

Types of schist used in buildings of Minoan Crete*

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ABSTRACT: A type of bluish – green schist slabs was used for paving courts, floors, streets, in the first New Palace Period (1650-1600 BC) in important buildings of North-central Crete. The north court of the Mansion in Nirou Chani is covered with slabs of that type with the difference that their shade is bluer. A provenance of the material from the area of Agia Pelagia Maleviziou (Herakleion Prefecture) is suggested according to macroscopic observations and archaeological evidence for the occupation of this site since Minoan times. Another type of green schist from Mathia Pedidos, probably extracted in Minoan times in the form of rectangular slabs, is presented as well.

Key-words: Blue schist, green schist, Phyllites - quartzites series, Minoan Crete, Herakleion Prefecture.

ΠΕΡΙΛΗΨΗ: Ένα είδος κυανωπών – πράσινων σχιστολιθικών πλακών είχε εφαρμοστεί σε επιστρώσεις αυλών, δαπέδων, δρόμων κατά την πρώτη νεοανακτορική περίοδο (1650-1600 π.Χ.) σε σημαντικά κτήρια της βορειο-κεντρικής Κρήτης. Η βόρεια αυλή του Μεγάρου στο Νίρου Χάνι καλύπτεται με πλάκες αυτού του τύπου με τη διαφορά ότι η απόχρωσή τους είναι πιο κυανή. Στην παρούσα εργασία προτείνεται η προέλευση αυτού του υλικού από την περιοχή της Αγίας Πελαγίας Μαλεβιζίου (Νομός Ηρακλείου) βάσει μακροσκοπικών παρατηρήσεων και των αρχαιολογικών ευρημάτων που μαρτυρούν την κατοίκηση του χώρου ήδη από την Μινωική περίοδο. Επιπροσθέτως παρουσιάζεται ένα είδος πράσινου σχιστολίθου από τη Μαθιά Πεδιάδος, για τον οποίον εικάζεται ότι ελατομείτο κατά τη Μινωική περίοδο υπό τη μορφή ορθογωνίων πλακών.

Λέξεις – κλειδιά: κυανός σχιστόλιθος, πράσινος σχιστόλιθος, Σειρά φυλλιτών – χαλαζιτών, μινωική Κρήτη, Νομός Ηρακλείου.

THE ARCHAEOLOGICAL EVIDENCE

The Minoan mansion at *Nirou Chani*, also known as “Megaron Nirou”, at the site Almyrides, a few kilometers east of Herakleion at the north coast of Crete (Fig. 1), was first built during the MM III period and destroyed in LM IB (XANTHOUIDĒS, 1922). Megaron Nirou is usually wrongly interpreted as an isolated mansion, but it is in fact one of the buildings of an unexplored settlement (ZOIS, 1998, p. 73) with seaport, market and cemetery (XANTHOUIDĒS, 1922; XANTHOUIDĒS, 1924; MARINATOS, 1925-26).

The northern and eastern courtyard was paved with irregularly shaped slabs of friable bluish schist “fetched from far away”, according to Xanthouidēs’ remark (XANTHOUIDĒS, 1919; XANTHOUIDĒS, 1922), Figs 2-3. Many pieces of bluish schists (*φυλλάδες*) were found in two piles in the “artist’s workshop” or “Sanctuary”, as well as in the interior of a clay *hydria* (XANTHOUIDĒS, 1922). These pieces were probably used for the preparation of blue or gray color or for some other technical work (XANTHOUIDĒS, 1922).

The general view of the courtyards at Megaron Nirou is certainly of blue- dark gray color, but this does not mean that every schist slab is of this particular shade; green schist slabs intrude sporadically as well. They macroscopically look like the schist slabs from Karystos. Thin bands of milky quartz appear in some layers. The soapy texture is indicative of the presence of talc.

The German archaeologists who studied the “Villa of the Lilies” in *Amnisos* describe the schist slabs used for the pave-

ments as “green to brown” (SCHÄFER, 1992), although P. Knoblauch correctly refers to them in the plan of the Villa published in the same edition as “original blue schist slabs” (SCHÄFER, 1992). In fact, their color is more greenish than those used in Nirou Chani.

A little further to the south, in central Crete, blue and red schist was used in the “palace-building” of *Archanes* for the covering of floors, roofs, and stairways (SAKELLARAKIS & SAPOUNA-SAKELLARAKI, 1997).

A small pavement of bluish-greenish schist slabs is still visible in the southwest section of the Minoan villa at *Vathy-petro*, situated beyond Archanes, to the south (SHAW, 1971; DRIESSEN & SAKELLARAKIS, 1997).

Arthur EVANS (1928a, p. 281 note 4. Also EVANS 1928b, p. 683) notes that slabs of greenish blue schist were very much in fashion in the end of MM III and the beginning of LM I period. Apart from Nirou Chani, he mentions examples from *Knossos* itself, where irregular slabs of blue-green schist were used in pavements as the underlying material of painted stucco (EVANS, 1928b, p. 683). It should be noted, however, that A. Evans does not differentiate green schist from greenish-blue schist slabs in his reports (EVANS, 1928b, p. 683, 812).

APPEARANCES OF BLUE SCHIST ON CRETE

Could the bluish shade of the pavement slabs in “Megaron Nirou” imply an import from Cyclades, for instance? The geographical position of the port directly to the south of Cy-

* Είδη σχιστολίθου που χρησιμοποιήθηκαν σε κτήρια της Μινωικής Κρήτης

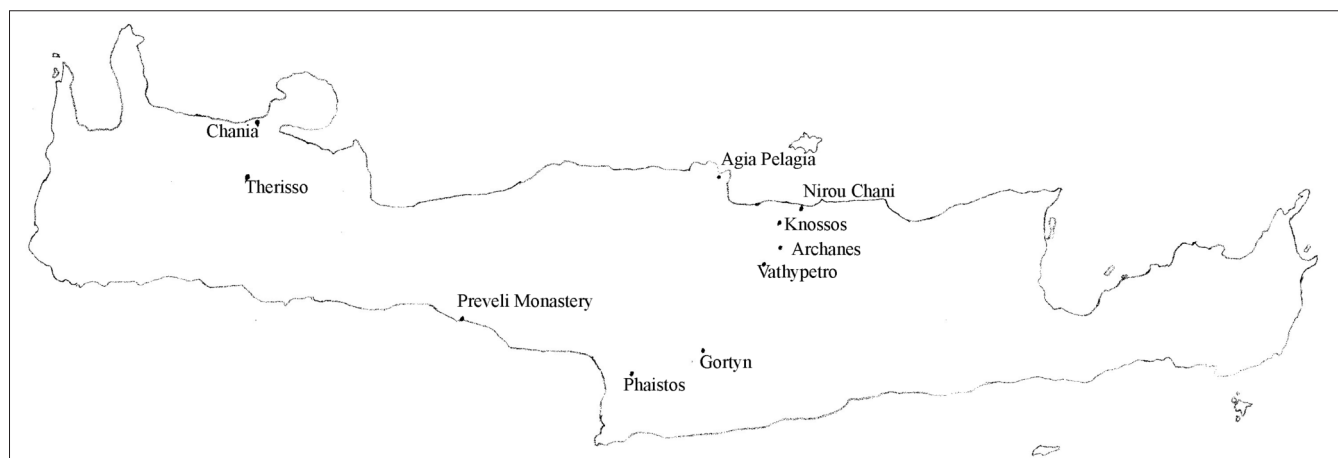


Fig. 1. Map of Crete.

clades makes such an hypothesis sound very tempting, but one should first consider that a correlation between the blueschists of the Arna Unit (Peloponnesus – Crete) and those of Cyclades show that they share many common lithologic, tectonic and metamorphic features (PAPANIKOLAOU & SKARPELIS, 1987-1988). Which area had XANTHOUDIDĒS (1922) in mind when he wrote that the blue schist slabs were brought from far away?

Blue schist (meta-basalt with glaucophane – lawsonite) appears in *Western Crete* (SCHUBERT & SEIDEL, 1972; SEIDEL *et al.*, 1975), north and west of Lefka Orē (White Mountains) in the Chania Prefecture in the area of Palaia Roumata, Lakkoī, Meskla, Therisson, Agia, Fig. 1 (SCHUBERT & SEIDEL, 1972). The glaucophane rocks are derived from alkali-olivine basalts of the oceanic type by high-pressure, low-temperature metamorphism (SCHUBERT & SEIDEL, 1972. SEIDEL *et al.*, 1975).

A significant appearance of blue schist can also be detected in the *southern coast* of Rethymnon Prefecture, at Plakias, as well as 2 km after the crossroad that leads to the beach of *Prevelē* (Fig. 1), a small distance before the old bridge (FASOULAS, 2000). The latter locality contains glaucophane – epidote (SEIDEL *et al.*, 1975).

THE TYPE OF SCHIST AT ACHLADA AND AGIA PELAGIA MALEVIZIOU

According to EPTING (1969) the phyllites in the western part of Talaia Orē consist mainly of brown or gray quartz- and mica phyllites, whereas in the eastern part (the area of the present research) olive green chlorite schist and albite – quartz phyllite prevail. Macroscopically, the chloritoid – bearing metapelites are characterized by a marked schistosity and the typical phyllitic lustre on the s-planes, the color varying from greenish silver to dark gray (SEIDEL *et al.*, 1975). SEIDEL *et al.* (1975) epigrammatically refer to chloritoid – bearing schists within the phyllite-quartzite series near *Rhogdia*, west of the city of Herakleion (Fig. 4).

During the excavations at Knossos in the early 20th cen-

tury, the workmen recognized the irregular slabs of “green schist” as the material “still extracted from quarries at *Rogdeà*, west of Candia” (EVANS, 1935, p. 992). In fact, both A. Evans and N. Platon obtained material from this area in order to restore lacunae in the pavements at Knossos (EVANS, 1935, p. 992 note 1; SHAW, 1971).

The prevailing color of the type of schist that appears in the village of *Rhogdia* is brown, not to mention that it is so friable that it is rendered unsuitable for pavements (Fig. 5). Elderly villagers confirm that there is no blue stone around *Rhogdia*; on the contrary, it is found in the nearby village of *Achlada*, in the conjecture to *Agia Pelagia*. In fact, PLATAKIS (1981) and PLATAKIS (1974) lists the popular name *blavopectra* (*i.e.* blue stone) in the area of *Achlada* used for the denomination of a greenish to bluish phyllite of the lower Triassic period, whose main mineral component is quartz. EPTING (1969) refers to them as “light green”. They are schists of sedimentary clastic origin such as: micaceous-quartzose, feldspar-quartzose-muscovitic, feldspar-quartzose-muscovitic-chloritic, carbonate, chloritic – carbonate, with microcrystalline texture and schistose structure parallelly oriented (VIDAKIS & MEULENKAMP, 1996). This type of schist is so abundant in *Achlada* that it is the building material for stone fences in the terraced fields (Fig. 6: at the exit of the village towards *Fodele*).

The color and texture of the schist slabs used in “*Megaron Nirou*” find their equivalent –at least macroscopically- in an outcrop which is visible in a road-cut directing to the bay of *Agia Pelagia* after one has entered the second exit of the national road towards *Agia Pelagia*. Color variations from green to blue –even light silver- appear in the same layer, 87m. above sea-level (Fig. 7, Fig. 4 point 1. Coordinates according to EGSA 87: 0591887, 3918786). Bands of milky quartz are visible between the layers of schist.

This shade of color in these rocks is characteristic in the picturesque view of the bay of *Agia Pelagia*, a famous modern summer resort that was inhabited since Minoan times. Sherds dating from LM I onwards, Mycenaean walls, classical and Hellenistic buildings indicate a continuous occupa-

tion of the site and a constant use of the local stone down to Roman times, if we judge from an inscribed schist grave *stele* (ALEXIOU, 1972). At the rocky promontory of *Souda*, ALEXIOU (1972) observed sections in the schist rocks for the leveling of small areas. The Capsis Hotel now occupies this promontory. According to the aforementioned, Achlada and Agia Pelagia seem to be the appropriate candidates for the extraction of schist in Minoan times (see also ALEXIOU, 1972).

THE TYPE OF GREEN SCHIST AT MATHIA PEDIDADOS

Quite different is the green schist found west of the village of Mathia (site *Γραν – Ελιά, Gran-Elia*) in the Herakleion Prefecture, a sample of which was handed to me by a friendly old lady in Mathia who had recently coated the exterior of her house by this local stone (Fig. 8). According to the locals, the site is far away from the village at a lower altitude, beyond the site of *Korakies*, and approached by cart track. Modern contractors exploit the site for its material, but it is highly probable that this stone has been used since MM IIIB/LMIA period in the form of rectangular slabs for the paving of a raised causeway at the “Central Building” in *Kastelli Pedidados* (RETHEMIOTAKIS, 1992-93). The Minoan occupation of Mathia is testified by Middle Minoan *pithos* burials at the site of *Stavroplaka*, and by an important settlement at the site of *Kataleimmata* first inhabited during the Late Minoan I period (PLATON, 1957).

According to the Geological Map of Greece (VIDAKIS *et al.*, 1989) there is a unit of the Phyllites- Quartzites series (P-Ts.ph) in the area of *Amariano* and up north to *Tzigounas*, to which phyllites, quartzites and sericitic schists are attributed. These are intercalated with the “platy limestones” or the metaflysch and the carbonate rocks of Tripolis zone. Dominant are mica-carbonate schists with micro-schist with microcrystalline – lepidoblastic texture and compact, parallel oriented schistose structure (VIDAKIS *et al.*, 1989). They consist mainly of mica-hydromica and chlorite leaflets, in parallel order, wherein elongated calcite microcrystals are intercalated and in a smaller proportion quartz and feldspar crystals (VIDAKIS *et al.*, 1989).

CONCLUSIONS

The island of Crete offers a wide variety of building materials. Economy of time and expenditure inevitably turned the interest to the use of local stones, although aesthetic preference or fashion styles sometimes dictated the selection of a certain material for the construction of a building (compare for instance the case of the islet of Pseira in eastern Crete, MCENROE (1990). That would explain the use of green – bluish schist slabs in Archanes and Vathypetro, two sites that are quite distant from Achlada and Agia Pelagia. The constructors of “Megaron Nirou” or the “Villa of the Lilies” in Amnisos would obtain the bluish schist slabs by sea –both



Fig. 2. General view of the paved courtyard in “Megaron Nirou”.



Fig. 3. Detail of the paved courtyard in “Megaron Nirou”.



Fig. 4. Map of the area of Agia Pelagia (northern coast of Crete, Herakleion Prefecture).



Fig. 5. Rhodgia, hill in the northern exit of the village.



Fig. 6. Modern stone fence built of blue-green schist at the exit of Achlada towards Fodele.



Fig. 7. Outcrop of blue schist in a road-cut towards Agia Pelagia (see point 1 in Fig. 4).

sites being ports during the Minoan period-, while another port at the bay of Agia Pelagia would serve as the point from which the schist slabs would be carried in ships.

A more detailed survey of these areas combined with pet-



Fig. 8. Green schist slab from Mathia Pediados.

rographic analysis would yield safer results of the use of certain outcrops and the choice of the material. The variety of adjectives used by scholars for the color characterization of the schist type in Achlada and Agia Pelagia is illuminating about the variety of color shades that exist in the same outcrop. At least, this is what one deduces by the observation of the slabs of the court at Nirou Chani.

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