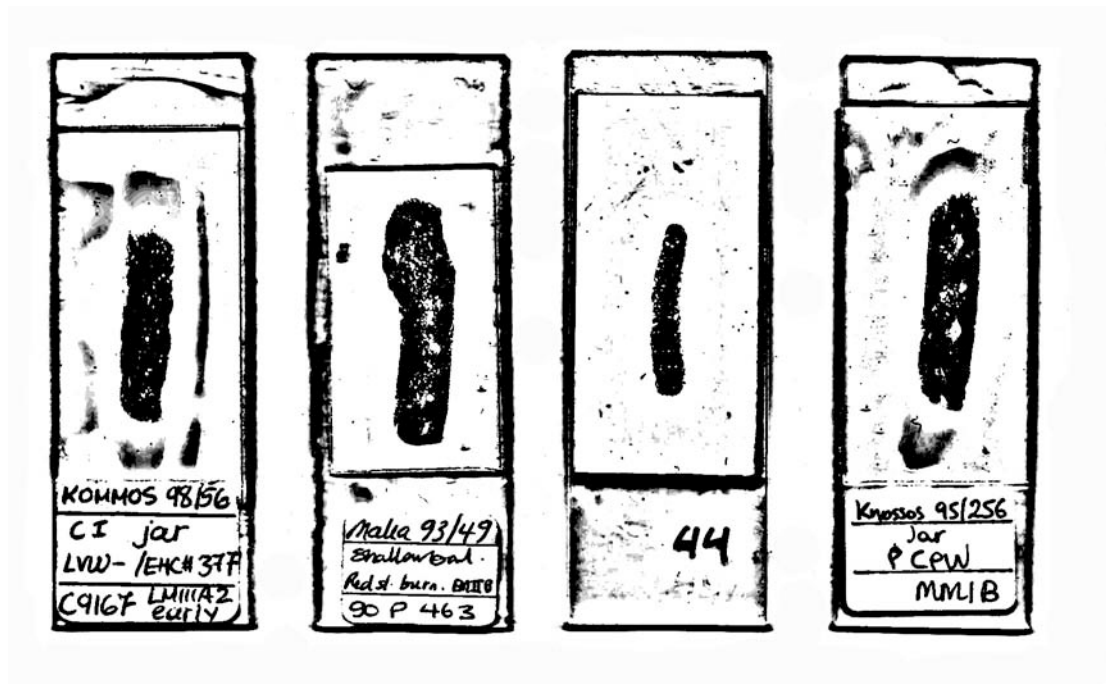


# PETROGRAPHY OF ARCHAEOLOGICAL MATERIALS

DEPARTMENT OF ARCHAEOLOGY, UNIVERSITY OF SHEFFIELD

15-17 FEBRUARY 2008



A MEETING ON THE METHODS AND APPLICATION  
OF THIN SECTION PETROGRAPHIC ANALYSIS  
TO ARCHAEOLOGICAL CERAMICS &  
OTHER CULTURAL MATERIALS

# PETROGRAPHY OF ARCHAEOLOGICAL MATERIALS

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ABSTRACTS & PROGRAMME

## RATIONALE

Thin section petrographic analysis is a well-established geoarchaeological tool for the study of a range of inorganic archaeological materials. Despite the importance of increasingly sophisticated methods of elemental and isotopic characterization, petrography is still widely used and therefore highly relevant to the determination of the provenance and technology of artefacts, as well as wider issues in material culture studies.

The proliferation of archaeological petrography during the latter part of the 20<sup>th</sup> Century, especially in the field of ceramic analysis, was represented by the activities of forums such as the *Ceramic Petrology Group (CPG)*, published in *The Old Potters Almanack*, as well as the production of two British Museum volumes on the subject (Freestone *et al.* 1982; Middleton and Freestone, 1991). Whilst petrographic analysis has now reached a more mature stage in its development, there still exist a number of disparate approaches and as yet, little formally accepted methodology. Given the continued importance of petrography in the study of inorganic artefacts and their wider meaning, it is perhaps timely to focus again on this useful technique and its application to archaeology.

The Sheffield meeting on *Petrography of Archaeological Materials*, co-hosted by the CPG and Department of Archaeology, University of Sheffield, is inspired by a renewed interest in thin section petrographic analysis. It follows on from the successful meetings of the 1980's and 90's, and brings together aspects of the methodology and application of petrography to archaeology. The geographical and chronological range of studies, covering prehistoric, classical and historic periods from the British Isles, mainland Europe, the Mediterranean, the Near East, Russia, India, Mesoamerica and the United States, and the breadth of different inorganic artefacts analysed, such as ceramics, plaster, paintings, mortar, mudbrick and metallurgical tools, presents a unique snapshot of archaeological petrography in the 21<sup>st</sup> Century.

By providing a much-needed opportunity to share recent petrographic research, the meeting addresses pertinent issues within the subject, such as the role of archaeological petrography within the study of material culture and the spread of craft technology, the integration of petrographic data with other analytical techniques, the development of petrography within new geographic areas and archaeological periods, and the relationship between petrography and information technology. It is hoped that the Sheffield meeting provides a forum for both archaeologists and materials scientists interested in petrographic approaches to artefacts and in doing so, paves the way for its continued application within archaeology.

Dr. Patrick Sean Quinn  
Department of Archaeology  
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[www.ceramicpetrography.com](http://www.ceramicpetrography.com)

## TIMETABLE AND ORDER OF PRESENTATIONS

### FRIDAY 15 FEBRUARY

- 19:00 Welcome
- 19:30-21:30 Keynote Presentations:
- 19:30 Lara Maritan  
*The Role of Petrography in the Study of Archaeological Ceramics*
- 20:30 Evangelia Kiriati  
*Beyond Characterisation: Ceramic Petrology as a Tool for Understanding Human Practice and Landscape History*
- 21:30 Wine and snacks.

### SATURDAY 16 FEBRUARY

- 09:00-09:20 Chandra Reedy  
*New Digital Image Analysis Approaches to Thin-Section Petrography of Cultural Materials*
- 09:30-09:50 Ben Jervis  
*Making Identities in Saxon Chichester: A Theoretical Application of Ceramic Petrology*
- 10:00-10:20 Jonathan Dicks  
*Dating Romano-British Ceramics by Thin Section Petrology*
- 10:30-10:50 Ruth Siddall  
*Echoes of Rome in the 13<sup>th</sup> Century and Beyond: Mortar Recipes from the Sanctuary Pavement at Westminster Abbey*
- 11:00-11:30 Coffee and Poster Session. Bookshop open
- 11:30-11:50 Mary Ownby  
*Petrographic Analysis of Middle Bronze Age Canaanite Jars from Memphis, Egypt*
- 12:00-12:20 Roberta Tomber  
*Revisiting Indian Cooking Pots in Roman Egypt*
- 12:30-12:50 Laura Gagné  
*White Painted Wares from Dhenia and Alambra, Cyprus*
- 13:00-14:00 Lunch. Bookshop open
- 14:00-14:20 Edward Faber, Peter Day and Vassilis Kilikoglou  
*Fine Grained Middle Bronze Age Ceramics from Crete: Combining Petrographic and Microstructural Analyses*

- 14:30-14:50 Marie-Claude Boileau  
*Dark Age Crete: Petrographic Analysis of Coarse Pottery from Knossos and Sybrita at the Beginning of the 1<sup>st</sup> millennium BC*
- 15:00-15:20 Chris Doherty  
*Recent Petrographic Studies at Catalboyuk, Turkey*
- 15:30-15:50 Pete Hommel, Peter Jordan, Peter Day, Noemi Müller and Viktor Vetrov  
*Ceramic Technology Amongst Early Post-Glacial Hunter-Gatherer Communities of Eastern Siberia*
- 16:00-16:30 Coffee and Poster Session. Bookshop open
- 16:30-18:00 Microscope Workshop, Material Science Microscope Lab (G21)  
Ceramic Petrology Group (CPG) AGM, Lecture Theatre (G14)

#### SUNDAY 17 FEBRUARY

- 09:00-09:20 Charlotte Hobday and Ruth Siddall  
*Making and Mixing Roman Paints: The Teachings of Petrographic Analysis*
- 09:30-09:50 Ana Jorge  
*Ceramic Technology and Style during the Iberian Chalcolithic to Bronze Age Transition: A Case Study from Northern-Central Portugal*
- 10:00-10:20 Daniel Alberó Santacreu  
*Technological and Social Characterization of Late Bronze and Iron Age Pottery from Majorca (Spain)*
- 10:30-11:00 Coffee and Poster Session. Bookshop open
- 11:00-11:20 Patrick Quinn and Margie Burton  
*Way out West: Compositional Analysis of Prehistoric Ceramics from the Anza Borrego Desert, Southern California*
- 11:30-11:50 Isabel Villaseñor and Ruth Siddall  
*Glass Inclusion and Hydraulic Phases in Lowland Maya Plasters: Volcanic or Meteoritic?*
- 12:00-12:20 Michela Spataro  
*The Earliest Potters in the Central Balkans: Technological Choices and Cultural Transmission*
- 12:30-12:50 Louise Joyner  
*A Petrographic Study of Late Neolithic Clay-Based Construction Materials from Makriyalos, Macedonia, Greece*
- 13:00-13:30 Meeting Summary – Peter Day. Farewell.

## ABSTRACTS – KEYNOTE PRESENTATIONS

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# BEYOND CHARACTERISATION: CERAMIC PETROLOGY AS A TOOL FOR UNDERSTANDING HUMAN AND LANDSCAPE HISTORY

EVANGELIA KIRIATZI

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Since Peacocks's review paper in 1970, ceramic petrology has established itself as a widely used technique and a necessary component of ceramic studies, throughout the UK and Europe. Great experience and knowledge has been accumulated, significant reference collections have been created and important methodological developments have been achieved concerning the kind of information that the technique can extract, as well as the processing and presentation of the data. Beyond these, considerable advances can be seen in the archaeological applications of ceramic petrology, the way it has been combined and integrated in the archaeological research and the kind of questions it is invited to address. An obvious shift in the research focus of ceramic petrology applications has taken place following analogous developments in contemporary archaeological theory and practice. The original emphasis mainly on characterisation of transport vessels and provenance issues, combined with the building of reference collections for the study, mostly, of long-distance trade patterns, has been gradually replaced by a wider interest in the study of both provenance and technology, the holistic investigation of technological traditions and a bottom up approach, moving gradually its focus from the local to the regional and interregional level.

This presentation will concentrate on the discussion of such developments, mainly in the context of the work carried out at the Fitch Laboratory, British School at Athens, where a number of large scale archaeological projects have been undertaken during the last three decades based mainly on the use of ceramic petrology. Emphasis will be given to current research that focuses on understanding reproduction of technological practice within certain natural and cultural landscapes and the reconstruction of the social history of such landscapes. Ceramic petrology has made a significant contribution to such projects, often in combination with chemical and micro-structural analysis. It has been used not only for the study of whole ceramic assemblages, either from excavations or regional field surveys, but also for the characterisation of the available landscape resources and the products of replication experiments carried out at the laboratory, as well as for the characterisation of the ceramic fabrics produced by traditional potters using local resources and known clay paste recipes.

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# THE ROLE OF PETROGRAPHY IN THE STUDY OF ARCHAEOLOGICAL CERAMICS

LARA MARITAN

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Given their abundance at archaeological sites of many ages, ancient ceramics represent an important means of studying the technological evolution, cultural development and the trade activities of ancient civilizations. In particular, the detailed compositional analysis of sherds using techniques of thin section petrography provides a means of examining both the origin and technology of ancient ceramics. On the basis of distinctive mineral or rock inclusions in medium and coarse-grained ceramic pastes, very detailed provenance interpretations can sometimes be made, leading to the elucidation of patterns of commercial trade and exchange. An example is the coarse Iron Age pottery from Este in North-eastern Italy (Maritan, 2001). Here the occurrence of large trachyte fragments in thin section permitted the precise identification of a source for the raw materials for these ceramics in the Euganean Hills. Fundamental to provenance interpretations of archaeological ceramics is the examination of comparative geological materials, especially where mineralogical 'markers' are present in sherds. In other cases, successful ascription of provenance can be possible using microchemical analysis of specific mineral inclusions, such as in a study of Roman ollae from Padova, North-eastern Italy (Maritan *et al.*, 2006). These ceramics were characterised by the presence of large fragments of serpentinite with Cr-spinel, which provides strong evidence for pottery exchange with the Apennine region. Some ceramic assemblages characterised by homogeneous chemical signatures can differ in terms of texture and technology. In such cases, for example the Bronze and Iron Age pottery from Tell Mishrifeh, Syria (Maritan *et al.*, 2005), petrographic analysis can provide a level of discrimination unrivalled by instrumental approaches. At Tell Mishrifeh, nine different petrographic groups were identified each representing different recipes but made with similar raw materials. Beyond issues of provenance, a petrographic approach to ancient ceramics can provide a crucial insight into the technology used in their manufacture. Determining the maximum firing temperatures is a common question of ceramic technology and one to which petrography can make an important contribution, especially when combined with other analytical methods, such as FT-IR, Mössbauer Spectroscopy and SEM. The behaviour of certain types of inclusions during firing can be used to constrain ancient firing temperatures of ceramics. Recent research into changes in the microstructure of molluscs in shell-tempered ceramics (Maritan *et al.* 2007) holds significant potential in this respect.

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# TECHNOLOGICAL & SOCIAL CHARACTERIZATION OF LATE BRONZE AND IRON AGE POTTERY FROM MAJORCA (SPAIN)

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The goal of this paper is to attempt a technological and social characterization of Majorcan prehistoric pottery through thin section analysis. The mineralogical composition and the textures of samples from the fortified site of Puig de Sa Morisca were studied using the petrographic microscope. The results provide important information about different productive aspects relating to the source of raw materials, preparation of clay and added tempers, forming processes and also firing temperature. Thin section characterization suggests some interesting technological differences between the Late Bronze/Early Iron Age (1250-500 BC) and the Late Iron Age (500-75 BC). The most significant changes are related to the intentional introduction of crushed calcite to the paste. Organic matter was also intentionally added to the clay, especially in the later period when the use of calcite starts to decrease. The study of variability in both types of temper provides a tool to understand the *chaîne opératoire* of this pottery, including productive strategies and the level of specialization observed in the prehistoric communities from Majorca. It also suggests some social functions inherent in the technological choices of the potter.

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DARK AGE CRETE: PETROGRAPHIC ANALYSIS OF COARSE POTTERY  
FROM KNOSSOS AND SYBRITA AT THE BEGINNING OF THE 1<sup>ST</sup>  
MILLENNIUM BC

MARIE-CLAUDE BOILEAU

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It is acknowledged that Crete is one of the most intensively studied areas in the Mediterranean for the application of archaeometric methods to the study of pottery technology and provenance. These methodological and interpretative achievements have however focused mainly on prehistoric pottery. Our project aims at transferring this analytical knowledge to the subsequent periods in order to investigate how pottery production was organised following the collapse of the palatial system of the Bronze Age. This paper discusses patterns of change and continuity in pottery production and consumption in the Early Iron Age and interprets the results in their wider regional context. The material under study was excavated at Knossos, a major centre with continuity of occupation in north-central Crete, and Thronos Kephala (ancient Sybrita), a newly-founded settlement in west-central Crete. The methodology integrates contextual, typological, and petrographic data and is based on 400 pottery samples and 28 geological samples collected during a geoprospection of potential potting raw materials conducted in the valleys south of Rethymno. Overall the analytical results provide a unique understanding of local and regional pottery production and consumption patterns for a period in Greek history that was undergoing major social, political and economic changes.

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# DATING ROMANO-BRITISH CERAMICS BY THIN SECTION PETROLOGY

JONATHAN DICKS

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Ancient kilns occurring in the Alice Holt Forest, Hampshire, England have been the focus of attention of antiquarians and archaeologists for many years. The kilns were in production from the middle of the first century AD until at least the end of the fourth century and well over a hundred kiln waster dumps have also been identified within the Forest. The excavation of some of these kilns and associated dumps in the early 20<sup>th</sup> Century revealed a wealth of information on the typology of the ceramics produced here (Lyne and Jefferies 1979; Millett 1979). However, more specific analysis is needed in order to better understand the nature of the ceramic industry and the organisation of the major Romano-British production centres.

Material was selected from a well-dated group of kiln waster dumps. The sherds include a range of fabrics and forms from the start of ceramic production at Alice Holt Forest in the first century AD, until the end of the fourth century. Samples were subjected to a series of petrological analyses in order to establish if any relationship exists between fabric and vessel form. In addition, variation in petrographic composition was studied over time.

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## RECENT PETROGRAPHIC STUDIES AT CATALHOUYK, TURKEY

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The important Neolithic-Chalcolithic tell site of Catalhoyukk (Central Turkey) is well known for its abundance of clay-based materials; the reliance on clay being partly a consequence of the immediate scarcity of sizeable sources of stone at the site. Clay was extensively used for architectural elements (mudbricks, mouldings, daub, mortar and plaster), and in smaller volumes for a diverse array of artifacts including pottery, clay balls and geometric objects, figurines, and stamp seals. 2006 saw the start of a new programme of research at Catalhoyuk which looks at clay use across these artifact divisions. This aims to supplement and integrate the ongoing research by the materials specialists by taking a geo-materials viewpoint. One component of this new study is petrography. This paper presents some initial findings and identifies the direction for future petrographic analysis at the site. The focus here is on pottery as, to date, little is known either of its production or relationship to the other clay-based technologies at Catalhoyuk.

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FINE-GRAINED MIDDLE BRONZE AGE CERAMICS FROM CRETE:  
COMBINING PETROGRAPHIC AND MICROSTRUCTURAL ANALYSES

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While the existence of broad chemical compositional zones on Crete has long been recognised, recent work on Bronze Age ceramics has identified individual production centres within these areas, based on the mineralogical information visible in thin section. Such discrimination is not always possible within fine-grained ceramics, many of which are formed from clay pastes deriving from the Neogene clays that occur across Crete. Since these clays are geologically and compositionally similar and may not always contain sufficient mineralogical information to allow them to be differentiated. This paper presents the results of a petrographic study of fine-grained Middle Bronze Age polychrome ware from Crete, where the mineralogical information was combined with high magnification imaging of the clay matrix. A variety of fine-grained fabrics were used for making this ware type, which illustrate the problems involved in defining petrographic fabrics and provenance determination. Some technological aspects of the ceramics are discussed that may be useful for determining regionally-specific traditions of production.

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# WHITE PAINTED WARES FROM DHENIA AND ALAMBRA, CYPRUS

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Studying the Red Polished Wares found at Alambra, Barlow (1994) included four sherds of White Painted Wares in her analysis. She divided these ceramics into two fabric groups, which she called White Painted A and B. These two groups corresponded to differences in decoration, although both groups were decorated in a geometric, rather than linear, scheme. White Painted A fabric was found to be identical with that of the Red Polished wares from the site, showing a local development out of the earlier Red Polished tradition. This is contrary to claims by Frankel (1974a, b, 1981, 1983, 1988) and Åström (1957) who believed that the White Painted tradition developed in the north of Cyprus and was then transmitted to the south. Barlow also discovered that the potters at Alambra were using two separate clay beds, one a calcareous marl, and the other composed of weathered volcanic rocks from the pillow lavas, rather than deliberately mixing or altering their clays. Although all of the wares could have been manufactured locally, Barlow (1994) felt that some of them may have been imported, possibly from Dhenia.

This paper examines seven sherds from Alambra and fifteen from Dhenia. The Alambra material comes from the same excavation as the sherds used by Barlow in her analysis, while the Dhenia material comes from two sources: a survey conducted by Hector Catling, and Tomb 6 excavated by Åström and Wright (1963). Although both sites are located in different geological areas of the island, there is similarity between both the decorative styles and the fabric of the vessels. Each fabric group, except one, contains sherds from both the settlement at Alambra and the cemetery at Dhenia. All of the groups contain material of different ware types according to Åström's typology, indicating that the differences between wares may be due to regional variation rather than chronology.

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# MAKING AND MIXING ROMAN PAINTS: THE TEACHINGS OF PETROGRAPHIC ANALYSIS

CHARLOTTE HOBDAY AND RUTH SIDDALL

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Polarising light microscopy and the descriptive terminology developed by petrographers are powerful tools for the examination of natural and synthetic, organic and inorganic compounds used in ancient pigments. Paints are complex materials requiring one or more pigment chromophores, plus secondary materials employed as extenders or siccatives. Unlike chemical and spectroscopic analytical techniques, polarising light microscopy reveals important characteristics of pigments including particle size, grain shape, the presence or absence of additional components and, of course, colour. These properties are directly related to the processes involved in refining, manufacture and preparation of pigments as used by artists and their assistants.

Case studies are presented here from various Roman-period painting contexts ranging from raw pigment excavated from Pompeii,, provincial wall paintings from the UK and Romano-Egyptian funerary art from the Fayoum. They demonstrate the methods used to replicate expensive materials from cheaper substitutes, the manufacture of pigments using different techniques and starting products, and the innovative uses of extenders and substrates for organic pigments.

These analyses provide an important insight into the day-to-day operation of the Roman artist's studio and additionally reveal further reaching implications concerning the methodology of ancient industries.

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# EARLY CERAMIC TRADITIONS OF HUNTER-GATHERERS IN EASTERN SIBERIA

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As one of the traditional elements of the 'Neolithic Package', pottery has long stood as an index of social complexity and the emergence of a sedentary, agricultural lifestyle; as a technological advance that simple, savage communities of gatherers and hunters could only be expected to adopt passively, if at all. This biased approach to prehistory has been widely challenged, and archaeologists now recognize that ceramic vessel technology has a considerably longer history than any agricultural practice, a history that is firmly rooted in hunter-gatherer society.

This paper presents the preliminary results of a project that examines continuity and change in the pottery traditions of post-glacial hunter-gatherer communities of the Transbaikal region (Eastern Siberia). The research focuses on the site-complex of Ust'-Karenga on the Vitim River, where one of the largest collections of ceramic vessels dated to the early Holocene have been recovered. Although this material is considerably later than the pottery from China Japan and even the Russian Far East, these deeply stratified sites provide a unique opportunity to ask why pottery was adopted into hunter-gatherer society, but also, by looking at the later cultural phases to explore how (and perhaps why) the technology was then adapted.

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# MAKING IDENTITIES IN SAXON CHICHESTER: A THEORETICAL APPLICATION OF CERAMIC PETROLOGY

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Excavations in Chichester, West Sussex throughout the 20<sup>th</sup> Century uncovered significant amounts of pottery from the Roman through to the Medieval period. This paper investigates how ceramic petrology can be used at Chichester as a tool to understand the generation and conservation of identities within a developing urban context. Textural analysis and petrological work coupled with documentary evidence and macroscopic ceramic analysis, arguably demonstrates that Chichester, practically abandoned in late antiquity, was repopulated from its wide hinterland after its designation as a Burh (defended town) in the ninth century AD. This population was then differentiated through the materials used for potting at a household level, potentially in different areas of the city. As Chichester's economy and population developed there was significant change in the raw materials used for potting and this can be argued to have contributed to the generation of a new urban identity as well as the economic control of the landowners in the immediate hinterland. Stimulated by the case of ancient Chichester, the paper discusses more generally the role of fabric analysis in the understanding of materiality in relation to the properties of the material and the role it played in manipulating identities in this emerging urban entity.

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# CERAMIC TECHNOLOGY AND STYLE DURING THE IBERIAN CHALCOLITHIC TO BRONZE AGE TRANSITION: A CASE STUDY FROM NORTHERN-CENTRAL PORTUGAL

ANA JORGE

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The Chalcolithic to Bronze Age transition of the Iberian Peninsula is characterised by distinct changes in ceramic morphology and decoration. The Upper Mondego Valley, in Northern-Central Portugal is no exception. During the late 3<sup>rd</sup> millennium, stylistic diversification is accompanied by the introduction of new supra-regional pottery types thought to have played a central role in exchange, the negotiation of identity and the emergence of social inequality. However, we know little about how these new types were integrated in local pottery traditions, and whether their introduction represents a change in the contexts of production or use.

In addressing these issues, a multi-scalar approach combining a more general characterisation of pottery technology with the detailed consideration of variability within and between sites can provide insights into a diversity of social and technological practices within the same cultural tradition. Petrographic analysis integrated with stylistic information reveals unexpected insights, beyond the image produced by typological studies alone. As the results from three sites from the Mondego Valley show, the detailed consideration of ceramic technology offers a means to explore the processes of group dynamics that characterize this period.

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A PETROGRAPHIC STUDY OF LATE NEOLITHIC CLAY-BASED  
CONSTRUCTION MATERIALS FROM MAKRIYALOS, MACEDONIA,  
GREECE

LOUISE JOYNER

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Clay-based construction materials that include floors, walls, daub, mudbrick, superstructures, ovens/hearths and a grill were sampled from a Late Neolithic site near Makriyalos. The site was discovered during the construction of a new railway line in 1992, and subsequently excavated by the Ephorate of Prehistoric and Classical Antiquities of Thessaloniki from 1993 to 1995. It is one of the largest non-tell sites in Macedonia, located on a main North-South trade route, approximately two kilometres from the coast. Forty-two samples were taken spanning the two phases of the site Phase I and Phase II and comparative clay samples were taken in the vicinity of the site. The samples were analysed petrographically to explore the use and manipulation of raw materials for a variety of functional uses in the construction of the site. Several fabrics span Phases I and II, while others are Phase specific. The relationship between fabric and function is not consistent.

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# PETROGRAPHIC ANALYSIS OF MIDDLE BRONZE AGE CANAANITE JARS FROM MEMPHIS, EGYPT

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The petrographic analysis of Middle Bronze Age (1750-1550 BC) Canaanite jars imported to Egypt from the Levant aims to illuminate the contacts of the time. The preliminary analysis of 56 Canaanite jar sherds excavated from Memphis, Egypt suggests several locations of production in the Levant. The unique mineralogical inclusions include alkali olivine basalt, the coralline alga fossil *Amphiroa*, and several metamorphic minerals such as epidote and kyanite. These inclusions along with the quantity of quartz sand assisted in determining possible areas where the Canaanite jars could have been manufactured. An initial comparison of the thin sections from the Memphite Canaanite jars and those from another site in Egypt, Tell el-Dab'a, allowed for a better understanding of how the Memphite material is related to the much larger corpus from this key site. These connections are important since Tell el-Dab'a is likely to be the site from whence the Canaanite jars were imported into Egypt. The relationship between Memphis and Tell el-Dab'a should help to illuminate contacts between the Egyptians at the former site and the foreigners at the later site. Therefore, along with the determination of contacts between Egypt and the Levant, the contacts within Egypt can be more fully appreciated.

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# WAY OUT WEST: COMPOSITIONAL ANALYSIS OF PREHISTORIC CERAMICS FROM THE ANZA-BORREGO DESERT, SOUTHERN CALIFORNIA

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Plain, undecorated, brown or buff coloured ceramic sherds occur frequently at archaeological sites in San Diego County, southern California. Ceramic technology arrived very late to this area (c. 1200 AD) and represents a key cultural marker used to separate the Late Prehistoric Period from the preceding aceramic phase. Despite the importance of ceramics in the archaeology of San Diego, no single agreed typology exists with which to classify these innocuous artefacts (Laylander 1992). Consequently, their contribution to the reconstruction of the prehistoric cultural development of the area is severely limited.

Recent analysis along the southwest Pacific coast and Peninsular Range Mountains using neutron activation (NAA) (Hildebrand *et al.* 2002) has highlighted the power of a detailed compositional approach to the Late Prehistoric ceramics of San Diego County. Inspired by this more rigorous up-to-date approach, research is underway to expand the compositional database of ceramics further inland into Anza Borrego Desert State Park. This area is rich in archaeological remains and is ideally located to study the relationship between the ancient cultures of the Colorado River and the later prehistoric development of the coastal region of southern California.

Using a combination of thin section petrography and NAA, ceramics from seven sites in the north and south of the Anza Borrego Desert have been analyzed in detail. Initial results suggest an unexpected level of compositional variability within the ceramics of this area. Several distinctive paste recipes that combine specific raw materials and technological practises have been indentified, some with a widespread distribution and others restricted to a particular region or a single site.

This first step in defining the compositional variability in the region is now being supplemented by a program of geological sampling and analysis. By confidently placing ceramic compositional groups within their landscape we hope to provide a firm basis with which to interpret aspects of ancient ceramic production and the exploitation of natural resources in this area, as well as the movement of artifacts and people within and beyond the desert.

## NOTES

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# NEW DIGITAL IMAGE ANALYSIS APPROACHES TO THIN-SECTION PETROGRAPHY OF CULTURAL MATERIALS

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Contemporary digital image analysis packages have updated thin-section petrography and transformed it into a cutting-edge, sophisticated tool for analyzing cultural materials. Background issues that must be understood before undertaking or interpreting image analysis include experimental design and statistical validity, calibration, image quality, and image enhancement (“preprocessing” of images). Early work required in-house computer programs, so was relatively limited in scope and application. Recently, comprehensive, widely available commercial image analysis packages have emerged. They provide fast preprocessing and simultaneous measurement of a wide range parameters, with several alternative approaches to data collection available. Examples will be illustrated using thin sections of ceramics (pottery, brick, clay core materials), and stone (sculptures, architectural materials, tools). Image analysis research problems discussed will include calculating amount (area percentage) of non-clay particles within a ceramic, grain-size analysis, quantifying particle shape, calculating area percentage of macropores, characterizing pore shape, measuring layer thickness (weathering, decorative, or interaction layers), and quantifying quartz microcrack patterns as a measure of stone deterioration. An experienced petrographer is still required to identify minerals and textures and interpret data. However, digital image analysis now provides a practical tool for rapidly obtaining quantitative data for a variety of parameters on a large number of samples.

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# ECHOES OF ROME IN THE 13<sup>TH</sup> CENTURY AND BEYOND: MORTAR RECIPES FROM THE PAVEMENT AT WESTMINSTER ABBEY

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The Sanctuary Pavement at Westminster Abbey is a unique example in Northern Europe of the Italian Cosmatesque technique, a direct successor to Roman and Byzantine Period opus sectile in stonework. Originally laid in the latter half of the 13th Century, documentary and technological evidence strongly suggests that the original floor was laid by craftsmen from Rome, using mortar recipes from a deep-seated Italian tradition.

Polarising light microscopy has been used to examine thin sections and grain mount dispersions of mortars from the original and subsequent restoration phases of the Sanctuary Pavement and has revealed a chronology of mortar production technology ranging from the Mediaeval through to the Victorian Period. Thirteenth Century materials are cocchiopesto mortars, given hydraulic properties by the addition of crushed and ground potsherds, whereas 16<sup>th</sup> and 17<sup>th</sup> Century restorations are simple non-hydraulic limes. The High Altar and Sanctuary were further restored by Sir George Gilbert Scott in the 1860s who used modern materials to replace sections of the floor damaged in the preceding century. His mortars, although fundamentally different from those used in previous phases, were an attempt to visually replicate the materials used by the original craftsmen.

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# THE EARLIEST POTTERS IN THE CENTRAL BALKANS: TECHNOLOGICAL CHOICES AND CULTURAL TRANSMISSION

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Between 2003 and 2006 a project was carried out on the production of early Neolithic Starčevo-Criş pottery of the central Balkans, dating to the sixth millennium cal BC. Potsherds from 19 sites in Romania, Serbia and Slavonia were collected and analysed in thin section, by Scanning Electron Microscopy-Energy Dispersive Spectrometry and X-Ray Diffraction. Soil samples from around the sites were also analysed, as well as other fired clay items (daub fragments, cult objects etc).

The minero-petrographic and chemical results suggest that the vessel fabrics can always be attributed to local clay sources, and that there is therefore no sign that pottery was traded over significant distances. Nevertheless, the same technological recipe for vessel manufacture was used throughout the Balkans, over a distance of more than 600km from Hungary to central-eastern Transylvania, for almost a millennium. Pots were fired in bonfires, and, in contrast to the contemporary Impressed Ware pottery of the adjacent Adriatic region, the clays were usually heavily tempered with organic matter, rather than minerals.

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# REVISITING INDIAN COOKING POTS IN ROMAN EGYPT

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In November 1998 at a joint meeting of the Ceramic Petrology Group and the Near Eastern Ceramic Research Association held at the British Museum a newly excavated group of cooking pots found at the Red Sea port of Berenike in Egypt was reported. At the time an Indian source was argued for these Red Sea vessels based on fabric and form, although a study tour of India had failed to locate any exact parallels for them.

This talk presents the progress of this on-going research, including the excavation of more vessels from another site on the Red Sea, ancient Myos Hormos. Several subsequent research trips to India have permitted the establishment of a comparative database of fabrics for this particular type of cooking pot. On the basis of fabric and technological considerations it is now possible suggest a source area in south-west India for some of the Red Sea vessels.

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# GLASS INCLUSIONS AND HYDRAULIC PHASES IN LOWLAND MAYA PLASTERS: VOLCANIC OR METEORIC?

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Since Ann Shepard documented the widespread use of volcanic glass in Maya lowland ceramics, Mayanists have debated on the origin and correct identification of these phases and its implications for the trade and procurement of materials in Pre-Columbian times. In this paper we present petrographic analyses of Late and Terminal Classic samples from Palenque (Chiapas, Mexico), where glass inclusions are common and which constitutes, to the best of our knowledge, the first study to report glass phases and its resulting hydraulic reactions in Maya plasters. Visible altered glass particles are also common in the plasters, which are thought to be impact glass from the Chicxulub meteorite. Although more conclusive evidence is needed, especially in the form of shocked quartz, we believe that the meteoritic hypothesis should be incorporated in the discussion of the origin of glass in Lowland Maya materials in order to further our understanding on the topic.

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# EL SANCTUARIO: PETROGRAPHIC ANALYSIS OF CHALCOLITHIC CERAMICS FROM NORTH WEST IBERIA

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The Chalcolithic in North West Iberia is considered to be a transition period in which new social, political and economic processes emerged. These processes also affected the ceramic assemblage of this area, which undergoes a drastic evolution after the appearance of the Bell Beaker pottery. To determine whether changes in the Chalcolithic ceramics were the due to significant social processes or result of new trends in pottery production, a detailed compositional study was carried out on the rich assemblage of El Santuario at El Pedroso Hill Fort in Castilla, Spain. Ceramics from this cave sanctuary were examined in thin section. The results of the analysis indicated that changes in the paste recipes and technology employed by the potters at El Santuario coincided with important changes in ceramic style. This is interpreted as being the result of a significant social change at El Pedroso, which may be related to the arrival of new population groups in North West Iberia.

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# EARLY ROMAN CERAMIC PRODUCTION AND CONSUMPTION AT VLAAMS-BRABANT, BELGIUM

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This project examines aspects of ceramic production and consumption in the Province of Vlaams-Brabant, Belgium, during the Early Roman Period. By applying a compositional approach to ceramics from two kiln sites at the vicus Tienen, it focuses on questions concerning changes in raw materials and technology used to produce ceramics between the 1<sup>st</sup> and 3<sup>rd</sup> C AD. Analytical approaches are also used to examine the consumption of ceramics at two sites in the area during Early Roman Times; a cult site with a Mithras temple, closely situated near the pottery kilns and a villa at nearby Hoegaarden, located at approximately 5 km from the vicus Tienen.

Some 78 ceramic samples were examined using ceramic petrology and scanning electron microscopy, including 31 samples from kiln wasters from Tienen, dated to the 1<sup>st</sup> to 3<sup>rd</sup> C AD and 47 samples from the Mithras temple and the Roman villa. The results of this analysis indicate the existence of a change in both the selection of raw materials and the technology used to produce pottery at Tienen during the Early Roman period. Comparison with the ceramics from the two consumption sites suggests that both were using the local ware produced at nearby Tienen.

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# MINING FOR CLAY: LATE PREHISTORIC CERAMIC PRODUCTION AND NATURAL RESOURCE EXPLOITATION IN THE PEAK DISTRICT NATIONAL PARK

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For many years, petrographic analysis has been successfully applied to prehistoric ceramics from several areas of Britain to investigate aspects of trade and exchange (Morris and Woodward 2003). However, comparatively little attention has been given to the rich archaeological assemblages of the Peak District National Park. Traditional approaches to Peak District ceramics have instead emphasised attributes such as vessel form and decoration. Relying on this data alone has limited the contribution of ceramic studies to the Late Prehistoric archaeology of the region, due to the similarity of forms through space and time.

The present project project aims to provide a much-needed reassessment of the nature of ceramic production, distribution and natural resource exploitation in the Peak District during the Late Bronze Age-Early Iron Age transition. This period appears to signal an important change in the prehistory of the Peak District from the widespread occurrence of small farming communities to the rise of a more hierarchical society (Barnatt and Smith 2004). By analyzing artefacts from several key sites across the Peak District, the project is examining the nature of this period through its ceramic record. Of particular interest is the relationship between inhabitants of the Peak District's three landscape zones, the distinction between hilltop settlements and farming communities, and the nature and extent of trade and exchange within the region.

Preliminary results from the sites of Gardoms Edge and Mam Tor reveal surprising continuity in terms of ceramic composition and suggest strong links between these two very different sites, which are supported by pottery typology.

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# MICROANALYSIS OF LATER PREHISTORIC GRANODIORITE-TEMPERED POTTERY FROM THE EAST MIDLANDS

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Recent petrological studies of later prehistoric pottery from the East Midlands have revealed a highly unusual and distinctive fabric characterised by angular granitoid inclusions that may derive from the Mountsorrel granodiorite complex of Charnwood Forest. This could provide evidence for a regional exchange system centred upon pottery production sites in Charnwood Forest. If verified by further work, this would add significantly to the growing evidence for long-distance ceramic exchange networks in first millennium BC Britain. A recent review of petrological analyses of granodiorite-tempered pottery from sites in the East Midlands concluded that the results of thin sectioning should be tested by chemical analyses aimed at providing additional evidence of the individual minerals and rock sources in order to distinguish between different potential sources (Knight *et al.* 2003). Such an approach is of particular importance given the uneven distribution of the minerals within the parent rock, the small size of the granitoid pottery inclusions and the few crystals contained in these. This paper presents the initial results of the combined petrological and electron microprobe study of later prehistoric granodiorite tempered pottery.

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# MINERALOGICAL AND PETROGRAPHICAL CHARACTERIZATION OF BURIAL AND HOUSEHOLD CERAMICS FROM EARLY IRON AGE SOUTHWESTERN SLOVAKIA

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In the Early Iron Age, southwestern Slovakia belonged to the Kalenderberg sociocultural group, which was part of northeastern Halstadian cultural complex. Kalenderberg ceramics have a distinctive shape and carved or painted geometric decoration. Dominant forms are amphorae, situlas and bowls with shanks. The ceramics can be further divided based on function, into burial and household forms.

In this study, Kalenderberg ceramics from the settlements of Dunajská Lužná and Dolné Janíky were analyzed in thin section and with X-ray powder diffraction in order to investigate aspects of their manufacture and raw material provenance. All samples were made from a similar tempered clay paste. Based upon the mineralogical and petrographical characterization of this temper, the ceramic raw materials used for the Kalenderberg pottery was sourced from the area surrounding the settlements. The techniques used to form the vessels appear to have been drawing and pinching. Differences in the firing temperature of the burial and household ceramics were observed, with burial vessels being low fired (maximum temperature 300°C) and the household ceramics considerably higher fired (600-900°C). This variation in firing temperature may indicate that the Kalenderberg ceramics were fired in a rather primitive kiln structure of kilns or in a simple pit firing.

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## AN ON-LINE ARCHAEOLOGICAL THIN SECTION DATABASE

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Petrographic data on artefacts is severely underrepresented in the archaeological literature. Published analyses are generally supported by a few black-and-white micrographs at the most, and full petrographic descriptions are not often included due to lack of space. This situation severely hinders the comparison of petrographic data between different studies, sites, analysts and laboratories.

In response to this problem, a project is underway at University of Sheffield Departments of Archaeology and Computer Science to design and build the first on-line petrographic database. This tool will provide an efficient means of storing, accessing and disseminating archaeological petrographic data, including high-quality colour micrographs, petrographic descriptions, point count data and associated archaeological information about artefacts.

The system consists of a relational database written in MySQL, connected to a web-based user interface for daily use and management functions. In order to populate the database, the project is developing a 'parser' to automatically retrieve specific information from petrographic descriptions of several different formats, including that of Whitbread (1995). To facilitate the sharing of data with possible future petrographic databases, the project is also defining an 'XML standard' (eXtensible Markup Language) for archaeological petrography.

The prototype database, expected in summer 2008, will be used initially for the storage and use of petrographic data from projects at University of Sheffield, Department of Archaeology. However, a beta version will be made available to other users thereafter. The inevitable transferral of petrographic information into databases such as that being developed here will greatly assist the curation of extensive thin section collections that exist in the UK and elsewhere (Vince 2001), ensuring their survival for future generations. Given that most archaeologists are never very far from a computer, the presentation and manipulation of extremely large amounts of data and reference material through this medium also has obvious benefits for research productivity.

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## SOUTERRAIN WARE: PETROLOGY AND PROVENANCE

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Souterrain Ware is the natively produced Early Christian coarseware in northeast Ulster. Dating of the production and use of this ware is believed at present to fall within the date range c650-1250AD. Studies carried out to date (involving examination of sherds using hand-lens analysis) indicate that Souterrain Ware was produced using clays sourced at, or in close proximity to, the site on which it was ultimately used/excavated. However, some evidence exists to suggest that occasional movement of vessels occurred, for example potential sherds have been identified on six sites from Britain. Further to this, some suggestion of movement of vessels has been vaguely hinted at from time to time in excavation reports, such as by Ivens in the case of Tullylish, County Down, where it was suggested that seven under-represented fabrics may have represented “stray imports” (Ivens 1987, 115). A similar suggestion was also made with regards a few sherds of Souterrain Ware from the excavated assemblage from Ballymacash, County Antrim (Jope and Ivens 1998).

This poster presents the results of thin-section analysis (undertaken as part of an MA thesis at the Department of Archaeology, University of Southampton) carried out in an attempt to resolve the question of whether occasional movement of Souterrain Ware vessels did occur. Interestingly, petrological analysis highlighted the absence of deliberate selection of particular types of temper, and the poorly-sorted nature of inclusions present reflected the relative rarity of preparation of the clays used. Results indicated that of the 149 sherds examined from eight sites (with each sherd representing an individual vessel), evidence existed for the non-local production, and subsequent movement of five vessels from four sites. Arnold’s ‘Threshold Model for Ceramic Resources’ was employed in a bid to define ‘local’ versus ‘non-locally’ produced vessels.

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# A MULTIDISCIPLINARY ANALYSIS OF FABRIC, TECHNOLOGY AND PROCUREMENT OF NEOLITHIC AND EARLIER BRONZE AGE CERAMICS WITHIN THE EAST MIDLANDS REGION OF ENGLAND

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This research focuses upon aspects of ceramic technology and production in the Neolithic and Early Bronze Age periods within the East Midlands region of England. The primary aim is to analyse, classify and provenance the characteristic pottery inclusions in an attempt to identify patterns of manufacture and distribution.

These periods in time were characterised by the transition from mobile populations, exploiting seasonal resources, to one of gradually increasing dominance over the landscape. Material culture became increasingly more prominent. This has been regarded as an indicator of widening social complexity and interactions, as demonstrated by studies on the axe trade in Neolithic Britain (Bradley and Edmonds 1993).

Pottery forms one of the core types of evidence for material culture in prehistoric Britain. Ceramic analysis can provide information concerning modes of production, raw material procurement and the addition of opening agents to the clays. Trade and exchange networks, the selection and exploitation of specific materials and proximity to their source may then be postulated, as illustrated by work on the gabbroic clays from the Lizard peninsula (Peacock 1988).

It is hoped that by using smaller domestic assemblages, rather than the larger, potentially cumulative multi-phase assemblages such as those from Durrington Walls, a more coherent and chronologically distinct pattern for the East Midlands will emerge.

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POTS IN A CAVE? THE PETROGRAPHIC ANALYSIS OF THE CERAMIC MATERIAL FROM NEOLITHIC THEOPETRA (THESSALY, GREECE)

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Theopetra Cave, situated in the NW end of the Thessalian plain, is one of the rare cases in the Aegean where uninterrupted habitation from Mesolithic to the end of the Neolithic period is evidenced. Moreover, it is the only cave settlement known in Thessaly, an area where the prevailing settlement form is that of a Tell, along with few extended sites.

Theopetra serves as an outstanding case study of the initiation of pottery technology at the very start of the Neolithic, a topic that has been of interest for many researchers, mainly with regard to the indigenous character of the Greek Neolithic. In addition, the Theopetra material contributes to unraveling the multifaceted set of differences and similarities in the production and/or use of pottery in the only inhabited cave set in a cultural landscape where open-air settlements stand out, exploring at the same time the level and character of intraregional contacts between the inhabitants of Theopetra and the rest of Thessaly, mainly through their participation in pottery exchange networks.

In order to discuss the above issues, the Theopetra pottery assemblage was studied using petrographic analysis as the most suitable analytical method, providing critical information on pottery technology and provenance.

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# PLASTERS, PAINTINGS AND FLOORS AT POMPEII: ARCHAEOMETRICAL INVESTIGATIONS

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Several samples of plasters, paintings and floors from buildings of the 2<sup>nd</sup> and 3<sup>rd</sup> Centuries BC and 1<sup>st</sup> Century AD with different functionality were collected from Temple of Venus (Pompeii). The main aim of this study was to characterize the building materials under a microscopical, chemical and microstratigraphy point of view (OM, SEM, ESEM, XRD, micro-ATR, FT-IR, Mössbauer and Laser Scanner) and the technological features, to relate them functionally to buildings or rooms, and to recognise their evolution with time.

Microscopically aggregate in plasters and mortars were constituted by components typical of Somma-Vesuvio volcanoclastic deposits. Different percentages of these components distinguished several different groups of aggregate. Thin layers made of lime and carbonate rock fragments (marmorino) or finely ground pottery (cocciopesto) were often present on the surface of the plasters. Similar pottery fragments were also found in the aggregate of the floors, where two main groups were observed, one including fragments of pottery of local production, the other representing fragments of exotic pottery.

Microstratigraphy and topography of paintings were carried out by the means of OM, micro-ATR, Mössbauer, Laser Scanner and ESEM. Chemical and micro-structural features of paintings indicated that they were probably made by a fresco pictorial technique.

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# ASSESSING SPECIALISED CERAMIC TECHNOLOGY: A FIRST LOOK AT TECHNOLOGICAL VARIATION IN LATER PREHISTORIC SCOTLAND

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Ceramic production and pottery technology has often been studied through the aid of thin section petrographic analysis. However, the production of other more specialised ceramic materials is still very limited. For example, the technological differences between pottery, and metalworking ceramics are still only characterised in generic terms. In order to readdress this imbalance, the present project examines in detail the technology of metalworking ceramics from late prehistoric and early historic Scotland. One case study comes from Traprain Law, an Iron Age hillfort in southeastern Scotland. Here different sets of ceramic metalworking materials such as moulds and crucibles are being examined in detail. Technological parameters of their production have been characterised. The analysis, which makes explicit use of recent clay sampling in the area, demonstrates how the ancient craftsmen at Traprain solved problems of availability of raw materials and technological constraints.

## NOTES

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## REFERENCES CITED

- Åström, P. 1957. The Middle Cypriote Bronze Age. *The Swedish Cyprus Expedition*, IV. Lund.
- Åström, P. and Wright, G. R. H. 1963. Two Bronze Age Tombs at Dhenia in Cyprus. *Op Ath* 1963: 225-276.
- Barlow, J. A. 1994. *Uncharted Vessels: Studies of Red Polished and White Painted Wares from Alambra, Cyprus*. Hydra. Working Papers in Middle Bronze Age Studies, II.
- Barnatt, J. and Smith, K. 2004. *The Peak District: Landscapes Through Time*. Windgather Press, Macclesfield.
- Edmonds, M. and Bradley, R. 1993. *Interpreting the Axe Trade: Production and Exchange in Neolithic Britain*. Cambridge University Press.
- Frankel, D. 1974a. *Middle Cypriot White Painted Pottery: An Analytical Study of the Decoration*. Södra Vägen, Göteborg.
- Frankel, D. 1974b. Inter-site relationships in the Middle Bronze Age of Cyprus. *World Archaeology*, 6: 190-208.
- Frankel, D. 1981. Uniformity and Variation in a Cypriot Ceramic Tradition: Two Approaches. *Levant*, XIII.
- Frankel, D. 1983. *Corpus of Cypriote Antiquities. Early and Middle Bronze Age Material in the Ashmolean Museum, Oxford*. Paul Åströms Forlag, Gothenburg
- Frankel, D. 1988. Pottery Production in Prehistoric Bronze Age Cyprus: Assessing the Problem. *Journal of Mediterranean Archaeology*, 1: 27-55.
- Freestone, I., Johns, C. and Potter, T. 1982. *Current Research in Ceramics: Thin-Section Studies*. British Museum Occasional Paper, 32, London.
- Hildebrand, J. A., Gross, G. T., Schaefer, J. and Neff, H. 2002. Patayan Ceramic Variability: Using Trace Elements and Petrographic Analysis to study Brown and Buff Wares in Southern California. In Glowacki, D.M. and Neff, H. (eds.) *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementary Mineralogical Investigations*. The Cotsen Institute of Archaeology Monograph 44, University of California, Los Angeles.
- Ivens, R. 1987. The Early Christian monastic enclosure at Tullylish, County Down. *Ulster Journal of Archaeology*, 50: 55-121.
- Jope, E. M. and Ivens R. J. 1998. The Raith at Ballymacash, County Antrim. *Proceedings of the Royal Irish Academy*, 98C: 101-123.
- Knight, D, Marsden, P. and Carney, J. 2003. Local or non-local? Prehistoric granodiorite-tempered pottery in the East Midlands. In Gibson, A. (ed.) *Prehistoric Pottery: People, Pattern and Purpose*, pp. 111-125. BAR International Series 1156, Oxford.
- Laylander, D. 1992. *Research Issues in San Diego Archaeology*. San Diego County Archaeological Society.

- Lyne, M. A. B. and Jefferies, R. S. 1979. *The Alice Holt/Farnham Roman Pottery Industry*, Council of British Archaeology Research Report No 30, London.
- Maritan L. 2001. Coarse Iron age pottery from Este (Padova), Italy. In Alpuente J., de Bustamante, I., López, P. and Sanz, J. (eds.) *Proceedings del 3rd International Congress on Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin, Alcalà de Henares, Spagna 9-14 luglio 2001*, pp 1-6. Servicio de Publicaciones de la Universidad de Alcalá.
- Maritan, L., Mazzoli, C. and Freestone, I. 2007. Modelling changes in mollusc shell internal micro-structure during firing: implication for temperature estimate in shell-bearing pottery. *Archaeometry*, 49: 529-541.
- Maritan, L., Mazzoli, C., Michielin, V., Morandi Bonacossi, D., Luciani, M. and Molin, G. 2005. The provenance and production technology of Bronze Age and Iron Age pottery from Tell Mishrifeh/Qatna (Syria). *Archaeometry*, 47: 723-744.
- Maritan, L., Mazzoli, C., Rigaldo, P., Pesavento Mattioli, S. & Mazzocchin, S. 2006. Le olle romane dello scavo di via Neroniana (Montegrotto Terme – Padova): Indagini preliminari. In Patron (ed.) *Proceedings del Convegno Nazionale AIAr, 16-18 febbraio 2005*, pp. 253-260.
- Middleton, A. and Freestone, I. 1991. *Recent Developments in Ceramic Petrology, British Museum, Occasional Paper 81*, London.
- Millett, M. 1979, The Dating of Farnham Pottery. *Britannia*, 10: 121-138.
- Morris, E. and Woodward, A. 2003. Ceramic Petrology and Prehistoric Pottery in the UK. *Proceedings of the Prehistoric Society* 69: 279-303.
- Peacock, D. P. S. 1970. The Scientific Analysis of Ancient Ceramics: A Review. *World Archaeology*, 1: 375-389.
- Peacock, D. P. S. 1988. The Gabbroic Pottery of Cornwall. *Antiquity*, 62: 21-24.
- Vince, A. 2001. Ceramic petrology and post-medieval pottery. *Post-Medieval Archaeology*, 35: 106-118.
- Whitbread, I. K. 1995 *Greek Transport Amphorae: A Petrological and Archaeological Study*. Fitch Laboratory Occasional Paper, 4. British School at Athens.