Marble and Sculpture at Lepcis Magna (Tripolitania, Libya): a Preliminary Study Concerning Origin and Workshops

Musso, Luisa; Buccino, Laura; Bruno, Matthias; Attanasio, Donato; Prochaska, Walter

Source / Izvornik: ASMOSIA XI, Interdisciplinary Studies on Ancient Stone, Proceedings of the XI International Conference of ASMOSIA, 2018, 481 - 490

Conference paper / Rad u zborniku

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

https://doi.org/10.31534/XI.asmosia.2015/02.32

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:123:128871

Rights / Prava: In copyright/Zaštićeno autorskim pravom.

Download date / Datum preuzimanja: 2025-02-03



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

	PRESENTATION	15
	NECROLOGY: NORMAN HERZ (1923-2013) by Susan Kane	17
1.	APPLICATIONS TO SPECIFIC ARCHEOLOGICAL QUESTIONS – USE OF MARBLE	
	Hermaphrodites and Sleeping or Reclining Maenads: Production Centres and Quarry Marks Patrizio Pensabene	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>	22
	Alabaster. Quarrying and Trade in the Roman World: Evidence from Pompeii and Herculaneum Simon J. Barker and Simona Perna	
	Recent Work on the Stone at the Villa Arianna and the Villa San Marco (Castellammare di Stabia) and Their Context within the Vesuvian Area Simon J. Barker and J. Clayton Fant	65
	Marble Wall Decorations from the Imperial Mausoleum (4 th C.) and the Basilica of San Lorenzo (5 th 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 Dorothy H. Abramitis and John J. Herrmann	89
	The Re-Use of Monolithic Columns in the Invention and Persistence of Roman Architecture Peter D. De Staebler	
	The Trade in Small-Size Statues in the Roman Mediterranean: a Case Study from Alexandria Patrizio Pensabene and Eleonora Gasparini	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 Barbara Burrell	117
	Iasos and Iasian Marble between the Late Antique and Early Byzantine Eras Diego Peirano	123

	Thassos, Known Inscriptions with New Data	
	Tony Kozelj and Manuela Wurch-Kozelj	131
	The Value of Marble in Roman <i>Hispalis</i> : Contextual, Typological and Lithological Analysis of an Assemblage of Large Architectural	
	Elements Recovered at Nº 17 Goyeneta Street (Seville, Spain)	
	Ruth Taylor, Oliva Rodríguez, Esther Ontiveros, María Luisa Loza,	
	José Beltrán and Araceli Rodríguez	143
	Giallo Antico in Context. Distribution, Use and Commercial Actors According	
	to New Stratigraphic Data from the Western Mediterranean (2 nd C. Bc – Late 1 st C. Ad)	
	Stefan Ardeleanu	155
	Amethystus: Ancient Properties and Iconographic Selection	
	Luigi Pedroni	167
2.	PROVENANCE IDENTIFICATION I: (MARBLE)	
	Unraveling the Carrara – Göktepe Entanglement	
	Walter Prochaska, Donato Attanasio and Matthias Bruno	175
	The Marble of Roman Imperial Portraits	
	Donato Attanasio, Matthias Bruno, Walter Prochaska and Ali Bahadir Yavuz	185
	Tracing Alabaster (Gypsum or Anhydrite) Artwork Using Trace Element Analysis	
	and a Multi-Isotope Approach (Sr, S, O)	
	Lise Leroux, Wolfram Kloppmann, Philippe Bromblet, Catherine Guerrot,	105
	Anthony H. Cooper, Pierre-Yves Le Pogam, Dominique Vingtain and Noel Worley	195
	Roman Monolithic Fountains and Thasian Marble	
	Annewies van den Hoek, Donato Attanasio and John J. Herrmann	207
	Archaeometric Analysis of the Alabaster Thresholds of Villa A, Oplontis	
	(Torre Annunziata, Italy) and New Sr and Pb Isotopic Data for	
	Alabastro Ghiaccione del Circeo Simon J. Barker, Simona Perna, J. Clayton Fant, Lorenzo Lazzarini and Igor M. Villa	215
	Simon J. Burker, Simonu Fernu, J. Cluyton Funt, Lorenzo Luzzarini unu igor M. Villa	213
	Roman Villas of Lake Garda and the Occurrence of Coloured Marbles	
	in the Western Part of "Regio X Venetia et Histria" (Northern Italy)	
	Roberto Bugini, Luisa Folli and Elisabetta Roffia	231
	Calcitic Marble from Thasos in the North Adriatic Basin:	
	Ravenna, Aquileia, and Milan	
	John J. Herrmann, Robert H. Tykot and Annewies van den Hoek	239
	Characterisation of White Marble Objects from the Temple of Apollo	
	and the House of Augustus (Palatine Hill, Rome)	2.45
	Francesca Giustini, Mauro Brilli, Enrico Gallocchio and Patrizio Pensabene	247
	Study and Archeometric Analysis of the Marble Elements Found	
	in the Roman Theater at Aeclanum (Mirabella Eclano, Avellino - Italy)	
	Antonio Mesisca, Lorenzo Lazzarini, Stefano Cancelliere and Monica Salvadori	255

Two Imperial Monuments in Puteoli:	
Use of Proconnesian Marble in the Domitianic and Trajanic Periods in Campania	
Irene Bald Romano, Hans Rupprecht Goette, Donato Attanasio and Walter Prochaska	
Coloured Marbles in the Neapolitan Pavements (16th And 17th Centuries):	
the Church of Santi Severino e Sossio	
Roberto Bugini, Luisa Folli and Martino Solito	
Roman and Early Byzantine Sarcophagi of Calcitic Marble from Thasos in Italy:	
Ostia and Siracusa	
Donato Attanasio, John J. Herrmann, Robert H. Tykot and Annewies van den Hoek	
Revisiting the Origin and Destination of the Late Antique Marzamemi	
'Church Wreck' Cargo	
Justin Leidwanger, Scott H. Pike and Andrew Donnelly	291
The Marbles of the Sculptures of Felix Romuliana in Serbia	
Walter Prochaska and Maja Živić	301
Truce I Fochusku unu muju zirre	
Calcitic Marble from Thasos and Proconnesos in Nea Anchialos (Thessaly)	
and Thessaloniki (Macedonia)	
Vincent Barbin, John J. Herrmann, Aristotle Mentzos and Annewies van den Hoek	311
Architectural Decoration of the Imperial Agora's Porticoes at Iasos	
Fulvia Bianchi, Donato Attanasio and Walter Prochaska	
The Winged Victory of Samothrace - New Data on the Different Marbles	
Used for the Monument from the Sanctuary of the Great Gods	
Annie Blanc, Philippe Blanc and Ludovic Laugier	331
Polychrome Marbles from the Theatre of the Sanctuary of Apollo Pythios	
in Gortyna (Crete)	
Jacopo Bonetto, Nicolò Mareso and Michele Bueno	337
Designed to the state of the st	
Paul the Silentiary, Hagia Sophia, Onyx, Lydia, and Breccia Corallina John J. Herrmann and Annewies van den Hoek	245
Jonn J. Herrmann and Annewies van den Hoek	
Incrustations from Colonia Ulpia Traiana (Near Modern Xanten, Germany)	
Vilma Ruppienė and Ulrich Schüssler	351
Stone Objects from Vindobona (Austria) – Petrological Characterization	
and Provenance of Local Stone in a Historico-Economical Setting	
Andreas Rohatsch, Michaela Kronberger, Sophie Insulander,	
Martin Mosser and Barbara Hodits	
Marbles Discovered on the Site of the Forum of Vaison-la-Romaine (Vaucluse, France):	
Preliminary Results	272
Elsa Roux, Jean-Marc Mignon, Philippe Blanc and Annie Blanc	
Updated Characterisation of White Saint-Béat Marble. Discrimination Parameters	
from Classical Marbles	
Hernando Royo Plumed, Pilar Lapeunte, José Antonio Cuchí,	250
Mauro Brilli and Marie-Claire Savin	

Grey and Greyish Banded Marbles from the Estremoz Anticline in Lusitania Pilar Lapuente, Trinidad Nogales-Basarrate, Hernando Royo Plumed, Mauro Brilli and Marie-Claire Savin	391
New Data on Spanish Marbles: the Case of <i>Gallaecia</i> (NW Spain) Anna Gutiérrez Garcia-M., Hernando Royo Plumed and Silvia González Soutelo	401
A New Roman Imperial Relief Said to Be from Southern Spain: Problems of Style, Iconography, and Marble Type in Determining Provenance John Pollini, Pilar Lapuente, Trinidad Nogales-Basarrate and Jerry Podany	413
Reuse of the <i>Marmora</i> from the Late Roman Palatial Building at Carranque (Toledo, Spain) in the Visigothic Necropolis <i>Virginia García-Entero, Anna Gutiérrez Garcia-M. and Sergio Vidal Álvarez</i>	427
Imperial Porphyry in Roman Britain David F. Williams	435
Recycling of Marble: Apollonia/Sozousa/Arsuf (Israel) as a Case Study Moshe Fischer, Dimitris Tambakopoulos and Yannis Maniatis	443
Thasian Connections Overseas: Sculpture in the Cyrene Museum (Libya) Made of Dolomitic Marble from Thasos John J. Herrmann and Donato Attanasio	457
Marble on Rome's Southwestern Frontier: Thamugadi and Lambaesis Robert H. Tykot, Ouahiba Bouzidi, John J. Herrmann and Annewies van den Hoek	467
Marble and Sculpture at Lepcis Magna (Tripolitania, Libya): a Preliminary Study Concerning Origin and Workshops Luisa Musso, Laura Buccino, Matthias Bruno, Donato Attanasio and Walter Prochaska	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	471
Robert H. Tykot, John J. Herrmann, Renée Stein, Jasper Gaunt, Susan Blevins and Anne R. Skinner	501
PROVENANCE IDENTIFICATION II: (OTHER STONES)	
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)	
Bojan Djurić, Divna Jovanović, Stefan Pop Lazić and Walter Prochaska	523
Aspects of Characterisation of Stone Monuments from Southern Pannonia	
Branka Migotti	537

3.

	The Budakalász Travertine Production Bojan Djurić, Sándor Kele and Igor Rižnar	545
	Stone Monuments from Carnuntum and Surrounding Areas (Austria) – Petrological Characterization and Quarry Location in a Historical Context	
	Gabrielle Kremer, Isabella Kitz, Beatrix Moshammer, Maria Heinrich and Erich Draganits	557
	Espejón Limestone and Conglomerate (Soria, Spain):	
	Archaeometric Characterization, Quarrying and Use in Roman Times	
	Virginia García-Entero, Anna Gutiérrez Garcia-M, Sergio Vidal Álvarez, María J. Peréx Agorreta and Eva Zarco Martínez	567
	The Use of Alcover Stone in Roman Times (Tarraco, Hispania Citerior).	
	Contributions to the Officina Lapidaria Tarraconensis	
	Diana Gorostidi Pi, Jordi López Vilar and Anna Gutiérrez Garcia-M.	577
4.	ADVANCES IN PROVENANCE TECHNIQUES, METHODOLOGIES AND DATABASES	
	Grainautline – a Supervised Grain Boundary Extraction Tool	
	Supported by Image Processing and Pattern Recognition	
	Kristóf Csorba, Lilla Barancsuk, Balázs Székely and Judit Zöldföldi	587
	A Database and GIS Project about Quarrying, Circulation and Use of Stone	
	During the Roman Age in Regio X - Venetia et Histria.	
	The Case Study of the Euganean Trachyte	
	Caterine Previato and Arturo Zara	597
5.	QUARRIES AND GEOLOGY	
	The Distribution of Troad Granite Columns as Evidence for Reconstructing	
	the Management of Their Production	612
	Patrizio Pensabene, Javier Á. Domingo and Isabel Rodà	613
	Ancient Quarries and Stonemasonry in Northern Choria Considiana	
	Hale Güney	621
	Polychromy in Larisaean Quarries and its Relation to Architectural Conception Gizem Mater and Ertunç Denktaş	622
	Euromos of Caria: the Origin of an Hitherto Unknown Grey Veined Stepped Marble	
	of Roman Antiquity	
	Matthias Bruno, Donato Attanasio, Walter Prochaska and Ali Bahadir Yavuz	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	
	Ameur Younès, Mohamed Gaied and Wissem Gallala	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
	A C FFFF WC A CONFERENCE VERIFUL A CONFERENCE A CONFERENC	

	The Local Quarries of the Ancient Roman City of <i>Valeria</i> (Cuenca, Spain) Javier Atienza Fuente	683
	The Stone and Ancient Quarries of Montjuïc Mountain (Barcelona, Spain) Aureli Álvarez	693
	<i>Notae Lapicidinarum</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>	
	A Review of Copying Techniques in Greco-Roman Sculpture Séverine Moureaud	717
	Labour Forces at Imperial Quarries <i>Ben Russell</i>	
	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>	
6.	STONE PROPERTIES, WEATHERING EFFECTS AND RESTORATION, AS RELATED TO DIAGNOSIS PROBLEMS, MATCHING OF STONE FRAGMENTS AND AUTHENTICITY	
	Methods of Consolidation and Protection of Pentelic Marble Maria Apostolopoulou, Elissavet Drakopoulou, Maria Karoglou and Asterios Bakolas	749
7.	PIGMENTS AND PAINTINGS ON MARBLE	
	Painting and Sculpture Conservation in Two Gallo-Roman Temples in Picardy (France): Champlieu and Pont-Sainte-Maxence Véronique Brunet-Gaston and Christophe Gaston	
	The Use of Colour on Roman Marble Sarcophagi Eliana Siotto	
	New Evidence for Ancient Gilding and Historic Restorations on a Portrait of Antinous in the San Antonio Museum of Art Jessica Powers, Mark Abbe, Michelle Bushey and Scott H. Pike	783
	Schists and Pigments from Ancient Swat (Khyber Pukhtunkhwa, Pakistan) Francesco Mariottini, Gianluca Vignaroli, Maurizio Mariottini and Mauro Roma	
8.	SPECIAL THEME SESSION: "THE USE OF MARBLE AND LIMESTONE IN THE ADRIATIC BASIN IN ANTIQUITY"	
	Marble Sarcophagi of Roman Dalmatia Material – Provenance – Workmanship <i>Guntram Koch</i>	

Funerary Monuments and Quarry Management in Middle Dalmatia Nenad Cambi	827
Marble Revetments of Diocletian's Palace Katja Marasović and Vinka Marinković	839
The Use of Limestones as Construction Materials for the Mosaics of Diocletian's Palace Branko Matulić, Domagoj Mudronja and Krešimir Bosnić	855
Restoration of the Peristyle of Diocletian's Palace in Split Goran Nikšić	
Marble Slabs Used at the Archaeological Site of Sorna near Poreč Istria – Croatia <i>Deni Gobić-Bravar</i>	871
Ancient Marbles from the Villa in Verige Bay, Brijuni Island, Croatia Mira Pavletić and Đeni Gobić-Bravar	
Notes on Early Christian Ambos and Altars in the Light of some Fragments from the Islands of Pag and Rab <i>Mirja Jarak</i>	
The Marbles in the Chapel of the Blessed John of Trogir in the Cathedral of St. Lawrence at Trogir <i>Deni Gobić-Bravar and Daniela Matetić Poljak</i>	
The Use of Limestone in the Roman Province of Dalmatia Edisa Lozić and Igor Rižnar	915
The Extraction and Use of Limestone in Istria in Antiquity Klara Buršić-Matijašić and Robert Matijašić	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>	
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>	
Roman Quarry Klis Kosa near Salona Ivan Alduk	
Marmore Lavdata Brattia Miona Miliša and Vinka Marinković	
Quarries of the Lumbarda Archipelago Ivka Lipanović and Vinka Marinković	

Island of Korčula – Importer and Exporter of Stone in Antiquity	
Mate Parica and Igor Borzić	
Faux Marbling Motifs in Early Christian Frescoes	
6 7	
in Central and South Dalmatia: Preliminary Report	
Tonči Borovac, Antonija Gluhan and Nikola Radošević	
INDEX OF AUTHORS	1009

MARBLE AND SCULPTURE AT LEPCIS MAGNA (TRIPOLITANIA, LIBYA): A PRELIMINARY STUDY CONCERNING ORIGIN AND WORKSHOPS

Luisa Musso¹, Laura Buccino², Matthias Bruno³, Donato Attanasio⁴ and Walter Prochaska⁵ ¹ Dipartimento di Studi Umanistici, Università degli Studi Roma Tre, Rome, Italy (luisa.musso@uniroma3.it) ² Dipartimento SAGAS - Storia, Archeologia, Geografia, Arte e Spettacolo, Università degli Studi di Firenze, Florence, Italy (laura.buccino@unifi.it) ³ Via dei Vascellari 34, Rome, Italy (matthiasbruno@libero.it) ⁴ Istituto di Struttura della Materia, Consiglio Nazionale delle Ricerche (ISM-CNR), Rome, Italy (donato.attanasio@ism.cnr.it) ⁵ Department of Applied Geosciences and Geophysics, University of Leoben, Leoben, Austria (walter.prochaska@unileoben.ac.at)

Abstract

The sculptures of Lepcis Magna represent one of the richest and most important collections of ancient Tripolitania (Libya). Many of the statues were discovered during the excavations carried out in the first half of the 20th century. Archaeometric analysis on the white marble provenance was conducted on a selection of 36 statues kept in the storerooms and in the Museum of Lepcis Magna. These new data concerning the origin of sculpted marbles allow better consideration of several questions concerning the import of sculptural marbles and finished works, the presence of foreign craftsmen in the local context, the ability to identify local production with a distinct style and the organization of the Tripolitanian workshops. Of particular relevance is the copious use of Luna marble for statues from the 1st up to the 3rd century AD.

Keywords

Lepcis Magna, sculptures, marble provenance

Introduction

The excavations at Lepcis Magna, the most important city of ancient Tripolitania (Libya), have yielded a remarkable number of sculptures, which make up one of the most representative samples from North Africa. Many of the statues were discovered during the archaeological campaigns of the first half of the 20th century in the Hadrianic Baths,¹ the Severan Complex,² the Old Forum,³ the Theatre,⁴ and the Serapeum;⁵ they are now on display in the National Museum of Tripoli and in the local Museum of Lepcis Magna, or stored in their reserves.

No marble quarries were present in ancient Tripolitania, so that all the rough and semifinished marble blocks destined for sculptural or architectural purposes had to be imported from renowned overseas marble quarries.

This paper presents the results of an archaeometric study on the provenance of white marble conducted in November 2013 on a selection of 36 statues, 31 of which have been kept since 2011 in the Old Museum of Lepcis Magna, now used for storage.

The criteria used for the selection (Tab. 1) reflect the accessibility of the statues themselves and take into account the indications provided by the Controller of the Department of Archaeology of Lepcis Magna. The togate statues (Fig. 2) make up the majority of the sample with 18 specimens (cat. nos. 6-10, 12-15, 17, 20, 22-24, 28-31), followed by 7 female portrait-statues⁶ (3 of which are inspired by the type of the "Large Herculaneum Woman" (cat. nos. 2, 26, 35), 1 is inspired by the "Small Herculaneum Woman" (cat. no. 18), 1 by the "Orans" type (cat. no. 37, Fig. 7), 1 by a variant of the "Ceres" type (cat. no. 1, Fig. 3) and 1 is a variant of the "Eumachia-Fundilia" type (cat. no. 25). Female ideal statues are attested as well as 6 times: 1 Muse (cat. no. 4), 1 seated female statue, most likely identifiable with a Muse (cat. no. 19), 1 female

¹ BARTOCCINI 1929; FINOCCHI 2012.

² FLORIANI SQUARCIAPINO 1974; FINOCCHI 2015.

³ AURIGEMMA 1941; MUSSO 1996a; DI VITA, LIVADIOTTI 2005.

⁴ CAPUTO, TRAVERSARI 1976.

⁵ DI VITA *et al.* 2003; KREIKENBOM 2005.

⁶ EQUINI SCHNEIDER, BIANCHI 1990; MUSSO 1996b; BUCCINO 2014.

Cat. no.	Object	Inv. no.	Provenance	Chronology
1	Headless draped female portrait-statue in Ceres type	L002300	Mausoleum of Gasr Duirat	First half of the 2 nd c. AD
2	Headless draped female portrait-statue in Large Herculaneum Woman type	L002310	West to Wadi er-Rsaf funerary area	2 nd c. AD
3	Fragmentary relief with a female captive	L002301	Severan Arch	Early 3 rd c. AD
4	Headless draped female ideal statue (Muse)	L002304	-	2 nd c. AD
5	Headless draped female ideal statue (peplophoros)	L002305	-	2 nd c. AD
6	Headless togate statue	L002306	North to the passageway along the front side of the Severan Basilica	Early 2 nd c. AD
7	Headless togate statue	L002307	-	Late 1 st - early 2 nd c. AD
8	Headless togate statue	L002308	-	Late 2 nd - early 3 rd c. AD
9	Headless togate statue	L002309	-	1 st c. AD
10	Headless togate statue	L002333	Severan Forum, exedra, left niche	Late 2^{nd} - early 3^{rd} c. AD
11	Headless draped female ideal statue	L002332	Scavi Nuovi, Unfinished Baths	2 nd c. AD (?)
12	Headless togate statue	L002312	Old Forum	Late 2 nd - early 3 rd c. AD
13	Headless togate statue	L002311	-	Late 3 rd c. AD
14	Lower part of a togate statue	L002313	-	2 nd c. AD
15	Lower part of a togate statue	L002314	Hadrianic Baths, eastern exedra	First half of the 2 nd c. AD
16	Headless herm	L002315	-	Early 2 nd c. AD (?)
17	Headless togate statue of a boy with bulla	L002316	Severan Forum	Second half of the 1 st c. AD
18	Lower part of a draped female portrait-statue in Small Herculaneum Woman type	L002317	-	1 st c. AD
19	Headless draped female ideal seated statue (Muse?)	L002318	Old Forum	Second half of the 2 nd c. AD
20	Headless togate statue	L002319	Severan Forum	2 nd c. AD
21	Headless draped female statue (peplophoros)	L002320	-	Late 2 nd - early 3 rd c. AD
22	Headless togate statue	L002322	-	2 nd c. AD
23	Headless togate statue	L002321	Theatre	1 st c. AD
24	Headless togate statue	L002323	Theatre	1 st c. AD
25	Headless draped female portrait-statue in Eumachia-Fundilia type (variant)	L002324	-	2 nd c. AD
26	Headless draped female portrait-statue in Large Herculaneum Woman type	L002325	Calchidicum	2 nd c. AD
28	Headless togate statue	L002327	Theatre	1 st c, AD
29	Headless togate statue	L002328	Old Forum	1 st c. AD
30	Lower part of a togate statue	L002329	-	2 nd c. AD
31	Lower part of a togate statue	L002330	Area around the Serapeum	2 nd c. AD
32	Cuirassed torso	L002342	-	1 st c. AD
34	Headless male ideal statue (Aesculapius)	2322	Hadrianic Baths, frigidarium	Second half of the 2 nd c. AD
35	Headless draped female portrait-statue in Large Herculaneum Woman type	2323	-	2 nd c. AD
36	Colossal headless female ideal statue (Virtus)	2161-2	once Tripoli, Orthodox Cemetery	Late 1 st - early 2 nd c. AD
37	Draped female portrait-statue in Orans type	498	Serapeum	Second half of the 2^{nd} c. AD
38	Draped female ideal statue (Tyche)	506	Serapeum	Second half of the 2^{nd} c. AD

Table 1. General overview of the 36 sculptures from Lepcis Magna with archaeological and chronological indications and analytical results of the tested marbles (isotopic data for sculpture cat. no. 38 are taken from LAZZARINI, TURI 2003)

Dolom. %	MGS mm	δ ¹³ Ο ‰	δ ¹³ C ‰	Intensity %	Distance	Prob.Rel. %	Prob.Ass %	Marble provenance
0	0.9	-7.73	2.60	155.0	0.6	100	99	Pentelic
0	0.9	-4.59	2.91	643	30	59	~ 0	Pentelic
0	1.75	-1.88	4.03	8.5	7.4	95	20	Proconnesos
0	1.1	-2.87	1.86	47.8	2.3	73	80	Luna
0	0.45	-2.16	2.08	21.9	8.7	88	12	Luna
100	1.3	-4.17	3.58	22.3	7	98	22	Thasos, Cape Vathy
0	0.65	-1.77	2.03	17.2	8.7	79	12	Luna
0	1.4	-1.07	2.78	17.3	5.9	79	32	Proconnesos
0	0.52	-1.78	2.11	63.9	5.9	100	32	Luna
0	1.4	-1.11	2.98	3.5	2.1	97	83	Proconnesos
0	0.8	-7.40	2.96	69.2	7.1	85	21	Pentelic
0	0.9	-2.70	4.91	3.3	8.2	99	15	Paros I Lychnites
21	0.55	-1.93	2.10	91.6	1.3	100	93	Luna
0	2.25	-3.80	1.87	16.3	2.6	71	76	Aphrodisias
14	1.75	-2.84	2.36	26.6	3.2	51	68	Aphrodisias
100	1.3	-3.66	3.51	54.2	4.3	95	51	Thasos, Cape Vathy
0	0.45	-2.03	2.01	86.6	3.1	100	69	Luna
0	0.75	-4.91	4.21	37.6	7.8	88	17	Ephesos 1
0	0.8	-7.74	2.50	277.9	1.5	100	92	Pentelic
0	1.1	-2.48	2.28	11.4	4.2	35	52	Paros II, Marathi
0	0.65	-6.41	2.45	162.6	4.2	90	52	Pentelic
0	1.3	-2.75	4.84	6.5	2.5	100	77	Paros I Lychnites
0	2.5	-0.74	2.32	25.3	2.1	81	84	Paros II, Chorodaki
0	0.7	-1.83	2.08	62.2	0.1	100	100	Luna
0	0.7	-1.44	2.42	22.9	2.6	93	76	Luna
26	0.7	-7.32	2.84	310.5	1.7	100	90	Pentelic
0	0.5	-1.52	2.34	67.8	2.1	100	83	Luna
0	0.4	-2.18	1.92	104.4	6.1	85	30	Luna
0	0.6	-1.87	2.31	55.9	1.0	100	97	Luna
0	1.1	-6.68	2.65	156.7	0.3	99	100	Pentelic
0	1.1	-4.27	2.48	151.4	1.7	92	89	Docimium
0	1.3	-3.53	2.77	8.8	4	67	55	Proconnesos
18	0.63	-5.86	2.74	135.3	3.5	81	62	Pentelic
0	0.45	-1.64	2.29	44.9	3.4	99	63	Luna
0	0.5	-2.69	3.00	1.6	5.4	81	38	Göktepe
-	fine	-2.82	2.50	-	-	-	-	Göktepe

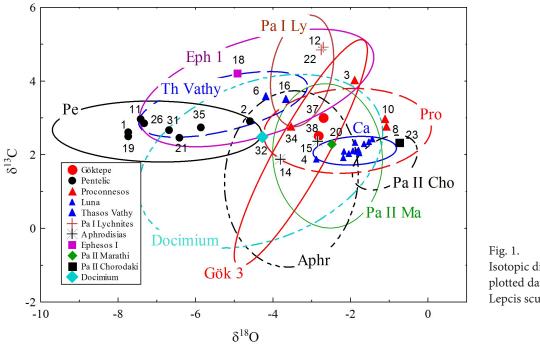


Fig. 1. Isotopic diagram with plotted data of the 36 Lepcis sculptures

figure wearing an Amazon style dress which has been interpreted as Dea Roma or, more likely, Virtus (cat. no. 36), 1 Tyche (cat. no. 38, Fig. 5), 1 unidentified (cat. no. 11) and 1 peplophoros (cat. no. 5; the second peplophoros, cat. no. 21, could be a portrait-statue). The sample also includes 1 male ideal statue of Aesculapius (cat. no. 34, Fig. 4), 1 cuirassed torso (cat. no. 32), 1 fragment of a relief showing a captive woman from the Severan Arch (cat. no. 3), and finally 1 headless herm (cat. no. 16). From a total of 36 pieces, 20 provenances are known with certainty (Tab. 1): the largest groups come from the Severan Complex (4), the Old Forum (3), the Theatre (3), the Serapeum (3), the Hadrianic Baths (2); the Calchidicum, the Severan Arch, the area of the so-called "Scavi Nuovi" next to the Unfinished Baths, the area of the Mausoleum of Gasr Duirat, and the funerary area of Wadi er-Rsaf are all represented only by one specimen.

The chronological range of the sculptures is quite large and, based on a still preliminary study, it extends from the 1st to the mid-late 3rd centuries AD.

The archaeometric analysis here presented, undertaken on a heterogeneous group of sculptures of provenance, typology, usages and chronology, provides the opportunity to combine observations about sculptural typology, style, and archaeological context of provenance, with those on the identification and origin of the marble. The aim of such an exercise is to gain a comprehensive understanding of the sculptural artefacts from Lepcis, from their execution to the identification of their workshops, and their place of production.

Archaeometric study

Since the eighties of the last century Susan Walker and Hafed Walda have been undertaking several sampling campaigns of different archaeological artefacts at Lepcis Magna, which included not only sculptures found in the city, but also a fair amount of architectural elements, such as the famous pillars of the Severan Basilica.⁷ Their analytical data were subsequently reviewed in comparison to the improved isotopic graphs, which over the years have undergone a remarkable transformation. In the following years other analyses were performed on more specific contexts, such as the Serapeum where several statues were discovered,⁸ while more recently archaeometric testing was undertaken on items of the Severan Complex,⁹ or on specific well attested marble types.¹⁰

In the frame of the Archaeological Mission of the University Roma Tre carried out in fall 2013, 31 statues in the Old Museum of Lepcis Magna (cat. nos. 1-26, 28-32) underwent archaeometric analysis with stable isotopes (Fig. 1), MGS, EPR (Tab. 1). To those we have added 5, previously analysed, statues, all of them on display in the Lepcis Museum (cat. nos. 34-38).

The obtained analytical data were compared with those of 15 Roman quarries (Tab. 2) of fine, medium and

- 9 BIANCHI et al. 2011; BIANCHI, BRUNO, PIKE 2015.
- 10 ATTANASIO et al. 2012.

⁷ WALKER, WALDA 1984; 1988.

⁸ LAZZARINI, TURI 2003.



Fig. 2. Lepcis Magna, Old Museum – Headless togate statue (cat. no. 24), Luna marble, from the Theatre (Archaeological Mission of the University Roma Tre, Fabian Baroni)

coarse grained white marble from Italy (Carrara/Luna), Greece (Pentelic; Paros I and II; Thasos Aliki and Vathy) and Asia Minor (Göktepe; Aphrodisias; Docimium; Ephesos; Proconnesos).

It was thus possible to assign as many as 12 statues to the white Luna marble (cat. nos. 4-5, 7, 9, 13, 17, 24-25, 28-30, 36), followed by 8 statues of Pentelic (cat. nos. 1-2, 11, 19, 21, 26, 31, 35) and 4 sculptures of Proconnesian marble (cat. nos. 3, 8, 10, 34). The Parian lychnites from Marathi (cat. nos. 12, 22), the Paros II quality from Marathi/Chorodaki (cat. nos. 20, 23), the Cape Vathy marble from Thasos (cat. nos. 6, 16), and the Aphrodisian marble from the "city quarries" (cat. nos. 14-15) and that from Göktepe (cat. nos. 37-38) are each attested by two exemplars, while the white Docimium marble quality (cat. no. 32) and the coarser Ephesian marble (cat. no. 18) are present only once.

The white Göktepe marble was used for two statues from the Serapeum, the impressive female portrait-statue and the statue of Tyche (Figs. 5, 7).¹¹ Previously the marble



Fig. 3. Lepcis Magna, Old Museum – Headless draped female portrait-statue of the Ceres type (cat. no. 1), Pentelic marble, from the Mausoleum of Gasr Duirat (Archaeological Mission of the University Roma Tre, Fabian Baroni)

of these two sculptures was identified as Luna marble,¹² but the values of strontium and the high intensity of manganese allow us to attribute at least the draped female portrait-statue of the Orans type (cat. no. 37, Fig. 7) unequivocally to white Göktepe statuary marble, while for the statue of Tyche (cat. no. 38, Fig. 5) measurements are incomplete but the isotopic signature together with the fine grain of the marble unquestionably identifies Göktepe as the source quarry.¹³

White marbles and statues production at Lepcis Magna from the 1st to the 3rd century AD

The most surprising data detected by this first preliminary archaeometric study is that the majority of the sculptures are of Luna marble, for a total of 12 statues corresponding to 34%. The presence of Luna marble is totally unexpected and the fact that this marble is actually the

¹¹ The statues are made of different pieces, but it was possible to sample only the lower ones of both sculptures. Nevertheless the marble quality of the other elements was identified macroscopically with the same high quality white Göktepe marble.

¹² LAZZARINI, TURI 2003, 287-289.

¹³ The female portrait-statue (cat. no. 37) was resampled and tested again after macroscopic inspection and the autoptic identification with the white Göktepe marble. The statue of Tyche (cat. no. 38) was not accessible at that time and the archaeometric analysis could not be repeated.

No.	Site, no. of samples	MGS mm	δ ¹⁸ O ‰	δ ¹³ C ‰	EPR intensity %	EPR linewidth %
1	Carrara, 112	0.80 0.4, 1.4	-1.89 -3.0, -0.5	2.11 1.1, 2.6	68.5 10, 237	63.4 55, 80
2	Pentelicon, 154	0.96 0.6, 1.8	-7.00 -9.0, -3.8	2.63 1.9, 4.1	226.3 12.5, 1010	58.2 38, 100
10	Pa I, lychn, 41	1.70 1.0, 3.1	-3.25 -4.0, -2.6	4.27 3.0, 5.1	8.6 3.6, 22.8	48.6 41, 59
11	Pa II Ma, 28	2.11 1.0, 3.0	-2.59 -4.2, -1.9	1.97 -0.6, 3.4	9.8 3.6, 49.5	52.0 42, 59
12	Pa II Cho, 62	2.07 0.9, 3.0	-1.11 -2.6, -0.6	1.79 0.5, 2.2	19.5 1.8, 36.7	47.9 40, 57
13	Th Aliki, 76	3.84 2.4, 7.5	-0.72 -4.8, 0.5	2.98 1.5, 3.6	130.8 3.6, 522.7	55.7 46, 69
14	Th Vathy, 37	1.85 0.9, 3.2	-5.29 -8.2, -3.2	3.37 2.0, 3.9	105.3 19.1, 633.9	75.8 62, 107
8	Göktepe 3, 72	0.62 0.2, 1.1	-3.33 -6.6, -2.6	2.11 -4.5, 3.4	3.5 1.1, 14.0	53.9 45, 64
9	Göktepe 4, 29	0.62 0.2, 1.3	-3.45 -7.1, -2.2	2.03 -1.5, 2.7	19.3 3.2, 47.1	46.0 37, 51
3	Docimium, 65	0.67 0.4, 1.2	-4.32 -7.7, -2.3	1.80 -1.4, 3.1	242.5 5.7, 626.6	53.9 40, 68
4	Aphrod, 103	2.12 0.1, 4.5	-3.53 -6.5, -2.05	1.34 -2.7, 2.6	43.4 3, 276	53.7 37, 72
5	Ephesos 1, 88	1.74 0.4 , 4.6	-4.42 -8.3 , -2.2	3.81 -0.6 , 5.1	60.0 14.7 , 51.3	56.4 42;73
6	Ephesos 2, 38	1.71 1.3 , 2.4	-3.14 -4.3 , -2.6	0.35 -0.8 , 1.5	41.8 23 ; 69	45.5 39 ; 60
7	Proconn 1, 380	1.72 0.4 , 3.5	-2.08 -5.2 , -0.3	2.65 -0.9 , 3.9	6.0 0.8 ; 46.4	57.8 37 ; 87
15	Proconn 2, 14	1.68 1.2, 2.5	-6.78 -9.1, -5.5	2.59 2.3, 3.2	7.7 1.2, 53.1	58.9 40, 75

Table 2.

Summary of the database of the considered white marbles. Mean variable values are given in the first row, followed by minimum and maximum values in the second row. The isotopic and EPR variables are given as ‰ or % with respect to specific standards (Pee Dee Belemnite for isotopes and Dolomite N368 BCS for EPR). The maximum grain size (MGS) is given in mm

most attested is at odds with the evidence from the architectonic materials in Lepcis¹⁴ and with what is so far known about the provenance of other sculptural marbles from North Africa.¹⁵ However it is clear that the Luna marble is among the earliest to have been used for statues of Lepcis and is the only one to be attested down to the late 3rd century AD. In fact, in the 1st century AD Luna marble is the most represented with 7 statues, 6 of which are togate (cat. nos. 7, 9, 17, 24, Fig. 2, 28-29), and one imposing statue of the goddess Roma, or rather Virtus (cat. no. 36), which dates between the 1st and the 2nd century AD. The Paros II from Chorodaki, the Ephesian and the white Docimian marble are attested only once, used respectively for a togate statue (cat. no. 23), a draped female portrait-statue (cat. no. 18) and a cuirassed torso (cat. no. 32).

The largest group of sculptures refers to the 2^{nd} century AD, when Greek and Asiatic marbles take

precedence, but the use of Luna marble remains well attested. The most representative marble is the Attic Pentelic marble, with 6 female statues (cat. nos. 1, Figs. 3, 2, 11, 19, 26, 35), and one togate statue (cat. no. 31), followed by the Carian marbles: the marble from the so-called Aphrodisias "city quarries" attested by 2 togate statues (cat. nos. 14-15), and the fine grained marble from Göktepe quarry district used for 2 female statues from the Serapeum (cat. nos. 37-38, Figs. 5, 7). Luna marble is attested for 3 female statues (cat. nos. 4-5, 25) and one togate statue (cat. no. 30). The Parian marbles, to be distinguished in Lychnites Paros I from the Marathi valley (cat. no. 22) and Paros II from Marathi (cat. no. 20), were used for 2 togate statues, while the white dolomitic marble from Cape Vathy on Thasos island is attested twice, for a togate statue (cat. no. 6) and a headless herm (cat. no. 16). The coarse white-grey Proconnesian marble is attested only once, for a statue of Aesculapius from the frigidarium of the Hadrianic Baths (cat. no. 34, Fig. 4).

The period between the end of the 2nd and the early 3rd century AD is represented by 4 statues, made in three different marbles: the Parian Lychnites (cat. no. 12), and the Asiatic Proconnesian marble (cat. nos. 8, 10) were used for togate statues, while the Pentelic is

¹⁴ WARD PERKINS 1951; 1980; PENSABENE 2001, 2003; 2006; BRUNO, BIANCHI 2015, 31-46.

¹⁵ Cyrene and Cherchel represent two case-studies: ATTANASIO *et al.* 2006; ATTANASIO, BRUNO, LANDWEHR 2012; LANDWEHR *et al.* 2012-2013.



Fig. 4. Lepcis Magna, Museum – Headless statue of Aesculapius (cat. no. 34), Proconnesian marble, from the Hadrianic Baths (Archaeological Mission of the University Roma Tre, Fabian Baroni)

represented by a peplophoros statue (cat. no. 21). In this period the use of Proconnesian marble gains prominence, a phenomenon amplified and made possible by the massive Severan building project, whose construction demanded the import from the quarries on Marmara Island of huge quantities of such material, as testified by the fragmentary relief with female captive from the Severan Arch (cat. no. 3). Finally, an additional togate statue made of Luna marble (cat. no. 13) may be dated to the late 3rd century AD.

Conclusions

At Lepcis Magna, the extensive use of marble in the public architecture begins with the construction of the great Hadrianic Baths, inaugurated in 137-138 AD, and reaches its peak, in terms of imported stocks, in the central decades of the 2nd century to continue in the Severan period: the Severan Complex testifies to the enormous imperial financial investment of L. Septimius Severus in his hometown.¹⁶





Fig. 5. Lepcis Magna, Museum – Statue of Tyche (cat. no. 38), Göktepe marble, from the Serapeum (Archaeological Mission of the University Roma Tre, Fabian Baroni)

The picture of statuary marble provenance outlined so far bears witness to a variety of marbles of Greek and Asiatic origin already in the 1st century AD, in addition to the more attested Italic Luna marble. The number of marble types grows over the 2nd century, with a predominance of those of Greek origin, among which the Pentelic, accompanied yet by two insular qualities from Paros, the Lychnites and the Paros II variety, and Thasos, the dolomitic marble of Cape Vathy. With regard to Pentelic marble, its presence at Lepcis Magna is attested from a huge shapeless block recovered in the shipwreck found during the construction works of the new harbour of Misratah (Sidi Ahmad).¹⁷ What we know about the way Pentelic marble was marketed, would lead us to hypothesize that the shipments of shapeless blocks to be sculptured at destination were accompanied by Attic sculptors accustomed to a sophisticated and rich patronage,18 but nevertheless

¹⁷ BRUNO, BIANCHI 2015, 102.

¹⁸ For a very fine peplophoros statue in Pentelic marble, found in Lepcis Magna and dated to 1st century AD, see PORTALE 2012.

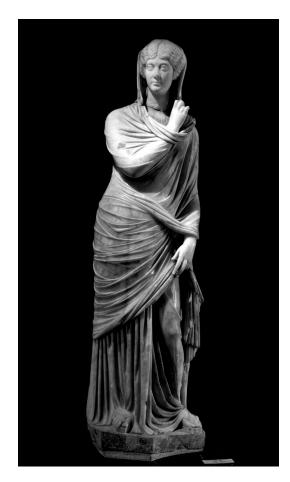


Fig. 6. Istanbul, Archaeological Museums – Draped female portrait-statue of the Ceres type, from Pisidian Antioch, sanctuary of Men (Photo courtesy of Roberto Lucignani, Rome)

we should bear in mind that in the 2nd century AD many flourishing and accomplished local sculpture workshops were active in Lepcis (Fig. 3). These workshops could have met the demand of the local market and work with imported marbles, adapting to the stylistic trends in vogue at that time.

Significant too is the presence of Asiatic marbles, among them the white statuary from Göktepe for 2 female statues of the Serapeum, one an ideal type (cat. no. 38, Fig. 5), the other a portrait-statue (cat. no. 37, Fig. 7), which show remarkable stylistic differences even though they were made with the same material: the portrait-statue is stylistically very close to another from Pisidian Antioch (Fig. 6),¹⁹ whereas the ideal statue was executed in a less refined, more rigid way. The portrait-statue is, with some probability, an imported product, as would let us suppose the fact that it is executed in different pieces to be later reassembled, and it can therefore be assigned to a micro-Asiatic workshop. A different question is to

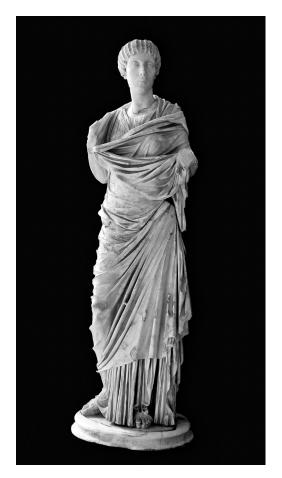


Fig. 7. Lepcis Magna, Museum – Draped female portraitstatue of the Orans type (cat. no. 37), Göktepe marble, from the Serapeum (Archaeological Mission of the University Roma Tre, Fabian Baroni)

determine whether such workshop was based in Asia Minor or in Rome, since Rome worked as hub of artists and art pieces, other than as a production centre. As the case of the marble from Göktepe proves, the relation between material and those who sculpt it can be rather complex; there cannot be any simplistic assumption about the identity of provenance of material and artist. The evidence entails a wide range of possibilities: imported products, finished or almost-finished; statues sculpted by travelling artists, who work only with familiar marbles; local workshops working with imported marbles.

As for the Proconnesian marble, we can assume that, especially in the Severan age, unused architectural elements originally destined for the largest urban building projects of Lepcis, might have supplied local sculptural workshops; this phenomenon is well evidenced by a number of sculptures from the early 3rd century AD discovered in the so-called Nymphaeum of Hercules along the main road of Lepcis.²⁰ Two statues of Hercules (Fig. 8)



Fig. 8. Lepcis Magna, Museum – Statue of Hercules, with the remains of the reused architrave, Proconnesian marble, from the so-called Nymphaeum of Hercules (Archaeological Mission of the University Roma Tre, Matthias Bruno)

clearly show along their lower edge and on their back the remains of the decoration of the original architrave.²¹

In conclusion, this brief presentation shows the variety of issues raised by the archaeometric analysis of marbles combined with the formal study of the sculptures, beginning with the differentiation in terms of use of various marbles, also in connection with the cultural and commercial exchanges on the Mediterranean market of the Roman Empire. The quite obvious connection between the type of marble and the provenance of the artists who travelled with the marble is plausible in the case of large and specific orders, but it cannot be assumed as the rule and must be carefully considered case by case. The knowledge of the local craftsmanship picture reveals a quite lively reality represented by workshops working with imported marble and reaching heterogeneous results with respect to quality of handcraft and influence of models.

To assess the relevance of the handcraft component that is foreign to the local context, we should not neglect the role of sculptural artefacts which are imported in a semi-worked condition or are completely finished and polished: they usually represent well defined and standardized types of works, as exemplified by the production of the Attic workshops for the export market.²²

These new data concerning the origins of sculpted marbles have provided an opportunity for dealing with an issue that moves from the provenance of the marbles to the core of artisanal production and its nodes and complexities. Such as, for example, the presence of foreign craftsmen in the local context, the importation of finished works, the ability to identify local production with a distinct style, but where different external influences are also visible, and finally the organization of the Tripolitanian workshops themselves.

BIBLIOGRAPHY

- ATTANASIO D., BRUNO M., LANDWEHR CH. 2012: "I marmi scultorei di Caesarea Mauretaniae (Cherchel)", in M. B. COCCO, A. GAVINI, A. IBBA (eds.): L'Africa romana: trasformazione dei paesaggi del potere nell'Africa settentrionale fino alla fine del mondo antico. Atti del XIX Convegno di Studio (Sassari, 16-19 dicembre 2010), Roma, 527-540.
- ATTANASIO D., KANE S., PLATANIA R., ROCCHI P. 2006: "Provenance, use, and distribution of white marbles at Cyrene", in E. FABBRICOTTI, O. ME-NOZZI (eds.): Cirenaica: studi, scavi e scoperte. Atti del X Convegno di Archeologia Cirenaica (Chieti, 24-26 novembre 2003), Parte I: Nuovi dati da città e territorio, Oxford, 247-255.
- ATTANASIO D., YAVUZ A. B., BRUNO M., HERR-MANN JR. J. J., TYKOT R. H., VAN DEN HOEK A. 2012: "On the Ephesian origin of greco scritto marble", in ASMOSIA IX, 245-254.
- AURIGEMMA S. 1941: "Sculture del Foro Vecchio di Leptis Magna raffiguranti la Dea Roma e i principi della casa dei Giulio-Claudi", Africa Italiana 8, 1-94.

- BARTOCCINI R. 1929: Le terme di Lepcis (Leptis Magna), Bergamo.
- BIANCHI F., BRUNO M., GORGONI C., PALLANTE P., PONTI G. 2011: "The pilasters of the Severan Basilica at Leptis Magna and the School of Aphrodisias. New archaeometric and archaeological data", in ASMOSIA VIII, 329-349.
- BIANCHI F., BRUNO M., PIKE S. 2015: "Pentelic marble in the Severan Complex in Leptis Magna (Tripolitania, Libya)", in ASMOSIA X, 23-34.
- BRUNO M., BIANCHI F. 2015: Marmi di Leptis Magna: repertorio delle pietre bianche e policrome della città, Roma.
- BUCCINO L. 2014: "Ritratti di Leptis Magna: modelli, produzione, contesto tra la dinastia flavia e gli Antonini", Libyan Studies 45, 19-47.
- CAPUTO G., TRAVERSARI G. 1976: Le sculture del teatro di Leptis Magna, Roma.
- DI VITA A., LIVADIOTTI M. (eds.) 2005: I tre templi del lato nord-ovest del Foro Vecchio a Leptis Magna, Roma.
- DI VITA A., PUGLIESE CARRATELLI G., DI VITA EVRARD G. 2003: "Il Serapeo di Leptis Magna: il tempio, le iscrizioni, i marmi", Quaderni di Archeologia della Libya 18, 267-292.
- EQUINI SCHNEIDER E., BIANCHI L. 1990: "Considerazioni su alcune statue femminili di Leptis Magna: iconografia e officine", in A. MASTINO (ed.): L'Africa romana. Atti del VII Convegno di Studio (Sassari, 15-17 dicembre 1989), Sassari, 793-801.
- FINOCCHI P. 2012: Le sculture delle terme adrianee di Leptis Magna. Dagli appunti di M. Floriani Squarciapino, Roma.
- FINOCCHI P. 2015: Le sculture del Ninfeo Maggiore di Leptis Magna. Dagli appunti di M. Floriani Squarciapino, Roma.
- FLORIANI SQUARCIAPINO M. 1974: Sculture del Foro Severiano di Leptis Magna, Roma.
- KREIKENBOM D. 2005: "Zum Sarapeion in Lepcis Magna", in Urbanistik und städtische Kultur in Westasien und Nordafrika unter den Severern. Beiträge zur Table Ronde in Mainz am 3. und 4. Dezember 2004, Worms, 83-99.
- LANDWEHR CH., ATTANASIO D., BRUNO M., SO-BOTT R. 2012-2013: "The sculptural marbles of Caesarea Mauretaniae (Cherchel, Algeria)", Jahrbuch des Deutschen Archäologischen Instituts 127-128, 227-260.

- LAZZARINI L., TURI B. 2003: "I marmi e le pietre", in DI VITA *et al.* 2003, 286-292.
- MUSSO L. 1996a: "Nuovi ritrovamenti di scultura a Leptis Magna. Athena tipo Medici", in Scritti di antichità in memoria di Sandro Stucchi, 2. La Tripolitania, l'Italia e l'Occidente, Roma, 115-139.
- MUSSO L. 1996b: "Statua funeraria nel tipo della Grande Ercolanese. Nota sulla scultura iconica femminile a Leptis Magna", in L. MUSSO *et al.*, La tomba presso la scuola elementare "al-Hadi al-Fergiani" a Khoms, Libya Antiqua, n.s. 2, 142-150.
- PENSABENE P. 2001: "Pentelico e proconnesio in Tripolitania: coordinamento o concorrenza nella distribuzione?", Archeologia Classica 52, 63-127.
- PENSABENE P. 2003: "La Porta Oea e l'arco di Marco Aurelio a Leptis Magna. Contributo alla definizione dei marmi e del loro costo, delle officine e delle committenze", Quaderni di Archeologia della Libya 18, 341-367.
- PENSABENE P. 2006: "Le scuole di Nicomedia e Afrodisia e i pilastri della basilica severiana di Leptis Magna", Marmora. An international journal for archaeology, history and archaeometry of marbles and stone 2, 41-58.
- PORTALE E. C. 2012: "Una 'nuova' Livia da Leptis Magna. Osservazioni sul contributo delle botteghe attiche nell'elaborazione e diffusione dell'immaginario imperiale", in TH. STEPHANIDOU-TIVERIOU, P. KARANASTASI, D. DAMASKOS (eds.): Κλασική παράδοση και νεωτερικά στοιχεία στην πλαστική της Ρωμαϊκής Ελλάδας. Πρακτικά Διεθνούς Συνεδρίου (Θεσσαλονίκη, 7-9 Μαΐου 2009), Thessaloniki, 477-496.
- TOMASELLO F. 2005: Fontane e ninfei minori di Leptis Magna, Roma.
- WALKER S., WALDA H. 1984: "The art and architecture of Lepcis Magna. Marble origins by isotopic analysis", Libyan Studies 15, 81-92.
- WALKER S., WALDA H. 1988: "Isotopic analysis of marble from Lepcis Magna. Revised interpretations", Libyan Studies 19, 55-59.
- WARD PERKINS J. B. 1951: "Tripolitania and the marble trade", in Journal of Roman Studies 41, 89-104.
- WARD PERKINS J. B. 1980: "Nicomedia and the marble trade", in Papers of the British School at Rome 48, 23-69.