic in the Eastern Aegean: Excavations at Gülpınar in the Troad", *Hesperia 75*, 2006, 289-315.
Topbaş *et al.* 1998	A. Topbaş - T. Efe - A. İlaslı, "Salvage Excavations of the Afyon Archaeological Museum, Part II: The Settlement of Karaoğlan Mevkii and the Early Bronze Age Cemetery of Kaklık Mevkii", *Anatolia Antiqua 6*, Istanbul, 1998, 21-94.
Umurtak 2005	G. Umurtak, "A Study of the Datig of New Groups of Pottery from Bademağacı Höyük and Some Reflections on the Date Chalcolithic Cultures of Southwestern Anatolia", *Anatolia Antiqua XIII*, Paris, 2005, 53-69.
Warner 1994	J.L. Warner, *Elmalı-Karataş II, The Early Bronze Age Village of Karataş, Archaeological Monographs*, 1994.
Weber 1898	G. Weber, "Die Hochdruck-Wasserleıtung Von Laodicea Ad Lykum", *Jahrbuch Des Kaiserlich Deutschen Arcäologischen Insituts, Band XIII*, Berlin, 1898.

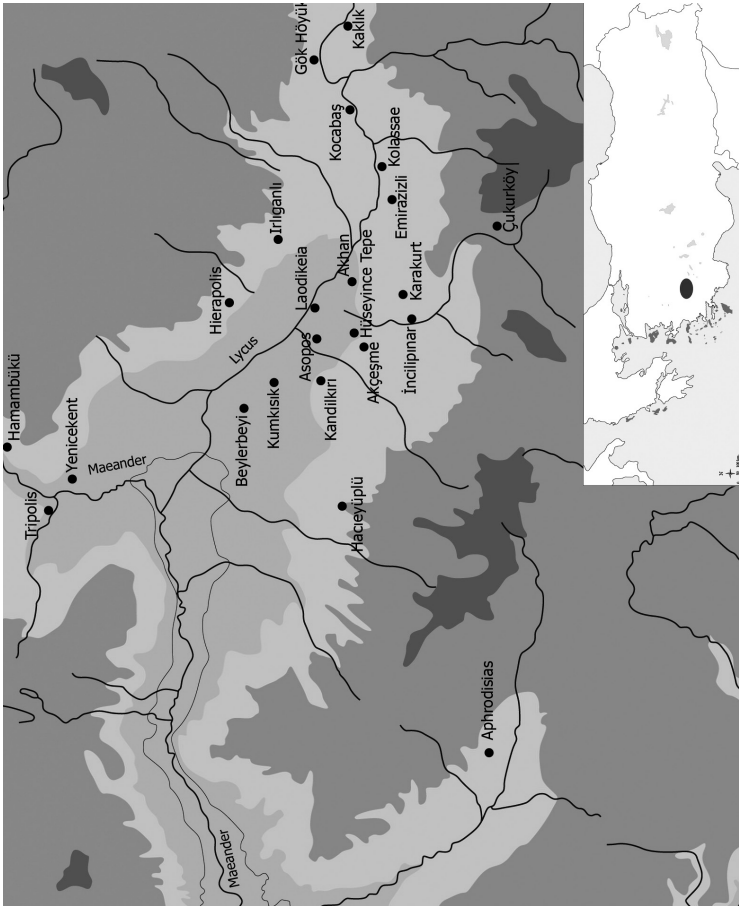

Fig. 1 Prehistoric Sites in the Lykos Valley

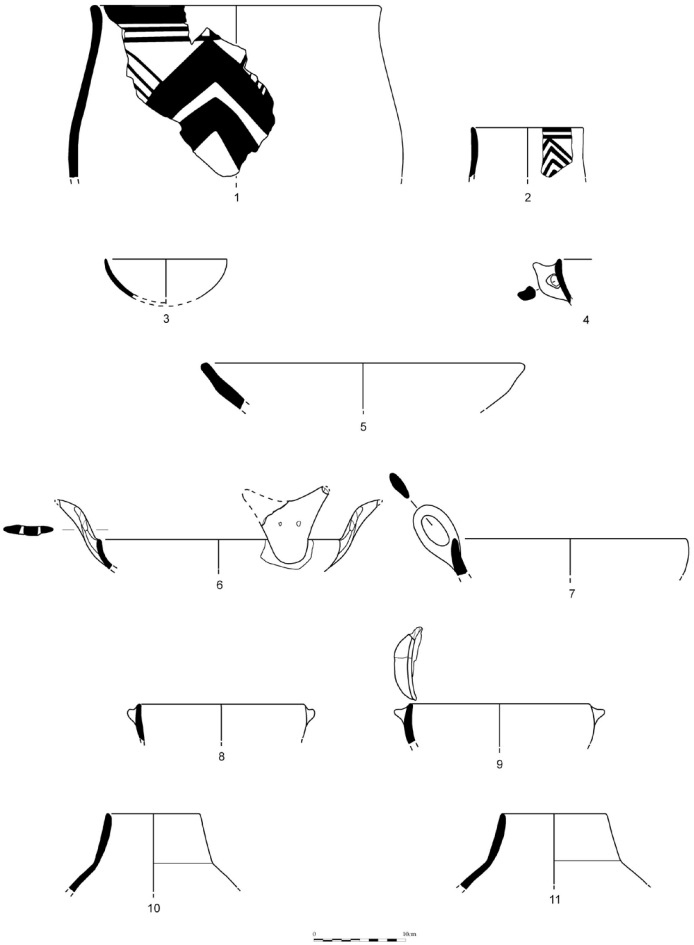

Fig. 2 1. Bowl, cream on red, Early Chalcolithic, Laodikeia (Şimşek 2013, 470, Res. 676), 2. Bowl, red on brown, Early Chalcolithic, Hüseyince Tepe, 3. Bowl, Middle Chalcolithic, Asopos Hill, 4. Handle with knob, Middle Chalcolithic, Asopos Hill, 5. Bowl, Middle Chalcolithic, Asopos Hill, 6. Bowl, Middle Chalcolithic, Asopos Hill, 7. Bowl, Middle Chalcolithic, Asopos Hill, 8. Bowl, Middle Chalcolithic, Asopos Hill, 9. Bowl, Middle Chalcolithic, Asopos Hill, 10. Jar, Middle Chalcolithic, Asopos Hill, 11. Jar, Middle Chalcolithic, Asopos Hill

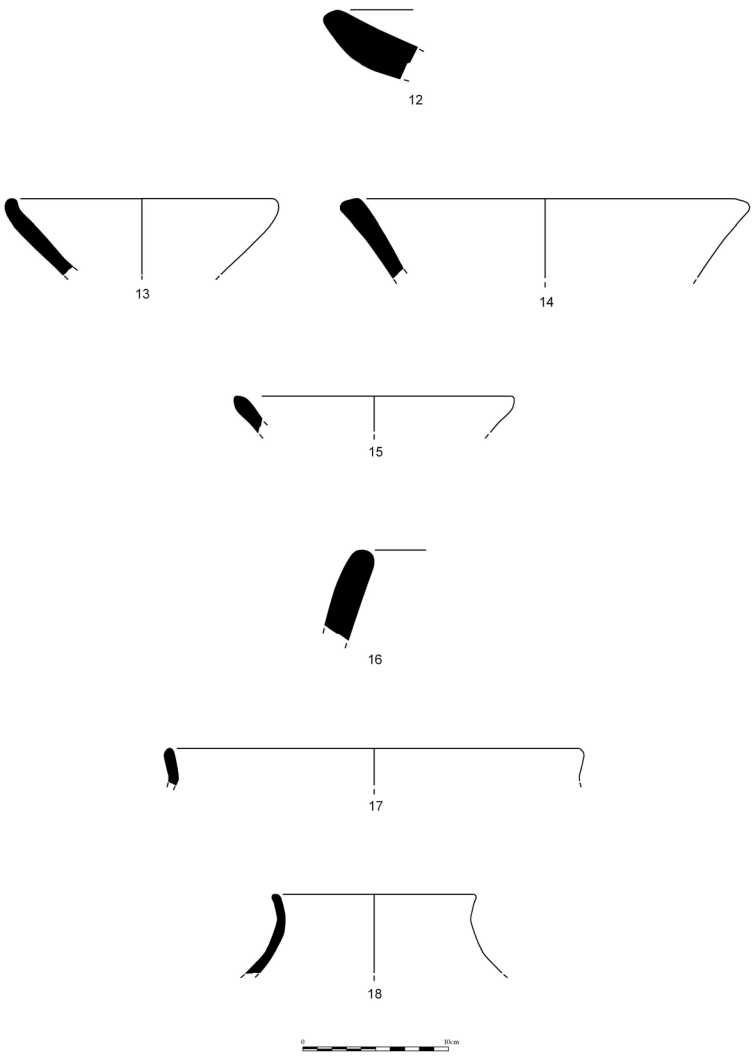

Fig. 3 12. Bowl, Late Chalcolithic, Kolossai, 13. Bowl, Late Chalcolithic, Çukurköy,14. Bowl, Late Chalcolithic, Çukurköy, 15. Bowl, Late Chalcolithic, Çukurköy,16. Jar, Late Chalcolithic, Kolossai, 17. Jar, Late Chalcolithic, Çukurköy, 18. Jar, Late Chalcolithic, Çukurköy

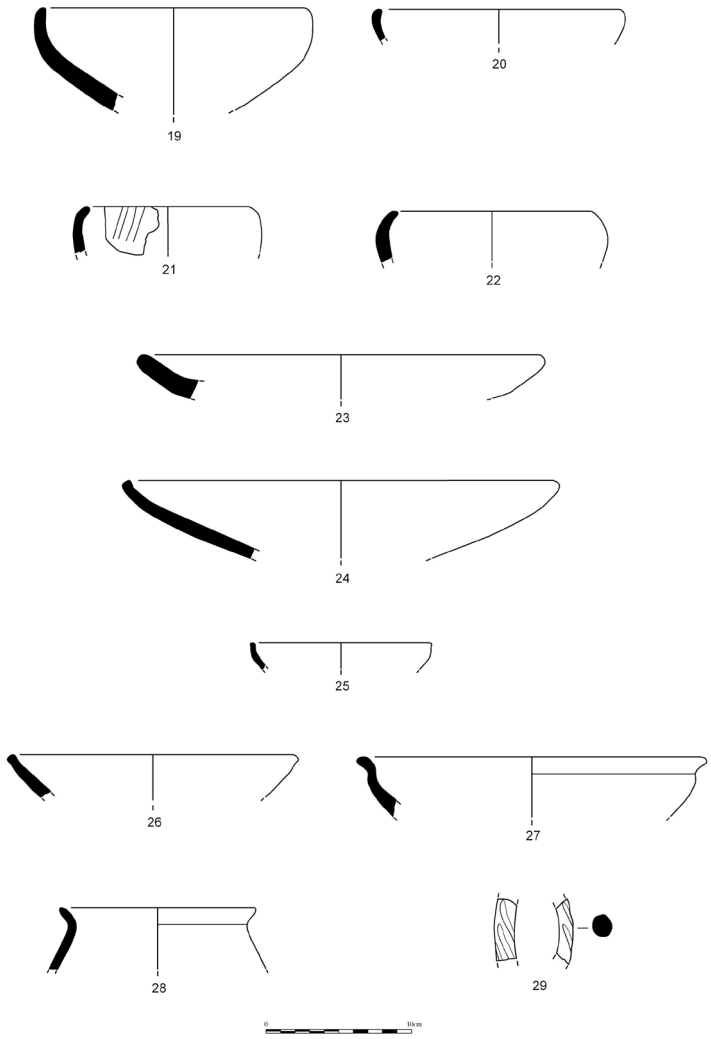

Fig. 4 19. Bowl, EBA II, İncilipınar, 20. Bowl, EBA I, Kolossai, 21. Bowl, EBA I, Kolossai, 22. Bowl, EBA II, Kolossai, 23. Bowl, EBA I, İncilipınar, 24. Bowl, EBA II, İncilipınar, 25. Bowl, EBA III, Kolossai, 26. Bowl, EBA III, İncilipınar, 27. Bowl, EBA III, İncilipınar, 28. Bowl, EBA II, Kolossai, 29. Handle, EBA III, Kolossai

THE LYKOS VALLEY DURING THE SECOND MILLENNIUM BC

Erim KONAKÇI*

The Lykos Valley is located in southwestern Anatolia. This geographical area is also known as the Denizli valley or plains. This region is also the western part of the geographical region known as the Upper Maeander basin[1]. The Lykos valley is a passage between the Aegean shore, Central Anatolia and the Mediterranean region (Fig. 1). The valley is surrounded by the Honaz (Kadmos) and Babadağ (Salbakos) mountains to the south and by the Çökelez Mountains to the north and it has an altitude of 250-500 meters above sea level. The eastern border of the valley is marked by Kocabaş and the western border faces Sarayköy, the junction of the rivers Maeander and Lykos. As there are no mountains on the eastern and western sides of the valley it becomes a natural passageway[2]. The itineraries passing through the valley divide into two at Sarayköy. The first continues along the Greater Maeander and reaches Miletus. This itinerary was used both for trade and military purposes, not only during the Middle and Late Bronze Age but also

* Asst. Prof., Pamukkale University, Faculty of Science & Arts, Department of Archaeology, 20017 Denizli, Türkiye. E-mail: ekonakci@pau.edu.tr

[1] Darkot – Tuncel 1995, 29.

[2] Göney 1975, 47 ff.

during earlier and later ages[3]. The Hellenistic, Roman, Seljuk and Ottoman settlements founded along this itinerary prove that this natural passageway was important throughout history[4]. The other itinerary that could be reached via the Lykos Valley connects to the Gediz valley through the Buldan passage reaching first Sardeis than Smyrna. When the destination is Caria, it is possible to follow the route of the Tavas plateau. Moreover, there are alternative routes over Babadağ that lead to the Caria region. For instance, one of the ridgeways from Aphrodisias to the Lykos valley is 35 km long.

Alongside its geographical position, which that facilitates transportation to neighbouring regions, another determining factor in the development of the Lykos valley was its rich water resources during the second millennium BC. The Great Maeander, which rises in the Suçıkan region near Afyon, flows through Çivril, Baklan and Çal before joining the Lykos River near Sarayköy on the western border of the Lykos valley. Thus, the greatest determining factor in the rise and development of settlements in the Lykos valley has been the Lykos River (Çürüksu), which is at the same time one of the larger branches of the Greater Maeander. Other major streams in the valley include the Asopos (Gümüşçay) and the Başlıçay which are branches of the Lykos River. Another important factor in the birth of settlements is the now dry lake between Hierapolis and Laodikeia. This lake is mentioned in an inscription attributed to Hadrianus which was discovered in Hierapolis during the 2003 excavations. The location and borders of the lake were determined using satellite photos[5]. This rich geographical structure has played an important role in the emergence of this site as a residential area since the Paleolithic Period.

Interest in the Lykos valley can be traced back to the seventeenth century. In those times, the growing interest of European aristocrats in the classical texts of authors including Strabon and Vitrivius and the desire to see the cities mentioned in the Bible boosted the number of visits to the region. This interest is testified by the visits of, along with many unnamed researchers, J. Spoon and G. Wheeler[6] during the seventeenth century Pococke[7] and R.

[3] Chevallier 1976, 141; Sevin 2001, 5; Johnson 1950, 4.
[4] Yavuz 1997, 80 ff.; Demirkent 2002, 1 ff.; Thonemann 2011, 1 ff.
[5] Scardozzi 2007, 86, Fig. 18, 19.
[6] Spoon – Wheeler 1679, 268.
[7] Pococke 1745, 71 ff.

Chandler[8] during the 18th century, and F. Arundell[9], A. L. Laborde[10], W. J. Hamilton[11], W. Cochron[12], G. Weber[13] and W. M. Ramsay[14] during the 19th century. However, the emphasis laid on the monumental structures of great Roman cities such as Laodikeia and Hierapolis by the mentioned researchers has influenced the way documentation studies were conducted.

Excavations concerning the cities of Hierapolis, Tripolis and Laodikeia were conducted. The excavations in Hierapolis started in 1887. The city has been excavated since 1957 by a team of Italian excavators. The excavations in Laodikeia were first initiated in 1961 by J. Gagniers. The excavations of the Caracalla Fountain which lasted three years, ended by the end of 1963[15]. Syria Street was excavated in 1992 by Denizli Museum. The excavations initiated in 2002 under the supervision of Denizli Museum were continued in 2003 by Prof. Dr. Celal Şimşek of Pamukkale University, Department of Archaeology[16]. The scientific advisor of the Tripolis excavations undertaken by Denizli Museum Directorate was Assist. Prof. Dr. Aytekin Erdoğan for 2009-2010 and the post has been held by Assist. Prof. Dr. Bahadır Duman since 2012.

Although it is known that the Lykos valley had settlements during the 2nd millennium BC, the only settlement studied through excavations is Laodikeia Asopos Hill. Before discussing the data obtained from the 2nd Millenium BC settlements in the region it would be appropriate to evaluate the historical data pertaining to the Lykos valley region during the 2nd millennium BC.

It is possible to observe reflections of the political and economic developments during the second millennium in the Lykos valley elsewhere

---

8 Chandler 1971.
9 Arundell 1975.
10 Laborde 1838, 86 ff.
11 Hamilton 1984.
12 Cochron 1887, 242 ff.
13 Weber 1898.
14 Ramsay 1895, 32 ff.
15 Gagnier *et al*. 1969, 1 ff.
16 Şimşek 2005, 305 ff.; Şimşek 2006, 419 ff.; Şimşek 2007a, 1 ff., Şimşek 2007b, 455 ff.; Şimşek 2008, 99 ff.; Şimşek 2009, 409 ff.; Şimşek 2010, 101 ff.; Şimşek 2011, 447 ff.

in Central and Western Anatolia. The developments in the Near East simultaneously laid the foundations of the process that resulted in the establishment of kingdoms. The Hittite Kingdom founded in Central Anatolia towards the end of 18th century BC organised expeditions to Arzava in the west from the earliest days of its foundation. The military campaigns organised by the Hittite Kingdom to subdue the Arzava region were primarily aimed at preventing possible attacks originating from here.

It is possible to consider the Lykos valley as a part of the Arzava territories[17]. In the Hittite texts the word Arzava (^{URU}ar-za-u-wa-aš, ^{URU}ar-za-wa-an, ^{KUR}ar-za-Ú-i-ja, $^{KUR\ URU}$ar-za-u-wa-za, $^{KUR\ URU}$ar-za-u-wa-az, $^{KUR\ KUR\ MEŠ\ URU}$ar-za-u-wa)[18] was found to refer to a city, a country or countries[19].

According to the Hittite texts, campaigns to subdue Arzava were organised during the reigns of Labarna, Hattusili I, Ammuna, Tudhaliya I/II, Arnuvanda I, Tudhaliya III, Suppiluliuma I, Murşili II, Muwatalli II, Hattusili III, Tudhaliya IV and Suppiluliuma II.

Among the above-mentioned kings, Murşili II, provided the most detailed information about the relations between the Arzava lands and the Hittite kingdom[20]. Arzava's transformation into a major power in the entire Aegean region and the increasing power of Ahhiyava, especially on the Aegean shore, forced Murşili II to launch an expedition to Western Anatolia in the third year of his reign[21]. Murşili started his campaign from Hatti to the Aegean Sea at Hattusa and reached the land of Arzava following the route marked by the Sehariya River, Sallapa, Aura, Valma and the Astarpa River[22]. After the victory against Arzava, Murşili II divided the region into principalities and decided their borders through a series of treaties. Accordingly, Mira-Kuvaliya was given to Mashuiluva, Seha River Country and Appaviya were given to Manapa-Tarhunta and Hapalla was given to Targasnalli[23]. During the reign of Murşili II's successor Muwatalli II, the

[17] Yiğit 2007, 7 ff.
[18] Del Monte – Tischler 1978, 42 ff.
[19] Houwink ten Cate 1970, 71; Heinhold – Krahmer 1977, 4.
[20] Alparslan 2006, 1 ff.
[21] Kınal 1953, 36; Bryce 1974, 103; Mellaart 1974, 506; Mellaart 1986, 217; Starke 2001, 38.
[22] Ünal 2003, 30.
[23] Mayer – Garstang 1925, 29; Kınal 1953, 36; Mellaart 1986, 218; Bryce 1998b,

name "Arzava Lands" was expanded to include Mira-Kuvaliya, Vilusa, Seha River Country, Appaviya and Hapalla. Our knowledge of Arzava comes from two sources compiled during the reign of Tudhaliya IV, namely "*The Crimes of Seha River Country*" and The Millavata Letter[24]. The last information about Arzava comes from a letter written during the reign of Suppiluliuma II[25].

The geographical locations of the countries, cities, mountains and rivers of Arzava[26], the name of which was known since the foundation of the Hittite Kingdom, is one of the issues subject to debate. It must be noted that Arzava did not have borders that resemble contemporary political borders. It is understood that the Arzava of Labarna's reign and the Arzava of Murşili II were different regions.

Scholars who argue that the borders of Arzava did not cover or only partially covered the valleys of the Maeander locate the country in various regions including South West Anatolia[27], Cilicia[28], Lycia[29], Cilicia and Pamphylia[30]. Those scholars who argue that the Maeander basin lay within the borders of Arzava generally accept the lands between the Maeander and Gediz rivers as Arzava[31]. Alongside this general definition there are

213; Beckman 1996, no 10-12; Alparslan 2006, 68, Macqueen 2001, 51.

[24] In this letter, which king is contemporary is open to discussion. It is also claimed that the letter might have been written during the reign of Tudhaliya III, Tudhaliya IV or Muwatalli. For the letter and discussions see; Güterbock 1983, 137; Singer 1983, 216; Bryce 1989, 303 ff.; Niemeier 1998, 38; Hawkins 1998, 19; Starke 2001, 42; Yakar 2007, 292; Ünal 2003, 41.

[25] Starke 2001, 42.

[26] Del Monte – Tischler 1978, 42 ff.

[27] Otten 1961, 112; Kınal 1953, 12.

[28] Sayce 1922, 233; Sayce 1923, 47; Kınal 1953, 7 footnote: 14-15.

[29] Bryce 1974, 108, Fig. 1, 112. Bryce omits this view in later studies; see Bryce 1998, map 3.

[30] Garstang 1929, 182 ff.; Garstang 1943, 36 and map: XVII. Garstang omits this view in later studies; see Garstang – Gurney 1959; 84, map 1, Goetze 1957, 49, 102, H.d. A. III. 1.3; Kınal 1953, 12.

[31] Garstang – Gurney 1959, 84, map 1; Huxley 1960, 33; Mellaart 1982, 376, 377, Fig. 1; Mellaart 1968, 197 Fig.1; Macqueen 1968, 175; 176 Fig. 11; Yakar 1976, 118 ff.; Schachermeyr 1986, Abb 19, 22; Marchese 1986, 86; Gurney 1990, Fig. 1; Bryce 1998, Harita 3; Hawkins 1998, 30 ff.; Macqueen 2001, 26; Bryce 2003, 15 map1; Yakar 2007, 287, Mac Sweeney 2010, 7 ff; Mac Sweeney 2011, 66.

others who assert that the western border of Arzava was the Aegean sea, the eastern border extended to Kütahya, Uşak, Afyon and the Dinar line (Pitassa,Valma, Lower Land), the southern border extended to the Bodrum peninsula (Likya-Lukka), and the northern border to Bergama (Assuva to the north) and the Kula-Uşak line (the north of this line there is Karkisa)[32], extending west near the Akşehir lake covering Afyon, and extending as far north as Edremit Bay passing over Bakırçay and as far south as Selçuk[33]. According to another similar proposal, Arzava-Mira territory extended to the west through a corridor that covers some parts of Kaystros and Gediz starting from the Upper Greater Maeander[34]. All these definitions locate the Lykos valley within the borders of the Arzava territories.

Another important point that should be noted is the changing definition of Arzava after Murşili II's campaign against Arzava. The name Mira ($^{KUR\ URU}$me-e-ra-a, $^{KUR\ URU}$mi-e-ra-a, $^{KUR\ URU}$me-ra-a, ^{KUR}me-ra-a, $^{KUR\ URU}$mi-i-ra-a, ^{KUR}mi-ra-a, ^{Uru}mi-i-ra-a, ^{Uru}mi-ra-a)[35] should be evaluated in parallel to Arzava and taken as a new political unit that gained importance in the lands referred to in Hittite sources as Arzava. The view that Mira was located at the opening of the Greater Maeander valley or in the territories west of Afyon (the Afyon-Kütahya region) is supported by many scientists[36]. Specifically, Kuvaliya, which joined Mira, is related to the area where the Great Maeander was born. Other than these there are views which suggest that Arzava must have been located in the region with Eskişehir to the north and the southern territories[37] and at the southern shores of Anatolia between Antalya and Göller Yöresi[38]. However, the borders of Mira[39] have been clarified by the recently re-read Karabel inscriptions. The data presented here show that Mira covered the territories between the Maeander and Gediz rivers. The vicinity of Karabel and İzmir, which are at the centre of

[32] Ünal 2003, 4.
[33] Starke 1997, 450 ff.
[34] Hawkins 1998, 1, 30 ff.
[35] Del Monte – Tischler 1978, 269.
[36] Garstang – Gurney 1959, 91 ff.; Macqueen 1968, 176, fig. 11, 177; Hawkins 1998, 2; Macqueen 2001, 60.
[37] Macqueen 1975, 40; Mellaart 1993, 418, 421, map: 1.
[38] Garstang 1941, 20; Bryce 1974, 108, Fig. 1; Bryce 1998, map 3.
[39] Hawkins 1998, 21 ff., Dickerman 1889, 340; Garstang 1910, 66, 75, 81, 170-175; Garstang 1929, 172 ff.; Goetze 1957, 54, 55; Bryce 2003, 17 ff.

Mira, shows that Mira and Arzava are located in the Maeander valley[40]. The re-evaluated Karabel inscriptions[41], the hieroglyphics around the stele at Karakuyu which state that Tarnaskava dominated Mira[42], the hieroglyphics at Latmos, Suratkaya, that describe prince Kupanta Kurantiya[43] and the names of people cited in the seal impressions at Çine Tepecik Höyük[44] all prove that Mira was sought in the right place[45]. When all the historical and geographical data summarised above are considered as a whole it is understood that the Lykos valley was part first of Arzava then Mira.

Lykos Valley Settlements

Although no systematic surveys have been conducted of the Middle Bronze Age and Late Bronze Age settlements in the Lykos valley which remained within the Arzava territories during the second millennium BC, the Lykos settlements were easily accessed as they are located very close to the centre of contemporary Denizli province.

One of the most outstanding issues has been that cities including Laodikeia, Tripolis and Kolossai, which are famous for their Hellenistic Roman period buildings, were also settled during the Middle and Late Broze Age. Data from the Asopos Mound[46] near Laodikeia, which will be analysed in detail, Akkaya (Yenice) and Hamambükü Höyük[47] near Tripolis and the double cone mound at Kolossai[48] demonstrate that these cities were settled during the second millennium BC. Alongside the mounds which symbolize the foundation of the above-mentioned Roman cities in the valley, data from other mounds has been dated to the Middle and Late Bronze Age. Among these we might count the İncilipınar Mound and the Karakurt Mound in Denizli city centre which was settled during the Middle and Late Bronze

[40] Ünal 2003, 22.
[41] Hawkins 1998, 21 ff.
[42] Işık *et al.* 2011, 1 ff.
[43] Peschlow 2002, 202.
[44] Günel – Herbordt 2010, 9, Günel 2011, 4.
[45] Işık *et al.* 2011, 1 ff.
[46] Konakçı 2012, 1 ff.; Şimşek – Konakçı 2013, 1 ff.; Konakçı 2014, 87 ff.
[47] Konakçı 2016.
[48] Şimşek 2002, 3 ff.; Duman – Konakçı 2006, 79 ff.; Konakçı – Duman 2007, 57 ff.; Duman - Konakçı 2011, 247 ff.

Age, the Kumkısık Mound on the Denizli-İzmir road which was settled during Middle Bronze Age, the Beylerbeyi Mound at Sarayköy which was settled during the Middle and Late Bronze Age, the Kocabaş Mound near Kocabaş, the Emirazizli Mound near Honaz which was settled during the Middle and Late Bronze Age, and the Kocadere Mound near Kocadere Village which was settled during the Middle Bronze Age (Figs. 2, 4, 5). The only excavated settlement from the Middle and Late Bronze Age in the Lykos Valley is the Laodikeia/Asopos Mound. This settlement will be discussed under a separate heading in order to explain the chronological and material culture of the valley.

Laodikeia/Asopos Hill

Asopos Hill is located within the borders of the ancient city of Laodikeia, which is situated in the Eskihisar, Bozburun and Goncalı neighbourhoods 6 km northeast of Denizli province. When the ancient texts on Laodikeia city are studied it is observed that Plinius asserted that there were two settlements here, namely Rhoas and Diospolis, before the Seleucid period[49]. The settlement was founded in the Lykos valley on a natural hill approximately 270 m high. Asopos Hill I has a size of 148x60 m, and Asopos Hill II has a size of 169x65 meters, and the entire settlement is dispersed over a 2.1 hectare area (Fig. 3). An area of 750m^2 was excavated during the 2007-2013 excavation seasons on the Asopos Hill, involving three different trenches on two hills. As per the current excavations the settlement on the Asopos Hill started during the Middle Chalcolithic period. The settlement was later populated during the Middle Bronze Age, Late Bronze Age, Iron Age, Hellenistic period, Early Roman and Late Roman periods.

Middle Bronze Age (Layer VI)

Archaeological materials that provide information about the Middle Bronze Age were discovered on Asopos Hills I and II. This layer is divided into two phases, namely VIa and VIb (The single sigma results of C14 analyses for carbons dated to phase VIb in the Beta laboratory are: 1890-1750 BC, 1940-1880 BC -*Beta-249344, Beta-284691*). Phase VIb, which was dated to 1950-1850 BC, is represented on Asopos Hill I by a pottery kiln, an oven

[49] Plinius N.H.V 105-108.

and a floor, while it is represented on Asopos Hill II with a building wall, a destroyed oven and pits. A building, two ovens, silo bases, pits, a platform, walls, scattered stone piles, and four babies buried in jugs were discovered in relation to phase VIa, which was dated to 1850-1700 BC (Layer VIa C14 results: 1870-1840 BC, 1820-1790 BC, 1780-1740 BC; 1760-1690 BC; 1880-1740 BC; 1880-1740 BC; 1880-1740 BC; 1630-1520 BC *(Beta-267468, Beta-267469, Beta-267470, Beta-267471, Beta-284693, Beta-249343)*.

The small finds discovered at the settlement that were dated to the Middle Bronze Age include spindle whorls, loom weights, bone awls, flint and obsidian tools, whetstones and axes, bronze pins, crescent shaped objects, zoomorphic figurines and scarabs.

When the forms of the pottery discovered in Asopos Hill phases VIb and VIa are evaluated it is seen that the most common forms are bowls and jars. As a result of the typological studies conducted, a sum of 18 bowl and 22 jar types were identified in both phases. Miniature vessels, spouted cups, trefoil and spouted pitchers, pithoi and bases, stems, body and handle fragments of different types were discovered along with bowls and jars (Figs. 6-7).

Parallels of the forms discovered on the Asopos Hill are observed in Inner Western Anatolia; in Beycesultan layers (according to the old stratification) V and IVa-c[50], Aphrodisias Bronze4-MBA[51] and MBA, and Kusura C Phase[52] on the Aegean shore; in Kocabaştepe MBA layers 1, 2 and 3[53], Bademgediği layer VI[54], Kadı Kalesi layer IV[55], the Panaztepe MBA layers[56], Troy layers V and VI Early and Middle (a-c)[57], Limantepe layer III[58], Milet layer III[59], Smyrna/Bayraklı[60], Ayasuluk MBA, and phases

[50] Lloyd – Mellaart 1965, 84 ff.
[51] Joukowsky 1986, 615 ff.
[52] Lamb 1937, 24 ff.
[53] Aykurt 2004, 35 ff.
[54] Meriç 2003, 95 ff.
[55] Kan 2005, Fig 11 ff.
[56] Günel 1999a, 41 ff.
[57] Blegen *et al.* 1951, 238; Blegen *et al.* 1953, Pl 423 ff.
[58] Günel 1999b, 66 ff.
[59] Raymond 2005, 233 ff.
[60] Bayne 2000, 63 ff.

XIa and XIb[61], on the islands; the Thermi MBA layers[62] and Antissa MBA layers[63] in the Poliochni Brown Phase[64]; in the Göller Yöresi region; the Bademağacı MBA deposit[65] in Southern Anatolia; Yumuktepe layers IX-XI[66] in Central Anatolia; Çavlum MBA necropolis[67], the Demircihöyük MBA layers[68], Yanarlar MBA necropolis[69], and the Boğazköy and Gordion Middle Bronze Age layers[70]. Potteries similar to those discovered on the Asopos Hill were unearthed in layers dated to the first half of the second millennium BC in other settlements, while the parallels are dated to the first quarter of the second millennium BC. However, it has to be underlined that considering the forms and ware groups, the potteries discovered on the Asopos Hill resemble especially the Middle Bronze Age pottery discovered at Beycesultan, Aphrodisias and Kusura.

Late Bronze Age (Layer V)

The Late Bronze Age layer was identified in both cones of the Asopos Hill. It is observed that the Late Bronze Age layer on Asopos Hill I was mostly destroyed due to heavy reconstruction activities during the Roman period. The Late Bronze Age layer is represented on Asopos Hill I by a wall among Late Roman walls in trenches G3-4 and a burnt compressed earth floor on the North and a partially preserved weak wall in trench D3. A pottery kiln, a wall and a floor dated to the Late Bronze Age were found on Asopos Hill II. The keyhole planned kiln is surrounded by piles of stones and a clay pool. Moreover, a pit contemporary with this layer was identified. The independent architectural elements discovered on the Asopos Hill which were dated to the Late Bronze Age indicate the existence of domestic buildings. Considering the available data it might be asserted that the Late

[61] Konakçı 2015.
[62] Lamb 1936, Pl XLVI.
[63] Bayne 2000, 97 ff.
[64] Bernabo'-Brea 1976, Tav. CCLXXXIV, m ff.
[65] Umurtak 2003, 54 ff.
[66] Garstang 1953, 224 ff.
[67] Bilgen 2005, LXX, 1.
[68] Kull 1988, 228 ff.
[69] Orthman 1963, 31 ff.
[70] Gunter 1991, 53 ff.

Bronze Age is represented in the settlement with weak architectural remains just like Beycesultan layer I[71] and the Aphrodisias Late Bronze Age layer[72].

Among the small finds discovered in the Asopos Hill Late Bronze Age layer there are various bronze objects, flint tools, terracotta spindle whorls, pyramidal and triangular weaving looms, loom weights and crescent-shaped objects.

When the Late Bronze Age bowls and pots discovered at the site are evaluated it is observed that all the pottery displays local characteristics and there is no Mycenaean pottery. Furthermore, the painted-decoration wares which did not exist during the Middle Bronze Age emerged during this period.

When we evaluate the forms of pottery discovered in Asopos Hill layer V, it is seen that the largest group is represented by bowls. Alongside bowls, trefoil cups and pitchers, teapots, spouted pitchers, bottles, pithoi and handles, knobs, bases, stems, bodies and lids of various forms were discovered in the settlement (Fig. 8).

The forms of bowls and pots encountered in Asopos Hill layer V resemble samples from a territory extending from Central Anatolia to the Aegean islands. Forms comparable to those unearthed in Asopos Hill layer V were observed in Central Anatolia; in Beycesultan layers Ia, Ib, II and III[73], Late Bronze Age layers I, II and III in Aphrodisias[74] on the Aegean shore; Bademgediği Tepe layers II, III, IV, V[75], Layers VI and VIIa in Troy[76], layer II of Limantepe[77], Ayasuluk layer X[78], the Late Bronze Age deposits of Panaztepe[79] and Çeşme Bağlararası[80] on the islands; in Thermi[81], Poliochni

[71] Mellaart – Murray 1995, 56.
[72] Joukowsky 1986, 149 ff.
[73] Mellaart – Murray 1995, Fig. 18b ff.
[74] Joukowsky 1986, 685 ff.
[75] Meriç 2003, 93 ff.
[76] Blegen *et al.* 1958, Pl. 249 ff; Blegen *et al.* 1953, Pl. 430 ff.
[77] Günel 1999b, 79 ff.
[78] Konakçı 2012, 416 ff.
[79] Günel 1999a, 41 ff.
[80] Aykurt 2010, 26 ff.
[81] Bayne 2000, 97 ff.

Brown phase[82], Perama, Antissa[83]; in Southern Anatolia in layers V-VI of Yumuktepe[84], in Central Anatolia; in Demircihöyük İKL 10/11 phases 4, 5[85], in Gordion Megaron 10 layers 5, 6, 7, 8, 10, 12, 13, 14, 14b; megaron 12 layers Va, Vb, Vc[86], and Porsuk layer V[87]. Considering the ware groups and the discovered pottery together, it may be asserted that the settlement principally resembles Aphrodisias Late Bronze Age layers I, II and III[88] and especially layer Ib of Beycesultan Höyük[89]. It is understood that Asopos Hill layer V (layer IV according to new excavation results) was contemporary with layer Ib of Beycesultan in view of the fact that some forms observed in Beycesultan layer II continue in layer I and some new forms have emerged especially in layer Ib. At this point it has to be noted that the stratification in the Beycesultan excavations was re-evaluated and the layers formerly defined as I and II by S. Lloyd and J Mellaart are now referred to as layers IV and V[90]. The Late Bronze Age layers of Aphrodisias are dated to the 13th-12th centuries BC. Considering that samples from Asopos Hill layer V are contemporary with Late Bronze Age pottery from Aphrodisias and the former layer Ib of Beycesultan, they should be dated to the wide range between the 14th and 12th centuries BC.

Evaluation

Palace, sanctuary and public buildings also observed at Beycesultan, combined with the survey results of Çivril, Baklan and Çal, indicate the probability of the mound's being the central settlement at the region. As a result of the survey studies in the close vicinity of Beycesultan, alongside smaller and different settlements, some others that could be defined as *central* and *secondary* were observed[91]. When we consider the staged settlement model provided in view of the Çivril valley survey studies within the Lykos

[82] Bernabo'-Brea 1976, CCLXXXIV: m ff.
[83] Bayne 2000, Fig. 28 ff.
[84] Garstang 1953, 247; Sevin – Köroğlu 2004, 78, 177
[85] Kull 1988, 232 ff.
[86] Gunter 1991, 51 ff.
[87] Dupre' 1983, 141 ff.
[88] Joukowsky 1986, 685 ff.
[89] Mellaart – Murray 1995, Fig 18, 20, 32-38, 40, 41, 47, 48 ff.
[90] Abay – Dedeoğlu 2013, 217 ff.
[91] Dedeoğlu 2009, 241 ff.

valley where Asopos Hill exists it could be asserted that the central settlement in the valley is the Kolossai Mound with its 9.24 hectare surface area. It is observed that the other settlements in the valley are located on east-west itineraries. It has not been possible to observe the layers dated to the second millennium BC in Laodikeia/Asopos Hill, which is 14 km from Kolossai Mound, extensively due to the destruction caused by Hellenistic and Roman layers. Despite this negative outlook some architectural elements such as buildings, ovens, pits, silos, kilns that help us characterise the settlement were unearthed in layers V, VIa and VIb. Although such information was obtained as a result of the excavations no traces of architectural elements that provide information about the administration of the region such as palaces, fortification walls and sanctuaries were encountered. The present condition of the settlement cannot be explained by destruction alone. Considering the fact that the Asopos Hill was dispersed over a 2.1 hectare area it could be deduced that it was a small-scale settlement where textile and pottery production took place alongside important agriculture activities and probably fishing. It is understood that the settlement preserved its identity during both the Middle and Late Bronze Age without any change.

ABBREVIATIONS AND BIBLIOGRAPHY

Abay – Dedeoğlu 2013	E. Abay – F. Dedeoğlu, "Beycesultan 2011 Yılı Kazı Çalışması Raporu", *34. Kazı Sonuçları Toplantısı (28 Mayıs-1 Haziran 2012), Vol. 1*, Çorum, 2013, 217-228.
Alparslan 2006	M. Alparslan, *II. Murşili ve Dönemi* (Istanbul Universitesi, Sosyal Bilimler Enstitüsü, Eskiçağ Dilleri ve Kültürleri Anabilim Dalı, Hititoloji Bilim Dalı, Phd. Thesis), Istanbul, 2006.
Arundell 1975	F.V.J. Arundell, *Discoveries in Asia Minor,* Band 2, New York, 1975.
Aykurt 2004	A. Aykurt, *Kocabaştepe Orta Tunç Çağ Seramik Örneklerinin Ege Arkeolojisindeki Yeri ve Önemi* (Hacettepe Universitesi, Sosyal Bilimler Enstitüsü, Unpublished Phd Thesis), Ankara, 2004.
Aykurt 2010	A. Aykurt, "Late Bronze Age Pottery from Çeşme Bağlararası (Çeşme Bağlararası Geç Tunç Çağı Seramiği)", *OLBA XVIII*, Mersin, 2010, 1-65.
Bayne 2000	N. Bayne, "The Grey Wares of North-West Anatolia: In The Middle and Late Bronze Age and The Early Iron Age and Their Relation to The Early Greek Settlements", *Asia Minor Studien 37*, Bonn, 2000.
Beckman 1996	G. Beckman, *Hittite Diplomatic Texts*, Atlanta, Michigan, 1996.
Bernabó-Brea 1976	L. Bernabó-Brea, *Poliochni citta Preistorica nell isola di Lemnos II*, Roma, 1976, 1-2.
Bilgen 2005	N. Bilgen, *Çavlum: Eskisehir Alpu Ovası'nda Bir Orta Tunç Çağı Mezarlığı*, Eskişehir, 2005.
Blegen *et al.* 1958a	C.W. Blegen – C.G. Boulter – J.L. Caskey – M. Rawson, *Troy Settlements VIIa, VIIb and VII, Vol 4, part: 2*, Princeton, 1958.
Blegen *et al.* 1958b	C.W. Blegen – C.G. Boulter – J.L. Caskey – M. Rawson, *Troy Settlements VIIa, VIIb and VII, Vol 4, part: 1*. Princeton, 1958.
Blegen *et al.* 1951	C. Blegen – J.L. Caskey – M. Rawson, *Troy II: The Third, Fourth and Fifth Settlements*, Princeton, 1951.
Blegen *et al.* 1953	C.W. Blegen – J.L. Caskey – M. Rawson, *Troy III*, Princeton, 1953.

Bryce 1974	T.R. Bryce, "Some Geographical and Political Aspects of Mursilis Arzavan Campaign", *Anatolian Studies 24*, 1974, 103-116.
Bryce 1989	T.R. Bryce "Ahhiyawans and Mycenaeans. An Anatolian Viewpoint." *Oxford Journal of Archaeology 8*, 1989, 297-310.
Bryce 1998a	T.R. Bryce, *The Kingdom of the Hittites*, Oxford, 1998.
Bryce 1998b	T.R. Bryce, "How Old Was Matanazzi", *The Journal of Egyptian Archaeology 84*, 1998, 212-215.
Bryce 2003	T.R. Bryce, *Hitit Dünyasında Yaşam ve Toplum*, Ankara, 2003.
Chandler 1971	R. Chandler, *Travels in Asia Minor 1764–1765*, London, 1971.
Chevallier 1976	R. Chevallier, *Roman Roads*, London, 1976.
Cochron 1887	W. Cochron, *Pen and Pencil in Asia Minor or, Notes From The Levant*, London, 1887.
Darkot – Tuncel 1995	B. Darkot – M. Tuncel, *Ege Bölgesi Coğrafyası 3*, Istanbul Universitesi Yay. No: 2365, Coğrafya Enstitüsü Yay. No: 99, Istanbul, 1995.
Dedeoğlu 2009	F. Dedeoğlu, "Denizli-Çivril İlçesi Yüzey Araştırması Verileri Işığında M.Ö 2. Binyılda Yukarı Menderes Havzası Yerleşim Düzeni", *Altan Çilingiroğlu'na Armağan, Yukarı Denizin Kıyısında Urartu Krallığı'na Adanmış Bir Hayat* (Edited by H. Sağlamtimur – E. Abay – ff.), Istanbul, 2009, 241-257.
Del Monte – Tischler 1978	G.F. Del Monte – J. Tischler, *Die Orts und Gewasser namen der Hethetischen Texte*, Wiesbaden, 1978.
Demirkent 2002	I. Demirkent, "XII. Yüzyılda Bizans'ın Ege Bölgesinden Güneye İnen Yolları Hakkında", *Anadolu'da Tarihi Yollar ve Şehirler Semineri*, Istanbul, 2002, 1-13.
Dickerman 1889	L. Dickerman, "The Hittites", *Journal of the American Geographical Society of New York 21*, 1889, 325-358.
Duman – Konakçı 2006	B. Duman – E. Konakçı, "Kolassai: Höyük, Kalıntı ve Buluntuları (Colassae: the Mound, Remains and Findings)", *Arkeoloji Dergisi VIII-2006/2*, Istanbul, 2006, 79-104.

Duman – Konakçı 2011	B. Duman – E. Konakçı, "The Silent Witness of the Mound of Colassae: Pottery Remains", *Colassae in Space and Time Linking to an Ancient City, Chapter 10* (Edited by A.H. Cadwalleder – M.Trainor), Göttingen, 2011, 247-282.
Dupré 1983	S. Dupré, *Porsuk I, La Ceramique de L'age Du Brunze et de L'age De Fer,* Institute Français D'Etudes Anatolıennes, Paris, 1983.
Gagnier *et al.* 1969	J. des Gagnier – P. Devambez – L. Kahil – R. Ginouves, *Laodicee du Lycos*, Paris, 1969.
Garstang 1910	J. Garstang, *The Land of the Hittites*, London, 1910.
Garstang 1929	J. Garstang, *The Hittite Empire*, London, 1929.
Garstang 1941	J. Garstang, "Arzava ve Lugga Memleketlerine Ait Bir Harita", *Belleten V /17-18*, Ankara, 1914, 17-32.
Garstang 1943	J. Garstang, "Hittite Military Roads in Asia Minor: A Study in Imperial Strategy with a Map", *American Journal of Archaeology 47, No 1*, 1943, 35-62.
Garstang 1953	J. Garstang, *Prehistoric Mersin, Yümük Tepe in Southern Turkey*, Oxford, 1953.
Garstang – Gurney 1959	J. Garstang – O.R.Gurney, *The Geography of the Hittite Empire*, the British Institute of Archaelogy at Ankara 56 Anne Queen Street London, 1959.
Goetze 1957	A. Goetze, *Kleinasien, Kulturgeschıchte Des Alten Orients*, München, 1957.
Göney 1975	S. Göney, *Büyük Menderes Bölgesi*, Istanbul, 1975.
Gunter 1991	A.C. Gunter, *Gordion Excavations Final Reports III, The Bronze Age,* Philedelphia, 1991.
Gurney 1990	O.R. Gurney, *The Hittites, Penguin Books*, London, 1990.
Günel 1999a	S. Günel, *Panaztepe II, MÖ II. Bine Tarihlendirilen Panaztepe Seramiğinin Batı Anadolu ve Ege Arkeolojisindeki Yeri ve Önemi*, Ankara, 1999.
Günel 1999b	S. Günel, "Vorbericht über die Mittel und Spätbronzezeitliche Keramik vom Limantepe", *Istanbuler Mitteilungen 49*, 1999, 41-82.
Günel 2011	S. Günel, "Çine-Tepecik Geç Tunç Çağı Yerleşmesi", *Türk Eski Çağ Bilimleri Enstitüsü Haberler 32*, Istanbul, 2011, 1-9.

Günel – Herbordt 2010	S. Günel – S. Herbordt, "Ein Hethitischer Siegelabdruck aus Çine-Tepecik", *Archaologischer Anzeiger, Heft 1*, 2010, 1-11.
Güterbock 1983	H.G. Güterbock, "The Hittites and the Aegean World 1: The Ahhiyawa Problem Reconsidered", *American Journal of Archaeology 87/2*, 1983, 133-138.
Hamilton 1984	W.J. Hamilton, *Researches in Asia Minor, Pontus and Armenia I-II*, NewYork, 1984.
Hawkins 1998	J.D. Hawkins, "Tarkasnawa King of Mira, 'Tarkondemos', Boğazköy Sealings and Karabel", *Anatolian Studies 48*, 1998, 1-31.
Heinhold-Krahmer 1977	S. Heinhold Krahmer, *Arzawa, Untersuchungen zu Einer Geshichte nach den Hethetischen Quellen*, Heidelberg, 1977.
Houwink ten Cate 1970	P.H.J. Houwink ten Cate, *Records of the Early Hittite Empire (1450-1380 BC)*, Uitgaven van het Nederlands Historisch-Archaelogisch Instıtuut de Istanbul 26, 1970.
Huxley 1960	G.L. Huxley, *Acheans and Hitttites*, Oxford, 1960.
Işık *et al.* 2011	F. Işık – M. Atıcı – R. Tekoğlu, "Die Nachhethitische Königsstele von Karakuyu beim Karabel-Pass. Zur Kulturellen Kontinuität vom bronzezeitlichen Mira zum eisenzeitlichen Ionia", *Asia Minor Studien 66, Studien zum Kleinasien VII*, 2011, 1-35.
Johnson 1950	S.E. Johnson, "Laodiceia and Its Neighbors", *Biblical Archaeologist 13, no 1*, 1950, 1-18.
Joukowsky 1986	M.S. Joukowsky, *Prehistoric Aphrodisias, An Account of the Excavations and Artifact Studies, Vol I-II, Excavations and Studies*, New Jersey, 1986.
Kan 2005	H. Kan, *Anaia-Kadıkalesi MÖ 2. Binyıl Seramikleri* (Ege Universitesi, Sosyal Bilimler Enstitüsü, Unpublished Ma Thesis), Izmir, 2005.
Kınal 1953	F. Kınal, *Arzava Memleketlerinin Mevkii ve Tarihi*, Ankara, 1953.
Konakçı 2012	E. Konakçı, *Büyük ve Küçük Menderes Havzalarındaki MÖ. 2. Binyıl Kültürlerinin Yeni Veriler Işığında Değerlendirilmesi* (Ege Universitesi, Sosyal Bilimler Enstitüsü, Protohistorya ve Ön Asya Arkeolojisi Bilim Dalı, Unpublished Phd Thesis), 2012.

Konakçı 2014	E. Konakçı, "Laodikeia'nın İlk Yerleşimi Asopos Tepesi (First Settlement of Laodikeia: Asopos Hill)", *10. Yılında Laodikeia (2003-2013 Yılları)*, Ed. by C. Şimşek, Istanbul, 2014, 87-123.
Konakçı 2015	E. Konakçı, "Ayasuluk Tepesi Orta Tunç Çağı Seramiği Üzerine Bir Değerlendirme", *Mustafa Büyükkolancı'ya Armağan, Essays in Honour of Mustafa Büyükkolancı* (Edited by C. Şimşek – B. Duman – E. Konakçı), Istanbul, 2015, 381-405.
Konakçı 2016	E. Konakçı, "Prehistorik Tripolis: Akkaya (Yenice) ve Hamambükü Höyük", *Tripolis Çalışmaları I*, Istanbul, in press.
Konakçı – Duman 2007	E. Konakçı – B. Duman "Yazılı ve Arkeolojik Kanıtlar Işığında Kolassai" (Colassae With the Light of Archaeological and Historical Evidences)", *Uluslararası Denizli ve Çevresi Tarih ve Kültür Sempozyumu Bildiriler Kitabı, Vol. 2*, Denizli, 2007, 57-67.
Kull 1988	B. Kull, *Demircihüyük V, Die Mittelbronzezeitliche Siedlung*, Mainz, 1988.
Laborde 1838	L.A. Laborde, *Voyage de la Syrie et de l'Asie Mineure*, Paris, 1838.
Lamb 1936	W. Lamb, *Excavations at Thermi in Lesbos*, Cambridge, 1936.
Lamb 1937	W. Lamb, "Excavations at Kusura near Afyon Karahisar", *Archaeologia LXXXVI*, 1937, 1-65.
Lloyd – Mellaart 1965	S. Lloyd – J. Mellaart, *Beycesultan vol 2, Middle Bronze Age Architecture and Pottery*, London, 1965.
Mac Sweeney 2010	N. Mac Sweeney, "Hittites and Arzawans: a view from Western Anatolia", *Anatolian Studies 60*, 2010, 7-24.
Mac Sweeney 2011	N. Mac Sweeney, *Community Identity and Archaeology, Dynamic Communities Aphrodisias and Beycesultan*, Ann Arbor, 2011.
Macqueen 1968	J.G. Macqueen, "Geography and History in Western Asia Minor in Second Millenium" *Anatolian Studies 18*, 1968, 169-185.
Macqueen 1975	J.G. Macqueen, *The Hittites and Contemporaries in Asia Minor*, London, 1975.
Macqueen 2001	J.G. Macqueen, *Hititler ve Hitit Çağında Anadolu*, Ankara, 2001.

Marchese 1986	R.T. Marchese, *The Lower Meander Flood Plain, A Regional Settlement Study*, *BAR International Series 292*, Oxford, 1986.
Mayer – Garstang 1925	L.A. Mayer – J. Garstang, "Kizzuwadna and Other Hittite States", *Journal of Egyptian Archaeology 11, No 1/2*, 1925, 23-35.
Mellaart 1968	J. Mellaart, "Anatolian Trade with Europe and Anatolian Geography and Culture Provinces in the Late Bronze Age", *Anatolian Studies 18*, 1968, 187-202.
Mellaart 1974	J. Mellaart, "Western Anatolia, Beycesultan and The Hittites", *Mansel'e Armağan*, Ankara, 1974, 493-526.
Mellaart 1982	J. Mellaart, "The Political Geography of Western Anatolia during the Late Bronze Age: Who Lived Where?", *Archiv für Orientforschung Beiheft 19*, 1982, 372-377.
Mellaart 1986	J. Mellaart, "Some Reflections on the History and Geography of Western Anatolia in the Late Fourteenth and Thirteenth Centuries BC", *Anadolu Araştırmaları X*, Istanbul, 1986, 215-231.
Mellaart 1993	J. Mellaart, "The Present State of 'Hittite Geography', *Nimet Özgüç'e Armağan*, Ankara, 1993, 415-422.
Mellaart – Murray 1995	J. Mellaart – A. Murray, *Beycesultan Vol. III Part II: Late Bronze Age and Phrygian Pottery and Middle and Late Bronze Age Small Objects*, Oxford, 1995.
Meriç 2003	R. Meriç, "Excavations at Bademgediği Tepe (Puranda) 1999-2002: A preliminary Report", *Istanbuler Mitteilungen 53*, 2003, 79-98.
Niemeier 1998	W.D. Niemeier, "The Mycenaeans in Western Anatolia and the Problem of the Sea People", *in Mediteranean Peoples in Transition Honor of Trade Dotham* (Edited by S. Gittin – A. Mazar – E. Stern), Kudüs, 1998, 17-65.
Orthmann 1963	W. Orthmann, *Frühe Keramik von Boğazköy aus den Ausgrabungen am Nordwesthang von Büyükkale*, Berlin, 1963.
Otten 1961	H. Otten, "Zur Lokalisierung von Arzava und Lukka", *Journal of Cuniform Studies 15, No. 3*, 1961, 112-113.

Peschlow 2002	A. Peschlow, "Latmos'da Hititler", *Birinci Uluslararası Aşağı Büyük Menderes Havzası Tarih, Arkeoloji ve Sanat Tarihi Sempozyumu* (Edited by A.A. Öztürk), 2002, 199-204.
Pococke 1745	R. Pococke, *A Description of The East and Some Others Countries*, Vol 1, 2, London, 1745.
Ramsay 1895	W.M. Ramsay, *Cities and Bishoprics of Phrygia*, Oxford, 1895.
Raymond 2005	A.E. Raymond, *Miletus in the Bronze Age and Minoan Presence in the Eastern Aegean* (Graduate Department of the History of Art Ancient Studies Collaborative Programme University Of Toronto, Unpublished Phd Thesis), Canada, 2005.
Sayce 1922	A.H. Sayce, "The Geographical Position of Arzava", *Journal of European Archaeology 8*, No. 3/4, 1922, 233-234.
Sayce 1923	A.H. Sayce, "The Early Geography of South Eastern Asia Minor", *Journal of Hellenic Studies 43*, Part 1, 1923, 44-49.
Scardozzi 2007	G. Scardozzi, "Ricerche topografiche e telerilevamento", *Hierapolis di Frigia, Le Attivita Delle Campagne Di Scavo e Restauro 2000-2003* (Edited by F. D'Andria – M. Piera Caggia), Istanbul, 2007.
Schachermeyr 1986	F. Schachermeyr, *Mykene und das Hethiterreich*, Wien, 1986.
Sevin 2001	V. Sevin, *Anadolu'nun Tarihi Coğrafyası*, Ankara, 2001.
Sevin – Köroğlu 2004	V. Sevin – K. Köroğlu, "Late Bronze Age at Yumuktepe", *New "Evidence from Step Trench South" Mersin Yumuktepe Reappraisal* (Edited by I. Ceneva – V. Sevin), Lecce, 2004, 73-83.
Singer 1983	I. Singer, "Western Anatolia in the Thirteenth Century BC According to the Hittite Sources", *Anatolian Studies 33, Special Number in Honour of the Seventy-Fifth Birthday of Dr. Richard,* 205-217.
Spoon– Wheeler 1679	J. Spoon – G. Wheeler, *Voyage de Dalmatie, de Grece, et Du Levant I-II*, Paris, 1679.
Starke 1997	F. Starke, "Troia im Kontext des Historisch-Politischen und Spraclichen Umfeldes Kleinasiens im 2. Jahrtausend" *Studia Troica 7*, 1997, 447-487.

Starke 2001	F. Starke, "Milattan Önce İkinci Bin Yılın Güç Dengesi İçinde Troia", *Troia-Düş ve Gerçek*, Istanbul, 2001, 34-44.
Şimşek 2002	C. Şimşek, "Kolossai", *Arkeoloji ve Sanat Dergisi 107*, Istanbul, 2002, 3-16.
Şimşek 2005	C. Şimşek, "2003 Yılı Laodikeia Antik Kenti Kazısı", *26. Kazı Sonuçları Toplantısı (24-28 Mayıs 2004, Konya)*, Vol. I, Ankara, 2005, 305–320.
Şimşek 2006	C. Şimşek, "2004 Yılı Laodikeia Antik Kenti Kazısı", *27. Kazı Sonuçları Toplantısı (30 Mayıs-3 Haziran 2005, Antalya)*, Vol. I, Ankara, 2006, 419–434.
Şimşek 2007a	C. Şimşek, *Laodikeia (Laodikeia ad Lycum)*, Istanbul, 2007.
Şimşek 2007b	C. Şimşek, "2005 Yılı Laodikeia Antik Kenti Kazısı", *28. Kazı Sonuçları Toplantısı (29 Mayıs-2 Haziran 2006, Çanakkale)*, Vol. I, Ankara, 2007, 455-478.
Şimşek 2008	C. Şimşek, "2006 Yılı Laodikeia Antik Kenti Kazıları", *29. Kazı Sonuçları Toplantısı (28 Mayıs-1 Haziran 2007, Kocaeli)*, Vol. 3, Ankara, 2008, 99-122.
Şimşek 2009	C. Şimşek, "2007 Yılı Laodikeia Antik Kenti Kazısı", *30. Kazı Sonuçları Toplantısı (26-30 Mayıs 2008, Ankara)*, Vol. II, Ankara, 2009, 409–436.
Şimşek 2010	C. Şimşek, "2008 Yılı Laodikeia Antik Kenti Kazısı", *31. Kazı Sonuçları Toplantısı (25-29 Mayıs 2009, Denizli)*, Vol. 4, Ankara, 2010, 101-134.
Şimşek 2011	C. Şimşek, "2009 Yılı Laodikeia Antik Kenti Kazıları", *32. Kazı Sonuçları Toplantısı (24-28 Mayıs 2010, Istanbul)*, Vol. III, Ankara, 2011, 447-474.
Şimşek – Konakçı 2013	C. Şimşek – E. Konakçı, "Güneybatı Anadolu'da Yeni Bir Prehistorik Yerleşim: Asopos Tepesi (A New Prehistoric Settlement in Southwestern Anatolia: The Asopos Tepesi)", *Arkeoloji Dergisi XVIII*, Istanbul, 2013, 1-37.
Thonemann 2011	P. Thonemann, *The Meander Valley, A Historical Geography from Antiquity to Byzantium*, Cambridge, 2011.

Umurtak 2003	G. Umurtak, “A study of A Group of Pottery Finds From the MBA Deposits at Bademağacı Höyük”, *Anatolica Antiqua XI*, Istanbul, 2003, 53-74.
Ünal 2003	A. Ünal, *Hititler Devrinde Anadolu 2*, Istanbul, 2003.
Weber 1898	G. Weber, *Die Hochdruck-Wasserleıtung Von Laodicea Ad Lykum*, Jahrbuch Des Kaiserlich Deutschen Arcäologischen Insituts, Band XIII, Berlin, 1898.
Yakar 1976	J. Yakar, “Hittite Involvement in Western Anatolia”, *Anatolian Studies 26*, 1976, 117-128.
Yakar 2007	J. Yakar, *Anadolu’nun Etnoarkeolojisi*, Istanbul, 2007.
Yavuz 1997	A.T. Yavuz, “The Concepts That Shape Anatolian Seljuq Caravanserais”, *Muqarnas 14*, 1997, 80-95.
Yiğit 2007	T. Yiğit, "M.Ö. 2. Binyılda Denizli ve Çevresi," *Uluslararası Denizli ve Çevresi Tarih ve Kültür Sempozyumu*, I. Cilt (Edited by A. Özçelik – ff.), Denizli, 2007, 7-11.

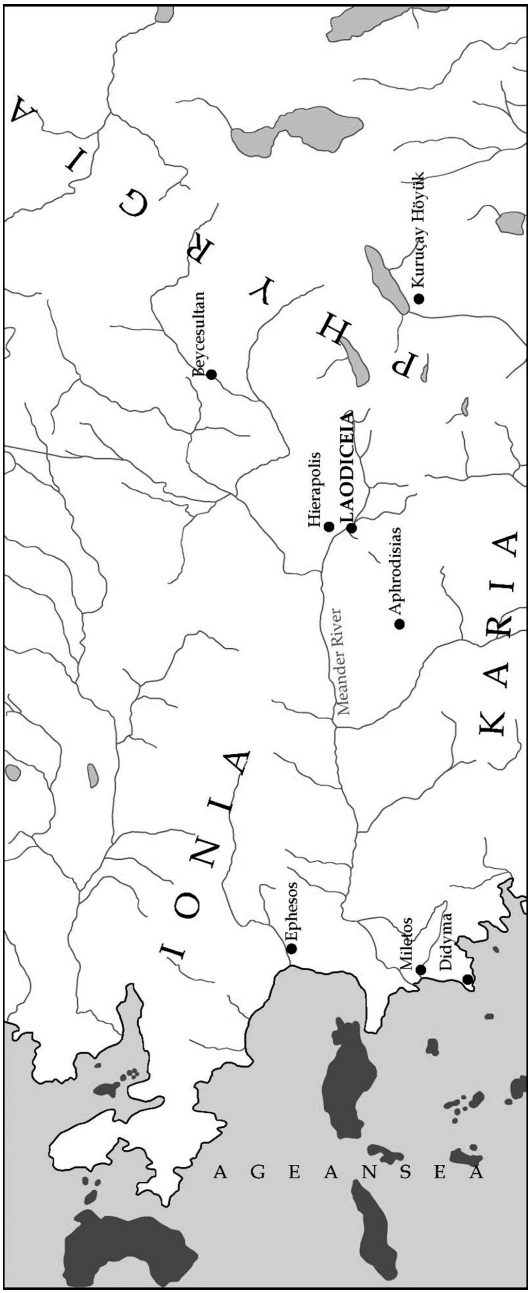

Fig. 1 The Maeander Valley

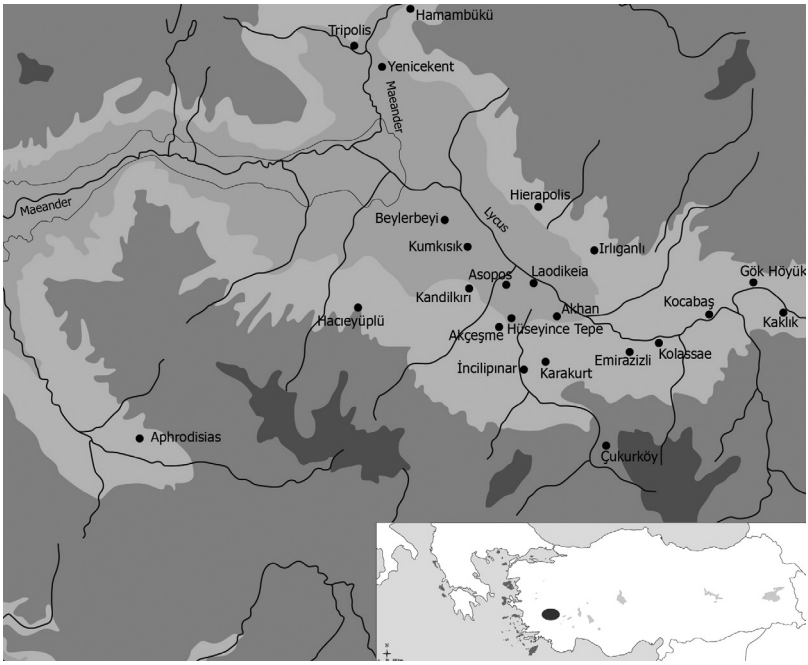

Fig. 2 Prehistoric Sites in the Lykos Valley

Fig. 3 Laodikeia and Asopos Hill

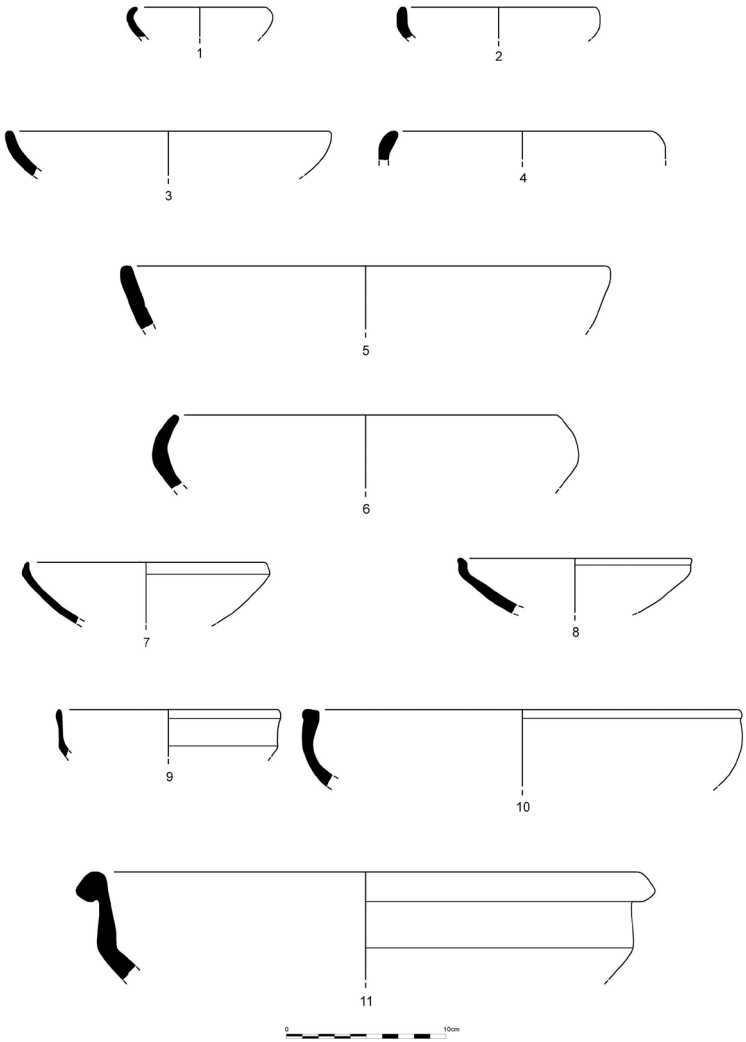

Fig. 4 1. Bowl, Middle Bronze Age, Beylerbeyi, 2. Bowl, MBA, Beylerbeyi, 3. Bowl, MBA, Beylerbeyi, 4. Bowl, MBA, Beylerbeyi, 5. Bowl, MBA, Beylerbeyi, 6. Bowl, MBA, Beylerbeyi, 7. Bowl, MBA, Kolossai, 8. Bowl, MBA, Kolossai, 9. Bowl, MBA, Kolossai, 10. Bowl, MBA, İncilipınar, 11. Bowl, MBA, Cankurtaran

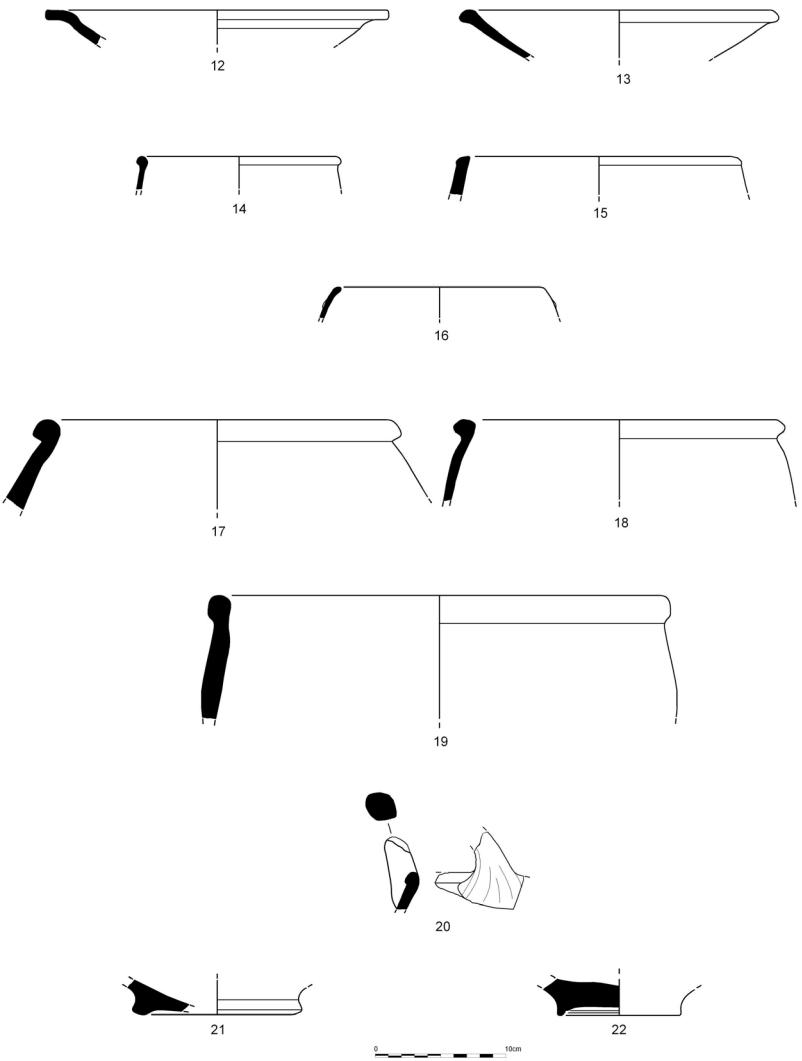

Fig. 5 12. Bowl, Late Bronze Age, Beylerbeyi, 13. Bowl, LBA, İncilipınar, 14. Bowl, LBA, Kolossai, 15. Bowl, LBA, Beylerbeyi, 16. Jar, LBA, Kolossai, 17. Jar, LBA, Beylerbeyi, 18. Jar, LBA, Beylerbeyi, 19. Jar, LBA, Beylerbeyi, 20. Bowl, LBA, Kolossai, 21. Bowl, LBA, Kolossai, 22. Bowl, LBA, Kolossai

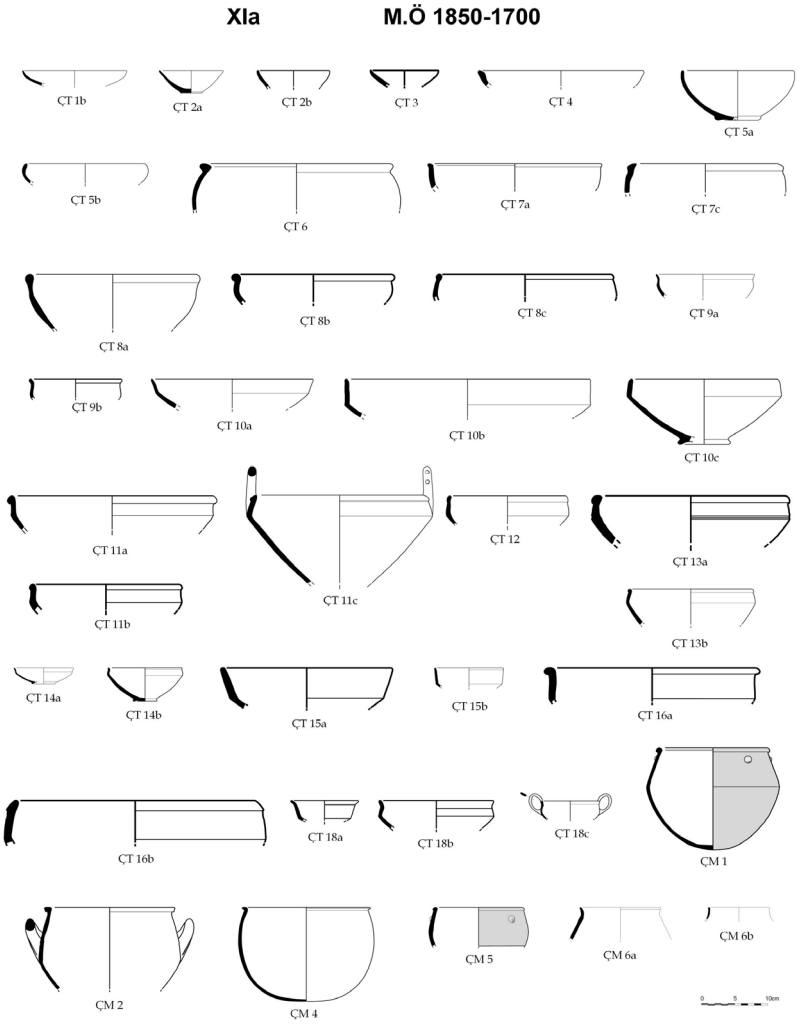

Fig. 6 Bowls and jars, MBA, Asopos Mound

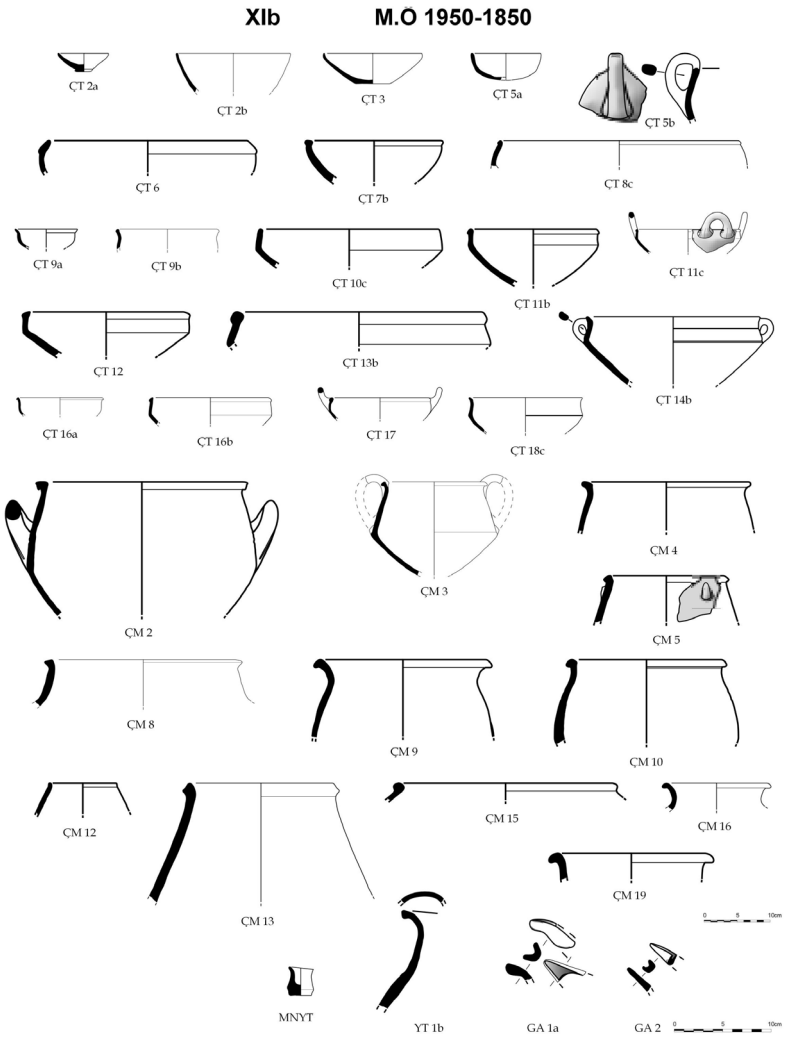

Fig. 7 Bowls and jars, MBA, Asopos Hill

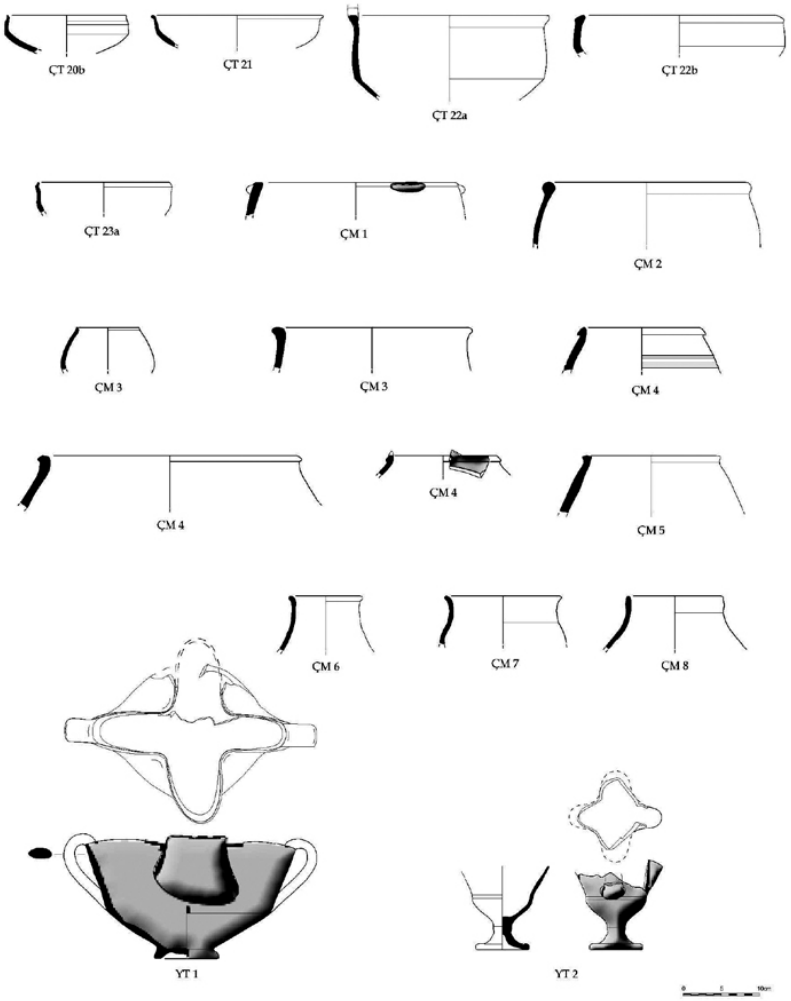

Fig. 8 Bowls and Jars, LBA, Asopos Hill

TABERNAE IN TRIPOLIS

Bahadır DUMAN*

Tripolis is located today in the Buldan District of Denizli Province, Turkey. In antiquity, it was significant for being at the convergence of Lydian, Carian and Phrygian territories (Fig. 1). According to the ancient sources a major trade route from Pergamon via Germe passed through Thyateira, Sardeis, and Philadelphia before heading towards Tripolis, Hierapolis and Laodikeia[1]. The presence of this major trade route guaranteed Tripolis its significance for centuries[2]. The commercial and social relations Tripolis established with other ancient cities along this trade route is becoming increasingly evident with the archaeological materials discovered at the site. In Tripolis, the archaeological excavations have been conducted jointly by the Directorate for Museums in Denizli and the Department of Archaeology of Pamukkale University since 2012[3]. In the four-year-long process, studies have been carried out in various areas of the city and it was noted that the

* Assoc. Prof., Pamukkale University, Faculty of Science & Arts, Department of Archaeology, 20017, Denizli, Türkiye. E-mail: bduman@pau.edu.tr

1 Ramsay 1890, 49.

2 Tabula Peutingeriana indicates Tripolis between Philadelphia and Hierapolis (Stuart 1991). In addition, the milestone attested by Anderson to the northwest of Kadıköy suggests the ancient road was close by the modern day Alaşehir-Yenicekent road (Anderson 1898, 85).

3 Duman 2013, 179 ff.; Duman – Baysal 2014, 633 ff.

5-meter-thick soil deposit served as a protective cover in all these areas. Thus, the remains of antiquity have survived with very little damage.

The three tabernae excavated have also been preserved with the rare and precious frescoes on their walls thanks to the protection of the soil deposit. The word 'taberna' used in this article refers to a partially habitable room, located on the ground floor and open to the street, which served as a small workshop and / or for local sales. The excavations of two of the tabernae, which are located along the north side of the Colonnaded Street and which enabled us to obtain important data on the commercial life of the Roman Period in 2013, have been completed and a third taberna has been detected on the same axis by means of georadar scanning (Fig. 2). During the excavations carried out in the area concerned, a total of three tabernae were discovered, one of which consists of two rooms (Fig. 3).

Following the construction of the fortification wall on the northern portico of the Colonnaded Street – dated to the era of the Early Roman Empire[4] – in the late fourth century AD the columns of the street and its Doric architectural elements remained within the fortification wall[5]. After this

[4] For a comparison of the Doric street façades in the cities of Hierapolis, Tripolis and Blaundos, see Ismaelli 2009, 404-407. Based on a comparison of the Doric façades in these three cities, Ismaelli proposes the existence of a local workshop active in the region based on common features of architectural solutions and local stones used. For the street in Laodikeia built during the consulship of S. Iulius Frontinus in AD 84-85, see Şimşek 2013, 114. For the Doric arrangement of the Colonnaded Street in Tripolis brought to light in the campaign of 1993, see Gider 2007, 25 ff. For the model inspiration of these Doric façades built with local stones such as travertine and onyx, D'Andria suggests the Sebasteion in Aphrodisias (D'Andria 2001, 101-103).

[5] The southern doorways of the tabernae were closed off by the fortification wall; the voussoirs of the Arched Building adjoining the tabernae were dismantled, and a supporting wall was built in the form of a buttress for the existing fortification wall. The construction of the wall concerned can be dated to the second half of the fourth century AD based on the coins and other finds made in the area. This date also casts light on the construction date of the fortification wall surrounding Tripolis. The materials used in the fortification wall are comprised of architectural elements such as marble architrave blocks, geisons, statue pedestals, and postaments which were dismantled from the buildings of the Roman period and reused in the defensive wall. Fortification walls built in similar fashion are found in many cities in Asia Minor (Jacobs 2012, 118 Table 1). Jacobs expresses that peace prevailed in Asia Minor in the period concerned and that the dates in question are

period, the fortification wall constituted the southern wall of the tabernae. The southern wall of the Arched Building, which was constructed with travertine blocks in the Late Hellenistic – Early Roman period, constitutes the northern wall of the tabernae. The walls of the tabernae contain panels formed with red, black, and yellow bands on cream background and made in a similar style, and some of these panels contain figurative frescoes.

TABERNA 1 / Room A

It is adjacent to the east wall of the Early Byzantine Church and to the west of the taberna called Room C and measures 7 x 1.80 m. Following the construction of the church to the west in the fifth century AD, the western wall was removed and the majority of the wall containing the church apse penetrated into the western section of the room, thereby leading to its destruction. Only some of the frescoes in the lower section have remained in good condition due to the considerable destruction on the northern wall of the room – at the same time as the southern wall of the Arched Building. The section which has been able to survive in good condition so far is indeed one-fourth of the first room of Taberna 1. The eastern wall of the taberna is at the same time the western wall of Taberna 1 Room B. The wall, with a thickness of 80 cm, is 7 m long, and its upper 1.40 m was built with mud bricks (Fig. 4) with a thickness of 5 cm, whereas the lower part features stone masonry with marble, pebble, and travertine fragments. On the wall are vegetal and geometric frescoes arranged in panels and borders rendered with red and black on a cream background (Fig. 5). The plant and geometric depictions in the panels are crumbling and falling apart due to considerable damage.

On the southern end of the eastern wall is a doorway with a width of 70 cm and a height of 1.40 m which leads to the second room of Taberna 1 (Fig. 6). The main entrance door of the room must have led to the Colonnaded Street. Nevertheless, the door was obliterated upon the construction of the fortification wall. Furthermore, the area where the door was located cannot

debatable as there was no extrinsic threat at this time (See Jacobs 2012, 117). In addition to the fortification walls seen in Sardis, Blaundos, Laodikeia, Hierapolis, Aphrodisias, Sagalassos, Perge, Selge, and Side, similar fortifications can be found in cities such as Tripolis and Herakleia Salbake (for Tripolis, see Duman 2013, 183, figs. 2 and 184).

be seen owing to the construction of the church adjacent to the west of the room. The floors of the Taberna were made with lime mortar-tempered compacted earth, and this floor has been preserved in a small area in front of the western wall of the first room in Taberna 1. It is seen that the frescoes on the northern and eastern walls also end at this level. A brick floor was unearthed 24 cm beneath the compacted earth floor. The terracotta bricks constituting the floor concerned, unearthed in the south of the building, must have been related to the church's phase of use in the fifth century AD. A pipe laid in a northwest-southeast direction was unearthed in the north of the brick flooring (Fig. 7). This pipe starts from the western wall and proceeds under the eastern wall towards the area beneath the ground level of Room A.

Two rows of bricks, comprising ten bricks on top of the other at 1.80-meter intervals, were unearthed in the northeast of the first room. A dense layer of burnt earth was found in almost the same levels as that of the bricks, which must have been part of the hypocaust system, and concave terracotta pieces, reminiscent of longitudinally cut pipes, were found in the same area. The concerned slabs lost their original properties and acquired a marble-like character as they had been exposed to high temperatures. The numerous pottery items, figurine fragments, bone objects and bowls found in the studies carried out in the first room of Taberna 1 have a significant place (Fig. 8). In addition to forty-eight coins, thirty-four of which are of bronze and fourteen of silver, a marble statue base fragment was found. All the silver coins are dated to a period between AD 222-268 (Fig. 9), whereas the bronze coins are dated to a time-span from the Late Hellenistic-Early Roman period to the fourth century AD (Fig. 10).

When the hypostyle, strigils and other archaeological materials discovered during the excavations are evaluated collectively, it may suggest that Room A of Taberna 1 was used as a small baths affiliated to Room B of the same taberna (Fig. 11). The discovery of two coins dated to the Late Hellenistic-Early Roman period and of pottery from this period indicates that the room was used in the periods mentioned. However, the 14 silver coins dated to AD 222-268 and the complete bowls dated to the middle of the third century AD discovered on the brick floor level of Room A indicate that the most intensive use of the place was about the mid-third century

AD (according to the coins of Emperor Severus Alexander and Valerianus, especially AD 230-260) and that its use ended probably due to an earthquake which occurred in the last quarter of the third century AD.

TABERNA 1 / Room B

Measuring 7x4.50 m inside, the two-story Room B is located to the east of Room A and to the west of Taberna 2. One doorway leads into Room A on its western side, while the main entrance leads to the Colonnaded Street to its south. Nevertheless, the main entrance door was closed upon the construction of the fortification wall, as in Taberna 1 Room A.

There are traces of two walls extending in a north-south direction in the middle of the room and a supporting pillar is located in front of the eastern wall of the room. The pillar was erected to support the eastern wall using stone, brick, and travertine materials. The eastern wall of the room is 80 cm in thickness, 7 m. in length, and 3.85 m. in height and at the same time constitutes the western wall of Taberna 2. The upper 1.55 meter part of the wall was built with mud bricks with a thickness of 5 cm whereas its lower section was built with stones. A thin layer of lime plaster decorated with colored frescoes in the lower section covers the wall surfaces.

On the wall is a circular groove with no plaster extending diagonally upwards at an angle of 60 degrees from the floor to the south of the supporting pillar. This trough must have been the seating for the lateral leg of the wooden staircase leading to the upper floor of the taberna (Figs. 12-13). The western wall of the room, built with mud bricks on top of stone foundations, is 80 cm wide and 7 m long and at the same time constitutes the eastern wall of Room A. On the southern end of this wall is a door leading to Room A measuring 64x140 cm and immediately to the north of it is a niche, which is 95 cm high, 60 cm wide, and 30 cm deep. A niche with similar dimensions is also found on the upstairs wall in the section above this niche and the door (Fig. 14). The interiors of both niches were plastered over with lime mortar. In the middle of the wall is a recess 13-cm wide with no plastering, which divides the wall into two vertically.

Built using stone, brick, and travertine fragments, the northern wall, with a thickness of 75 cm, is at the same time the southern wall of the Arched Building. There are ten rectangular holes in its upper section, meant

for holding the wooden beams carrying the upper floor of the taberna. Some thin plaster of lime mortar is partially visible above them, while colored frescoes start right beneath them.

Two columns of the northern portico of the Colonnaded Street are located in the southern wall of the room, which constitutes at the same time the fortification wall. The main entrance door of the room must have been between these two columns. A vertically situated pipe with a diameter of 18 cm. was unearthed adjacent to the column in the west in the southwestern corner of the room.

The polychrome frescoes on the cream background on the eastern, northern, and western walls of the room are arranged as successive panels and bands (Figs. 15-17). All the rectangular panels seen on all three walls have stylized volute stems terminating in arrowheads[6]. However, there are some differences in dimensions and motifs in the southern halves of the eastern and western walls, although they are in the same style.

On the western wall, this distinction was indicated in the middle of the wall by means of a wooden post with a width of 13 cm. which stood vertically with the same height as the wall. It is possible to think of a similar implementation on the symmetrical eastern wall. Nevertheless, it probably corresponded to the recess on the western wall. This shows that probably the northern and southern halves of Room B were either different parts or sections of the same room. There are main panels which are 55 cm above the floor, 80-88 cm in width and 1.17-1.21 m in length, which are framed by one black, one yellow and two red lines starting from the outermost part along the three walls. Between the main panels are narrow panels with a width of 20 cm on average that contain green and red floral motifs. The panels are bordered at the top by a horizontal border with a thickness of 13 cm on the northern wall and in the northern halves of the eastern and western walls, and by a horizontal border 25 cm in thickness in the southern halves of the eastern and western walls (Fig. 18).

---

[6] For a comparison of the stylized volute stems attested in the wall paintings of Zeugma, Ephesos and some other cities, see Barbet 2005, 203, Fig. 113. Among these, the volute stems of Tripolis are comparable to examples 6-7 in Ephesos given in Barbet 2005, 203, Fig. 113.

There is a stylized Lesbian cymation (*cyma reversa*) ornamentation on the border, contoured with two black lines on the northern wall and in the northern halves of the eastern and western walls, whereas there are green and red flower motifs in the form of a frieze in the southern halves of the walls. Over the main panels, a border in the form of a frieze extends along the three walls. This frieze is 80 cm tall on the northern wall, 75 cm tall in the northern half of the eastern wall, 61 cm tall in the southern half of the eastern wall, 55-65 cm tall in the northern half of the western wall, and 43-47 cm tall in the southern half of the western wall. While this horizontal frieze contains green and pink flower motifs and figures – generally birds – on the northern wall and in the northern halves of the eastern and western walls, the panel was left blank in their southern halves.

The frieze is bordered at the top by a band of a yellow, a black and a thin red line from the top to the bottom. This border slopes down along the groove of the staircase immediately to its north, creating a trapezoidal panel. On the other hand, it is impossible to see how the fresco ended in the south of the western wall since the frescoes have been substantially damaged. Below each of the main rectangular panels are very stylized foliates in black extending down to the floor. Of the main rectangular panels, five can be seen on the eastern and western walls of the room each and four can be seen on its northern wall. On the eastern wall, only part of one panel is visible in the north and south each as they remain behind the supporting pillar. In the northern half of the eastern wall, a south-facing pheasant was depicted in the first panel from the north. The second panel contains two pomegranate depictions (Figs. 19-20). Since only part of the third panel is visible due to the supporting pillar in front of the wall, the depiction in it cannot be identified. The same is valid for the first large panel in the southern half of the wall. A running leopard is depicted in the last panel of the wall located to the south of this panel. The outer contours of the leopard, running leftwards, are black; its yellow body contains black spots. The wide panel proceeding along the wall over the main panels in the northern half of the western wall of the room contains parrot and pigeon depictions painted in yellow, green and red amidst flowers from north to south. On the same wall is a depiction of a bowl which is full of a red liquid, possibly wine. Again in the northern half of the wall, there is a yellow squash (*Cucurbita pepo*) in the first panel from the north.

The second panel contains a partridge with a yellow, brown, and black body, a red beak, and red feet. The third panel contains a depiction of three yellow fruits - perhaps apricots. There is a Greek inscription with a letter height of 1.5 cm on the red frame line above the fruits. Not all letters are legible as they are poorly preserved. Of the panels in the southern half of the wall, the first panel from the north contains a mask depiction in yellow and red[7]. A partridge amidst flowers is depicted in the frieze extending all over the main panels on the northern wall[8]. Two dark green zucchinis (*Recens cucurbita*) with yellow flowers on their tips are depicted in the easternmost panel. Since the other panels are highly damaged, the depictions in them cannot be discerned (Fig. 21). In the studies carried out in the northwestern corner of the room, a fresco fragment probably belonging to the northern wall was unearthed in front of the northern wall. Part of the neck and face of a figure, thought to be Ariadne (?), has been preserved[9]. A crown of olive leaves is visible on the left edge of the figure's head (Fig. 22). The linear style panels with decorative motifs in their centres attested on the walls of the Tripolitan tabernae reflect the fourth style of Pompeii, after which no development of importance is known in the art of wall painting. Examples of this style dating to the last quarter of the second to the early third century AD are known in Ostia, Rome, Tivoli[10], Ephesos[11] and some other lesser places[12].

Conservation work was carried out on the damaged frescoes on the northern wall of the room and in the southern halves of the eastern and western walls. The terracotta thymiaterion with a depiction of Eros and Psyche hugging and kissing thus exposed in the room has an essential place (Fig. 23). Of the seashells found in the south-western corner, *Hexaplex*

---

[7] For a similar mask in the frieze of vault 36a of house no. 6 in Ephesos, see Zimmermann – Ladstätter, 2011, 105, Figs. 176- 177.

[8] For parallel examples in Ephesos, see Zimmermann – Ladstätter, 2011, 91, Fig. 140; 134, Figs. 252- 254.

[9] Borhy 2011, Fig. 12.

[10] Ling 1991, 175.

[11] The wall painting in the fourth phase house unit on Terrace 2 in Ephesos is closely parallel to those of Tripolis. For the fourth phase wall painting in Ephesos, see Zimmermann – Ladstätter, 2011, 94-120.

[12] For the finds at Brigetio in Pannonia, see Borhy 2011, Fig. 15, 23.

trunculus was used to obtain paint by crushing it. In addition, five bronze coins were also found in this room (Fig. 24).

TABERNA 2

The room adjacent to the east of Room C measures 7x4.50 m. On its northern wall is an arched doorway of travertine blocks, having a width of 1.65 m and height of 2.45 m leading into the Arched Building. The western wall, 80 cm in thickness and 7 m in length, at the same time constitutes the eastern wall of Room B of Taberna 1. It is seen that the wall with mud bricks on top of stone foundations has shifted eastwards and become deformed probably owing to earthquakes and external impacts. The eastern wall of the room was built with double rows of bricks and travertine blocks at 50 cm intervals with lime mortar. The northern façade of the fortification wall constitutes its southern wall, as in the other tabernae.

On the walls are partially preserved frescoes in two layers which were applied in different phases (Figs. 25-27). There are panels with vegetal and geometric motifs, formed with bands and borders on a cream background. It is noted that the panels of the layer beneath were drawn with red, black, and yellow and decorated with floral and geometric motifs inside. On the other hand, the wall is divided into panels ranging from 53 to 71 cm in width using black at the upper layer. While no decoration is seen in the panels, a depiction of floral decorations starting from the floor and giving the impression that there is a base under the panel is present under each panel. Both fresco layers contain graffiti with floral, figurative and symbolic content as well as graffiti with ancient Greek letters, words, and sentences made subsequently with incised lines (Fig. 28).

A bench built with stones, bricks and lime mortar measuring 50 cm high and 50 cm deep runs along the eastern, western, and southern walls of the room and some of its northern wall (Fig. 29). The mortar marks have been partially preserved in the section where the baseboards, measuring 5.5x5.5 cm were situated at the intersection point of the bench and the walls. Rearrangements were made in the room upon the construction of the fortification wall in the late fourth century AD. The bench constructed after the main south entrance was blocked due to the fortification wall and the construction of a new fresco layer over a former one indicate that the building remained in use for a while more after the fourth century AD. Moreover, it

was observed that the door leading into the adjacent Arched Building had not been closed. This shows that Room B was also used together with the Arched Building in the Late Roman period. Roof tiles, baseboard fragments and marble veneer fragments in various colors such as white, blue, grey, brown, green, and red were discovered during the excavations (Fig. 30). Furthermore, the other finds include a variety of pottery and seashells, a total of 54 bronze coins dated to the period between the first century and the fourth century AD (Fig. 31), marble veneer pieces with depictions of Serapis (Fig. 32a), Tyche (Fig. 32b) and Heracles–Hippolyte (Fig. 32c), a fragment of the right foot of a bronze statue (Fig. 33), bone hairpins, and bone spoons and fragments (Fig. 8). According to the data from the coins and pottery forms, it is thought that the building was first constructed in the early third century AD.

The use of these tabernae ended upon the closure of their doorways to the Colonnaded Street – the only entrance door of Rooms A and B – in the late fourth century AD, which is also supported by the pottery and coin findings (Fig. 34). Nevertheless, since the taberna called Room B had one more door leading to the Arched Building to its north, in spite of the closure of its main entrance in the late fourth century AD, it remained in use until the fifth century AD. However, the presence of windows at certain intervals on the southern interior façade of the Arched Building, which is dated to the Late Hellenistic – Early Roman period, suggests a portico adjacent to the Arched Building in the previous phase preceding the tabernae we are dealing with today (Fig. 35). Maybe after the portico had lost its function after an earthquake, tabernae were constructed in a row in the same area (Fig. 36). The rooms, which must have been constructed in the late second and early third century AD, collapsed with an earthquake that occurred in the third quarter of the same century and some of them were abandoned, whereas some of them went on being used with various renewal activities until the fourth fifth centuries AD (Fig. 37). The chronological data, detected in the first three of the tabernae along the north side of the Colonnaded Street and in their excavations, will enable us to reach clearer results with the excavations scheduled to be carried out in this area in the following years.

ABBREVIATIONS AND BIBLIOGRAPHY

Anderson 1898	J.G.C. Anderson, "A Summer in Phrygia II", *JHS* 18, 1898, 81-128.
Barbet 2005	A. Barbet, *Zeugma II, Peintures murales romaines*, Paris, 2005.
Borhy 2011	L. Borhy, "Everyday-life on the Pannonian Limes: Houses and Their Inner Decoration in Roman Brigetio (Komárom / Szőny, Hungary)", *Histria Antiqua* 20, 2011, 47- 61.
D'Andria 2001	F. D'Andria, "The evolution of Hierapolis of Phrygia", *Urbanism in Western Asia Minor, JRA Suppl*. 45 (Edited by D. Parrish), 2001, 97-115.
Duman 2013	B. Duman, "Son Arkeolojik Araştırmalar ve Yeni Bulgular Işığında Tripolis ad Maeandrum", *CEDRUS* I, 2013, 179- 200.
Duman – Baysal 2014	B. Duman – H.H. Baysal, "Tripolis 2. Sezon Kazı ve Restorasyon Raporu: 2013", *36. Kazı Sonuçları Toplantısı*, Cilt 2, Ankara, 2014, 633- 650.
Gider 2007	Z. Gider, "Tripolis'in Ana Caddesi'nde Müze Kurtarma Kazısında Bulunan Dorik Malzemeler, The Doric Materials Found with Museum Recovery Excavation at Tripolis Main Street", *Uluslararası Denizli ve Çevresi Tarih ve Kültür Sempozyumu (6-8 Eylül 2006, Denizli) Bildiriler* II (Edited by A. Özçelik – Y. Avcı – M.Y. Ertaş – S. İnan – Y. Kılıç – S. Parlaz), Denizli, 2007, 25-31.
Ismaelli 2009	T. Ismaelli, *Architettura Dorica a Hierapolis di Frigia*, Istanbul, 2009.
Jacobs 2012	I. Jacobs, "The Creation of the Late Antique City: Constantinople and Asia Minor during the 'Theodosian Renaissance'", *Byzantion* 82, 2012, 113-164.
Ling 1991	R. Ling, *Roman Painting*, Cambridge, 1991.

Ramsay 1890 — W. M. Ramsay, *The Historical Geography of Asia Minor*, London 1890.

Stuart 1991 — P. Stuart, *De Tabula Peutingeriana*, Nijmegen, 1991.

Şimşek 2013 — C. Şimşek, *Laodikeia (Laodicea ad Lycum), Laodikeia Çalışmaları 2*, Istanbul, 2013.

Zimmermann – Ladstätter 2011 — N. Zimmermann – S. Ladstätter, *Wall Painting in Ephesos*, Istanbul, 2011.

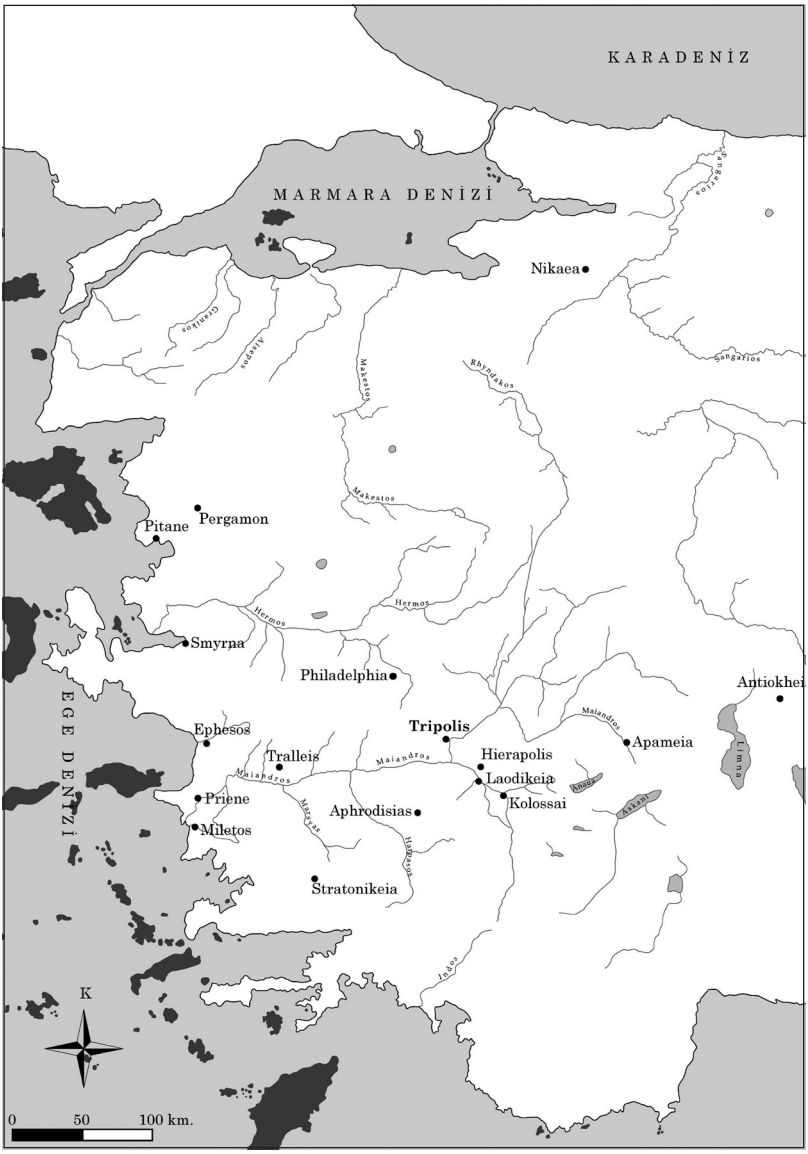

Fig. 1 Map of western Anatolia

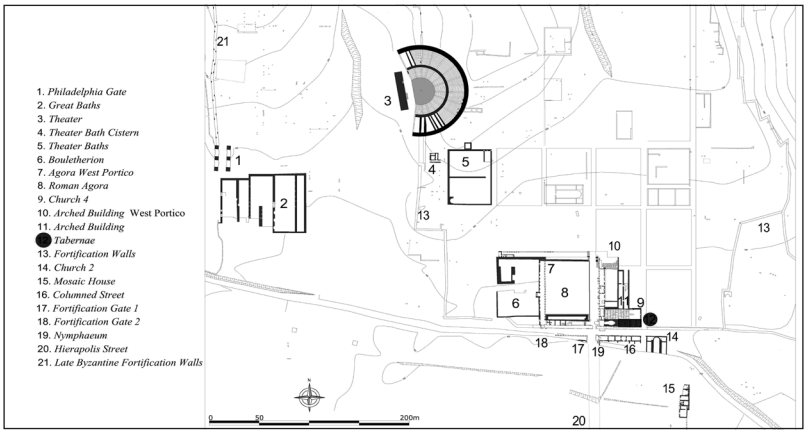

Fig. 2 Plan of city centre

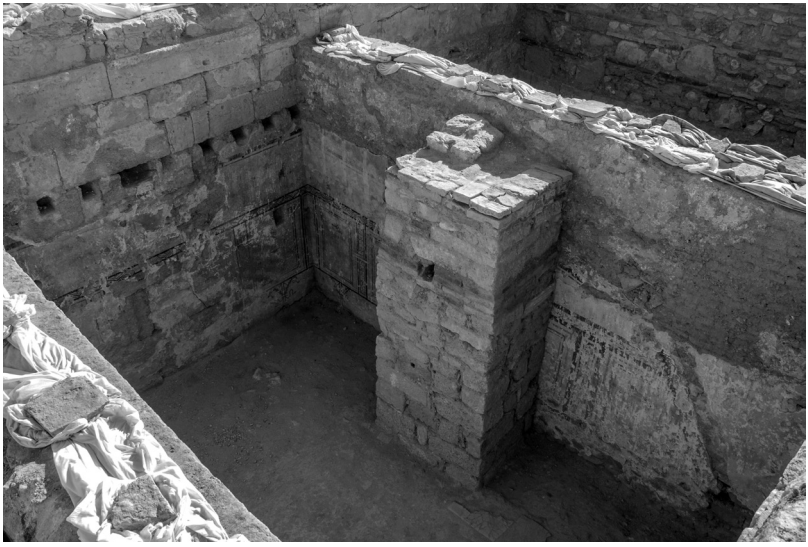

Fig. 3 Tabernae

Fig. 4 Mud-brick walls

Fig. 5 Taberna 1B, wall painting

Fig. 6 Taberna 1, the doorway between Rooms A and B

Fig. 7
Taberna 1B, terracotta pipeline

Fig. 8
Taberna 1A, bone findings
(3rd c. AD)

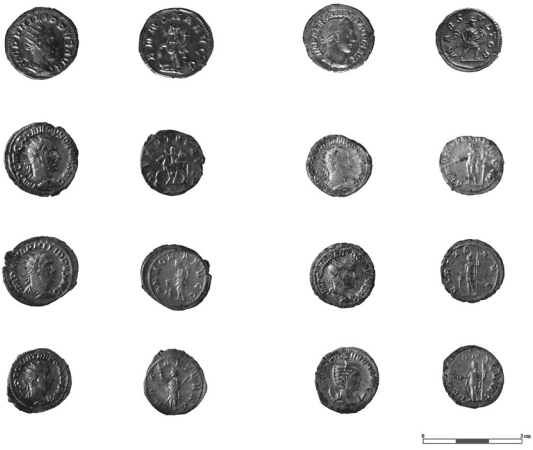

Fig. 9
Taberna 1A,
silver coins

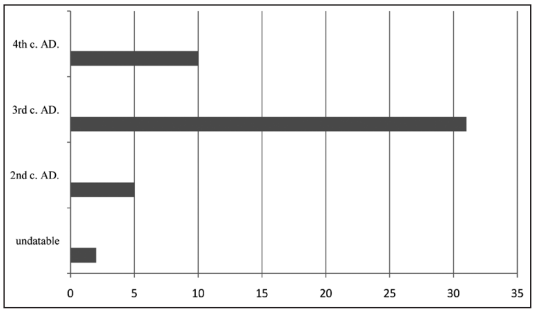

Fig. 10
Taberna 1A, the
distribution of the
coins

Fig. 11
Taberna 1A, hypostyle and strigilis

Fig. 12 Taberna1B, traces of wooden stairs

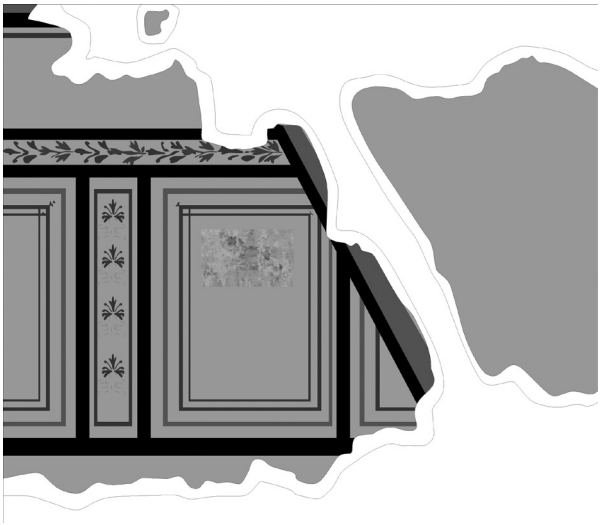

Fig. 13
Taberna 1B, traces of wooden stairs on drawing

Fig. 14
Taberna 1B, niches of the upper and lower floors

Fig. 15 Taberna 1B, wall painting

Fig. 16 Taberna 1B, paintings on the west Wall

Fig. 17 Taberna 1B, paintings on the north Wall

Fig. 18 Taberna 1B, drawing of paintings on the west Wall

Fig. 19 Taberna 1B, paintings on the east Wall

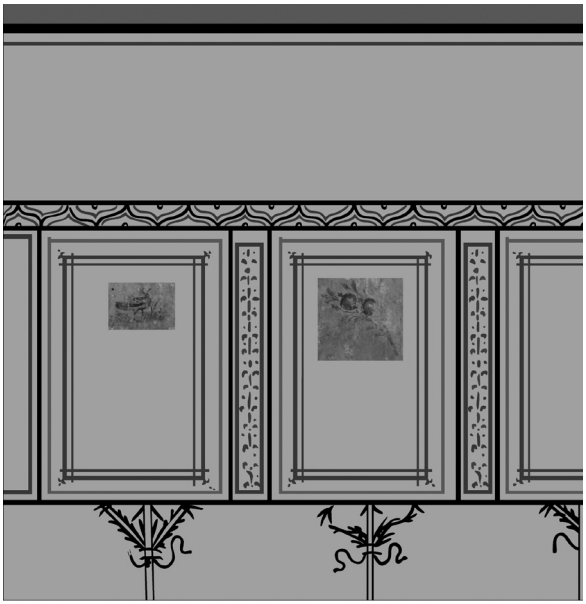

Fig. 20
Taberna 1B, drawing
of paintings
on the east Wall

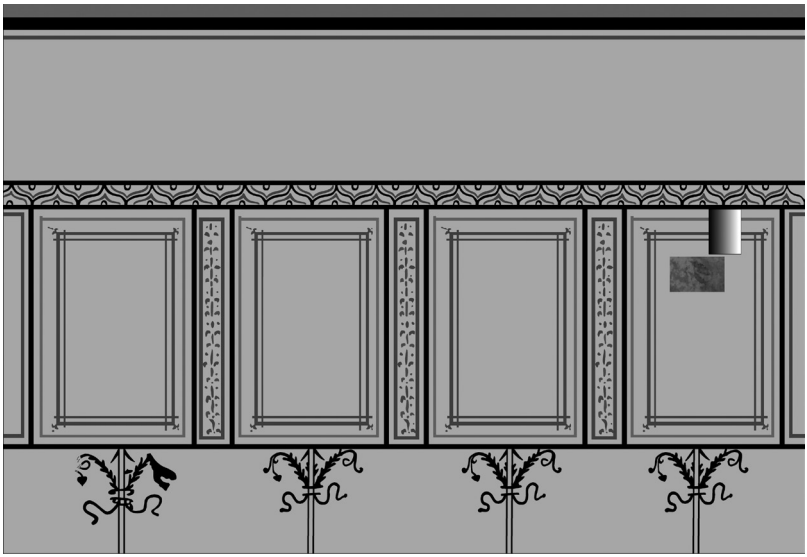

Fig. 21 Taberna 1B, drawing of paintings on the north Wall

Fig. 22
Taberna 1B,
fragment of figurative
painting (Ariadne ?)
on north Wall

Fig. 23 Taberna 1B, terracotta thymiaterion (3rd c. AD)

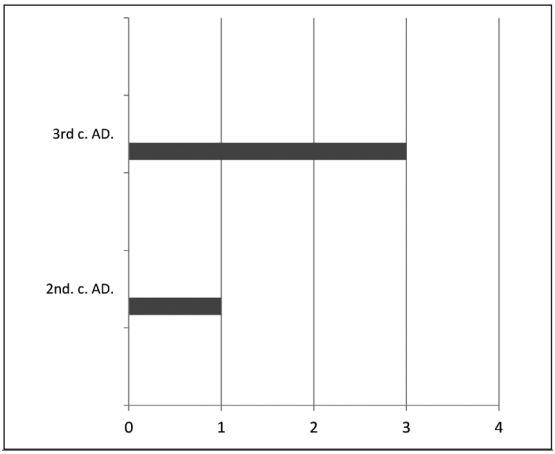

Fig. 24
Taberna 1B,
distribution of
the coins

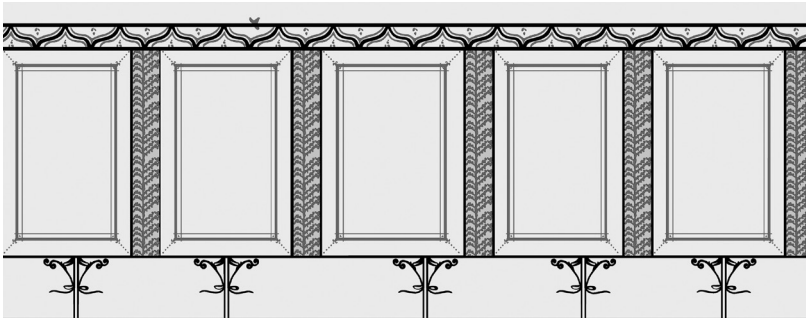

Fig. 25 Taberna 2, drawing of first layer

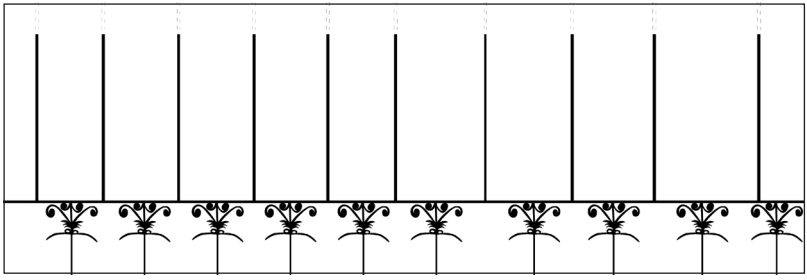

Fig. 26 Taberna 2, drawing of second layer

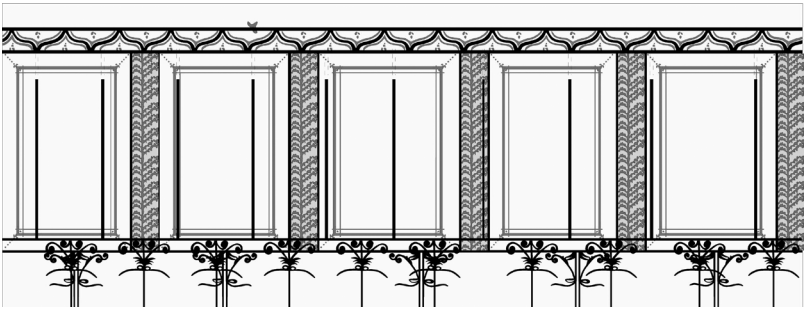

Fig. 27 Taberna 2, drawing of all layers

Fig. 28
Taberna 2, drawing of graffito

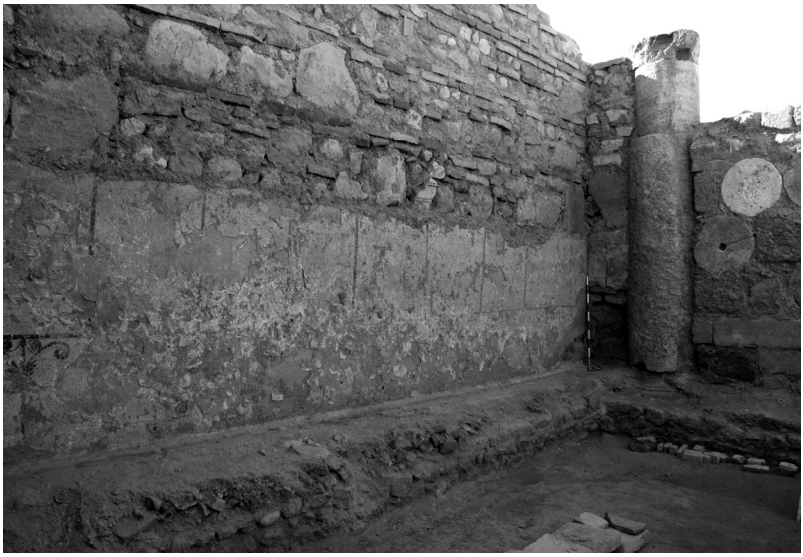

Fig. 29 Taberna 2, bench

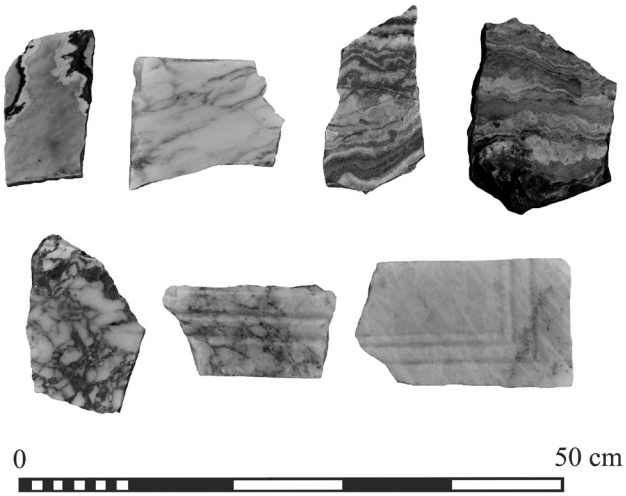

Fig. 30 Taberna 2, marble veneer in various colors

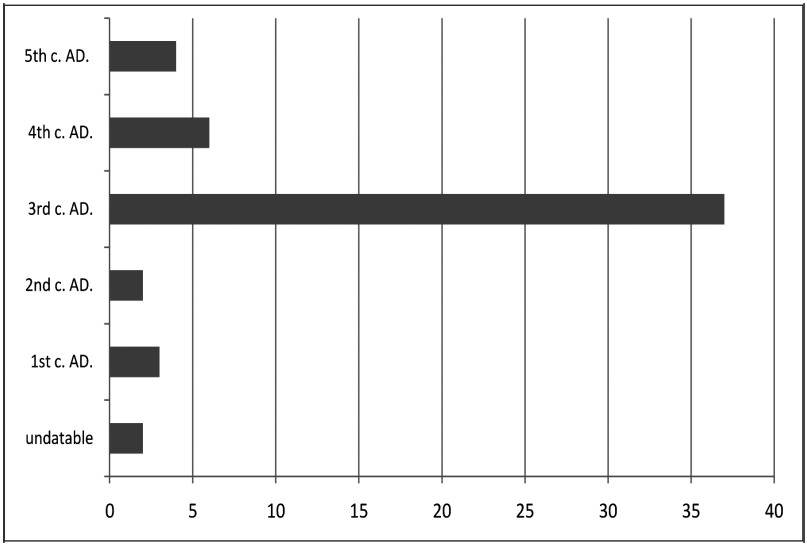

Fig. 31 Taberna 2, distribution of the coins

Fig. 32
Taberna 2, marble veneer:
a- Serapis,
b- Tyche,
c- Heracles and Hippolyte (3rd c. AD)

Fig. 33 Taberna 2, right foot of a bronze statue (3rd c. AD)

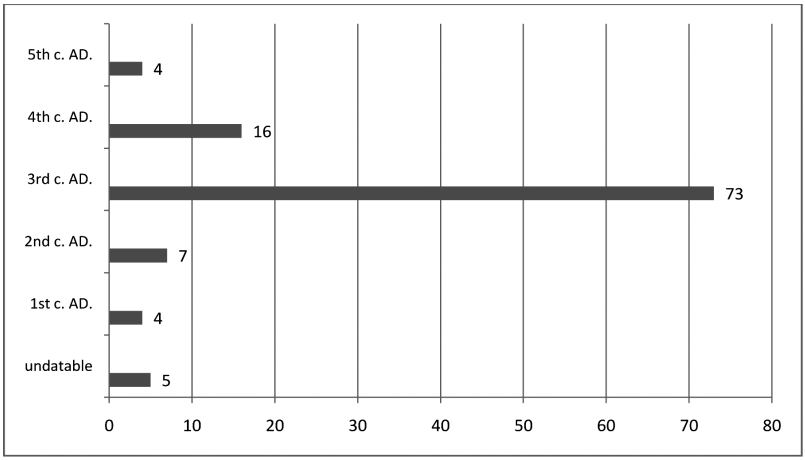

Fig. 34 Distribution of the coins found in the Tabernae

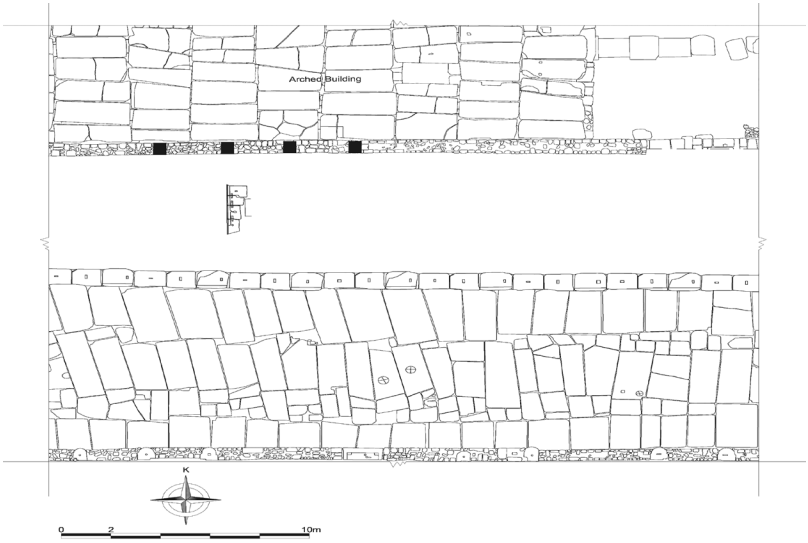

Fig. 35 Drawing showing the first phase of the Tabernae area

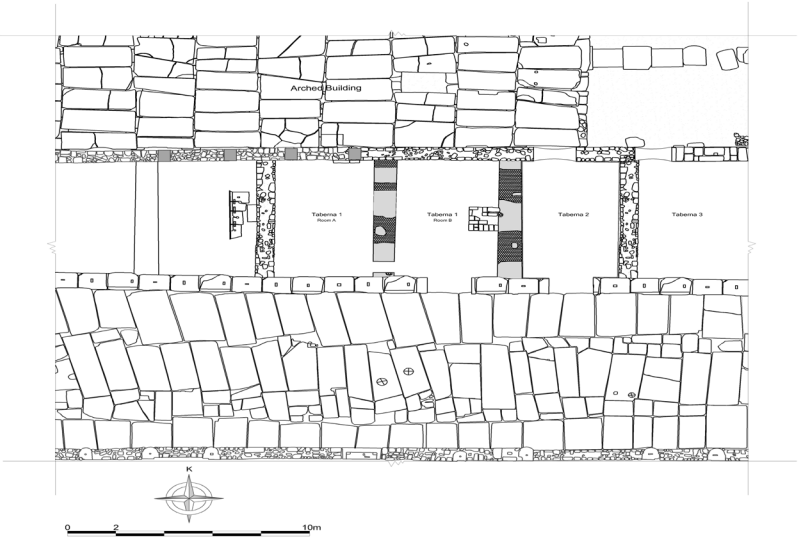

Fig. 36 Drawing showing the second phase of the Tabernae area

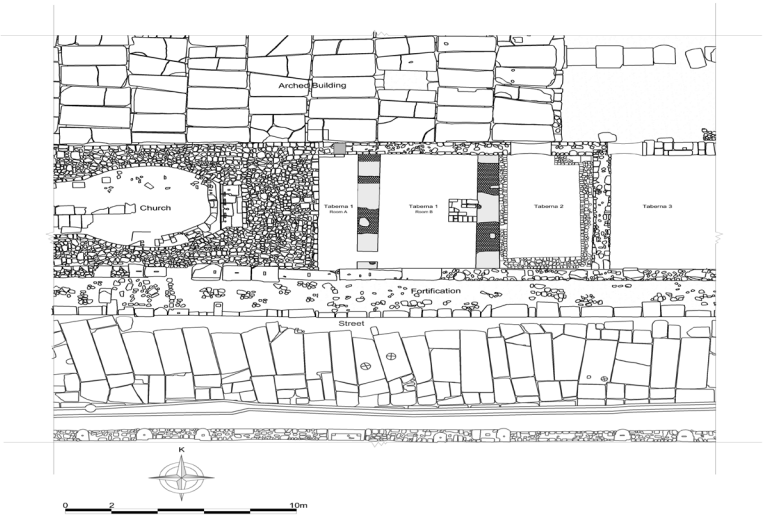

Fig. 37 Drawing showing the final phase of the Tabernae area

PROVENANCE OF BANDED TRAVERTINE FROM THE ANCIENT CITY OF TRIPOLIS (YENICE/BULDAN - DENIZLI) BASED ON MINERO-PETROGRAPHIC AND GEOCHEMICAL CHARACTERIZATION

Tamer KORALAY – Bahadır DUMAN** – Kıymet DENİZ*** – Yusuf Kağan KADIOĞLU*****

Introduction

Nowadays, the number of interdisciplinary studies that offer solutions to scientific and technical problems are increasing. This study is significant for being an interdisciplinary study which has discovered important results

* Assoc. Prof. Dr., Pamukkale University, Faculty of Engineering, Department of Geological Engineering, 20017 Denizli, Türkiye. Email: tkoralay@pau.edu.tr / tkoralay@gmail.com

** Assoc. Prof. Dr., Pamukkale University, Faculty of Science & Arts, Department of Archaeology, 20017 Denizli, Türkiye. E-mail: bduman@pau.edu.tr

*** Res. Asst., Ankara University, Geological Engineering Department, Tandoğan, 06100 Ankara, Türkiye. E-mail: kdeniz@eng.ankara.edu.tr

**** Prof. Dr., Ankara University, Earth Science Application & Research Center, Tandoğan, 06100 Ankara, Türkiye. E-mail: kadi@ankara.edu.tr / ykadioglu@gmail.com

as a consequence of the cooperative work by the sciences of geology and archaeology. When data from archaeological excavations are connected with the cooperative studies of different scientific fields, it is possible to reach significant conclusions. In many studies, which are related to geology and geological formations, thin sections of rock samples analyzed by optical microscope are widely used in order to find out the minero-petrographic characteristics of these rocks. Data from minero-petrographic studies form a technical and scientific basis for a range of research projects that are being planned. For instance, detailed analysis of rock samples from the buildings of the excavation fields tells us a great deal about the ancient quarry business. Similarly, the designation of the provenance of the rocks used in buildings will help select the right material for protection and restoration and the right applications. Travertine is a terrestrial carbonate rock, formed by the precipitation of carbonate minerals (calcite, dolomite, aragonite etc.) from solution in magmatic and meteoric waters, and/or geothermally heated hot springs[1]. It was used extensively as a building material in the ancient Greek and Roman world in the Mediterranean region because of its low weight and softness, making it perfect for carving intricate interior detail[2]. The purpose of this study is to determine the minero-petrographic characteristics of the rocks that were used in the buildings of the ancient city of Tripolis and to obtain information about the probable provenance of these rocks.

Historical Background of the Ancient City of Tripolis

The ancient city of Tripolis lies within the borders of the province of Denizli, the county of Buldan and the town of Yenicekent. It was at the intersection of the Lydia, Phrygia and Karia regions and near the Maeander River in the Hellenistic period (Fig. 1a). But before that it was within the borders of the Lydia region with the establishment name Apollonia and then Antoniopolis for a short time. It became the intersection for the people from all three regions in the 1st century BC, and thus it was renamed Tripolis[3]. The Lykos (Çürüksu) Valley, within whose borders the ancient city of Tripolis is located, had been under the rule of the Seleukos Dynasty until the Battle of Magnesia between the Seleukos Kingdom and the Romans in 190 BC. The Romans,

[1] Guo – Riding 1998, 163-180; Pentecost 2005, 446; Özkul *et al.* 2013, 179-204.
[2] Reedy 2008, 256; Rapp 2009, 348; Ingham 2010, 192.
[3] http://www.pau.edu.tr/tripolis

who won this battle with the help of Pergamon, signed the Apameia (Dinar) Peace Treaty in 188 BC and left Seleukos land in that region to Pergamon. After the death of King Attalos III in 133 BC and in accordance with his will, Pergamon was included within the Roman Empire[4]. The ancient city had its most magnificent times in its Roman period. New buildings were added to the city starting from the 2nd century AD and public buildings such as city gates, streets, baths, stadiums, theatre and parliament buildings were constructed. In the ancient city of Tripolis, which was represented at the level of episcopacy in the Council of Nicaea (İznik) in 325 AD, significant damage was observed after the earthquake in 494 AD. At the end of the 6th century AD and the beginning of the 7th century AD, people living in Tripolis had to move to Direbol (Narlıdere), which was 5 km North of the city, and to the safer mountain slopes because of Sassanian raids, which affected the whole of Anatolia. After this compulsory migration, there are no data which indicate another settlement until the 13th century. In the first half of the 13th century, Tripolis changed hands between Byzantines and Turks a few times and it fell under the domination of Turks around 1304-1306 (İnançoğulları and Germiyanoğulları). Finally, Denizli and its surrounding area came under the domination of the Ottoman Empire in 1429. Although the history of Tripolis goes back to the Hellenistic period, the archaeological materials found during the surface examinations around the city prove that settlement in this region goes back to 5000 years ago[5]

The Geological Structure of the Ancient City of Tripolis and Its Surroundings

The research area, which includes the ancient city of Tripolis and its surroundings, is represented on the 1/25000 Uşak L21-c3 topographic map. The ancient city of Tripolis is located in a region where extensional tectonics are dominant and its altitude above sea level is 220 meters. The altitude increases towards the northern part of the city (Fig. 1b). The Maeander River, which is the greatest river in the region with its 51 m^3/s flow, borders the ancient city on its eastern side. In addition, there are streams, whose flow changes seasonally and which are connected to the Maeander River, in the study area and around it. Especially in the rainy season, these streams

[4] Şimşek 2007, 384; 2013, 530.

[5] Duman 2013, 179-200.

carry sediments from higher altitudes and deposit them on the remains of the ancient city where the slope gets lower and this makes the excavations more difficult. The climate of the city of Denizli shows variety since its geographical location is between the Aegean, Middle Anatolia and Mediterranean Regions. Generally, the main features of the climates of the Aegean Region and the southern part of Middle Anatolia are observed. It is a little colder than the general climate of the Aegean Region. It is different from the general Aegean Region climate, with temperatures of up to 40 °C in the shade during summers and down to -15 °C during winters. The 32-year average temperature is 10.9 ºC according to the calculations of the Güney Meteorological Station for the years 1975-2006. On average during these 32 years, the coldest month is January with -0.1 ºC on average and the hottest month is July with 22.2 ºC on average. Precipitation is 47.32 kg/m^2 annually, with 40% of rain in winter, 21% in spring and 33% in autumn[6].

Today, in order to overcome problems with raw materials, time and money in the construction business, it is desired that the raw materials come from the surroundings of the area where they will be used. Considering this fact, was also natural for ancient civilizations to use the construction materials which were closest to their cities. Thus, it is appropriate to firstly investigate the geological structures and rock units of the ancient cities and their surroundings. The ancient city of Tripolis is in the Great Maeander Graben in West Anatolia, which is formed by normal faults in a roughly east-west direction under the effect of active extensional tectonics. The geological units of the study area are as follows form the oldest to the youngest;

- Paleozoic metamorphic rocks,
- Upper Pliocene Kızılburun formation,
- Pliocene Sazak, Kolonkaya and Tosunlar formation,
- Quaternary terrestrial rocks[7]

There are discordances and gaps among these rocks in the region. The majority of rocks in Tripolis and its surroundings are composed of

[6] http://www.dmi.gov.tr

[7] Şimşek 1984, 145-162; Sun 1990, 86; Gökgöz 1994, 263; Gökgöz 1998, 115-156; Çakır 1999, 67-80; Bülbül 2000, 97; Alçiçek 2007, 304; Koralay *et al.* 2013, 499-506; Erten *et al*. 2014, 504-518.

metamorphic rocks identified as Maeander Massif. It is possible to identify two rock series separated by their degree of metamorphism. These are the core series composed of high grade metamorphic rock such as augen-gneiss, migmatite, amphibolite, eclogite and the cover series of quartzite, mica schist, phyllite and marbles. Schists and quartzites that form the cover series are thin-middle layered and they are mostly composed of quartz, muscovite and biotite minerals. It is mentioned by different researchers that the core series of the Maeander Massive is an old crystalline block that belongs to the Pan African basement and its age is between 0.8 and 2 billion years[8]. There is no consensus over the age of the cover series of the Massive which is the result of differences in definitions and distinctions. While some researchers accept the existence of a sequence from the Cambrian to the Eocene in the cover series, others mention a sequence from the Upper Carboniferous to the Upper Cretaceous Eocene[9]. Neogene sediments are composed of Kızılburun, Sazak, Kolankaya and Tosunlar formations from oldest to youngest[10]. The Middle Miocene Kızılburun formation is composed of coarse and fine grained conglomerate, sandstone and mudstone almost 300 meters in thickness. The Middle Miocene Sazak formation rests on the Kızılburun formation compatibly. The Sazak formation has a thickness of 150-300 meters and is composed of limestone, gray colored marl, laminated siltstone-mudstone, argillaceous limestone, cherty limestone, selenitic gypsum, gypsum arenite, gypsum halite and gypsum mudstone lithologies. The Middle Late Miocene Kolonkaya formation consists of marl, mudstone (clay-silt sequence) and dominantly sandstones and it has a thickness of 500 meters. Sandstones are light brown, yellowish and gray in color and they are a little hardened, middle-thick layered, with a large amount of Gastropod and Lamellibranch fossils. Pliocene sediments are represented by the Tosunlar formation and they are 500 meters thick. This formation is generally reddish orange and/or yellowish white colored, middle-thick layered, loose carbonate-clay cemented, and is mainly composed of semi

[8] Konak 1985, 33; Satır – Friedrichsen 1986; 703-714; Oberhänsli *et al.* 1997, 135-150; Yılmaz *et al.* 1998, 210-336; Bozkurt – Satır 2000, 285-296; Erdoğan – Güngör 2004, 15-36; Candan *et al.* 2007, 8-13; Candan *et al.* 2011, 123-167; Koralay *et al*. 2011, 69-121.

[9] Konak 1985, 33; Erdoğan – Güngör 1992, 9-34; Yılmaz *et al.* 1998, 210-336.

[10] Şimşek 1984, 145-162; Sun 1990, 86; Gökgöz 1994, 263; Alçiçek 2007, 304; Erten et al. 2014, 504-518.

round pebble stone-sandstone sequences formed by rock lithologies of former formations and partly marl and calcic levels[11]. Alluvium, travertine cemented terrace deposites and travertine formations in Tripolis and its surroundings compose the Quaternary sediments (Fig. 2).

Material and Methods

The mineralogical and petrographic characteristics of the banded travertine samples from the the ancient city of Tripolis have been identified at Pamukkale University Department of Geological Engineering Optical Mineralogy Laboratory using a "Leica DM750P" polarizing microscope.

In order to specify the carbonate minerals (calcite/dolomite/aragonite etc.) and the unidentified smaller components which could not be distinguished in the banded travertine samples during the microscopic examinations, X-Ray Diffractometer (XRD) analysis was applied. The XRD analysis was performed at Ankara University Earth Sciences Research and Application Centre (YEBİM) Laboratory using an "Inel Equinox 1000" with CoKα radiation. In this study, four banded travertine samples were analyzed to determine their mineralogical composition by XRD. The analyzed samples were finely ground using a tungsten carbide crushing vessel. Then a few milligrams of the powder were placed in a sample holder and put in the XRD machine.

To determine the geochemical characteristics of the banded travertine samples, X-Ray Fluorescence (XRF) analysis was performed. For XRF analysis, seven banded travertine samples were finely ground in a tungsten carbide crushing vessel until they reached the dimensions of 150-200 mesh. Then 3.9 g of powdered sample was mixed with 0.9 g of wax homogeneously. The sample powder was pressed at 20 N in an automatic pressing machine to get a pressed disc. The XRF analysis was performed at Ankara University YEBİM Laboratory with a "Spectro XLAB 2000 PEDXRF (Polarized Energy Dispersive XRF)" machine. The analyses were calibrated by using the standards drawn up by USGS for sedimentary rocks (limestone).

[11] Şimşek 1984, 145-162; Sun 1990, 86; Gökgöz 1994, 263; Alçiçek 2007, 304; Erten *et al.* 2014, 504-518.

Minero-Petrographic Properties of the Banded Travertines

Natural building stones have been widely used in buildings and monuments since ancient times due to their easy extraction, easy shaping and endurance. Historical buildings constructed with natural stones have survived no matter how old they are or how bad the conditions they have been exposed to. Moreover, they carry information about the time they were constructed down to the modern age. Natural building stones, which have been replaced by artificial variations as a result of changing and improving technology, were especially widely used in ancient buildings and monuments. 35% of the natural building stones in the ancient city of Tripolis are composed of banded travertine and rocks combined with travertine.

Banded travertine samples were utilized in a widespread manner in column structures, cladding, floors and walls (Figs. 3a, b, c). The most typical properties of banded travertine samples are that they show bands of white, yellowish white, greenish white, red and reddish brown (Figs. 4a, b, c). The width of the colored bands varies and they are generally sequenced in parallel to each other. Yellowish white and reddish brown are dominant among the banded travertine samples. In some samples, there are elliptical spaces between the color bands. In these spaces, small euhedral crystal structures are observed[12].

It was established by the Optical microscope examinations that the banded travertine samples are formed by long thin needle-shaped carbonate crystals (Fig. 5a). In the needle-shaped carbonate crystals, transverse fractures which are formed vertically towards the long axis of the crystals are widely observed (Fig. 5b). The colored bands are separated by levels composed of fine-grained carbonate slurry, Fe-oxide minerals and/or elliptical cavities (Figs. 5c, d). Clay minerals are precipitated along each band with dark color under the microscope (Fig. 5e). Needle-shaped carbonate crystals have developed on these levels. It is quite difficult to distinguish carbonate minerals (calcite/dolomite/aragonite etc.) under the microscope[13]. Thus, XRD analysis was used. According to the whole-rock powder XRD results, calcite is the dominant carbonate mineral in the banded travertine samples while smaller amounts of dolomite peaks were also found (Fig. 6).

[12] Koralay 2015, 6-7.
[13] Koralay 2015, 6-7.

Geochemical Characteristics of the Banded Travertines

With the purpose of identifying the geochemical characteristics of the banded travertines, major and trace element analyses were conducted. The geochemical analysis results of the banded travertine samples are given in Table 1 and shown in the box-plot diagrams. Hence the MgO content of the banded travertine samples ranges from 0.02 to 0.22 wt%, Al_2O_3 content 0.03-0.12 wt%, SiO_2 content 0.20-0.60 wt%, P_2O_5 content 0.004-0.023 wt%, SO_3 content 0.01-0.70 wt%, Ca content 41.52-44.58 wt%, TiO_2 content 0.002-0.006 wt%, MnO content 0.003-0.026 wt%, and Fe_2O_3 content 0.06-1.23 wt% (Fig. 7).

Trace elements, which are known to be relatively resistant to chemical events such as alteration, metamorphism and metasomatism, are widely used for nomenclature, tectonic classification and determining distinctive characteristics[14]. The Co content of the samples ranges from 10.5 ppm to 27.6 ppm, the Cu content from 1.5 to 2.3 ppm, the Zn content from 0.9 to 8.1 ppm, the Rb content from 0.8 to 3.1 ppm, the Sr content from 722.2 to 5090 ppm, the Zr content from 9.8 to 29.0 ppm, the Nb content from 3.4 to 4.2 ppm, the Ba content from 17.9 to 77.0 ppm, the Pb content from 1.0 to 26.4 ppm, the Th content from 1.1 to 1.9 ppm and the U content from 9.8 to 14.0 ppm (Fig. 7).

The Mg/Ca ratio for the banded travertine samples ranges from 0.0003 to 0.0030, the Mn/Sr ratio from 0.0005 to 0.0103, the Sr/Ca ratio from 0.017 to 0.114, the Rb/Sr ratio from 0.0006 to 0.0014, the Zr/Ti ratio from 2.8 to 20.2 and the Nb/Y ratio range from 3.8 to 5.3. In general, the banded travertine samples display limited compositional variation in terms of major oxide and trace elements.

Possible Provenance of the Banded Travertine Samples

Using multiple instrumental analysis techniques (Optical Microscope, X-Ray Diffractometry (XRD), X-Ray Fluorescence, (XRF), Confocal Raman Spectrometry (CRS), Cathodoluminescence (CL), Electron Paramagnetic Resonance (EPR), C-O stable isotope and U-Th isotope analyses) together in the studies to determine the provenance of building

[14] Rollinson 1993, 352.

stones in ancient cities yields significant results. In these studies, valuable results can be obtained by conducting similar analyses on both rock samples from ancient cities and from the possible provenance and evaluating them together[15].

In this study, the possible provenance of the banded travertine is discussed by taking into consideration only the minero-petrographic characteristics of samples from the ancient city of Tripolis, the geological formation of the region, the ancient quarries around the city and the grave stone epitaph that was brough to light as a result of the excavations. Accordingly, it is possible to mention the ancient quarries located almost 3 km northeast of the ancient city as the provenance of the banded travertines and the travertine type of the building stones. The ancient quarries are located on the eastern side of the valley through which the Maeander River flows (Figs. 8a, b, c, d). Towards the upper part of the slope starting from the bank of the river, three partly-preserved ancient travertine quarries have been identified. There are some clear cutting marks in different directions on the quarry faces left by sharp tools which aimed to extract blocks and columns (Figs. 8b, c, d). Moreover, there are small cavities, all sequenced in a line with certain intervals on the main rock block. Wooden wedges must have been nailed into these cavities. The wedges must have been widened by constantly being wetted and the widening wedges must have caused cracks, which separated the rocks from the main block.

In addition to the geological and minero- petrographic observations, it is important to note that in a funerary inscription, which was found in the excavations in Tripolis, it says that "…*Hereunder I lie, young of age, in a tomb, by the name of Eutyches, stonecutter;*…" (Fig. 8e). This stone proves that there were stone craftsmen who worked in those quarries and lived in the ancient city of Tripolis (*Personal Communication from Bahadır Duman*). In addition, it is significant archaeological evidence which indicates that the provenance for the banded travertines may be those quarries.

[15] Attanasio *et al.* 2000, 257-272; Attanasio 2003, 284; Rapp – Hill 1998, 274; Koralay – Kılınçarslan 2015.

Results and Discussion

The results of this study, which aimed to identify the minero-petrographic and geochemical characteristics and the possible provenance of the banded travertine samples from the ancient city of Tripolis, can be summarized as follows:

I) Banded travertine and travertine combinational building stones constitute 35% of the building stones in the ancient city of Tripolis.

II) The banded travertine was used for columns, wall blocks, and cladding of walls and floors in Tripolis city. The typical feature of banded travertine is its white, yellowish white, greenish white, red and reddish brown-colored banded structure.

III) According to the microscopic investigation, the banded travertine displays a banded texture and is composed of needle-shaped (or bladed) carbonate minerals (mostly calcite in composition) and a small amount of accessory minerals (Fe-oxides). This result is also supported by XRD studies.

IV) Major and trace element analyses were conducted to determine the geochemical properties of banded travertine samples. The banded travertine samples display limited compositional distribution in terms of major and trace element content.

V) The provenance of the banded travertines, which were widely used in many buildings in the ancient city, must be the ancient quarries located almost 3 km northeast of the ancient city. The geological characteristics of the banded travertine in those quarries show great similarities with the building stones of the ancient city.

VI) This study presents the minero-petrographical identification of the banded travertine building stones of the ancient city of Tripolis, which is located in Denizli Graben, for the first time. Data gathered as a result of this study will form a significant basis for the protection and restoration work that continues in the ancient city. In order to clearly determine the provenances, from where the banded travertine building stones necessary for the protection and restoration work can be obtained as original, analysis

(Confocal Raman Spectrometry (CRS), Cathodoluminescence (CL), Electron Paramagnetic Resonance (EPR), C-O stable isotope and U-Th isotope analyses) of rock samples should be increased and the data from these analyses should be evaluated together.

ABBREVIATIONS AND BIBLIOGRAPHY

Alçiçek 2007	H. Alçiçek, *Denizli Havzası (Sarayköy-Buldan Bölgesi, GB Türkiye) Neojen Çökellerinin Sedimantolojik İncelenmesi* (Ankara Universitesi, Fen Bilimleri Enstitüsü, Jeoloji Mühendisliği Anabilim Dalı, Unpublished Doctoral Thesis), Ankara, 2007.
Attanasio 2003	D. Attanasio, *Ancient white marbles: Analysis and Identification by Paramagnetic Resonance Spectroscopy*, L'Erma di Bretschneider, Roma, 2003.
Attanasio *et al.* 2000	D. Attanasio – G. Armiento – M. Brilli – M.C. Emanuele – R. Platania – B. Turi, "Multi method marble provenance determinations: the Carrara marbles as a case study for the combined use of isotopic, electron spin resonance and petrographic data", *Archaeometry 42*, 2000, 257-272.
Bozkurt – Satır 2000	E. Bozkurt – M. Satır, "The southern Menderes Massif (Western Turkey): geochronology and exhumation history", *Geological Journal 35*, 2000, 285-296.
Bülbül 2000	A. Bülbül, *Kamara ve Çizmeli (Yenice-Buldan) Sıcak ve Mineralli Sularının Hidrojeolojisi* (Pamukkale Universitesi, Fen Bilimleri Enstitüsü, Jeoloji Mühendisliği Anabilim Dalı, Unpublished M.Sc. Thesis), Denizli, 2000.
Çakır 1999	Z. Çakır, "Along - Strike Discontinuity of Active Normal Faults and Its Influence on Quaternary Travertine Deposition: Examples From Western Turkey", *Turkish Journal of Earth Sciences 8*, 1999, 67-80.
Candan *et al.* 2007	F. Chen – R. Oberhansli – M. Çetinkaplan – C. Akal – M. Satır – O. Kaya, "Menderes Masifi'nin Pan-Afrikan temelin stratigrafisi ve örtü - çekirdek serilerinin ilksel dokanak ilişkisi (In Turkish)", *Menderes Masifi Kolokyumu*, Izmir, 2007, 8-14.
Candan *et al.* 2011	O. Candan – R. Oberhänsli – O.Ö. Dora – M. Çetinkaplan – E. Koralay – G. Rimmelé – F. Chen – C. Akal, "Menderes Masifi'nin Pan-Afrikan Temel ve Paleozoik-Erken Tersiyer Örtü Serilerinin Polimetamorfik Evrimi (In Turkish)", *MTA Dergisi, 142*, 2011, 123-167.

Duman 2013	B. Duman, "Son Arkeolojik Araştırmalar ve Yeni Bulgular Işığında Tripolis ad Maeaundrum (In Turkish)", *Cedrus 1*, Antalya, 2013, 179-200.
Erdoğan – Güngör 2004	B. Erdoğan – T. Güngör, "The problem of the core-cover boundary of the Menderes massif and an emplacement mechanism for regionally extensive gneissic granites, Western Anatolia (Turkey)". *Turkish Journal of Earth Sciences 13*, 2004, 15-36.
Erdoğan – Güngör 1992	B. Erdoğan – T. Güngör, "Menderes Masifi kuzey kanadının stratigrafisi ve tektonik evrimi (In Turkish)", *Türkiye Petrol Jeologları Derneği Bülten 4/I*, 1992, 9-34.
Erten *et al.* 2014	H. Erten – Ş. Şen – M. Görmüş, "Middle and late Miocene Cricetidae (Rodentia, Mammalia) from Denizli Basin (southwestern Turkey) and a new species of Megacricetodon", *Journal of Paleontology 88(3)*, 2014, 504-518.
Gökgöz 1994	A. Gökgöz, *Pamukkale - Karahayıt - Gölemezli Hidrotermal Karstının Hidrojeolojisi* (Süleyman Demirel Universitesi Fen Bilimleri Enstitüsü, Jeoloji Mühendisliği Anabilim Dalı, unpublished doctoral thesis), Isparta, 1994.
Gökgöz 1998	A. Gökgöz, "Geochemistry of the Kızıldere–Tekkehamam–Buldan–Pamukkale geothermal fields", *United Nations University, Geothermal Training Programme, Reports*, Reykjavik, Iceland, 1998, 115-156.
Guo – Riding 1998	L. Guo – R. Riding, "Hot-spring travertine facies and sequences, Late Pleistocene Rapolano Terme, Italy", *Sedimentology 45*, 1998, 163-180.
Ingham 2010	J. Ingham, *Geomaterials Under the Microscope: A Colour Guide, CRC Press*, 2010.
Konak 1985	N. Konak, "A Discussion on the Core-Cover Relationship on the Basis of Recent Observations (Menderes Massif)", *The Geology Congress of Turkey Abstracts 33*, 1985.
Koralay *et al.* 2011	O.E. Koralay – O. Candan – C. Akal – O.Ö. Dora – F. Chen – M. Satır – R. Oberhanslı, "Menderes Masifindeki Pan Afrikan ve Triyas Yaşlı Metagranitoyidlerin Jeolojisi ve Jeokronolojisi, Batı Anadolu, Türkiye (In Turkish)", *MTA Dergisi 142*, 2011, 69-121.

Koralay 2015 — T. Koralay, "Minerologic, Petrographic and Geochemical Properties of Traverten Building Stones in Tripolis Antique City (Yenice/Buldan Denizli)", *Travertine - Tufa Workshop November 5-8*, Denizli Turkey, 6-7 (inside USB).

Koralay – Kılınçarslan 2015 — T. Koralay – S. Kılınçarslan, "A multi-analytical approach for determining the origin of the marbles in Temple-A from Laodicea ad Lycum (Denizli-Western Anatolia, Turkey)", *Journal of Cultural Heritage,* http://dx.doi.org/10.1016/j.culher.2015.05.005

Koralay *et al.* 2013 — T. Koralay – Y.K. Kadıoğlu – Y. Jiang – S.Y. Jiang, "Determination of Tourmaline Composition in Pegmatite from Buldan - Denizli (Western Anatolia-Turkey) Using XRD, XRF and Confocal Raman Spectroscopy", *Spectroscopy Letters, 46*, 2013, 499-506.

Oberhänsli *et al.* 1997 — R. Oberhänsli – O. Candan – O.Ö. Dora – S. Dürr, "Eclogites within the Menderes Massif / Western Turkey", *Lithos 41*, 1997, 135-150.

Özkul *et al.* 2013 — M. Özkul – S. Kele – A. Gökgöz – C.C. Shen – B. Jones – M.O. Baykara – I. Fórizs – T. Németh – Y. W. Chang – M.C. Alçiçek, "Comparison of the Quaternary travertine sites in the Denizli extensional basin based on their depositional and geochemical data", *Sedimentary Geology 294*, 2013, 179-204.

Pentecost 2005 — A. Pentecost, *Travertine*, Springer Verlag, 2005.

Rapp 2009 — G. Rapp, *Archaeo-mineralogy*, Springer Verlag, 2009.

Rapp – Hill 1998 — G. Rapp – C.L. Hill, *Geoarchaeology,* Yale University Press, 1998.

Reedy 2008 — C.L. Reedy, *Thin-Section Petrography of Stone and Ceramic Cultral Materials*, Archetype Publication Ltd, 2008.

Rollinson 1993 — H.R. Rollinson, *Using geochemical data: Evaluation, presentation, interpretation*, New York, 1993.

http://www.dmi.gov.tr

http://www.pau.edu.tr/tripolis

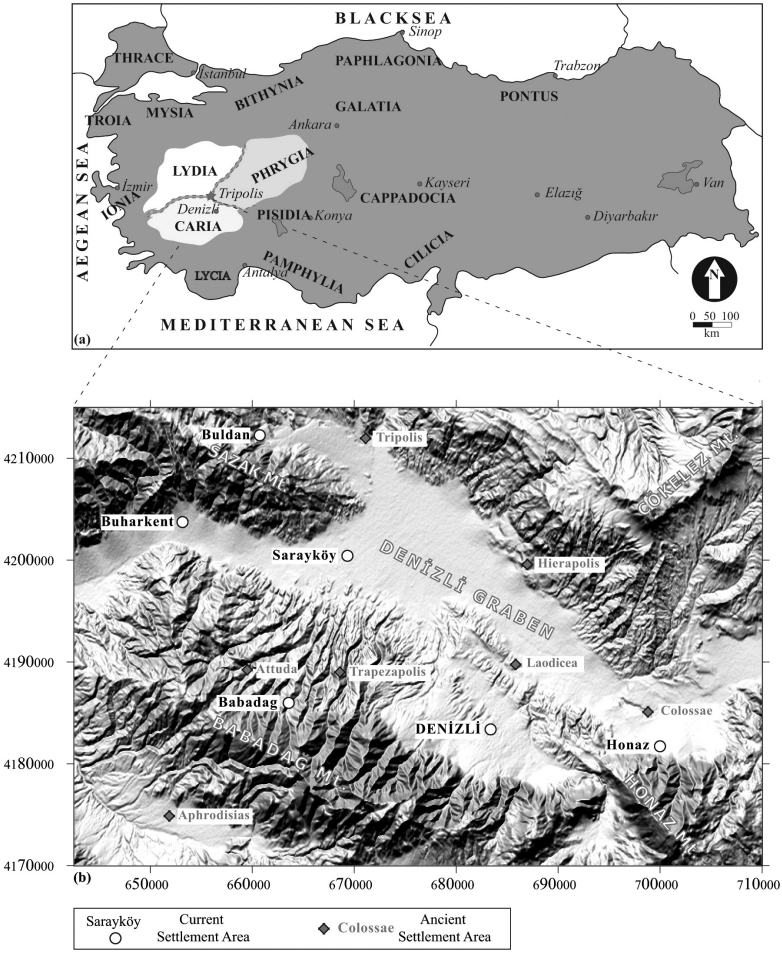

Fig. 1 a) Simplified map of Asia Minor showing the distribution of the ancient regions (modified from http://www.arkeolojidunyasi.com/antik_bolgeler.html) b) Digital Elevation Model (DEM) of Denizli Graben

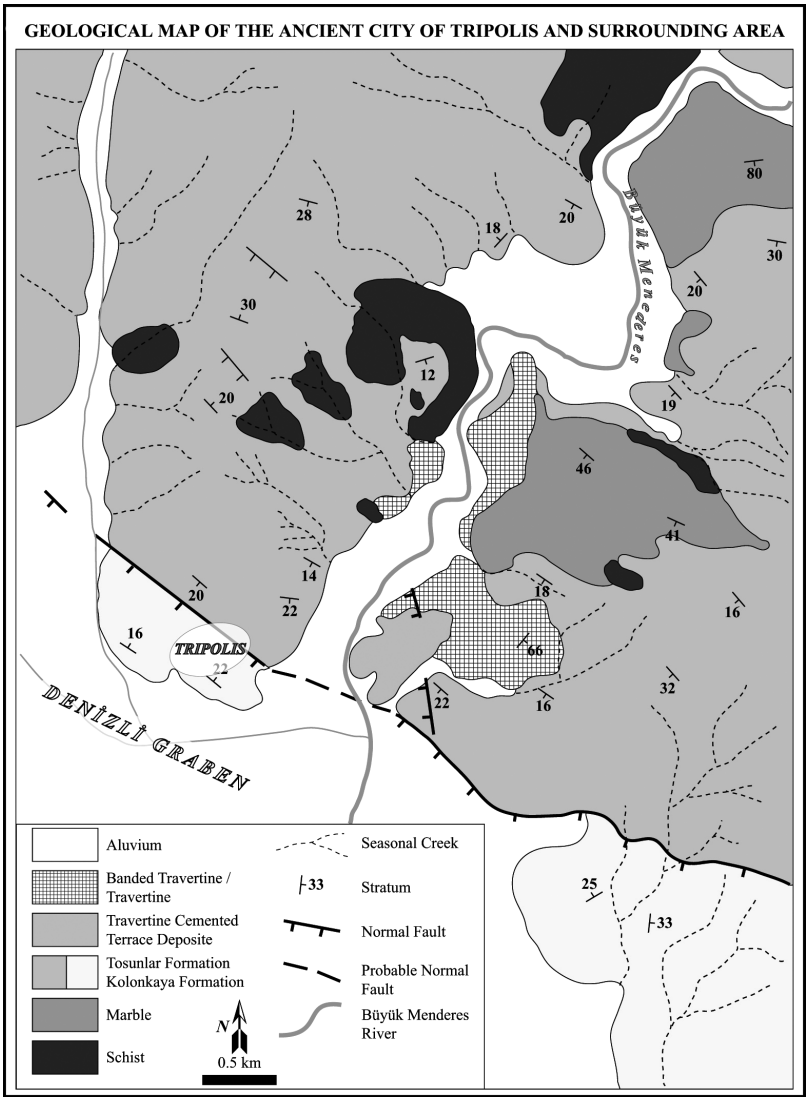

Fig. 2 Geological map of the ancient city of Tripolis and surrounding area

Fig. 3 Banded travertine blocks used for different purposes a) columns, b) column basement and c) paving.

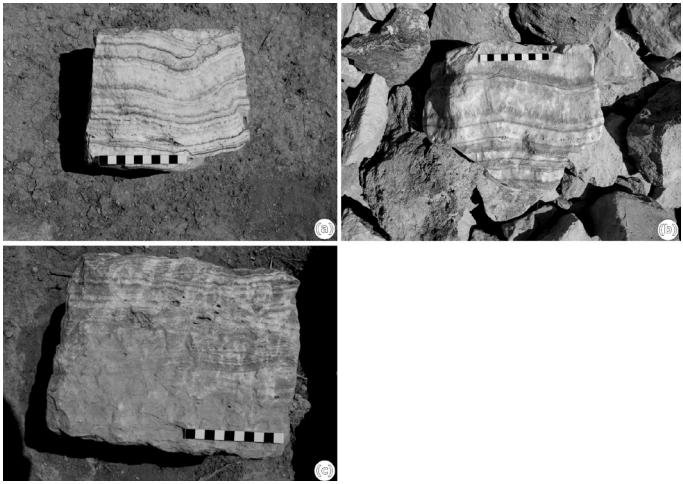

Fig. 4 Specimens of banded travertines: a) white, yellowish white, greenish white, red and reddish brown-colored banded structure, b) the colored bands, ranging between 0.5 and 5 cm in width, are generally parallel to each other, c) elliptical small cavities between colored bands

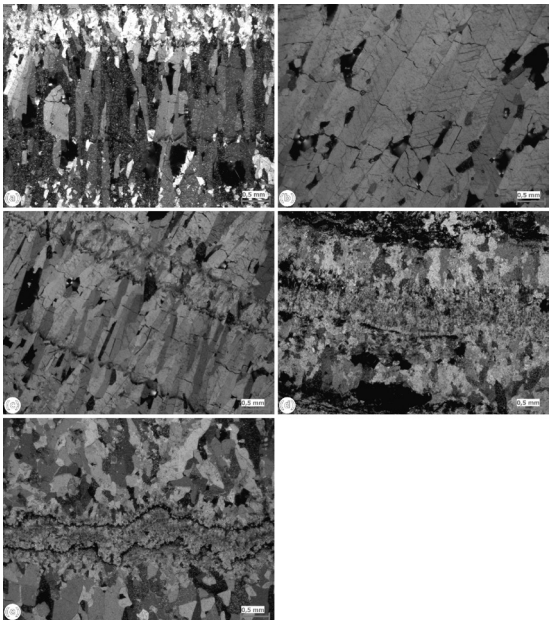

Fig. 5 Microphotographs of banded travertine samples: a, b, c) banded texture, micro cracks and iron-oxide bands in needle-shaped carbonate minerals, d, e) colored bands are separated by levels composed of fine-grained carbonate slurry, iron-oxide minerals and/or elliptical cavities

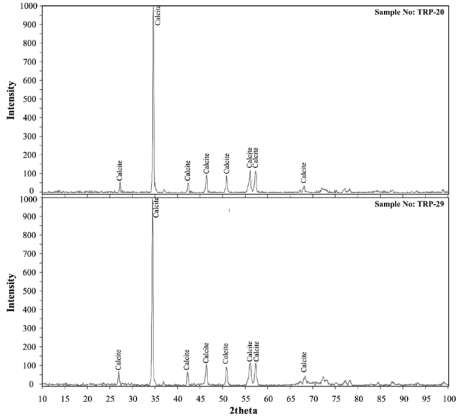

Fig. 6
XRD graphics of selected banded travertine samples

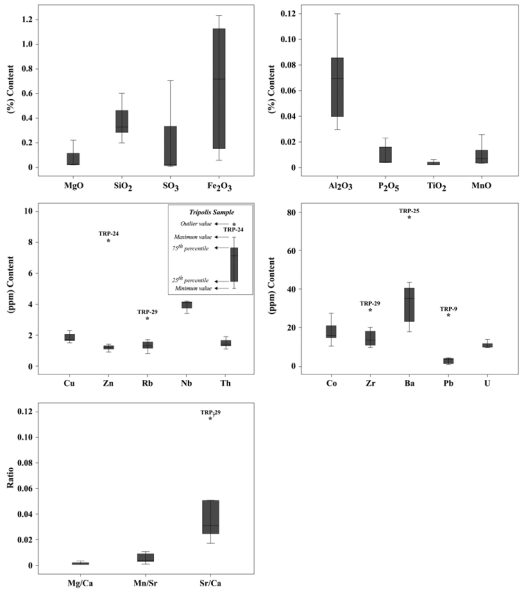

Fig. 7
Content boxplots of selected major and trace element and elemental ratios in Tripolis banded travertine samples

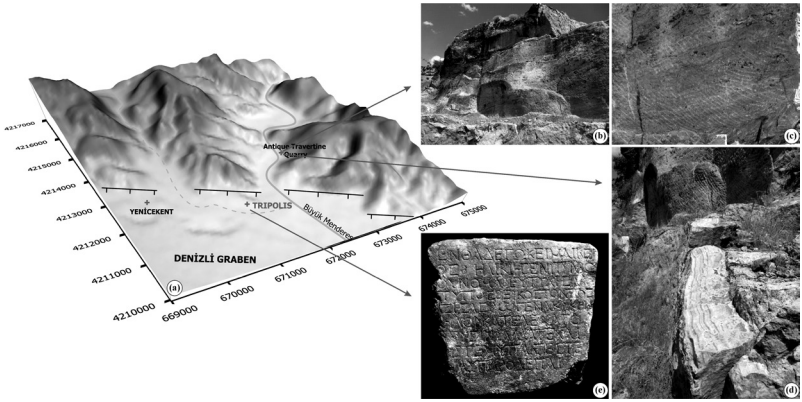

Fig. 8 a) location map of ancient banded travertine quarries,
b, c) work-faces bearing cutting marks left by pickaxes and pointed chisels (Fig. 6c taken from Prof. Dr. Mehmet ÖZKUL),
d) raw banded travertine block in ancient quarry, e) funerary inscription of the stonecutter Eutyches

Elements		**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
MgO	(%)	0.02	0.22	0.08	0.09
Al_2O_3	(%)	0.03	0.12	0.07	0.03
SiO_2	(%)	0.20	0.60	0.37	0.14
P_2O_5	(%)	0.004	0.023	0.010	0.009
SO_3	(%)	0.01	0.70	0.21	0.32
Ca	(%)	41.52	44.58	43.30	1.21
TiO_2	(%)	0.002	0.006	0.003	0.002
MnO	(%)	0.003	0.026	0.010	0.009
Fe_2O_3	(%)	0.06	1.23	0.65	0.52
Co	(ppm)	10.5	27.6	18.0	5.8
Ni	(ppm)	4.3	8.7	5.1	1.6
Cu	(ppm)	1.5	2.3	1.8	0.3
Zn	(ppm)	0.9	8.1	2.1	2.6
Rb	(ppm)	0.8	3.1	1.5	0.8
Sr	(ppm)	722.2	5090.0	1934.3	1501.2
Y	(ppm)	0.8	1.1	0.9	0.1
Zr	(ppm)	9.8	29.0	15.8	6.9
Nb	(ppm)	3.4	4.2	3.9	0.3
Ba	(ppm)	17.9	77.0	36.9	20.0
Pb	(ppm)	1.0	26.4	6.0	9.1
Th	(ppm)	1.1	1.9	1.5	0.3
U	(ppm)	9.8	14.0	11.0	1.9
Mg/Ca		0.0003	0.0030	0.0011	0.0012
Mn/Sr		0.0005	0.0103	0.0052	0.0039
Rb/Sr		0.0006	0.0014	0.0009	0.0004
Sr/Ca		0.017	0.114	0.044	0.033
Zr/Ti		2.8	20.2	9.1	5.6
Nb/Y		3.8	5.3	4.5	0.4

Table 1 Major oxide (%) and trace (ppm) element analyses of the banded travertine samples

MARMORA PHRYGIAE PROJECT: THE CONTRIBUTION OF LANDSCAPE ARCHAEOLOGY RESEARCH IN THE TERRITORY OF HIERAPOLIS IN PHRYGIA TO THE RECONSTRUCTION OF BUILDING SITES IN THE CITY AND THEIR STRATEGIES FOR SUPPLYING STONE MATERIALS

*Giuseppe SCARDOZZI**

Introduction

Since 2005 the Laboratory of Ancient Topography, Archaeology and Remote Sensing of the Institute for Archaeological and Monumental Heritage of the National Research Council (CNR-IBAM) of Italy performed landscape archaeology research in the territory of Hierapolis in Phrygia, in south-western Turkey (Pamukkale, Denizli Province), in the context of the Italian Archaeological Mission activities[1]. Systematic surveys, aimed at the

* Researcher of the Institute for Archaeological and Monumental Heritage of the National Research Council, Monteroni Street, Lecce, Italy. E-mail. g.scardozzi@ibam.cnr.it

[1] The research in the territory of Hierapolis was possible thanks to the constant support of Prof. Francesco D'Andria, director of the Italian Archaeological Mission. Many thanks also to my colleagues Drs. Laura Castrianni, Giacomo Di Giacomo, Immacolata Ditaranto and Ilaria Miccoli, who have collaborated during field

production of the archaeological map of the territory of Hierapolis, were performed between 2005 and 2008, while other investigations aimed at the data control and updating were carried out in 2012 (Hierapolis of Phrygia Survey Project); new investigations, mainly dedicated to the study of the ancient quarries of marble, travertine and breccias, were carried out in 2013-2015 (Marmora Phrygiae Project). The investigated area has an extension of about 700 square kilometres and it includes the northern sector of the Lykos river valley (modern day Çürüksu river, one of the main tributary of the Maeander River), where Hierapolis lies, and the Uzunpınar plateau and the western sector of the Çal plateau, north of the city. This study area mostly corresponds with the ancient territory of Hierapolis according the epigraphic documentation of the Roman Imperial age. This territory bordered those of other important cities in the southern sector of the Lykos valley, i.e. Laodikeia ad Lycum, Trapezopolis and perhaps Hydrela, whose location is uncertain, while in the south-western sector of the alluvial plain there is Kolossai and at the north-western end, just beyond the Maeander, the ancient city of Tripolis lies.

According to the morphology, it is a varied territory. In fact, the Lykos valley lies about 200-300 m above mean sea level (a.m.s.l.) and from this plain the territory gradually climbs until the broad Uzunpınar and Çal plateaus, north of Hierapolis, which are between 1150-1250 m a.m.s.l. at their southern part and between 850-950 m a.m.s.l. at their northern part. Both the Uzunpınar and Çal plateaus have their natural western, northern and southern boundaries in the deep and narrow valley of the Maeander river, which here runs between the mountains, and beyond which lie the territories of other ancient cities, i.e. Blaundos and Motella (to the north), and Dionysopolis and the *Hyrgaletici Campi*, mentioned by epigraphic texts and literary sources (to the north-east).

The investigated territory had not been previously studied in systematic way. Before this research, only limited data was available thanks to the unsystematic investigations conducted by W. M. Ramsay at the end of 19th century, when the general settlement pattern was highlighted[2]. Subsequently,

works and in the data processing.

[2] Ramsay 1883, 371-380, 383-386, 392; Ramsay 1887, 350; Ramsay 1895, 121-125, 133-134, 141-146, 149, 235-236; Ramsay 1928, 196-211, 273-275. See also Hogarth 1887 and Anderson 1897, 411-413.

during the 20th century, the area was partially investigated by W.H. Buckler, W.M. Calder and W.K.C. Guthrie[3], and by L. Robert, who focused mainly on inscriptions[4]. Moreover, in the last decades a few studies regarded the epigraphic documents recovered in this territory[5].

Investigations for the archaeological map of the territory of Hierapolis: a base of knowledge for the Marmora Phrygiae Project

Many data acquired during the systematic archaeological surveys conducted in the territory of Hierapolis between 2005 and 2012 (Hierapolis of Phrygia Survey Project) allowed to reconstruct the historical development of this area from the Prehistoric times to the Ottoman age[6].

The research methodology was mainly based on the systematic archaeological survey of the study area, which was performed using trekking GPS navigation systems for the positioning of ancient features. The field walking was supported by integration of various non-destructive methods and technologies of investigation: in particular, processing, analysis and interpretation of multi-temporal high resolution satellite images and geophysical prospecting[7]; moreover, in some cases aerial documentation was acquired using drones. While georadar and geomagnetic surveys were performed only in a few contexts in the territory near the city, high resolution satellite images were systematically used for the entire study area in the discovery of palaeo-environmental features or archaeological traces linked to buried ancient structures (damp-, shadow-, soil- and crop-marks)[8]; moreover, these images were processed for the production of ortho-images, space maps and topographic maps used during field works and as base cartographies for the archaeological map and in the linked GIS platform.

---

3 Buckler – Calder and Guthrie 1933, xiv-xvi, 95-117.

4 Robert 1937, 94-110; Robert 1962, 127-149, 164, 356-363 with Robert 1985, 49, 52-54.

5 Ritti 2002; Ritti *et al.* 2008, 68-72, 98-100, 118-124, 140, 222, 290, 296, with previous bibliography.

6 The publication of the archaeological map of the territory of Hierapolis is scheduled for the end of 2016; preliminary results of the research are in Scardozzi 2011.

7 Scardozzi 2007a; Castrianni *et al.* 2009.

8 Lasaponara *et al.* 2008; Lasaponara *et al.* 2010; Lasaponara *et al.* 2016.

In fact, satellite images have compensated for the limited availability of aerial photos, up-to-date cartographies and large scale topographic maps[9]. In particular, were used both some images taken between 2002 and 2015 by recent civil satellites QuickBird-2, Ikonos-2 and WorldView-2, and some space photos taken between 1961 and 1980 by American reconnaissance satellites Corona KH-2, KH-3, KH-4A and Hexagon KH-9; the last ones are particularly useful because they show the territory of Hierapolis before important transformations of the last decades, due to the building of infrastructures, the expansion of modern villages and the diffusion of mechanized agriculture[10]. Moreover, 3D digital models of the ground were processed from both radar and optical satellite data; in particular, a Digital Elevation Model was created from Shuttle Radar Topography Mission data and Digital Surface Models were extracted from a stereo pair taken by Terra satellite with ASTER (Advanced Spaceborne Thermal Emission and Reflectance Radiometer) sensor and from an Ikonos-2 stereo pair. These models, also draped with satellite images, were very useful both for the study of the territory and for the location of the archaeological features in their morphological context. Lastly, also remote sensing applications using high resolution radar images taken by CosmoSkyMed satellites are successfully testing[11].

The investigations identified many archaeological remains that allow to reconstruct the evolution of the settlement pattern in the study area since at least the Bronze age. At this period, for example, date back the earliest phases of two small settlements, Hüyük Tepe and Can Pınar, which were identified respectively in the Lykos valley, about 2 km north-west of the village of Akköy, and in the plateau north of Hierapolis, about 2 km south of the village of Uzunpınar[12]. However, most of the archaeological documentation regards the centuries between the Hellenistic age and the Byzantine period, when Hierapolis was alive (Fig. 1). In fact, the city was founded by Seleucids during the 3rd century BC and was an important city

[9] Castrianni *et al.* 2010; Di Giacomo *et al.* 2011.

[10] Scardozzi 2008.

[11] This experimental research is performed in cooperation with Drs. Nicola Masini (CNR-IBAM) and Rosa Lasaponara (CNR-IMAA, Institute of Methodologies for Environmental Analysis).

[12] Castrianni – Scardozzi in press.

during the Roman Imperial period and the Early Byzantine age; it went into decline after the 7th century AD and was definitely abandoned in the 14th century AD, after the conquest of Seljuk Turks[13].

In the territory closest to Hierapolis, the aqueducts, which brought drinking water to the city along three main routes, from north, north-east and east, have been identified, documented and reconstructed[14]. Between 6 and 13 km long, they consisted of terracotta pipes of medium size (diameter of 20-34 cm), in some cases simply buried in the earth, in others laid in hollows carved out of the rock or carved stone supports; they start from springs located immediately below the edge of the Uzunpınar plateau, at an altitude of between 1065 and 1090 m a.m.s.l. Again in the area immediately surrounding Hierapolis, numerous ancient quarries of travertine, alabaster, white and grey marble, and polychrome breccias with reddish matrix were identified; they were extensively exploited for the building sites of urban area and necropoleis[15].

The roads network was studied and reconstructed, in particular in the Lykos valley, which was crossed by very important routes that linked central Anatolia to the Aegean coast[16]. Among the last ones, the entire route of the road that connected Hierapolis to Tripolis, mentioned in the *Itinerarium Antonini* (336,3-336,4) and represented in the *Tabula Peutingeriana* (IX, 4), was identified; long stretches of this road (which have a total length of 19.5 km and ran along the north-western border of the Lykos plain), up to 8 m wide, paved with compacted gravel and bounded on both sides by two rows of travertine blocks, are preserved between Hierapolis and Akköy. Also the ancient road leading to Laodikeia across the Lykos plain was reconstructed; it was about 10-11 km long and ran to the west of an ancient lake, today dried up, which has been identified along the Lykos river, about 5 km south-west of Hierapolis and 2 km north of Laodikeia, thanks to the old map of the area drawn by A. Philippson at the beginning of 20th century[17]. This lake,

[13] About the history and monuments of Hierapolis: D'Andria 2003; D'Andria – Caggia 2007; D'Andria *et al.* 2008; D'Andria *et al.* 2012; Scardozzi 2015; D'Andria *et al.* in press.

[14] Scardozzi 2007b; Scardozzi 2012a, 111-117.

[15] Scardozzi 2010a; Scardozzi 2012b; Scardozzi 2012a, 117-125.

[16] Scardozzi 2012c.

[17] Philippson 1914.

documented also by a large damp-mark visible in a recent satellite image[18], was mentioned in an inscription discovered in Hierapolis that was a copy in marble of a letter from the Emperor Hadrian (131 AD), who was seeking to intervene in a dispute between Laodikeia on one side, and Hierapolis and Tripolis on the other; the controversy concerned fishing rights in the lake, which lied within the territory of Laodikeia[19].

Again in the area immediately surrounding the city and in the plateaus north of Hierapolis, evidence of intensive occupation of the territory were found, with rural villages and settlements of medium and small size (the last ones identifiable as farms), characterized by many installations for olive oil and wine production[20]. Very interesting is also the discovery of isolated Hellenistic funerary tumuli that could have belonged to the dominant classes of the rural communities, which had adopted the funerary typologies of the urban aristocracy[21]; according to their location in some necropoleis of the northern sector of Lykos valley and in the Uzunpınar plateau, these tumuli could be considered as landmarks that materialize the control of the *chora* by Hierapolis.

The investigations allowed to discover new and very significant data regarding the sanctuaries of the territory of Hierapolis[22]. In particular, among the most important discoveries, worthy of mention is the identification of the sacred area dedicated to the indigenous god *Karios*, assimilated to Apollo with the epithet *Kareios* by the Greeks who founded Hierapolis, where was worshipped in the main sanctuary of the city; we refer here to the remains of a platform with marble steles dedicated to the divinity, which was identified along the north-western slope of the Somaklı Tepe, at the south-eastern edge of the Uzunpınar plateau, just over 1 km to the east of the village of Güzelpınar and about 11 km north-east of Hierapolis[23]. Very important was also the identification of the sacred area dedicated to the

[18] Scardozzi 2007c, 83-85.
[19] Ritti *et al.* 2007, 589.
[20] Scardozzi 2010b; Scardozzi 2012a, 126-134.
[21] Scardozzi 2012a, 134-139; Scardozzi in press (a).
[22] Scardozzi 2013a. About the main sacred areas of the Lycus valley, see also Şimşek 2009.
[23] Miranda *et al.* 2012, 708-732. For an inscribed stele from the same site, see Ceylan – Ritti 1997.

deities worshipped by the local community of *Motaleis*, previous known only thanks to a few inscribed steles of uncertain provenance[24]; its remains, with at least two marble buildings, were discovered at the north-eastern edge of the same plateau, on the hill named Yüksektepe, about 2 km south of the village of Dağmarmara[25].

Again in the Uzunpınar plateau, the remains of the main ancient village of this territory, Thiounta, mentioned in some inscriptions and characterized by the presence of quarries of a valuable white marble, were documented in the area of the modern village of Eski Gözler, along the slopes that descend towards the Maeander river[26]. Moreover, in the northern sector of the same plateau, also the remains of a regular land division, that could be datable to the Hellenistic age, were identified thanks to the integration of archaeological surveys and analysis of multi-temporal satellite images[27]. Lastly, in the western sector of the Çal plateau, the ancient villages of Melokome, Salouda e Kagyetta, mentioned in the epigraphic sources, were identified in the area south of the Sanctuary of Apollo Helios Lairbenos[28], and the remains of the important city of Mossyna, mentioned by Roman Imperial inscriptions and Byzantine literary sources, were documented on a promontory located about 1 km south-east of the modern village of Sazak[29].

Marmora Phrygiae Project: aims and research activities

The Marmora Phrygiae Project started at the beginning of 2013 and has a lifetime of 42 months, with a public founding from the Italian Ministry of Instruction, University and Research (MIUR). The research project is carried out by three Institutes of the National Research Council of Italy (CNR-IBAM, Institute for the Archaeological and Monumental Heritage, Lecce; CNR-IGAG, Institute of Environmental Geology and Geo-Engineering, Rome; CNR-ICVBC, Institute for the Conservation and Valorization of Cultural Heritage, Florence) and by the University of Salento in Lecce

[24] Robert 1983.
[25] Miranda *et al.* 2012, 690-708.
[26] Castrianni – Scardozzi 2012, 87-95; Scardozzi 2014. About the archaeological evidence on the Çal plateau see also Şimşek 2007a.
[27] Scardozzi 2013b.
[28] About this sanctuary, see Ritti *et al.* 2000.
[29] Castrianni – Scardozzi 2011; Castrianni – Scardozzi 2012, 95-104.

(Department of Cultural Heritage), which work in integration within the Italian Archaeological Mission at Hierapolis. Research activities involve experts from different disciplines (archaeology, ancient topography, art history, architecture, geology, geophysics, physics, geochemistry, chemistry, biology, remote sensing, computer science, electrical engineering, law) and are based on the integration of different methodologies and technologies.

The main objective of the project is the study of the building sites of Hierapolis and their strategies in supplying stone materials, applying a diachronic approach from the Hellenistic times to the Byzantine age[30]. This type of research can be performed in Hierapolis thanks to two important characteristics of the study area: i) there is a high level of knowledge both of the main monuments of the city, where the Italian Archaeological Mission works continuously from 1957, and of the surrounding territory, where the Hierapolis of Phrygia Survey Project between 2005 and 2012 (see above) reconstructed in detail the ancient settlement pattern and the historical landscape; ii) Hierapolis is within an important quarrying district that offered an extensive range of stone materials also in the area very close to the city.

The research project is characterized by a systematic approach to the study of building sites. In fact, with respect to the previous studies regarding Hierapolis, focusing only on a few monuments and on the imported marbles[31], the project focuses both on local stone materials and the imported ones, and also on the exported ones, in particular the alabaster. The last one is a banded travertine, which was identified with the *marmor hierapolitanum* mentioned in the Roman and Byzantine literary sources; it was used in Rome, Constantinople and in numerous cities of the western Anatolia and in the Mediterranean basin.

A first main task of the project concerns the study and reconstruction of the ancient topography of the mining district of Hierapolis (including the strategies of quarrying stone materials and the routes between the quarries and the building sites in the urban area and necropoleis), thanks to systematic geo-archaeological field surveys and documentation. This

[30] In general about the project, which will finish in September 2016, see Scardozzi in press (b).

[31] Attanasio – Pensabene 2002; Frate 2006 and 2007.

task includes also the detailed archaeometric characterization of the ancient marble and alabaster quarries in the territory of Hierapolis and in the Denizli basin for the provenience investigation of stone materials used in the city and surrounding necropoleis, thanks to the collection of many samples from these quarries and the integration of mineral-petrographic analyses (performed by the Optic and Electronic Microscopy and X-Ray Diffractometry Laboratory of CNR-IBAM in Lecce), C-O stable isotope analyses (performed by the Mass Spectrometry Laboratory of CNR-IGAG in Rome), and cathodoluminescence analyses (performed by the Units of Archaeometric Studies in the Institute of Classical Archaeology of Catalonia - ICAC, Tarragona).

A second main task of the project is the systematic study of the monuments of Hierapolis characterized by an extensive use of marble, with particular attention to the reconstruction of their plans, elevations and decorative apparatuses. The research aims at defining the origins of stone materials used in the public building sites of Hierapolis thanks to the integration of archaeological data and archaeometric analyses of many samples collected in the entire urban area. Moreover, also the organization of these building sites is studied, considering planning and construction aspects, technical and organization solutions, times and costs of work, legal and administrative aspects, social and economic dynamics, public and private customers, etc.

Another important task includes the reconstruction of the ancient topography and organization of the necropoleis of Hierapolis, with particular regard to the archaeometric characterization of marble sarcophagi, their distribution in the funerary areas and the choices of private customers. Moreover, particular attention was dedicated to the funerary inscriptions mentioning sarcophagi made using valuable marbles, such as Dokimeion and Thiounta.

Furthermore, another important task regards the diagnostic studies aimed at the assessment of the state of conservation of marbles in Hierapolis, also in consideration of the particular tectonic and hydro-geological context of the site, due to the active seismic fault that crosses the city. These research activities, performed by CNR-ICVBC, include the study of the physical-chemical mechanisms responsible for the phenomena of degradation, the

monitoring of environmental parameters and surfaces, the analyses of waters and dissolved gases, and the thermographic analyses for the identification of thermic anomalies.

Lastly, among the main tasks of the project it is important to remember the development and implementation of an opensource webGIS, named "Marmora Phrygiae" and aimed at the data management, integration and sharing. At the end of the project, it also will be used for the free on-line publication of the archaeometric and archaeological data collected during the research. The alphanumeric geodatabase is organized in three levels linked among them: i) contexts, which includes the quarries and the monuments or the necropoleis where the stone samples were collected; ii) objects, which includes the sampled artefacts from the city and necropoleis (architectonic elements, sarcophagi, etc.) or the quarry faces where samples were collected or the unfinished materials sampled in the quarries; iii) samples, which includes the archaeological ones and those collected in the quarries. Moreover, these data were georeferenced on different types of base-maps, both vector (the new archaeological map of Hierapolis) and raster (high resolution optical satellite images, topographic maps with medium scale). According to the concept of open access to scientific data, the webGIS "Marmora Phrygiae" could be an important research tool for the knowledge of the archaeometric characteristics of marbles and alabasters from southern Phrygia, helpful for the investigation on exported materials and for the study of supplying stone materials strategies in the building sites of Hierapolis and of the nearby ancient cities, in particular Laodikeia ad Lycum, Kolossai and Tripolis ad Maeandrum.

Marmora Phrygiae Project: systematic study and archaeometric characterization of the ancient quarries in the Denizli basin and Uzunpınar plateau

The main contribution to the Marmora Phrygiae Project from landscape archaeological research in the territory of Hierapolis was the study of ancient quarries in the Denizli basin and Uzunpınar plateau. During 2013 and 2014 field work campaigns, a systematic geo-archaeological study of these quarries was performed by CNR-IBAM and it was aimed at the documentation of the extractive sectors, their DGPS georeferentiation and reconstruction of the transportation routes; the archaeological and

topographical surveys were carried out in integration to the study of the geologic characteristics of the area (in cooperation with the University of Calabria, Department of Biology, Ecology and Earth Sciences, Cosenza). Moreover, the research was aimed at the archaeometric characterization of these quarries; so, many samples were collected by CNR-IGAG researchers during surveys.

Thanks to the peculiar geologic and tectonic setting of the site[32], in the territory immediately surrounding Hierapolis are available different types of stone, which were widely quarried for the urban building sites and the funerary monuments of necropoleis. In particular, there are quarries of travertine, breccia and marble that are located in a 3 km radius from Hierapolis and accessible by routes that guaranteed a fast transfer of materials to the city. These quarries were extensively exploited especially in Hellenistic and Roman Imperial times, but also in the Early Byzantine age, even if on a lesser scale due to the large reuse of stones that characterized this period.

Different types of travertine are in the immediately territory surrounding Hierapolis: travertine cemented talus, bedded travertine and banded travertine. The last one is a calcareous alabaster, in the varieties *listato*, *fiorito* and *ghiaccione*, identified with the "Hierapolis marble" that Strabo (IX, 5, 16) recalled among the coloured stones from Asia Minor that were widely imported to Rome during the Augustan period; it was also recognized as the λίθος Ἱεραπολίτος that was used, according to the Byzantine literary sources, for the balustrades of the stairs that gave access to the ambon of St. Sofia at Constantinople, and for the sarcophagi of Theodora, wife of Justinian, and of the wife of the emperor Anastasios II, both placed in the Church of the Holy Apostles in Constantinople[33]. Most of the alabaster quarries are located a short distance from the city, to the west, north-west and north-east, and they are large trenches excavated in the central sectors of long fissure ridges; moreover, other important ancient alabaster quarries

[32] About the geologic and tectonic setting of the Denizli basin see Koralay – Kılınçarslan 2015, 264-265; Kumsar *et al.* 2015, 2-4, with previous bibliography.

[33] Scardozzi 2012b, 578-582; Marabini – Scardozzi 2015, 263-268, with previous bibliography. See also Pensabene 2013, 394-397, where an Imperial property of the alabaster quarries near Hierapolis, at least in the early Imperial age, is hypothesized.

are about 3.5 km north-west of the village of Gölemezli (about 13 km north-west of Hierapolis)[34] and further north, about 3 km north-east of Tripolis, where this stone was widely used[35].

The polychrome breccia of Hierapolis is characterized by a noticeable grey, ochre yellow and white clasts of metamorphic and sedimentary rocks, mixed in a reddish calcareous matrix[36]; it is possible to distinguish two types of this breccia, one more compact and cemented, with smaller clasts and a less proportion of matrix, and another one more friable, characterized by bigger clasts and a more quantity of matrix. The quarries are mostly concentrated in an area located 2 km north-west of the city, along the Karahayıt fault, which is the north-westernmost sector of the Pamukkale fault zone; some extraction areas are also to the east of this fault, at more altitude.

While in 2016 the research activities will be aimed at the archaeometric characterization of the breccia and the alabaster of Hierapolis, the first stone only locally used in the cities of the Lykos valley and the second one exported also in western Anatolia and in western Mediterranean basin, one of the main result of the 2013-2015 investigations was the systematic study and archaeometric characterization of white and grey marble quarries in the Denizli basin and Uzunpınar plateau (Fig. 2)[37]. About the analytical methods, for all the samples X-ray diffraction spectra were determined to detect the presence of dolomite and calcite. A selection of samples was cut into thin sections for a petrographic and mineralogical investigation under a polarizing microscope to establish the characteristic litotypes of each quarry, study the texture and crystal boundary shapes, and determine the Maximum Grain Size (MGS). Cathodoluminescence microscopy was also performed on the thin sections, which were polished for this purpose; it has been used with some success to discriminate the white marble quarries. Moreover, the whole set of samples was powdered for the oxygen and carbon stable isotope analysis (Fig. 3).

---

[34] Bruno 2002.

[35] Koralay *et al.* in press.

[36] Scardozzi 2012b, 577-578; Marabini – Scardozzi 2015, 262-263, with previous bibliography.

[37] Brilli *et al.* 2015, 124-142.

About the Hierapolis marble the most important result was the discrimination of two main varieties that were quarried a short distance from each other: Hierapolis-Gök Dere and Marmar Tepe (Fig. 4). In fact, the geologic evolution of this area have determined significant differences in the petrographic and geochemical characteristics of the two very near marbles; in some cases, also their macroscopic appearance is different.

The Hierapolis-Gök Dere marble was quarried in an area very close to the city, located about 800 m north-east of the North Necropolis, along the valley of the seasonal stream named Gök Dere. These quarries were partially already known before the recent investigations performed during the Marmora Phrygiae Project[38], and they were already sampled[39]; in the scientific literature, this stone is the Hierapolis marble[40]. The main quarry fronts are located along the southern side of the narrow valley of the Gök Dere (Fig. 4, M2, M4 and M5); the stream bed, dry during many months of the year, was the only access for the extraction area and the transportation road for the extracted materials. The quarries are in a stretch of the valley about 300 m long, at an altitude between 470 and 520 m a.m.s.l.; the largest quarries are at the two ends of this stretch. The first (M2), at the entrance of the valley, includes three quarry faces 10, 40 and 35 m long, and high up to 10 m (Fig. 5, a); the bigger one has been heavily damaged by a recent resumption of quarrying, but in the side parts it is still possible to see the marks of the picks used for the extraction of blocks. The second quarry (M5) is about 20 m large and has a front 31 m long and about 10-12 m high (Fig. 5, b); on the north-eastern side, the quarrying activity exposed a vein of polychrome breccia with reddish matrix characterized by small and well cemented clasts. A second sector of this extraction area is located about 700 m further north-west, at the top of the hill (about 610 m a.m.s.l.) that lies immediately to the north of the Gök Dere valley; the main quarry (Fig. 4, M1) has a face about 20 m long and up to 6-7 m high (Fig. 5, c)[41].

The Hierapolis-Gök Dere marble is white, but is often spotted in tones from yellowish to grey, with grey veins and, sometimes, rusty orange or

[38] Waelkens 1986, 668; Waelkens *et al.*1987, 117 with Scardozzi 2010a, 358.

[39] Attanasio *et al.* 2006, 177-179 (quarries H1 and H2).

[40] For a recent survey and sampling of those quarries see also Koralay – Kılınçarslan 2015, 274-286.

[41] It corresponds to the quarry H4 of Attanasio *et al.* 2006, 177-179.

reddish alabaster patches; pure white specimens are the exception. The grain is generally irregular, varying from medium to large, while the consistency is prevailingly uneven, with some parts compact and others friable. The average grain size can be classified as medium, with MGS measured between 0.80 and 3.00 mm. Isotopes of this marble are between -0.74 and 3.69‰ for carbon and between -10,05 and -5.73‰ for oxygen[42]; they allow a clear-cut characterization of this marble with respect to the other marbles from the territory of Hierapolis (Fig. 3). Moreover, according to the whole data set available[43], petrography and geochemistry allow also to distinguish the marble from the Gök Dere valley (quarries M2=H1-H2=A, M4=B and M5=C) and the marble from the top of the hill immediately to the north of the valley (quarry M1=H4); in fact, the first one is characterized by a smaller grain size (MGS mean values between 0.70 and 1.55 mm) and it has isotopes between 0.02 and 1.80‰ for carbon and between -10,05 and -7.26‰ for oxygen, while the second one is characterized by a bigger grain size (MGS mean value of 2.45 mm) and it has isotopes between -0.74 and 3.69‰ for carbon and between -9,57 and -4.53‰ for oxygen (Fig. 5, d).

The largest extraction area of the white and grey marble close to Hierapolis is located about 2 km north of the city, on the Marmar Tepe mountain (Fig. 4), and it has not been considered in previous archaeometric studies[44]. On the mount's summit, constantly sloping southward, at an altitude between 900 and 800 m a.m.s.l., and on its southern slope, there are about 45 quarry sites (13 of which were sampled) on a surface of almost 4 ha. The quarries are mostly recesses in the bedrock, deep up to 5-6 m, with variable size, and they can reach up to a width of 20 m and a length of 50 m (Fig. 5). The extraction took place with steps, often exploiting the natural fissures that characterize the rock, thanks to the use of wedges and picks, of which signs remain. In the quarries located further down the southern slope of the mountain, the faces are long up to 20 m and reach a height up to 8 m. The transportation roads went down from the southern side of the

[42] These isotopic data, measured during the Marmora Phrygiae Project, fall with those published in Attanasio *et al.* 2006, table 2.18, and in Koralay – Kılınçarslan 2015, table 7.

[43] Attanasio et al. 2006, table 2.18; Brilli et al. 2015, table 2; Koralay – Kılınçarslan 2015, fig. 6 and table 7.

[44] These quarries were identified during the 2006 field walking campaign: Scardozzi 2010a, 358-359; Scardozzi 2012b, 575.

Marmar Tepe and reached the plain located immediately north of the North Necropolis. It is evident from the vastness of the extraction area that this marble was likely the most exploited in the Hierapolis territory, possibly due to the easy of transportation to the city and the open space that made the quarrying operations easier, especially compared to the Gök Dere quarries opened along the narrow and uneven valley of the seasonal stream.

The Marmar Tepe marble is white (often with greyish veins) to greyish in colour. It has a heterogeneous medium-large grain size with a measured MGS between 2.00 and 4.50 mm; its macroscopic aspect is highly variable, from compact to poorly cohesive. Isotopes of Marmar Tepe marble range mostly between -6.15 and -1.78‰ for the oxygen and between 0.09 and 2.54‰ for the carbon, and they allow to neatly distinguish this stone from the Hierapolis-Gök Dere marble (Fig. 3).

It is important to highlight that the discrimination between the marbles quarried in the two main extraction areas nearby the city (i.e. Gök Dere and Marmar Tepe, which could be considered the "urban quarries", as in the case of Aphrodisias[45]) is very important in the study of the strategies in supplying marble materials for the building sites of Hierapolis; in fact, the archaeometric analyses of the marble samples collected in the urban area and in the necropoleis, still in progress, are documenting that these two marbles constitute about 75% of those employed in Hierapolis.

Again in the northern side of the Lykos valley, but more far from Hierapolis, are the marble quarries of Gölemezli, located 4 km north-west of the modern village, about 13 km north-west of Hierapolis; these extraction area was identified in 2006[46] and it has never been investigated for archaeometric characterization before the Marmora Phrygiae Project. The marble quarries are located about 400 m north-east of the already mentioned Gölemezli alabaster quarry (Fig. 7, GM1-GM2); even though the recent resumption of the extraction activities has partially destroyed the ancient fronts, at least two faces can be distinguished (10-15 m long and up to 4 m high), with various steps upon which the pick marks are clear (Fig. 8, a-c). Two other ancient quarries, both partially destroyed by recent extraction activities, are located about 530 and 450 m further north-west

[45] Long 2012.

[46] Scardozzi 2010, 356; Scardozzi 2012, 575.

respectively (Fig. 7, nos. 3-4); in the first, two small extraction faces (with a max length 20 m) are still visible, while in the second one a stepped face roughly 37 m long and almost 7 m high was preserved in 2006 (Fig. 8, d), but nowadays it is completely destroyed. The marble from the Gölemezli quarries is predominantly white and is rarely greyish; sometimes there are rusty coloured veins. It is in general rather compact and bright, and very coarse-grained, with a measured MGS between 4.20 and 5.20 mm. The isotopic analyses display a narrow range for carbon isotopes from 1.85 to 2.98‰ and a less restricted range for oxygen isotopes between -5.79 and -2.78‰; so, in the scatterplot $\delta^{18}O/\delta^{13}C$ (Fig. 3) this marble shows a clear-cut field of existence. In general, the Gölemezli extraction area is smaller than the other ones in the territory of Hierapolis. The investigations on marble provenance are documenting that this stone is a very little used in the city; so, it is probably that these quarries were exploited by the closer city of Tripolis, which lies only 7 km to the north-west.

The most valuable white marble of the Hierapolis territory was the Thiounta marble, which was quarried close to the ancient village located at the northern edge of the Uzunpınar plateau, in the area of Eski Gözler, about 20 km north of the city. The Thiounta marble (σόρος ἡ λευκὴ ἡ θιουντήνη) is mentioned at least by four inscriptions from Hierapolis, inscribed on funerary monuments in the North Necropolis, which document the prestige of sarcophagi made using this stone[47]. The extraction area is quite large and includes both the edge of the plateau and some sites along the slope leading down to the Maeander river, where quarrying continues still today[48]; the modern activities make it difficult to establish the original extension of the ancient extractive district. At least two main ancient quarries where identified (Fig. 9, TH1=A and TH2=AB4), which where sampled during the 2013 field work campaign, when some samples were collected also from a large modern quarry that probably have destroyed an ancient extraction site (Fig. 9, TH3=M)[49]. The best preserved ancient quarry (TH1=A) is a

[47] Judeich 1898, nos. 113, 178, 312, 339; D'Andria 2003, 58; Ritti 2006, 56-62.

[48] Attanasio, 2003, 203-208; Attanasio *et al.* 2006, 179-183; Scardozzi 2010a, 354-355.

[49] The two ancient quarries correspond to those named A and AB3 or AB4 in Attanasio et al. 2006, 179-183, while the large modern one corresponds to that named M in the same work; in two other quarries, named AB1 and AB2 in the same study, the ancient extraction faces were destroyed by the recent resumption

large recess in the bedrock (extended on a surface of about 1 ha), located north of the modern village of Yeni Gözler, where some ancient quarry faces (with heights up to 4-5 m) are visible and many unfinished materials are abandoned (in particular blocks and fragments of columns); approximately at the centre, is a rocky core saved by extraction and about 3 m high, where marks produced by the use of picks are visible (Fig. 10). Moreover, other ancient quarry faces are in the slope that gradually descends forward the Maeander river; among them, one of the largest (TH2) was partially destroyed by the recent resumption of the extraction activities.

From a macroscopic view the Thiounta marble is mainly white and sometimes spotted or mottled with veins. The aspect and brightness of this stone is similar to the white marble from Aphrodisias, but the dimensions of the crystals is slightly larger in the first one; in fact, the MGS falls between 3.00 and 3.70 mm[50]. Most of isotope data are grouped in a narrow range, both for carbon and oxygen, between 1.4 and 2.6‰ and -4.3 and -2.8‰, respectively (Fig. 11)[51]. Some samples, in particular from modern quarries, fall out of this group; among the samples that present a carbon isotope composition significantly lower, some clearly represent a grey facies, which evidently incorporated some organic carbon, while some of the samples that show an oxygen isotopic composition much lower could be affected by isotopic alteration, probably due to meteoric water, even though no macroscopic evidence of weathering was detected.

The Thiounta quarries, while still in the Hierapolis territory, were located at a considerable distance from the city, but it was rather easy accessible by a long route (about 45 km) using the Maeander river until Tripolis and then the road between this city and Hierapolis. On the contrary, trying to reach Hierapolis through the winding ancient routes that crossed the Uzunpınar plateau and descended towards the Lykos valley would have been much more difficult and costly, even though more short. The

of activities and they were not re-sampled in 2013.

[50] In Attanasio *et al.* 2006, table 2.19 and 2.16, the measured MGS of the Thiounta and Aphrodisias marbles have medium values respectively of 2.93 mm and 2.1 mm, both with a standard deviation of 0.7 mm.

[51] The isotopic data from the analyses performed during the Marmora Phrygiae Project fall with the data published in Attanasio *et al.* 2006, table 2.19, in particular for the sure ancient quarries.

archaeometric analyses, both the already published ones[52] and those still in progress performed during the Marmora Phrygiae Project, show the use of the Thiounta marble in Hierapolis for architectonic elements and sarcophagi at least during the Roman Imperial age.

Lastly, another important and large extractive district is located in the southern side of the Lykos valley, in the mountains south-west of the modern city of Denizli, and it was investigated and sampled several times from 1970s[53]. This district was probably controlled by Laodikeia, located about 13-15 km to the north-east, where this stone, traditionally named Denizli marble, was used as confirmed also by archaeometric analyses[54]; this marble seems little used in Hierapolis, located about 23-25 km further north-east, according to the analyses performed during the Marmora Phrygiae Project (still in progress). The extractive district of the Denizli marble is quite large and the investigations of mid-seventies identified no less than 32 ancient quarries, many of which are today destroyed due to the modern extraction activities. The remains of some quarries are still identifiable along the western side of the Domuzderesi stream (also named Değirmen Dere), on the eastern slopes of the mountains named Gök Tepe and Bozyokuş Tepe (Fig. 12, D1, D2, D3=D, D4, D5; Fig. 13, a-b); the quarries, located between 2 and 4 km south-west of the modern village of Yeşilköy, were accessible thanks to the narrow valley of the seasonal stream, from which also an ancient well preserved transportation road, partially cut in the bedrock, started. Other ancient quarries were accessible thanks to the secondary narrow valley of the Kuru Dere stream, covering about 1.7 to 1.8 km to the west by the Domuzderesi stream; in this area, the ancient quarry faces are in both the northern and southern sides of the valley, respectively on the south-eastern slope of Kuzluk Tepe and on the northern slope of Bozyokuş Tepe, at altitudes between 25 and 80 m with respect to the bed of the stream (Fig. 12, DA-DB=A-B-C and DC-DD; Fig. 13, c-d). Recently, other large quarries were discovered about 2.5 km north of the Domuzderesi

[52] Attanasio – Pensabene 2002, 84.

[53] Monna – Pensabene 1977, 81-84; Attanasio 2003, 171-173; Şimşek 2007b, 329-339; Attanasio *et al.* 2006, 169-176 (quarries DA-DD); Şimşek 2013, 439-443; Brilli *et al.* 2015, 129, 137-140 (quarries D1-D5); Koralay – Kılınçarslan 2015, 270-286 (quarries A-D).

[54] Koralay – Kılınçarslan 2016.

and Kuru Dere area, along the northern slope of the Gök Tepe[55]; they are about 2.3 km south-west of the modern village of Yenişehir, from which the area is accessible.

The Denizli marble is quite compact and with different colours: pure white, white with grey veins, and grey. Considering the whole archaeometric data set available[56], it is possible to distinguish three main varieties, which correspond to different locations of the quarries. The first variety (Denizli-1) was quarried in the southernmost sector of the Domuzderesi valley (Fig. 12, quarries D1, D2, D3=A, D4) and it has a medium-large grain size with a measured MGS generally between 1.20 and 2.60 mm (only one sample arrive to 4 mm); isotopes range mostly between -2.92 and -1.85‰ for the oxygen and between 1.64 and 3.24‰ for the carbon (Fig. 14; only two samples fall out of this group). This variety of Denizli marble fall with the group of samples named Den-1 and Den-2 in the Norman Herz's database and with the samples Den1 and Den4 collected by Monna and Pensabene[57]. The second variety (Denizli-2) was quarried in the northernmost sector of the Domuzderesi valley (Fig. 12, quarry D5) and in the Kuru Dere valley (Fig. 12, quarries B-C-D=DA-DB and DC-DD). It has a small grain size with a measured MGS that has mean values of 0.75-0.85 mm[58] and 1.35 mm[59]; isotopes range mostly between -9.59 and -5.30‰ for the oxygen and between -1.44 and 3.41‰ for the carbon (Fig. 14; only two samples fall out of this group). This variety of Denizli marble fall with the group of samples named Den-3 in the Norman Herz's database and with the samples Den6 and Den9 collected by Monna and Pensabene[60]. Its petrographic features and isotopic data are very similar to those of the Hierapolis-Gök marble, from which it can be distinguished thanks to cathodoluminescence analyses[61]. Lastly, it is possible to suppose the existence of a third variety, which was documented by five samples (Den3, Den5, Den7, Den12, Den13) collected

[55] The discovery was presented by Dr. Tamer Koralay at the International Conference "Cave e cantieri antichi d'Asia Minore", held in Rome on 2-4 December 2015.

[56] Attanasio *et al.* 2006, 169-176; Brilli *et al.* 2015, 129, 137-140; Koralay – Kılınçarslan 2015, 270-286.

[57] Attanasio *et al.* 2006, table 2.17, fig. 2.47.

[58] Koralay – Kılınçarslan 2015, 271-273, fig. 6.

[59] Attanasio et al. 2006, table 2.17.

[60] Attanasio *et al.* 2006, table 2.17, fig. 2.47.

[61] Brilli *et al.* 2015, 140.

by Monna and Pensabene[62] without a precise location of the provenance quarry. It has a medium-large grain size with a measured MGS between 2.40 and 2.90; isotopes range mostly between -2.90 and -2.69‰ for the oxygen and between -0.18 and 0.43‰ for the carbon (Fig. 14).

Conclusions

The recent archaeological and archaeometric investigations about the ancient marble quarries in the territory of Hierapolis and in the southern side of the Lykos valley have constituted a fundamental database for the study of the provenance of stone materials used in the building sites of Hierapolis. The analyses on the samples from the urban area and surrounding necropoleis, still in progress, are documenting that at least 90% of marbles used in Hierapolis are local; only particular architectonic elements or artefacts (such as a few types of sarcophagi) were made, in particular between the 2nd and 3rd century AD, using more valuable marbles from other extractive districts, such as Aphrodisias and Dokimeion (both white marble and *pavonazzetto*)[63]. At this regard, it is important to remember that the use of Dokimeion marble was mentioned in some inscriptions from the North, South-West and South-East Necropoleis of Hierapolis[64], and in the dedication of the Severan scaenae frons of the Theatre in the centre of the city[65]. Moreover, it is important to remember that an inscription again in the North Necropolis mentions a sarcophagus in Ταυρισκιανή marble[66]; it is a name never documented elsewhere, perhaps attributable to a site called *Tauriskon/ke,* which we do not know if it was within the study area, where only in the case of Thiounta the ancient name of the marble is known.

Lastly, it is important to highlight that the experience and documentation produced by the research activities of the Marmora Phrygiae Project could be very useful for the reconstructions of strategies in supplying stone materials also in the other ancient cities close to Hierapolis, in particular Laodikeia

[62] Attanasio *et al.* 2006, table 2.17, fig. 2.47.

[63] About these two extractive district see: Attanasio *et al.* 2006, 151-165; Long 2012, 169-185, 190-201; Brilli *et al.* 2015, 129, 138-140, tables 2-3.

[64] Judeich 1898, nos. 56, 158, 209, 213, 323, 335; D'Andria 2003, 59-60; Ritti 2004, 469.

[65] Attanasio – Pensabene 2002; Ritti 2006, 119-124; Pensabene 2007, 294-295.

[66] Ritti 2002, 55-56.

ad Lycum and Tripolis ad Maeandrum, where recent investigations allowed to reach a high level of knowledge of the urban areas and surrounding necropoleis[67]. In fact, both cities had local marble quarries, but they surely used the alabaster of Hierapolis and its particular polychrome breccia with reddish matrix, and probably also the valuable Thiounta white marble.

[67] Şimşek *et al.* 2011 and 2013; Duman 2013; Duman – Baysal 2014.

ABBREVIATIONS AND BIBLIOGRAPHY

Anderson 1897	J.G.C. Anderson, "A Summer in Phrygia I", *Journal of Hellenic Studies 17*, 1897, 396-424.
Attanasio – Pensabene 2002	D. Attanasio – P. Pensabene, "I marmi del teatro di Hierapolis", *Saggi in onore di Paolo Verzone* (Edited by D. De Bernardi Ferrero), Roma, 2002, 69-85.
Attanasio 2003	D. Attanasio, *Ancient white marbles. Analysis and identification by paramagnetic resonance spectroscopy,* Roma, 2003.
Attanasio *et al.* 2006	D. Attanasio – M. Brilli – N. Ogle, *The isotopic signature of classical marbles*, Roma, 2006.
Brilli *et al.* 2015	M. Brilli – F. Giustini – A.M. Conte – P. Lapuente Mercadal – G. Quarta – H. Royo Plumed – G. Belardi – G. Scardozzi, "Petrography, geochemistry, and cathodoluminescence of ancient white marble from quarries in the southern Phrygia and northern Caria regions of Turkey: Considerations on provenance discrimination", *Journal of Archaeological Science Reports 4*, 2015, 124-142.
Bruno 2002	M. Bruno, "Alabaster quarries near Hierapolis (Turkey)", *ASMOSIA, 6. Interdisciplinary studies on ancient stones. Proceedings of the sixth international Conference of the Association for the Study of Marble and Other Stones in Antiquity, Venice 15-18 June 2000* (Edited by L. Lazzarini), Padova, 2002, 19-24.
Buckler *et al.*1933	W.H. Buckler – W.M. Calder – W.K.C. Guthrie, *Monumenta Asiae Minoris Antiqua, IV. Monuments and documents from eastern Asia and western Galatia*, 1933, xiv-xvi, 95-117.
Castrianni *et al.* 2009	L. Castrianni – G. Di Giacomo – I. Ditaranto – G. Scardozzi, "Integrated technologies and methodologies for the reconstruction of the ancient topography of Hierapolis in Phrygia and its territory (Turkey)", *Proceedings of 13th International Congress "Cultural Heritage and New Technologies", Workshop 13 - Archäologie und Computer, Vienna November 3-5 2008*, Wien, 2009, 1-23.
Castrianni *et al.* 2010	L. Castrianni – G. Di Giacomo – I. Ditaranto – G. Scardozzi, "High resolution satellite ortho-images for archaeological research: different methods and

experiences in the Near and Middle East", *Advances in Geosciences 24*, 2010, 97-110.

Castrianni – Scardozzi 2011 — L. Castrianni – G. Scardozzi, "Mossyna: The rediscovery of a "lost city" in the territory of Hierapolis in Phrygia (Turkey)", *Proceedings of the 15th International Conference on "Cultural Heritage and New Technologies", Vienna 15-17 November 2010*, Wien, 2011, 616-633.

Castrianni – Scardozzi 2012 — L. Castrianni – G. Scardozzi, "I resoconti dei viaggiatori alla luce delle recenti ricognizioni archeologiche: la localizzazione di Thiounta e Mossyna nel territorio di Hierapolis", *Hierapolis di Frigia, V. Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M. Piera Caggia – T. Ismaelli), Istanbul, 2012, 87-95.

Castrianni – Scardozzi *in press* — L. Castrianni – G. Scardozzi, "Insediamenti protostorici del territorio di Hierapolis di Frigia: l'Höyük Tepe e l'abitato di Can Pınar", *Hierapolis di Frigia, VIII. Le attività delle campagne di scavo e restauro 2007-2011* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), in press.

Ceylan – Ritti 1997 — A. Ceylan – T. Ritti, "A New Dedication to Apollo Kareios", *Epigraphica Anatolica 28,* 1997, 57–67.

D'Andria 2003 — F. D'Andria, *Hierapolis of Phrygia (Pamukkale). An Archaeological Guide*, Istanbul, 2003.

D'Andria – Caggia 2007 — F. D'Andria – M.P. Caggia (Eds.), *Hierapolis di Frigia, I. Le attività delle campagne di scavo e restauro 2001-2003*, Istanbul, 2007.

D'Andria *et al.* 2008 — F. D'Andria *et al.*, *Atlante di Hierapolis di Frigia* (Edited by F. D'Andria – G. Scardozzi – A. Spanò), Istanbul, 2008.

D'Andria *et al.* 2012 — F. D'Andria *et al.*, *Hierapolis di Frigia, V. Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012.

D'Andria *et al. in press* — *Hierapolis di Frigia, VIII. Le attività delle campagne di scavo e restauro 2007-2011* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, in press.

Di Giacomo *et al.* 2011 — G. Di Giacomo – I. Ditaranto – G. Scardozzi, "Cartography of archaeological surveys taken from an Ikonos stereo pair: a case from Hierapolis

of Phrygia territory (Turkey)", J*ournal of Archaeological Science 38*, 2051-2060.

Duman 2013 — B. Duman, "Son arkeolojik araştırmalar ve yeni bulgular ışığında Tripolis ad Maeandrum", *Cedrus 1*, 2013, 179-200.

Duman – Baysal 2014 — B. Duman – H. Baysal, "Tripolis 2. sezon kazı ve restorasyon raporu: 2013", *36. Kazı Sonuçları Toplantısı, vol. 2*, Ankara, 2014, 633-650.

Frate 2006 — O. Frate, "Il materiale lapideo come indicatore sociale, culturale ed economico. Il caso dei sarcofagi di marmo della necropoli nord di Hierapolis di Frigia", *Le risorse lapidee dall'antichità ad oggi in area mediterranea, Canosa di Puglia, 25-27 settembre 2006* (Edited by V. Badino – G. Baldassarre), Torino, 2006, 423-430.

Frate 2007 — O. Frate, "I sarcofagi in marmo della Necropoli Nord. Metodo della ricerca e risultati preliminari", *Hierapolis di Frigia, I. Le attività delle campagne di scavo e restauro 2001-2003* (Edited by F. D'Andria – M.P. Caggia), Istanbul, 2007, 457-472.

Hogarth 1887 — D.G. Hogarth, "Apollo Lermenus", *Journal of Hellenic Studies 8,* 1887, 376-400.

Judeich 1898 — W. Judeich, "Inschriften", *Altertümer von Hierapolis* (Edited by C. Humann – C. Cichorius – W. Judeich – F. Winter), Berlin, 1898, 67-180.

Koralay – Kılınçarslan 2015 — T. Koralay – S. Kılınçarslan, "Minero-petrographic and isotopic characterization of two antique marble quarries in the Denizli region (western Anatolia, Turkey)", *Periodico di Mineralogia 84*, *2*, 2015, 263-288.

Koralay – Kılınçarslan 2016 — T. Koralay – S. Kılınçarslan, "A multi-analytical approach for determining the origin of the marbles in Temple-A from Laodicea ad Lycum (Denizli-Western Anatolia, Turkey)", J*ournal of Cultural Heritage 17*, 2016, 42-52.

Koralay *et al. in press* — T. Koralay – B. Duman – K. Deniz – Y.K. Kadioğlu, "Provenance of banded travertine from Tripolis antique city (Yenice/Buldan - Denizli) based on the minero-petrographic and geochemical characterization", *Proceedings of European Association of Archaeologists 20th Annual Meeting, Istanbul 10-14 September* 2014, in press.

Kumsar *et al.* 2015	H. Kumsar – Ö. Aydan – C. Şimşek – F. D'Andria, "Historical earthquakes that damaged Hierapolis and Laodikeia antique cities and their implications for earthquake potential of Denizli basin in western Turkey", *Bulletin of Engineering Geology and the Environment*, 2015, 1-18.
Lasaponara *et al.* 2008	R. Lasaponara – N. Masini – G. Scardozzi, "New perspectives for satellite-based archaeological research in the ancient territory of Hierapolis (Turkey)", *Advances in Geosciences 19*, 2008, 87-96.
Lasaponara *et al.* 2010	R. Lasaponara – N. Masini – G. Scardozzi, "Elaborazione di immagini satellitari ad alta risoluzione e ricognizione archeologica per la conoscenza degli insediamenti rurali del territorio di Hierapolis di Frigia (Turchia)", *Il dialogo dei Saperi. Metodologie integrate per i Beni Culturali* (Edited by F. D'Andria – D. Malfitana – N. Masini – G. Scardozzi), Napoli, 2010, 479-494.
Lasaponara *et al.* 2016	R. Lasaponara – G. Leucci – N. Masini – R. Persico – G. Scardozzi, "Towards an operative use of remote sensing for exploring the past using satellite data: The case study of Hierapolis (Turkey)", *Remote Sensing of Environment 174*, 2016, 148-164.
Long 2012	L. E. Long, "The Regional Marble Quarries," *Aphrodisias V. The Aphrodisias Regional Survey* (Edited by C. Ratté – P.D. De Staebler), Darmstadt-Mainz, 2012, 165-201.
Marabini – Scardozzi 2015	S. Marabini – G. Scardozzi, "Appendice I. La ricerca geo-archeologica a Hierapolis", *Nuovo Atlante di Hierapolis di Frigia. Cartografia archeologica della città e delle necropoli* (Edited by G. Scardozzi), Istanbul, 2015, 227-268.
Miranda *et al.* 2012	E. Miranda – T. Ritti – G. Scardozzi, "L'area sacra dei Motaleis e il santuario di Apollo Karios nel territorio di Hierapolis", *Hierapolis di Frigia, V. Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 687-737.
Monna – Pensabene 1977	D. Monna – P. Pensabene, *Marmi dell'Asia Minore*, Roma, 1977.

Pensabene 2007 — P. Pensabene, "Gli elementi marmorei della scena: classificazione tipologica e inquadramento nella storia degli studi della decorazione architettonica in Asia Minore", *Il teatro di Hierapolis di Frigia* (Edited by D. De Bernardi Ferrero – G. Ciotta – P. Pensabene), Genova, 2007, 229-388.

Pensabene 2013 — P. Pensabene, *I marmi nella Roma antica*, Roma, 2013.

Philippson 1914 — A. Philippson, *Reisen und Forschungen im westlichen Kleinasien, IV: Das östliche Lydien und südwestliche Phrygien*, Gotha, 1914.

Ramsay 1883 — W.M. Ramsay, "The Cities and Bishopriscs of Phrygia", *Journal of Hellenic Studies 4*, 1883, 370-436.

Ramsay 1887 — W.M. Ramsay, "Antiquities of Southern Phrygia and the border lands", *American Journal of Archaeology 3, 3-4*, 1887, 344-368.

Ramsay 1895 — W.M. Ramsay, *The Cities and Bishoprics of Phrygia, I,* Oxford, 1895.

Ramsay 1928 — W.M. Ramsay, *Asianic Elements in Greek Civilisation,* London, 1928.

Ritti 2002 — T. Ritti, "Documenti epigrafici dalla regione di Hierapolis", *Epigraphica Anatolica 34*, 2002, 41-70.

Ritti 2004 — T. Ritti, "Iura sepolcrorum a Hierapolis di Frigia nel quadro dell'epigrafia sepolcrale microasiatica. Iscrizioni edite e inedite", *Libitina e dintorni. Libitina e i luci sepolcrali. Le leges libitinariae campane. Iura sepulchrorum. Vecchie e nuove iscrizioni. Atti dell'XI Rencontre franco-italienne sur l'épigraphie, Libitina 3*, Ed. S. Panciera, Roma, 2004, 455-634.

Ritti 2006 — T. Ritti, *Guida epigrafica a Hierapolis di Frigia (Pamukkale)*, Istanbul, 2006.

Ritti *et al.* 2000 — T. Ritti – C. Şimşek – H. Yıldız, "Dediche e Καταγραφαί dal santuario frigio di Apollo Lairbenos", *Epigraphica Anatolica 32*, 2000, 1-88.

Ritti *et al.* 2007 — T. Ritti – F. Guizzi – E. Miranda, "La ricerca epigrafica: risultati dell'ultimo quadriennio e prospettive future", *Hierapolis di Frigia, I. Le*

attività delle campagne di scavo e restauro 2001-2003 (Edited by F. D'Andria – M.P. Caggia), Istanbul, 2007, 583-618.

Ritti *et al.* 2008 — T. Ritti – F. Guizzi – E. Miranda, *Museo archeologico di Denizli-Hierapolis. Catalogo delle iscrizioni greche e latine. Distretto di Denizli*, Napoli, 2008.

Robert 1937 — L. Robert, *Études Anatoliennes*, Paris, 1937.

Robert 1962 — L. Robert, *Villes d'Asie Mineure. Études de géographie ancienne*, Paris, 1962.

Robert 1983 — L. Robert, "Les dieux des Motaleis en Phrygie", *Journal des Savants 1*, 1983, 45-63.

Robert 1985 — L. Robert, *Études anatoliennes 1937, Supplement XII*, Paris 1985.

Scardozzi 2007a — G. Scardozzi, "Remote sensing and archaeological survey in the Hierapolis of Phrygia territory, Turkey", *Proceedings of SPIE Europe Remote Sensing, Conference 6749 "Remote Sensing and Archaeology"*, Florence, 2007, 6749-04/1-12.

Scardozzi 2007b — G. Scardozzi, "Hierapolis di Frigia. Applicazioni informatiche alle ricognizioni archeologiche e telerilevamento da satellite: l'esempio degli acquedotti della città", *Archeologia e Calcolatori 18*, 2007, 331-352.

Scardozzi 2007c — G. Scardozzi, "Ricerche topografiche e telerilevamento", *Hierapolis di Frigia, Le attivita delle campagne di scavo e restauro 2000-2003* (Edited by F D'Andria – M.P. Caggia), Istanbul, 2007, 67-86.

Scardozzi 2008 — G. Scardozzi, "Old high resolution satellite images for landscape archaeology: case studies from Turkey and Iraq", *Proceedings of SPIE Europe Remote Sensing, Conference 7110 "Remote Sensing and Archaeology"*, Cardiff, 2008, 7110-03/1-14.

Scardozzi 2010a — G. Scardozzi, "Hierapolis di Frigia, dalle cave ai cantieri di demolizione: l'approvvigionamento di materiali lapidei nella città di età imperiale e protobizantina", *Arqueología de la Construcción, II. Los procesos constructivos en el mundo romano: Italia y provincias orientales. Certosa di Pontignano, 13-15 de noviembre 2008* (Edited by S. Camporeale – H. Dessales – A. Pizzo), Madrid-Mérida, 2010, 351-374.

Scardozzi 2010b — G. Scardozzi, "Oil and wine production in Hierapolis of Phrygia and its territory during Roman and Byzantine age: documentation from archaeological excavations and surveys", *Olive oil and wine production in Anatolia during antiquity. International Symposium Proceedings, Mersin 6-8 November 2008* (Edited by Ü. Aydınoğlu – A.K. Şenol), Istanbul, 2010, 277-302.

Scardozzi 2011 — G. Scardozzi, "Contributo alla ricostruzione della topografia antica della Frigia meridionale tra l'età ellenistica e l'epoca proto-bizantina: ricognizioni archeologiche nel territorio di Hierapolis", *Atlante Tematico di Topografia Antica 21*, 2011, 111-146.

Scardozzi 2012a — G. Scardozzi, "Ricognizioni archeologiche nel territorio di Hierapolis (campagne 2005-2006): gli acquedotti, le cave di materiali lapidei, gli insediamenti rurali, i tumuli funerari", *Hierapolis di Frigia, V. Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 109-143.

Scardozzi 2012b — G. Scardozzi, "Ancient marble and alabaster quarries near Hierapolis in Phrygia (Turkey): new data from archaeological surveys", *Proceedings of the IX International Conference of ASMOSIA, Tarragona 8-14 June 2009*, Tarragona, 2012, 573-583.

Scardozzi 2012c — G. Scardozzi, "Un nuovo miliario dal territorio di Hierapolis di Frigia. Contributo alla ricostruzione della viabilità antica nella valle del Lykos", *Hierapolis di Frigia, V. Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 739-766.

Scardozzi 2013a — G. Scardozzi, "I santuari del territorio di Hierapolis di Frigia: nuovi dati dalle ricognizioni archeologiche", *Archeologia dei luoghi delle pratiche di culto, Atti del Convegno, Cavallino 26-27 gennaio 2012* (Edited by L. Giardino – G. Tagliamonte), Bari, 2013, 69-88.

Scardozzi 2013b — G. Scardozzi, "Antiche divisioni agrarie in Asia Minore: problematiche e strumenti di ricerca", *Archeologia Aerea 7*, 2013, 124-148.

Scardozzi 2014 — G. Scardozzi, "Topografia antica del territorio di Hierapolis di Frigia: ricognizioni archeologiche

negli altopiani di Uzunpınar e Çal", *Scienze dell'Antichità 20,* 2014, 95-122.

Scardozzi 2015 — G. Scardozzi (Ed.), *Nuovo Atlante di Hierapolis di Frigia. Cartografia archeologica della città e delle necropoli*, Istanbul, 2015.

Scardozzi *in press a* — G. Scardozzi, "Necropoleis from the territory of Hierapolis in Phrygia: New data from the archaeological surveys", *Life and Death in Asia Minor in Hellenistic, Roman, and Byzantine Times. Studies in Archaeology and Bioarchaeology,* in press.

Scardozzi *in press b* — G. Scardozzi, "Marmora Phrygiae. Un progetto per lo studio delle antiche cave di marmo e di alabastro di Hierapolis di Frigia e delle strategie di approvvigionamento dei materiali lapidei: approcci metodologici e prospettive di ricerca", *Atti del Convegno DECOR - Decorazione e architettura nel mondo romano, Roma 21-23 maggio 2014*, in press.

Şimşek 2007a — C. Şimşek, "Çal ve Baklan İlçelerindeki Arkeolojik Kalıntılar", *21. Yüzyıla Girerken Geçmişten Günümüze Çal Yöresi, Denizli*, 2007, 729-757.

Şimşek 2007b — C. Şimşek, *Laodikeia (Laodikeia ad Lycum)*, Istanbul, 2007.

Şimşek 2009 — C. Şimşek, "Regional cults in the Lycos valley and its neighbourhood", *Studies in honour of Altan Çilingiroğlu. A life dedicated to Urartu on the shores of the Upper Sea*, Istanbul, 2009, 673-690.

Şimşek *et al.* 2011 — C. Şimşek – M. Okunak – M. Bilgin, *Laodikeia Nekropolü (2004-2010 Yılları)*, Edited by C. Şimşek, Istanbul, 2011.

Şimşek 2013 — C. Şimşek, *Laodikeia (Laodicea ad Lycum), Laodikeia Çalışmaları 2*, Istanbul, 2013.

Waelkens 1986 — M. Waelkens, "Marmi e sarcofagi frigi", *Annali della Scuola Normale Superiore di Pisa 16*, 1986, 661-678.

Waelkens *et al.* 1987 — M. Waelkens – P. De Paepe – L. Moens, "Survey in the white quarries of Anatolia", *4. Araştırma Sonuçları Toplantısı*, Ankara, 1987, 113-126.

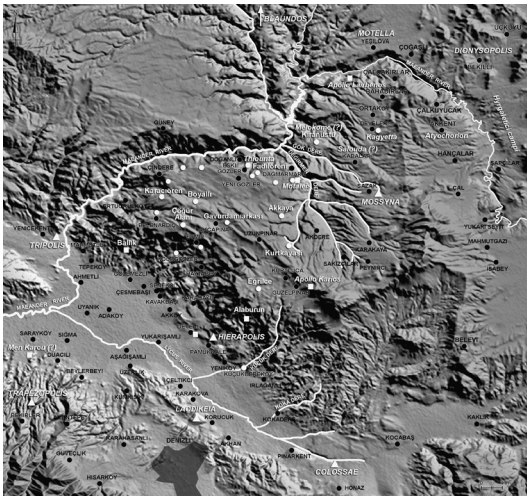

Fig. 1 The ancient topography of the Denizli basin and the Uzunpınar and Çal plateaus in a DSM extracted from ASTER stereo-pair: the main sites from the Hellenistic age to the Early Byzantine period are indicated in white (triangles=cities; circles=villages; squares=sanctuaries).

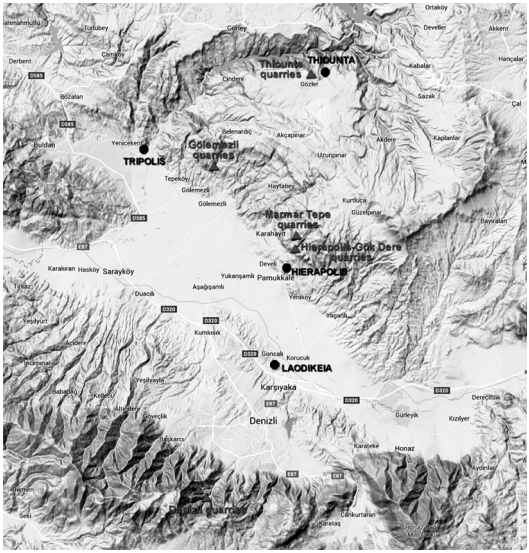

Fig. 2
Location of the ancient quarries in the Denizli basin and Uzunpınar plateau.

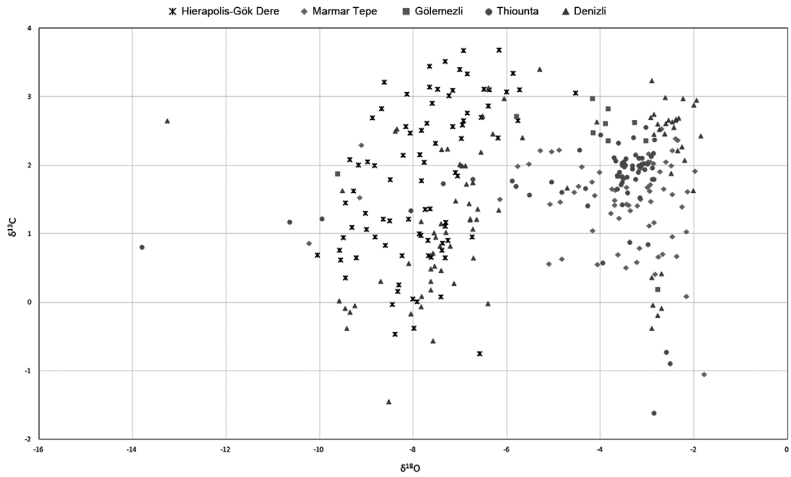

Fig. 3 C-O isotopic diagram of the marble quarries of Hierapolis-Gök Dere, Marmar Tepe, Gölemezli, Thiounta and Denizli (integration of data from Attanasio *et al.* 2006, tables 2.16, 2.17, 2.18, 2.19, Brilli *et al.* 2015, tables 2-3, and Koralay – Kılınçarslan 2015, table 7).

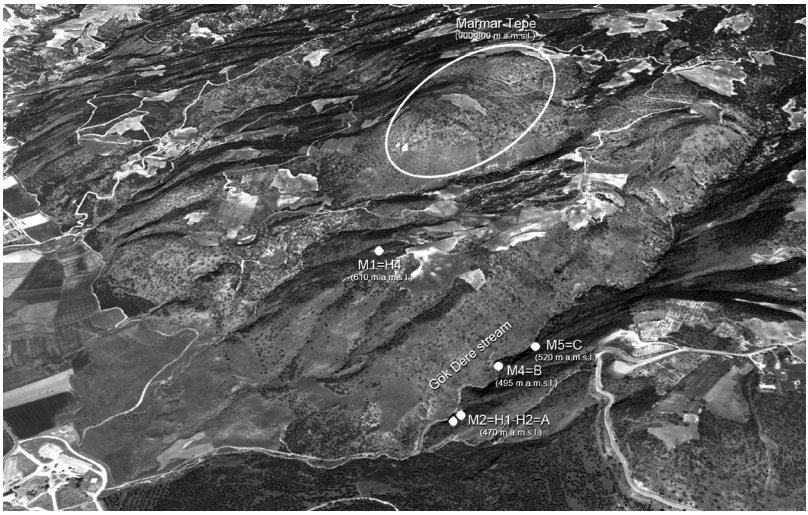

Fig. 4 WorldView-2 satellite image taken in 2015 (3D view from south), with location of the main Hierapolis-Gök Dere marble quarries; the circle indicates the area of Marmar Tepe marble quarries.

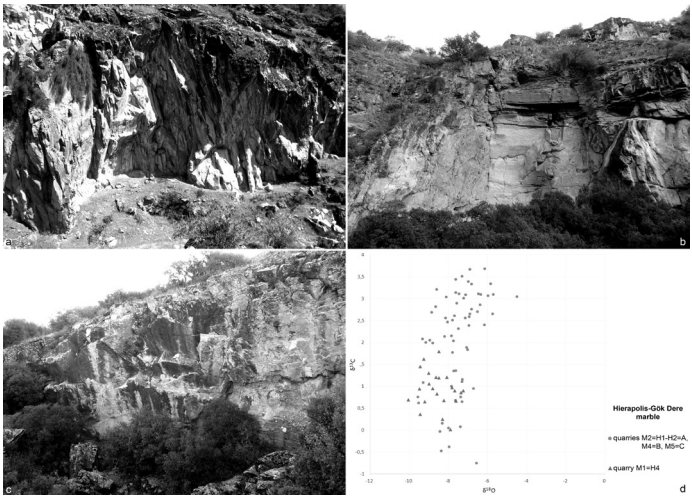

Fig. 5 Hierapolis-Gök Dere marble quarries: general views of quarries M2 (a), M5 (b) and M1 (c); (d) C-O isotopic diagram based on the integration of data from Attanasio et al. 2006, table 2.18 (quarries H1-H4), Brilli *et al.* 2015, tables 2-3 (quarries M1-M5), and Koralay – Kılınçarslan 2015, table 7 (quarries A-C).

Fig. 6 Marmar Tepe marble quarries: (a) location of the sampled sites; (b-d) three views of extraction sites.

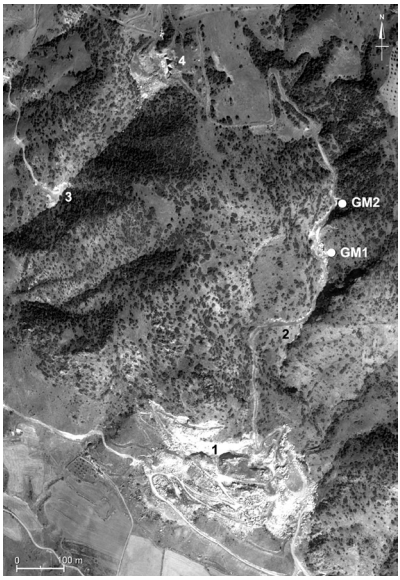

Fig. 7
Pléiades satellite image taken in 2013 with location of the sampled Gölemezli marble quarries (GM1-GM2): (1) alabaster quarry; (2) transportation road partially cut in the bedrock; (3-4) ancient quarries almost completely destroyed by modern extraction activities.

Fig. 8 Gölemezli marble quarries: (a-c) quarry GM1; (d) quarry no. 4 documented during the surveys of 2006 and nowadays destroyed by modern extraction activities.

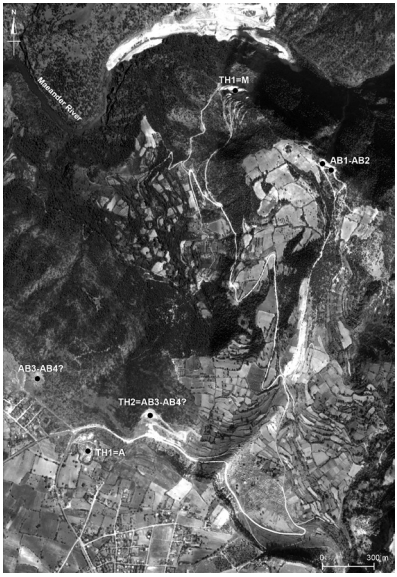

Fig. 9
Pléiades satellite image taken in 2013 with location of the sampled Thiounta marble quarries.

Fig. 10 Thiounta marble quarry (TH1): (a-b) faces with marks of picks; (c-d) unfinished materials and debris from the extraction activity and roughing of blocks.

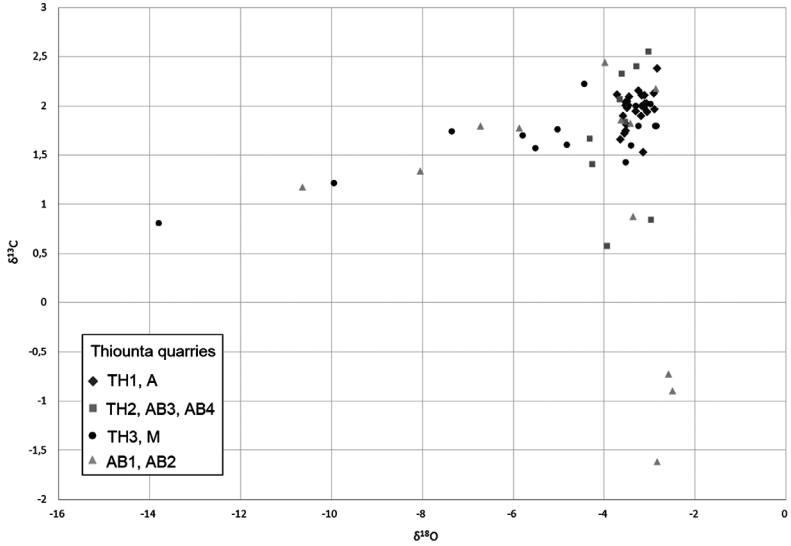

Fig. 11 C-O isotopic diagram of Thiounta modern and ancient marble quarries, based on the integration of data from Attanasio *et al.* 2006, table 2.19 (quarries A, M, AB1-AB4), and Brilli *et al.* 2015, tables 2-3 (quarries TH1-TH3).

Fig. 12
WorldView-2 satellite image taken in 2015 with location of sampled Denizli marble quarries: DA-DD (Attanasio et al. 2006, 169-176); D1-D5 (Brilli *et al*. 2015, 129, 137-140); A-D (Koralay – Kılınçarslan 2015, 270-286).

Fig. 13 Denizli marble quarries: (a) ancient quarry faces (TH2); (c-d) remains of ancient quarry faces and unfinished materials (TH3).

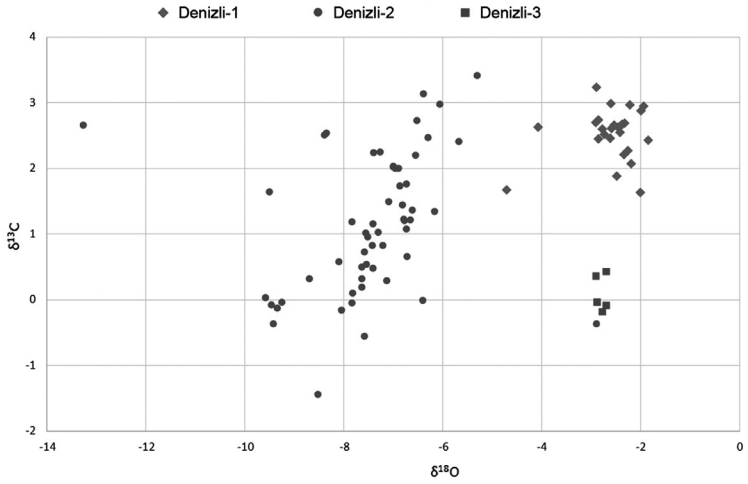

Fig. 14 C-O isotopic diagram of Denizli marble quarries, based on the integration of data from Attanasio *et al.* 2006, table 2.16, Brilli *et al.* 2015, tables 2-3, and Koralay – Kılınçarslan 2015, table 7.

NATURE AND CULT IN THE *PLOUTONION* OF HIERAPOLIS. BEFORE AND AFTER THE COLONY

Francesco D'Andria*

Mythology and geology[1]

For the study of the relationships between environment, landscape and natural phenomena, the site of Hierapolis represents an exceptional field of application. The Phrygian city lies on an upland dominating the valley of the river Lykos, a tributary of the Maeander. The valley of the Lykos is a *graben*, bounded by the two parallel mountain chains of Babadağ (*Salbakos*) to the west and Çökelez Dağ to the east.

The whole area is characterised by highly active seismic phenomena due to the presence of faults on both the western side, crossing the modern city of Denizli, and the eastern side, running through the ancient city of Hierapolis[2]. A number of intense earthquakes have struck the Phrygian city

* Prof. Dr., University of the Salento, Lecce-Italy. E-mail: francesco.dandria@unisalento.it

[1] I would like to thank Maria Piera Caggia and Tommaso Ismaelli for their help in preparing the texts and processing the images.

[2] On the phenomena arising from the presence of the seismic fault, see Altunel, Hancock 1996; Altunel 2000; for the most up-to-date geological map of Hierapolis, see Marabini 2015, 7-12. A comparative study of the earthquakes that struck the

during its history, leaving indelible traces on its monuments and forming the current landscape of ruins (Fig. 1)[3]. The fault of Pamukkale has also produced extraordinary natural phenomena, such as the white cascades of travertine, which stretch for more than a kilometre. These features represent an essential element in tourist itineraries of Turkey even today; it is precisely due to the fairy-tale landscape of the white calcareous formations, including stalactites and pools that are continuously replenished with flowing spring waters, that the Turks called this site "Beyaz Cennet", White Paradise.

The white cascades of Pamukkale are also the result of the intense seismic activity affecting the site. Underground waters from thermal springs well up to the surface through fractures in the earth's crust, emerging at a temperature of about 35 °C. Once exposed to the atmosphere, the waters form calcium carbonate deposits, which are seen in a variety of forms across the urban landscape. Poisonous gases such as carbon dioxide also emerge from these fractures, in high concentrations. Recent measurements made by Prof. Hardy Pfanz of the University of Duisburg-Essen have shown the emerging gases are 90% CO2 at some points[4]. This causes the death of any animals that get too close to the widest of these openings, which, due to its troubling characteristics, the ancients considered to be one of the entrances to the underworld, inhabited by the divinities Pluto and Persephone (Fig. 2). For both the ancient inhabitants and visitors to the site today, the negative perception of the cave resulting from its reputation as "the Gates of Hell" is transformed, thanks to the cascades of white stone created by the flowing spring waters, into the image of Paradise (i.e. the Beyaz Cennet) (Fig. 3), where inexhaustible springs bring health, well-being and fecundity, today as they did 2000 years ago[5].

---

two neighbouring cities of Hierapolis and Laodikeia can be found in Kumsar *et al.*, 2015, 1-18, which contains an extensive bibliography on the seismology of the area.

[3] Mighetto – Galvagno 2012, 469-494.

[4] Pfanz *et al.* 2014, 110-112.

[5] The theme of negative turning to positive in the community's perception and religious practices is discussed in D'Andria (2014a, the book has the title "Cehennem'den Cennet'e", "From Hell to Paradise"), which contains Turkish translations of the articles presenting the discovery of the *Ploutonion* and the Sanctuary and Tomb of St Philip.

The impact of geological phenomena on the development of religious activities and structures in the ancient world is widely attested throughout the Mediterranean, particularly in the presence of cavities, thermal springs and seismic gas vents[6]. The most important sites in Greece include the cave of Tenaros on the southern tip of the Peloponnese, Eleusis, Delphi (where the presence of the *chasma ghes* gave rise to the oracle) and the river Acheron in Epirus, where the *Nekyomanteion*, the oracle of the dead, was located (Fig. 4). In Sicily the area around the lake of Pergusa near Enna was considered one of the entrances to the Underworld, from which Hades emerged to kidnap the young Persephone, making her his bride and queen. In Campania, due to the volcanic events around Lake Averno (from the Greek Aornos, i.e. "without birds", the animals having been asphyxiated by the poisonous fumes that were emitted), it was considered by the ancients to be one of the gates to the Underworld. It was here that Virgil (Aeneid, VI, 237-242) had his Trojan hero begin his journey into the Underworld: "*...talis sese halitus atris// faucibus effundens supera ad convexa ferebat// [unde locum Grai dixerunt nomine Aornum]*", "…such a vapour from those black jaws was wafted to the vaulted sky whence the Greeks spoke of Avernus, the Birdless Place" (H.R. Fairclough, http://www.theoi.com/Text/VirgilAeneid6.html). In the same region is the sanctuary of the goddess Mephitis, in the valley of the Ansanto in Irpinia, in an area characterised by sulphurous emissions that produce a pestilential odour, from which the term "mephitic" derives (Fig. 5). Servius (commenting on the Aeneid, VII, 563) explains that "*...quod gravis odor iuxta accedentes necat, adeo ut victimae circa hunc locum non immolarentur, sed odore perirent ad aquam adplicatae. Et hoc erat genus litationis*", "a terrible stench kills those who approach it, to the point that victims around this place were not slaughtered but perished from the stench when they come into contact with the water. And this was a kind of sacrifice" (Our translation)[7].

---

[6] On the impact of caves and their associated phenomena on collective psychology in Antiquity, see Ustinova 2009, especially pages 84-87 on the *Ploutonia* of the valley of the Maeander, based essentially on literary sources.

[7] For a general discussion on the worship of Mephitis in southern Italy, see Mele 2008, especially pages 203-369 on the Sanctuary in the valley of the Ansanto.

Hierapolis, the wealth of waters and gaseous emissions

The waters were an extraordinary resource for the life of the city; used to irrigate the fields, they formed travertine channels that marked (and still mark today) the boundaries between fields, as in the description by Vitruvius: (Vitruvius VIII, 3) "*Every year, channels to the right and left of the fields bring water to them, and the resulting deposits form boundaries for their fields" ("Ita quotannis dextra ac sinistra margines ex terra faciundo inducunt eam et efficiunt his crustis in agris saepta")*. The waters were associated with considerable technological innovations, as seen in the relief on a 3rd century travertine sarcophagus showing a hydraulic saw (Fig. 6), about 200 years before the water-powered machines used for cutting blocks of stone discovered during excavations in Gerasa in Jordan and Ephesus in Asia Minor[8].

Hierapolis is described in an epigram of the theatre as *potnia nymphon*, "queen of the nymphs, blessed with splendid springs"[9], and a relief of the theatre depicts the abduction of Proserpina in a landscape that recalls the travertine basins formed by the flowing spring waters[10]. However, the gases that emerged from the fractures in the terrain were harmful to living creatures that approached them. The Ancients associated this unsettling phenomenon with the presence of the Sacred. Numerous writers described these disturbing features, which were found not just in Hierapolis but in other places along the valley of the Maeander, for example in Acharaka near Nysa and Myus near Magnesia, where there are also cult complexes called *Ploutonia*, linked to the divinities of the Underworld, Hades and Persephone (Fig. 7). In the Augustan era, Strabo (13, 4, 14) wrote an extensive description of the *Ploutonion* of Hierapolis, mentioning a cave and the events that were held there: the area in front of the cave is enclosed by a wall "*and is filled with a vapour so thick that one can barely see the ground*" (τοῦτο δὲ πλῆρές ἐστιν ὁμιχλώδους παχείας ἀχλύος ὥστε μόγις τοὔδαφος καθορᾶν). Indeed, the hot water still gives rise to clouds of steam near the springs in winter even today. During his visit Strabo threw sparrows

[8] Grewe – Kessener 2007, 227-234. On the machine discovered in Ephesus, see Mangartz 2007, 235-242; on the hydraulic saw of Gerasa, see Seigne – Morin 2007, 243-257.

[9] Ritti 2006, 112-114.

[10] D'Andria 2011a.

into the cave and they were killed by the fumes. Nicola Zwingmann has written a detailed commentary on this account, stressing the interest stirred by these natural phenomena, which even became a form of ancient tourist attraction[11]. Zwingmann suggests that the sparrows were given to visitors by the priests of the sanctuary so they could observe the site's destructive power. Strabo also alludes to the sacrifice of bulls that were asphyxiated by the fumes and says that only the eunuch priests of the goddess Cybele could enter the cave, remaining unharmed however. The ancient authors were unable to provide an explanation for these phenomena. Cassius Dio (68, 27) stated: "*I am unable to comprehend the reason for this, but I am telling you what I saw as I saw it and what I heard as I heard it*" (οὐ μὴν καὶ τὴν αἰτίαν αὐτοῦ συννοῆσαι ἔχω, λέγω δὲ ἅ τε εἶδον ὡς εἶδον καὶ ἃ ἤκουσα ὡς ἤκουσα). In the 4th century Ammianus Marcellinus (XXIII, 6, 17-18) spoke of "*a noxious vapour that destroyed everything it came into contact with… with the sole exception of the eunuchs: as to the explanation of why is this the case let us leave it to the speculations of physicists" ("Unde emergens itidem noxius spiritus … quidquid prope venerat conrumpebat, absque spadonibus solis, quod qua causa eveniat, rationibus physicis permittatur")*.

References to Cybele are found in other accounts from the imperial era, right up until the beginning of the 6th century, when the Neoplatonist philosopher Damascius (*Life of Isidoros*, in Photius, 131) described his visit to the *Ploutonion*, framing it in terms of a mystic experience in which he dreams of becoming Attis, while the Mother of the Gods celebrated the feast of the Hilaria, symbol of salvation from the Underworld. Upon his return to Aphrodisia, Damascius described the event to his friend, the philosopher Asclepiodotus of Alexandria, who observed that it was "not one dream rather than another, but a greater portent instead of a smaller one", (καὶ διηγήσατο οὐκ ὄναρ ἀντὶ ὀνείρατος, ἀλλὰ θαῦμα μεῖζον ἀντὶ ἐλάττονος)[12].

[11] Zwingmann 2012.

[12] On the identification of literary sources for the *Ploutonion,* see Ritti 1985, 7-15.

The archaeological research and the identification of the Ploutonion

The archaeological discoveries resulting from the recent excavations in Hierapolis since 2007 have provided an extraordinary quantity of data confirming these accounts[13] (Fig. 8).

Determining the exact location of the *Ploutonion* described in the literary sources, was an objective of the Mission's activities even in its earliest phases. In the 1960s Gianfilippo Carettoni conducted excavations in the area of the sanctuary of Apollo, bringing to light a building constructed over a sort of well with thermal spring waters, from which poisonous gases were emitted. Despite the small dimensions of the well, which was framed by a niche with a sculpted marble shell, the suggestive power of the ancient accounts was overwhelming and the well was identified as the *Ploutonion*[14]. Further evidence for this assumption was the fact that the gases around the mouth of the cave caused the death by asphyxiation of birds. However, a new reading conducted by Tommaso Ismaelli in 2009[15] led us to ascribe an oracular function to the building and to the circular *monopteros* that was used for the extraction of the *sortes*. Indeed, it was in this structure that the famous inscription with the alphabetic oracle was discovered. As in the oracle of Claros, the presence of the well, from which the mantis drew water before performing the ritual acts, is perfectly consistent with the cleromantic context[16].

The search for the *Ploutonion* was finally resolved during studies conducted in the area to the south of the sanctuary of Apollo as part of the surveys for the publication of the Atlas of Hierapolis, specifically in an area characterised by monumental remains[17] (Fig. 9). It was here that I had previously noted the presence of the main thermal springs that feed the lake (now used for summer bathing by the numerous tourists) at the Pamukkale Termal and have created the travertine channels and basins. The

[13] For a presentation of the results of the excavations that made it possible to identify the Sanctuary of Hades, see D'Andria 2013, 157-217.
[14] Carettoni 1963-1964.
[15] Ismaelli 2009.
[16] Moretti *et al.* 2014, 33-49.
[17] Atlante Hierapolis.

investigations and archaeological excavations, which intensified in the years from 2010 to 2012, brought to light a substantial monumental complex, characterised by the presence of a *theatron* and a cave from which spring water and carbon dioxide emerge (Fig. 10). The carbon dioxide results in the death of birds and small animals drawn by the heat, especially at night, when the presence of the gas is more intense. Indeed, every morning finds the mouth of the cave littered with the corpses of small birds and even predators such as owls, which are attracted by the dead animals and are in turn asphyxiated. The entrance to the cave also attracts predatory mammals such as foxes and martens, which eat the bodies of the unfortunate birds, leaving only the wings behind. Taken together, these elements led me to conclude that this context was in fact the *Ploutonion* described by Strabo. In the course of the 2012 campaign the issue was definitively resolved by the discovery of the dedicatory inscription above the arch that frames the entrance to the cave. The text reads: [---]Πλούτωνι καὶ Κόρῃ τὴν ψαλ[ίδα ---] *(... dedicated the arch to Pluto and Kore)*[18] (Fig. 11).

Spatial organisation, architecture and sculptures in the Sanctuary of Pluto

The excavations brought to light the whole sanctuary, revealing an extraordinary correspondence between the literary sources and the archaeological evidence[19] (Fig. 12). The entrance to the cave, faced with a wall with Ionic semi-columns, is surmounted by a rectilinear ritual theatre about 30 m in length that could hold almost 600 spectators[20]. As in the sanctuary of Apollo Karneios in Knidos[21], the considerable difference in height between the theatre and the area below prevented worshippers from descending: they could witness the sacrifices of bulls and the rites conducted by the priests of Cybele, without however entering the area in front of the cave mouth, which was reserved for the priesthood and the persons responsible for performing ritual acts and sacrificing the animals (Fig. 13). The presence of the *theatron* is consistent with the account of

[18] D'Andria 2014b, 366-367, res. 13-15.

[19] On the excavations of the 2009-2011 campaigns, see Panarelli 2016.

[20] For an initial presentation of the *theatron,* see D'Andria 2013, 169-171.

[21] Love 1973, 419-424; Nielsen 2002, 138, 139, Fig. 63; Bruns-Özgan 2002, 66-72, Fig. 87.

Cassius Dio (68, 27), written at the beginning of the 3rd century, which makes explicit reference to the presence of a structure for spectators (Fig. 14). All of the elements of the sanctuary complex have now been identified. The structure itself is surrounded by an exceptional *temenos* (wall), dated to the 1st century BC, composed of squared travertine blocks laid in accordance with a sophisticated technique associated with the Hellenistic tradition (Fig. 15). In front of the cave was a tholos flanked by two basins for ritual and therapeutic immersions. The portico on the north side, which is also late Hellenistic, has an extraordinary Doric colonnade in which the drums of the columns are deliberately left roughly hewn (Fig. 16). This generates a striking contrast with the fine stonework of the capitals, an arrangement comparable to that of the portal of the theatre of Kibyra and the Porta Maggiore in Rome. One of the buildings, built over the fracture of the fault, has beds on two sides, indicating incubation rites linked to healing practices, which are mentioned by Strabo in reference to the *Ploutonion* of Acharaka near Nysa on the Maeander and are believed to have been practised in the sanctuary of Hierapolis (Fig. 17). The sculptural decoration is also consistent with the sanctuary context[22]. Of particular interest here is the discovery in 2013, right in front of the Gateway to the Underworld, of two sculptures in marble of great symbolic importance: the statue of Cerberus, the mythical three-headed dog that guarded the Kingdom of the Dead, and the statue of a serpent coiled around a rod, also associated with the Underworld (Fig. 18). Next came the excavation of the votive deposits, at times associated with stone altars around which are significant traces of combustion activities, as in the *escharon* (the investigation of which is still in progress, publication forthcoming) to the north of the temple of Apollo[23]. The votive deposits are mainly characterised by unguentaria and open ceramic forms linked to libation practices, which were found upturned with the rim pressed into the earth (Fig. 19). Among these were numerous bowls of the Megarian type or from the early imperial period with reliefs[24]. Other objects found in these deposits include oil lamps (with signs of use), discovered in large numbers precisely in the area in front of the cave, with types datable to as

[22] D'Andria, *in press*, a.

[23] Semeraro 2012, 309-314; on the paleobotanical researches, in the Sanctuary of Apollo, see Fiorentino *et al.* 2012, 49-55.

[24] On the study of the votive deposits, see Giannico 2013-2014.

late as the beginning of the 7th century AD, and thus contemporary with the account of Damascius. Just a few decades later, perhaps under the emperor Justinian, the entrance to the cave was deliberately buried under a huge load of earth, building blocks and architectural elements taken from demolished monuments. Among these it was possible to recognise blocks from a marble portico with a dedication to the emperor Nero[25] (Fig. 20).

Of particular importance are the bio-archaeological finds discovered in the deposits. These include seeds and charcoals which are currently being studied, but also the bones of animals, interpreted as the remains of sacrificial activities[26]. These are mostly the remains of birds such as chickens and doves, but also very small bones that will be the object of excavation and study by a team of archaeo-zoologists headed by Jacopo De Grossi Mazzorin[27] (Fig. 21). This evidence recalls Strabo's reference to the birds that were thrown into the cave.

The most ancient phases of the Sanctuary

The intensive excavations of 2013 made it possible to reach the most ancient levels, particularly the layer of rock above the cave on which the *theatron* was built in the imperial era. This led to the discovery, for the first time in Hierapolis, of evidence of occupation before the establishment of the Seleucid colony at the end of the 3rd century BC. Indeed, before the recent findings, only two fragments of Phrygian burnished ceramics had been discovered, in the colluvial deposits excavated in the area of the north agorà, which had clearly been transported from the heights to the east of the city. The rock of the *Ploutonion* seems to be marked by a series of cuts, recesses, holes and cup marks around an altar of the "stepped" type, common in Phrygia in the Archaic phases of the cult of Cybele[28]. This altar is directly above the entrance to the cave, which was considered to be the Gate of the Underworld. On the basis of a comparison with materials recovered during surveys conducted in the surrounding area and during the excavations

[25] The study of the blocks belonging to the portico was the subject of the doctoral thesis of Sara Bozza 2014-2015.

[26] On the palaeo-botanical investigations, see Fiorentino in this volume.

[27] On the presence of bird bones in cult contexts, see De Grossi Mazzorin 2004, 179-181.

[28] D'Andria *in press*, b.

of the Asopos-*tepe* in Laodikeia, many ceramic fragments discovered in connection with this altar are believed to be of the protohistoric or archaic era[29]. Of particular importance for understanding the dynamics of the settlement in Hierapolis in the Iron Age are the discoveries made in February 2016 by archaeologists from the Museum of Denizli in the high plain to the north of the northern necropolis, in the area of the visitors' entrance to the Archaeological Park. For the first time in Hierapolis, during rescue excavation work in view of new structures for tourists, settlement structures dated to the Iron Age were brought to light. They included circular huts indicating the presence of a large settlement that is believed to have covered the extensive flat area at the foot of Çökelez Dağ, which looks on to the broad plain of the river Lykos[30]. The village was about two kilometres from the natural cavity corresponding to the place of worship that came to be called the *Ploutonion* in the Hellenistic-Roman period.

Among the ceramic fragments found during the excavations in the Sanctuary of Hades is part of a pot decorated with relief figures (Fig. 22). The vessel, glazed with a fine golden micaceous slip, had a reconstructed height of about 60 cm, and is believed to have served a ritual function due to its globular shape and two horizontal handles, making it suitable for containing liquids[31]. The production technique and style allow it to be dated to the 6th century BC, with stylistic references to Ionic and Lydian contexts. The image in relief is of extraordinary importance because it shows a figure seated on a high-backed chair, playing a double-reed flute. One of the two reeds is flared at the end, in the shape of a horn, enabling it to be recognised as an *elymos*, the typical Phrygian double flute, linked to the cults of the goddess Cybele[32]. In a relief of the Roman period from the area near Lanuvium (now in Rome, Musei Capitolini)[33] showing an archigallus

[29] Konakçı 2014, 87-122.

[30] For the information and for generously sharing important new knowledge on the Phrygian phase, I would like to thank the Director of the Museum of Denizli, Hasan Hüseyin Baysal, and the archaeologists that conducted the excavations, Elvan Altıntaş and Birgül Çamoğlu.

[31] D'Andria *in press*, b.

[32] On the elymos, the typical Phrygian double flute, see the important study by Bélis 1986, 21-40.

[33] Vermaseren 1977, n. 466. On the use of musical instruments in the rituals of Cybele, see now Pavolini 2015, 357, fig.4.

(high priest), among other musical instruments such as a kettledrum and cymbals is an *elymos*, which was a typical attribute of the cult of the *Magna Mater* up until the imperial era. The discovery of the ritual vase with the representation in relief of a figure, perhaps of priestly rank, linked to the cult of Cybele represents an extraordinary confirmation of the accounts of Strabo and the other ancient writers, who stress the connections between the *Ploutonion* and the cult of the Phrygian Mother.

Also associated with a female cult, in the site's more ancient phases, are the Hellenistic terracotta statuettes of the *kourotrophos* (the mother holding a child) discovered in the sanctuary (Fig. 23). In the course of the most recent excavation campaign (2015), the travertine façade of Ionic semi-columns was dismantled, in order to restore the structure, which had been severely damaged by earthquakes. It was thus possible to explore the area immediately inside the large crack caused by the seismic fault, highlighting the votive offerings left by worshippers. These included a series of objects linked to the female world, particularly numerous spindle-shaped clay *unguentaria* and five in blue vitreous paste with yellow linear decoration, from Egypt (Fig. 24). Bone combs, glass beads, and hairpins made of bone and glass confirm that the sacred cave was visited by women and that a female divinity was worshipped there. The goddess was linked to the natural world and the powerful forces manifested by the subsoil, like Cybele and later Persephone, who acquired greater importance in the Roman period, beside her spouse Pluto.

The wider regional framework

These are new data that require confirmation and further study with reference to additional evidence, which the continuing excavations of the deepest levels of the *Ploutonion*, still in the initial phase, are expected to yield. Together with the cave of the thermal springs and the emissions of gas, the Phrygian sanctuary of Cybele is believed to have represented a point of religious reference for the populations which during the Archaic period settled in the valley of the Lykos, the surrounding heights and now – thanks to the recent discoveries in the area north of Hierapolis – on the upland where the city itself was built (Fig. 25). Research conducted in the area by the Museum of Denizli has identified numerous rock-cut cult sites

with stepped altars[34] (Fig. 26). Typical throughout Phrygia, these structures were first highlighted in the 1930s by the pioneering work of Emilie Haspels in the settlements around Mydas Şehri[35].

Before the foundation of the colony of Hierapolis, the cave and the surrounding rock must have already been the focal point of the cult for the region's inhabitants. Indeed, a place of worship dedicated to the Phrygian Cybele was established here in the Archaic period[36]. The mother-goddess is thus associated with the rocky heights and the most spectacular manifestations of natural power emanating from the depths of the earth[37].

The discovery of the Archaic sanctuary opens up a new chapter in the understanding of the cultural and religious dynamics affecting the area, along an itinerary linking the Aegean coast with the highlands of inner Anatolia. The foundation of the colony in the late 3rd century BC saw the establishment of a new settlement and cultural system, highly influenced by the urban layout of the Hellenistic *polis*, whose name (Hierapolis, i.e. "Sacred City") appears to be a clear reference to the religious function of the cave and the surrounding holy rock. The ancient Phrygian cult of the Magna Mater was thus incorporated into a new religious context, centred on the Underworld divinities Hades-Pluto and Persephone-Kore, based on the Greek tradition and the myths that had spread among the Ionian colonies[38]. In the *Ploutonion* of Hierapolis, literary and archaeological sources converge to produce a coherent account of this complex situation, in which natural phenomena are at the origin of cults that reveal intense dialogue and interaction among the different cultures of Anatolia.

[34] Şimşek 2009, 673-690; Söğüt 2011.
[35] Haspels 1971; Berndt-Ersöz 2006.
[36] Scardozzi 2013.
[37] Roller 1999.
[38] Schipporeit 2013, 17f.

ABBREVIATIONS AND BIBLIOGRAPHY

Altunel – Hancock 1996	E. Altunel – P.L. Hancock, "Structural attributes of travertine-filled extensional fissures in the Pamukkale plateau, western Turkey", International Geology Review 38, 1996, 768-777.
Altunel 2000	E. Altunel, "L'attività sismica a Hierapolis e nelle zone limitrofe", Ricerche archeologiche turche nella valle del Lykos (Eds. F. D'Andria – F. Silvestrelli), Galatina, 2000, 299-314.
Atlante Hierapolis	F. D'Andria – G. Scardozzi – A. Spanò (Eds.), Atlante di Hierapolis di Frigia, Hierapolis di Frigia 2, Istanbul, 2008.
Bélis 1986	A. Bélis, "L'aulos phrygien", Revue archéologique 1986, 21-40.
Berndt-Ersöz 2006	S. Berndt-Ersöz, Phrygian Rock-Cut Shrines. Structure, Function and Cult Practice, Leiden, 2006.
Bozza 2014-2015	S. Bozza, Architettura ionica a Hierapolis di Frigia, Doctoral Thesis, Università Cattolica di Milano.
Bruns-Özgan 2002	Ch. Bruns-Özgan, Knidos. Ein Führer durch die Ruinen, Konya, 2002.
Carettoni 1963-1964	G. Carettoni, "Scavo del tempio di Apollo a Hierapolis (rapporto preliminare)", Annuario della Scuola archeologica di Atene e delle missioni italiane in Oriente 41-42, 1963-1964, 411-433.
D'Andria 2011a	F. D'Andria, "Gods and Amazons in the nymphaea of Hierapolis", Roman sculpture in Asia Minor, Proceedings of the International Conference to celebrate the 50th anniversary of the Italian excavations at Hierapolis in Phrygia, Cavallino (Lecce), 24-26 May 2007, Journal of Roman Archaeology Supplement 80 (Eds. F. D'Andria – I. Romeo), Portsmouth, 2011, 150-172.
D'Andria 2011b	F. D'Andria, "Hiérapolis de Phrygie. Métodologies intégrées pour la reconstruction des paysages de la ville et du territoire", Kelainai-Apameia Kibotos: Développement urbain dans le context anatolien. Actes du colloque International, München 2-4 avril 2009 (Eds. L. Summerer – A. Ivantchik – A. von Kienlin), Bordeaux, 2011, 345-358.
D'Andria 2013	F. D'Andria, "Il Ploutonion a Hierapolis di Frigia", Istanbuler Mitteilungen 63, 2013, 157-217.

D'Andria 2014a	F. D'Andria, Cehennem'den Cennet'e. Hierapolis (Pamukkale), Istanbul, 2014.
D'Andria 2014b	F. D'Andria, "Phrygia Hierapolis'i (Pamukkale) 2012 yılı kazı ve restorasyon çalışmaları" 35. Kazı Sonuçları Toplantısı (27-31 Mayıs, 2013, Muğla), vol. 1, Ankara, 2014, 361-375.
D'Andria in press, a	F. D'Andria, "Sculpture in the context of the Ploutonion in Hierapolis", Sculpture in Roman Asia, Conference in Ephesos, 1-4 october 2013.
D'Andria in press, b	F. D'Andria, "The Cult of Cybele in Hierapolis of in Phrygia", The Phrygian lands over time, International Conference, Eskişehir, 2015.
De Grossi Mazzorin 2004	J. De Grossi Mazzorin, "I resti animali del mitreo della Crypta Balbi: testimonianze di pratiche cultuali", Roman Mithraism: the Evidence of the Small Finds (Eds. M. Martens – G. De Boe), Brussels, 2004, 179-181.
Fiorentino et al. 2012	G. Fiorentino – C. D'Oronzo – F. Solinas, "Le ricerche archeobotaniche a Hierapolis di Frigia. Campagne 2002-2006", Hierapolis di Frigia V. Le attività delle campagne di scavo e restauro 2004-2006 (Eds. F. D'Andria, M.P. Caggia, T. Ismaelli), Istanbul, 2012, 39-59.
Giannico 2013-2014	V. Giannico, Il Ploutonion a Hierapolis di Frigia. I depositi votivi, Postgraduate Thesis in Archaeology, Università del Salento.
Grewe – Kessener 2007	K. Grewe – P. Kessener, "A Stone Relief of a Water-Powered Stone Saw at Hierapolis, Phrygia. A first Consideration and Reconstruction Attempt", Énergie hydraulique et machines élévatrices d'eau dans l'antiqué, Actes du colloque international, Vers-Pont-du-Gard 20-22 septembre 2006 (Eds. J.-P. Brun – J.-L. Fiches), Naples, 2007, 227-234.
Haspels 2007	C.H.E. Haspels, The Highlands of Phrygia. Sites and Monuments, Princeton, 2007.
Ismaelli 2009	T. Ismaelli, "Il monopteros del Santuario di Apollo a Hierapolis di Frigia. Ricerche sull'oracolo alfabetico", Istanbuler Mitteilungen 59, 2009, 131-192.
Konakçı 2014	E. Konakçı, "Laodikeia'nın İlk Yerleşimi: Asopos Tepesi", 10. Yılında Laodikeia (2003-2013 Yılları), Ed. C. Şimşek, Istanbul, 2014, 87-122.

Kumsar et al. 2015	H. Kumsar – Ö. Aydan – C. Şimşek – F. D'Andria, "Historical earthquakes that damaged Hierapolis and Laodikeia antique cities and their implications for earthquake potential of Denizli basin in western Turkey", Bulletin of Engineering Geology and the Environment, DOI 10.1007/s10064-015-0791-0, 2015, 1-18.
Love 1973	I.C. Love, "A Preliminary Report of the Excavations at Knidos, 1972", American Journal of Archaeology, 1973, 413-424.
Mangartz 2007	F. Mangartz, "The Byzantine Hydraulic Stone Cutting Machine of Ephesos (Turkey). A Preliminary Report", Énergie hydraulique et machines élévatrices d'eau dans l'antiqué, Actes du colloque international, Vers-Pont-du-Gard 20-22 septembre 2006 (J.-P. Brun – J.-L. Fiches Eds.), Naples, 2007, 235-242.
Marabini 2015	S. Marabini, "Note illustrative della carta geologica di Hierapolis", Nuovo Atlante di Hierapolis, Cartografia archeologica della città e delle necropoli, Hierapolis di Frigia VII (Ed. G. Scardozzi), Istanbul, 2015, 7-12.
Mele 2008	A. Mele (Ed.), Il culto della dea Mefite e la valle d'Ansanto: ricerche su un giacimento archeologico e culturale del Samnites Hirpini, Avellino, 2008.
Mighetto – Galvagno 2012	P. Mighetto – F. Galvagno, "Le Terme-Chiesa e la sfida della conservazione dei segni dell'attività sismica: i primi interventi di messa in sicurezza e di consolidamento del complesso monumentale", Hierapolis di Frigia V. Le attività delle campagne di scavo e restauro 2004-2006 (Eds. F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 469-493.
Moretti et al. 2014	J.-Ch. Moretti – N. Bresch – I. Bonora – D. Laroche – O. Riss, "Le temple d'Apollon et le fonctionnement de l'Oracle", Le Sanctuaire de Claros et son Oracle (Ed. J.-Ch. Moretti), Lyon, 2014, 33-50.
Nielsen 2002	I. Nielsen, Cultic theatres and ritual drama. A study in regional development and religious interchange between East and West in antiquity, Aarhus, 2002.
Nuovo Atlante di Hierapolis	G. Scardozzi (Ed.), Cartografia archeologica della città e delle necropoli, Hierapolis di Frigia VII, Istanbul, 2015.

Panarelli 2013/2014 — P. Panarelli, Il Ploutonion a Hierapolis di Frigia. Lo scavo e i materiali, Doctoral Thesis, Università Cattolica di Milano.

Pavolini 2015 — C. Pavolini, "La musica e il culto di Cibele nell'Occidente Romano", Archeologia Classica 66, 2015, 345-375.

Pfanz et al. 2014 — H. Pfanz, G. Yüce, F. D'Andria, W. D'Alessandro, B. Pfanz, Y. Manetas, G. Papatheodorou, "The Ancient Gates to Hell and their Relevance to Geogenic CO2". History of Toxicology and Environmental Health. Toxicology in Antiquity I (Ed. P. Wexler), London, 92- 117.

Ritti 1985 — T. Ritti, Fonti letterarie ed epigrafiche, Hierapolis scavi e ricerche 1, Roma, 1985.

Ritti 2006 — T. Ritti, An Epigraphic Guide to Hierapolis of Phrygia (Pamukkale), Istanbul, 2006.

Roller 1999 — L.E. Roller, In Search of God the Mother: the Cult of Anatolian Cybele, Berkeley, 1999.

Scardozzi 2013 — G. Scardozzi, "I santuari del territorio di Hierapolis di Frigia: nuovi dati dalle ricognizioni archeologiche", Archeologia dei luoghi e delle pratiche di culto, Atti del convegno (Cavallino 26-27 January 2012), (Eds. L. Giardino – G. Tagliamonte), Bari, 2013, 69-88.

Schipporeit 2013 — S.Th. Schipporeit, Kulte und Heiligtümer der Demeter und Kore in Ionien, Byzas 16, Istanbul, 2013.

Seigne – Morin 2007 — J. Seigne – Th. Morin, "Une scierie hydraulique du VIe siècle à Gerasa (Jerash, Jordanie). Remarques sur les prémices de la mécanisation du travail", Énergie hydraulique et machines élévatrices d'eau dans l'antiqué, Actes du colloque international, Vers-Pont-du-Gard 20-22 septembre 2006 (Eds. J.-P. Brun – J.-L. Fiches), Naples, 2007, 243-257.

Semeraro 2012 — G. Semeraro, Ricerche nel Santuario di Apollo, Hierapolis di Frigia V. Le attività delle campagne di scavo e restauro 2004-2006, (Eds. F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 293-324.

Söğüt 2011 — B. Söğüt, Eumeneia, Şeyhlü-Işıklı, Istanbul, 2011.

Şimşek 2009 — C. Şimşek, "Regional Cults in the Lycos Valley and its Neighbourhood", Studies in Honour of Altan Cilingiroğlu. A Life dedicated to Urartu on the Shores of the Upper Sea (Eds. H. Sağlamtimur – E.

Abay – Z. Derin – A. Ü. Erdem – A. Batmaz – F. Dedeoğlu – M. Erdalkıran – M. B. Baştürk – E. Konakçı), Istanbul, 2009, 673-690.

Ustinova 2009 — Y. Ustinova, Caves and the Ancient Greek Mind. Descending Underground in the Search for Ultimate Truth, Oxford, 2009.

Vermaseren 1977 — M.J. Vermaseren, Corpus cultus Cybelae Attidisque, 3. Italia, Latium, Études préliminaires aux religions orientales dans l'empire romain 50, Leiden, 1977.

Zwingmann 2012 — N. Zwingmann, Antiker Tourismus in Kleinasien und auf den vorgelagerten Inseln, Antiquitas 59, Bonn, 2012.

Note: All images except Figures 3 and 5 belong to the Archive of the Italian Archaeological Mission in Hierapolis.

Fig.1
Baths-Church. The east wall leans as a result of earthquakes.

Fig.2
Birds killed by the fumes of CO_2 near the *Ploutonion*.

Fig. 3
The white cascades of travertine that give Pamukkale its name, the Castle of cotton (photograph by A. Gandolfi).

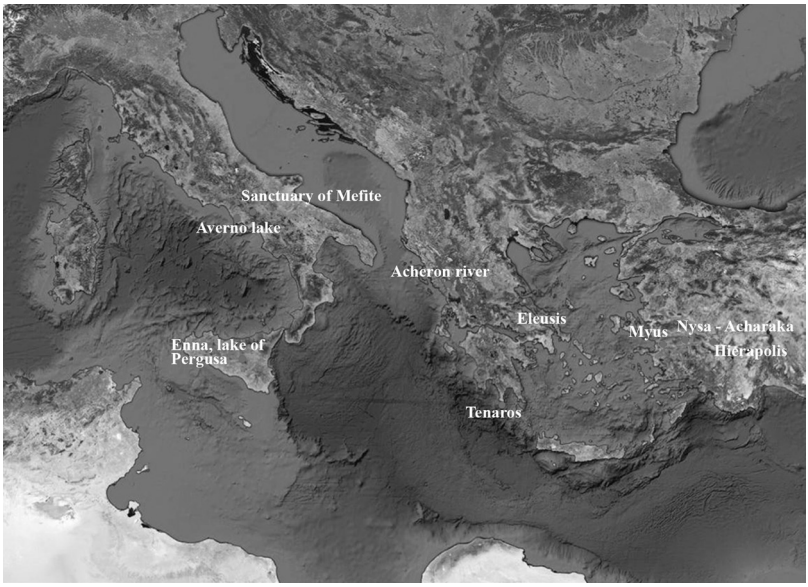

Fig. 4 The main places of worship linked to the Underworld in the Mediterranean.

Fig. 5 The Sanctuary of Mephitis in Valle d'Ansanto (3D virtual reconstruction by Archigramma, Mele 2008).

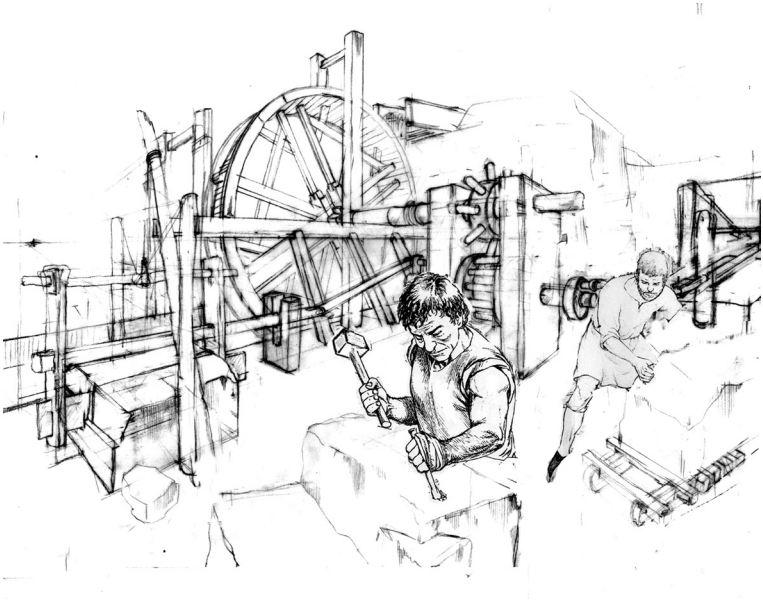

Fig. 6 The water-powered saw shown in the relief on the sarcophagus of Hierapolis, 3rd century AD (from an idea by F. D'Andria, implemented by InkLink).

Fig. 7
Map of the *Ploutonia* of the valley of the Maeander: the coins struck in local mints show themes linked to chthonian cults.

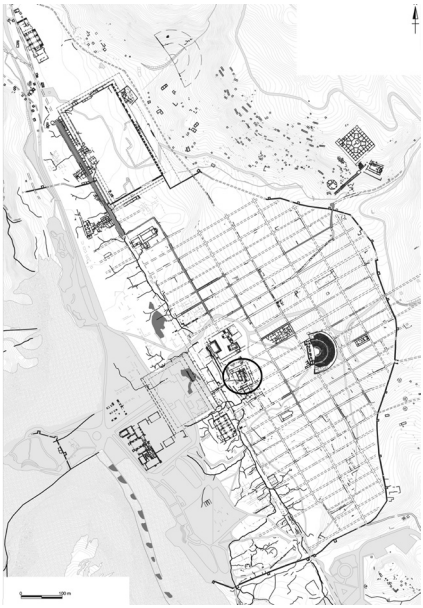

Fig. 8
Map of Hierapolis showing the *Ploutonion* (from Nuovo Atlante Hierapolis).

Fig. 9 Photograph taken from a hot-air balloon: A- the Sanctuary of Apollo; B- the *Ploutonion.*

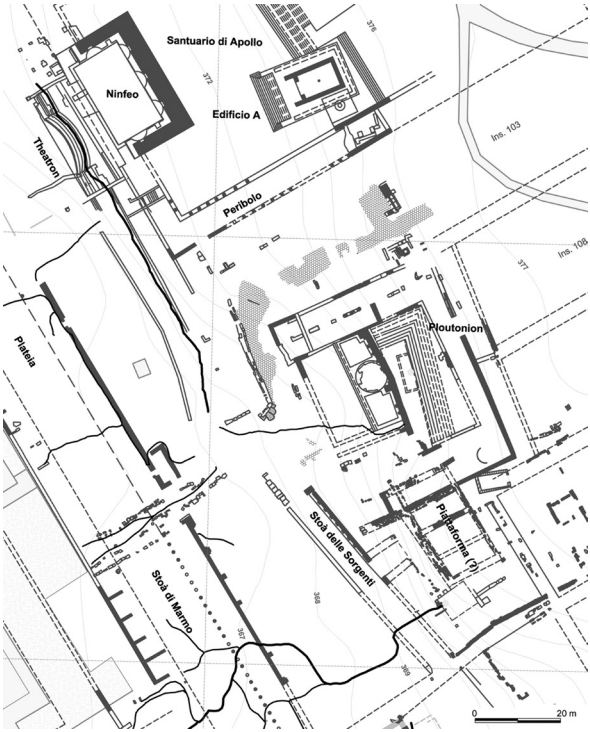

Fig. 10
Site plan of the *Ploutonion* (from Nuovo Atlante Hierapolis).

Fig. 11 The Ionic façade of the cave of the *Ploutonion,* with a dedication to Pluto and Kore.

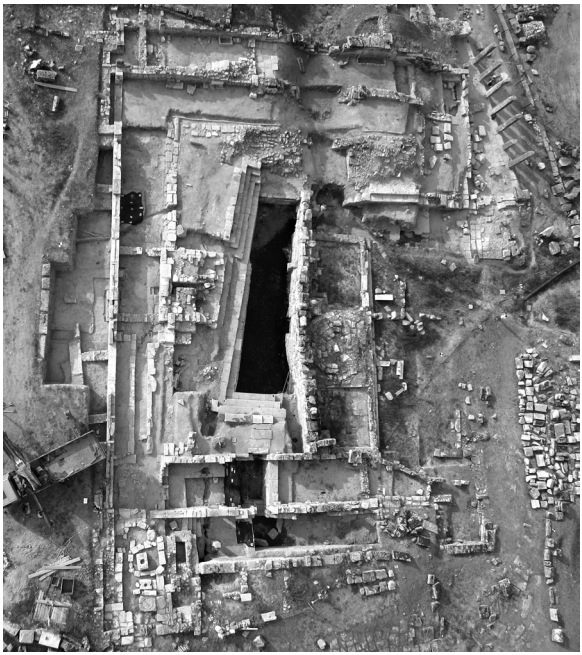

Fig. 12
Photograph taken from a hot-air balloon of the area of the *Ploutonion.*

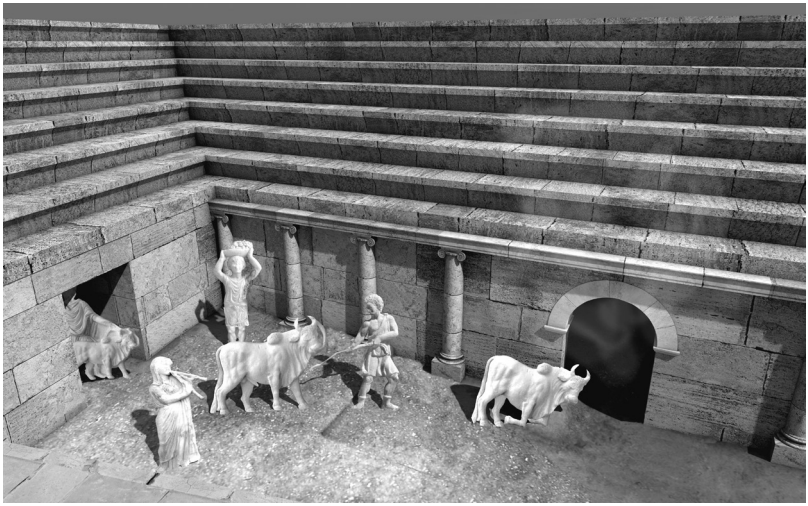

Fig. 13 3D reconstruction of the entrance to the cave of the *Ploutonion*, with the sacrifice of bulls asphyxiated by the fumes of carbon dioxide (M. Limoncelli).

Fig. 14 The theatron of the *Ploutonion* after the restorations of 2015.

Fig. 15 The perimeter wall (*temenos*) of the *Ploutonion*.

Fig. 16
Ploutonion, north side: column of the Doric portico with unfinished drums.

Fig. 17 *Ploutonion*: the abaton (the inner room, reserved for initiates), with beds for incubation practices.

Fig. 18 The *Ploutonion* immediately after the excavation, before the restorations; to the right the marble sculpture of the coiled serpent.

Fig. 19 The votive deposit, with materials dated to the Hellenistic period, mainly spindle-shaped unguentaria (2nd century BC).

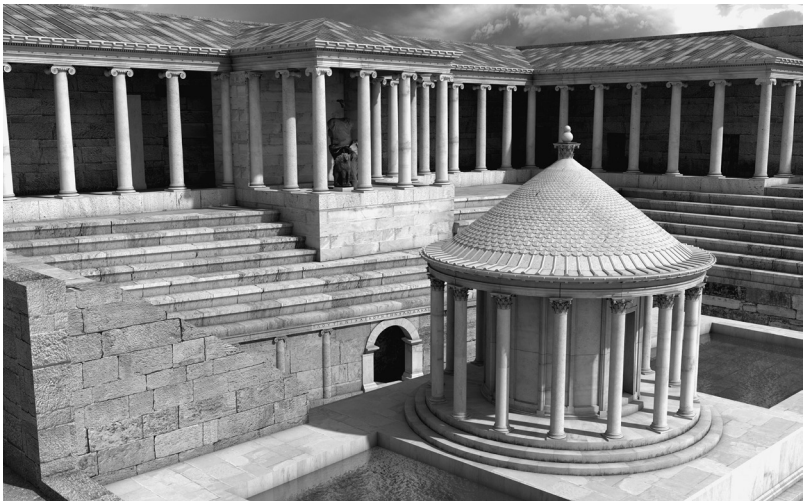

Fig. 20 *Ploutonion:* virtual reconstruction of the Portico of Nero, above the *summa cavea* of the *theatron* (M. Limoncelli).

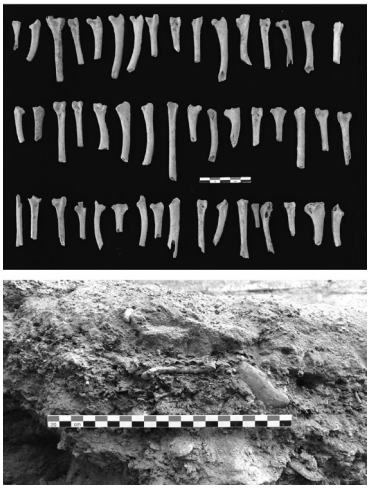

Fig. 21
Ploutonion: the votive deposits containing bones of birds.

Fig. 22
Ploutonion: the late Archaic vase showing the player of the elymos.

Fig. 23 Terracotta *kourotrophoi* from the *Ploutonion.*

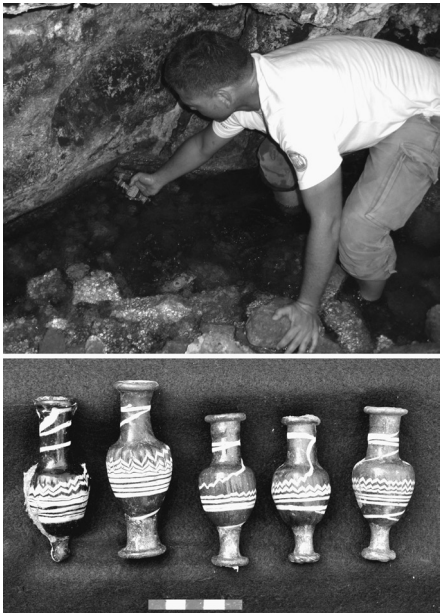

Fig. 24
Discovery of the unguentaria in blue glass at the entrance to the cave.

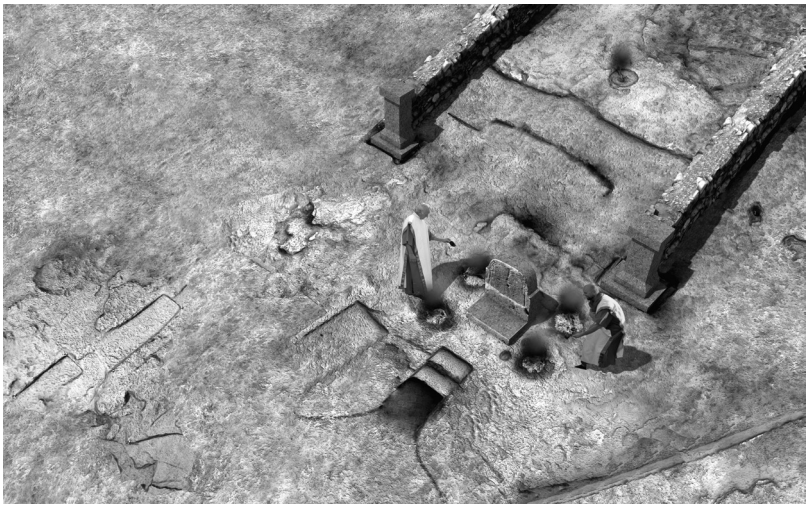

Fig. 25 Virtual 3D reconstruction of the Phrygian place of worship above the entrance to the cave of the *Ploutonion* (M. Limoncelli).

Fig. 26 Rock-cut place of worship in the Eumeneia district (Şeyhlü-Işıklı, Çivril region, in the upper Maeander valley).

PALAEO-VEGETATIONAL RECONSTRUCTIONS IN THE LYKOS VALLEY BY ARCHAEOBOTANICAL ANALYSES AT HIERAPOLIS

*Girolamo Fiorentino**

Study area

The ancient city of Hierapolis lies on the south-east slopes of a hill delimited to the north by the river Çürüksu, a tributary of the Maeander, to the south-east by the heights of Honaz Dağ and to the south by Baba Dağ. The settlement is situated on a flat area of travertine. This litotype is part of a large formation of thermal origin, extended throughout the Denizli region, dating from the Middle Miocene (400,000 ago)[1] (fig. 1). The location of the site along an active fault is also evident in the complex phases of occupation and abandon of the site and in the seismic traces on ancient architectural elements[2].

* Laboratory of Archaeobotany and Palaeoecology, Department of Cultural Heritage, University of Salento, Lecce, Italy. E-mail: girolamo.fiorentino@unisalento.it

[1] Westaway 1993; Pentecost 1995; Altunel, Hancock 1996; Özkul *et al.* 2002.

[2] Altunel 2000.

The area has already been the subject of floral research, in particular as regards the micro-flora associated with thermal waters[3], for some Caryophyllaceae of the genus *Minuartia*[4] and some species of *Fumaria*[5], with few citations, however, in the floras of the region[6].

In terms of its potential vegetation, the area lies within the Mediterranean and transitional Mediterranean regions[7], with tree coverage characterised by *Pinus brutia* and *Quercus*[8]. Where the presence of *Pinus brutia* is heavily reduced or completely absent as a result of human activities, it has been replaced by secondary vegetation typical of garrigue and maquis: *Arbutus unedo, A. andrachne, Calycotome villosa, Cistus creticus, C. salvifolius, Juniperus oxycedrus, Erica verticillata, E. arborea, Phillyrea latifolia, Pistacia lentiscus, P. terebinthus, Q. coccifera, Styrax officinalis, Vitex agnus-castus, Crataegus monogyna, Paliurus spina-Christi,* etc.

Reconnaissance of the terrain shows the natural vegetation to be highly degraded, particularly in the upper areas of the plateau; here there are small areas with *Q. coccifera*, probably the residues of more extensive wooded areas, the regression of which to scrub-like vegetation indicates centuries of animal grazing. Currently the area is being replanted with conifers, especially on the slopes of the hills and bordering the archaeological area (fig. 2).

Analysis of ancient botanical remains in the travertine formation

An early investigation entailed a palaeobotanical examination of cross-sections in the layers of travertine, especially along the *stenopoi of Regio III*, in order to detect plant fossil casts. Analysis of the current travertine formation mechanisms and the way in which plant remains are incorporated and conserved along the channels has confirmed the importance of this particular context of formation for the reconstruction of the past natural

[3] Güner 1966; Pentecost *et al.* 1997; Yavuz – Çobanoğlu 2007.
[4] Çelebioğlu – Favarger 1983
[5] Lidén 1986.
[6] Davis 1965-1985; Kürschner *et al.* 1997.
[7] Zohary 1973.
[8] Akman 1995; Çolak – Rotherha 2006; Gücel *et al.* 2008; Atalay – Efe 2010.

environment[9]. Studying the levels of travertine visible along sections, has made it possible to recognise numerous plant fossil casts attributed to the leaves of broad-leaf trees, conifer needles, branches and twigs of trees and shrubs, and stems of grasses (fig. 3). The morphological recognition of the fossil casts was performed directly in loco or by taking high-resolution photographs that were subsequently processed in the laboratory with the help of image analysis software. Further investigation on travertine deposits, also through the analysis of palinomorphs, however, requires a careful stratigraphic review for the chronological position of the reconstructed paleoenvironments.

Archaeobotanical analyses in the site

The analyses were conducted on burnt plant remains sampled on sight in the various excavated areas (fig. 4). In the case of the ash levels of the altars of the Sanctuary of Apollo, we carried out to the sampling of total excavated sediment, full of burnt plant remains[10].

The sampled sediment was subjected to floatation using two series of sieves with meshes of 3,0 and 0.5 mm, in order to recover plant remains across a range of size classes. The material resulting from the floatation was examined by microscope (Nikon SMZ 645) to distinguish the various plant components (charcoals and other plant macro-remains). The remains were subsequently subjected to morphological and anatomical recognition by microscopes (Nikon SMZ 645 and Nikon ECPLYPSE ME 600). Taxonomic identification was performed with reference to anatomical atlases[11] and the collection of plants held by the Laboratory of Archaeobotany and Palaeoecology of the University of the Salento.

In total, 1198 charcoals and 139 plant macro-remains from the various contexts of excavation were recognised and determined. Among the charcoals were 8 tree/shrub identified to varying taxonomic resolution: *Pinus brutia/halepensis, Ficus carica, Morus cfr. nigra* (mulberry), *Olea*

[9] Schopf 1975; Alçiçek – Wesselingh 2008.

[10] Semeraro 2012.

[11] Greguss 1955; Jacquiot 1955; Greguss 1959; Jacquiot *et al.* 1973; Yaltırık 1984; Fahn *et al.* 1986; Schweingruber 1990; Yaltırık 1993; Merev 1998; Tosun 1999; Göksu 2006; Akkemik – Yaman 2012.

europaea, Prunus cfr. dulcis (almond), Quercus sp., Quercus ilex, Populus sp. The plant macro-remains, which were found in insula 104, included caryopses of cereals *(Hordeum vulgare, Triticum sp.)* and the endocarps of fruit trees *(Olea europaea, Vitis vinifera, Prunus dulcis)*.

We present the results of the more specifically archaeobotanical research of the following archaeological contexts:

- the Cathedral (fig. 5);
- *insula* 104, characterised by dwelling structures dated to the Byzantine epoch (fig. 6);
- the Sanctuary of Apollo, particularly the area adjacent to the north side of the Temple, with accumulations of ashes and burnt plant remains, datable to the period from the 1st century BC and the 1st century AD (fig. 7).
- the eschara of the Ploutonion (fig. 8): preliminary results

Structural wood elements of the Cathedral

The original nucleus of the Cathedral complex was built in the Late-Ancient period, with the building reaching its maximum architectural development in the 6th century. The building is believed to have been destroyed in the 7th century, probably as a result of an earthquake and the consequent fire[12].

The archaeobotanical samples were taken from the levels of collapsed material containing the walls of the final phase and probably represent the timbers of the building. Particular attention was paid to the spatial location of the samples, in an effort to facilitate the structural reconstruction of the wooden elements used in the building. Two stratigraphic units (UUSS 40 and 42) were sampled in different areas of excavation, both attributable to the phases of the building collapse.

The archaeobotanical remains identified by the analysis were all combusted woody tissues (charcoals) belonging to a single taxon: *Pinus brutia/halepensis* with traces of compression (fig. 9). The wood of the pine tree has properties that make it particularly suitable for use in construction, thanks to the elasticity of its cellular structures (tracheids). The wooden remains seem to belong to beams and struts of small to medium dimensions

[12] Peirano 2012.

(about 10-15 cm in diameter) and probably correspond to horizontal structural elements in the roofing over the atrium of the Cathedral.

Residential structures of Insula 104

Insula 104, near the west side of the Theatre, is made up of a series of dwelling structures dated to the proto- and middle-Byzantine eras[13].

Sampling and analysis was conducted in four environments on the west side (A 194, A 1254, A 1267, A 1361) and in levels present on *stenopos* D[14]. The anthracological analysis made it possible to recover and determine 547 pieces of charcoals belonging mainly to *Pinus brutia//halepensis, Olea europaea, Morus cfr. nigra, Quercus sp., Quercus type ilex, Popolus sp., Prunus cfr. dulcis*. The plant macro-remains recovered from *Insula* 104, are from caryopses of *Triticum* sp. (wheat) and *Hordeum* vulgare (barley), endocarps of *Olea europaea* (olive), *Prunus dulcis almond* and *Vitis vinifera grape*, and fragments of non-identifiable seeds.

The dominant presence of pine among the anthracological remains could indicate use of the wood of this conifer as a raw material in the walls of the structures rather than residues of fuel. The presence of charcoals of *Morus cfr. nigra*, together with anthracological and carpological remains of *Olea europaea, Vitis vinifera* and *Prunus dulcis*, may be interpreted as evidence of the cultivation of fruit trees near the buildings, probably in gardens or orchards. Further confirmation of this is provided by the exclusive presence of branches and twigs of small dimensions, plausibly the result of seasonal pruning.

The agricultural economy is attested by the caryopses of cereals including wheat *(Triticum sp.)* and barley *(Hordeum vulgare)*, which accompany the cultivation of tree crops (olive, vines, almonds).

The eschara of Sanctuary of Apollo

Micro-excavations and archaeobotanical research in the area characterised by secondary dumping of burnt material and ceramic fragments, interpreted as the *escharon* of the Santuario of Apollo, began with the campaign of

[13] Zaccaria Ruggiu 2012.
[14] Zaccaria Ruggiu 2012.

2003[15]. The archaeological deposit was made up of ash-rich sediments and occupied about 80% of the area initially brought to light; the removal of these first layers, chronologically associated with the 1st century AD, made it possible to identify a series of archaeological traces (cuttings and fillings) along the northern edge of the area. The excavation of the area of the *escharon* involved the careful and methodical micro-stratigraphic removal of the archaeological levels and the taking of cores from these, in order to determine the dynamics of combustion and the structural, distributional and spatial characteristics of the archaeobotanical remains. The walls bear the traces of intense thermal damage due to direct combustion inside the furrows, while a series of vertical micro-assays highlighted traces of older, horizontal combustions.

It can thus be argued that an early use of the area involved the lighting of pyres or fires at ground level, with the consequent lateral dispersion of the ashes and charcoals. In a subsequent phase rectangular pits were dug, inside which further acts of combustion were performed. The sediments of the various archaeological levels were removed whole, with the aim of recovering and analysing the numerous archaeobotanical remains.

The anthracological analysis, together with the stratigraphic contextualisation, made it possible to determine the distributional and spatial features of the plant remains in the area of the *escharon*, and thus to reconstruct the probable depositional and ritual dynamics for which the plant remains provide evidence (fig. 10). In the material filling the pits/furrows on the north-east side, from the deepest and most ancient layers to the most recent ones, almond is the most frequently found taxon, followed by pine, while the rest is made up of holm-oak, olive and fig. The taxonomic distribution of the remains recovered from the furrows positioned on the north-west of the area is characterised by the constant presence of almond and pine, but in different quantities from the furrows to the north-east. In contrast, the pit/furrow running across the two groups of furrows described above is characterised by the dominant presence of remains of *Olea europaea, Pinus brutia/halepensis* and *Ficus carica*.

[15] For the preliminary archaeobotanical analyses: Fiorentino – Solinas 2008; Fiorentino – D'Oronzo 2010; Fiorentino *et al.* 2012, while for the description of the context Semeraro 2007; Semeraro 2008; Semeraro 2012.

From the anthracological point of view, in the area of the *escharon* analysed to date it is thus possible to identify two areas that are organised differently in spatial and taxonomic terms and are physically separated by stratigraphic element US 422 (pit/channel). In both areas there are apparently similar structures (the furrows), which the xylotomic and seasonal analyses however indicate were used at different times, probably corresponding to different moments and ways of conducting the religious ritual[16].

In general, the horizontal stratigraphic levels, which the furrows cut across, are taxonomically characterised by the prevalence of fragments of pine. Some of the remains recovered are portions of secondary and tertiary branches with residues of bark. This characteristic enabled us to make some proposals regarding the reconstruction of the season in which the plants were cut. This entailed identifying, in cross section, the last growth ring in order to verify the presence of either earlywood (indicating spring growth) or latewood (indicating slower growth in summer-autumn). The analysis was performed on bark-bearing branches of *Pinus brutia/halepensis* (found to have been cut in the spring) and *Prunus cfr. dulcis* (cut in the winter).

The eschara of the Ploutonion: preliminary results

The initial analyses of the *Eschara of the Ploutonion*, highlight the taxonomically differentiated distribution of the plant remains in the various structures of the area[17].

Specifically, charcoals and endocarps of olive were identified in one of structures, while a greater concentration of remains of pine charcoals was identified in the other one.

Also important is the association of the archaeobotanical remains of olive (charcoals and fruits) with specific plastic decorative motifs on certain bowls (fig. 11), interpretable as representations of olive leaves and fruits, possibly reflecting characteristics of the cult and rituals of the Ploutonion.

[16] Fiorentino – Solinas 2008.

[17] D'Andria 2013; Giannico 2015.

Final considerations

The archaeobotanical analyses conducted to date enable us to delineate a fairly complex palaeo-vegetational framework, with chronological and contextual differentiation. The general anthracological diagram is still difficult to interpret in terms of variation of the vegetation, due to the functional characteristics of the contexts of discovery (fig. 12).

Indeed, the analyses pertaining to the phases of the 1st century BC and the 1st century AD refer to accumulations of combustion residues that are linked to the cult activities of the Sanctuary of Apollo and the Ploutonion, and not necessarily to the natural vegetation surrounding the settlement; rather they reflect choices specific to the ritual[18]. Significant in this regard is the evidence of almond associated with pine, which clearly represents no natural plant association, as is the presence of oaks, particularly evergreen species.

The subsequent Byzantine phases, precisely because of the contextual characteristics of the discoveries, provide evidence of a vegetational environment exploited in various ways, with the use of naturally-growing *Pinus brutia* for carpentery and construction and the presence of orchards and gardens for growing tree crops. There are evident traces of agricultural exploitation of the area surrounding the city during the Byzantine phases, with variegated cultivation of cereals including barley and wheat, while pasture, particularly for sheep and goats, characterises the landscape in subsequent phases up until modern times, with clear signs of overgrazing and impoverishment of the vegetation.

[18] Fiorentino - Solinas 2008.

ABBREVIATIONS AND BIBLIOGRAPHY

Akkemik – Yaman 2012 — Ü. Akkemik – B. Yaman, *Wood anatomy of eastern Mediterranean species*, Remagen-Oberwinter, 2012.

Akman 1995 — Y. Akman, *Türkiye Orman Vejetasyonu*, Ankara, 1995.

Alçiçek – Wesselingh 2008 — H. Alçiçek – F.P. Wesselingh, "Lake Denizli (Turkey) as an archive of Neogene environmental and climate change and endemic biodiversity refuge", *26th IAS Regional Meeting/ SEPM-CES Sediment (1-3 September 2008), SDGG Heft 58*, Bochum, 2008, 30.

Altunel 2000 — E. Altunel, "L'attività sismica a Hierapolis e nelle zone limitrofe", *Ricerche archeologiche turche nella valle del Lykos* (Edited by F. D'Andria - F. Silvestrelli), Galatina (Lecce), 2000, 299-325.

Altunel – Hancock 1996 — E. Altunel – P.L. Hancock, "Morphological features and tectonic setting of Quaternary travertines at Pamukkale", *Geological Journal 28*, 1996, 335-346.

Atalay – Efe 2010 — I. Atalay – R. Efe, "Structural and distributional evaluation of forest ecosystems in Turkey", *Journal of Environmental Biology 31*, 2010, 61-70.

Çelebioğlu *et al.* 1983 — T. Çelebioğlu – C. Favarger – K.L. Huynh, "Contribution à la micromorphologie de la testa des graines du genre Minuartia (Caryophyllaceae). I. Sect. Minuartia", *Bulletin du Muséum national d'histoire naturelle*. Section B, Adansonia 5, n. 4, 1983, 415-435.

Çolak – Rotherha 2006 — A.H. Çolak – I.D. Rotherha, "A review of the forest vegetation of Turkey: its status past and present and its future conservation", *Biology and Environment: Proceedings of the Royal Irish Academy 106B, 3,* 2006, 343-354.

D'Andria 2013 — F. D'Andria, "Il Ploutonion a Hierapolis di Frigia", *Istanbuler Mitteilungen 63*, 2013, 157-217.

Davis 1965-1985 — P.H. Davis (ed.), *Flora of Turkey and the East Aegean Islands*, Vols.1-9, Edinburgh, 1965-1985.

Fahn *et al.* 1986 — A. Fahn – E. Werker – P. Bass, *Wood anatomy and identification of trees and shrubs from Israel and adjacent regions*, Jerusalem, 1986.

Fiorentino – D'Oronzo 2010 — G. Fiorentino – C. D'Oronzo, "Une approche archéobotanique et expérimentale pour identifier des episodes de feu successifs dans des structures foyères sur le sanctuaire d'Apollon à Hierapolis (Turquie)", *P@lethnologie 2*, 2010, 59-68.

Fiorentino *et al.* 2012 — G. Fiorentino – C. D'Oronzo – F. Solinas, "Le ricerchearcheobotaniche a Hierapolis di Frigia. Campagne 2002-2006", *Ricerche Archeobotaniche Hierapolis di Frigia V, Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 39-59.

Fiorentino – Solinas 2008 — G. Fiorentino – F. Solinas, "Micro-stratigraphical and archaeobotanical approaches to investigating ash deposits in the Apollo Sanctuary in Hierapolis", *1. Uluslararası Antik Dönemde Kehanet ve Apollon'un Anadolu Kültleri Sempozyum Bildirileri (17-20 Ağustos 2005, Izmir), ADerg XII/ 2008-2*, Izmir, 2008, 89-98.

Giannico 2015 — V. Giannico, *Il Ploutonion a Hierapolis di Frigia. I depositi votivi*, Unpublished Thesis, Scuola di Specializzazione in Archeologia, Università del Salento, Lecce, 2015.

Göksu 2006 — Ş.R.N. Göksu, *Ak dut (Morus alba L.) ağacının bazı anatomik ve kimyasal özellikleri* (Karaelmas Üniversitesi, Fen Bilimleri

Enstitüsü, Orman Endüstri Mühendisliği Anabilim Dalı, Unpublished M.Sc. Thesis), Zonguldak, 2006.

Greguss 1955 — P. Greguss, *Identification of living gymnosperms on the basis of xylotomy*, Budapest, 1955.

Greguss 1959 — P. Greguss, *Holzanatomie der europäischen Laubhölzer und Sträucher,* Budapest, 1959.

Gücel *et al.* 2008 — S. Gücel – K. Özkan – S. Çelik – E. Yücel – M. Öztürk, "An overview of the geobotanical structure of turkish Pinus sylvestris and Carpinus betulus forests", *Pakistan Journal of Botany 40, 4*, 2008, 1497-1520.

Güner 1966 — H. Güner, "Die Mikroflora der Thermalwasser von Pamukkale", *Ege Üniversitesi Fen Fakültesi İlmi Raporlar Serisi 19,* 31, 1966.

Jacquiot 1955 — C. Jacquiot, *Atlas d'anatomie des bois de Conifères,* Paris, 1955.

Jacquiot *et al.* 1973 — C. Jacquiot – Y. Trenard – D. Dirol, *Atlas d'Anatomie des bois des Angiospermes*, Paris, 1973.

Kürschner *et al.* 1997 — H. Kürschner – T. Raus – J. Venter, *Pflanzen der Türkei. Ägäis-Taurus-Inneranatolien*, Wiesbaden, 1997.

Lidén 1986 — M. Lidén, "Synopsis of Fumarioideae with a monograph of the tribe Fumarieae", *Opera Botanica 88,* 1986, 1-133.

Merev 1998 — N. Merev, "Doğu Karadeniz Bölgesindeki Doğal Angiospermae Taksonlarının, Odun Anatomisi", *KTÜ, Orman Fakültesi Yayınları, Yayın n. 27*, Trabzon, 1998.

Özkul *et al.* 2002 — M. Özkul – B. Varol – M.C. Alçiçek, "Depositional environments and petrography of Denizli travertines", *Mineral Resources Exploitation Bulletin 125*, 2002, 13-29.

Peirano 2012 — D. Peirano, "Scavi e ricerche nel cantiere della Cattedrale", *Hierapolis di Frigia V, Le attività delle campagne di scavo e restauro 2004-*

2006 (Edited by F. D'Andria, M.P. Caggia, T. Ismaelli), Istanbul, 2012, 591-600.

Pentecost 1995 — A. Pentecost, "The Quaternary travertine deposits of Europe and Asia Minor", *Quaternary Science Reviews 14,* 1995, 1005-1028.

Pentecost *et al.* 1997 — A. Pentecost – S. Bayari – C. Yesertener, "Phototrophic microorganism of the Pamukkale travertine Turkey: their distribution and influence on travertine deposition", *Geomicrobiological Journal 14*, 1997, 269-283.

Schopf 1975 — J.M. Schopf, "Modes of fossil preservation", *Review of Palaeobotany and Palynology 20, 1-2,* 1975, 27-53.

Schweingruber 1990 — F.H. Schweingruber, *Anatomie europäischer Hölzer: Ein Atlas zur Bestimmung europäischer Baum-Strauch- und Zwergstrauchhölzer,* Bern, Stuttgart, 1990.

Semeraro 2007 — G. Semeraro, "Ricerche archeologiche nel santuario di Apollo (Regio VII) (2001-2003)", *Hierapolis di Frigia I. Le attività delle campagne di scavo e restauro 2000-2003* (Edited by F. D'Andria - M.P. Caggia), Istanbul, 2007, 169-209.

Semeraro 2008 — G. Semeraro, "The sanctuary of Apollo in Hierapolis: a stratigraphical approach to a cult context", *1. Uluslararası Antik Dönemde Kehanet ve Apollon'un Anadolu Kültleri Sempozyum Bildirileri (17-20 Ağustos 2005 Izmir), ADerg XII/2008,* Izmir, 179-190.

Semeraro 2012 — G. Semeraro, "Ricerche nel Santuario di Apollo", *Hierapolis di Frigia V, Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria – M.P. Caggia – T. Ismaelli), Istanbul, 2012, 293-324.

Tosun 1999 — S. Tosun, "Ebe Sarıçam Bolu'daki Doğal Yayılışı, Bazı Silvikültürel ve Morfogenetik

Özellikleri", *1st International Symposium on Protection of Natural Environment and Ehrami Karaçam (23-25 September 1999, Kütahya)*, Kütahya, 1999.

Westaway 1993 — R. Westaway, "Neogene evolution of the Denizli region of Western Turkey", *Journal of Structural Geology 15*, 1993, 37-53.

Yaltırık 1984 — F. Yaltırık, *Türkiye meşeleri teşhis kılavuzu,* Ankara, 1984.

Yaltırık 1993 — F. Yaltırık, *Dendrology I (Gymnospermae)*, Istanbul, 1993.

Yavuz - Çobanoğlu 2007 — M. Yavuz - G. Çobanoğlu, "Lichen flora of Pamukkale (Hierapolis), Turkey", P*akistan Journal of Biological Sciences 10, 17*, 2007, 2998-3001.

Zaccaria Ruggiu 2012 — A. Zaccaria Ruggiu, "Un quartiere residenziale, l'insula 104", *Hierapolis di Frigia V, Le attività delle campagne di scavo e restauro 2004-2006* (Edited by F. D'Andria, M.P. Caggia, T. Ismaelli), Istanbul, 2012, 419-442.

Zohary 1973 — M. Zohary, *Geobotanical Foundations of the Middle East*, Stuttgart 1973.

Fig. 1 Travertines of Hierapolis

Fig. 2 Agora of Hierapolis with moden pine formation

Fig 3 Leaf fossil in travertine at Hierapolis

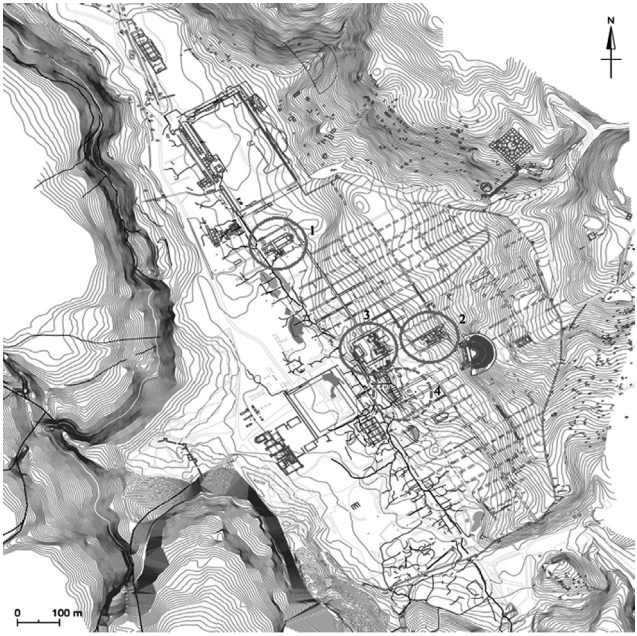

Fig 4 Plan of Hierapolis with contexts analysed
1) Cathedral, 2) Insula 104, 3) Sanctuary of Apollo,
4) Ploutonion

Fig 5 Cathedral of Hierapolis

Fig 6 Excavations at the 104 insula

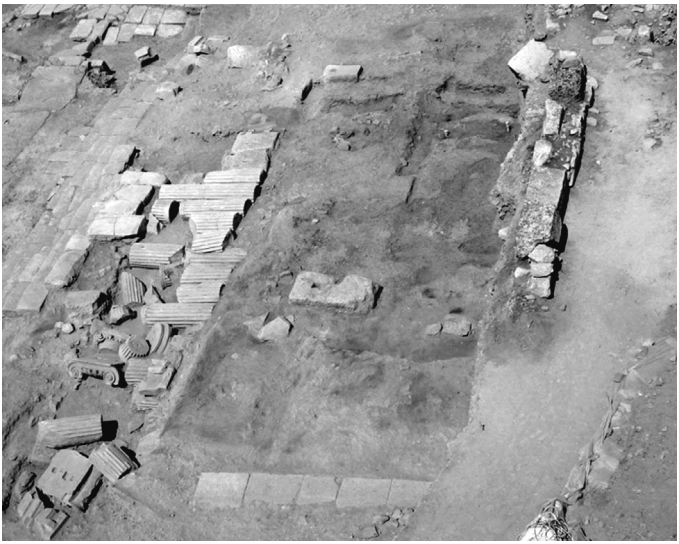

Fig 7　Eschara of Sanctuary of Apollo

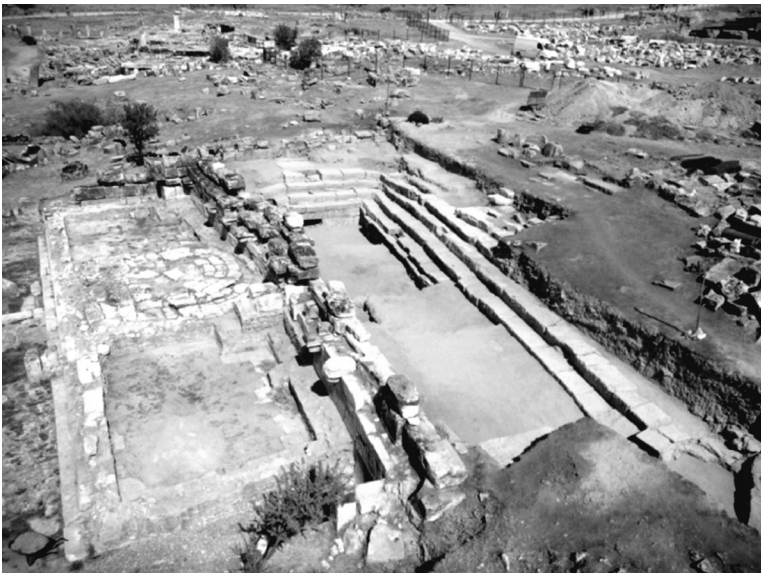

Fig 8　Ploutonion of Hierapolis

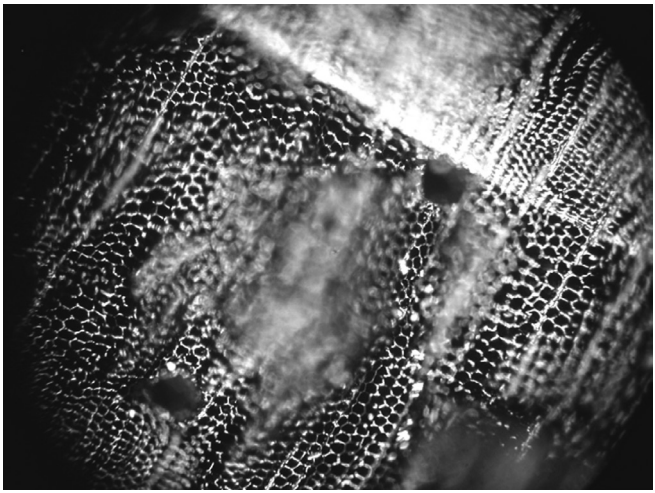

Fig 9 Transversal section of charcoal of Pinus brutia/ halepensis (magnification 100x)

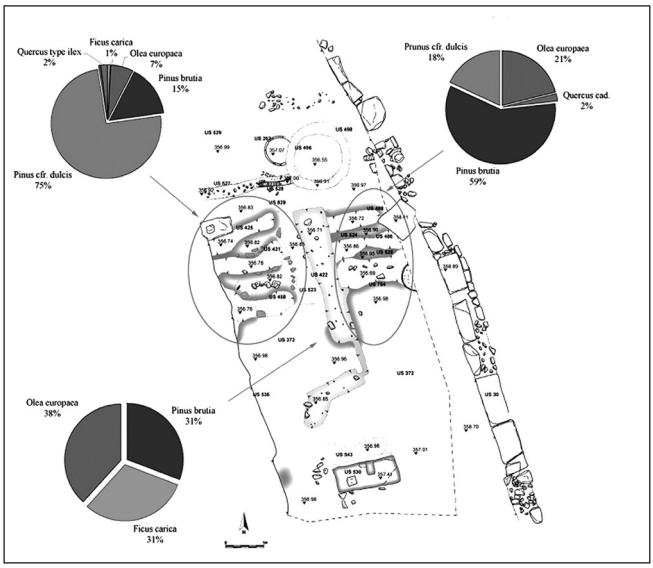

Fig 10 Plan of eschara of Apollo Sanctuary with taxonomical distribution of charcoals

Fig 11 Fragment of Relief bowl

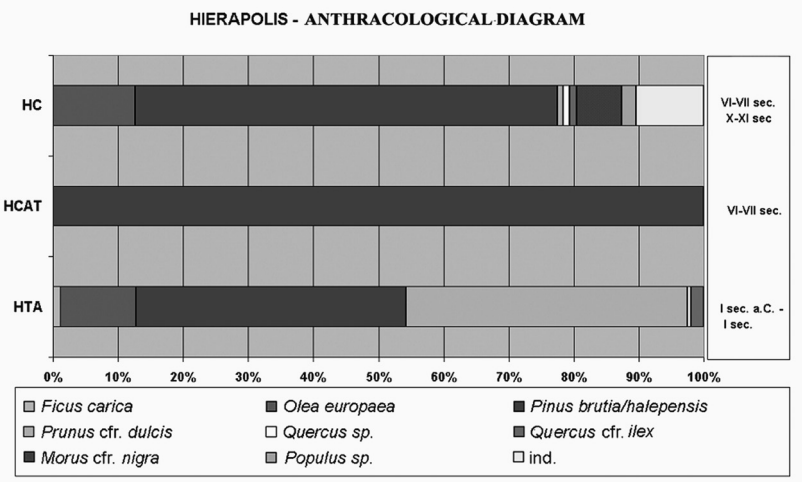

Fig 12 The general anthracological diagram

ABSTRACTS

Urban Planning of Laodikeia on the Lykos in the Light of New Evidence

Celal ŞİMŞEK

Laodikeia is located on the borders of the villages of Eskihisar, Goncalı, Korucuk and Bozburun, six kilometers north of the modern city of Denizli. Laodikeia is also situated at the crossroads of main routes that connect western, central and southern Anatolia with each other. Set amidst the fertile plains of the Lykos River, Laodikeia lies on a high plateau surrounded on three sides by rivers: the Lykos, the Kadmos and the Asopos.

The Hellenistic city was founded by commander Seleucus Antiochus II in the name of his wife Laodike around the middle of the third century BCE. The city was designed in accordance with a Hippodamian plan. Throughout its history Laodikeia suffered many earthquakes and was rebuilt numerous times. It was finally abandoned after a severe earthquake in the reign of Emperor Focas (r. 602–610 CE). Its citizens settled at Denizli – Kaleiçi and Hisarköy on the north slopes of Mt. Salbakos (modern Babadağ) after the city's abandonment. Laodikeia was one of the Seven Churches named in the Book of Revelation and later became a metropolitan city in the Early Byzantine period.

Excavations in Laodikeia show that the city was settled continuously from the Chalcolithic Period (Copper Age, 5500 BCE) to the 7th century CE. The name of the settlement was, in turn, Rhoas (Asopos Hill), Diopolis (City of Zeus) and finally Laodikeia.

Civic planning during the Hellenistic and Roman Periods was highly organized. The city was planned along a grid system with main and side streets crossing each other. The city plan consisted of insulae measuring 42x1-53 meters. Religious, civic, and common structures were built in these insulae. Colossal baths located in the central, eastern, and western areas were connected to the agoras. The stadium, located at the southern side of the city, and the west and east theatres, located at the city's northern side, show the importance placed on the beauty of communal living, art, sport and civic space. Shops were built along the perimeters of the peristyle houses bordering its streets.

Prehistory of the Lykos Valley

Ali Ozan – Fulya Dedeoğlu – Erim Konakçı

The archaeological evidence which has been recently obtained has shown that the Lykos Valley has been selected as an area of settlement by people since the Lower Palaeolithic Period. The results of the archaeological excavations and surveys have indicated that the occupation of the valley continued until the end Late Antiquity. The Lykos Valley's long period of settlement might be considered as evidence that the valley's environmental conditions enabled people to live there from the earliest times. Its location in the center of the extent valley systems in Central Western Anatolia has also been seen as a key factor for the valley in terms of occupation. Another result of its central location is that the Lykos Valley shows development connected with the cultural regions around it in almost every period.

The Lykos Valley during the Second Millennium BC

Erim KONAKÇI

The Maeander River from the south of Adıgüzel Dam towards the west, flowing through Güney town, forms a large floodplain after Yenicekent. The Çürüksu Valley, lying between Honaz and Sarayköy, joins the Maeander Valley around Sarayköy. The plain lying to the east of the junction of the Maeander and the Çürüksu is known as the Lykos Valley, hosting the Denizli and Sarayköy plains. The interest of researchers in the Lykos Valley goes

back to the 17th century AD, and the curiosity of the European aristocracy about the cities mentioned in the Bible or in classical texts by Strabon, Vitruvius etc. led a number of people to visit the region. T. Smith, J. Spoon and G. Wheeler in the 17th century, Pococke and R. Chandler in the 18th century, F. Arundell, A. L. Laborde, W. J. Hamilton, W. Cochron, C. Texier, G. Weber and W. M. Ramsay in the 19th century, and many other researchers not mentioned here may be listed at length. However, the enthusiasm of the early researchers was mostly limited to the great Roman metropolises such as Laodikeia or Hierapolis, and the prehistoric cultures of the region were not properly documented in that period. This study aims to achieve an understanding of the historical geography of the region, and analyses mounds that were inhabited during the 2nd millennium BC. Both the archaeological data and the inscriptions indicate that there was a political organization comprised of states in south-western Anatolia in the early 2nd Millennium BC. In this period, the Lykos Valley was located within the Arzawa Lands. However, the archaeological excavations within the scope of this period in the region are limited to the Laodikeia-Asopos Hill.

Tabernae in Tripolis

Bahadır DUMAN

The ancient city of Tripolis is located in the town of Buldan in the Denizli Province. The Colonnaded Street which runs in east-west direction, located in the south of the city, is 450 m long. It has only partially been excavated and it has a width of 10 m. However, in the 4th century AD, fortification walls were built on its north side, thus bringing its width down to 7 m. In the northern adjoining part of the Colonnaded Street, the southern façades of the tabernae destroyed by the earthquake that occurred probably in the 3rd quarter of the 3rd century AD were closed by the fortification wall in the Late Roman Period. The period when the tabernae began to be used again following the major earthquake contains essential information on the construction of the fortification walls and tabernae. Discussion of the history of Roman tabernae is located at the intersection of architectural

and economic history. This article aims to make statements on the role of tabernae in the economic and architectural history of Tripolis. The data presented in this article make clear that the commercial landscape character of the city fundamentally changed between the first and fourth centuries AD.

Provenance of Banded Travertine from the Ancient City of Tripolis (Yenice/Buldan - Denizli) Based on Minero-Petrographic and Geochemical Characterization

Tamer KORALAY – Bahadır DUMAN – Kıymet DENİZ – Yusuf Kağan KADIOĞLU

Magnificent images of rocks, used in buildings and monuments, have been an indicator of power and wealth since ancient times. This situation has always attracted the attention of mankind. Having rich sources of marble and natural stone in Anatolia, several civilizations have created important works using this wealth throughout history. The banded travertine blocks, with various colors and textures, were used in the structures of Tripolis ancient city. In this study, minero-petrographic and geochemical characterizations of banded travertines were examined and compared to ancient travertine quarry samples in order to determine the source area. Banded travertine samples mainly consist of carbonate minerals (mostly calcite) in needle-shaped crystals. This conclusion is also supported by XRD studies. According to the geochemical analysis results, banded travertine samples display limited compositional variation.

In addition, some of the element ratios of the banded travertines are as follows; Mg/Ca = 0.0003-0.0030; Mn/Sr = 0.0005-0.0103; and Sr/Ca = 0.017-0.114. According to the geological, minero-petrographic and archaeological results, the most probable source of the banded travertines in Tripolis is the ancient travertine quarries, about 3 km. northeast of the ancient city.

Marmora Phrygiae Project: The Contribution of Landscape Archaeology Research in the Territory of Hierapolis in Phrygia to the Reconstruction of Building Sites in the City and Their Strategies for Supplying Stone Materials

Giuseppe SCARDOZZI

Landscape archaeology research conducted in the territory of Hierapolis in Phrygia by the Italian Archaeological Mission has made it possible to reconstruct the ancient topography of the northern sector of the Lykos valley and the highlands of Uzunpınar and Çal.

The research has obtained important data regarding the settlement pattern of the area from Prehistoric to Ottoman times, and in particular from the Hellenistic age to the Roman and Early-Byzantine periods, when the territory was largely included in the administrative area of Hierapolis. Specifically, the routes of aqueducts and the road system were reconstructed, a number of farms and some large villages (characterized by remains of installations for olive oil and wine production) were found, and a few important sacred areas were discovered.

In 2013, a new research project (Marmora Phrygiae) began and the first year of activity was mainly aimed at the petrographic and geochemical characterization of the alabaster (banded travertine, i.e. the marmor hierapolitanum mentioned in the Roman and Byzantine literary sources) and marbles (white and grey) extracted from the numerous ancient quarries indentified in the territory of Hierapolis (both in the area immediately surrounding the city and in the Gölemezli and Thiounta areas). This entailed extensive and systematic sampling; the samples were analyzed to determine their mineral-petrographic and physical-chemical characteristics (using cathodoluminescence, C-O stable isotopic analyses, EPR spectroscopy). The project is also aimed at the study of the ancient building sites in the city (planning, architectural, organization and legal aspects) and their strategies for supplying stone materials, both local and imported (for example from Dokimion and Aphrodisias). In the main monumental complexes of the urban area, many samples of marbles and alabasters, georeferenced using a differential GPS system, were taken. All the collected data have been implemented in a opensource webGIS, developed for the project; it is

aimed at data management and integration, and it will also constitute an important research tool for the study of high-quality stones used in the other cities in the Lykos valley and the exported ones, such as the alabaster of Hierapolis, that was used in Rome, Constantinople and in numerous cities of the western Mediterranean basin.

Nature And Cult in the *Ploutonion* of Hierapolis before and after the Colony

Francesco D'Andria

The site of Hierapolis is characterised by extraordinary natural processes that have produced the landscape of white travertine cascades from which the name Pamukkale ("castle of cotton") derives. These phenomena are caused by the presence of an active seismic fault running across the site. The cracks in the terrain are seen in the thermal springs, with intense emissions of noxious gases (particularly carbon dioxide, which in some points is much more abundant than oxygen).

Since ancient times these exceptional natural phenomena have exerted a powerful fascination; numerous writers have described them, frequently associating them with the presence of the Sacred. In the first century BC Strabo wrote of a site near a cave with a sanctuary dedicated to the gods of the Underworld, from which it took the name Ploutonion. Strabo notes that as birds drew near the cave they were asphyxiated by the emissions and he describes bulls being sacrificed by bringing them to the cave so that they were killed in the same way. According to Strabo, only the eunuch priests of the goddess Cybele could enter the cave and emerge unharmed. These themes were taken up by other authors up until the beginning of the 6th century AD, when the Neoplatonist philosopher Damascius described his visit by means of a dream metaphor linked to the feast of the Hilaria and the cult of the Magna Mater. In 2012 the excavations conducted by the Italian Archaeological Mission made it possible to identify the sanctuary, bringing to light the entrance to the cave, marked by a dedicatory inscription to Pluto and Kore. Intensive excavations in the area brought to light the whole of the sacred complex, characterised by the presence of the theatron (described by Cassius Dio), a tholos, the temenos and numerous votive deposits and hearths (escharai). Near the entrance to the cave were found elements of

sculptural decoration linked to chthonian themes, particularly the marble statue of Cerberus, the three-headed guard dog of the Underworld, and the statue of a serpent. The 2013 campaign saw the excavation of the most ancient levels, down to the bedrock overlying the cave. This brought to light the levels preceding the foundation of the colony of Hierapolis in the late 3rd century BC. The bedrock is characterised by a series of flat planes carved in the rock, which may be interpreted as stepped altars, associated with materials linked to the Archaic occupation of the site. Among the ceramics is a fragment of a ritual vase with reliefs, dated to the 6th century BC, with the representation of a musician playing the elymos, the double flute associated with the Phrygian cult of Cybele.

These new data enable us to consider the role of the site from a new perspective with respect to the Phrygian settlement of the valley of the Lykos, where numerous places of worship with stepped altars are attested. Hierapolis was thus already a sacred place, dedicated to Mother Cybele, before the foundation of the colony. The indigenous cult of Cybele persisted right up until the start of the Byzantine era, alongside that of the dii inferi Pluto and Kore, who were introduced by the new colony's Hellenistic founders.

Palaeo-Vegetational Reconstructions in the Lykos Valley by Archaeobotanical Analyses at Hierapolis

Girolamo Fiorentino

Archaeobotanical research in Hierapolis began in 2002 with the first botanical survey of the vegetation currently surrounding the site, establishing the climatic and environmental features of the area and studying the exploitation of the plant resources by the local community. Analyses of the ancient plant remains began in 2003, with excavations and recovery of samples from various areas of the site differing in terms of context and chronology. The archaeobotanical analyses sought to reconstruct the features of the natural environment and the relationship with the dynamics of human settlement of the area[1].

[1] This paper is an updated version of Fiorentino *et al.* 2012.