

Alabaster. Quarrying and Trade in the Roman World: Evidence from Pompeii and Herculaneum

Barker, Simon J.; Perna, Simona

Source / Izvornik: **ASMOSIA XI, Interdisciplinary Studies on Ancient Stone, Proceedings of the XI International Conference of ASMOSIA, 2018, 45 - 64**

Conference paper / Rad u zborniku

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

<https://doi.org/10.31534/XI.asmosia.2015/01.03>

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:123:848139>

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

Download date / Datum preuzimanja: **2025-02-21**



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 <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 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 <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 nd C. Bc – Late 1 st C. Ad) <i>Stefan Ardeleanu</i>	155
<i>Amethystus</i> : Ancient Properties and Iconographic Selection <i>Luigi Pedroni</i>	167
2. PROVENANCE IDENTIFICATION I: (MARBLE)	
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 th And 17 th 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 Silentiary, 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
3. 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) <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
4. ADVANCES IN PROVENANCE TECHNIQUES, METHODOLOGIES AND DATABASES	
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
5. QUARRIES AND GEOLOGY	
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
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 <i>Maria Apostolopoulou, Elissavet Drakopoulou, Maria Karoglou and Asterios Bakolas</i>	749
7. PIGMENTS AND PAINTINGS ON MARBLE	
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
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>	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
INDEX OF AUTHORS	1009

ALABASTER. QUARRYING AND TRADE IN THE ROMAN WORLD: EVIDENCE FROM POMPEII AND HERCULANEUM

Simon J. Barker¹ and Simona Perna²

¹ Norwegian Institute in Rome, University of Oslo, Rome, Italy (simon.baker3@gmail.com)

² Via Arenaccia 257, Naples, Italy (simona.perna8@gmail.com)

Abstract

Alabaster was highly valued by the Romans, but the trade, origin, quarries and distribution of this stone in the Roman period have been overlooked. The study and documentation of *in situ* examples of alabaster form a vital part in correcting this gap in our knowledge. The *Alabaster Quarrying and Trade in the Roman World Project* co-directed by the authors has examined the *in situ* alabaster, real and painted, at Pompeii and Herculaneum in order to determine the varieties employed in each city and changes in use from the second century BC to the first century AD. The paper presents the results of a survey undertaken in three seasons (2014-2016) by our project, whose ultimate aim is to build a database of datable examples of alabaster and sources in order to fully understand its quarrying, distribution, use and importance in the Roman world.

Keywords

alabaster, Pompeii, Herculaneum, pavements

Introduction

Alabaster (calcitic onyx) was highly valued during the Roman period for ornamental uses; however the quarrying and trade of this stone have only recently started to attract scholarly attention. The *Alabaster: Quarrying and Trade in the Roman World Project* launched by the authors is based upon one key question: what is the exact origin of the alabaster used in Roman Italy? While alabaster is seemingly synonymous with Egypt, it has been shown that alabasters from Asia Minor, Algeria, and Italy were also prized and used in the Roman period.¹ In light of the increasing analytical data for alabaster quarries,

it is now necessary to develop a comprehensive analysis of *in situ* examples. It is only through the compilation of a database of (ideally) datable examples in conjunction with scientific analysis to link individual examples to known quarries, given the similar macroscopic characteristic of alabaster, that we can start to assess the demand for alabaster, its dispersion, chronology and scale. Overall, this will greatly strengthen our knowledge of the use and importance of alabaster in the Roman world.

Between 2014 and 2016 the authors were able to examine 33 houses at Pompeii and 8 houses at Herculaneum that employ alabaster, real or painted.² In addition, 6 bar counters and façades were also examined (3 from Pompeii and 3 from Herculaneum). The results of our survey show a varied use of calcareous alabasters from Egypt, North Africa, Asia Minor and possibly Italy, primarily onyx, *fiorito*, and *alabastro a pecorella* as well as rarer types, such as *tartarugato* and *ghiaccione*.

The ancient label for calcareous alabaster is *onyx*³ for its translucency and pattern resembling a human nail; however, onyx is geologically a form of quartz.⁴ For the sake of convenience and in keeping with Classical terminology, we have chosen to use the term *alabaster* followed by several classifiers to distinguish colour and texture: *cotognino* (a calc-synter, characterised by light to deep yellow and creamy zones alternating with white to greenish swirls, concentric patches of lesser or greater

1 BARBIERI *et al.* 2002b; BRUNO 2002a; ÇOLAK, LAZZARINI 2002; LAZZARINI *et al.* 2012; HERRMANN Jr. *et al.* 2012; SCARDOZZI 2012.

2 The authors wish to thank Professor Massimo Osanna and Dr Maria Paola Guidobaldi for granting us access to the monuments, the custodians and conservators at Pompeii and Herculaneum for their collaboration, and the museum assistants in the Department of Ancient Egypt and Sudan at the British Museum for letting us view the alabaster samples from the Klemm and Klemm collection.

3 Lucan, *Pharsalia*, 10, 116; Martial, *Epigr.*, 12.50.4 and 7.94.1; as an adjective *onychinus* meaning made or resembling onyx marble: Gellius, *Noct. Att.*, 19.7.15; Lampridius, *Elagabalus*, 32; Herodian, *Hist.*, 4.7.

4 HARRELL 1990, 40.

Site	Latitude	Longitude	Location	Country	Province	Material	Bibliography
Wadi Araba	29.07958	31.45951	Near Wadi Askhar el-Qibli	Egypt	Aegyptus	Brown translucent alternating with creamy white bands varying in thickness.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Harrell <i>et al.</i> 2007, 423-424.
Wadi Assiut	27.31551	31.35933	25 km north-east of Assiut	Egypt	Aegyptus	This variety presents a wide range of colours with an alternation between grey to grey-dark brown bandings and light- to off-white and pink-coloured calcite layers.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Klemm and Klemm 2008, 163-164.
Wadi Sannur,	28.633611	31.25250	25 km south from Beni Suef	Egypt	Aegyptus	Very thick off-white to white rhythmic layers of which the colour ranges from beige to pink white and thickness from 1 to 15 centimetres.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Klemm and Klemm 2008, 148-152.
Wadi Muwathil	28.780470	31.192960	25 km south-East	Egypt	Aegyptus	Intervening colour layers mostly displaying a fine rhythmic banding comprised of a wavy-like form of varying thickness.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Klemm and Klemm 2008, 148-152.
Wadi Umm Ar-gub	28.63501	31.26717	10 km south of Beni Suef	Egypt	Aegyptus	Generally presents an almost white clearly defined banding alternating with darker yellow zones, which gives the rock its almost transparent appearance with calcite needles.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Klemm and Klemm 2008, 148-152.
El-Qawatir	28.100333	30.81667	East of el-Minya	Egypt	Aegyptus	The alabaster is characterised by a pale yellow to brownish colour with grey-white concentric veins.	Aston <i>et al.</i> 2000, 14; Lazzarini 2002, 241-242; Klemm and Klemm 2008, 152-158.
Hatnub	27.5501	31.02317	15 km south-east of Tell el-Amarna	Egypt	Aegyptus	Alabaster occurs here in two varieties: 1) a light whitish yellow to pink base displaying a rough banding 7 cm thick, interrupted by a fine grained pink coloured limestone of a few mm thickness. The calcite aggregates are always arranged perpendicular to the bandings; 2) a rough crystalline aspect which resembles marble, ranging in colour from pink yellow to white grey tones with barely noticeable banding. Probably variety described by Pliny the Elder (NH 36.60).	Hester and Heinzer 1981; Mielsch 1985, 37; Gnoli 1988, 215-218; Klemm and Klemm 2008, 161-163.
Ain Smara	36.357222	6.618611	Close to Constantine	Algeria	Numidia	Several varieties of alabaster (<i>alabastris di Constantina</i>) are known but the main one is a honey-white layered travertine called <i>oryx dorée</i> . A small region at Ain Smara produces an unusual red, white, and black alabaster, a kind of grayish <i>alabastris fiorito</i> , which is locally called <i>brèche d'Afrique</i> .	Toubal 1995, 57-61; Herrmann, Attanasio, <i>et al.</i> 2012, 1331.

Aïn Tekbalet	35.133186	-1.200086	Western Algeria near Oran	Algeria	Algeria			Banded travertine or onyx marble. Long white and beige strata predominate. Orange, brown, beige, and rust-red lines separate the gray and white bands.	Herrmann, Van den Hoek and Tykot 2012.
Bou Hanifia	35.316291	0.049694	20 km south-west of Mascara	Algeria	Algeria	Mauretania Caesariensis		The Bou Hanifia area has two quarries of travertine-alabaster, Sidi Sliman and Douar Kerma, but only the latter presents alabaster a <i>pecorella</i> . The Red and white alabaster (<i>pecorella</i>), holotype and allotype. Compact banded travertine composed mainly of fine-grained calcite, with rich bushy developments of iron oxides, predominantly red hematite.	Herrmann, Van den Hoek and Tykot 2012.
Akhisar	38.918889	27.837500	Ancient Thyarira (south of Harmandali)	Turkey	Turkey	Asia		Banded alabaster similar to Egyptian onyx. Very compact with alternating thick semi-transparent layers (bands) of pure honey-coloured calcite, and thin milky-white, opaque layers forming areas with a typical concretionary fabric.	Çolak and Lazzarini 2002.
Gölemezli	38.000344	29.016703	North of Hierapolis, Phrygia	Turkey	Turkey	Asia		<i>Fiorito</i> , opaque in light colours, white, yellow, brown with stains of dendritic swirls that convolutes either darker, or the same colours or black. Several varieties occur from white (white <i>ghiaccione</i>) to coloured (<i>listato</i> , <i>fiorito</i> or <i>a rosa</i>).	Mielsch 1985, 37-38; Gnoli 1988, 223-225; Bruno 2002a; Lazzarini and Sangati 2004, 76-77; Scardozzi 2010; 2012.
Djebel Oust	36.354167	10.377222	35 km south of Tunis, near the ancient towns of Uthina and Thuburbo Matus	Tunisia	Tunisia	Africa Proconsularis		Two varieties are known from these quarries: holotype, characterised by a regular fabric formed by thick layers of yellowish, sometimes greenish colour alternating with layers of red-purplish colour, and a variety similar to Egyptian <i>fiorito</i> , which shows a more irregular fabric, sometimes dendritic with white layers mixed with red and red-brownish often arborescent layers.	Lazzarini <i>et al.</i> 2012.
Circeo	41.232500	13.052778	South-western Lazio	Italy	Italy	Italia I		Black and white varieties from the Grotta del Precipizio quarry and yellow-brown from the la Batteria/Morrone/Torrefico quarries.	Lazzarini and Sangati 2004, 76-77; Bruno 1998; 2002b.
Iano di Montaione	43.514089	10.877528	45 km south-east of Pisa	Italy	Italy	Italia VII		Three varieties known: (1) yellow-to-dark brown alternating with creamy white layers; (2) a more precious variety called <i>alabastro tartarugato</i> due to its typical pattern resembling the shell of a tortoise; (3) known as <i>alabastro cinerino</i> since it has grey-bluish layers of the colour of ash mixed with purely white ones.	Lazzarini <i>et al.</i> 2012.
Castelnovo dell'Abate	42.993271	11.515564	39 km south of Siena	Italy	Italy	Italia VII		Characterised by white, yellow and brown layers of varying thickness, sometimes embedding small fragments (relics) of the mother rock.	Lazzarini <i>et al.</i> 2012.

Table 1. Alabaster quarries at which activity in the Roman period is proven or suspected (after PRICE, COOKE 2012, RUSSELL 2013, HARRELL 2016)

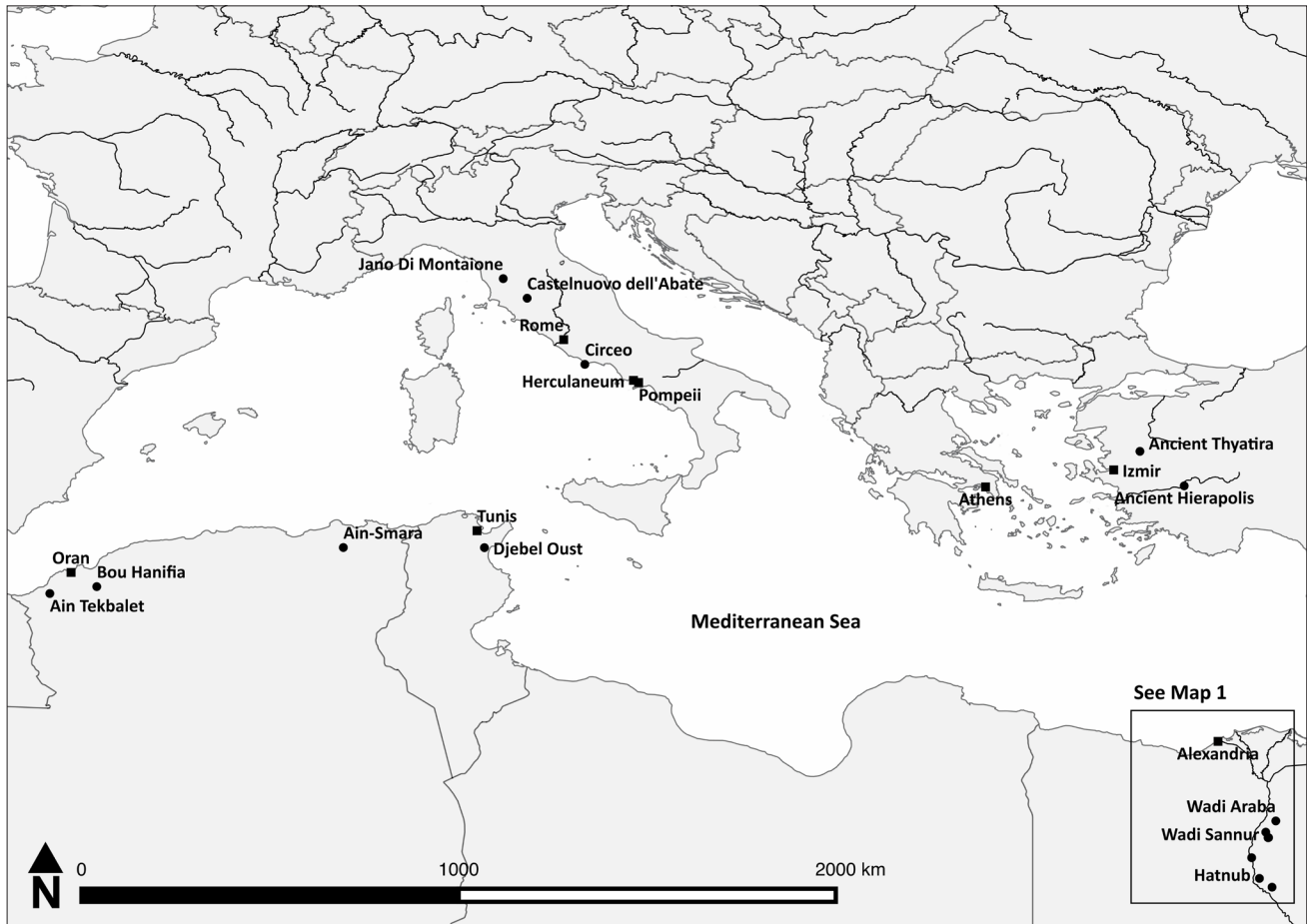


Fig. 1. Map of currently known alabaster sources (map: S. Barker)

translucency with some red inclusions), *listato/banded* (calc-synter with straight translucent honey yellow and white bands),⁵ *fiorito* (a travertine with an opaque creamy to grey base with frequent red and brown inclusions and a pattern of banding, which varies from wavy to flowery), *pecorella* (a travertine with an orange, brown, beige, and rust-red base with gray and white bands, convoluted formations and spots), *tartarugato* (a calc-synter), and *ghiaccione* (a calc-synter, characterized by a translucent white grey to greenish base with some brown inclusions). These terms are mainly descriptive and they do not necessarily indicate qualities that are unique to one source.

Known sources of calcareous alabaster

Calcareous alabaster is found in many areas of the Mediterranean (Table 1, Fig. 1). Onyx alabaster is quintessentially Egyptian, but alabasters are also found in Turkey, North Africa and Greece (Crete).⁶ The Egyptian sources of calcareous alabaster are located at many points along the west bank of the lower Nile Valley between Helwan and Asyut (Fig. 2).⁷ After Egypt, Turkey is the second largest site of extraction for onyx alabaster particularly in the areas of Hierapolis⁸ and Akhisar, south of Harmandali (ancient Thyatira).⁹ Other non-Egyptian varieties include the Tunisian variety from Djebel Oust (c. 50 km south of Tunis) near the ancient towns of Uthina

5 However, these varieties could depend on how the stone is cut - when cut parallel to the bedding, the surface will present a dendritic structure and if cut across the bedding, the pattern will have straight to wavy bands - thus further complicating visual identification of these varieties.

6 BARBIERI *et al.* 2002a; 2002b.

7 KLEMM, KLEMM 2008.

8 SCARDOZZI 2012, 579-582.

9 BRUNO 2002a; COLAK, LAZZARINI 2002; LAZZARINI *et al.* 2012.

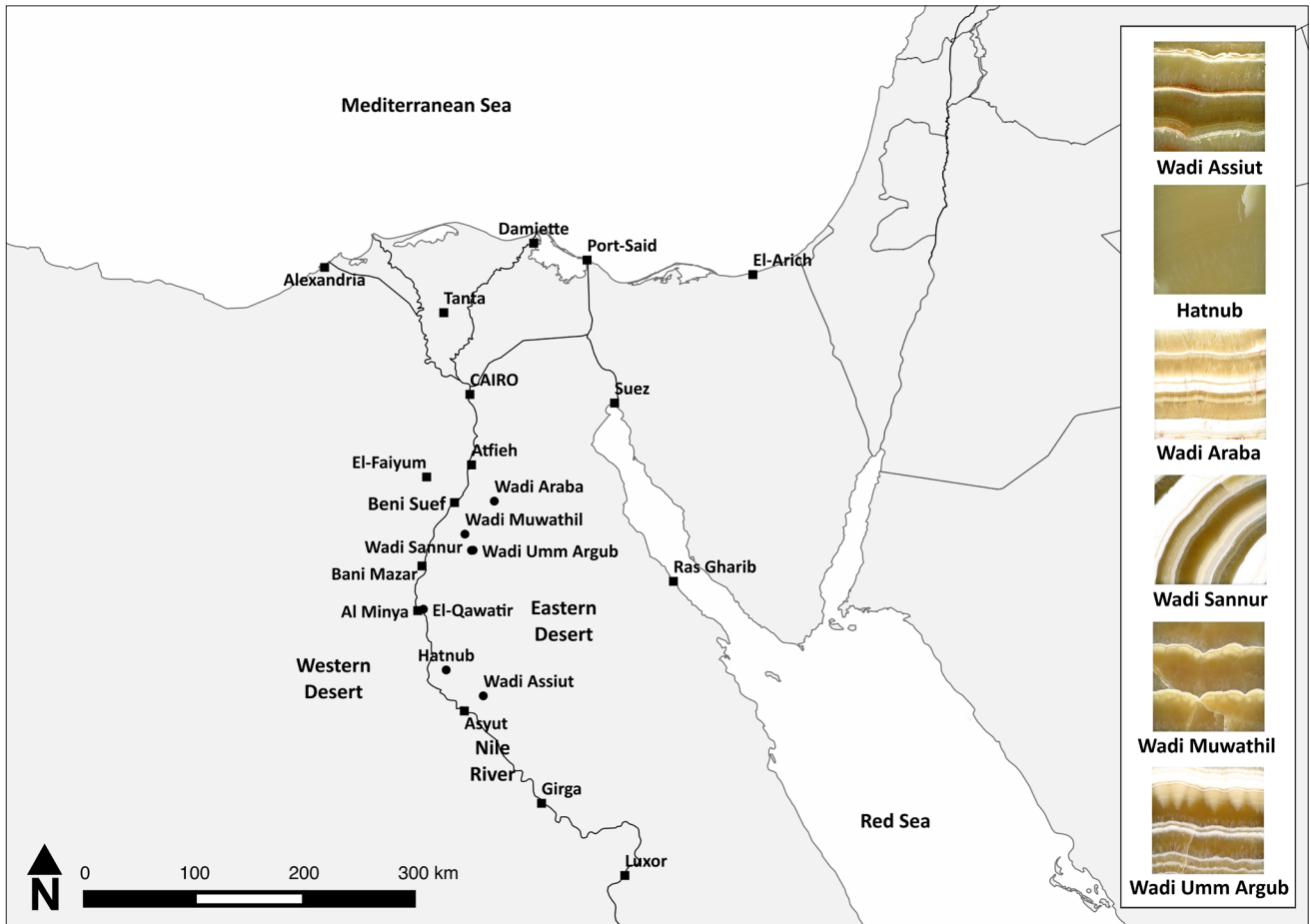


Fig. 2. Egyptian alabaster quarry map (map: S. Barker; alabaster images from HARRELL 2016)

and Thuburbo Maius.¹⁰ Several varieties can be found in Algeria, including a banded or onyx alabaster from Aïn Tekbalet near Oran and Bou Hanifia (ancient Aquae Sirenses).¹¹ In addition to these, there are some Italian sources at Jano di Montaione and Castelnuovo dell'Abate in Tuscany,¹² and the quarries southwest of the Circeo promontory in Latium.¹³

Ancient uses and current state of research

Pliny the Elder testifies to the novelty of alabaster in mid-first-century BC Rome, where Lentulus Spinther and Balbus, in 54 BC and 13 BC respectively, were amongst the first Romans to display alabaster items.¹⁴ The stone's popularity for architectural decoration continued

into the late Flavian period as we apprehend from Book I of Statius' *Silvae* (after AD 93).¹⁵ In keeping with and inspired by the Hellenistic fashion of lining walls with this stone, calcareous alabaster began to be reproduced in wall decoration and frescoes in Roman contexts while it also appeared in floors from the early first century BC, as the evidence from Pompeii and Herculaneum shows.

One of the most substantial Roman uses of calcareous alabaster is for the production of vase-shaped funerary urns, which came into use from the Caesarean period (50-40 BC) and whose production peaked in Rome under the Julio-Claudians. The stone can be identified on optical evidence, and although archaeometric analyses have not been carried out, the majority of the urns seem to be carved in Egyptian onyx (*cotognino* and *listato*), which confirms the Roman predilection for such varieties.¹⁶ This is in line with what emerges from our survey of both real and painted alabaster, which sees the preponderance of these varieties, particularly at Pompeii,

10 LAZZARINI *et. al.* 2012, 437.

11 HERMANN *et al.* 2012, 463-470.

12 LAZZARINI *et. al.* 2012, 437-438.

13 BRUNO 1998, 213-220; 2002, 286.

14 Pliny, *NH*, 36.60.

15 Statius, *Silvae* I.2.149; I.5.1-65.

16 For a discussion of these urns, see PERNA 2014.



Fig. 3.
Pompeii, House of the
Theatrical Paintings
(I.6.11), Room 4
(photo: S. Barker)



Fig. 4. Pompeii, House I.17.2 (photo: S. Barker)

from the Second-Style period (60-20 BC) and peaking in the Julio-Claudian period.

Very few quarries have been investigated in any detail and our knowledge of the scale of operations at most sites remains scarce. For example, too little is known of the extent of Roman activity - represented by some discarded column shafts - at the Djebel Oust quarries, while the trade in its stone, whose use seems to have been mainly local for the production of *sectilia* tiles, is difficult to quantify.¹⁷ Additionally, it appears that the physical conformation of the beds only allowed the extraction of small blocks. It seems that in Rome, the use of alabaster from these quarries peaked in the late Imperial period.¹⁸ At Thyatira-Akhisar surveys have retrieved much evidence - consisting of debris, tool marks, and discarded architectural elements - for extensive Roman quarrying at the site and it cannot be excluded that it fed a larger and not simply local market.¹⁹ Ancient sources like Strabo (64 BC - AD 21)²⁰ testify to the particular admiration for alabasters from Asia Minor in Augustan Rome. Moreover, recent quarry surveys and contextual analyses have made it apparent that the *fiorito* and banded varieties were used between the Hellenistic and the late Republican periods

17 LAZZARINI *et al.* 2012, 444.

18 GNOLI 1988, 22.

19 ÇOLAK, LAZZARINI 2002.

20 Strabo, *Geography*, IX.5.16.

in many parts of the Mediterranean.²¹ The attractiveness of alabaster from Asia Minor in Roman Italy is also reflected by the fact that their painted imitations occur in First- and Second-Style Roman frescoes, although items and decorative elements carved from the real stone seem to have been still relatively rare.

Although the general picture of alabaster quarries has become much clearer in recent years, much work remains to be done. The main factors that currently hinder the advancement of research on alabasters are: (1) the lack of a common terminology (e.g. calcite versus travertine, banded travertine versus onyx alabaster, etc.) and the many labels invented by the 16th-century Italian stonecutting tradition and still widely in use are extremely deceptive; (2) the limited number of quarry-based studies. Alabaster is one of the most variegated stones used by the Romans and the number of currently known sources is not proportional to the many varieties used in ancient contexts. Its macroscopic appearance can vary from bed to bed and from quarry to quarry even within the same area. This means that a number of variables (cutting direction, exhausted veins, and geology of the area) and the existence of unsampled quarries must be taken into consideration when trying to assign a variety to a given known source; (3) the lack of a comprehensive database compiling archaeometric data from individual quarries and artefacts. The majority of known quarry sites are rarely studied in depth and we still lack the detailed archaeometric data that would greatly help to establish the provenance of the varieties used for ancient artefacts. Therefore, extensive sampling is needed to fill the many gaps that still exist in our understanding of the trade and use of alabaster in the Roman period.²²

The scope of the present study

The purpose of the first three seasons of our project was to examine examples of *in situ* alabaster, as well as painted imitation, at Pompeii and Herculaneum in order to: identify all the possible real varieties in use at both sites; determine the types of painted alabaster, where recognisable, to compare faux varieties to real ones; and assess

21 BRUNO 2002a, 23; SCARDOZZI 2012, 573.

22 Recent work on analytical methods for quarry provenance has substantially increased the database of microscopic characterisation of various alabasters, while research suggests that strontium-isotope analysis as a method for provenancing calcite-alabaster/travertine is the most reliable. ANTONELLI *et al.* 2010; ÇOLAK, LAZZARINI 2002, 38-40; LAZZARINI *et al.* 2012. See also BARKER *et al.*, this volume.

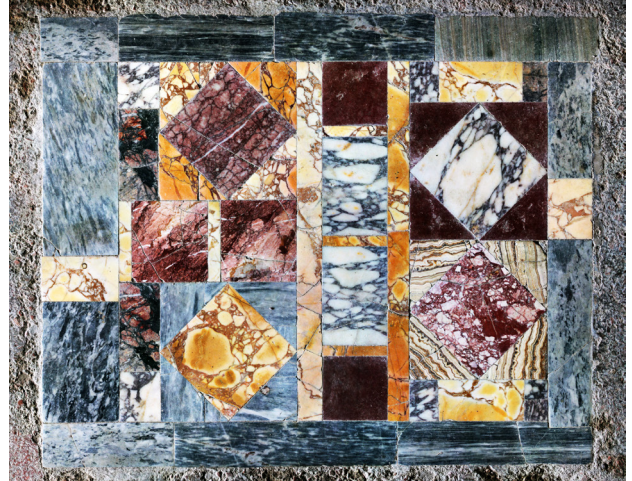


Fig. 5. Pompeii, House of the Prince of Naples (VI.15.7-8) (photo: S. Barker)



Fig. 6. Herculaneum, House of the Stags, (IV.21) Room 5 (photo: S. Barker)

alabaster-use at each site and changes in use-patterns from the second century BC to the first century AD. The aim was to carry out a qualitative, quantitative, contextual and spatial analysis of this stone in order to better understand the dynamics of its use and trade.

With its *terminus ante quem* of AD 79, the *in situ* alabaster at Pompeii and Herculaneum represents a useful analytical tool in the determination of the types of this stone in circulation in Italy from the second century BC to the first century AD. By determining the varieties of alabaster employed in each city and the changes in their use over time we can gather statistical data for the Vesuvian cities and a greater understanding of the quarrying and trade of this stone in the early Imperial period more generally.

In total 55 of the 105 locations at Pompeii and 10 of the 13 locations at Herculaneum with real or painted marble decoration were surveyed in the first three field

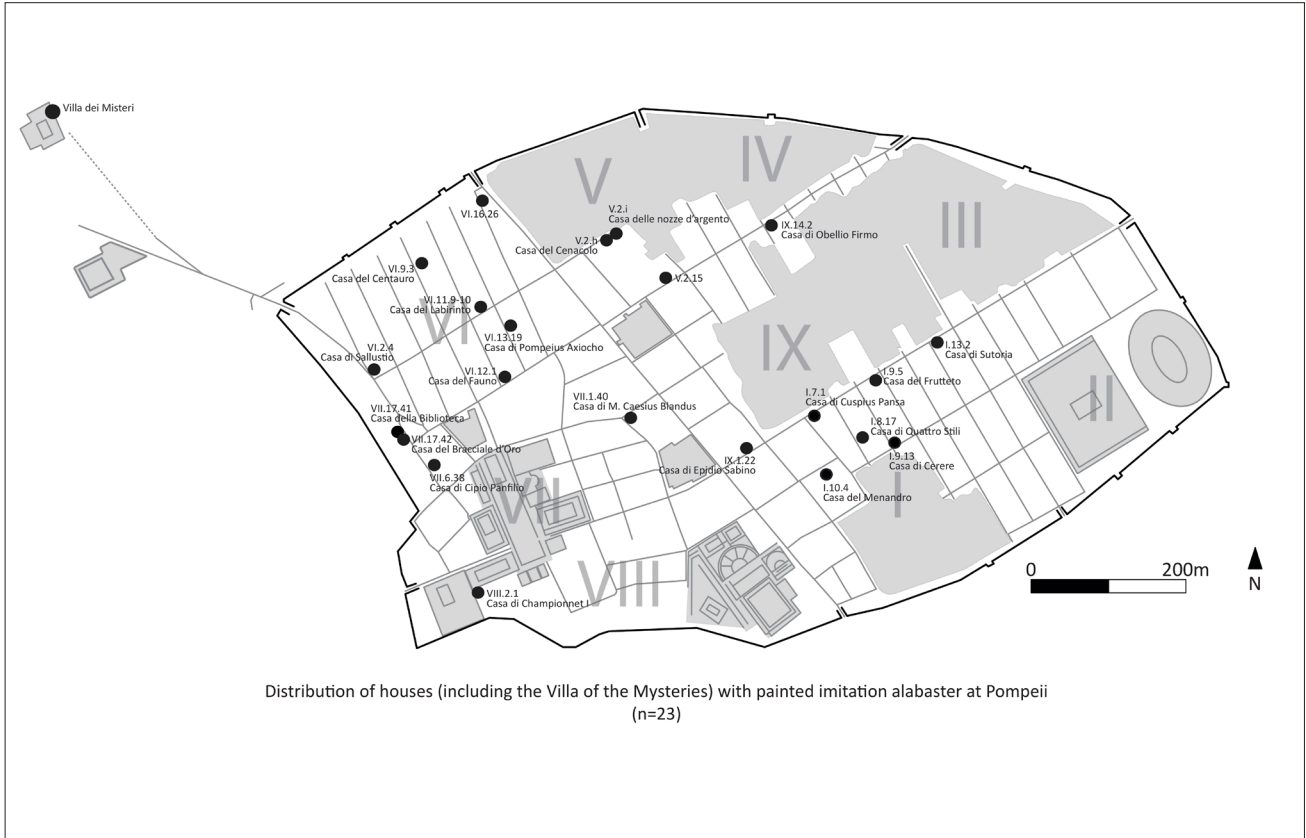


Fig. 7. Map of locations with painted alabaster at Pompeii (map: S. Barker)



Fig. 8. Map showing locations with painted alabaster by date at Pompeii (map: S. Barker)

seasons. The locations included houses as well as bar counters and façades. Our survey of houses at both cities examined a variety of pavement styles that incorporated alabaster: *cementizio a base fittile* (e.g. House of the Theatrical Paintings I.6.11, Fig. 3); *cementizio a base litica* (e.g. House I.17.2, Fig. 4); *mosaico a tessere piccole o medie*;²³ *emblemata* (e.g. House of the Prince of Naples, VI.15.7-8, Fig. 5) and *opus sectile* (e.g. House of the Stags, IV.21, Fig. 6).²⁴ In each case we photographed, measured, counted and classified every piece of alabaster. Similarly, we recorded, described and classified alabaster in painted form within wall frescoes. In addition, to our survey of houses and bars at both cities, we integrated our data with some 12 case studies from *Pompei Pitture e Mosaici* (1990-1999) and *Mosaici antichi in Italia*. In addition, we analysed, albeit only macroscopically, 24 Egyptian alabaster samples from The Rosemarie and Dietrich Klemm Collection currently at the Department of Ancient Egypt and Sudan at the British Museum in order to acquire further data on the visual characterisation of these Egyptian varieties to compare with the Vesuvian examples.

In many cases, the poor state of preservation of both floors and frescoes hindered in-depth analysis, especially in an any attempt to assign specific varieties to painted imitations. In addition, because sampling and scientific analysis were beyond the scope of the first two field seasons, our survey of alabaster is based on visual identification. While similarities between the varieties detected *in situ* and those known from published quarry sources may often be recognised on macroscopic observations, this cannot be considered fully reliable. For these reasons, the results presented here should be seen as essentially preliminary.

Painted alabaster

From the 59 houses at Pompeii (including the Villa of the Mysteries), which retain or are known to have had painted imitation marble, painted alabaster can be identified in 23 (Fig. 7). At Herculaneum only one house, the House of the Alcove (IV, 4), features painted imitation of alabaster, in all probability *fiorito*. Overall, the top painted varieties recorded are onyx alabaster (52% of the total), *alabastro fiorito* (28%), with 20% unidentified due to of the poor conservation of the painted surface or because the variety was not clear, especially in First-Style paintings (e.g. House VI.16.26 at Pompeii). If we consider the total percentages of alabaster varieties represented during the Second-Style period, the period with the largest number of houses (13) with painted

imitation alabaster, we find onyx is the predominant type depicted, being found in 7 locations. This ratio corresponds to the volume and popularity of real alabaster attested at Pompeii during this same period.

As Table 2 shows, the painted varieties of alabaster became very realistic in the Second-Style and for this reason it is often possible to recognise a close correspondence between the real and the painted varieties. Moreover, this seems to suggest that the painters were somewhat familiar with the real stone. For example, at the Villa of the Mysteries not only can the painted alabaster constituting the frieze of the “Mysteries” frescoes (60 BC)²⁵ in Room 5 be confidently classified as *fiorito* from Asia Minor but it also presents close similarities with real inserts of this type particularly with the varieties quarried near *Hierapolis* (Table 1). Consequently, alabaster varieties, especially *fiorito*, must have been already available during the Second-Style period and it cannot be excluded that initially they were employed for public building projects, while their use in private contexts, as with all polychromes, was still fairly limited.

Distribution and chronology

The distribution of painted alabaster across Pompeii shows that the highest number of painted imitation occurs in Regio VI where the oldest houses in the city are located, followed by almost the same number of dwellings in Regio I.²⁶ If we consider the distribution within individual houses, we find that painted alabaster chiefly occurs in “private” areas, particularly in *cubicula*.

Our survey also shows significant chronological changes in the use of painted imitation alabaster. In our total sample of 23 houses, 8 feature painted alabaster datable to the First-Style period, 13 to the Second-Style period, none in the Third-Style period, 1 from the Fourth-Style period and one house with alabaster in both First- and Second-Style periods (Fig. 8). This lack of painted alabaster in the Fourth-Style is particularly interesting given that painted imitation marble remained popular at Pompeii, with at least 15 houses featuring imitation marble decoration in dados or lower zones of walls in this period.²⁷ Several possibilities might account for this trend. It is possible that the increased use of real alabaster, including new varieties, during this period made painted imitation alabaster redundant. Alternatively, there might be a preference for painted polychrome marble over painted



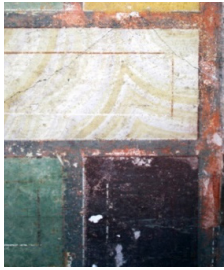




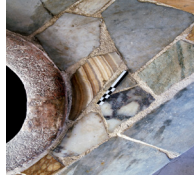
23 GRANDI, GUIDOBALDI 2006, 31-38.

24 GUIDOBALDI, OLEVANO 1998, 223-240.

25 ESPOSITO 2007, 450.

26 For a socio-economic analysis of the decoration of the houses within these *Regiones*, see WALLACE-HADRILL 1994, ch. 7 in particular.

27 See McALPINE 2014, Appendix.

Painted	Description	Real
 <p>House of Caenaculum (V.2.h)</p>	<p>Onyx with dark yellow and green almost straight bands and concentric swirls (left). The dark yellow hues are typical of the so-called “<i>cotognino</i>” alabaster that is Egyptian alabaster whose colour resembles that of a quince (right). A variety with green bands similar to that depicted here was quarried at Ghorayb in Egypt.</p>	 <p>House of Lucretius Stabia (IX.3.5-24)</p>
 <p>House of Ceres (I.9.13)</p>	<p>Onyx with honey yellow and creamy white wavy banding (left). The banded pattern reproduces the thick calcite layers typical of the real Egyptian alabaster (right) particularly that quarried at Wadi Araba and El-Qawatir.</p>	 <p>House of Gilded Cupids (VI.16.7)</p>
 <p>House of Four Styles (I.8.17)</p>	<p>Fiorito with marked yellow, orange and dark red concentric swirls (left). In all probability it represents a <i>fiorito</i> alabaster (right) from Asia Minor, possibly quarried near Hierapolis.</p>	 <p>Thermopolium (I.11.1)</p>
 <p>House of Menander (I.10.4)</p>	<p>Onyx alabaster with dark yellow, red and green flowery patches (left). In all probability a mix of varieties. The dark yellow hues are typical of the so-called Egyptian “<i>cotognino</i>” alabaster (right). Red to brown inclusions are also characteristic of other Egyptian varieties, such as those from Hatnub and Bosra.</p>	 <p>Thermopolium (I.8.8)</p>






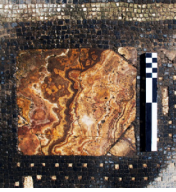


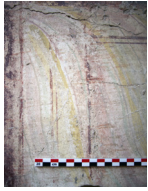

 <p>House of Labyrinth (VI.8-10)</p>	<p>A very realistic example of <i>fiorito</i> characterized by marked orangey, dark brown and creamy white flowery patches and concentric swirls (left). In all probability imitating a <i>fiorito</i> alabaster from Asia Minor (right).</p>	 <p>House of Thermopolium (I.8.8)</p>
 <p>House of Caesius Blandus (VII.1.40)</p>	<p>Onyx alabaster with dark yellow, red and green wavy horizontal banding (left). The hues and pattern are typical of the so-called Egyptian “<i>cotognino</i>” alabaster. Red to brown inclusions are also characteristic of some real Egyptian varieties (right), such as those from Hatnub and Bosra.</p>	 <p>House (I.17.12)</p>
 <p>Villa of the Mysteries</p>	<p>A very realistic example of <i>fiorito</i> characterized by marked orangey, red and dark brown flowery patches and concentric swirls (left). It reproduces a <i>fiorito</i> alabaster from Asia Minor (right), possibly a variety quarried near Hierapolis.</p>	 <p>House of the Beautiful Impluvium (I.9.1)</p>
 <p>House of Pompeus Aiochus (VI.13.19)</p>	<p>Fiorito with a marked yellow, orange and dark red concentric patch or “eye” (left). In all probability it represents an alabaster from Asia Minor (right).</p>	 <p>House of Lucretius Fronto (V.4.a)</p>
 <p>House of the Golden Bracelet (VII.17.42)</p>	<p>Onyx alabaster with honey yellow and red wavy horizontal banding (left). Red to brown ferruginous inclusions are characteristic of some real onyx varieties from Egypt (right).</p>	 <p>House of the Beautiful Impluvium (I.9.1)</p>

Table 2. Painted alabaster varieties, their description and correspondence with real alabaster (table: authors; photos: S. Barker)

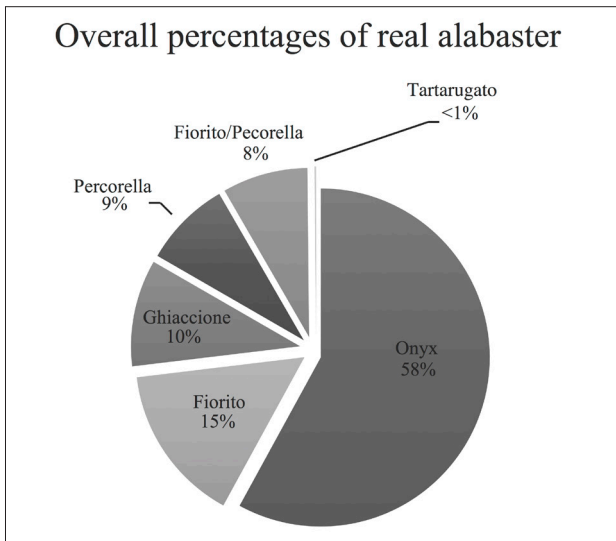


Fig. 9. Graph showing percentages of real alabaster from Pompeii and Herculaneum (graph: S. Perna)

alabaster. The use of real polychrome marbles had increased greatly at Pompeii during the Fourth-Style period in both private and public architecture.²⁸ Local élites at Pompeii might well, therefore, have been working hard to keep up with fashions in decorative stone-use, in which alabaster was no longer as prestigious (or at least as popular) at Pompeii.

Real alabaster

A total of 1,253 pieces of alabaster were documented during the course of the first three field seasons: onyx alabaster (58%) was the most attested, followed by *alabastro fiorito* (15%), *ghiaccione* (10%), *pecorella* (9%), and a further 8%, which could either be *fiorito* or *pecorella*, but could not be fully distinguished due to the overlap between these two varieties. A range of other varieties of alabaster was also found, but in much smaller quantities, including *Palombara* (>1%) and *tartarugato* (>1%) (Fig. 9).

The onyx alabaster is in all probability from Egypt, and was clearly in use from as early as the Second-Style period at Pompeii with 5 examples from this period. Onyx alabaster predominates in early examples at Pompeii but is completely absent from extant examples at Herculaneum. In contrast, the *fiorito* varieties, quite likely from Asia Minor, and a remarkable quantity

of *pecorella* from North Africa are found at Herculaneum from the Third- and Fourth-Style periods. *Alabastro fiorito* features in a total of 22 houses at Pompeii and Herculaneum but does not appear earlier than the Third-Style period (Fig. 10). Alongside these “main” types, some “singular” and non-clear cut varieties at both cities have been identified on optical grounds. The most frequent are: a variety of banded onyx that presents a translucent dark white to beige horizontal bands or concentric swirls alternating with brown or dark red layers, with 5 occurrences in Pompeii and Herculaneum; a variety of *fiorito* with a porous creamy white-coral pink base with concentric purple to dark purple swirls with dark brown “eyes,” with 3 cases; and a mix between *pecorella* and *fiorito* that occurs in c. 100 examples in the House of the Stags at Herculaneum alone.

Although all of the varieties of real alabaster noted above are attested at both Pompeii and Herculaneum, there are noticeable differences in their quantities at the two sites, especially after AD 62. There is a striking discrepancy, in particular, in the amounts of onyx *cotognino*, banded alabaster, *fiorito* and *pecorella*. The extant examples at Herculaneum show a far higher proportion of *fiorito* (116 compared to 69) and *pecorella* (101 compared to 1) than at Pompeii, and this figure is even more striking if we include the examples which could be either *fiorito* or *pecorella* (an additional 100 at Herculaneum) (Fig. 11). While we should acknowledge the difference in the sample size between the two sites, since only a fraction of Herculaneum has been excavated, the results suggest a clear difference between the top recorded varieties at each city: onyx alabaster at Pompeii and *fiorito* and *pecorella* at Herculaneum. Pompeii has a wider spread of alabaster across a greater number of dwellings and over a longer period of time: 856 inserts documented at Pompeii compared to 397 at Herculaneum; however, it is also clear that houses dating to the Third- and the Fourth-Style periods from Pompeii had significantly fewer pieces of alabaster than those at Herculaneum. Moreover, Herculaneum contained larger pieces, primarily in *sectilia* tiles.

This difference in the quantities, range and size of alabaster can be better seen when we compare individual premises at both sites. The houses with the highest number of fragments at Herculaneum are the House of the Stags, with over 232 inserts and *sectilia* tiles, the House of the Alcove, with over 74, and the House of the Telephus Relief (Ins. Or. I, 1), with over 19 examples. The House of the Stags contained the largest individual insert with a rectangular tile of *pecorella* that measures 81 x 111 cm in Cryptoportic D in front of the threshold of Room 16. These examples are far richer than those at Pompeii, where only the House of Menander has a

28 See FANT 2007, 340–3 for marble in Flavian public architecture at Pompeii. However, the quantity of polychrome marble reused on the bar counters at Pompeii suggests that much was available for use in public buildings in the Julio-Claudian period; see FANT *et al.* 2013, 206.

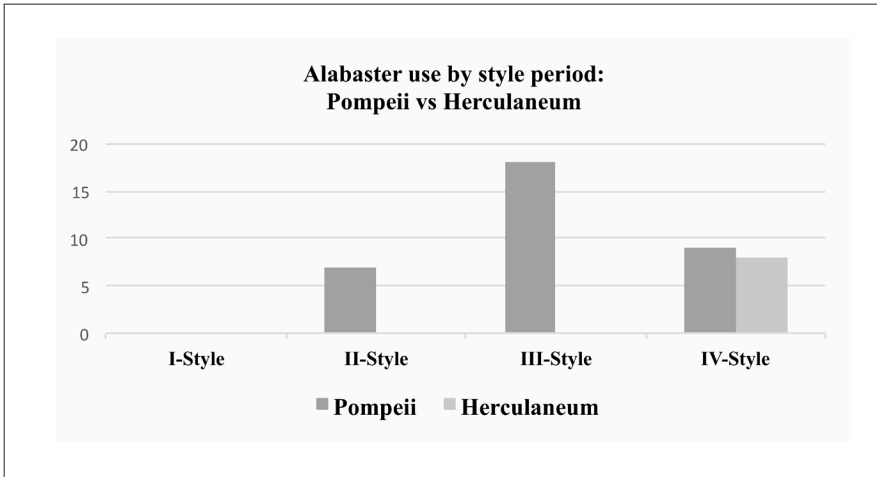


Fig. 10. Graph showing alabaster by style period at Pompeii and Herculaneum (graph: S. Perna)

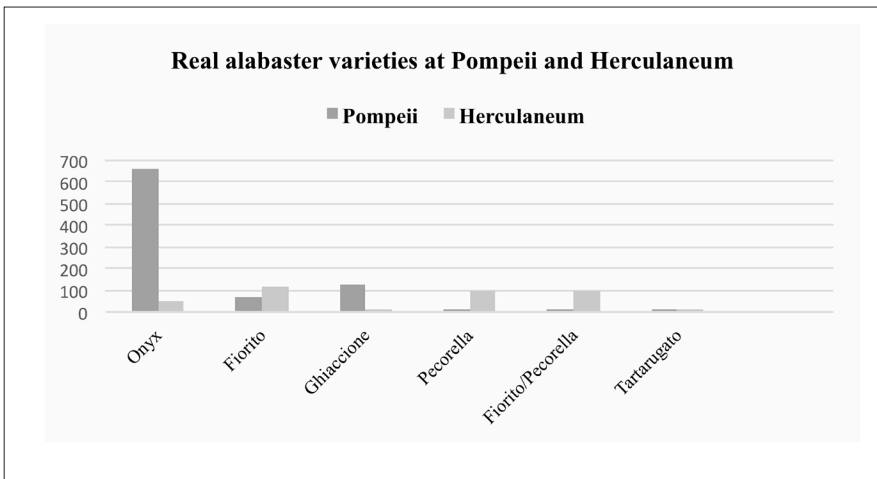


Fig. 11. Graph showing the varieties of real alabaster detected at both sites (graph: S. Perna)

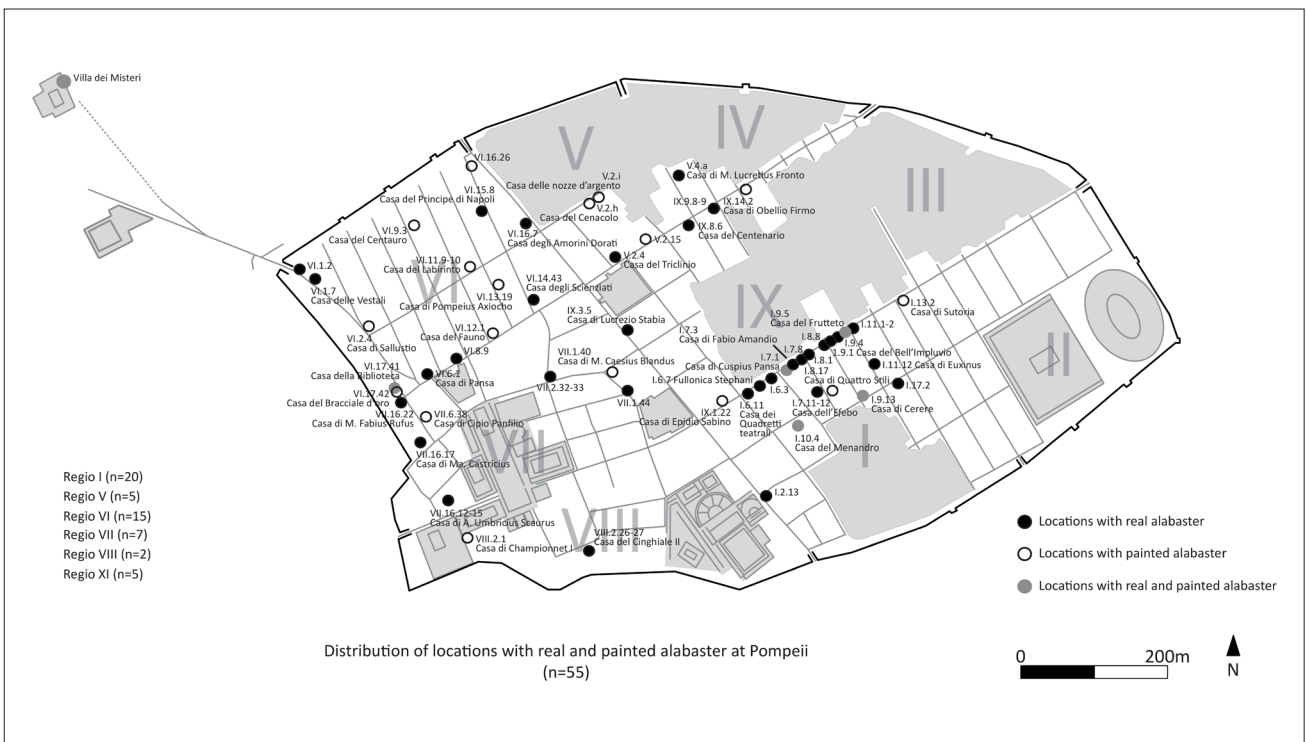


Fig. 12. Distribution of locations with real and painted alabaster at Pompeii (map: S. Barker)

Herculaneum	House	Location	Room Type	Alabaster Variety	Number of tiles	Maximum Size	Floor Style				
	House of the Stags	IV. 21	Tablinum <i>Oecus</i> 15	<i>Fiorito</i>	13	21x25 cm	Fourth				
				<i>Pecorella</i>	3	22x22 cm					
				Onyx	5	21x21 cm					
			<i>Cryptoporticus</i>	<i>Fiorito</i>	5	10x10 cm					
				<i>Pecorella</i>	126	10x10 cm					
				Onyx	3	10x10 cm					
			Cryptoporticus – Side D/ Room 16	<i>Pecorella</i>	1	81x111 cm					
			<i>Dieta</i> 23	<i>Fiorito</i>	1	13.5 x 7 cm					
			<i>Oecus</i> 7	<i>Fiorito</i>	30	21x21 cm					
				<i>Pecorella</i>	2	21x21 cm					
				Onyx	13	21x21 cm					
			<i>Triclinium</i> 5	<i>Fiorito</i>	17	29x29 cm					
				<i>Pecorella</i>	4	29x29 cm					
				Onyx	9	28x15 cm					
			Pompeii	House of Lucretius Fronto	V. 4.a	Atrium		<i>Fiorito</i>	11	7.5 x 7.5 cm	Third (Augustan)
								<i>Tartarugato</i>	1		
						<i>Cubiculum</i>		<i>Ghiaccione?</i>	1	39 x 39 cm	Fourth?

Table 3. Breakdown of the varieties, number and size of alabaster inserts in the House of the Stags at Herculaneum and the House of Lucretius Fronto at Pompeii (table: authors)

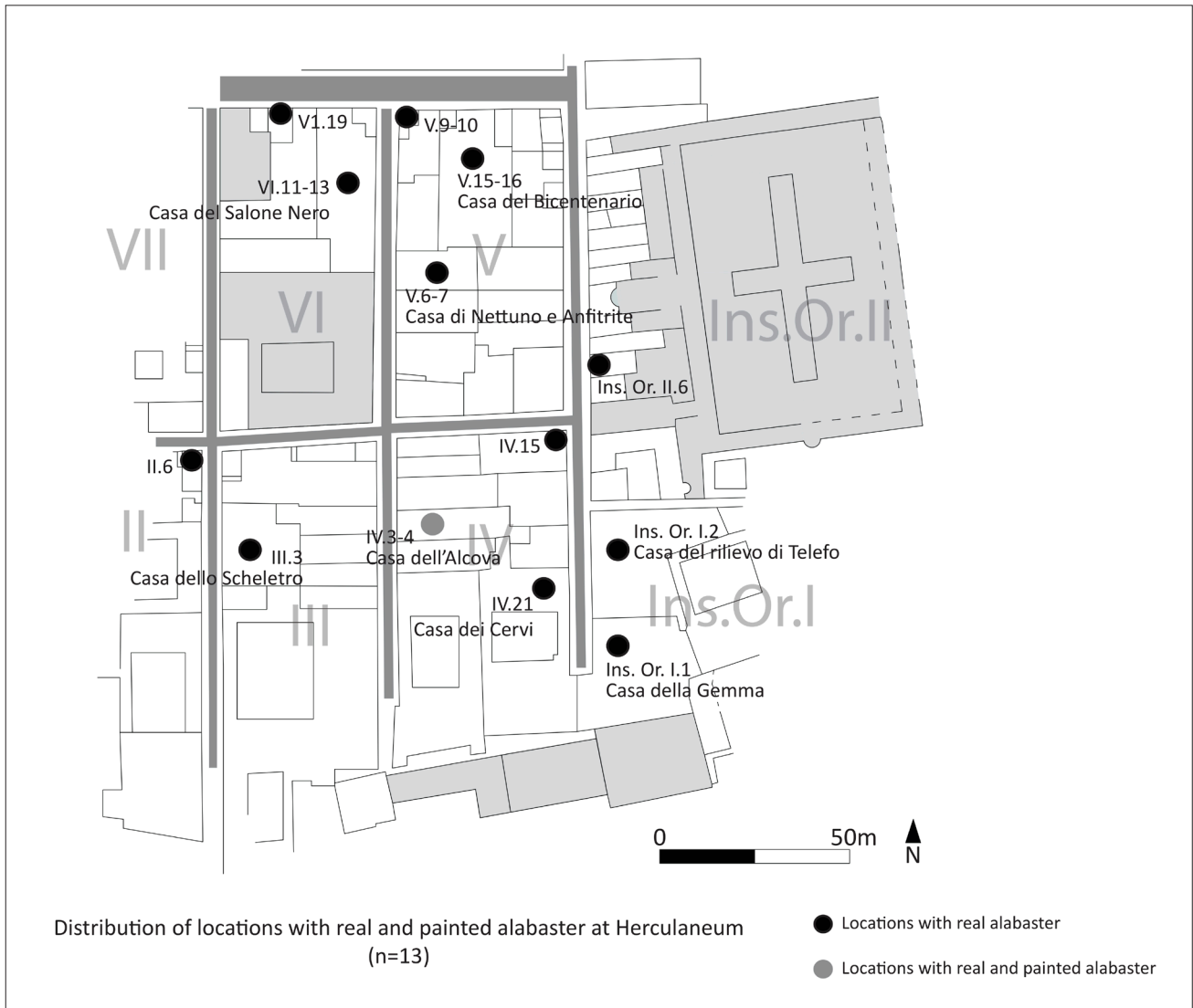


Fig. 13. Distribution of locations with real and painted alabaster at Herculaneum (map: S. Barker)

higher number of inserts (over 280 pieces),²⁹ which were generally small in size (c. 9 x 5 cm) (Table 2), and only the House of Paquius Proculus (I.7.1) features a large insert, a round tile of onyx in an *emblema*. Indeed, the richer use of alabaster in this period at Herculaneum is in line with the general use of polychrome marble in the city during the major refurbishments immediately before and after AD 62 that were in keeping with major trends in Rome, unlike at Pompeii, which seems to have remained more conservative.

Distribution and chronology

The distribution of alabaster at Pompeii shows that out of 55 locations with alabaster – 43 houses, the Villa of the Mysteries and 11 bar counters (Fig. 12) – 26 contain real alabaster and 6 contain both real and painted alabaster. The distribution of alabaster at Herculaneum shows that 12 locations had real alabaster – 7 houses and 5 bar counters (Fig. 13) – and only one house contained real and painted alabaster. The overall distribution patterns suggest that real alabaster was in apparent short supply and, despite being one of the first polychrome stones to be introduced into Pompeii, it only became more widely distributed during the Fourth-Style period. This is clear when we compare the distribution of alabaster in the total number of houses with polychrome marbles: 27 out of a total of 106 houses with polychrome marble, including the Villa of the Mysteries, have real alabaster (Fig. 14) and 8 out of a total

29 These figures are preliminary, as the Villa of the Mysteries was not accessible due to restoration work at the time of our surveys.



Fig. 14. Comparison of the distribution of polychrome marble and alabaster at Pompeii (map: S. Barker)



Fig. 15. Comparison of the distribution of polychrome marble and alabaster at Herculaneum (map: S. Barker)

of 17 houses with polychrome marble at Herculaneum have real alabaster (Fig. 15). This limited distribution of alabaster in respect to other polychrome marbles further confirms that large quantities of this material were exceptional, perhaps due to the dynamics of extraction and thus to availability. This made the use of alabaster a clear indication of the wealth and status of the house owners. Further confirmation of this phenomenon can be found at Herculaneum, where the houses with the highest number of alabaster inserts and varieties of alabaster are found on the south side of the city overlooking the sea, in the most richly marble-decorated residences. Similarly, at Pompeii the highest number of houses with alabaster is recorded in *Regiones* I and VI, where many of the richest residences in the town are located. A further point can be made with regard to the distribution of alabaster by considering the location of its use within individual houses at both sites. Real alabaster features mainly in the “public” areas of the house - the *atrium* (10), *tablinum* (6) *triclinium* (13) *fauces* (3) and peristyle (2) - however, strikingly, we also find it displayed in more “private” rooms, such as *cubicula* (7) and *oecii* (4) (Fig. 16). Interestingly, in those houses where both real and painted alabasters occur, the two types are never located in the same room.

Conclusions

The data emerging from our project shows that onyx alabaster, in all probability from Egypt, is the earliest recorded variety in our survey. Its use spans from the Second-Style to the Fourth-Style with a peak in the Julio-Claudian period. This is in keeping with the hypothesis that Egyptian alabaster was one of the earliest varieties to come into use, around 50 BC according to Pliny the Elder.³⁰ Macroscopic identification seems to confirm the provenance of most of the onyx at both sites from already known sources, such as el Qawatir, Wadi Araba and, possibly, one or more from Hatnub.

Alabaster-use seems to have changed and new alabaster varieties were introduced in the Augustan and Julio-Claudian periods. While Egypt was the original, primary source from which the growing market for alabaster was fed, it seems quite evident that it became less used overtime as new quarries were exploited and more variegated alabasters became available. The use of real *fiorito*, whose varieties from Asia Minor were known in Rome as early as the Augustan period,³¹ peaked at Pompeii and Herculaneum in the Third- and Fourth-Style periods. However, the frequent appearance and realism of painted imitations of *fiorito*, especially in Second-Style paintings,

30 Pliny, *NH*, 36.60.

31 Strabo, *Geography*, IX.5.16.

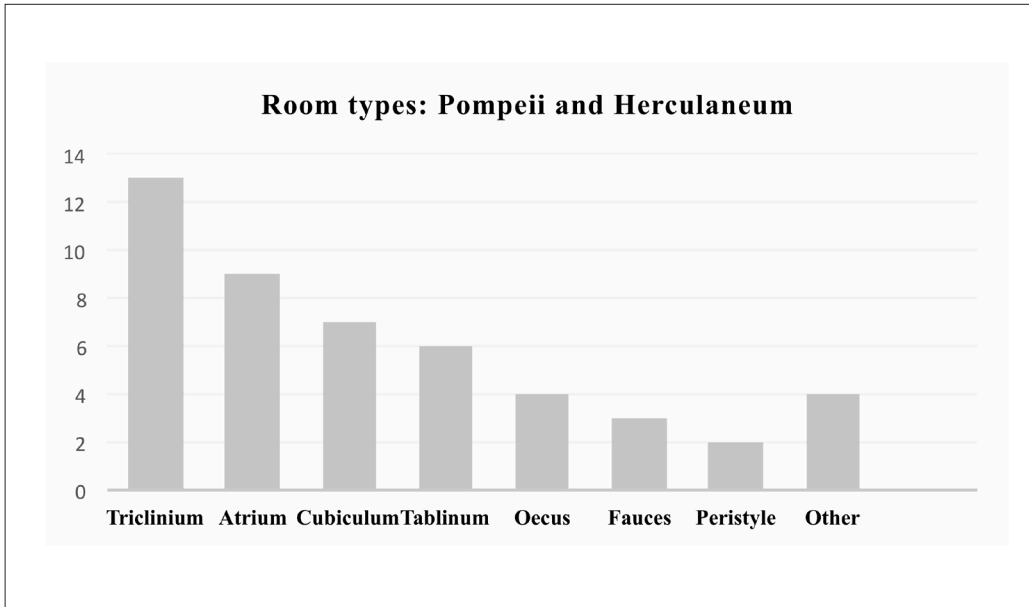


Fig. 16. Graph showing the overall total of room types at both sites with alabaster (graph: S. Perna)



Fig. 17. *Ghiaccione* alabaster in the House of Ceres, (I.9.13), Pompeii (photo: S. Barker)



Fig. 18. *Ghiaccione* alabaster in the House of Euxinus, (I.11.12), Pompeii (photo: S. Barker)

suggest that although we lack contemporary instances of real *fiorito*, limited quantities may have been available at this time. The present study also raises evidence for the use of *ghiaccione* alabaster from Circeo, which has so far only been linked with use in the second century AD.³² Pieces of *ghiaccione* were identified in the Houses of Umbiricius Scaurus (VII.16.15), Ceres (I.9.13, Fig. 17) and Euxinus (I.11.12, Fig. 18), suggesting its use as early as the mid-first century BC; however, this identification was based on visual analysis and scientific analysis is still needed.

The evidence from painted alabaster reflects the use of real alabaster. Egyptian onyx was most common, followed by *fiorito*, as early as the Second-Style when

painted imitations of alabaster reached high levels of accuracy. The use-patterns in relation to space and function of the rooms in the houses at both Pompeii and Herculaneum demonstrate that real and painted alabasters were used both in private rooms, where they could be enjoyed solely and uniquely by the owners of the houses, and in public areas, to impress visitors and to display wealth. The occurrence of alabaster in many of the richest houses at Pompeii and Herculaneum testifies to the prestige that the material had enjoyed since its first appearance in Rome. These are some of the elements that the *Alabaster Quarrying and Trade in the Roman World Project* seeks to uncover about calcareous alabaster, one of the most variegated decorative stones used in Antiquity. Only by producing more geological and archaeological data and combining them into a comprehensive database will we help bridge the gaps in our current knowledge on the quarrying, trade, and use of this stone in the Roman world.

32 BRUNO 1998, 213-220; 2002a, 286. See the article on the alabaster thresholds at Villa A by BARKER *et al.* in this volume.

REFERENCES

- ANTONELLI F., LAZZARINI L., CANCELLIERE S., DESSANDIER D. 2010: "On the white and coloured marbles of the Roman town of Cuicul (Djemila, Algeria)", *Archaeometry* 52/4, 575-596.
- ASTON B. G., HARRELL J. A., SHAW, I. 2000: "Stones" in P. T. NICHOLSON, I. SHAW (eds.): *Ancient Egyptian Materials and Technology*, Cambridge, 5-77.
- BARBIERI M., LILYQUIST C., TESTA G. 2002a: "Provenancing Egyptian and Minoan Calcite-Alabaster artifacts through $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic ratios and petrography", in *ASMOSIA VI*, 403-414.
- BARBIERI M., TESTA G., MEROLA D., POLYCHRONAKIS Y., SIMITZIS V. 2002b: "Provenancing Egyptian and Minoan Calcite-Alabaster artifacts through $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic ratios and petrography", in *ASMOSIA VI*, 415-423.
- BRUNO M. 1998: "Su una cava di alabastro del Circeo in località "La Batteria"", in P. PENSABENE (ed.): *Marmi Antichi II, cave e tecniche di lavorazione, provenienza e distribuzione*, Roma, 213-222.
- BRUNO M. 2002a: "Alabaster quarries near Hierapolis (Turkey)", in *ASMOSIA VI*, Padova, 19-24.
- BRUNO M. 2002b: "Il mondo delle cave in Italia: considerazioni su alcuni marmi e pietre usati nell'antichità", in M. DE NUCCIO, L. UNGARA (eds.): *I marmi colorati della Roma imperiale*, Padua, 277-90.
- ÇOLAK M., LAZZARINI L. 2002: "Quarries and characterisation of a hitherto unknown alabaster and marble from Thyatira (Akhisar, Turkey)", in *ASMOSIA VI*, Padova, 35-40.
- ESPOSITO D. 2007: "Pompei, Silla e la villa dei Misteri", in B. PERRIER (ed.): *Villas, maisons, sanctuaires et tombeaux tardo-républicains : découvertes et relectures récentes*, Actes du colloque international de Saint-Romain-en-Gal en l'honneur d'Anna Gallina Zevi, Roma, 441-465.
- FANT J. C., 2007: "Marble real and painted (imitation) at Pompeii", in J. J. DOBBINS, P. FOSS (eds.): *The World of Pompeii*, New York and Abingdon, 336-346.
- FANT J. C., RUSSELL B., BARKER S. J. 2013: "Marble use and reuse at Pompeii and Herculaneum: the evidence from the bars", *Papers of the British School at Rome* 81, 181-209.
- GNOLI R. 1988: *Marmora Romana*, 2nd ed. Roma.
- GRANDI M., GUIDOBALDI F. 2006: "Proposta di classificazione dei cementizi e mosaici omogenei ed eterogenei", in *Atti dell'XI Colloquio AISCOM*, Ancona 16-19 febbraio 2005, Tivoli: 31-38.
- GRANDI M., GUIDOBALDI F., PISAPIA M. S. 2014: *Mosaici antichi in Italia: Regione prima*; Ercolano, Roma.
- GUIDOBALDI F., OLEVANO F. 1998: "Sectilia pavimenta dell'area vesuviana", in P. PENSABENE (ed.): *Marmi Antichi II, cave e tecniche di lavorazione, provenienza e distribuzione*, Roma, 223-240.
- HARRELL J. A. 1990: "Misuse of the term "alabaster" in Egyptology", in *Gottinger Miszellen* 119, 37-42.
- HARRELL J. A. 2016: *Research on the Archaeological Geology of Ancient Egypt* Accessed (14.04.16): www.eeescience.utoledo.edu/faculty/harrell/egypt/AGRG_Home.html
- HARRELL J. A., BROEKMANS M. A. T. M., GODFREY-SMITH D. I., 2007: "The origin, destruction and restoration of colour in Egyptian travertine" *Archaeometry*, 49, 421-436.
- HERRMANN JR. J. J., ATTANASIO D., TYKOT R. H., VAN DEN HOEK A. 2012: "Aspects of the Trade in Colored Marbles in Algeria" in "L'Africa Romana," XIX Convegno Internazionale di studi Sassari, 16-19 dicembre 2010, Roma, 1331-1342.
- HERRMANN JR. J. J., VAN DEN HOEK A., TYKOT R. H. 2012: "Alabastro a pecorella, Aïn Tekbalet, and Bou Hanifia, Algeria: a preliminary report", in *ASMOSIA IX*, 463-473.
- HESTER T. R., HEINZE R. E. 1981: *Making Stone Vases, Ethnoarchaeological Studies at an Alabaster Workshop in Upper Egypt*, Malibu.
- KLEMM R., KLEMM D. 2008: *Stones and quarries in ancient Egypt*, London.
- LAZZARINI L. 2002: "La determinazione della provenienza delle pietre decorative usate dai Romani", in M. DE NUCCIO, L. UNGARO (eds.): *I marmi colorati della Roma Imperiale. Catalogo della mostra* (Roma 28 settembre 2002-19 gennaio 2003), Venezia, 223-265.
- LAZZARINI L., SANGATI C. 2004: "I più importanti marmi e pietre colorati usati dagli antichi", in L. LAZZARINI (ed.): *Pietre e marmi antichi. Natura, caratterizzazione, origine, storia d'uso, diffusione, collezionismo*, Padua, 73-100.
- LAZZARINI L., VISONÀ D., GIAMELLO M., VILLA I. 2012: "Archaeometric characterisation of one Tunisian and two Italian calcareous alabasters used in antiquity", in *ASMOSIA IX*, 436-446.
- McALPINE L. J. 2014: *Marble, Memory, and Meaning in the Four Pompeian Styles of Wall Painting*, Unpublished PhD thesis, University of Michigan.
- MIELSCH H. 1985: *Buntmarmor aus Rom in Antikemuseum Berlin*, Berlin.
- PERNA S. 2014: *Roman Cinerary Urns in Coloured Stone: Production and Significance*, Two Volumes, Unpublished PhD Thesis, Royal Holloway University of London.

- PRICE M., COOKE, L. 2012: Corsi Collection of Decorative Stone Accessed (18.03.16) www.oum.ox.ac.uk/corsi/.
- PUGLIESE CARRATELLI G. (ed.) 1990 - 1999: Pompei. Pitture e mosaici, I - IX, Rome.
- RUSSELL B. J. 2013: Gazetteer of Stone Quarries in the Roman World, Version 1.0, accessed (04.03.16): www.romaneconomy.ox.ac.uk/databases/stone_quarries_database/.
- SCARDOZZI G., 2010: "Hierapolis di Frigia, dalle cave ai cantieri di demolizione: l'approvvigionamento di material lapidei nella città di età imperiale e proto-bizantina", in S. CAMPOREALE, H. DESSALES, and A. PIZZO (eds.): *Arqueología de la construcción II. Los procesos constructivos en el mundo romano: Italia y provincias orientales (Anejos de Archivo Español de Arqueología 57)*, Madrid, 351-74.
- SCARDOZZI G. 2012: "Ancient marble and alabaster quarries near Hierapolis in Phrygia (Turkey): new data from archaeological surveys", in *ASMOSIA IX*, 573-574.
- TOUBAL A. 1995: "Les mines et les carrières en Numidie. Exploitations antiques", in P. TROUSSET (ed.): *Production et exportations africaines. Actualités archéologiques en Afrique du Nord antique et médiévale. VI^e Colloque International sur l'Histoire et l'Archéologie de l'Afrique du Nord*, Roma, 275-334.
- WALLACE-HADRILL A. 1994: *Houses and Society in Pompeii and Herculaneum*, Princeton.