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Quarry Industry in Rough Cilicia: The Cases of Dana Island and Kesiktaş

GÜNDER VARİNLİOĞLU*

Abstract

The fame of the construction workers originating from Isauria (Rough Cilicia) is a well-known phenomenon in Late Antique architectural history. In the late fifth and sixth centuries, textual evidence reported Isaurian architects, masons, quarrymen, and ordinary laborers in construction projects in North Syria, Palestine, and Constantinople. Their emergence coincided with the construction upswing across the Eastern Mediterranean. In Isauria, builders had easy access to ordinary building materials, as variations of limestone bedrock are ubiquitous. In this context, two coastal quarries are unique cases illustrating the development of the quarrying industry and trade in ordinary stones. The first example is Dana Island where settlement and quarries co-existed. Quarrying may have started in the early Roman period, while its transformation into an industrial and commercial endeavor is a Late Antique phenomenon. As large-scale quarrying subsided or ended at the end of antiquity, the infrastructure such as coastal ramps, warehouses, and stockpile areas fell out of use. Decrepit buildings were pillaged, their sites were excavated, and quarries were cut through the coastline that had long served the quarry industry. The second case is Kesiktaş, which functioned exclusively as a quarry of industrial proportions but did not have a permanent settlement. Unlike Dana, the chronology of quarrying at Kesiktaş cannot yet be dated. Nevertheless, the stone industry and trade in ordinary building materials were essential in the economy and

Öz

İsaurialı inşaat işçilerinin ünü, Geç Antik Dönem mimari tarihinde iyi bilinen bir olgudur. Geç beşinci ve altıncı yy.'larda yazılı kaynaklar, İsaurialı mimarların, taş ustalarının, taş ocakçılarının ve vasıfsız işçilerin, Kuzey Suriye, Filistin ve Konstantinopolis'teki inşaat projelerinde yer aldığından söz etmiştir. Onların ortaya çıkışı, Doğu Akdeniz'de yapı faaliyetinin arttığı dönemle eş zamanlıdır. İsauria'da yapı ustaları sıradan yapı malzemesine kolayca erişim sağlamışlardır, çünkü farklı türlerdeki kireçtaşı çok yaygındır. Bu bağlamda, kıyılarıdaki iki taş ocağı alanı, taş ocakçılığı endüstrisinin ve sıradan taş ticaretinin gelişimini gösteren benzersiz örneklerdir. Bunların ilki, yerleşimle taş ocaklarının bir arada bulunduğu Dana Adası'dır. Taş ocakçılığı erken Roma Dönemi'nde başlamış olabilir; bunun endüstriyel ve ticari bir faaliyete dönüşümü ise Geç Antik Çağ'da gerçekleşmiştir. Antik Çağ'ın sonunda büyük ölçekli taş ocakçılığı azaldığında veya bittiğinde, kıyı rampaları, depolar ve stok alanları gibi altyapı unsurları kullanımdan kalkmıştır. Eski yapılar yağmalanmış, kazılmış ve uzun zamandır taş ocakçılığı endüstrisine hizmet veren kıyı şeridinde yeni ocaklar açılmıştır. İkinci örnek Kesiktaş, endüstriyel ölçekte taş ocağı olarak kullanılmıştır; kalıcı yerleşimi yoktur. Dana Adası'nın tersine, Kesiktaş'taki taş ocakçılığının kronolojisini henüz bilmiyoruz. Gelgelelim, taş endüstrisinin ve ticaretinin İsauria'nın ekonomisinde ve zanaatlerinde önemli bir yeri vardı. Kıyı hattında konumlanan ve endüstriyel ölçekteki bu iki taş ocağı, yerel

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crafts of Isauria. These two coastal quarries of industrial proportions are unique case studies to explore the use of local geology for stone extraction, the various techniques of quarrying, the size and types of stone blocks that circulated in the sea lanes, and the logistics of the quarrying industry and stone transport. They provide us snapshots of complex taskspaces where the protagonists were the quarrymen, quarry owners, stonecutters, metal workers, and other supporting laborers.

Keywords: quarrying, stone trade, construction industry, Isaurians, coastline

jeolojinin işlenmesini, taş ocakçılığı tekniklerini, deniz yollarında taşınan blokların boyutlarını ve türlerini, taş ocakçılığı endüstrisinin ve taş nakliyesinin lojistiğini araştırmak için benzersiz alanlardır. Bu iki örnek, taş ocakçılarının, taş ocağı sahiplerinin, taşçıların, metal işçilerinin ve bu endüstriye yardımcı başka çalışanların başrolde olduğu karmaşık iş peyzajlarına (taskspaces) ışık tutmaktadır.

Anahtar Kelimeler: taş ocakçılığı, taş ticareti, yapı endüstrisi, İsaerialılar, kıyılar

The urban and rural landscapes of Rough Cilicia (Isauria) are fertile grounds to study the long-lasting traditions of stone quarrying, stone working, and stone building. Mortar-free masonry using local limestone became the prevailing construction technique as early as the Hellenistic period when the region was divided between the Ptolemies, Seleucids, and their client-kings.¹ The introduction of brick and mortar occurred only after Rome annexed Cilicia in 74 CE and established building yards for new architectural programs, where Roman building masters employed and trained local workers.² Thus, since at least the third century BCE, the regional building skills were based on cutting, shaping, transporting, and joining local stone varieties.

The fame of the construction workers originating from Isauria is a well-known phenomenon in Late Antique architectural history. From the end of the fifth century through the 560s, several texts repeatedly reported the involvement of Isaurian architects, masons, quarrymen, and ordinary laborers in construction projects in North Syria, Palestine, and Constantinople, as well as in the army where they were entrusted with architectural problems. *The Life of Saint Sabas* by Cyril of Scythopolis talks about two Isaurian *architektones* who were responsible for the construction of the saint's lavra between Jerusalem and the Dead Sea (494-50). The *Life of St. Martha* and the *Life of St. Symeon Stylite the Younger* (541-558) describe at length the work of Isaurian quarrymen, masons, architects, workshops, and unskilled workers, employed or volunteering in building projects in and around Antioch. The "complete Malalas" mentions the Isaurians working in the reconstruction of the dome of St. Sophia after it collapsed in 558.³ The architect responsible for the new dome was Isidore of Miletus the Younger, who was also involved in imperial projects in Dara, Chalcis, and Zenobia in North Syria,⁴ where he may have worked with Isaurian crews. The shortage of skilled builders expressed in fourth-century texts and legislation was no longer a problem as construction crews traveled transregionally. By the mid-fifth century, legal codes were replete with references to the improper behavior of construction professionals who "ganged up" to charge very high fees for their labor.⁵ Although

¹ Rauh et al. 2013; Durugönül 1998, 119-32.

² Spanu 2003.

³ Mango 1966.

⁴ Russell 2013a, 359-60; Zanini 2003, 218-19; 2007, 389-90.

⁵ Zanini 2006, 379-80.

Isaurian builders did not have a bad name in the sources, the services of these highly demanded professionals must have been costly. In any case, the building profession was a lucrative business by the mid-fifth century.⁶

In Mango's footsteps, scholars sought material evidence for Isaurian builders in architectural projects across the Byzantine Empire. Resafah-Sergiopolis in Syria, Tomarza in Cappadocia, and Ravenna in Italy are among the places where certain architectural details were interpreted as evidence of the involvement of itinerant Isaurian builders.⁷ Across Rough Cilicia, houses and churches with their standing arches, vaults, and domes were construed as the work of these skilled builders in their homeland.⁸ This technical know-how (albeit not unique) has been evaluated as the reason why Isaurian builders were indispensable in construction projects as ambitious as St. Sophia in Constantinople.⁹ The funerary inscriptions from Corycus strengthened the idea that the region had an exceptionally lively building industry in late antiquity. Not only architects, builders, engineers, and contractors, but also carpenters, marble workers, masons, and suppliers of materials had prospered and were buried in costly stone sarcophagi on valuable land outside the city.¹⁰ For this paper, I leave aside the discussion about what the term Isaurian signified and assume that the Isaurian builders mentioned in the written sources were professionals who were born, raised, or trained in the province of Isauria.¹¹ Thus, the architectural landscapes of Isauria or Rough Cilicia were their primary base of operations.

The Isaurian ateliers comprised highly skilled artisans who knew how to shape perfectly polygonal or isodomic ashlar blocks and how to use them for erecting walls, apses, arches, vaults, and domes. Likewise, in a quarry site, understanding the natural cracks of the stone, cutting separation trenches, inserting wedges, shaping stone blocks, and hauling and lifting heavy objects required special training and experience. This included knowledge of the material properties of the stones and the methods of moving stones with simple devices or complex machinery.¹² The construction business, however, needed also many unskilled or low-skilled men, employed in tasks that were physically demanding but easy to learn. Digging trenches, mixing mortar, carrying quarry waste, or mixing mortar did not require any special skills. For example, the *Life of St. Symeon Stylite the Younger* describes the Isaurians who worked in quarrying, cut stones, and acquired wooden handles for masons' tools.¹³ These individuals were not highly paid artisans, but jacks-of-all-trades who had developed basic skills and gained experience through their work at multiple construction sites.

⁶ The reputation of Isaurian builders may have persisted beyond the sixth century CE. The early ninth-century chronicle of Theophanes the Confessor, possibly copying the sixth-century chronicle of Malalas, referred to Isaurians as the most skilled master builders in the market.

⁷ Castelfranchi 2007; Deichmann 1969, 213-39; Hill 1975.

⁸ I only mention one of the earliest publications which deliberately looked for Isaurian building skills in the region; see Dagron and Callot 1998.

⁹ The tradition of stone masonry is not unique to Rough Cilicia, nor has this region developed the most sophisticated or the most refined methods of stone construction.

¹⁰ Trombley 1987.

¹¹ Elton 2000; Russell 1991.

¹² For example, at the Roman imperial quarries of Mons Claudianus, ostraca recorded specialists handling the stones at the loading ramp; see Russell 2013a, 11.

¹³ Van den Ven 1962, chapters 96, 172, 188, 228.

Quarrying in Rough Cilicia

In Rough Cilicia, builders had easy access to ordinary building materials, as variations of limestone bedrock are ubiquitous across the region. In Cilician settlements, it was customary for the workmen to quarry the stone blocks right at or in the vicinity of the construction site. Once enough material was extracted, the structure was erected directly on the quarry pit: faces were repurposed as walls, pits became interior spaces, and evidence for quarrying phases was largely erased. This mode of exploitation is so common that quarries incorporated into structures are rarely discussed in publications. Cilician quarries and their operations have never been at the forefront of scholarly research. Our knowledge of quarrying in Rough Cilicia is limited to a few publications that discuss either small-scale extraction zones (Olba) or larger quarries that supplied material for the nearby settlement (Zengibar). In Olba, a landlocked site in the lower Taurus Mountains, three small quarries on the hillside right outside the urban center display the methods of stone extraction and transport. Stone-cutting traditions in Olba can be traced back to Seleucid control in the late Hellenistic period and followed through the Early Byzantine period. In this context, the tombs of two different stone masons, bearing reliefs of stone-working tools have been interpreted as further evidence for the prevalence of stone-related crafts.¹⁴ Olba's small-scale quarries are representative of the practice of exploiting the stone resources near the construction site. In Cilicia, the only large-scale quarry landscape that has been the subject of archaeological-albeit limited-and geological analysis is located at Zengibar Castle (ancient Isaura Nova) in the Taurus mountains. Four quarries inside and outside the fortifications supplied stone blocks for civic, religious, military, and residential structures of the Roman and Byzantine settlement.¹⁵ Both Olba and Zengibar are landlocked sites. Their quarries were opened to provide building material for specific construction projects at the nearby site. As such, these were neither industrial establishments, nor involved in the stone trade.

In this context, two coastal quarries in Rough Cilicia are unique cases that illustrate the development of the quarrying industry and trade in ordinary stones (fig. 1). The first example is located on Dana Island (ancient Pityoussa) where settlement and quarries co-existed. The chronology of inhabitation and quarrying is very complex because the island continued to be exploited as a source of building material as well as serving a way station after the coastal settlement was abandoned. The second and smaller case is Kesiktaş located around 35 nautical miles (65 km) west of Dana Island. Kesiktaş served exclusively as a quarry of industrial proportions but did not have a permanent settlement directly attached to the quarries.¹⁶

¹⁴ Akçay 2008.

¹⁵ Gökçe et al. 2020.

¹⁶ This paper is based on two survey projects under my directorship: Boğsak Archaeological Survey (BOGA) on Dana Island (2011, 2015-2021) and Building Archaeology in Stony Cilicia (TAKA) at Kesiktaş (2022-2023). We thank the General Directorate of Cultural Assets and Museums for the research permits and the Silifke Museum staff for their continuous assistance. Over the years, the fieldwork presented in this paper has been financed by Mimar Sinan Fine Arts University, Purdue University, British Academy, Mary Jaharis Center for Byzantine Art and Culture, GABAM (Koç University Sevgi Gönül Center for Byzantine Studies), AKMED (Koç University Suna & İnan Kıraç Research Center for Mediterranean Civilizations), and Mersin Metropolitan Municipality. We are also grateful to METAB (Mersin ve Çevresi Turizm Alanı Altyapı Hizmet Birliği), Mersin and Silifke Rotary Clubs, and Feti-Duran Çetin for their support in renovating our local headquarters in Boğsak. For a general overview of the painstaking work of our dedicated and hardworking team members, see bogsakarkeoloji.com/en

Dana Island

Dana is the largest island of Cilicia. Covering an area of approximately 276 ha and rising about 250 m above sea level, it runs parallel to the mainland a distance of 2.5 km away. It was known as Pitusu and Pityoussa in ancient sources, Provensale in the Middle Ages, and Dana at least since the early twentieth century.¹⁷ The extensive limestone resources of the island, supported by its connectivity, enabled the formation of a major quarrying industry, which is the largest known example along the southern coast of Asia Minor. The earliest occupation dates possibly from the sixth century BCE when two ring forts were built on the southern crest. The masonry technique consisted of a large rubble core of small, chipped stones faced with irregularly shaped, medium-sized (less than 40 cm) blocks.¹⁸ The acquisition of this simple building material would hardly require complex quarrying procedures. The occupation of the military outpost does not seem to have been long-lasting since the ceramic assemblage in and around the forts is predominantly Late Antique. The next phase of occupation took place along the western flank of the island in the Early Roman Imperial period. The pottery finds from our pedestrian survey date almost entirely from late antiquity, with Early Roman sherds forming 17 percent of the total assemblage.¹⁹ The only structure that we may tentatively associate with Roman construction is the coastal bathhouse and another unidentified building in its vicinity. Both buildings use a combination of mortared brick and ashlar masonry, while the latter had vaults and small domes built entirely of brick. Otherwise, the remaining buildings rise on rock-cut foundations and employ several masonry styles using locally quarried limestone varieties, which cannot be firmly dated on the masonry styles alone.²⁰ It is therefore unclear whether this Early Roman assemblage marks the beginnings of the maritime settlement or the use of the island as a waystation and a quarry.

The settlement known as Pityoussa developed from the fourth through at least the eighth centuries along the western flank of the island. The inhabitation as it survives today includes large houses and housing complexes on the hillside. Commercial, utilitarian, and religious buildings such as baths, churches, warehouses, shops, and hostels, and infrastructure such as cisterns and loading ramps spread out along and near the 1.5 km long coastline. The growth of this maritime settlement and its quarries, spread over an area of approximately 30 ha, may be reconstructed in reference to the expansion of quarrying operations into new areas and the repurposing of abandoned quarries. Across the western flank, structures were built on the plot that was initially used to extract the stone blocks. Behind inhabited areas, quarries were

¹⁷ The toponym of Pitusu appears in Neriqlissar's Chronicle (ABC 6). The name Pityoussa takes over as early as the fifth century CE, such as in the *Stadiasmus Maris Magni* and the *Acts of Barnabas*. Provensale and its variations are used from 1300 onwards, including Piri Reis' *Book of Navigation*. For a list of medieval and post-medieval toponyms and their sources, see Hellenkemper and Hild 1986, 31. In early twentieth century maps, the island was referred as Dana, while its historic toponyms of Pityusa and Provençal were added in parenthesis. For example, see H. Kiepert's map of Ermenek published in 1902-1906.

¹⁸ Kaye et al. 2020, 24-25; Kaye and Rauh 2020, 146-51. Our team has visited but not studied the highly inaccessible quarries along the deep ravine further down the South Fort (Dana Kale 1). These quarries may continue until the small bay on the east coast. They may be contemporaneous with the construction activity on the south summit in late antiquity.

¹⁹ We discussed the preliminary results of the pedestrian survey in Varinlioğlu et al. 2017. For the full catalogue of the pottery from Dana Island, see Varinlioğlu et al. 2022.

²⁰ Most of the surviving masonry on the island is made of medium- or large-sized ashlar blocks bound with little mortar. Mortar-bound *petit appareil* masonry, which is the dominant style on Boğsak Island and Mylai on the mainland, is much less common on Dana Island. This contrast does not necessarily suggest a chronological difference. For a discussion of masonry styles on Dana Island in the context of Rough Cilician building practices, see Varinlioğlu and Esmer 2019, 255-57.

probably used as cemeteries in a phase not too distant from the abandonment of the quarry pit. On the hillside, former quarry pits, work areas, causeways, and spoil dumps were gradually occupied by new buildings (fig. 2).

The ceramic assemblage shows that the fifth and sixth centuries CE were the busiest periods of the island's history. The construction of six (or maybe seven) churches in the lower settlement must also date from this period.²¹ The South Fort, which lay in ruins since the sixth century BCE, was renovated possibly to function as a monastery with its church and subsidiary chapel built inside the fortified enclosure. Thus, at its climax, Pityoussa was possibly endowed with seven or eight churches. The exploitation of the deep ravine down the South Fort on the eastern flank as a quarry may be contemporaneous with the development of the south ridge in late antiquity. This complex maritime settlement and its quarrying industry contracted and was abandoned during or soon after the eighth century. By the end of late antiquity, the western coastline of the island was already transformed into an easily accessible and long "quay" that was equipped with the infrastructure that mariners could use, even if the island was no longer inhabited. The island, now known as Provensale, repeatedly resurfaces in late medieval portulans as a waystation.²² Among them, Piri Reis described it with the same toponym, without failing to mention the cisterns as sources of drinking water.²³ Our intensive survey revealed only a handful of medieval and modern sherds on the northern edges of the coastline, which cannot be interpreted as evidence of permanent settlement. However, as pastoralists, fishermen, tourists, and archaeologists still do, inclined loading ramps and flat floors could still be used for temporary anchorage, while damaged buildings provided ready-made building material. As I discuss below, opportunistic quarrying of the abandoned coastline was part of the island's long history of exploitation. During the visit of Heberdey and Wilhelm in 1891-1892, people were still using the island as a source of grindstones.²⁴ As such, the island remained in use but never again as a permanent settlement.²⁵

Coastal Settlement and its districts

As it survives today, this large maritime settlement has three districts that are loosely separated by unbuilt open areas. The core and the densest part of the settlement, or the Center District (ca. 5 ha) expands from the coastline into the hills up to 40 m asl (fig. 3).²⁶ The houses

²¹ Pityoussa was mentioned in two texts from the fifth century CE: *Stadiasmus Maris Magni* 483 and *Acts of Barnabas* 1:292-302.

²² This toponym may refer to the Hospitaller Order or to the merchants from Provence who were involved in the trade between Konya and Cyprus; see Hild and Hellenkemper 1990, 95, 127, 380.

²³ Piri Reis, *Kitab'ı Bahriyye*, 377 / b, see Sarıcaoğlu 2014. Today, in addition to two large, vaulted cisterns inside the South Fort, about 250 cisterns of various sizes and forms (mostly bell-shaped) are spread out across the lower settlement. About our team's use of UAV-based remote sensing methods to identify cisterns and similar underground structures, see Shin et al. 2023.

²⁴ Heberdey and Wilhelm 1896, 99.

²⁵ We strongly disagree with the alternative explanation of the island as a shipyard and a naval base (see Öñiz 2021). In this paper, as in our previous publications on Dana Island, we maintain that the coastal features are best interpreted as the remains of quarries, loading platforms, building foundations, and a handful of slipways (see Varinlioğlu 2012; Varinlioğlu et al. 2017; Jones 2019). The ceramic evidence we documented via intensive pedestrian survey and the architectural evidence (e.g., baths, churches, houses) decidedly indicates a Roman to Byzantine date for the formation of the coastal settlement and the redevelopment of the South Fort. Our complex field methodology also included extensive pedestrian survey and mapping, terrestrial and airborne photogrammetry and LiDAR, geological and archaeometric analysis, and a detailed quarry inventory.

²⁶ The values across this paper refer to the current sea level. The area calculation for the districts excludes the quarries behind the inhabitation but includes the coastline.

organized on terraces are often larger and better built than their counterparts in other parts of the settlement. The structures along its coastline are severely damaged, pillaged, and quarried in later phases. The remains of foundations, walls, stairs, and interior spaces give the impression of a vibrant maritime area before the demise of the settlement.²⁷ Among the jumble of walls and pillaged rooms, two buildings built of brick and ashlar masonry stand out. The northern brick building functioned as a bath as its surviving hypocaust indicates. The other brick building, 50 m south, is a smaller construction formerly surmounted by brick vaults and domes.²⁸ The Center District had three (or four) churches.²⁹ Churches III and IV, approximately 120 m apart, are built 30-40 m from the shoreline, while Church V is constructed on a steep hill (ca. 30 masl) that has a complete visual command of the sea lanes from Boğsak in the north to Aphrodisias in the south.³⁰ Quarries—some repurposed as cemeteries—follow the contour lines and occupy the elevations between 40 and 70 masl behind the inhabitation. The only quarry that may be associated with industrial operations (Q036) is located at the northeastern boundary, somewhat separate from the inhabited zone. This extensive quarry connects to the shoreline via large open areas (causeways?) on either side.

The North District (ca. 3 ha), separated from the Center District by a 25-30 m wide unbuilt area, is not as densely built-up as its southern neighbor (fig. 4). The district had two churches. Church I, built about 90 m from the shore (ca. 25 masl), must have served the local inhabitants. Church II was built on the shoreline and had a sort of atrium before its narthex and possibly a quay for marine passengers along its north wall. North of the church, a long series of rock-cut building foundations and walls continue uninterrupted along the coastline. The northern section of the district's shores was substantially quarried (e.g., Q049 and Q050) in later phases. This has almost destroyed the evidence for earlier phases of construction. The quarries of the North District are spread out between 10 and 60 masl, getting denser at higher elevations. Only some of these quarries were repurposed as cemeteries. Two quarry zones at the south and north boundaries of the district are connected to large open areas along the hillside. These may have been used as yards to load the stone blocks on wagons or sledges, and as causeways to move them down to the shore.

The South District (ca. 7.5 ha) in the southern half of the settlement is the main center for the quarrying industry and the living quarters of the quarry workers (fig. 5). In its northern section, residential buildings occupy the hillside between coastal features and the lowest level of the quarries. Most houses are small and built of irregularly shaped small- and medium-sized stones, which may be discarded blocks from the quarrying operations. One exception is the so-called Ashlar Complex (DI.ST001-ST002), which was a spacious residential

²⁷ This reminds the northeastern coastline of Boğsak Island, which is likewise heavily destroyed and pillaged, but not substantially quarried.

²⁸ We had tentatively referred to this building as a “kiln.” I will discuss this structure and my interpretation of it in another publication.

²⁹ The large open area about 30 m northwest of Church IV has numerous architectural pieces, including column shafts, mullion columns, pieces of capitals, fragmentary mosaics, stone drains, and cornices. Although these can be dated roughly to late antiquity, they do not include any Christian symbols or liturgical stone elements (e.g., templon pieces). Unlike other churches on the island, we could not discern clear remains of an apse, exterior walls, or associated tombs. Another caveat is its location: while the churches of the Center and North Districts were built around 100-150 m apart, this “church” does not fit this spatial distribution. As such, I propose two alternative hypotheses: it is another kind of sumptuous building in the vicinity of Church IV and the bath complex, or it is a loading yard for architectural pieces before they were removed from the island.

³⁰ Erdemci 2023.

complex.³¹ Built on top of abandoned quarries and using several large ashlar blocks, it must have housed quarry managers and their families. The sharp contrast between numerous small, poorly built structures³² and a handful of large, carefully constructed houses suggests that a mixed community of quarry workers inhabited this district. If the wealthy quarry owners³³ and their families lived on the island, they must have resided further north, probably in the Center District far away from the noisy, dusty, and crowded industrial zone. One should also note that the northern section of the South District is the only part of the settlement without a church or any other religious building. The presence of a Christian community is evidenced by a single example of a doorpost with a cross relief. Otherwise, our pedestrian survey indicates some activity in this sub-district already during the Early Roman period. Its development as a center of the quarry industry is, however, a Late Antique phenomenon.

The southernmost end of the South District is the most sparsely built-up section of Pityoussa. Quarries occupy the hillside between 40-80 masl, while the lower hillside has several large buildings, none of which can be securely identified as houses. An exception to this is the large church (Church VI) and the adjacent rock-cut and ashlar masonry structure built just below the quarry zone. These unusually large and carefully built structures may together form the largest church complex on the island.³⁴

In the South District, extensive quarries cutting through the slope occupy two separate zones in the upper elevations, separated by an open area that continues down to the shore. In the north, quarries start at 30 masl and continuously cut through the contour lines up to 100 masl. The artificial “valleys” that are created by deep cutting between these stepped quarry faces possibly functioned as loading yards and causeways for moving stone blocks to the shore. As one continues further south, quarries become gradually shorter, lower (between 40-70 masl), and more fragmented.

The coastline of the South District stands out with the succession of rectangular indentations that cut through the coastline.³⁵ These rectangular “floors” (w: 7-10 m, preserved l: 9-18 m) separated by higher, wide jogs (2-7 m) are often found in groups of three or four. They are surrounded by large open spaces on the landside. Although these rectangular features may look similar at first sight, they are neither identical in function nor do they represent a single phase in the history of the island. The surviving evidence does not allow us to securely date them or identify the exact function(s) of each of them. Their roughly rectangular and elongated shape, size, and location on the coastline make them suitable for multiple uses. Some of these floors, especially those with a slight gradient (4.7-6.5 degrees) must have been used

³¹ Varinlioğlu and Esmer 2019.

³² Likewise, the workers' village at Mons Porphyrites was poorly preserved due to low-quality building materials, erosion, and earthquakes; see Maxfield and Peacock 2001, 25-26.

³³ In this paper, I do not deal with the question of ownership in Roman and Late Antique quarries. Recent studies on Roman marble quarries suggest that the state, municipalities, sanctuaries, and landed aristocrats were involved in quarrying since these operations took place on their properties; see Long 2017.

³⁴ We securely identified the remains as a church on the last day of our final campaign in 2021. Therefore, my conclusions are based on our very cursory exploration of the remains under thick vegetation.

³⁵ After our 2011 reconnaissance survey on Dana Island, I had raised the question whether some of these features may be interpreted as slipways used for boat repairs. Our team's intensive studies in 2015-2021 identified building foundations, quarries, loading ramps, and possible slipways. The interpretation of this unusual coastline has been published in detail by our team member M. Jones (2019), which I do not repeat in this paper. Instead, I focus on their uses during the heyday of the quarrying industry at Pityoussa, and the exploitation of the coastline for opportunistic quarrying in different phases of the island's history.

as ramps to load stone blocks onto the boats.³⁶ The unbuilt areas around them would then be suitable for stockpiling the blocks near loading ramps. Operating large-scale quarries on a resource-poor island required the constant acquisition of supplies. The quarry operators would be expected to provide the necessary materials to repair stone-cutting tools, construct and repair lifting equipment, fix transport boats or rafts, bring in and feed draft animals, and sustain the workforce. This required ramps and surfaces to unload the material brought onto the island from the land. Warehouses that were easily accessible from the coastline were also a dire necessity.³⁷ As simple inclined surfaces with one short side opening onto the sea, they could also be used for pulling the boats ashore for repairs. It would not be farfetched to argue that the owners of boats involved in quarrying operations lived and kept their boats on the island. As such, the unusually regular, almost repetitive structuring of the coastline of the South District reflects the well-organized, complex, and logistically cumbersome nature of the quarrying industry and stone trade. The circular structure (dia: 4.8 m) built over the cape at the southern frontier of the settlement is another building that must be associated with this business. This unusual building may be interpreted as a watchtower having the visual command of the coastline of the South District, as well as the marine traffic between the mainland and Dana Island. As such, it was in an excellent position to control the exchange of material (stone blocks, supplies, draft animals, etc.) and the movement of people between the hillside and the sea.³⁸

After the quarrying industry lost its vitality and / or the settlement was abandoned, the coastal features, no longer used as ramps, became small-scale quarries (see quarry typology below). Stepped quarry faces, deep pits, extraction channels, wedge holes, and partially removed stone blocks can be observed all along the western coastline. Such opportunistic quarrying is, however, much more widespread on the shoreline of the South District, which was already the main center for quarrying and stone trade in late antiquity.

Another unique feature of the South District is the stepped and paved road leading to the South Fort. The ascent is marked by one or two arched transitional elements starting between the two quarry zones in the upper elevations. As I have discussed previously, in late antiquity the South Fort was renovated, and a church was added inside the enclosure. In the vicinity of the fort, our team came across a building that may be interpreted as a storage facility, several agricultural terraces, and a big quarry further down on the eastern hillside.³⁹ I interpret the development of the south ridge around the South Fort as a monastic foundation, which eventually attracted visitors and pilgrims. If the South Fort was indeed repurposed as a monastery, the construction of Church VI at the southern border of the industrial district and a paved road connecting the South Fort to the shore may represent a new phase in the history of this highly

³⁶ The processes of carrying, hauling, lifting, and loading stone blocks onto boats is reconstructed and richly illustrated for the early Byzantine marble quarries at Aliko on Thasos Island; see Sodini et al. 1980, 119-22. For an overview of the methods of stone transport, see Rockwell 1993, 166-77.

³⁷ The supply chain supporting the Roman imperial quarries at Mons Claudianus in Egypt is very useful for understanding the complex logistical challenges of an industrial quarry beyond the extraction and transport of stones; see Adams 2001.

³⁸ The marble quarries at Aliko on Thasos Island have a large variety of guard towers. The authors report other examples on Paros, Naxos, Skyros, and Siphnos; see Kozelj and Wurch-Kozelj 1992, 43, 46, 52, 54. Likewise at Mons Claudianus quarries, *skopeloi* were square, round, or irregularly shaped lookout posts that were used for internal communication within the quarries. Three towers, two on hilltops, were intended for long-distance communication and warning; see Peacock and Maxfield 1997, 254-55.

³⁹ Kaye et al. 2020.

complex maritime settlement. In this case, can we go one step further and raise the question of whether the monastic community had ownership or control over the management of the quarries in the South District of Pityoussa?⁴⁰

A quarry typology?

The western flank of the island, where both the main quarries and the settlement are situated, is a highly modified landscape with multiple phases of exploitation.⁴¹ The natural terrain was quarried so extensively that it is a challenge to reconstruct the original topography of the island and determine the phases of quarrying. All the quarries, whether inland or on the coast, consist of clastic limestone, also known as limestone alluvium. This type of limestone has significant porosity and is lighter in weight than true limestone, which makes it easier to move and export.⁴² Therefore, what makes the island a suitable place for a quarrying industry is not the decorative or even structural quality of the stone but rather the convenient location of the quarries on the sea lanes. The blocks quarried along the slopes could be loaded almost immediately from the quarry to the ships, like similar examples on the islands of Thasos and Proconnessus.⁴³ We do not yet know the destination of the stones. However, unlike marble and decorative stones, ordinary materials such as lime and sandstone often traveled regionally, unless they were suitable for fine decoration.⁴⁴

On the western flank of Dana Island, the natural terrain between the 1.5 km-long coastline and the hillside up to 100 masl was transformed by quarrying across the ages. This area (ca. 30 ha) comprises the quarry pits, areas for working extracted blocks, spoil dumps (some filling earlier pits), causeways, areas for stockpiling, loading ramps, as well as the structures that were subsequently constructed on top of the fully exploited and abandoned quarries. Excluding all the subsidiary spaces and former quarries occupied by buildings, abandoned quarry zones cover at least 5 ha, and the quarry faces reach up to 3.3 m above the current ground level.⁴⁵ These quarries can be studied in four categories, based on the use of the terrain, their location, and scale, which are intricately connected to the properties and extent of the bedrock.⁴⁶ One can also see multiple quarry types in a single quarry zone. This suggests that quarries operated by different crews may have eventually joined and formed a large, continuous pit. This may also be evidence for multiple phases of quarrying.

The first type (Qtype 1) designates the quarries that follow the contour lines at higher elevations and occasionally join the quarries running down the hillside (Qtype 2). These are

⁴⁰ I discuss the question of monastic foundations on Cilician islands in a forthcoming monograph.

⁴¹ In my discussion, I exclude the possible involvement of the quarries on the eastern flank in the stone trade since we did not have the opportunity to study them. Access to this part of the island is very difficult and treacherous.

⁴² A. Moore, who joined our fieldwork in 2019, identified two formations on Dana Island. Higher elevations have older limestone bedrock, while alluvial fans, formed by erosion, are younger and consist of secondary calcium carbonate (caliche). His final report will appear in the project's forthcoming monograph.

⁴³ Asgari 1978; Sodini et al. 1980.

⁴⁴ Russell 2013a, 355-57.

⁴⁵ As this was a survey project, our permit was limited to basic clearance for photogrammetric documentation and LiDAR. The accumulation of soil and pine needles is considerable. Still, the quarry faces on Dana Island are significantly shallower than those at Kesiktaş. Another major difference is the complete lack of quarry waste and vegetation inside the pits at Kesiktaş.

⁴⁶ For the City Quarries of Aphrodisias in Caria, Rockwell (1996, 96-103) proposed a quarry typology and a relative chronology based on a progression from smaller and simpler quarries to larger and complex examples. In a more recent work, Russell (2016, 266-67) convincingly argued that quarries of different scales coexisted.

found in the Center and North Districts (e.g., Q034, Q039), where they were frequently repurposed as cemeteries with chamosorion tombs on the upper surfaces and a few arcosolium tomb chambers carved into quarry faces (fig. 6).⁴⁷ These may belong to the earliest phases of quarrying on the island before the dense settlement developed below on the hillside in a slightly later phase.

The second type (Qtype 2) designates the quarries that follow the slope and run perpendicular to contour lines. Between 30-100 masl, these quarries cut through the hillside and ascend the steep slope in such a way as to create causeways connecting the quarries to the shore (e.g., Q018, Q036). Moreover, the inclined top surfaces of the quarries may have also facilitated the transfer of stone blocks down the hill (fig. 7). In several instances, longitudinal stepped pits run almost parallel and join each other in a U-shape at higher elevations. In such cases, two “parallel” stretches were probably opened simultaneously by different crews and eventually joined at the top. This type of quarry is most common in the South District where the inhabitation is less crowded.⁴⁸ As such, these must belong to the pinnacle of Pityoussa’s quarrying industry in late antiquity when the island provided building materials for construction projects along the sea lanes.

The third type of quarry (Qtype 3) represents quarrying operations that took place exclusively along the shoreline (fig. 8). Roman and Late Antique builders had already deeply carved the shoreline to create rock-cut spaces and extract stone blocks for construction on the spot. Church II in the North District is such an example. Here the lower levels of the walls and the apse were carved out of bedrock. Qtype 3, however, represents a later phase. Their exploitation must have started with the removal of fallen blocks or dismantling the damaged masonry and continued with the further quarrying of rock-cut floors and walls. For example, in the coastal zone between Q049 and Q050 in the North District, one can still see rock-cut and masonry walls of earlier structures, as well as wedge holes and extraction channels of the later quarry. This small coastal area gives us a snapshot of the juxtaposition of the multiple phases of occupation, spoliation, and quarrying along Dana Island’s coastline. Another common feature of these quarries is short and long straight (occasionally curved) channels (w: 20-30 cm; l: up to 32 m) that can be seen in several sections of the coastline. While longer channels that continue inland up the slope may be for drainage, others may correspond to the early stages of quarrying when the work areas of distinct crews were physically marked on the bedrock. The jogs separating roughly rectangular quarry pits, also seen in Kesiktaş, may indicate such an organizational principle. The partitioning of the stone resources suggests a quarrying operation that was carefully planned and organized.

At the lowest level of the quarrying are small rocky outcrops. These were probably exploited for a particular building project on the island (Qtype 4) rather than as part of an industrial operation. In the North District, such quarries (Q048) near the northern border of the settlement must have supplied material for nearby structures. Likewise, at the southern border of the

⁴⁷ The majority consists of simple, uninscribed, and undecorated rock-cut (chamosorion) tombs with simple flat lids. A smaller number of examples were covered with plain roof-typed lids, sometimes with simple acroteria on four corners. Arcosolium niches carved on vertical faces are much fewer (e.g., along the south wall of Church VI). Finally, there is a handful of rock-cut sarcophagi (e.g., Church II and V) and vaulted masonry tombs (e.g., in the vicinity of Church VI).

⁴⁸ Quarry Q036, which fits the typology of Qtype 2, is located at the northern border of the central settlement. It is next to the wide and empty area between the central and northern district, and with easy access to the shoreline. This further supports the association of Qtype 2 quarries with industrial exploitation and stone trade.

South District, a few small quarry zones are either outside the built-up zones (Q038) or in the vicinity of large building complexes (Q032). Qtype 4 quarries are often repurposed as cemeteries for simple chamosorion tombs or, less frequently, shaped as rock-cut sarcophagi.

Dana as a quarry island

Quarrying and trading of utilitarian building materials was the main source of wealth for Pityoussa and its unusual growth from the fourth century through the eighth century. As the quarrying industry moved to new zones, abandoned quarries were gradually turned into structures. The settlement's zenith in the fifth and sixth centuries, detectable in its architecture and ceramic assemblage, coincides with the heyday of construction across Cilicia and the operations of Isaurian builders, stone-cutters, and construction workshops in a much larger geography. The so-called Isaurian builders practiced their trades widely. On Dana Island, Isaurian quarry workers carried out a systematic, industrial operation that created a significant economic surplus for a resource-poor island. After centuries of quarrying and modification to make the coastline suitable for transporting stone blocks and supplies, the western shore was transformed into an unusually long and accessible quay. In later phases, this facilitated the pillaging of building materials and quarrying along a coastline, which was unusually befitting this purpose.

Kesiktaş

Kesiktaş, locally known as Taşkesiği,⁴⁹ is another major coastal quarry, located 35 nautical miles (65 km) west of Dana Island. Four ancient cities in the vicinity may have been the primary customers of these quarries: Arsinoe (4 km), Nagidus (8 km), Celenderis (23 km), and Anemurium (25 km).⁵⁰ Unlike Pityoussa, Kesiktaş was exploited exclusively as a quarry and never built over. The quarries follow the coastline along a 480 m-long stretch and continue inland approximately 80 m and up to 16 m asl (fig. 9). The total surface of this quarry zone, including work areas and coastal banks for stone transfer, is spread over a surface of around 3 ha, which is significantly smaller than Dana Island. The border of the quarries on the land side is marked by stepped quarry faces (ca. 1-2.5 m high) that run continuously all along, except behind the West Quarry. Beyond this border, small quarry zones, stone blocks, and waste indicate that small-scale quarrying took place in the immediate hinterland.⁵¹ In our first field campaign in 2022, we have tentatively identified two types of limestone.⁵² The main quarries consist of reef limestone, which is heavily fossilized, porous, and very light. This low-quality limestone was nevertheless preferred as a building material, certainly not for its appearance but possibly for its low weight. This made it easy to transport and a material suitable for vaulting. The second type forming the quarry faces on the land side is micritic limestone, which is denser and heavier.

⁴⁹ Taşkesiği is also the name of the hill with the largest concentration of quarry pits in the City Quarries of Aphrodisias in Caria; see Long 2012, 170.

⁵⁰ The research of Russell (2013a, 65) showed the close correspondence between major quarry sites and urban centers in the Roman period.

⁵¹ Although we did not come across spoil dumps in or near the quarries, it may still be too early to reach conclusions. However, as mortar entered Cilician construction with Roman control of the region in the late first century CE, gravel and stone chips, spoils of quarrying, were also needed and possibly traded; see Dworakowska 1983, 153-54.

⁵² I am grateful to Yusuf Kaan Kadioğlu for his identification of the geological characteristics.

The 3 ha-large quarry area consists of three separate zones, separated by inclined and severely weathered surfaces which may have served as work and stockpiling areas. The West Quarry, which is about 0.40 masl, covers a roughly rectangular area (ca. 78 x 40 m) separated from the sea by rock-cut barriers (ca. 1.7 masl) against waves (fig. 10). The continuous bank (ca. 5 m wide) running along the seaside of the barriers at the current sea level must have been used as a quay to load the stone blocks onto boats. Another suitable location for mooring is the rectangular U-shaped, possibly artificial bay at the south end of the West Quarry. The circular holes around it may be manmade so as to hold the posts of a capstan or pulley. Across the West Quarry, several phases of extraction can be detected: first, the quarry “plots” were delineated by thin lines, then these lines were enlarged into separation trenches forming an orthogonal grid, and finally stones blocks were extracted using wedges and crowbars.⁵³

The Center Quarry, approximately 60 m to the southeast and covering an area of 0.1 ha, is the smallest exploitation zone at Kesiktaş (fig. 11). Starting near the coastline, the deep pit (max. 5 m high) continues inland longitudinally forming an irregular shape (ca. 25 x 34 m). Within this quarry, a small (ca. 6 x 6 m), L-shaped, and deeper pit near the coastline is today filled with seawater. This pool may have subsequently been used as a fish tank, while the circular features around the pool may be interpreted as small-scale salt pans. The flat bank, which I interpreted above as a quay, continues along the coastline. Further east, separation trenches, small rectangular pits, and other heavily weathered features that look like stepped quarries, suggest either the existence of former quarries or a test area which was deemed unsuitable and left unexploited.

The East Quarry is the largest (0.8 ha) and most complex example in Kesiktaş. It runs about 210 m along the coastline and extends further inland 30-55 m as the crow flies (fig. 12). Deep quarry pits consist of descending platforms combining shallow steps and larger platforms suitable for multiple block extraction. This large area is loosely divided into two sections by a U-shaped, semi-natural bay in the center. West of the bay (East Quarry 1), quarries start on the coastline and reach up to 13 masl at 50-55 m from the shore. After clearing the surface for debris, quarrymen must have started near the coastline to create the infrastructure (e.g., coastal banks) needed to move the blocks. The first 25-30 m beyond the shoreline may thus represent the first phase of the quarry operation. Like the Center Quarry, this zone has three deeper quarry pits close to the shore. Two of them (9.5 x 5 m; 15 x 11 m) are small pools close to the shoreline and hence filled with seawater today. The third one (6.5 x 6 m), which is on a higher elevation, has a floor covered with sea salt which partially masks the orthogonal grid of stone extraction. These pools, like the pool in the West Quarry, may have initially been used as quenching basins for cooling and repairing metal tools and subsequently repurposed as fish tanks and / or salt pans.⁵⁴

Varying floor levels, higher jogs between rectangular pits (like on Dana Island), the orientation(s) of the descending steps, and quarry “islands” suggest that multiple crews were simultaneously at work. Alternatively, quarrying might have proceeded in phases as crews moved from one zone to the other, perhaps in different time periods (fig. 13). For example,

⁵³ Multiple-block extraction following orthogonal grids (or chess-board pattern) is a systematized and efficient quarrying practice known as early as 1500 BCE. For examples in Egypt dating from the New Kingdom, see Harrell and Storemyr 2013, 33-37.

⁵⁴ The interpretation of these features requires further exploration in the field.

a hypothetical line separates East Quarry 1 into two sections. This boundary runs between the unfinished quarry “island” and the artificial jog separating two rectangular quarry pits on the land side. I would argue that different crews worked west and east of this preset boundary, which has become increasingly more visible as quarry pits became deeper on either side. As work proceeded, the physical boundary between the quarry areas was gradually removed while the “island” remained untouched.

East Quarry 2 covers the area north and east of the natural bay. This was enlarged (25 x 30 m) to serve as an artificial harbor, like the much smaller example in the West Quarry. The hillside north of the bay has two adjacent, roughly rectangular quarry pits, separated by a 6 m-wide jog. The east side of the bay was exploited in multiple steps. First, the bay was further modified by quarrying the southeast side down to the sea level. The resulting deep pit (ca. 12 m) had a large floor (ca. 15 x 12 m) which could function as a quay for loading stone blocks produced in this quarry. At a later stage, a track was opened to connect the quay with the quarries further east.

The easternmost section of Kesiktaş quarries (East Quarry 3) exploited the hill rising above a shallow and protected natural bay. Two rectangular pits (ca. 4 m), separated by a jog (w: ca. 7 m), started on the cliff and extended around 7 m inland up to 16 m asl. The lowest level (ca. 2 m asl) of the west pit, where separation trenches can still be seen, probably served as the floor for working and stockpiling stone blocks. The eastern pit above the bay is severely damaged. After the lower section below 11 masl collapsed into the sea, only the quarry steps at higher elevations stayed in place.

Where did the quarry crews of Kesiktaş live? Our limited reconnaissance survey in the immediate hinterland of the quarries did not reveal any significant amount of archaeological material. The terrace walls further uphill and the dry masonry wall in the southeast bay are not necessarily ancient or medieval. The closest “settlement” is on the cape 1 km to the northwest, today known as Deniz Tepesi. The remains of walls on the summit possibly belong to a fortified enclosure that had visual command of the sea lanes. The two-story building of mortared masonry must be of the Late Antique or Medieval era. Arsinoe, 2.3 nautical miles (4 km) to the west, is the closest city to the Kesiktaş quarries, but this site has never been archaeologically explored. This foundation of the late third century BCE, described as an anchorage by Strabo, became a bishopric in the early sixth century CE.⁵⁵ Due to its size, status, and proximity, Arsinoe is a likely market for the stones quarried at Kesiktaş. Future investigations should also consider other harbor cities in the vicinity such as Nagidus (8 km) and Anemurium (25 km) to the west, and Celenderis (23 km) to the east. The last two are particularly important since they had significant early Roman and Late Antique phases, contemporaneous with the quarries on Dana Island.

Conclusion

The limestone varieties of Rough Cilicia, whether micritic, calcitic, or fossilized, were ordinary building materials used in different capacities in various construction projects such as walls, vaulting, and decoration. Visually unattractive building materials often did not travel far, and water transport was preferable due to its low cost. The weight and volume of stone cargoes

⁵⁵ Jones and Habicht 1989, 336-37; Strab. 14.5.3. The location of Melania that Strabo mentions as a place between Arsinoe and Celenderis is unknown. About Late Antique Arsinoe, see Hild and Hellenkemper 1990, 198.

and the difficulty of transferring them between the marine vessel and land made the stone trade based on cabotage rather inefficient and impractical.⁵⁶ For ordinary construction projects, including the main walls of the churches, a range of block sizes was satisfactory. Therefore, the quarries could easily produce stones suitable for multiple uses, which could be shipped directly to the customer as needed. Several shipwrecks with cargoes of ordinary stones were found in the Mediterranean. For example, the Carry-le-Rouet wreck off the southern coast of France carried limestone blocks to Marseilles for the construction of the city walls in the late second or early first century BCE.⁵⁷ An example from late antiquity is the Dor 2001 / 1 wreck (late fifth - early sixth century CE) discovered off the coast of Byzantine Dora in Israel. This was a coaster with an almost flat bottom, carrying coarse calcareous sandstone blocks and voussoirs to a nearby, unknown construction project.⁵⁸

For Rough Cilicia, our evidence is limited to marble architectural elements that traveled along the sea lanes of the Mediterranean and Aegean, while the sources of ordinary stones for building or sculpture have not been explored. After the foundation of Constantinople as the new capital in 330 CE, Rough Cilician building activity exponentially increased. The construction upswing of the fifth and sixth centuries coincided with the emergence of Isaurian builders and crews as experienced construction specialists. The appearance of new settlements, the expansion of existing ones, and the construction of churches, pilgrimage sites, and monasteries as rural and urban landscapes were Christianized, undoubtedly created an unprecedented demand for building materials. This required extensive quarrying across the province. Could local sources supply the increasing demand, or did the builders of coastal settlements acquire stone blocks from distant quarries on the seaways, such as Dana Island and Kesiktaş?

For Dana Island, pottery and architecture suggest that quarrying may have already started in the early Roman period, while its transformation into an industrial and commercial endeavor is a Late Antique phenomenon. As large-scale quarrying subsided or ended, the infrastructure such as coastal ramps, warehouses, and stockpile areas also fell out of use. Decrepit buildings were pillaged, their sites were excavated, and small quarries were cut through the coastline that had long served the quarry industry. The island, formerly a permanent settlement, has gradually become a harbor for refuge, a source of building material, a stopover for fishermen, and a goat island for pastoralists. The archaeological evidence for Kesiktaş is so far much more limited. The hinterland of the quarries is so heavily modified that any surface material, whether pottery, glass, or metal, has been long removed. This prevents us from proposing a chronology for the use of these quarries. Unlike Dana, there is no evidence (yet) to associate the quarrying activity at Kesiktaş with late antiquity, or any specific period for that matter.

Regardless of chronology, the stone industry and trade in ordinary building materials seem to have been essential for the economy and crafts of Rough Cilicia. Despite their differences, the stones extracted from Dana and Kesiktaş are lower quality stones that are lighter than their denser “true limestone” counterparts. This may have made them easier to quarry, move, lift, transport, and use in construction. These coastal quarries of industrial proportions provide unique case studies to explore the use of local geology for stone extraction, the various methods of quarrying, the size and types of stone blocks circulating in the sea lanes, and the logistics of the quarrying industry and stone transport. They provide us snapshots of complex

⁵⁶ Russell 2013a, 132-35.

⁵⁷ Russell 2011, 140-41; Russell 2013b.

⁵⁸ Mor and Kahanov 2006.

taskspace where the protagonists were the quarrymen, quarry owners, stonecutters, metal workers, and other supporting laborers.

Mango had argued that Isaurians “had never been farmers; the only skills they possessed were fighting and stone-cutting.”⁵⁹ After decades of archaeological surveys in the region, we know now that this is an incorrect statement. Isaurians / Cilicians cultivated the coastal plains, the valley floors, and every small plot of land in the mountains. Nevertheless, this territory was poor in natural resources, which required a multitude of strategies to make this landscape economically viable and sustainable. The transformation of an otherwise common building industry into a widely exported commodity may have been such a creative strategy that the inhabitants of Rough Cilicia developed through time and perfected in late antiquity.

In the heyday of construction activity, we should perhaps interpret the involvement of the Isaurians not only as builders with extraordinary skills but also as inhabitants of a region that managed to create a functioning and flexible construction business, capable of supplying a workforce whenever and wherever they were needed. Even if most or some of the builders may have come from the mountainous hinterland, the “marketing” of this industry would take place in coastal towns tightly connected to the maritime networks. The involvement-or lack thereof-of the quarry industry at Kesiktaş in the formation or propagation of the Isaurian building operations remains unanswered for now. However, Dana Island became one of the largest settlements of Late Antique Rough Cilicia as well as a fertile ground for Isaurian stonecutters and building crews.

⁵⁹ Mango 1966, 363.

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FIG. 1 Map of Dana Island, Kesiktaş, and major sites (Google Earth Image, 2024).



FIG. 2 Distribution of settlement and quarries on Dana Island (Google Earth Image, modified by H. Küntüz).



FIG. 3 Center District at Pityoussa on Dana Island (plan drawing: N. Arslan, 2021).

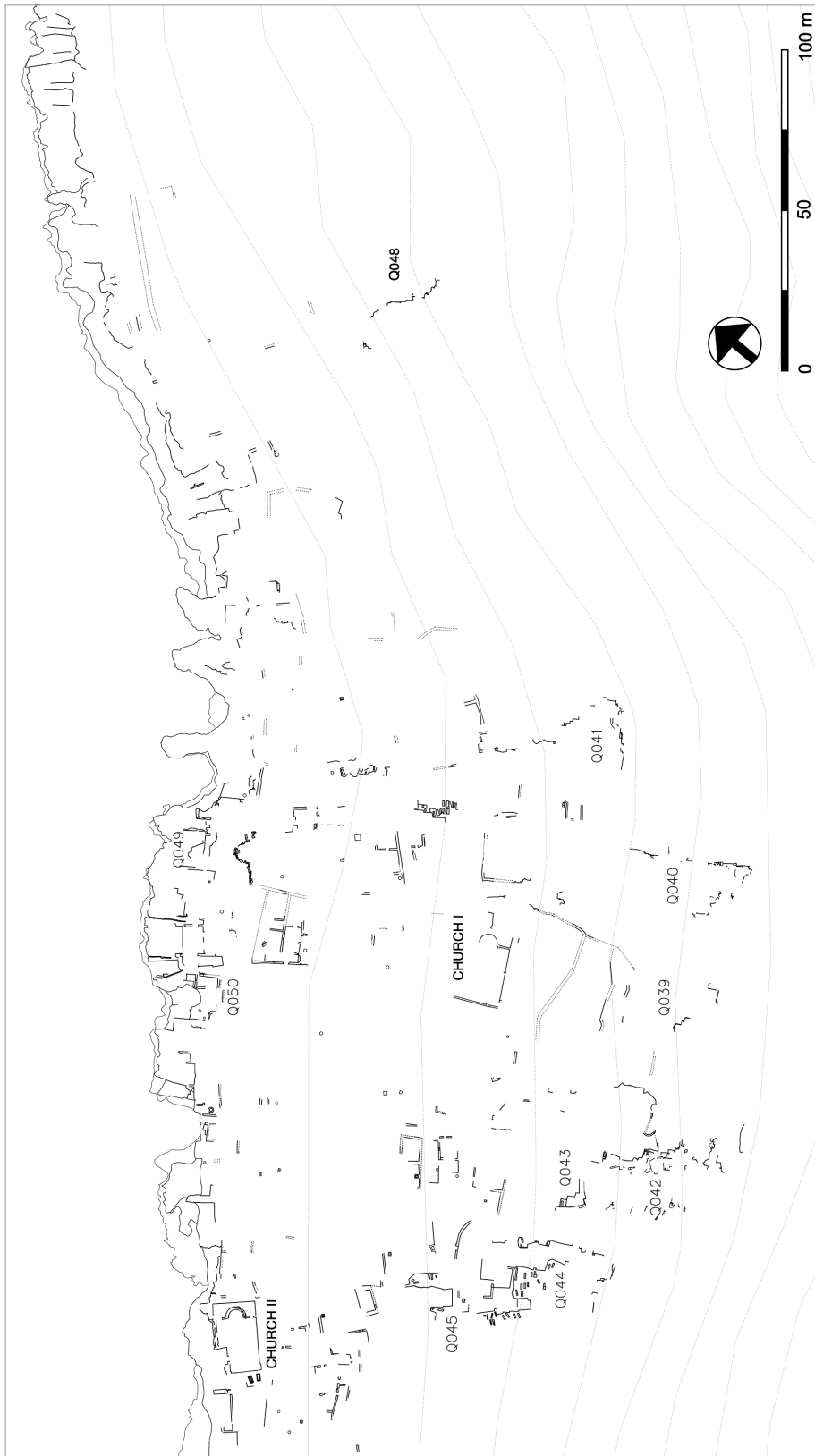


FIG. 4 North District at Pityoussa on Dana Island (plan drawing: N. Arslan, 2021).



FIG. 5 South District at Pityoussa on Dana Island (plan drawing: N. Arslan, 2021).



FIG. 6

Q034 belonging to Qtype 1 (aerial orthophoto: K. Başak, 2019).



FIG. 7
Higher elevations of Q003 belonging to Qtype 2 (photo: R. Ceylan, 2021).

FIG. 8
Examples of coastal quarries (Qtype 3) in the southern section of the coastline (air photo: K. Başak, 2019).



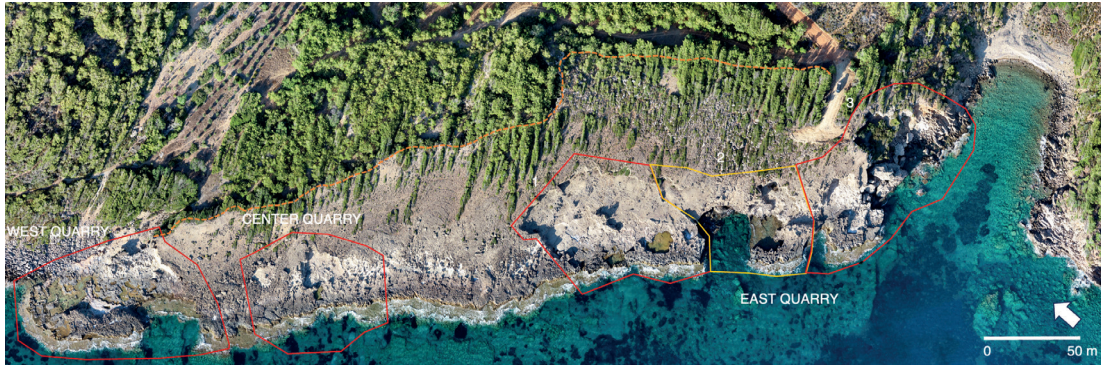


FIG. 9 Kesiktaş quarries
(aerial orthophoto: T. Turan, GeoGrafik Harita ve Coğrafi Bilgi Teknolojileri, 2023).



FIG. 10 West quarry at Kesiktaş
(aerial orthophoto: T. Turan, GeoGrafik Harita ve Coğrafi Bilgi Teknolojileri, 2023).

