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KOS AND THE ROMAN MARBLE TRADE NETWORK: IMPORTED BUILDING MATERIAL IN KOS (DODECANESE, GREECE) AND POSSIBLE EXPORTS OF LOCAL ARCHITECTURAL MEMBERS DURING THE ROMAN ERA*

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Keywords: marble, revetment, pavement, columns, capitals, quarries

Parole chiave: marmo, rivestimenti parietali, pavimentazioni, colonne, capitelli, cave

Abstract

The Roman marble trade network triggered the systematic extraction of bulks of white and polychrome stones from the quarries of all the Roman provinces. This is also the case on Kos, where since the age of Augustus its marble quarries were reorganized and its outcrops of monzonite were exploited for the carving of monolithic columns. The taste for colored marble can be also observed in the most important public edifices and in several luxurious residences of the island, which indicates that imports of stone took place in Roman Kos. From the late 1st century BC onwards, various architectural members and rough blocks for the detachment of slabs or pieces for wall revetments and floor pavements were supplied from the major imperial quarries. Compensating for the lack of archaeometric analysis data, extensive macroscopic observations on the architectural remains of the island and a thorough bibliographic research enabled us to make an estimation of the origin of the marble material in use during the Roman Imperial era.

Il sistema di approvvigionamento e distribuzione del marmo nel mondo romano innescò il processo di estrazione sistematica di grandi quantità di pietre bianche e policrome dalle cave di tutte le province. Questo valse anche per Kos, le cui cave di marmo bianco furono riorganizzate sin dall'età augustea e gli affioramenti di monzonite sfruttati per la produzione di fusti monolitici di colonna. Il gusto per le pietre policrome può osservarsi nei più importanti edifici pubblici dell'isola e in numerose tra le sue ricche domus, a riprova dell'importazione di marmi nella Kos romana. A partire dalla fine del I sec. a.C., dalle principali cave dell'impero giunsero numerosi elementi architettonici e blocchi grezzi, utili alla realizzazione di lastre da impiegare in rivestimenti parietali e piani pavimentali. In assenza di dati offerti da specifiche analisi archeometriche, estese analisi autoptiche di tipo macroscopico dei resti architettonici dell'isola e un'accurata indagine bibliografica hanno consentito di effettuare una stima circa l'origine dei marmi impiegati a Kos nel corso dell'età imperiale.

Throughout history, Koans made ample use of local resources for the construction of the public and domestic buildings on their island. Given the availability of high-quality stone material and the proximity of the quarries to the Koan demes, most stone resources at Kos were locally obtained. Sedimentary, metamorphic, volcanic and plutonic rocks were extensively used, according to their properties, as building material, since prehistoric periods. One of the features of the Koan architecture in Roman times is related to the continuity of exploitation of island's natural resources. Even then, local rocks were used alongside with the newly-imported Roman masonries and the spolia from abandoned buildings¹. However, the data for imports of marble and decorative rocks in Roman times remain poor and rather inconclusive.

The turning point for the Koan stone industry was the end of the 1st century BC and the beginning of the 1st century AD. During the reign of Augustus², the rebuilding of Kos after the disastrous earthquake of 6-5 BC³ had been

* I would like to thank Achilleas Chatziconstantinou, geologist, for the revision of this paper. His assistance proved to be valuable for the exploration of the Koan quarries for over than two decades, as well as for his remarks on my text.

¹ POUPAKI 2011a, vol. A, pp. 118-121.

² In the Augustan age, the agora of Kos was renovated (ROCCO, LIVADIOTTI 2011, p. 401 and f.n. 37, p. 402 figs. 20a-b), the *Odeion* of

Kos was erected (CHLEPA 1999; HÖGHAMMAR 2001) and building activities also took place in Halasarna (KOKKOROU-ALEVRAS 2004, p. 116 no. 41; see also POUPAKI 2011b, p. 19 f.n. 15).

³ MALACRINO 2007, pp. 259-260, f.n. 50-54. See also POUPAKI 2011a, vol. A, p. 165, f.n. 165. The earthquakes of 26 and 14 BC were probably less destructive (MALACRINO 2007, pp. 259-260).

achieved mainly through recycling the stone architectural members from ancient buildings and the adoption of the innovative Roman masonry techniques. New public edifices were erected, and the existing buildings were embellished, taking advantage of the quarries of local marble, which were then organized, while the exploitation of new outcrops of local marble began, according to the general terms of the Roman marble network. According to the ancient literature⁴, the policy of Tiberius in the 1st century AD promoted the organization of the Roman marble trade. Even though, this view is generally disputed by the recent research, which had demonstrated that many important quarries were placed under the communal or private ownership⁵. In any case, the intensive extraction of Koan marble began in the late 1st century BC and the 1st century AD, because of the increase of demand for stone material, as a result not only of the increased flavor for elite display⁶, but as a pressing need to rebuild the damaged edifices from the earthquakes⁷. Indeed, the exploration of the quarrying sites of Dikaios mountain enabled us to propose that the major quarrying fronts in Kakoskalo site were active probably in Roman and Late Roman periods. That is the only quarry of Kos, where large scale extraction took place, leaving vast dumping areas, full of marble chips and rough boulders, as well as high quarrying fronts, comparable to the ones of other quarries in the empire. The practice of filling the open spaces between the rock-brackets left uncarved, with the waste products of the quarrying, is a common process, that is also attested in many Roman quarries⁸. The marble quarries of Dikaios provided probably oversized blocks, such as the monolithic unfinished columns stocked in the area of the agora's *propylon*⁹. Moreover, the extraction of hard rocks, like the Koan monzonite, for the carving of monolithic columns is associated with the same historical circumstances. Unfortunately, due to the absence of a typical quarrying site of monzonite, like the Dikaios marble quarry, it is difficult to come to similar conclusions¹⁰.

Despite the high artistic – and probably market – value of the sculpture carved in Koan marble during the Hellenistic period¹¹, it is impossible to support the same view for exchanges of architectural members carved in Koan marble. Neither it is possible to suggest that architectural sculpture carved in Koan marble were exported in neighboring areas, although that in the Hellenistic period such exports were likely¹². However, limited exports of Koan monzonite columns had been recorded. Judging from visual comparisons, we reached the conclusion that these architectural members were also exported to Asia Minor and that they were used together with similar products from other quarries¹³. This is the case of the *Macellum* of Perge, where columns of Koan monzonite had been used together with the columns of *marmor misium* and Egyptian *granito bianco e nero gabino*¹⁴. Furthermore, columns carved in Koan monzonite were detected in Rhodes, Tlos and Xanthos in various historic periods¹⁵. Basing on this evidence, we suggest that Kos could provide supplementary building material for the *Macellum* of Perge, that is for the replacement of the damaged columns of the monument.

The geographical location of Kos on the commercial routes of the Aegean enabled imports of raw materials in the whole antiquity. The recent archaeological research shed light to purchases of marbles and decorative stones during the Roman period¹⁶. Nevertheless, the use of imported marbles during the 1st century BC and 1st century AD cannot be justified by archaeological evidence even in the case of major public buildings of the town of Kos. The imported marbles used in the Central and the Western Bath Complexes¹⁷, which were erected to fulfill the demand of the city's population for modern amenities and sanitation infrastructure, do not belong to the first phase of construction, but in the late Roman one.

The catastrophic earthquake¹⁸ during the age of Antoninus Pius (139 or 142 AD) left the fortification and many buildings of the island in ruins. Thus, the rebuilding of the main public edifices was of highest priority. The majestic *propylon* that embellished the agora of the town was the most important example, where imported marbles had been used. The Proconnesian marble employed in that section of the agora was probably originated from the Hellenistic parts of the same building, but it cannot be excluded that additional Proconnesian members had been imported¹⁹. The main use of the Proconnesian architectural members can be also attested in the *Nymphaeum*, which

⁴ Suetonius, *De Vita Caesarum, Tiberius*, 28, 49. See also WARD-PERKINS 1992, p. 24, f.n. 11.

⁵ HIRT 2015, p. 296. According to the same scholar (*ibid.*, p. 292), material of lesser importance escaped from the imperial control and was purchased freely in the Mediterranean: see also FANT 1993, p. 154.

⁶ RUSSELL 2013, p. 14.

⁷ The destruction layers from the recorded earthquakes of 27-26 and 6-5 BC, during the reign of Augustus, are well confirmed in many excavated buildings of Kos island: POUPAKI 2011a, pp. 19-20 (with bibliography).

⁸ POUPAKI 2017, pp. 207-209.

⁹ POUPAKI 2011a, vol. A, pp. 117, 188-189; vol. B, p. 336 nos. Ημ23-Ημ25.

¹⁰ POUPAKI 2011c, pp. 18-20.

¹¹ POUPAKI 2011a, vol. A, pp. 209-213.

¹² *Ibid.*, pp. 96-97.

¹³ *Ibid.*, pp. 113, 123.

¹⁴ POUPAKI 2011c, pp. 16-17.

¹⁵ POUPAKI 2011a, vol. A, pp. 101-102.

¹⁶ For a general presentation of the most important Roman quarries of colored marbles, LAZZARINI 2007.

¹⁷ LIVADIOTTI 2004; LIVADIOTTI 2017. For the building stones: POUPAKI 2011a, vol. B, nos. K42 and K49 (with bibliography).

¹⁸ For the dating of the earthquake: KOKKOROU-ALEVRAS 2004, p. 22, f.n. 43; MALACRINO 2007, p. 263.

¹⁹ The use of Proconnesian marble in the Roman empire began in

was adjacent to the *propylon*, and for the pavement of the central area of the agora, as well as for the exedra at its north-western part. However, for the walls of the *Nymphaeum*²⁰ *cipollino*²¹ revetment had been used.

The most informative building, regarding the use of colored marbles, is the so-called “Casa Romana”, the luxurious villa built on the site of a Hellenistic residence in Amygdalona quarter in the mid-2nd century AD, probably belonged to a wealthy member of the imperial élite of the island²². Imported marbles had mainly been used for the decoration of the atria (peristyles) and the adjacent rooms of the villa. In the construction of the Great Peristyle of the villa (room XXVIII) and the adjacent room XXV monolithic columns of *cipollino verde* and *cipollino nero* (fig. 1) had been used²³, partly replaced by columns of *marmor Celticum/Aquitanicum*²⁴ during the Italian restoration of the building. The *cipollino verde* columns obviously were quarried in Carystos, but *cipollino* of black and white color²⁵ is probably local and it had been also quarried in Dikaios mountain, as it was found out by our recent investigation²⁶ (fig. 2). However, the quantities of gray and white *cipollino* that it was used in the buildings of Roman Kos is too large to have been quarried locally. Besides, it may be safe to assume that any existing outcrops of good quality *cipollino nero* on the island were exhausted by the Roman quarrying activity. The simultaneous use of *cipollino* both from Carystos and from Kos may hint that the owner wanted to reduce the cost of the imported material by combining it with local stone of equal quality and similar appearance²⁷. Proconnesian marble, combined with Koan marble and travertine, as well as gray imported limestone had been chosen for the thresholds of the villa²⁸.

The floors of its main rooms were paved with various marbles and local rocks. Among the imported marbles found, the biggest variety is attested in the reception rooms (XXVI, XXVII, XXXI and XXXVI; fig. 3). The marbles



Fig. 1. Kos, Casa Romana. Column drum from *cipollino nero* in room XXVIII, incorporated in the restored column (A.'s photo).

the Flavian period and remained dominant from the mid-Hadrianic period onwards. Even for the Severan restorations of earlier structures continued to be a favorite choice (RUSSELL 2013, p. 186). For the quarries of Proconnesus, cf. KOKKOROU-ALEVRAS *et alii* 2005.

²⁰ ROCCO, LIVADIOTTI 2011, pp. 414-416 and f.n. 75; LIVADIOTTI 2012, p. 107 fig. 19c.

²¹ The *cipollino* quarries (KOKKOROU-ALEVRAS *et alii* 2014, pp. 262-267 nos. 1000, 1003-1008, with bibliography) were probably active since the Classical period (CHIDIROGLOU 2010, p. 50), but the systematic attempts to quarry large monoliths were undertaken in the late Hellenistic period (DODGE 1984, p. 72). The organization of the exports of blocks and columns of Karystian marble is dated in the Roman Republic period: POUPAKI, CHIDIROGLOU 2017, p. 442, f.n. 5-6 (with bibliography).

²² The inscriptions referring to the famous Roman doctor M. Aelius Sabinianus found by the excavators do not provide enough evidence about the owner of the villa (BURASELIS 2000, pp. 120-121).

²³ *Bigio antico*, according to ALBERTOCCHI 1996, p. 63.

²⁴ The same columns were also used for the colonnade of the *triclinium* and the room XXXIX. The most important quarry of that marble is in Aubert, close to St. Girons of the Pyrenees (France): VEYSSIÈRE 2015.

²⁵ According to Corsi (<http://www.oum.ox.ac.uk/corsi/stones/view/144/>, retr. on 22.5.2019) *cipollino nero* had been quarried in Myloi of Carystus, but after a thorough research in the quarry the marble proved to be *cipollino* of green and white color: POUPAKI, CHIDIROGLOU 2017.

²⁶ POUPAKI 2017, p. 208.

²⁷ The same practice continued even in the early Byzantine period in Kos: POUPAKI 2011a, vol. A, p. 123.

²⁸ Between the room XVIII and the stoas around the winter peristyle (room XVIII) a block of green *cipollino* had been employed, a rather rare case. Proconnesian marble was used for the stylobate of the columns in room XXVIII.



Fig. 2. Kos, Dikaios mountain. A rough boulder of *cipollino nero*, close to Kakoskalo site (photo by A.).

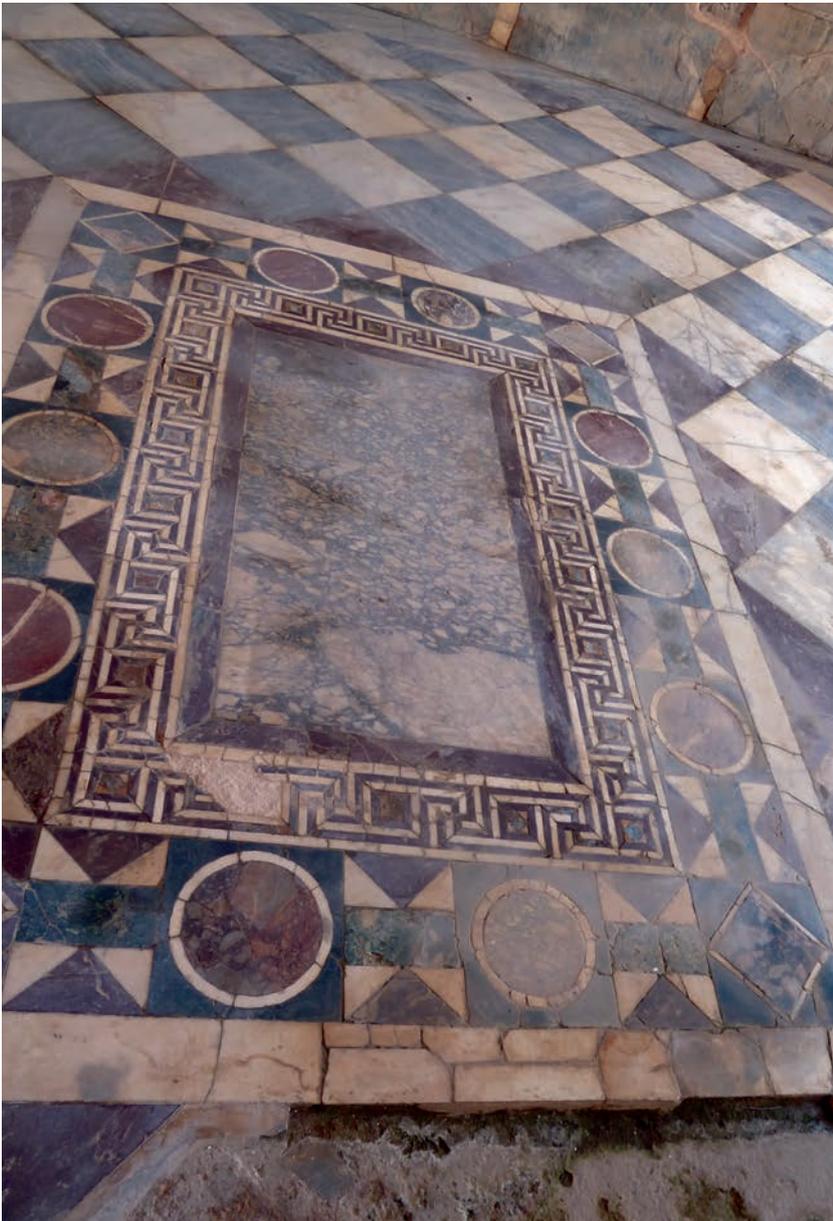


Fig. 3. Kos, Casa Romana. *Opus sectile* in room XXVI (photo by A.).



Fig. 4. Kos, Casa Romana. Water tank/pool in the atrium, room XV (A.'s photo).

used in them are Docimian or Skyrian *pavonazzetto*²⁹, *cipollino verde* from Carystos³⁰, red marble from Karia (either from Iasos or Mylasa)³¹ and *cipollino rosso* from the same area³², as well as *verde antico* (*lapis Atracius*) from Chasampale of Thessalia³³. The floors of the rooms XXXIX, XXVI and XVII are paved with square slabs of white Proconnesian and gray hard limestone, which is often mentioned as *bigio antico* by certain scholars³⁴, but it looks like *bardiglio* from Carrara, too³⁵. The provenance of that limestone, which is largely used in Koan architecture since Hellenistic times, is probably the opposite coast of Asia Minor, where the outcrops of that material are still visible in Halicarnassos, Knidos and the surrounding areas. In fact, the similarity between the gray limestone used in the Hellenistic buildings of Kos and the slabs for the revetment of the walls of Casa Romana is astonishing. *Bigio antico*, though, is a general term for the gray marble and many scholars suggest that it was extracted in organized Roman quarries of Asia Minor (Ephesos³⁶, Teos³⁷, Iznik³⁸ and Aphrodisias-Göktepe³⁹) or Lesvos⁴⁰. That marble is largely used in the villa⁴¹.

A variety of marbles had also been used for the external revetments of the water tanks/pools inside the atria. Especially, for the water tank of the room XV we noted the use of slabs of *breccia di Settebasi* (*marmor*

²⁹ Their resemblance is obvious: Corsi Collection, samples 124 and 405 (<http://www.oum.ox.ac.uk/corsi/stones/view/124> and <http://www.oum.ox.ac.uk/corsi/stones/view/405>, retr. 22.5.2019). The marble was used in the central rectangle of the *opus sectile* in the room XXVI, in the central disc of the *opus sectile* in the room XXXV (ALBERTOCCHI 1996, p. 93; DE MATTEIS 2004, p. 101), and for the pavements of the rooms XXXI (ALBERTOCCHI 1996, p. 66), XXXVI (*ibid.*, p. 96), XVII (*ibid.*, p. 43), XXXV (*ibid.*, p. 93), XXXVI (*ibid.*, p. 96), etc. The Docimian quarry of *pavonazzetto* is in Bacakale, which was active between 30 BC and 500 AD: <http://www.artofmaking.ac.uk/explore/monuments/304/> (retr. on 22.5.2019). For the quarry of *pavonazzetto* from Skyros: LAZZARINI, TURI 1999.

³⁰ It was used for the floor of the room XIV (ALBERTOCCHI 1996, p. 32) and for the *opus sectile* in the room XXXV (DE MATTEIS 2004, p. 101), which ALBERTOCCHI 1996, p. 93, identifies as *verde antico*.

³¹ It was used for the *opus sectile* in the room XXXV, which ALBERTOCCHI 1996, p. 79, identifies as *rosso antico*.

³² It was used for the *opus sectile* in the room XXVI (ALBERTOCCHI 1996, p. 66). *Cipollino rosso* (sample 95 of Corsi Collection: <http://www.oum.ox.ac.uk/corsi/stones/view/95>, retr. 22.5.2019) had been extracted on the slopes of the Cirkince Tepe above Iasos: MONNA, PENSABENE 1977, pp. 109-113; ANDREOLI *et alii* 2002, pp. 13-18; RUSSELL 2013, p. 86, f.n. 206.

³³ It was used in the *opus sectile* of the room XXVI: ALBERTOCCHI 1996, p. 93. For the quarry: KOKKOROU-ALEVRAS *et alii* 2014, pp. 76-77 no. 256 (with bibliography).

³⁴ See *infra*, f.n. 43-47.

³⁵ According to the sample 153 of Corsi Collection (<http://www.oum.ox.ac.uk/corsi/stones/view/153>, retr. 22.5.2019).

³⁶ ATTANASIO *et alii* 2017.

³⁷ For the most important Roman quarries of gray limestone (Karagölu and Taşdibi Tepe): BARAN, PETZL 1977-78; RUSSELL 2013, p. 89; BRILLI *et alii* 2019. The quarries were active from 75 AD to 166 AD and their marbles arrived at Rome in the early 1st century BC: RAWSON 1975, p. 39 f.n. 34.

³⁸ RUSSELL 2013, p. 185, f.n. 256; LAZZARINI 2013, pp. 145-146.

³⁹ *Ibid.*, pp. 143-144.

⁴⁰ ALBERTOCCHI 1996, pp. 35, 43. For the marble: LAZZARINI *et alii* 1999; LAZZARINI 2013, pp. 144-145; LEKA, ZACHOS 2015. The gray marble of Lesvos had been exported since the Attalidic period (CRAMER 2004, pp. 126-130). There is a significant affiliation between the *bigio antico* used in Casa Romana and the columns reused in the Medieval abbey of Fiastra (Urbs Salvia), which were proven to be carved in *marmor Lesvium* by archaeometric methods: ANTONELLI, LAZZARINI 2013, p. 308 and fig. 11c.

⁴¹ E.g. for the *lararium* at the entrance (pavement and revetment).



Fig. 5. Kos, Casa Romana. The wall revetment around the Great Peristyle, room XXVIII (A.'s image).

scyrium)⁴² and *greco scritto*, as well as *pavonazzetto* and gray hard limestone marble (*bigio antico?*) for the niches⁴³ (fig. 4). For the water pool of the room XVIII slabs of white marble, probably Koan, alabaster and *bigio antico* had been used, while for the one of the Great Peristyle (room XXVIII) *pavonazzetto*, Proconnesian marble, gray marble (*bigio antico?*) and *breccia di Settebasi* (*marmor scyrium*) can be attested⁴⁴. The marbles that were used for the wall-revetments are not known. In fact, the slabs of *marmor Celticum/Aquitanicum*, which were used in the rooms XIV⁴⁵, XXVII⁴⁶, XXXI, and the niche of the entrance were selected during the restoration of the building and do not correspond to the original kind of marble slabs used. It seems plausible that *cipollino nero* had originally been used, as this was also the case for the columns in the Great Peristyle⁴⁷. The walls of the rooms XXVII and XXXI were the most elaborated ones, adorned with alternative rows of white Koan marble, *cipollino nero*⁴⁸ (replaced partly by the *marmor Celticum/Aquitanicum*), and *greco scritto* (fig. 5), while slabs of *marmor luculleum* (*Africano*) from Teos of Asia Minor⁴⁹, or *marmor Scyrium* were also added by the edges. The lower parts of the walls in the room XXVI were covered with rectangular slabs of *bigio antico* alternated with thin oblong slabs of white marble. Casa Romana is a unique case amongst the excavated Roman buildings of Kos, where such a great variety of imported marbles has been certified⁵⁰.

In the bath complex of the *Asclepieion*⁵¹ the use of Proconnesian marble was observed for the revetment of the walls in its *frigidarium*, *apodyterium* and *basilica thermarum*⁵² and for thresholds⁵³, but no further description of the colored marbles used. Even though, among the stone rubbles around the monument, there are many fragments of colored marble slabs: *cipollino verde* from Carystus, *marmor Iasense*, *fior di pesco* (*marmor Chalcidicum*) probably from Eretria⁵⁴, *pavonazzetto* from Skyros island in Northern Sporades and from Phrygia, gray marble perhaps of Thassian or Naxian origin, etc.

In the 3rd century AD for the renovation of the Harbor Stoa monolithic columns of *cipollino verde*⁵⁵ replaced the damaged Hellenistic columns of local travertine (fig. 6). These columns were crowned with Corinthian capitals of white marble, probably Proconnesian⁵⁶. The combination of *cipollino* columns and Proconnesian capitals appears

⁴² That marble had been quarried in Koulouri, Skyros island: KARAMBINIS, LAZZARINI 2015, p. 795.

⁴³ ALBERTOCCHI 1996, p. 35, identifies the marbles used as *bigio antico* and *africano verde*.

⁴⁴ *Ibid.*, p. 48.

⁴⁵ M. Albertocchi (1996, p. 32) mentions white marble and *bigio antico*.

⁴⁶ The French marble in that room replaces the slabs of *greco scritto*.

⁴⁷ In the room XXVI ALBERTOCCHI 1996, pp. 64-65, mentions *bigio antico*, though.

⁴⁸ Albertocchi (1996, pp. 71-72, 78-79) mentions white marble and *bigio antico*.

⁴⁹ It was quarried in Kara Gölu (RUSSELL 2013, p. 89, f.n. 209; ADAK,

KADIOĞLU 2017) and in Beylerköy (TÜRK *et alii* 1988) between 36 BC and 170 AD (DWORAKOWSKA 1990, p. 257, f.n. 45-46).

⁵⁰ ALBERTOCCHI 1996 proposes more colored marbles, which we could not identify.

⁵¹ It is dated to the mid-2nd century AD, with additions in the 3rd century AD (LIVADIOTTI 2017, p. 239 f.n. 17).

⁵² MALACRINO 2005, pp. 144, 161, 172.

⁵³ *Ibid.*, p. 151.

⁵⁴ The Eretrian marble was exploited since the Flavian period (RAWSON 1975, p. 38, f.n. 33; SCHMIDT 2011, pp. 527-542).

⁵⁵ LIVADIOTTI 1996.

⁵⁶ *Ibid.* See parallels from Palatia of Proconnesos and other areas:

quite often in the monuments of Hadrian and Antonine Age, e.g. in Ostia⁵⁷, in Libya (Sabratha and Leptis Magna⁵⁸), etc. Generally, the use of Corinthian capitals from Proconnesos had been the most convenient solution, since they were not very expensive⁵⁹.

The Late Roman marble pavements (3rd-4th century AD), such as the well-preserved *opus sectile* in the *triclinium* of the *Domus* at Piazza Quadrata (Konstantinou Palaiologou Square), of the 2nd half of the 4th century AD⁶⁰, which nowadays decorates the Laokoon Room in the Palace of the Great Master of the Knights in Rhodes (fig. 7), retained the size and the magnificence of the earlier ones. For that *opus sectile, verde antico (lapis Atracius)*⁶¹, *fior di pesco, marmor Africano (luculleum)* from Teos in Asia Minor and *pavonazzetto* from Skyros and from Docimium, as well as *rosso antico* from Laconia⁶² were used.

The Central Bath Complex was founded between 50 and 150 AD in the quarter of Amygdalona, on the site of the Central Gymnasium⁶³. The luxurious paved floors are dated in the construction period of the 4th and 5th century AD.⁶⁴ For the floors of the *tepidarium*, the *apodyterium* and the *basilica thermarum*, Proconnesian marble and *cipollino verde*⁶⁵ had been used. The preserved revetment slabs of the *tepidarium* combined *greco scritto* (white marble with gray strokes), probably of Ephesian origin⁶⁶, with the red marble with white spots (fig. 8). *Pavonazzetto* from Docimium quarried



Fig. 6. Kos, Harbor Stoa. *Cipollino verde* columns used in the building (A.'s photo).

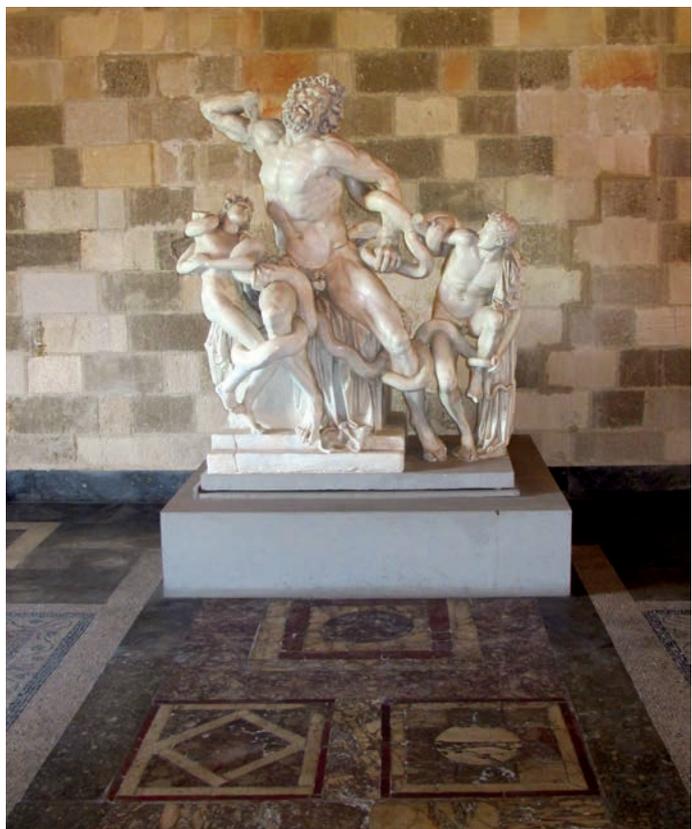


Fig. 7. Rhodes, Palace of the Great Master of the Knights, Laokoon room. *Opus sectile* from the *Domus* of Piazza Quadrata in Kos (photo by A.).

ASGARI 1988; PENSABENE 1993, pp. 33-35 nos. 1-2; BIANCHI, BRUNO 2009, p. 104, figs. 6, 7-8.

⁵⁷ PENSABENE 1973, p. 64 nos. 247-248.

⁵⁸ WARD-PERKINS 1993, p. 72.

⁵⁹ The maximum price of Proconnesian marble is 40 *denarii per pes* (square foot: CORCORAN, DELAINE 1994, pp. 263-265, 272; BARRESI 2003, p. 158), whereas that of *pavonazzetto* was 200 *denarii* per Roman foot (*ibid.*, pp. 157-158).

⁶⁰ MORRICONE 1950, p. 241; ROCCO 1996, pp. 158-163; DE MATTEIS 2004, pp. 117-119, 131-132, 137-140.

⁶¹ *Africano verde* according to De Matteis (2004, p. 119) and *breccia verde d'Egitto* according to my opinion (POUPAKI 2011a, vol. B, p. 78 no. 100). However, the Egyptian marble differs from that of the Koan *opus sectile*, because it contains brown and not white spots.

⁶² KOKKOROU-ALEVRAS *et alii* 2014, p. 187 nos. 682-683, 699 (with bibliography).

⁶³ Identified as the Gymnasium of "Παιδων" (MORRICONE 1950, p. 245 f.n. 69; LAURENZI 1936-37, pp. 136-140).

⁶⁴ LIVADIOTTI 2017, pp. 247-248.

⁶⁵ LIVADIOTTI 2004, p. 204 f.n. 47, 50; EAD. 2017, p. 247.

⁶⁶ There are *greco scritto* quarries in Algeria (ANTONELLI *et alii* 2009; ATTANASIO 2003, p. 176), in Tunisia (MIELSCH 1985, p. 60 nos. 642-648) and in Ephesus (ATTANASIO 2003, pp. 173-176; ATTANASIO *et alii* 2012; PROCHASKA, GRILLO 2012). Ephesian seems to be the most probable origin of the rock used in Koan Baths.



Fig. 8. Kos, Central Baths. Wall revetment in one of its room (A.'s photo).



Fig. 9. Column drum carved in Docimian *pavonazzetto* (A.'s image).

in Altintas⁶⁷ is seemingly closer to that red marble, but it was only locally used (e.g. at Aezanoi)⁶⁸. On the contrary, the red-spotted marble quarried in Iasos⁶⁹ and in Mylasa (Kiyi Kislacik)⁷⁰ from Karia (*marmor Iasense*) is identical with that of the Central Baths. It is quite remarkable that even slabs of Hymettian gray marble had been used for the revetment of the walls in the *apodyterium* and the *basilica thermanum*. The Hymettian marble does not appear often in Koan architecture, although being quite popular in the Roman empire⁷¹.

The Western Thermal Complex, on the other hand, was built in the Western Quarter of the town, on the site of the Western Gymnasium and its remains are rather invisible, buried under the early-Byzantine *Basilicae* A and B, and do not provide enough evidence on the use of imported marbles. In fact, the excavation report of Morricone mentions the use of veined marble on the pavement of the *basilica thermanum*, but no additional information is given⁷².

So far, in several sites of Kos town many column drums and unfluted columns of various marble types have been discovered, that could not be associated with specific buildings. In the Western Quarter of the town, in the archaeological site of Casa Romana (fig. 9) and in Castle of Nerantzia, there are some fragmented columns of

⁶⁷ For Dokimeian quarries (in Bacakale, Altıntaş and Çakirsaz): RÖDER 1971; WARD-PERKINS 1992, pp. 61-105; HIRT 2010, p. 303, f.n. 244; RUSSELL 2013, p. 89, f.n. 211. The marble of Altintas differs from that of the imperial quarry in Ischisar.

⁶⁸http://www.artofmaking.ac.uk/explore/sources/1045/PR311_01_150

(retr. on 22.5.2019).

⁶⁹http://www.quarryscapes.no/QLM_may_07.php (retr. on 22.5.2019).

⁷⁰ CRAMER 2004, p. 148 figs. 180-181.

⁷¹ KOKKOROU-ALEVRAS *et alii* 2019, pp. 125, 128.

⁷² MORRICONE 1950, p. 228.



Fig. 10. Column drums carved in Chian *portasanta* and in *bigio antico* (A.'s photo).

pavonazzetto (of Docimium), whilst in the Castle of Nerantzia there are column drums of pink marble of Chios, *portasanta*⁷³, and *bigio antico* (fig. 10), a colonnette from *breccia corallina* (*marmor Sagarium*)⁷⁴, and several Doric columns of Proconnesian marble⁷⁵. It is remarkable, though, that the unfluted columns of *cipollino nero* are quite common in many sites of the island (in the Western Quarter, in the Castle of Nerantzia, in the archaeological site of Casa Romana; fig. 11), which may reflect the quantity of the extracted material from the Roman quarries of Kos.

Several spiral columns⁷⁶ of unknown origin are scattered in the archaeological sites of Casa Romana (fig. 12) and inside the Medieval Castle, too. Despite the description of their material as basalt, their rock is probably a sort of well-consolidated gray limestone, or marble, which differs from the well-known gray limestone which is extensively used in the architecture of the island and which was probably imported from the opposite coast. Spiral columns of Aphrodisias, of the 2nd century AD, were carved in black limestone with white-yellowish veins from Göktepe quarries⁷⁷, which is totally different from the gray limestone of the Koan spiral columns. The rock of these columns leads us to assume that they may have come from either Hymettian (Attica)⁷⁸, or Lesvian (at Moria)⁷⁹, or Laconian quarries (in Taygetos mountain)⁸⁰.

Overall, based on the evidence provided by the study of imported marbles in Kos, during the 2nd and 3rd century AD Proconnesian marble remains a favorite product for the Koans. Minor imports also took place from the opposite Karian coast (Iasos and Mylasa), Docimium, Ephesos, Attica (Hymettus), Carystos, Eretria, Skyros, Teos, Thessalia and possibly Lesvos. It is quite impressive that *cipollino nero* was used for sizeable architectural members, which may indicate the local origin of the marble. The evidence from the late 3rd and 4th century AD enables us to observe additional imports from Peloponnesus (Laconia). Even so, Koans in Roman era preferred to import decorative stones from the opposite coast of Asia Minor, that is the Karian territory (Iasos, Mylasa), Ephesos and Teos, following a practice introduced in earlier centuries⁸¹. Egyptian and generally North-African rocks do not appear in the Roman architecture of the island at all, probably because of their high cost, whereas Attic marbles are quite rare.

The pre-cited materials cannot be seen as individual purchases from the owners of the quarries themselves. In fact, the Roman trade system involved rather complicated exchange patterns, as a result of the established commercial policy of each emperor. Stockpiling in special areas of the importing cities⁸² in the proximity of the harbors (e.g. Ephesos⁸³), more efficient quarrying methods, standardization of sizes and partial prefabrication of the exported architectural

⁷³ For its quarry: KOKKOROU-ALEVRAS *et alii* 2014, pp. 27-28 no. 58 (with bibliography).

⁷⁴ It was quarried close to Sagarius river in Bithynia (Verzirhan, Bilecik): LAZZARINI 2010.

⁷⁵ There is a strong possibility that these columns date earlier.

⁷⁶ BENSON 1959, pp. 267-268 nos. KOS a-f, pls. 47, 48, 50. For spiral columns: HENDERSON 2013.

⁷⁷ YAVUZ *et alii* 2011, p. 95 and fig. 3.

⁷⁸ Monolithic columns were extracted in the ancient quarry of

Karavi of Hymettus: KOKKOROU-ALEVRAS *et alii* 2019. Hymettian columns were found in a *navis lapidaria* wrecked close to Mahdia (Tunis): MERLIN 1909, pp. 650-671.

⁷⁹ PENSABENE 1998.

⁸⁰ For its quarries: KOKKOROU-ALEVRAS *et alii* 2004, pp. 125, 130-131 and figs. 6, 14-15.

⁸¹ POUPAKI, forthcoming.

⁸² RUSSELL 2013, pp. 234-239.

⁸³ BOURAS 2011; BOURAS 2016.



Fig. 11. Unfluted column carved in *cipollino nero* (A.'s photo).



Fig. 12. Spiral column in gray hard limestone (image by A.).

members, are only a few of the aspects concerning the distribution processes of products carved in the Roman quarries of marble⁸⁴.

The wide range of marbles and other decorative stones attested in the Koan buildings during the entire Roman period⁸⁵ was not only an indication of opulence of the provincial elite, but also a sign of the adoption of the Roman fashion to the Koan “lifestyle” and of the compliance of Koans to the Roman values. The repertoire of the kinds of marbles chosen for each of the monuments discussed above can be explained by the fact that the architects used specific pattern books, where certain types of decorative stones and other combinations were suggested⁸⁶. As it is generally accepted, under emperor Domitian’s imperial administration specialized workshops operated in Rome, massively producing specific architectural elements in certain types of marbles⁸⁷ (e.g. Corinthian capitals from Proconnesian marbles⁸⁸). These workshops remained active even until the age of Hadrian, whereas stonemasons from various artistic centers were specialized in working with marbles they were most familiar with (e.g. Attic craftsmen worked on Pentelic marble). The interconnections of the island with the renowned marble workshops of Attica, Asia Minor and Alexandria can also be detected through the study of the signatures of the artists preserved on many inscribed monuments of Kos⁸⁹. The celebrated sanctuaries and the major building programs of the island attracted highly skilled artists, who had sculptured major *œuvres d’art* that are often mentioned by the ancient writers. Nevertheless, the presence in Kos of famous *redemptores marmorarii*, the contractors who were responsible for supplies and carving of marble, remains rather obscure due to the poor inscribed evidence⁹⁰.

⁸⁴ HIRT 2010, pp. 346-351.

⁸⁵ The lack of comparable relative evidence of assemblages from other Greek islands or regions do not allow us to draw any conclusions about the marbles circulated in the Greek inland during the Roman era. Even though, similar marbles may be detected in Roman Kourion of Cyprus, where the marbles of Asia Minor and Proconnesos were also predominant: PROCHASKA *et alii* 2017.

⁸⁶ DUNBABIN 1999, pp. 94-95. This idea had been further developed for mosaic workshops (*ibid.*, p. 298, f.n. 27; RIPOL 2018, p. 439). In Byzantine times, workshops fabricated *opus sectile* panels, ready to be installed: SNYDER 2018.

⁸⁷ FREYBERGER 1990, *passim*.

⁸⁸ ASGARI 1988.

⁸⁹ POUPAKI 2011a, vol. A, pp. 199-202.

⁹⁰ The female *cognomen* “Cossutia” is mentioned in a Koan inscription (HERZOG 1899, no. 175; RAWSON 1975, p. 39, f.n. 35), but it is not clear if she belonged to the family of *Cossutii*, the famous Roman *redemptores marmorarii*, active in stone supply for more than 400 years: RUSSELL 2013, pp. 204-205.

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