

# Polychromy in Larisaeon Quarries and its Relation to Architectural Conception

---

Mater, Gizem; Denktaş, Ertunç

Source / Izvornik: **ASMOSIA XI, Interdisciplinary Studies on Ancient Stone, Proceedings of the XI International Conference of ASMOSIA, 2018, 633 - 638**

Conference paper / Rad u zborniku

Publication status / Verzija rada: **Published version / Objavljena verzija rada (izdavačev PDF)**

<https://doi.org/10.31534/XI.asmosia.2015/05.03>

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:123:430073>

Rights / Prava: [In copyright](#)/[Zaštićeno autorskim pravom.](#)

Download date / Datum preuzimanja: **2025-01-02**



Repository / Repozitorij:

[FCEAG Repository - Repository of the Faculty of Civil Engineering, Architecture and Geodesy, University of Split](#)





# ASMOSIA XI

Interdisciplinary Studies on Ancient Stone

## PROCEEDINGS

of the XI ASMOSIA Conference, Split 2015

Edited by Daniela Matetić Poljak and Katja Marasović



Interdisciplinary Studies on Ancient Stone  
Proceedings of the XI ASMOSIA Conference (Split 2015)

Publishers:

ARTS ACADEMY IN SPLIT  
UNIVERSITY OF SPLIT

and

UNIVERSITY OF SPLIT  
FACULTY OF CIVIL ENGINEERING,  
ARCHITECTURE AND GEODESY

Technical editor:  
Kate Bošković

English language editor:  
Graham McMaster

Computer pre-press:  
Nikola Križanac

Cover design:  
Mladen Čulić

Cover page:

*Sigma shaped mensa of pavonazzetto marble from Diocletian's palace in Split*

ISBN 978-953-6617-49-4 (Arts Academy in Split)

ISBN 978-953-6116-75-1 (Faculty of Civil Engineering, Architecture and Geodesy)

e-ISBN 978-953-6617-51-7 (Arts Academy in Split)

e-ISBN 978-953-6116-79-9 (Faculty of Civil Engineering, Architecture and Geodesy)

CIP available at the digital catalogue of the University Library in Split, no 170529005

Association for the Study of Marble & Other Stones in Antiquity

# ASMOSIA XI

## Interdisciplinary Studies of Ancient Stone

Proceedings of the Eleventh International Conference of ASMOSIA,  
Split, 18–22 May 2015

Edited by  
Daniela Matetić Poljak  
Katja Marasović



Split, 2018

**Nota bene**

All papers are subjected to an international review.

The quality of the images relies on the quality of the originals provided by the authors.

# CONTENT

<b>PRESENTATION</b> .....	15
<b>NECROLOGY: NORMAN HERZ (1923-2013) by Susan Kane</b> .....	17
<b>1. APPLICATIONS TO SPECIFIC ARCHEOLOGICAL QUESTIONS – USE OF MARBLE</b>	
Hermaphrodites and Sleeping or Reclining Maenads: Production Centres and Quarry Marks <i>Patrizio Pensabene</i> .....	25
First Remarks about the Pavement of the Newly Discovered Mithraeum of the Colored Marbles at Ostia and New Investigations on Roman and Late Roman White and Colored Marbles from Insula IV, IX <i>Massimiliano David, Stefano Succi and Marcello Turci</i> .....	33
Alabaster. Quarrying and Trade in the Roman World: Evidence from Pompeii and Herculaneum <i>Simon J. Barker and Simona Perna</i> .....	45
Recent Work on the Stone at the Villa Arianna and the Villa San Marco (Castellammare di Stabia) and Their Context within the Vesuvian Area <i>Simon J. Barker and J. Clayton Fant</i> .....	65
Marble Wall Decorations from the Imperial Mausoleum (4 <sup>th</sup> C.) and the Basilica of San Lorenzo (5 <sup>th</sup> C.) in Milan: an Update on Colored Marbles in Late Antique Milan <i>Elisabetta Neri, Roberto Bugini and Silvia Gazzoli</i> .....	79
Sarcophagus Lids Sawn from their Chests <i>Dorothy H. Abramitis and John J. Herrmann</i> .....	89
The Re-Use of Monolithic Columns in the Invention and Persistence of Roman Architecture <i>Peter D. De Staebler</i> .....	95
The Trade in Small-Size Statues in the Roman Mediterranean: a Case Study from Alexandria <i>Patrizio Pensabene and Eleonora Gasparini</i> .....	101
The Marble Dedication of Komon, Son of Asklepiades, from Egypt: Material, Provenance, and Reinforcement of Meaning <i>Patricia A. Butz</i> .....	109
Multiple Reuse of Imported Marble Pedestals at Caesarea Maritima in Israel <i>Barbara Burrell</i> .....	117
Iasos and Iasian Marble between the Late Antique and Early Byzantine Eras <i>Diego Peirano</i> .....	123

Thassos, Known Inscriptions with New Data <i>Tony Kozelj and Manuela Wurch-Kozelj</i> .....	131
The Value of Marble in Roman <i>Hispalis</i> : Contextual, Typological and Lithological Analysis of an Assemblage of Large Architectural Elements Recovered at N° 17 Goyeneta Street (Seville, Spain) <i>Ruth Taylor, Oliva Rodríguez, Esther Ontiveros, María Luisa Loza, José Beltrán and Araceli Rodríguez</i> .....	143
<i>Giallo Antico</i> in Context. Distribution, Use and Commercial Actors According to New Stratigraphic Data from the Western Mediterranean (2 <sup>nd</sup> C. Bc – Late 1 <sup>st</sup> C. Ad) <i>Stefan Ardeleanu</i> .....	155
<i>Amethystus</i> : Ancient Properties and Iconographic Selection <i>Luigi Pedroni</i> .....	167
<b>2. PROVENANCE IDENTIFICATION I: (MARBLE)</b>	
Unraveling the Carrara – Göktepe Entanglement <i>Walter Prochaska, Donato Attanasio and Matthias Bruno</i> .....	175
The Marble of Roman Imperial Portraits <i>Donato Attanasio, Matthias Bruno, Walter Prochaska and Ali Bahadır Yavuz</i> .....	185
Tracing Alabaster (Gypsum or Anhydrite) Artwork Using Trace Element Analysis and a Multi-Isotope Approach (Sr, S, O) <i>Lise Leroux, Wolfram Kloppmann, Philippe Bromblet, Catherine Guerrot, Anthony H. Cooper, Pierre-Yves Le Pogam, Dominique Vingtain and Noel Worley</i> .....	195
Roman Monolithic Fountains and Thasian Marble <i>Annewies van den Hoek, Donato Attanasio and John J. Herrmann</i> .....	207
Archaeometric Analysis of the Alabaster Thresholds of Villa A, Oplontis (Torre Annunziata, Italy) and New Sr and Pb Isotopic Data for <i>Alabastro Ghiaccione del Circeo</i> <i>Simon J. Barker, Simona Perna, J. Clayton Fant, Lorenzo Lazzarini and Igor M. Villa</i> .....	215
Roman Villas of Lake Garda and the Occurrence of Coloured Marbles in the Western Part of “Regio X Venetia et Histria” (Northern Italy) <i>Roberto Bugini, Luisa Folli and Elisabetta Roffia</i> .....	231
Calcitic Marble from Thasos in the North Adriatic Basin: Ravenna, Aquileia, and Milan <i>John J. Herrmann, Robert H. Tykot and Annewies van den Hoek</i> .....	239
Characterisation of White Marble Objects from the Temple of Apollo and the House of Augustus (Palatine Hill, Rome) <i>Francesca Giustini, Mauro Brilli, Enrico Gallochio and Patrizio Pensabene</i> .....	247
Study and Archeometric Analysis of the Marble Elements Found in the Roman Theater at Aeclanum (Mirabella Eclano, Avellino - Italy) <i>Antonio Mesisca, Lorenzo Lazzarini, Stefano Cancelliere and Monica Salvadori</i> .....	255



Two Imperial Monuments in Puteoli: Use of Proconnesian Marble in the Domitianic and Trajanic Periods in Campania <i>Irene Bald Romano, Hans Rupprecht Goette, Donato Attanasio and Walter Prochaska</i> .....	267
Coloured Marbles in the Neapolitan Pavements (16 <sup>th</sup> And 17 <sup>th</sup> Centuries): the Church of <i>Santi Severino e Sossio</i> <i>Roberto Bugini, Luisa Folli and Martino Solito</i> .....	275
Roman and Early Byzantine Sarcophagi of Calcitic Marble from Thasos in Italy: Ostia and Siracusa <i>Donato Attanasio, John J. Herrmann, Robert H. Tykot and Annewies van den Hoek</i> .....	281
Revisiting the Origin and Destination of the Late Antique Marzamemi 'Church Wreck' Cargo <i>Justin Leidwanger, Scott H. Pike and Andrew Donnelly</i> .....	291
The Marbles of the Sculptures of Felix Romuliana in Serbia <i>Walter Prochaska and Maja Živić</i> .....	301
Calcitic Marble from Thasos and Proconnesos in Nea Anchialos (Thessaly) and Thessaloniki (Macedonia) <i>Vincent Barbin, John J. Herrmann, Aristotle Mentzos and Annewies van den Hoek</i> .....	311
Architectural Decoration of the Imperial Agora's Porticoes at Iasos <i>Fulvia Bianchi, Donato Attanasio and Walter Prochaska</i> .....	321
The Winged Victory of Samothrace - New Data on the Different Marbles Used for the Monument from the Sanctuary of the Great Gods <i>Annie Blanc, Philippe Blanc and Ludovic Laugier</i> .....	331
Polychrome Marbles from the Theatre of the Sanctuary of Apollo Pythios in Gortyna (Crete) <i>Jacopo Bonetto, Nicolò Mareso and Michele Bueno</i> .....	337
Paul the Silentary, Hagia Sophia, Onyx, Lydia, and Breccia Corallina <i>John J. Herrmann and Annewies van den Hoek</i> .....	345
Incrustations from Colonia Ulpia Traiana (Near Modern Xanten, Germany) <i>Vilma Ruppiniè and Ulrich Schüssler</i> .....	351
Stone Objects from Vindobona (Austria) – Petrological Characterization and Provenance of Local Stone in a Historico-Economical Setting <i>Andreas Rohatsch, Michaela Kronberger, Sophie Insulander, Martin Mosser and Barbara Hodits</i> .....	363
Marbles Discovered on the Site of the Forum of Vaison-la-Romaine (Vaucluse, France): Preliminary Results <i>Elsa Roux, Jean-Marc Mignon, Philippe Blanc and Annie Blanc</i> .....	373
Updated Characterisation of White Saint-Béat Marble. Discrimination Parameters from Classical Marbles <i>Hernando Royo Plumed, Pilar Lapeunte, José Antonio Cuchí, Mauro Brillì and Marie-Claire Savin</i> .....	379

Grey and Greyish Banded Marbles from the Estremoz Anticline in Lusitania <i>Pilar Lapuente, Trinidad Nogales-Basarrate, Hernando Royo Plumed, Mauro Brilli and Marie-Claire Savin</i> .....	391
New Data on Spanish Marbles: the Case of <i>Gallaecia</i> (NW Spain) <i>Anna Gutiérrez García-M., Hernando Royo Plumed and Silvia González Soutelo</i> .....	401
A New Roman Imperial Relief Said to Be from Southern Spain: Problems of Style, Iconography, and Marble Type in Determining Provenance <i>John Pollini, Pilar Lapuente, Trinidad Nogales-Basarrate and Jerry Podany</i> .....	413
Reuse of the <i>Marmorata</i> from the Late Roman Palatial Building at Carranque (Toledo, Spain) in the Visigothic Necropolis <i>Virginia García-Entero, Anna Gutiérrez García-M. and Sergio Vidal Álvarez</i> .....	427
Imperial Porphyry in Roman Britain <i>David F. Williams</i> .....	435
Recycling of Marble: Apollonia/Sozousa/Arsuf (Israel) as a Case Study <i>Moshe Fischer, Dimitris Tambakopoulos and Yannis Maniatis</i> .....	443
Thasian Connections Overseas: Sculpture in the Cyrene Museum (Libya) Made of Dolomitic Marble from Thasos <i>John J. Herrmann and Donato Attanasio</i> .....	457
Marble on Rome's Southwestern Frontier: Thamugadi and Lambaesis <i>Robert H. Tykot, Ouahiba Bouzidi, John J. Herrmann and Annewies van den Hoek</i> .....	467
Marble and Sculpture at Lepcis Magna (Tripolitania, Libya): a Preliminary Study Concerning Origin and Workshops <i>Luisa Musso, Laura Buccino, Matthias Bruno, Donato Attanasio and Walter Prochaska</i> .....	481
The Pentelic Marble in the Carnegie Museum of Art Hall of Sculpture, Pittsburgh, Pennsylvania <i>Albert D. Kollar</i> .....	491
Analysis of Classical Marble Sculptures in the Michael C. Carlos Museum, Emory University, Atlanta <i>Robert H. Tykot, John J. Herrmann, Renée Stein, Jasper Gaunt, Susan Blevins and Anne R. Skinner</i> .....	501
<b>3. PROVENANCE IDENTIFICATION II: (OTHER STONES)</b>	
Aphrodisias and the Regional Marble Trade. The <i>Scaenae Frons</i> of the Theatre at Nysa <i>Natalia Toma</i> .....	513
The Stones of Felix Romuliana (Gamzigrad, Serbia) <i>Bojan Djurić, Divna Jovanović, Stefan Pop Lazić and Walter Prochaska</i> .....	523
Aspects of Characterisation of Stone Monuments from Southern Pannonia <i>Branka Migotti</i> .....	537

The Budakalász Travertine Production <i>Bojan Djurić, Sándor Kele and Igor Rižnar</i> .....	545
Stone Monuments from Carnuntum and Surrounding Areas (Austria) – Petrological Characterization and Quarry Location in a Historical Context <i>Gabrielle Kremer, Isabella Kitz, Beatrix Moshhammer, Maria Heinrich and Erich Draganits</i> .....	557
Espejón Limestone and Conglomerate (Soria, Spain): Archaeometric Characterization, Quarrying and Use in Roman Times <i>Virginia García-Entero, Anna Gutiérrez García-M, Sergio Vidal Álvarez, María J. Peréx Agorreta and Eva Zarco Martínez</i> .....	567
The Use of Alcover Stone in Roman Times ( <i>Tarraco, Hispania Citerior</i> ). Contributions to the <i>Officina Lapidaria Tarraconensis</i> <i>Diana Gorostidi Pi, Jordi López Vilar and Anna Gutiérrez García-M.</i> .....	577
<b>4. ADVANCES IN PROVENANCE TECHNIQUES, METHODOLOGIES AND DATABASES</b>	
Grainautline – a Supervised Grain Boundary Extraction Tool Supported by Image Processing and Pattern Recognition <i>Kristóf Csorba, Lilla Barancsuk, Balázs Székely and Judit Zöldföldi</i> .....	587
A Database and GIS Project about Quarrying, Circulation and Use of Stone During the Roman Age in <i>Regio X - Venetia et Histria</i> . The Case Study of the Euganean Trachyte <i>Caterine Previato and Arturo Zara</i> .....	597
<b>5. QUARRIES AND GEOLOGY</b>	
The Distribution of Troad Granite Columns as Evidence for Reconstructing the Management of Their Production <i>Patrizio Pensabene, Javier Á. Domingo and Isabel Rodà</i> .....	613
Ancient Quarries and Stonemasonry in Northern Choria Considiana <i>Hale Güney</i> .....	621
Polychromy in Larisaeon Quarries and its Relation to Architectural Conception <i>Gizem Mater and Ertunç Denктаş</i> .....	633
Euromos of Caria: the Origin of an Hitherto Unknown Grey Veined Stepped Marble of Roman Antiquity <i>Matthias Bruno, Donato Attanasio, Walter Prochaska and Ali Bahadır Yavuz</i> .....	639
Unknown Painted Quarry Inscriptions from Bacakale at <i>Docimium</i> (Turkey) <i>Matthias Bruno</i> .....	651
The Green Schist Marble Stone of Jebel El Hairech (North West of Tunisia): a Multi-Analytical Approach and its Uses in Antiquity <i>Ameur Younès, Mohamed Gaied and Wissem Gallala</i> .....	659
Building Materials and the Ancient Quarries at <i>Thamugadi</i> (East of Algeria), Case Study: Sandstone and Limestone <i>Younès Rezkallah and Ramdane Marmi</i> .....	673

The Local Quarries of the Ancient Roman City of <i>Valeria</i> (Cuenca, Spain) <i>Javier Atienza Fuente</i> .....	683
The Stone and Ancient Quarries of Montjuïc Mountain (Barcelona, Spain) <i>Aureli Álvarez</i> .....	693
<i>Notae Lapidinarum</i> : Preliminary Considerations about the Quarry Marks from the Provincial Forum of <i>Tarraco</i> <i>Maria Serena Vinci</i> .....	699
The Different Steps of the Rough-Hewing on a Monumental Sculpture at the Greek Archaic Period: the Unfinished Kouros of Thasos <i>Danièle Braunstein</i> .....	711
A Review of Copying Techniques in Greco-Roman Sculpture <i>Séverine Moureaud</i> .....	717
Labour Forces at Imperial Quarries <i>Ben Russell</i> .....	733
Social Position of Craftsmen inside the Stone and Marble Processing Trades in the Light of Diocletian's Edict on Prices <i>Krešimir Bosnić and Branko Matulić</i> .....	741
<b>6. STONE PROPERTIES, WEATHERING EFFECTS AND RESTORATION, AS RELATED TO DIAGNOSIS PROBLEMS, MATCHING OF STONE FRAGMENTS AND AUTHENTICITY</b>	
Methods of Consolidation and Protection of Pentelic Marble <i>Maria Apostolopoulou, Elissavet Drakopoulou, Maria Karoglou and Asterios Bakolas</i> .....	749
<b>7. PIGMENTS AND PAINTINGS ON MARBLE</b>	
Painting and Sculpture Conservation in Two Gallo-Roman Temples in Picardy (France): Champlieu and Pont-Sainte-Maxence <i>Véronique Brunet-Gaston and Christophe Gaston</i> .....	763
The Use of Colour on Roman Marble Sarcophagi <i>Eliana Siotto</i> .....	773
New Evidence for Ancient Gilding and Historic Restorations on a Portrait of Antinous in the San Antonio Museum of Art <i>Jessica Powers, Mark Abbe, Michelle Bushey and Scott H. Pike</i> .....	783
Schists and Pigments from Ancient Swat (Khyber Pukhtunkhwa, Pakistan) <i>Francesco Mariottini, Gianluca Vignaroli, Maurizio Mariottini and Mauro Roma</i> .....	793
<b>8. SPECIAL THEME SESSION: „THE USE OF MARBLE AND LIMESTONE IN THE ADRIATIC BASIN IN ANTIQUITY”</b>	
Marble Sarcophagi of Roman Dalmatia Material – Provenance – Workmanship <i>Guntram Koch</i> .....	809

Funerary Monuments and Quarry Management in Middle Dalmatia <i>Nenad Cambi</i> .....	827
Marble Revetments of Diocletian's Palace <i>Katja Marasović and Vinka Marinković</i> .....	839
The Use of Limestones as Construction Materials for the Mosaics of Diocletian's Palace <i>Branko Matulić, Domagoj Mudronja and Krešimir Bosnić</i> .....	855
Restoration of the Peristyle of Diocletian's Palace in Split <i>Goran Nikšić</i> .....	863
Marble Slabs Used at the Archaeological Site of Sorna near Poreč Istria – Croatia <i>Đeni Gobić-Bravar</i> .....	871
Ancient Marbles from the Villa in Verige Bay, Brijuni Island, Croatia <i>Mira Pavletić and Đeni Gobić-Bravar</i> .....	879
Notes on Early Christian Ambos and Altars in the Light of some Fragments from the Islands of Pag and Rab <i>Mirja Jarak</i> .....	887
The Marbles in the Chapel of the Blessed John of Trogir in the Cathedral of St. Lawrence at Trogir <i>Đeni Gobić-Bravar and Daniela Matetić Poljak</i> .....	899
The Use of Limestone in the Roman Province of Dalmatia <i>Edisa Lozić and Igor Rižnar</i> .....	915
The Extraction and Use of Limestone in Istria in Antiquity <i>Klara Buršić-Matijašić and Robert Matijašić</i> .....	925
Aurisina Limestone in the Roman Age: from Karst Quarries to the Cities of the Adriatic Basin <i>Caterina Previato</i> .....	933
The Remains of Infrastructural Facilities of the Ancient Quarries on Zadar Islands (Croatia) <i>Mate Parica</i> .....	941
The Impact of Local Geomorphological and Geological Features of the Area for the Construction of the Burnum Amphitheatre <i>Miroslav Glavičić and Uroš Stepišnik</i> .....	951
Roman Quarry Klis Kosa near Salona <i>Ivan Alduk</i> .....	957
Marmore Lavdata Brattia <i>Miona Miliša and Vinka Marinković</i> .....	963
Quarries of the Lumbarda Archipelago <i>Ivka Lipanović and Vinka Marinković</i> .....	979

Island of Korčula – Importer and Exporter of Stone in Antiquity <i>Mate Parica and Igor Borzić</i> .....	985
Faux Marbling Motifs in Early Christian Frescoes in Central and South Dalmatia: Preliminary Report <i>Tonči Borovac, Antonija Gluhan and Nikola Radošević</i> .....	995
<b>INDEX OF AUTHORS</b> .....	1009

## POLYCHROMY IN LARISAEAN QUARRIES AND ITS RELATION TO ARCHITECTURAL CONCEPTION

Gizem Mater and Ertunç Denktas

Istanbul Technical University, Istanbul, Turkey (matergizem@gmail.com; ertuncdenktas@yahoo.com)

### Abstract

The architectural remains of Larisa (Buruncuk) display a skillful stone carving practice based on predominantly andesite (occasionally also basalt), tuff and limestone. Color scale ranging between bluish-grey and reddish-brown can be observed at ancient local quarries. Larisaeen architecture is outstanding in using masonry blocks showing the different colors presented by the site's quarries. Late archaic buildings in particular show a vivid combination of andesite blocks. Only at "Tower I" is it possible to assume that the decorative purpose is in the foreground. At others, with randomly placed colored blocks, the efficient use of quarries must have played the primary role. Colorfully painted architectural terracotta plates once decorated the buildings of Larisa, applied on mud brick walls strengthened with timber. The use of multi-colored andesite blocks (and others inserted), thus perfectly matches this special archaic conception in architecture, which illustrates the taste of archaic Greek art for polychromy.

### Keywords

polychromy, andesite quarries, Archaic

The earliest field studies on the settlement known as Larisa, situated on a hill east of Buruncuk-Izmir started in 1902 with a joint German-Swedish undertaking. Johannes Boehlau and Lennart Kjellberg conducted the excavations in Larisa with the aim of shedding light on the early stages of Greek art. The fieldworks terminated after three further campaigns conducted between 1932 and 1934. After these campaigns and further studies in Istanbul Archaeological Museums, "Larisa am Hermos" the major volumes on the results of the Larisa excavations were published by Boehlau and Schefold in 1940-42.

During the excavations many buildings on the acropolis were documented. Besides various architectural stone pieces, painted terracotta plates with reliefs depicting chariot races, symposium and hunting scenes, plates with floral-geometric ornamentation and roofing elements were found. These groups of finds are dated to

the timespan from the 7<sup>th</sup> to the 5<sup>th</sup> centuries BC. Most of the architectural stone pieces, including Aeolic capitals, small finds and a considerable part of the terracotta plates are preserved in Istanbul Archaeological Museums, whereas other groups of finds are kept in Izmir (as well as in Sweden and Germany).

Since 2010, the Larisa architectural-archaeological survey has been carried out under the direction of Prof. Turgut Saner from Istanbul Technical University with the permission and support of the Turkish Ministry of Culture and Tourism.<sup>1</sup> The studies focus on Larisa West (acropolis and settlement area, including necropolis), the fort settlement of Larisa East, and the monumental building on the Koca Tepe hill on the level of the Hermos plain. The new research focuses intensively on documentation of the settlement patterns and architecture in Larisa.

Fieldworks at Larisa also address ancient quarrying activities.<sup>2</sup> The location of quarries and the stone extraction techniques are being documented by the identification of traces left on the solid bedrock and on building blocks (Fig. 1). The subject matter of color also presents some problems that the research addresses. Several walls in Larisa are constructed with the use of blocks of different colors. The preserved examples on site display surfaces somewhat comparable to patchwork. The question that is introduced here relates to whether this practice is based on a practical or a decorative intention.

On the rock surfaces at the slopes of the hill where Larisa West settlement is founded, the presence of ancient quarries with traces of stone extraction has been identified. Some areas were still actively used in

1 SANER 2016, 61-93.

2 The ancient quarrying activities in Larisa including the remains of quarries and numerous traces of extraction are currently (2018) being studied by Gizem Mater in her doctoral dissertation (ITU Institute of Social Sciences Art History Program). In spite of the accuracy of the observations and the richness of already collected data, the classification of extraction traces according to form, size and the way of placing, which is presented here will surely need to be revised.

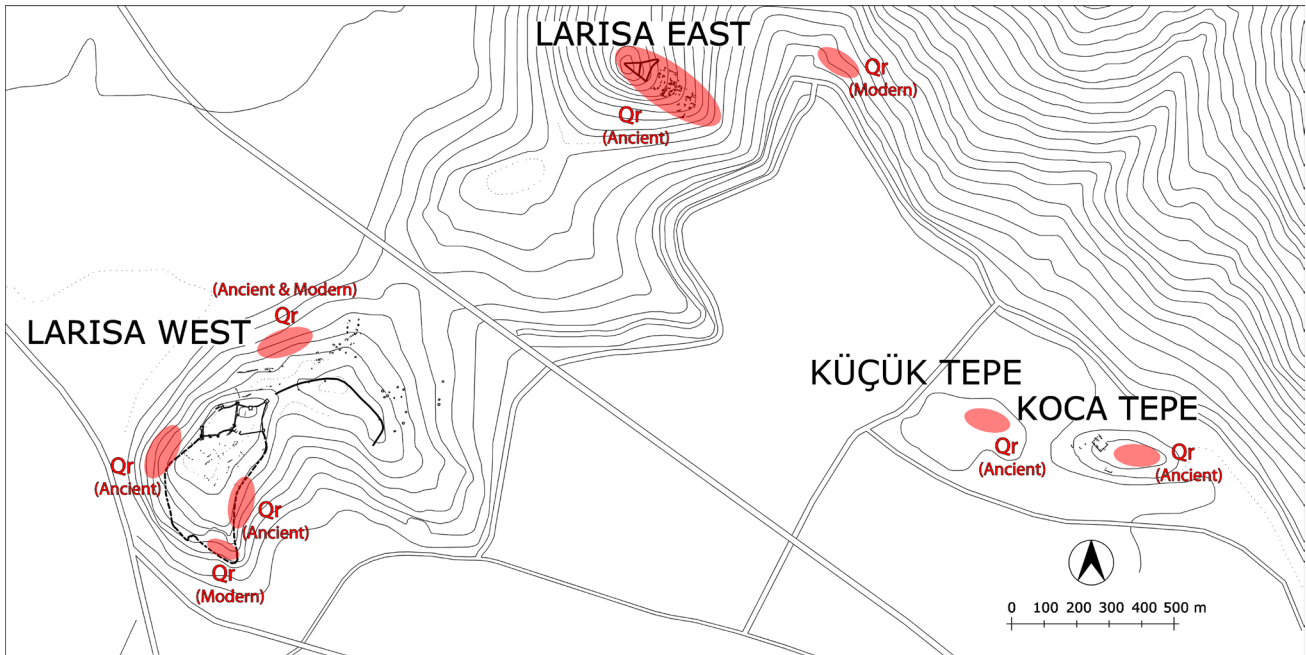


Fig. 1. Location of ancient and modern andesite quarries in Larisa (photo: © Archive of Larisa)



Fig. 2. Main ancient quarry area on the south-eastern slopes of the acropolis in Larisa West (photo: © Archive of Larisa)

contemporary times, that is in the 1970s (or earlier), and these activities unfortunately damaged the ancient traces. The larger quarry, which presents a lot of ancient traces on - the southeast of the hill where the extensive urban area is located, is one of the main quarry areas (Fig. 2). There are also remnants of recent quarrying activities on the north (Fig. 3); but were abandoned forty years ago. Above these northern quarries, on higher levels, there are traces of ancient working still to be identified. There might also be quarries opened in ancient periods on other hillsides, and these areas will be examined in detail in the next surveys. On the site of Larisa East, larger or smaller clusters of natural rock were simply used as quarries for the construction of the fort and dwellings on the terraces. Almost all smaller solid rocks on the surface were used for that purpose. These spots in and around the settlements were obviously considered the most convenient for transportation.

Andesite, which is the local stone of Larisa and the neighboring region, was acquired from these quarries. As it is known, andesite is categorized in the group of igneous rocks and it is a volcanic stone formed in the third geological period. In the Aegean region, where Larisa is situated, this formation is very frequently encountered. Inherently andesite is hard and resistant to deterioration, and thus it is rather difficult to work. Just as in Larisa in some other neighboring ancient settlements as well (for example Kyme, Phokaia and Gryneion) andesite was used in the construction of various edifices, especially of city walls.

There are high amounts of iron and magnesium minerals in andesite. These minerals give andesite its





Fig. 3. Main ancient quarry area on the northern slopes of the acropolis in Larisa West (photo: © Archive of Larisa)

color in accordance with their concentrations.<sup>3</sup> While magnesium darkens the color of the stone, making it blacker, iron gives it a red color. Iron minerals give different colors in the same way. Magnetite mineral gives a dark or blackish color; hematite gives red, and limonite imparts a yellowish color.<sup>4</sup> Sometimes, the colors of andesite rocks may diversify with the co-existence of these minerals.

Andesite blocks from Larisa quarries appear in a diversity of colors. The colors of stones vary over a large scale, appearing generally in bluish-grey, reddish-brown, and sometimes even different tones of pink and violet; plus a dark basaltic version. Observations on site have shown that this diversity of colors does not refer to a distinction between quarries; stones with all basic color groups may appear at one and the same quarry (Fig. 4). Even though, in the western city area different colors of andesite are found at one and the same quarry, in the eastern area the reddish brown version can predominantly be seen in quarries and edifices.

3 ZIM, SCHAFFER 1962, 116.

4 ZIM, SCHAFFER 1962, 41.



Fig. 4. Diverse color layers in the same quarry in Larisa West (photo: © Archive of Larisa)



Fig. 5. Wedge-holes on a vertical rock surface before splitting in the south-eastern quarry in Larisa West (photo: © Archive of Larisa)

Generally, two types of splitting holes in terms of quarrying method can be identified on surfaces; narrow strip-like holes and wider-and-regularly carved holes. The narrow ones can be presented in two groups considering the length. In several cases, one single line about 20-30 cm long (or longer), 1-2 cm wide and about 3 cm deep is seen on the surface. These openings obviously served for the splitting of smaller or middle size blocks from the rock. Some of them can be considered a preliminary stage for the opening of smaller holes on the surface. On the other hand, there are hundreds of cases on site where a row of smaller rectangular holes is set into the surface of the rock to enable the splitting. These wedge holes are about 8-12 cm long, 1-2 cm wide and 3-5 cm deep (Fig. 5).

As for the architecture in Larisa: the area that can be defined as the “acropolis” at Larisa West is the residence of a local tyrant housing a palace, a Megaron, a temple, and related buildings. A late archaic defense line, which is dated to the beginning of the 5<sup>th</sup> century BC, surrounds this area with eight towers and a wide



Fig. 6. The outer wall construction of the bulwark (photo: © Archive of Larisa)

bulwark.<sup>5</sup> The late archaic circuit of the acropolis displays one of the remarkable practices of polygonal masonry works in Greek defense architecture. “Lesbian masonry”, which consists of polygonal blocks with curvilinear edges, can be observed in the rising parts of the walls. The bases of the defense walls rest on bedrock and their front façades are composed of roughly carved large blocks with no special surface treatment. On the base, a double-shelled reddish-brown wall of andesite blocks with chiseled surface is constructed. Occasionally the walls rise over the blocks, which protrude from the curtain wall slightly. These blocks act like a *euthynteria* as in temple architecture that provides a *toichobat* for the rising parts of the defense wall.<sup>6</sup>

One of the most remarkable characteristics of the walls of buildings and defense structures is that they have multi-colored masonry. This diversity is acquired by using andesite blocks of different colors and tones together within the walls. Within the random arrangement of stones it has been shown that stones in both basic tones of color are used together. These are bluish-grey and reddish-brown. This practice is probably related to practical reasons rather than decorative concerns. In other words, effective usage of quarries with a minimum loss of material was the main concern.

Tower I on the western slope and bulwark are the sectors of late archaic circuit where construction data can be obtained and most striking examples of usage of different colored andesite can be found. The outer wall construction of the bulwark shows close similarities with



Fig. 7. Tower I of the late archaic circuit on the acropolis (photo: © Archive of Larisa)

the other sectors of walls. Elaborately worked “coursed polygonal masonry” resting on the bedrock is constructed with reddish-brown andesite blocks. With this appearance it shows similarities with the curtain walls and towers of the entire defense line. This wall has a horizontal band projecting out slightly from the wall surface. This horizontal band made of reddish-brown andesite and the polygonal blocks have similar surface finishing (Fig. 6). Surroundings of the bulwark and Tower I, horizontal bands of this material are encountered scattered on the field. This observation explains the existence of a horizontal band throughout the whole line of the defense walls.

With its elaborate workmanship and the usage of different colored stones, Tower I is differentiated from curtain walls and other towers, and exhibits a monumental appearance. The walls of the tower rest on solid bedrock, on a base that projects approximately 2 cm. The polygonal masonry of the tower is constructed with bluish-grey andesite blocks and they are set up with obvious horizontal rectangular surfaces (Fig. 7). The horizontal band of 21 cm height, that terminates the rectangular horizontal areas, has a more distinctive reddish color than the average reddish-brown stones used in other buildings in Larisa. These bands are decorated with additional small grooves framing the central surface of the block. Handling bosses are left in the center of frames, which might present a decorative intention as well (Fig. 8). The usage of horizontal bands with different colors in a decorative manner can also be seen in the city walls at Melanpagos and Erythrai in the close neighborhood.

Another late archaic building of the tyrant’s residence, the Megaron, has a main space with a squarish plan and two smaller rooms behind it. The masonry of the Megaron with its polygonal blocks shows close similarities to the late archaic defense wall. In particular, its better preserved western wall shows a polygonal pattern

5 The construction techniques of late archaic walls of Larisaean acropolis and their relevance with topography and surrounding buildings are currently (2018) being studied by Ertunç Denктаş in his doctoral dissertation (ITU Institute of Sciences History of Architecture Program).

6 SANER, SAĞ 2012, 428.



Fig. 8. Coursed polygonal masonry and horizontal decorative band at Tower I on the acropolis (photo: © Archive of Larisa)



Fig. 9. Coursed polygonal masonry that includes multicolored andesite blocks near tower VII on the acropolis (photo: © Archive of Larisa)

with the use of four-five edged reddish-brown and bluish-grey andesite blocks together.

In addition to the variety of color tones of andesite blocks, the usage of different materials is also another practice that can be observed in the masonry of the Larisaean acropolis throughout the periods. For instance, white limestone blocks were used in the masonry of the walls of Tower VII, which is likely to be part of an earlier fortification system on the acropolis.<sup>7</sup> The rising wall of the late archaic circuit that lies between Tower VII and the gate displays a patchwork-like masonry from the combination of different color andesite blocks (Fig. 9).

Finally, in the late archaic fort at Larisa East and in the dwellings located on its slopes mainly andesite blocks of reddish-brown tones are used. The reason that the rocks in this place are more “brownish” than the ones in the acropolis is probably because the minerals in the soil here are different than those in the acropolis area of the western settlement.

To sum up; in Larisa there is stonework based on andesite, the local stone of the region, taken from local quarries. This stonework is encountered at the wall bases of the buildings, in the initial layers above the foundations, retaining walls and city walls. Andesite is not affected by weather conditions very much, so the blocks’ colors ranging from bluish-grey to reddish-brown and even a brighter tone of red are not related to weather conditions but to the minerals of the soil it was found in.

In Larisa’s stonework, practical applications are more important than decorative concerns. Andesite stone blocks taken out from quarries close by are mostly used randomly together regardless of their color differences. This practice, applied to almost all buildings

within the field, differs only at Tower I. At Tower I, the usage of red stone of a special brightness and a tone that is not encountered in any other parts of the site attracts particular attention. These stones were particularly chosen and used in the bonding layer of the tower. Decorative grooves are additionally applied on them.

In the lower sections of the buildings in Larisa, except in the defensive walls, one or two rows of andesite blocks were used. These were not plastered and on top of them, mud brick walls with plaster were constructed. The mud brick sections must have been enveloped with wooden beams and coverings, which carried the terracotta plates.<sup>8</sup> In the façade decoration, these terracotta plates, displaying hunting, symposium and chariot race scenes, colored predominantly in red and black, are used in accordance with the taste and wide-spread practice of the polychromy of the period. In the masonry, the application of andesite blocks with different colors can be considered in the same manner. In other words, this practice shows an aesthetic harmony and unity with terracotta plates. In addition, timber column shafts; column capitals and frieze blocks made of tuff were apparently painted as well.<sup>9</sup> Therefore, the randomly made color choices, actually based on the idea of using the quarries as efficiently as possible, also supported the choices concerning decoration within the architectural understanding of the period.

8 SANER, ALMAÇ 2015, 756.

9 Hardly visible remains of red and blue colour pigments had been seen in one of the pilaster capitals and two geison pieces that were found on the acropolis during the excavations. BOEHLAU, SCHEFOLD 1940, 123-124, 128.

7 BOEHLAU, SCHEFOLD 1940, 50-51.

**BIBLIOGRAPHY**

- BOEHLAU J., SCHEFOLD K. 1940: Larisa am Hermos. Die Ergebnisse der Ausgrabungen 1902-1934, Vol. 1, Die Bauten, Berlin 1940.
- SANER T., SAĞ K. 2012: "The Aeolian-Style Polygonal Masonry in Larisa (Buruncuk) and its Regional Context", in R. CARVAIS *et al.* (eds.): Nuts & Bolts of Construction History, Paris, Vol. 2, 427-434.
- SANER T., ALMAÇ U. 2015: "The Splendor of Andesite: Quarrying and Constructing in Larisa (Buruncuk) Aeolis", in ASMOSIA X, 805-809.
- SANER T. 2016: "Architectural Survey in Larisa (Buruncuk) 2010-2015 (including Turkish summary)", in T. SANER (eds.): Larisa-Buruncuk Mimari Araştırmaları - Architectural Survey, İstanbul, Vol. 1, 61-93.
- ZIM S. H., SCHAFFER R. P. 1962: Rocks and Minerals: A Guide to Rocks, Gems and Minerals, New York 1962.