Sea of Glass:

Current Research on Glass from the Mediterranean and Beyond

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ABSTRACTS

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THE TALE OF EGYPTIAN BLUE: ANCIENT PRODUCTION AND PROVENANCE QUESTIONS IN THE MEDITERRANEAN REGION

Archaeological evidence shows that Egyptian blue, currently considered the first human-made pigment, was a prominent material in the ancient Mediterranean region. Despite the availability of archaeological material, there are many open questions regarding the nature and source of raw materials for its synthesis, as well as how its chaîne opératoire changed over time. The following talk aims to present, from a multidisciplinary perspective, the current challenges in Egyptian blue ancient production and provenance research, and to show starting strategies to target these specific questions.

The diverse physical and chemical processes involved in Egyptian blue synthesis, the need for (structured) geochemical information to identify tentative raw material sources, and the need for effective sampling methods of pigments in archaeological contexts hinder the process of provenance studies through isotopic and trace element analyses. The talk will introduce these research questions and challenges, while also highlighting the connections between provenance studies of Egyptian blue and glass. Hence, future findings could have an impact beyond this specific pigment, contributing to research on glass provenance, and therefore, a way to better understand human-made materials, trade networks, and production practices in past societies.

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THE GLASS MANUFACTURING ACTIVITY IN ALTARE: A REVIEW OF RESEARCH AND FUTURE PROSPECTS

Glass production in Altare (Liguria, Italy), is a case of particular interest for the study of pre-industrial Italian and European glassmaking. Documented since at least the end of the 13th century, it developed around the “Università dell’Arte Vitrea”, which was abolished in 1823, and was characterised by a complex network of commercial relations and the mobility of its craftsmen, who were active in numerous Italian and European production centres.

Despite the historical significance of this tradition, the technological, compositional and organisational characteristics of Altare’s glassmaking, as well as its contribution to the development of European glassmaking, remain largely unexplored.

This paper aims to outline the research currently being carried out on the subject.

CRISTINA BOSCHETTI

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AN ENVIRONMENTAL HISTORY OF VENETIAN GLASS: PRODUCTION, WASTE DISPOSAL, AND URBAN EXPANSION

Venice offers an exceptional case for investigating relationships between glass production, urban growth and resource management. During periods of demographic and industrial growth, the peculiar setting of Venice on islands located inside a sheltered maritime lagoon required repeated land reclamation to expand the surface of the city. Approaching Venetian glass as part of the city's material metabolism, this presentation explores how reuse, recycling and waste disposal connected furnaces, households and reclamation areas and contributed to the lagoon's physical transformation.

This presentation reports results from a study of approximately 2,500 glass finds from two multistratified sites, the former "Conterie" factory on Murano and Fondamenta Nuove–Sant'Alvise in Venice, initiated in July 2026 within a Culture Moves Europe-funded project. Both sites preserve successive land reclamation deposits but occupy different positions within the lagoon's urban and productive landscape. Their comparison investigates how glass moved between production, consumption and disposal contexts. Indicators of production, including glass masses and canes, document the circulation of production waste and semi-finished products beyond Murano. Islamic glass provides evidence for imported glass circulating in Venice within wider Mediterranean exchange networks. Stratigraphic sequences provide independent chronological evidence for technological developments and suggest that some technologies preceded their formal recognition in archival records.

Future LA-ICP-MS analyses at IRAMAT-CEB, CNRS, Orléans will investigate supply groups, imports, provenance and recycling.

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GEOGRAPHICAL AND CHRONOLOGICAL SHIFTS IN THE CHEMISTRY OF GLASS PRODUCED ALONG THE LEVANT COAST

Slumped bowls from Tell Iẓṭabba has a terminus date of 107 BCE and reveal two groups corresponding to an Early Roman type and a Hellenistic type with lower alumina concentration. Attention is drawn to the decline in Al_2O_3 contents of known primary glass production from South to North on the Syro-Palestinian coast. Based on this, it is suggested that Hellenistic glass originated north of Beirut.

Colourless glasses from Tell Iẓṭabba typically contain both manganese and antimony. It appears that antimony was added to glass already containing manganese to improve the colour. Hence the assemblage provides insights into two important technological changes that underpinned the early Roman expansion in glass production of the period – a shift over time in production and the development of decolourisation.

EMILY HARRIS-TAYLOR (CRANFIELD UNIVERSITY)

THE ANALYSIS OF GLASS FROM THE ROMAN VILLA, WARKTON, KETTERING

The study investigates Roman glass artefacts excavated from Warkton Villa, Kettering, aiming to shed light on manufacturing techniques, raw material origins, and the patterns of glass circulation in Late Antique Roman Britain. It seeks to address questions regarding technological transmission, material economy, and cultural hybridity in rural elite settings.

A comprehensive compositional analysis was conducted using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) alongside detailed microscopic examination. This dual approach enabled both quantitative and qualitative assessment of the glass samples, focusing on elemental composition, trace element variation, and microstructural features.

The assemblage was found to be dominated by natron-fluxed silicate glass, characteristic of traditional Roman recipes from the Eastern Mediterranean. However, significant variation in trace elements and microscopic inclusions pointed to episodes of recycling and secondary production, most likely taking place in provincial workshops. Additional evidence, such as residual colourants, surface weathering, and unique textural attributes, suggested post-depositional alteration and small-scale craft modification, indicating local technological adaptation within the broader context of imperial exchange networks.

The findings demonstrate that the glass artefacts from Warkton Villa provide compelling evidence of how rural elite sites in Roman Britain engaged with imported materials and adapted them locally. This case study highlights the permeability of trade boundaries and underscores the active role of local producers in transforming and negotiating Roman material traditions, enriching our understanding of cultural hybridity and technological exchange in the province.

SUE HEASER
(INDEPENDENT
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THE STORIES BEADS TELL

Polychrome glass beads, when studied in close detail, can reveal a great deal of information. They are handmade objects and made using lampworking in coloured glass. They have tiny anomalies such as tool marks, indications of the working temperature of the glass, the colours used and errors in construction which create a specific signature of the maker and can even show batches of beads that were probably made together at one time.

Previous typologies have often been too general, often based on colour, and placed beads into broad categories that miss these vital clues. The author's investigation of several rare polychrome beads found in Britain from Roman and Anglo-Saxon times has led to the discovery of parallels across Europe to the Eastern Mediterranean and beyond. The beads show a range of making techniques including combed beads, millefiori mosaic and thread-decorated. This presentation will showcase these beads and their elaborate patterns that give clues to trade links, the possible location of manufacture and the fascinating connections between women buried in similar periods but thousands of miles apart.



Photos (L to R): 1. Combed bead from Whitby jet mine, courtesy of Whitby Jet Museum; 2. Trailed bead from Petersfinger, courtesy of Salisbury Museum; 3. Mosaic bead from Stowing, Kent, courtesy of Duncan Sayer

NICOLA HURT
(MUSEUM OF LONDON ARCHAEOLOGY)

POST-MEDIEVAL GLASS BEAD MAKING AT HAMMERSMITH EMBANKMENT

Until recently it was thought that England did not participate in the seventeenth century glass bead trade which was dominated by Venetian and Dutch glass houses. However, MOLA excavations at Hammersmith Embankment have uncovered a significant glass bead making operation dated to the early 17th century. These excavations produced over 21kg of glass bead making waste, including failed beads, production tubes, and glass waste. With such a large and diverse assemblage it has been possible to explore not only the types of beads being produced, but the production methods for drawn beads and many ways the process could fail.

This talk will share some of the findings from the analysis of the bead making waste from Hammersmith. It will present how this project grappled with the problem of defining colours and identifying different types, demonstrating proposed methodologies for recording the complex layering and decoration of beads. It will also discuss the relationships between colour, size, and decoration, and the remarkably standardised production evidenced. The talk will close with some comparisons to bead assemblages from other sites, and suggestions for further research.

KELSI KAVIANI
(UNIVERSITY OF CAMBRIDGE)

REASSESSING GLASS PRODUCTION AT 10TH – 11TH CENTURY SABRA AL-MANSURIYYA, TUNISIA: NEW COMPOSITIONAL EVIDENCE

The organisation of early medieval plant ash glass industries remains one of the most pressing questions in archaeological glass studies. Only three sites so far exist with archaeological evidence of primary furnaces producing glass using halophytic plant ash as the flux: 8th-9th century al-Raqqa in Syria, 10th-11th century Tyre in Lebanon, and mid-10th–mid-11th century Sabra al-Mansuriyya in Tunisia. The large quantity of glass fragments and whole vessels excavated from Sabra has been extensively typologically studied, but has only been preliminarily analysed by SEM-EDS.

This paper presents the results on a re-analysis of window, vessel, raw, waste, and crucible glass from Sabra using LA-ICP-MS. The chemical data distinguish a composition distinct from Eastern Mediterranean, Iberian, or West Asian plant ash glass and confirm the primary production of plant ash glass at the site along with the secondary fabrication of a wide range of high-quality and common glassware. Strong compositional and typological similarities to glass from 10th – 11th century Sicilian contexts suggest a close technological connection between Ifrīqiya and Sicily, one further supported by the glazed ceramic and historical evidence. The stained-glass window fragments were characterised as non-local imports, potentially produced elsewhere in North Africa or in the Central or Western Mediterranean. This paper concludes by providing a first in-depth look at the technological choices of the Sabra al-Mansuriyya glass workshop and its role in the wider medieval Mediterranean economy.

NIAN LIU

(KEY LABORATORY OF ARCHAEOLOGICAL SCIENCES AND CULTURAL HERITAGE, CHINESE ACADEMY OF SOCIAL SCIENCES)

STUDY OF FAIENCE IN THE BRONZE AGE XINJIANG, CHINA: ORIGINS, TRANSMISSION, AND LOCALIZATION

This study examines the origins, transmission, and localization of faience in Bronze Age Xinjiang, China. Through the detailed analysis of microstructure and chemical composition of faience beads excavated from various archaeological sites in Xinjiang, the research identifies diverse transmission routes and sources of faience during the Bronze Age. The soda-rich faience unearthed at the Xiaohe Cemetery, located south of the Tianshan Mountains, shows a connection to the Harappan civilization of the Indus Valley, suggesting that it might have spread to the Tarim Basin via Central Asia.

Meanwhile, faience beads found in the northern Tianshan Mountain reveal influences from the North Caucasus, accompanied by evidence of technological adaptation and localization. This study of faience beads uncovers distinct cultural exchange routes and mechanisms between the northern and southern regions of the Tianshan Mountains during the Bronze Age, offering new perspectives on the transmission of technology across the Eurasian continent during this period.

ARTEMIOS OIKONOMOU (FITCH LABORATORY, BRITISH SCHOOL AT ATHENS)

WHAT CAN MYCENAEAN GLASS TELL US? INSIGHTS FROM NEW SCIENTIFIC ANALYSES

Glass has a fascinating history of more than 4000 years from today reflecting a captivating journey of innovation. In the Late Bronze Age, glass was mostly manufactured in Egypt and Mesopotamia while the Mycenaeans had a significant role and were involved mostly to glassworking rather than glassmaking activities.

The high level of craftmanship acquired by the Myceneans produced massive quantities of vitreous materials such as faience and glass, mostly in the form of jewelry. These vitreous objects, especially beads, pendants and plaques, were highly valued for their ornamental and symbolic roles. Such objects are commonly retrieved from elite burials, reflecting their association with social status and cultural significance.

As it is established by various scholars Mycenean glass was often made by fusion of specific raw materials such quartz pebbles and plant ashes, while various colorants were added, producing objects that ranged from translucent to opaque. Mycenean glass is highly susceptible to degradation due to its composition and burial environment leading to significant alteration of its visual characteristics.

This paper is focusing on the technology and provenance of LBA glass found in Greece as well as on identifying the weathering mechanisms and associated compositional changes in the surface of the artifacts with the aid of state-of-the art non-invasive and micro-invasive techniques.

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A MISSING LINK IN THE MEDITERRANEAN: THE ORIGINS OF MEDIEVAL GLASS FROM CYPRUS

The island of Cyprus was captured from its Byzantine ruler by Richard I of England in 1191 during the Third Crusade, and it soon became a key military and commercial hub for the Crusader states in the eastern Mediterranean. However, we know very little about the production and circulation of glass on the island in this transformative period, despite its potential to provide key insights into wider systems of trade, connectivity and exchange across the wider eastern Mediterranean. This paper presents new LA-ICP-MS and isotopic results for 58 glass samples dated between the 11th and the 13th centuries excavated at the castle of Saranta Kolones (Paphos) and from a Georgian church in the village of Softades (Larnaca district). The assemblage encompasses several different glass typologies, among which the famous gilded and enamelled blue “Paphos bottles” (12th century), a large group of “bubble rim” bottles and prunted beakers. The results reveal multiple sources of glass from different regions in the Levant as well as from Anatolia, and suggest a shift in supply patterns between the late Byzantine and Crusader period. In particular, one compositional group, likely originating in inland Syria, appears to have circulated predominantly during the Crusader period, with parallels identified in contemporary assemblages across the eastern Mediterranean and in Venice. This may point to the emergence of a new, still unidentified primary glassmaking workshop in the region. One large bottle may represent one of the earliest known examples of plant ash glass made in Venice.