BGSG

Volume 53

Research Paper

Correspondence to:
Michael Stamatakis
stamatakis@geol.uoa.gr

DOI number:
http://dx.doi.org/10.12681/bgsg.18835

Keywords:
Samos, quarries, tools, slaves, Nymphs, Crete.

Citation:
Tziligkaki Eleni K. and Stamatakis Michael G., (2018), Underground quarries in the area of Agiades, Samos Island, Greece: Notes on historical topography and chronology. Bulletin Geological Society of Greece, 53, 161-192.

Publication History:
Received: 07/10/2018
Accepted: 10/11/2018
Accepted article online: 10/11/2018

The Editor wishes to thank Prof. M. Stamatakis, Prof. Hara Drinia and Ms Erietta Vlachou for editorial assistance.

UNDERGROUND QUARRIES IN THE AREA OF AGIADES, SAMOS ISLAND, GREECE: NOTES ON HISTORICAL TOPOGRAPHY AND CHRONOLOGY

Eleni K. Tziligkaki[1] and Michael G. Stamatakis[2]

(1) Saranta Ekklēsion 39, GR-17124 Nea Smyrnē, Athens, Greece. e-mail: eletzili@gmail.com

(2) Department of Geology and Geoenvironment, National and Kapodistrian University of Athens, Panepistimiopolis, Ano Ilissia 157 84, Athens, Greece. e-mail: stamatakis@geol.uoa.gr

Abstract

This paper shows the need for cataloguing and comparing tool marks left on the quarries' front in order for the chronological sequence of the different phases of limestone exposed in underground quarries at Agiades, Chora Samos, to be assessed. Up to now, an archaic and a roman phase of exploitation is inferred by surface pottery, tools, tool marks, the monuments themselves, and parallels from underground quarries on the island of Crete. The proximity of the quarries to a temenos of Apollo and the Nymphs is comparable to other cases from the Greek world. In an attempt to understand the social status of the quarrymen and their level of literacy, data from the graffiti observed in Eupalinos' tunnel were correlated with the lack of patronym and ethnonym observed in quarries in the Aegean, and related to the characterization of the Samians as «πολυγράμματοι». A control of Hera's sanctuary over the quarries at Agiades is implied by the frequent appearance of the letters HP on slabs used in Eupalinos' tunnel.

Keywords*: Samos, quarries, tools, slaves, Nymphs, Crete.*

Περίληψη

Η εργασία παρουσιάζει την ανάγκη για την καταγραφή και την σύγκριση των ιχνών που αφήνουν τα εργαλεία στο μέτωπο ενός λατομείου, με στόχο να συναχθεί η χρονολογική διαδοχή των διαφορετικών φάσεων εξόρυξης του ασβεστόλιθου στα υπόγεια λατομεία των Αγιάδων Χώρας Σάμου. Μέχρι τώρα συμπεραίνουμε μια αρχαϊκή και μια ρωμαϊκή φάση εκμετάλλευσης βάσει της επιφανειακής κεραμικής, των εργαλείων, αλλά και των ιχνών που άφησαν οι ακμές των εργαλείων στον λίθο. Παράλληλα εξετάζονται συγκριτικά, τα ίδια τα μνημεία και ανάλογα υπόγεια λατομεία στην Κρήτη. Η εγγύτητα των λατομείων με τέμενος του Απόλλωνος και των Νυμφών συγκρίνεται με άλλες περιπτώσεις στον ελληνικό κόσμο. Σε μια προσπάθεια να κατανοηθεί η κοινωνική θέση των λατόμων και το επίπεδο της γνώσης ανάγνωσης και γραφής αυτών συσχετίστηκαν στοιχεία από τα χαράγματα (graffiti) στο Ευπαλίνειο όρυγμα με την απουσία πατρικού και εθνικού ονόματος, απουσία που παρατηρείται σε άλλα λατομεία στο Αιγαίο. Τα στοιχεία αυτά συνδυάστηκαν με τον χαρακτηρισμό των Σαμίων ως «πολυγραμμάτων». Η συχνή εμφάνιση των αρχικών HP σε πλάκες του Ευπαλινείου ορύγματος ίσως αποτελεί έναν υπαινιγμό για τον έλεγχο του Ηραίου στα λατομεία των Αγιάδων.

Λέξεις κλειδιά: Σάμος, λατομεία, εργαλεία, δούλοι, Νύμφες, Κρήτη.

1. Introduction

Herodotus (III,60) mentioned Samos in his history due to three major technological projects: the temple of Hera, the aqueduct of Eupalinos and the breakwater in the harbour of Samos. All three of them are in fact a result of specialised knowledge on techniques of quarrying and mining. Most of the building stones used for construction of the public and private buildings in ancient Samos was extracted from open and underground limestone quarries, located in the Agiades Hill, close to Chora Samos.

The impression of the temple of Hera must have been that of a forest of columns. The tunnel of Eupalinos comprised skills in topography and underground excavation for a length of 1036m and a maximum of 167m below ground level

(Kienast, 1995, 37). The breakwater (called "χῶμα" by Herodotus, i.e. soil, earth) demanded the use of immense amounts of stone for its construction (Tölle-Kastenbein, 1976; 72ff; Kienast, 1978). Archaic Samos could have just as well been the equivalent of Pericles' classical Athens in terms of building programs and employment of workmen, if these achievements had not been the result of tyranny, the initiative of tyrant Polykrates (Mikrogiannakis, 1992; Tziligkaki, 2013). It is even mentioned that tyrant Polykrates had a secret tunnel dug from his residence in the acropolis to the harbor, so that he could secure a safe exodus in case of danger (Herodotus III 146. Tölle-Kastenbein, 1976, 86-89).

Part of Samos' history is represented in its fortifications, where different masonry styles depict analogous reconstruction phases (Kienast, 1978). The trench around the city walls was dug by captives from Lesbos after a successive siege by Polykrates (Herodotus III 39).

2. Method

The present paper projects the necessity of studying the tool marks left on the rock at Agiades' quarries, and attempts a synthesis of ancient texts, inscriptions, and graffiti in order to shed light on the topography of the surrounding area, as well as the level of literacy of the quarry workers. The majority of the data come from the Eupalinos' tunnel which is contemporary to the big three-aisled underground chain of Agiades quarries, whose operation dates to the 6th century BC based on scattered pottery in its vicinity. The usual practice for the chronology of a quarry focuses on the identification of the quarry's stone in ancient monuments (Bessac, 1993, 213; Kokkorou- Alevras et al., 2010, 77) and the dimensions of unfinished blocks in the interior or close to the quarry. In some places, the "negative" print of an extracted block left on the rock may lead to some speculations about the monument for which it was destined. The observation of the tool marks left on the rock remains, however, the most effective means for the identification of a possible evolution in quarrying techniques through time (Bessac, 1993, 213).

2.1 The quarries

Stamatiadēs (1866, 62) refers to an ancient quarry between Chora village and the ancient port in Pythagorion, that in his day was a cave with a small church in its interior, dedicated to the Presentation of the Virgin Mary (*Παναγία Σπηλιανή, Panagia Spēlianē*). In front of its entrance is a church dedicated to St. George. According to tradition, the cave was the residence of the Samian Sibylla, Herophile, or Phyto/ Phoito (Pausanias X, 12.5; RE s.v. Phyto; s.v. Herophile). The cave is deep and dark (Stamatiadēs, 1866, 62). Another ancient quarry is located to the north of Kastro, at Haghia Trias Monastery (Karakasi, 2001, 18). Almost 45 galleries at an altitude of 150 m were quarried at the slopes of Kastri Mountain and of the mountain lying to the NW (Tournefort, 1727 II, 119; Stamatiadēs, 1866, 63; Stamatakis, 1990, 2044; Fig. 1, 2045). The latter is separated from Tatarouga Mountain by a ravine (Stamatiadēs, 1866, 63). The name Tartarouga derives from the name of birds, which nestle in large numbers in that mountain (Stamatiadēs, 1866, 63). The galleries are arranged at two levels along the slope of Agiades hill with an altitude difference of 10m between them (Stamatakis, 1990, 2044; Fig. 1, 2045) (Fig. 1).

Fig. 1: Samos, Agiades hill. The underground galleries arranged in two levels.

As the altitude increases, so does the size of the underground galleries (Kienast, 1992, 208). The extraction site falls within the hard porcelaneous yellowish – brown limestones of the Pythagorion Formation (Stamatakis, 1990, 2044 Fig. 1, 2045). The underground galleries are orientated North-South, their entrance pointing to the South or to the Southeast (Stamatakis 1990, 2044 Fig. 1. Kienast, 1992, 208). Some small galleries were exploited until the 20th century for the extraction of small and light limestone slabs (Kienast, 1992, 206). The big and most impressive quarry was first mentioned by Pococke (1745) and then by Stamatiadēs (1866, 63). A more detailed (but not final) report about the quarry dimensions followed by H. Kienast (1992).

The big underground quarry is almost 50 m deep, on average 5 m high and altogether about 20 m wide (Kienast, 1992, 208, Fig. 48 a.b). It is divided into three aisles that were originally separated by ca. 1.50m broad walls; these walls were gradually taken down until they reached the form of big pillars (3×8 m) (Kienast, 1992, *op.cit.*), Fig. 2.

Fig. 2: Samos, Agiades hill. The pillars of the three-aisled underground quarry.

On the quarry floor, one can still see the channels cut for the extraction of angular blocks (Stamatiadēs, 1866, 63) Fig. 3.

Fig. 3: Samos, Agiades hill. In the interior of the big underground quarry the channels cut for the extraction of angular blocks are still visible.

In some places on the floor, traces of wedge slots for the extraction of a 120 cm×90 cm block are still seen (Kienast, 1992, 208).

Scattered shards found in the area of the quarries date it to the first half of the 6th c. BC, a period of intense building activity on the island (Kienast, 1992, 210). The quarry also provided nitrate salts for the production of gunpowder during the Greek Revolution in 1821 (Tournefort, 1727 II, 119; Stamatakis and Zagkouroglou, 1984). Niter (KNO_3) still occurs as white fluffy material in fissures and joints of the beds in the lowermost series of galleries (Fig. 4).

High up, at an altitude of 280 m, a 10 m deep shaft has been located, but remains unexplored (Vlastaridis and Evelpidou, s.d.).

Fig. 4: Samos, Agiades hill. Niter (KNO_3) still occurs as white fluffy material in fissures and joints of the beds in the lowermost row of galleries.

3. Results

3.1 Proximity of quarries to a *temenos* of Nymphs and/or Apollo. The Samian case.

In Samos' tradition, the Nymphs along with the Leleges founded Heras' sanctuary («Ἀδμήτην γάρ φησι, […] ἐπιμεληθῆναι τοῦ ἱεροῦ τοῦ καί νῦν ὑπάρχοντος, πρότερον δὲ ὑπό Λελέγων καί Νυμφῶν καθιδρυμένου», *FHG* III, Menodotus Perinthius vel Samius, p.103 fr.1). A reconstruction of the landscape around Agiades quarries would comprise a stream and the spring of Eupalinos' aqueduct, while swarms of birds called Tatarouga (hence the name of the nearby hill) would fly around; a quite idyllic landscape, that would have been ideal for the cult of Nymphs. A *temenos* of Apollo Nymphegetes and the Nymphs is situated at Vrogana, a location 6km to the west of Chora village, according to an inscribed slab found in an ancient well (Stamatiadēs, 1866, I, p.224; *RE* IA 2, s.v. Samos, 2200; Tsakos, 1977, 75. Museum of Vathy cat.nr. 9). But the site of Vrogana lies far away from the area of the quarries.

Dunst (1972, 162-3) on the other hand adds a similar *horos* slab to the Museum of Vathy, which also refers to Apollo Nymphegetes. Dunst locates the existence of a *temenos* of the Nymphs in the area of Agiades, in accordance to Th. Wiegand (Dunst, 1972, 163), who supports the transformation of the Nymphs into frightening beings and reports the following custom back in 1910; when the women went to wash in the Agiades spring, first they made the symbol of the cross. Then it is a strict custom during the washing not to swear or speak boisterously, so that the Najades (Ναϊάδες, Nymphs) would hear (Wiegand, 1970, 151; Dunst, 1972, 163; for the continuity of the characteristics of the ancient Nymphs in the Greek folklore tradition, see Kamaretta, 1986, 284, 286). Tsakos (1977, 76 nr.31) is reluctant to accept Dunst's interpretation, but he asserts that the cult of Nymphs must be considered absolutely certain inside the cave behind Panagia Spēlianē Monastery. The practice of a cult would explain the presence of piles of shards and handles from hydrias and stamped amphorae (Tsakos, 1977, 76 nr.31). One of those stamped amphorae bears the letter gamma, "an uncommon letter to stand alone in an amphora stamp", see Grace, 1971, 63 nr.25, 90 nr.50). Last but not least, the 6th century BC *Kore* bearing the dedicatory inscription [ὁ δεῖνα ἀ] νέθηκεν Νύμφη[ι]σιν ὁ Μάνδριος, was found in the area of Panagia Spēlianē Monastery (Dunst, 1972, 162; Tsakos, 1977, 76 nr.31 does not correlate the statue with any of the aforementioned sanctuaries of Apollo and the Nymphs).

The proximity of quarries to sanctuaries of Nymphs (and Pan), as well as Apollo is also attested elsewhere in the Greek world (for a synthesis and cases from Crete, see Tziligkaki, 2014).

a) At the underground marble quarry of Marathi on the island of Paros (Cyclades), a person called Ἀδάμας Ὀδρύσης dedicated a relief placed at the entrance of the quarry to the Nymphs (Tournefort, 1727 I, 239-240; Bodnar, 1973, 271; Bruno 2000, 92).

b) In Attica, at Vari Cave or the cave of "Νυμφολήπτου" (i.e. seized by the Nymphs) the quarryman «Ἀρχέδημος ὁ Θηραῖος καὶ Χολ(λ)είδης ταῖς νύμφαῖς ᾠκοδόμησε» and «φραδαῖσι νυμφῶν τἄντρον ἐξηργάσατο» (=Archedemos from Thera and the deme of Cholleidai constructed this for the Nymphs and rearranged the cave of the Nymphs on their suggestion. Archedemos is depicted holding the tools of his craft, a pick and a chisel (Orlandos, 1994, 82 Fig.26, 83

n.6; Schörner and Goette, 2004, 42 Pl. 29). At the interior of Vari Cave the names of Pan (Schörner and Goette, 2004, 49 nr.6, 50 nr.8, Pl.33, Pl. 35) and Apollo (Schörner and Goette, 2004, 47 nr.5, Pl.22.1, Pl.25.1) have been inscribed as well.

c) At Palaiopolis on the island of Andros (Cyclades), two inscriptions – *horoi* of the 4th century BC possibly indicate the existence of a quarry (Palaiokrassa-Kopitsa, 2007, 41 Fig.60, 42). These *horoi*, inscribed on a vertically quarried rock, are related to a sanctuary of the Nymphs, which according to Palaiokrassa-Kopitsa (2007, 42) is probably located in the area of Apollo's sanctuary.

d) The sanctuary of Apollo Marmarinos at Marmarion in southern Euboea, mentioned by Strabo (10.1.6; C 446) and Eustathios (281, 4; Index s.v. Μαρμάριον) could have been associated with the cult of Apollo by the quarrymen and craftsmen working at the marble quarries of the area (Carpenter and Boyd, 1977, 208).

e) Black-glazed shards of archaic and classical date with inscribed dedications to Pan and the Nymphs were found in the Lera Cave, also known as the Cave of Pan (Faure, 1962, 47; Davaras, 1967, 497, Pl. 369b). The cave lies close to the coastal site of Stavros, at Akrotēri Peninsula, in western Crete (Davaras, 1967), where extensive sandstone quarries with different phases of exploitation are situated (Kelletat, 1979, 47; Zamani and Maroukian, 1981, 156 fig.4; Raab, 2001, 126 site SV7; Tziligkaki, 2014, site X5, 58-62, fig.X35- X81).

f) The name of Apollo, along with engraved footprints, has been inscribed thrice (Ἀπόλλωνος Ἀπόλλωνος Ἀπόλλωνι) on a rock at the area of the limestone quarries of Sopata Vernegadi at Cavo Sidero, the northeastern cape of Crete (*ICr* III, vii 19; Tziligkaki, 2014, 403-404).

g) On Kythera Island, at Site II of Avlemonas quarries, an hermaic *stele* similar to the Laconian ones of Apollo Karneios (SE Peloponnese], was deposited in a niche carved in a rock-cut room that presumably served as a sanctuary of the god (Kokkorou-Alevras et al., 2009, 179, Fig. 6, Pl. 1.ii).

h) In the Hellenistic acropolis of the city of Rhodes, artificial caves are linked with the so called *Nymphaia*, underground constructions that are however open to the sky (Rice, 1995, 388, 392, Fig. 10-15, 393 Figs. 16 and 20, 395 Fig.22). Underground caves, water, the Nymphs and Pan are correlated in this case as well (Rice, 1995, 402).

3.2 The quarry workers

Apart from Herodotus' information about the origin of the people who dug Samos' fortification trench, nothing else is known yet about the identity, origin or working conditions of the quarry workers employed in the Agiades' quarries. The study of Eupalinos' aqueduct may offer some hints about the archaic period; the remains of rock in the meeting point of the tunnels implies that two workmen worked side by side digging the aqueduct's tunnel and perhaps a third one was shovelling and carrying outside the extracted material (Kienast, 1995, 94, Pl. 23, Fig.17). The two cisterns in the southern tunnel entrance (Kienast, 1995, 123-126) must have supplied the water needed for the workmen and the tempering of their metal tools.

Mason's marks are painted with red paint on the tunnel walls in the form of letters used as numbers (Kienast, 1995, 193). Male names are also written in the genitive form, such as ΑΡΙΣΤΙΔΩ, ΑΣΒΙΔΕΩ, ΦΑΙΔΕΩ, ΖΩΙΛΩ, ΞΑΝΘΙΩ, ΠΟΣΕΔΕΩΝΙΩ, ΠΥΘΩ, as well as two names in the nominative: ΑΣΠΡΑΤΙΟΣ and ΠΥΘΙΔΟΚΡΑΤΗΣ, the latter in smaller letter form (Kienast 1995, 193, Pl. 40.4 with the name of Άσβιδέω written from right to left). Kienast (1995, 194) regards that the names reveal the person responsible for each section, even though their task is not clear.

Eupalinos on the other hand, the architect of the tunnel, conceals his name; his "signature" and heritage to posterity is the inscription ΠΑΡΑΔΕΓΜΑ -more of an enigma, but also the key to anyone who can understand his engineering masterpiece (Kienast, 2004, 88-89). It is thanks to Herodotus (III, 60) that his name and descend comes down to us: *Μεγαρεύς Εὐπαλῖνος Ναυστρόφου* (i.e. Eupalinos, son of Naustrophos, from the city of Megara). To the curiosities of Samos, listed by the Samian Menodotus, one could include the way the Samians chose to write their names in inscriptions; «ἐπέγραφον γάρ πατρόθεν προτάσσοντες τὸν πατέρα», so that the name in genitive comes first, followed by the name in nominative (*FHG* III, Menodotus Perinthius vel Samius, p.105 fr.2; Gregorius Cor. p.50-51; Corpus parœmiographorum Graecorum, p.386 10 C). But the names in genitive at Eupalinos' tunnel do not seem to apply to that case.

If we accept Kienast's interpretation about names of persons responsible for each section (Kienast, 1995, 194), then the lack of patronym in the graffiti of the tunnel is striking. A family tradition is meaningless in the community of slaves, because there is no legal relationship of the children to their parents (Solin, 2008, 122; Faraguna, 2014, 172). At the marble quarries of Karystos the name of ΔΙΟΚΛΗC (Lambraki 1980, 47, Fig.10a) is inscribed without a patronym or ethnic name. Single names in the genitive can indicate the name of the slave rather than his master (Baldwin Bowsky, 2009, 213-214). In that context, the genitives ΠΥΡΡΟΥ and ΠΑΡ ΣΟ inscribed on quarries of the roman period on Thasos Island (Kozelj and Wurch –Kozelj, 2009) could reflect their status.

In the quarry area of Sopata Vernegadi at Cavo Sidero (the outmost northeastern cape of the island of Crete) a quarryman named Pythas took the initiative to inscribe his name and profession, but not his patronym or ethnic name: Πυθάς λιθοκόπος (*ICr* III, vii.6. About the quarry, Papadakis 1983, 384). Fraser and Matthews (1987, sv. Πυθάς) reluctantly date the inscription to the 2nd c. BC. [the word λιθοκόπος appears twice in Attica; in an inscription of the Roman period (*IG* III.1, n.307), and in one of the Byzantine period (*IG* III.2, n.3455)].

The names in the nominative may either belong to free men or to slaves; In a 6th century BC building inscription -engraved on a rock on the road leading from the village Skoureika to the village Neochori- the names of two *τέκτονες* (*Εὐρυκλῆς* and *Χαρμόφιλος*) who built a (wooden) bridge, are referred in the nominative without their patronym; instead, their profession is emphasized (Dunst, 1972, 124-126). The lack of patronym is also observed in the name of the citizens (*Τελέσανδρος* and *Δημαγόρης*) appointed by the city to supervise the construction, but here the absence of any details in -what appears to be- an abridged version of the original archival copy is expected (for discrepancies in public documents, see Faraguna, 2014, 167). However, the profession of *τέκτονες* (craftsmen, carpenters) is usually related to people of lower *strata* or slaves (Dunst, 1972, 125 nr.46).

In the 6th century BC slavery was practiced in the island of Samos, according to the data provided by Herodotus; the captives from Lesvos were used to dig the trench of Samos fortifications (Herodotus III 39). In the time of pharaoh Amasis,

a courtesan (*ἑταίρα*) of Thracian origin, named Rhodōpis, was a slave to Iadmōn of Samos, the same man who owned the famous Aesop (Herodotus II 134: «γενεὴν μὲν ἀπὸ Θρηίκης, δούλη δὲ ἦν Ἰάδμονος τοῦ Ἡφαιστοπόλιος ἀνδρὸς Σαμίου, σύνδουλος δὲ Αἰσώπου τοῦ λογοποιοῦ». Zelnick-Abramovitz 2005, 63). She was brought to Egypt by Xanthes of Samos (Herodotus II, 135: «Ῥοδῶπις δὲ ἐς Αἴγυπτον ἀπίκετο Ξάνθεω τοῦ Σαμίου κομίσαντος…»), probably a slave of Thracian origin according to Zelnick-Abramovitz (2005, 171). The name Ξανθίας is common in slaves and implies a northern origin (see Zelnick-Abramovitz 2005, 172 note 79 for examples in Greek comedy). In that context, the name Ξανθίας, painted in Eupalinos' tunnel, points to a slave of northern origin. Additionally, the name of Ποσειδώνιος could belong to a slave named after his qualities, analogous to god Poseidon (see Masson 1990, 152, despite the fact that he excluded the case of naming slaves after Zeus, Apollo or Poseidon). The Samians were called *πολυγράμματοι* by Aristotle (*FHG* II 160 frg. 181; *RE* IA 2, s.v. Samos, p. 2206), because they granted citizenship to slaves on payment of 5 *staters*. The reason for such an action was the scarcity of citizens due to their sufferings by the tyrants (Photius Lex.v. «Σαμίων ὁ δῆμος ὡς πολυγράμματος…Οἱ γὰρ Σάμιοι καταπονηθέντες ὑπό τῶν τυράννων, σπάνει τῶν πολιτευομένων ἐπέγραψαν τοῖς δούλοις ἐκ πέντε στατήρων τὴν ἰσοπολιτείαν, ὡς Ἀριστοτέλης ἐν τῇ Σαμίων πολιτείᾳ»).

The word *πολυγράμματος* means the one marked with many letters (*LSJ*, 1968, s.v. *πολυγράμματος*, and s.v. *στιγματίας*, one who bears tattoo-marks, esp. branded culprit or runaway slave. The branding of the Samian captives with the Athenian owl, and the equivalent branding of the Athenian captives with the samian boat *samaina*, is considered to be a fiction of Duris, *FHG* II 452 nr.59). The word also means of great knowledge, very learned (*LSJ*, 1968, s.v. πολυγράμματος II). According to Andron Ephesius (*FHG* II 348 nr.7), the Samians were called *πολυγράμματοι* because they introduced the 24 Greek letters (Suidas: «Σαμίων ὁ δῆμος ὡς πολυγράμματος…ὅτι παρά Σαμίοις εὑρέθη πρώτοις τὰ κδ΄ γράμματα ὑπό Καλλιστράτου, ὡς Ἄνδρων ἐν Τριπόδι»). Indeed, the 24 letters of the Greek alphabet are painted in the walls of the Eupalinos' tunnel as a representation of numbers (Kienast 1995, 193. Kienast, 2004, 81 n.23). The level of literacy in archaic Samos is also reflected in a passage from Herodotus; the tyrant Polykrates employed the citizen Maiandrios, son of

Maiandrios, as a scribe (Herodotus III 123: «ὁ Πολυκράτης [….] ἀποπέμπει πρῶτα κατοψόμενον Μαιάνδριον Μαιανδρίου ἄνδρα τῶν ἀστῶν, ὅς οἱ ἦν γραμματιστής»).

The evidence from the Eupalinos' aqueduct is most informative about the literacy of the workmen engaged in the tunnel construction, whether they were freemen or slaves. There are numerous symbols inscribed on the cover slabs, for instance the letters AP. The letter M appears 6 times, the letter H once (Kienast, 1995, 194). The combination HP appears strikingly often, but not as many times as the combination HPΦ that appears 25 times in all possible scripts, (Keinast, 1995, 194). The published figures of HPΦ (Kienast, 1995, Pl. 37, 3-5) are indicative of at least three handwritings. The most striking feature at the same time is the cursive script (Kienast, 1995, 194). Kienast (1995, 194) suggested that these symbols could be interpreted as simple signs of the carriers or sellers and therefore as monograms of their names. In our view, the often combination of the letters HP is rather conspicuous; the monogram could stand for Hera or her sanctuary, as in some stamped Samian amphorae (see Grace, 1971, 93 nr.77). After all, the quarries of Agiades provided the building stone for Rhoikos' Hera temple. An interference or even control of Heras' sanctuary over the exploitation of the limestone quarried from Agiades seems to be quite intriguing.

Unfortunately, masons' marks are not reported so far from the underground quarries of Agiades. However, one fact is certain; the quarry workers at Agiades hill knew well the topography and petrology of the area. They rejected the possibility of exploiting the soft and unconsolidated diatomic limestones of the Chora Beds and preferred the well-bedded, porous bitumen-bearing limestones of the Pythagorion Formation (Stamatakis, 1990, 2045; Owen et al., 2011). The rooms and pillars technique of the big quarry reveals expertise in mining and quarrying techniques and implies the employment of a wide range of skilled workmen. During the morning, the sunlight would have sufficiently brightened the interior of those galleries whose entrance pointed to the Southeast (Fig. 1). Rock stratification dictated the quarry opening to the East-West axis. An entrance to the East indicates that the quarry is lit better during the day, whereas an entrance to the west allows better lighting later in the day (Younes and Ouaja, 2009, 233).

3.3 Tool marks

Marks that seem to have been made by a double – dented pick (see Bessac, 1997, 25 Fig.1b; Bessac, 2002, 35 Fig.21 nr.2) and a tool with levelled point occur in the walls of the lower row of Agiades underground quarries (Fig. 5).

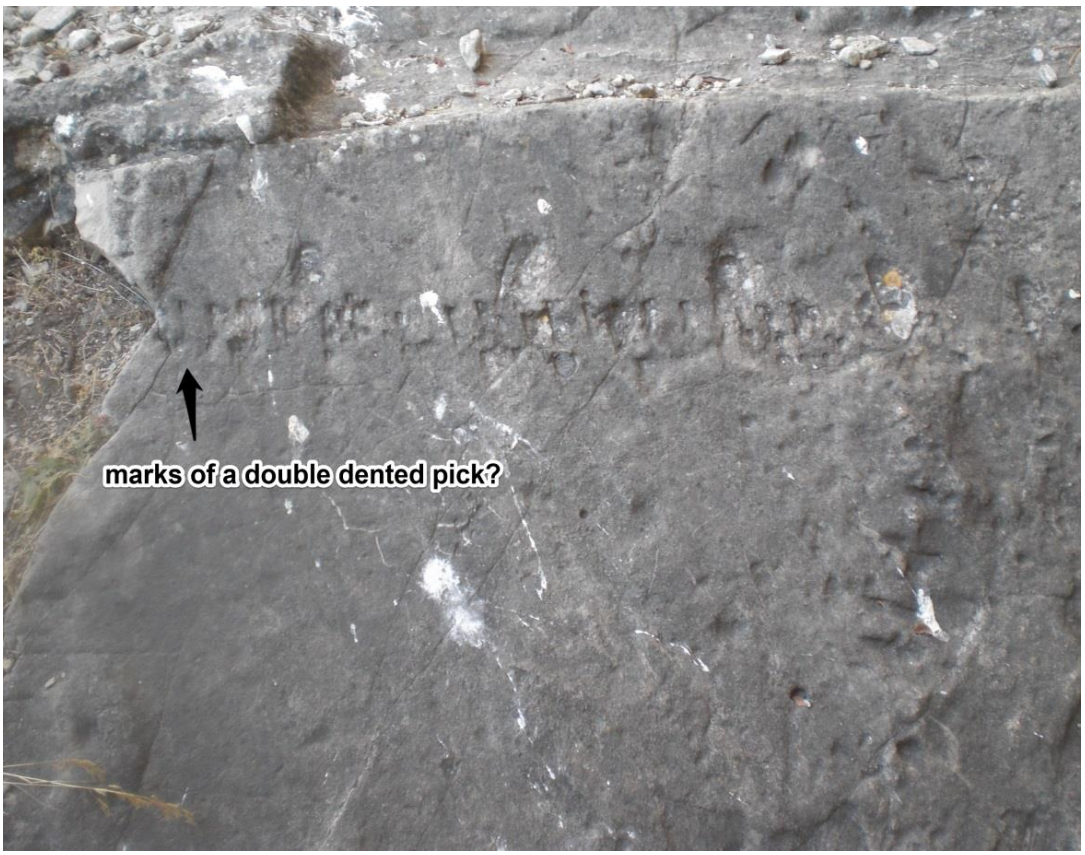

Fig. 5: Samos. Tool marks observed in the walls of the lower row of Agiades underground quarries. Height of the image 0.60 m.

A quarrying pick with a sharp point was also used in smoothing out the sidewalls of Eupalinos' tunnel (Kienast, 1995, Pl.41,7-8) and at the interior of one of the one-aisled underground quarries at the lower row of Agiades hill. (Figs 6 and 7).

Fig. 6: Samos, Agiades hill. A quarrying pick with a sharp point used in smoothing out the sidewalls of a one-aisled underground quarry. Height of the outcrop approximately 2 m.

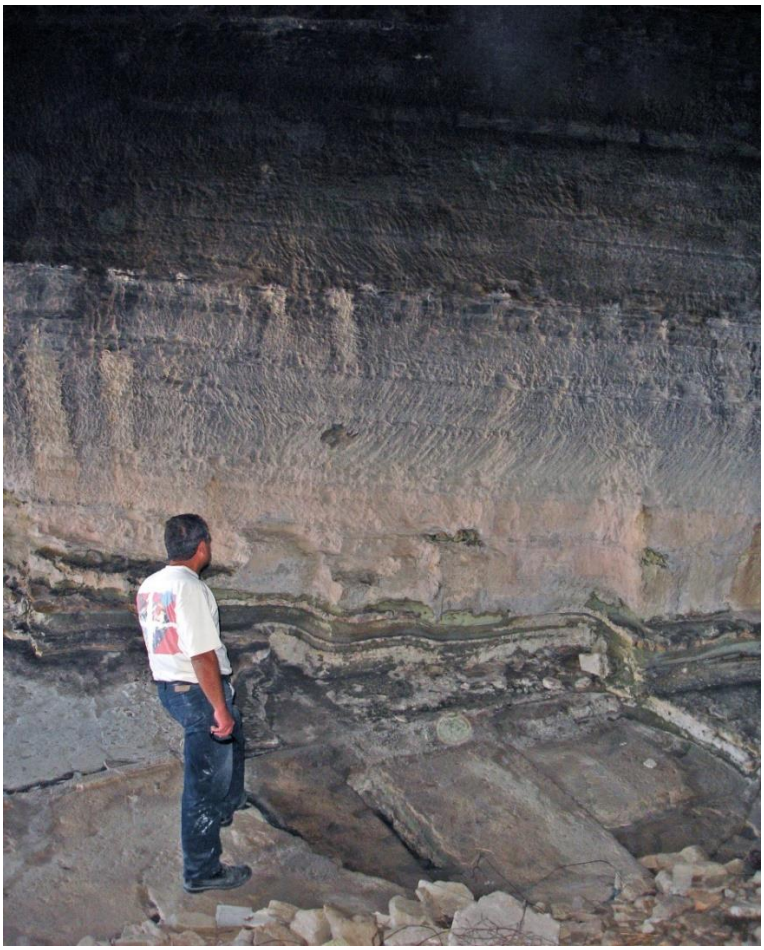

Fig. 7: Samos, Agiades hill. Interior of a one-aisled quarry.

The *skeparnon* (= short-handed axe) was the characteristic tool of the stonemasons for the working on the soft calcium marl (Kienast, 1995, 45 n. 126, Pl. 16.4-5). With the use of harder stone in the Late Archaic period, the *skeparnon* went out of use (Reuther, 1957, 22. Kienast, 1995, *op.cit.*). The breadth of its cutting edge is estimated to have been almost 0.06 m. (Reuther, 1957, 24, 33). The metallic pickaxe found in Cistern 2 of Eupalinos' aqueduct (Jantzen et al., 2004, 130 n. 810, Pl. 24) is suggested to be correlated with the quarrying activity at Agiades hill during the Roman and perhaps Early Byzantine period. It is paralleled with tools of the Roman and Early Byzantine period in Italy and Sardis (Jantzen et al., 2004, 130 n. 810.; For Sardis: Waldbaum, 1983, 48-49, Pl.11 nr.132, nr.136, nr.140). Only a few clay oil lamps dating to the imperial times were found in the tunnel, the majority of them being byzantine (Jantzen et al., 2004, 13). The presence of water springs and/ or cisterns close to quarries was necessary not only due to the hard labour of the quarry workers (notice the *hydria* of the second half of the 6th century BC found in Eupalinos' tunnel; Jantzen et al., 2004, 200 n.1291, Pl.40) but also for the tempering of their metallic tools. Whatever the case might have been, Cistern 2 seems the appropriate place for a workman to lose his tool. The pickaxe is 0.24 m long; its oval wooden shaft –now lost- measured 0.03 m in diameter (Jantzen et al., 2004, 130 n.810, Pl. 24). According to the published sketch and measurements, its sharp end is 0.06 m long and almost 0.015 m wide, and its wide end measures 0.045 m. Its weight is not recorded. The tool belongs to the type 3 "Marteau taillant" by Bessac (1986b, 39, 40 n.2, Fig.10 nr.5).

3.4 The identification of the quarried limestone in Samian monuments

3.4.1 The Heraion

The research of the German Archaeological Institute of Athens conducted on Samos, based on the material and the size of the quarries at Agiades, concluded that they provided the limestone for the Rhoikos-temple of Hera (Kienast, 1992, 210). Stamatiadēs (1866, 63) and Stamatakis (1990) attributed the building material of the city walls to the underground quarries of Agiades area.

Unfortunately the site of Hera's temple was exploited as a quarry itself as soon as the 3rd century AD (Kyrieleis et al., 1985, 400 n.65), thus providing ready blocks of stone that most probably were transferred overseas (Reuther, 1957, 39). As a result, there is not a single block of stone *in situ* that can with certainty be attributed to the archaic temple, a temple whose stone masonry comprised almost 6000m³ of limestone blocks (Reuther, 1957, 39). Despite this loss, the brown limestone blocks used in the exterior *peristasis* foundation were used as though they had come from the quarry; their faces are not parallelepiped, but are blunt pyramid like, steep faced (Reuther, 1957, 33). In some of them the bosses used for the hoisting of the blocks were left in place (Reuther, 1957, 24). Their outer faces are rectangular with large strokes of a pointed tool, like the modern *skeparnon* (Reuther, 1957, 33).

3.4.2 The Sacred Way

Luckily enough, the limestone of Agiades was used for the slabs that paved the Sacred Way. That means that the quarries operated in the late 2nd century AD and in the beginning of the 3rd century AD, if we judge from a Samian bronze coin of Caracalla found in the compressed filling of the Sacred Way (Kyrieleis et al., 1985, 399, 404, 406 Fig.31). The slabs used were almost 4.5m wide, around 0.30m thick and up to more than 2m² in volume (Kyrieleis et al., 1985, 399, 401 Fig. 27, 405 Fig.30). Their dimensions do not coincide with the dimensions of an extracted block from the floor of the big underground quarry reported by Kienast (1992, 208). Unless such dimensions coincide with the slabs used for the slightly raised pavement of the Sacred Way (for the pavement, see Kyrieleis et al., 1985, 399). It is estimated that 10000m³ of limestone was extracted to pave the Sacred Way with slabs (Kyrieleis et al., 1985, 399 n.61).
If to those 10000m³ one adds the estimated 6000m³ for the construction of the Heraion, then an approximate volume of 16000m³ must have been extracted from the quarries of the Agiades hill. The dimensions of the big three-aisled underground quarry reported by Pococke (1745), Stamatiadēs (1866) and Kienast (1992), do not seem to correspond to the volume of such an exploitation. The nearby one-aisled galleries could be considered as possible roman quarries, but a detailed examination of the tool marks left on the rock is strongly advised before the deduction of any conclusions.

3.4.3 The renovated Rhoikos altar (?)

Two large decorative ornaments, made of brown porous limestone, a large ionic *kymation* and a large *ovum* (ᾠόν), may be of a Roman age. The dimensions of the *ovum* match the marble ones of the large renovated Rhoikos altar – an altar that dates to the Roman period (Reuther, 1957, 40, Zeichnung Z49 and Z48). Their place at the *epistepsis* of the *cella* walls is disputed by Reuther (1957, 40) due to their large dimensions and corroded surface that implies a long-term exposure to weather conditions.

4. Discussion

4.1 The fortifications

The quarries entrance at an altitude of 145 m, are not visible from ground level, but the city walls must have had a view and control of them. Even though the archaic wall had few towers (Kienast, 1978, 72; Tsakos, 2006, 301), Tower 28 on the top of the mountain must be the one mentioned by Herodotus (III, 54. Tsakos, 2006, 295 Fig.1, 302). Samos' city walls are well preserved but the stones do not come from the Agiades quarry. Their building material comes mainly from the quarry close to the Monastery of Panagia Spēlianē (*RE* IA 2, s.v. Samos, p. 2185). So far, four construction phases of the city walls have been identified; the polygonal one dates to the archaic period before Polykrates' era or at least at the first years of his reign (Kienast, 1978, 102). It is assumed that the city walls pre-existed when the captives from Lesbos dug the trench around it (Kienast, 1978, 93 n.284, 102). The isodomic construction phase dates in the years between 310-290 B.C. Such an expensive project is attributed either to Demetrius Poliorketes or to tyrant Duris (Kienast, 1978, 97). The siege of Philip V caused damage to the fortifications that were repaired with large rectangular dressed stones (Tsakos, 2006, 298 figs. 4-5, 299). The last phase, of pseudo-polygonal masonry, most probably dates to the first decade of the 2nd c. B.C., especially in the time span of the Rhodian dominion on Samos in the years 197-190 B.C. (Kienast, 1978, 99).

Therefore, it is expected that traces of tools that were used in the last reconstruction phase of Samos' city walls would most probably survive on the

faces of the quarries, unless of course all the construction phases are represented in different quarry faces. In that case, any surviving marks of tools or wedges should be recorded and then compared to other well dated marks primarily on the island of Samos and secondarily elsewhere. The usual practice is to use the stone extracted from the trench as building material for the fortifications. But it seems that this was not the case on Samos, since Herodotus' information may imply that the city walls already existed by the time Polykrates made the captives dig the trench (Kienast, 1978, 93 n.284). In that case, the vertical and "well sharpened" surfaces of the trench (Kienast, 1978, 93, Pl. 37-37) could provide important data for any surviving tool marks on the rock and therefore serve as a guide for tool marks in the archaic period.

4.2. Eupalinos's Aqueduct

The Eupalinos' Aqueduct may offer more evidence. The stream bed of the spring of Eupalinos' aqueduct was straightened and technically smoothed out. The side walls are vertically worked in a height between 1.50 and 2.50 m in a length of ca. 18m upstream (Kienast, 1995, 89, Fig. 26b). Unfortunately, the clear tool marks on the surfaces of the rock could not be satisfactorily photographed due to the dense vegetation (Kienast, 1995, 89 n.169), but another visit at the site may turn out more fruitful. Kienast interpreted the tool marks left on the tunnel walls as a result of the use of hammer and chisel (Kienast, 1995, 94). Despite the fact that special quarrying techniques were not detected and that small stone chippings were extracted (*op. cit.)*, the most common tool of quarrymen was the pick (Orlandos, 1994, 116.; Bessac, 1986b, 293; Id., 1997, 9, 25 Fig.1.; Korres, 2000, 72 Fig. 9). It is the friable nature of the rock that gives the impression that small stones were extracted. It is worth wondering though whether the extracted stone from the tunnel was exploited for the construction of the «χῶμα» (the breakwater). An analogous case comes from Melos Island, in the western Cyclades (Aegean Sea); the debris dug out for the construction of a Nazi Bunker at Adamas (the island's port) was used for the formation of a small plateau at the quay entrance. This area was then further expanded, so that the destruction by the sea would be prevented (Karnava *s.d.*).

4.3. The underground quarries of Crete Island

Crete Island offers a variety of underground limestone quarries (see Tziligkaki, 2014) that could be compared with those of Samos. Such quarries are situated at the site of Vintzi in Kalathas (Akrotēri Peninsula), at Kato Galatas in north-western Crete, Peristeres and Sternes at Eleutherna (Stampolidis, 2004), Spēlios at Haghioi Apostoloi (Hood et al., 1964, 71-72, fig. 11G), Maroulas at Maroulas village of Rethymnon Prefecture, Labyrinthos (Spratt, 1865. Petrocheilou, 1990. Zoupis, 1998. Patroudakis, 2004a; 2004b) and Mikrē Labyrinthos (Fig. 8) at Messara, as well as the quarry of Chatzidaki-Niva in the Knossos area (Evans, 1921, 533, Fig.388; Id., 1928, 62.; Shaw, 1971, 38-41, fig.30a-c.; Kalokairinos, 1989-1990). The quarries belong to the type of pillars and galleries with the exception of the smaller Kalathas and Spēlios quarry (for the type see, Bessac 1986; also Korres, 2000).

Fig. 8: Crete Island. The underground quarry of Mikrē Lavyrinthos at Mesara.

The site of Spēlia (Σπήλια) close to Knossos owes its name to the numerous underground quarries along the sides of the hill (Spratt, 1865. Kalokairinos 1989-1990, 28-31. Alexiou, 1973, 464) Fig. 9.

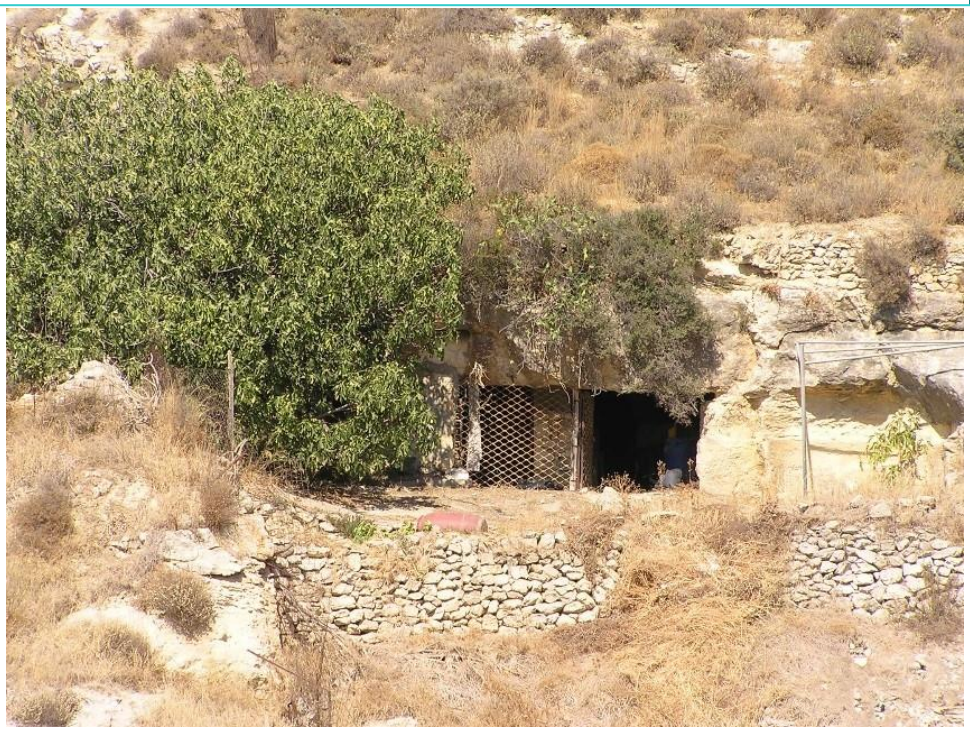

Fig. 9: Crete Island. Two one-aisled underground quarries at Spēlia, in the area of Knossos.

At the site of Haghia Eirini two one-aisled quarries are situated side by side (Fig. 10).

Fig. 10: Crete Island. The one-aisled underground quarries at Haghia Eirini, close to Knossos.

One of them is 7 m long, 3 m wide and 4 m high. They both resemble two places from Agiades; the three one-aisled quarries mentioned by Kienast (1992, 208 Fig. 46-47), and the original stage of extraction at the big underground quarry of Agiades, where a wall divided the aisles before it gradually took the shape of pillars (Fig. 3). The majority of the Cretan underground quarries exhibit faces that date to the Roman period. However, there are hints that the two big Sternes and the lower strata of Peristeres at Eleutherna–now covered by earth and debris- may have an archaic age (Tziligkaki, 2014). In that case, the comparison of the tools and techniques used in Eleutherna and Samos could be priceless.

The use of underground artificial spaces as refuge sites was common in both Samos and Crete; Eupalinos' tunnel served as a refuge from the end of the 6th century AD until the middle of the 7th century AD, a time when the aqueduct was out of use (Jantzen et al., 2004, 5, 12-13). During the continuous revolutions of Cretans in the Ottoman period, the Labyrinth [Lavyrinthos] of Gortys served as a refuge for whole villages of the Messara plain; each village occupied a room of this vast underground artificial cave and named the room after the village (Patroudakis, 2004a, 32). Captain T.A.B. Spratt (1865 II, 47) mentioned that in the years of the Greek Independence War (1822-1828) the villagers built narrow rooms with rubble walls along the sides of the wider corridors, close to the entrance. The relief oil lamps found in the interior of Lavyrinthos are now lost (Patroudakis, 2004b, 54).

5. Conclusions

The underground quarries at Agiades represent the following types: a) one – aisled gallery, and b) underground spaces supported by pillars. The stratigraphy of the porous limestone must have dictated the North – South axis, which prevented the opening of an eastern entrance. Such an orientation would have allowed more light during the morning. The social status of the quarrymen is inferred by the data offered by the archaic Eupalinos' tunnel. The names in genitive, especially those of Ξανθίας and Ποσειδώνιος, as well as the lack of patronym are indicatives of slaves. The level of literacy in archaic Samos is correlated with the characterization of the Samians as πολυγράμματοι; it is

reported by Aristotle that in Samos the citizenship was granted to slaves due to lack of men due to the sufferings of the citizens by the tyrants.

The quarries provided ample building stone for the Hera temple. In the temple foundation, traces of tool marks from the quarry are still seen in the surface of blocks of the brown porous limestone. The marks are made by a tool whose cutting edge is 0.06m wide. The same tool was used for the decoration motifs and the symbols inscribed on limestone slabs used at Eupalineion. The often appearance of the monogram HP on these slabs perhaps implies the control of Hera's sanctuary over the exploitation of the extracted limestone; the large three-aisled underground quarry of Agiades seems to be the best candidate for an archaic exploitation, due to the 6th century pottery scattered in the area.

On the other hand, the lower row of Agiades with the one-aisled galleries recall in arrangement the ones in the vicinity of roman Knossos. It is possible that the extraction of the slabs used for the renovation of the Sacred Way at Heraion in the 2nd century AD took place in these underground quarries. Dense, curvy strokes are observed on their surfaces. There is also a hint for the use of the double dented pick. A roman pickaxe found in Cistern 2 of Eupalinos' aqueduct is related to the quarrying activity at Agiades.

This paper suggests the necessity of cataloguing and comparing the tool marks observed in the underground quarries of Agiades to a) the tool marks at Eupalinos' stream bed, b) to the possible ones at the trench of Samos fortifications, and c) to those on the rough blocks of Heraion foundations. The tool marks at Eupalinos' tunnel indicate the use of a pointed pick, but the density and orientation of the strokes may have been the result of the narrow space available to the quarry men, and therefore they cannot provide a successful parallel.

The site of the quarries exhibits a continuous use, if we judge from the use of the extracted limestone in ancient monuments; during the archaic period the quarries operated for the Rhoikos temple and the archaic one. Their operation in the Roman period is primarily deduced by the renovation of the Sacred Way and secondarily by the fragment of a large porous ovule that matches the marble

ovules of the renovated Rhoikos altar. The proximity of the quarries with a *temenos* dedicated to Apollo and the Nymphs should not be surprising at all; instead, the case of Agiades should be added to the list of several other analogous cases in the Greek world.

6. Acknowledgements

Special thanks are owed to Dr. Demetrius Bosnakis, Assistant Professor in the University of Crete, for his remark about the lack of patronym in the names of the slaves. The shrine of Apollo at Kythera Island was kindly indicated by Dr. Manolis Stefanakis, Associate Professor in the University of Aegean. The authors would like to thank Dr. Panos Valavanis, Professor in the National and Kapodistrian University of Athens, for his review. Thanks are expressed to Dr. James R. Hein, United States Geological Survey, California, for revising the final version of the manuscript.

7. References

Alexiou, S., 1973. Χρονικά –Αι αρχαιότητες Ηρακλείου κατά το 1972. *CretChron*, 25, 457-478.

Baldwin Bowsky, M., 2009. Downstairs, Upstairs: Tonnius and Other Romans at Eleutherna, Sector I, in: Themelis, P.G. (Ed.), *Ancient Eleutherna – Sector I*, Vol. 1, University of Crete, Athens: Εκδόσεις Πανεπιστημίου Κρήτης, Νικόλαος Σταμπολίδης, Πέτρος Γ. Θέμελης, pp. 201-223.

Bessac, J.-C., 1986a. La prospection archéologique des carrières de pierre de taille. Approche méthodologique. *Aquitania*, 4, 151-171.

Bessac, J.-C., 1986b. L'outillage traditionnel du tailler de pierre de l'Antiquité à nos jours. *Revue Archéologique de Narbonnaise, Suppl*. 14.

Bessac, J.-C., 1993. État des recherches sur les carrières antiques du Bois des Lens (Nîmes). *Journal of Roman Archaeology*,6, 205-225.

Bessac, J.-C., 1997. Traces d'outils sur les pierres: quelques repères chronologiques. *Actes du X^e Colloque International de Glyptographie du Mont-Sainte-Odile (France), du 4 au 9 juillet 1996*, Braine –le Château, 7-32.

Bessac, J.-C., 2002. Les carrières du Bois des Lens (Gard). *Gallia*, 5.1, 29-51.

Bodnar, E.W. S.J., 1973. A Quarry Relief on the Island of Paros. *Archaeology*, 26.4, 270-277.

Bruno, M., 2000. The Results of a Field Survey on Paros, in: Schilardi, D.U., Katsonopoulou, D. (Eds), Paria *Lithos. Parian Quarries, marble and workshops of sculpture: Proceedings of the First International Conference on the Archaeology of Paros and the Cyclades, Paros, 2-5 October 1997*, Athens: Π. Χατζηγιάννης & ΣΙΑ Ο.Ε., 91-94.

Carpenter, J., Boyd, D., 1977. Dragon-Houses: Euboia, Attika, Karia. *AJA*, 81, 179-215.

Corpus parœmiographorum Graecorum, edited by E.L. Leutsch et F.G. Schneidewin, Tomus I. Gottingae: Vandenhoeck & Ruprecht (1839). On openlibrary.org.

Davaras, K., 1967. Αρχαιότητες και μνημεία Δυτικής Κρήτης. *ArchDelt*, 22, Β΄2-Χρονικά, 495-501.

Dunst, G., 1972. Archaische Inschriften und Dokumente der Pentekontaetie aus Samos. *AM*, 87, 99-163.

Eustathii archiepiscopi Thessalonicensis Commentarii ad Homeri Iliadem (Ευσταθίου Αρχιεπισκόπου Θεσσαλονίκης Παρεκβολαί εις την Ομήρου Ιλιάδα), Tomus 1. Lipsiae (1827).

Evans, A. Sir., 1921. *The Palace of Minos at Knossos: The Neolithic and Early and Middle Minoan Ages*, Vol. I, London.

Evans, A. Sir., 1928. *The Palace of Minos at Knossos*, Vol. II.1, London.

Faraguna, M., 2014. Citizens, Non-Citizens, and Slaves: Identification Methods in Classical Greece, in: Depauw, M., Coussement, S. (Eds), Identifiers and Identification Methods in the Ancient World: Legal Documents in Ancient Societies III, Orientalia Lovaniensia Analecta 229, Leuven-Paris-Walpole, Ma: Uitgeverij Peeters en Departement Oosterse Studies, 165-183.

Faure, P., 1962. Cavernes et sites aux deux extrémités de la Crète. *BCH*, 86.1, 36-56.

Fragmenta Historicorum Græcorum, edited by C. Müller, Vol. 2-3, Parisiis: Didot (1848-1849). On openlibrary.org.

Fraser, P. M., Matthews, E. (Eds), 1987. *A Lexicon of Greek Personal Names*, Vol. I: The Aegean Islands-Cyprus-Cyrenaica, The British Academy, Clarendon Press Oxford.

Grace, V. R., 1971. Samian Amphoras. *Hesperia*, 40, 52-94.

Gregorius, Corinthi Metropolita, *de Dialectis*, edited by G. Koen. Lugduni Batavorum: Van der Eyk & De Pecker (1766). (Google eBook).

Herodoti Historiae, edited by Carolus Hude, editio tertia, t. 1. Oxford Classical Texts/ Εκδόσεις Καρδαμίτσα.

Index in Eustathii Commentarios in Homeri Iliadem et Odysseam (studio M. Devarii), Lipsiae, 1828. (Κατάλογος δειγματικός των εν τοις Ευσταθίου εις την Ομήρου Ιλιάδα και Οδύσσειαν υπομνήμασιν εμφερομένων χρησίμων. Δια Ματθαίου του Δεβαρη παρεκβληθείς και συγκεφαλαιωθείς).

ICr: Guarducci, M. (Ed)., 1942. *Inscriptiones Creticae. Opera et consilio Friderici Halbherr collectae III. Tituli Cretae orientalis*. Libreria dello Stato, Roma.

IG III.1: Dittenberger, G. (Ed), 1878. *Inscriptiones Atticae aetatis Romanae*, Vol.III, Pars I, Berolini.

IG III.2: Dittenberger, G. (Ed.), 1882. *Inscriptiones Atticae aetatis Romanae*, Vol.III, Pars II, Berolini.

Jantzen, U., Hautum, W., Megow, W.-R., Weber, M., 2004. Die Wasserleitung des Eupalinos: Die Funde, edited by Hermann J. Kienast, *Samos* XX. Dr. Rudolf Habelt Gmbh, Bonn.

Jockey, Ph. (Ed)., 2009. *Λευκός Λίθος. Marbres et autres roches de la Méditerranée antique: études interdisciplinaires. Actes du VIIIe Colloque international de l' Association for the Study of Marble and Other Studies used in Antiquity* (ASMOSIA), *Aix – en Provence 12-18 juin 2006*, Maison méditerranéenne des sciences de l 'homme, Paris.

Kalokairinos, M., 1989-1990. Ανασκαφές στην Κνωσό, Εισαγωγή – Επιμέλεια: Κατερίνα Κόπακα. *Παλίμψηστον,* 9/10, 5-69.

Kamaretta, A., 1986. Ομαδικοί θεοί – Χοροί θεϊκών κοριτσιών. Νύμφες. In: Κακριδής, I. Θ. (Ed). 1986. *Ελληνική Μυθολογία –Οι Θεοί*, vol. 2, Αθήνα: Εκδοτική Αθηνών, 281-286.

Karakasi, K., 2001. *Archaische Koren*. Hirmer Verlag, München.

Karnava, A., (*s.d.*) translated by Cissy Chatzinikolaou. *The Refuge of Adamas in Milos*. The historical background, http://refugeproject.blogspot.gr/ Historical context

Kelletat, D., 1979. *Geomorphologische Studien an den Küsten Kretas. Beiträge zur regionalen Küstenmorphologie des Mittelmeerraumes*. Series: Abhandlungen der Akademie der Wissenschaften in Göttingen, Mathematisch–Physikalische Klasse, Folge 3, Nr. 32, Göttingen.

Kienast, H. J., 1978. *Die Stadtmauer von Samos*. Samos XV, Bonn.

Kienast H. J., 1992. Topographische Studien im Heraion von Samos. *Archäologisher Anzeiger*, 1992, 171-213.

Kienast H. J., 1995. *Die Wasserleitung des Eupalinos auf Samos*. Samos XIX, Bonn.

Kienast, H. J., 2004. Παράδεγμα. Das Vermächtnis des Eupalinos. *AM*, 119, 67-90.

Kozelj, T., Wurch-Kozelj, M., 2009. Les carrières du Cap Phanari à Thasos. In: Jockey 2009, 49-71.

Kokkorou-Alevras, G., Efstathopoulos, A., Poupaki, E., Chatzikonstantinou, A., 2009. Ancient Quarries of Kythera. In: Jockey, 2009, 177-188.

Kokkorou-Alevra, G., Poupaki, E., Efstathopoulos, A., 2010. *Αρχαία Ελληνικά Λατομεία: Οργάνωση χώρου και εργασίας, τεχνικές λατόμησης και λάξευσης, τρόποι μεταφοράς, κόστος, διασπορά και χρήση λίθων*. Αθήνα: Πολιτιστικό Ίδρυμα Ομίλου Πειραιώς.

Korres, M., 2000. The Underground Quarries of Paros. In: Schilardi, D.U., Katsonopoulou, D., *Paria Lithos. Parian Quarries, marble and workshops of sculpture*: *Proceedings of the First International Conference on the Archaeology of Paros and the Cyclades, Paros, 2-5 October 1997*, Π. Χατζηγιάννης & ΣΙΑ O.E., Athens, 61-82 (in Greek with an English summary).

Kyrieleis, H., Kienast, H.J., Weißhaar, H.-J., 1985. Ausgrabungen im Heraion von Samos 1980/81. *Archäologischer Anzeiger*, 1985, 365-450.

Lambraki, A., 1980. Le cipolin de la Karystie. Contribution à l'étude des marbres de la Grèce exploités aux époques romaine et paléochrétienne. *RA*, 1980, 31-62.

LSJ: H.G. Liddell, R. Scott, Sir. H.S. Jones. 1940. *A Greek-English Lexicon*, 9th edition Oxford: At the Clarendon.

Masson, O., 1990. Les noms des esclaves dans la Grèce antique. In: Onomastica Graeca Selecta I, introduction and index by Catherine Dobias and Laurent Dubois, Paris, 147-161.

Mikrogiannakis, E., 1992. *Παθολογία πολιτευμάτων στην αρχαιότητα*, Αθήνα.

Orlandos, A. K., 1994. *Τα υλικά δομής των αρχαίων Ελλήνων και οι τρόποι εφαρμογής αυτών*. 2nd ed. Βιβλιοθήκη της εν Αθήναις Αρχαιολογικής Εταιρείας αριθ. 37, Η εν Αθήναις Αρχαιολογική Εταιρεία, Αθήναι.

Owen, B. R., Renaut, R.W., Stamatakis, M.G., 2011. Late Miocene lacustrine sedimentation in the Mytilinii Basin, Samos Island, Greece. *J. Paleolimnol*, 46, 151-166.

Palaiokrassa-Kopitsa, L., 2007. Η αρχαία πόλη – Επιγραφές και λαξεύματα στους βράχους. In: Παλαιοκρασσά – Κόπιτσα, Λ. (ed), *Παλαιόπολη Άνδρου. Είκοσι χρόνια ανασκαφικής έρευνας,* Αθήνα, 41-43.

Papadakis, N. P., 1983. Κάβο Σίδερος. *ArchDelt* 38, Β΄2 – Χρονικά, 381-384.

Patroudakis, G., 2004a. Ο Λαβύρινθος του μυστηρίου και της λήθης. *Κρητικό Πανόραμα* 3, Φεβρουάριος – Μάρτιος 2004, 20-65.

Patroudakis, G., 2004b. Τα μυστικά του Λαβυρίνθου. *Κρητικό Πανόραμα* 4, Μάιος – Ιούνιος 2004, 50-67.

Pausaniou Hellados Periēgēsis, Books 9 and 10 (Βοιωτικά και Φωκικά), Nikolaos D. Papachatzis (ed). 1992. Vol. 5. Ekdotike Athenon S.A., Athens.

Petrocheilou, A., 1990. Σπήλαιο «Λαβύρινθος» Γόρτυνος Ηρακλείου Κρήτης. *Πεπραγμένα του ΣΤ΄ Διεθνούς Κρητολογικού Συνεδρίου*, Χανιά, 99-106.

Pococke, R., 1745. *A Description of the East, and Some Other Countries*, Vol. II, Part II. London.

Raab, H. A., 2001. Rural Settlement in Hellenistic and Roman Crete. The Akrotiri Peninsula, BAR International Series 984.

RE: Pauly, A., Wissowa, G., Real-Encyclopädie der Classischen Altertumswissenschaft (1893-1978).

Reuther, O., 1957. Der Heratempel von Samos: Der Bau seit der Zeit des Polykrates. Mann, Berlin.

Rice, E.E., 1995. Grottoes on the Acropolis of Hellenistic Rhodes. *BSA*, 90, 383-404.

Schörner, G., Goette H.R., 2004. *Die Pan-Grotte von Vari*. Von Zabern, Mainz am Rhein.

Shaw, J. W., 1971. Minoan Architecture: Materials and Techniques, *ASAtene* 49.

Solin, H., 2008. Zur Herkunft der römischen Sklaven (zugleich eine Ergänzung von M. Bang, Die Herkunft der römischen Sklaven, 1910). In: Heinen, H. (Ed), *Menschenraub, Menschenhandel und Sklaverei in antiker und moderner Perspective: Ergebnisse des Mitarbeitertreffens des Akademievorhabens Forschungen zur antiken Sklaverei, Mainz, 10. Oktober 2006*, Forschungen zur antiken Sklaverei 37, Steiner Verlag, Stuttgart, 99-130.

Spratt, T. A. B. Captain., 1865. *Travels and researches in Crete*, vol. 1-2. J. van Voorst, London.

Stamatakis, M. G., Zagkouroglou, K., 1984. On the occurrence of Ni in Samos Island, Greece. *Mineral Wealth*, 33, 17-26.

Stamatakis, M. G., 1990. Building stones from the ancient quarries of Agiades area, Samos Island, Greece. In: Marinos, P., Koukis, G. (Eds), The engineering geology of ancient works, monuments and historical sites - Preservation and Protection, Vol. 4, Balkema, Rotterdam, 2043-2047.

Stamatiadēs, E. I., 1866. *Σαμιακά, ήτοι ιστορία της νήσου Σάμου από των πανάρχαιων χρόνων μέχρι των καθ' ημάς*, τόμος IV. Εν Σάμω: εκ του ηγεμονικού τυπογραφείου.

Stampolidis, N. Chr., 2004. Η πόλη. Δυτικός ανασκαφικός τομέας ΙΙΙ. In: Stampolidis, N. Chr. (Ed), *Eleutherna. City-Acropolis-Necropolis*, Athens, 82-103. (In Greek)

Στράβωνος Γεωγραφικών Ι΄- The Geography of Strabo, Book X, with an English Translation by H.L. Jones, vol. V, The Loeb Classical Library (1961).

Tölle-Kastenbein, R., 1976. Herodot und Samos. Duris Verlag, Bochum.

Tournefort, J. P. de., 1727. *Relation d' un voyage du Levant fait par ordre du Roy*, t. I-II. A, Chez de Freres Bruyset, Lyon (Google eBook).

Tsakos, K., 1977. Επιγραφές Σάμου Ι. *ArchDelt* 32, Μέρος Α΄- Μελέται, 70-79.

Tsakos, K., 2006. Σάμος, αρχαία πόλη: Νεότερα από το δυτικό μέτωπο της οχύρωσης. In: Σταμπολίδης, Ν. Χρ., *Γενέθλιον: Αναμνηστικός τόμος για την συμπλήρωση είκοσι χρόνων λειτουργίας του Μουσείου Κυκλαδικής Τέχνης,* Ίδρυμα Ν.Π. Γουλανδρή – Μουσείο Κυκλαδικής Τέχνης, Αθήνα, 295-303.

Tziligkaki, E. K., 2013. The pathology of constitutions. The case of Samos. In: *Geological Setting, Mineral Resources and ancient works. Training School of Samos and adjacent islands of the Aegean Sea, 26-30 August 2013, Karlovassi, Samos Island, Greece*, Proceedings, 143-146.

Tziligkaki, E. K., 2014. *The ancient quarries of Crete*, Faculty of Letters, Ph.D. Thesis, University of Crete, Rethymno, 937 p. (in Greek).

Vlastaridis, I., Evelpidou, N.. *(s.d.).* Cultural aspects. In: Evelpidou, N., Vassilopoulos, A., Darlas, A., *Caves. Natural and Manmade Underground European Heritage*, North East South West INTERREG IIIC, Papasotiriou Publications, Athens, 58-62.

Waldbaum, J. C., 1983. Metalwork from Sardis: The finds through 1974. *Archaeological Exploration of Sardis* 8. Harvard University Press.

Wiegand, G. (Ed). 1970., Halbmond im letzten Viertel. Briefe und Reiseberichte aus der alten Türkei von Theodor und Marie Wiegand, 1895 bis 1918. Bruckmann, München.

Younes, A., Ouaja, M., 2009., The ancient Underground Quarries between Sullecthum and Leptiminus. In: Jockey 2009, 229-237.

Zamani, A., Maroukian, H., 1981. A morphotectonic investigation in northwestern Crete: The peninsula of Akrotiri. *Z.Geomorph.N.F.*, Suppl. Bd.40, 151-164.

Zelnick – Abramovitz, R., 2005. Not wholly free. The concept of manumission and the status of manumitted slaves in the ancient Greek world. Mnemosyne Suppl. 266. Brill, Leiden-Boston.

Zoupis, K., 1998. Αρχαίο λατομείο Γόρτυνος. Σπήλαιο ‘Λαβύρινθος’ Ηρακλείου Κρήτης. In: *Άνθρωπος και Σπηλαιοπεριβάλλον. Α΄ Πανελλήνιο Σπηλαιολογικό Συνέδριο, 26-29 Νοεμβρίου 1992,* Πρακτικά, (Αθήνα), ΥΠ.ΠΟ-Δημοσιεύματα του Αρχ/κού Δελτίου αρ. 68, 161—164.