

Digging into Pottery: Scientific Approaches to Archaeological Ceramic Analysis Around the World



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Edited by
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Contents

Introduction	iii
Preface	iv
Patrick Quinn	
Tracing Traditions: A Comprehensive Review of Neolithic Ceramics in Northern Greece	1
Archontoula Barouda	
Investigating Pottery Technology in the Late to Final Neolithic Southeast Asia: A Case Study from North Taiwan	17
Che-Hsien Tsai, I-Ting Chen, Wei-Hsun Lin and Shao-Pu Tsai	
Similar yet Distinct: A Comparative Study of Plaster of Architectural Features and Plaster Containers from Neolithic Tell Sabi Abyad, Syria	36
Bonnie Nilhamn and Merel L. Brüning	
Lime and Gypsum Binders through the Lenses	65
Paola Pizzo and Jan Válek	
Silo: An Early Iron Age Ceramic Form in the Area of Western Slovenia	79
Manca Vinazza, Doris Potočnik, Nives Ogrinc, Aleš Šoster, Matej Dolenec and Nastja Rogan Šmuc	
Tracing Pottery Consumption and Regional Interactions at Sant Genís de Rocafort Priory (Martorell, Barcelona, Spain), 12th to 16th Centuries	97
Esther Travé Allepuz, Josep Socorregut Domènech, Rosario Navarro Sáez and Montserrat Farreny Agràs	
Interweaving Traditions: Ceramic Production at Cartagena de Indias, Colombia, before and after the European Conquest	119
Roberta Mentasana, Jaume Buxeda i Garrigós, Marisol Madrid i Fernández, Juan Guillermo Martín and Monika Therrien	
Made in Singapore (?): Petrographic Analysis of 14th-16th Century AD Coarse Earthenware Sherds from Empress Place (EMP), Singapore	139
Alvin Sern Hao Chua	

Introduction

It is with great pleasure that we present *Digging into Pottery*, a volume dedicated to showcasing the current state of scientific research on archaeological ceramics and plasters from across the globe. This collection brings together a wide range of studies that highlight not only the technological and compositional analyses of ancient materials but also their broader cultural, social, and economic significance. By combining careful laboratory investigation with archaeological interpretation, these papers illuminate past human behaviours, craft practices, and the movement of materials across ancient landscapes.

We are deeply grateful to the authors for sharing their expertise and insights, and to the anonymous reviewers whose careful reading and constructive feedback have strengthened the quality and clarity of these contributions.

Special thanks are due to Dr Patrick Quinn for writing the Preface, and to Professor Ian Freestone for his inspiring keynote at the Ceramic Petrology Group meeting in London in 2023, which sparked many of the discussions that shaped this volume and inspired its title, *Digging into Pottery*. We are also indebted to Boris Ljubičić, the renowned Croatian designer, for kindly designing the striking cover, *A Word of Sherds*, which captures the spirit of exploration and discovery that underpins this research.

This volume represents a snapshot of the diversity of approaches in the field, from petrography and geochemistry to advanced imaging and other laboratory techniques. These methods provide powerful tools for understanding the production, distribution, and use of ceramic and plaster materials in the past. We hope that *Digging into Pottery* will serve not only as an overview of current research but also as a stimulus for further study, dialogue, and collaboration across disciplines.

Ultimately, this collection serves as an essential resource for researchers, students, and practitioners seeking to understand how scientific analysis can illuminate past human behaviours, technological choices, and the circulation of materials across the ancient world. We hope it will inspire readers to engage with these techniques and perspectives, fostering a deeper appreciation of the rich and complex histories embedded in the archaeological record.

Editors

Maja Miše

Andrea Martínez-Carrasco

Preface

This peer reviewed volume was inspired by the Annual Meeting of the Ceramic Petrology Group (CPG), which took place at the UCL Institute of Archaeology between 10-11 November 2023. The CPG is a special interest group that brings together academics, museum researchers and commercial archaeologists interested in the study of archaeological ceramics through thin section petrography and other related techniques, such as instrumental geochemistry and scanning electron microscopy (<https://www.facebook.com/groups/TheCPG/>). It was founded in the UK in the late 20th century in response to the increasing application of ceramic petrography/petrology, within academic and museum research, following its initial application in earlier pioneering studies. Petrography, geochemistry and other archaeometric approaches to ceramics developed considerably as a field in the latter part of the 20th century and into the new millennium, and several dedicated volumes were published, often following CPG meetings. The present book continues this tradition by bringing together a collection of fresh studies on the scientific analysis of ceramics from a wide range of archaeological periods and parts of the world via thin section petrography and other laboratory approaches, many of which were presented at the 2023 CPG Annual Meeting.

The volume opens with a much-needed first published review of scientific research into Neolithic ceramics from Northern Greece by Archontoula Barouda. The prehistoric and later periods of Greece have been a hotspot for the application of ceramic petrography and geochemistry, with literally hundreds of studies and the accumulation of large datasets from many sites. Crete, the Cyclades and certain parts of the mainland such as Corinth have been particularly well studied. However, the ceramic record of northern Greece has received much less attention and a review of the disparate studies is well overdue. This chapter brings various strands of previous research together in terms of their contribution to research topics such as pyrotechnology, which is a key concern in the study of Neolithic craft practice and innovation in this part of the world, as well as the distribution of pottery.

Che-Hsien Tsai and colleagues reconstruct the technology of Neolithic ceramics from Taiwan in Chapter 2, using a combination of thin section petrography and geochemistry, as well as traditional macroscopic approaches. The scientific study of pottery from Taiwan and adjacent regions has not featured in previous English language volumes on ceramic analysis, so is a welcome contribution. The study demonstrates how the scientific methods developed in areas such as Greece and the Aegean can be applied to material from quite different cultures. Of course, there are many commonalities in terms of the technological steps and solutions that potters often independently adopted in disparate regions. Similar geological materials, such as andesite and shale, are also available in different parts of the world and ceramics from quite different places may be relatively indistinguishable under the microscope. However, it is the cultural context that differs, and thus the significance of compositional diversity and changes in technology. The authors suggest the presence of multiple potting groups or interactions and exchanges between the studied site and the broader region during the Late Neolithic Period, as well as technological differences between the Yuanshan and Botanical Garden cultures.

Plaster is a type of inorganic material that was used by many past societies and shares some similarities and differences with fired clay-based ceramics. In some parts of the world, such as Syria, it was used since the Neolithic for coating architectural features such as floors and walls, as well as for fashioning portable containers. This interesting topic is tackled by the chapter of Bonnie Nilhamn and Merel Brüning. It characterises the raw materials and production technology of plaster from Tell Sabi Abyad via multiple analytical techniques, comparing different structures and examining how it evolved over time at the site. The chapter contains a useful summary of the nature of plaster-based materials, their ingredients and technological processes. It also highlights some of the challenges faced when studying ancient cementitious structures and objects and their technology, compared to modern plaster in the field of engineering materials. The chapter demonstrates the benefits of combining bulk geochemistry and SEM microanalysis with thin section petrography when studying ancient plaster.

Continuing this theme, the next chapter by Paola Pizzo and Jan Válek applies a multi-analytical approach to the study of Late Bronze Age to Roman plaster from Paphos, Cyprus. This study resulted from the Marie Curie Innovative Training Network ‘PlaCe’ (Training the next generation of archaeological scientists: Interdisciplinary studies of pre-modern Plasters and Ceramics from the eastern Mediterranean). The PlaCe project was an important recent initiative to train archaeological material scientists from several European countries through the completion of doctoral research projects. These and other young researchers will no doubt take the field of ceramic analysis forward in the coming years, refining our analytical and theoretical approaches, opening new avenues of enquiry, and revisiting long-standing issues.

The chapter by Vinazza and colleagues characterises the inorganic and organic composition of an interesting but poorly-understood type of ceramic vessel from the Early Iron Age of western Slovenia. The technology and function of the large thick-walled so-called ‘silo’ vessels are examined using macroscopic, petrographic, mineralogical and geochemical methods. Commendable is the combination of these instrumental methods with the study of organic molecules left from the use of the ceramics. Organic residue analysis of ancient ceramics is a powerful method for exploring the possible functions of vessels used to store, process, transport or consume substances derived from animals or plants. By combining it with the detailed analysis of the dominant inorganic material from which ceramics were produced, it is possible to extend the reconstruction of the life history of vessels beyond their production sequence or *chaîne opératoire* to include use and function.

Travé Allepuz and colleagues present the detailed analysis of Medieval ceramics from a recently-excavated priory near Barcelona, Spain. They use detailed macroscopic and petrographic analysis to explore the dynamics of pottery production, consumption, and regional interactions during the 13th and 14th centuries at this site. This reveals local connections between the monastery and nearby settlements, as well as interaction within a broader geographical area. The authors make use of the large compositional database of Medieval ceramics from many sites in Catalonia that they have amassed over the past 15 years to determine the sources of the pottery. This is a good example of how sustained analysis in a particular area can greatly benefit current studies and lead to more certain provenance attribution.

Mentesana and colleagues examine ceramic production at Cartagena de Indias, one of the most important Spanish colonial ports in the Americas during the 16th and 17th centuries. Using a combination of XRF, XRD, SEM and thin section petrography, they investigate Indigenous, Mestizo and Criollo wares recovered from the Convent of Santo Domingo and related sites. The study demonstrates a strong continuity in Indigenous technological practices despite European colonisation, while also identifying the introduction of wheel throwing, glazing and higher firing temperatures in Criollo pottery intended to emulate European forms. The coexistence of these traditions reveals the complex processes of cultural interaction and technological adaptation that characterised colonial Cartagena.

The volume closes with what might be the first published petrographic study of coarseware ceramics from Singapore. Early Singapore was an important centre for the trade in Chinese porcelain, which turns up in excavations, as well as shipwrecks. However, low-fired, coarse earthenware is much less well studied in terms of its origins and material is assumed to have been locally made. As this chapter by Alvin Chua demonstrates, via the petrographic and SEM-EDS analysis of ceramics from Empress Place, a pre-colonial (14th to 16th centuries AD) site in downtown Singapore, this is not the case. Many of the analysed ceramics seem to have been brought to the island from elsewhere. Unfortunately, positively identifying the origin(s) of these non-local/imported coarseware vessels is hampered by a lack of comparative compositional data from potential source areas. Chua’s work is however a brave start that can be built upon by future studies.

The volume you are about to read captures a useful snapshot of the state-of-the-art of the field of scientific research into pottery and related ceramic artefacts within archaeology. It demonstrates how the main

laboratory techniques can be used to detect cultural patterning with inorganic artefacts and how this can be interpreted in terms of the activities, knowledge and identities of past people, as well as their interactions with one another.

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