



A Fresh Batch: Current Research in Ancient and Historical Glass

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ABSTRACTS

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**THE IMPACT OF
ANALYSIS IN THE
INVESTIGATION
OF LBA GLASS
PRODUCTION,
TRANSPORT AND
EXCHANGE**

Compositional analysis has greatly advanced our understanding of Late Bronze Age (LBA) glass as one of the most prestigious items of its time, from its origins in the New Kingdom to its pivotal role in the diplomatic gift-giving practices among the Great Powers of the LBA. The sensitive detection of trace elements using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) has enabled researchers to determine the provenance of LBA glass, identify specific raw materials and colorants, and characterize changes in composition and colouring strategies over time.

This research combines compositional analysis with traditional archival research to establish new connections between historically significant sites, furthering our understanding of the origins, development, and distribution of early glass production. A re-examination of early glass from the tomb of Amenhotep II (1427-1400 BCE) (KV35) indicates that Egyptian glassmakers were technically capable of producing multiple colours using domestically sourced raw materials by the reign of Amenhotep II, in addition to receiving early glass items of Mesopotamian origin, likely transported by foreign women residing at the harem palace in Gurob, Egypt. The significant site of Serabit in the Sinai Peninsula was identified as one of the largest glass consumption sites in the LBA, receiving glass votives over a period of approximately 300 years, based on compositional dating confirmed by temple inscriptions. From this research, two distribution models are proposed: one highlighting the circulation of glass under Egyptian administration, and another for the international LBA glass trade system that included Mesopotamia and vassal states, as evidenced by the presence of both Egyptian and Mesopotamian glass at the city of Tall Zirā a, Jordan.

Overall, this study provides new evidence of Egypt's early glassmaking capabilities and the broader LBA glass trade network, including the crucial role of women in the transport and distribution of glass.

This study aims to understand the manufacturing process of glass ingots, particularly blue glass, through the use of different furnace types including electrical and wood-fired furnaces in varying locations.

The study also investigates the use of a separator in the manufacturing process, which would allow for the glass ingots to be easily separated from the crucibles. Various materials such as oil, pure lime, and crushed oyster shells are used as a parting layer in the glass crucibles; both the lime and oyster shell layers are successful in separating the ingots from the crucibles after firing.

This study also aims to further understanding of cross-craft interaction between glassmaking and other pyrotechnologies such as metallurgy. Metallurgical crucibles are examined and comparisons are drawn between them and crucibles that were used for glass manufacturing. The workshops excavated at sites such as Amarna, Qantir and Lisht are also considered to understand the skills that may have been needed in order to produce glass on an industrial scale.

The experiments in this study suggest new avenues for research focussing on the manufacture of coloured glass ingots and the interactions between glassmaking and other technologies in Late Bronze Age Egypt.

SARAH MITCHELL
(NEWCASTLE
UNIVERSITY)

**JEWELS CREATED
FROM DIRT: AN
INVESTIGATION
INTO THE SOCIAL
CONTEXT BEHIND
GLASS
MANUFACTURING
IN LATE BRONZE
AGE EGYPT**

ELISABETTA
MALAMAN*, WITH
IVANA ANGELINI*
AND MARTA RAPI**
(*UNIVERSITÀ DEGLI
STUDI DI PADOVA,
**UNIVERSITÀ DEGLI
STUDI DI MILANO
STATALE)

**ETRUSCAN GLASS
FROM FORCELLO:
TECHNIQUES,
STYLES, AND
PRODUCTION IN
THE HEART OF
PADANIAN ETRURIA**

Research on Italian glass artefacts from Iron Age is currently lacking a multi-analytical study approach. To date, scholars have focused mainly on typological and decorative studies of Etruscan glasses, whereas information on composition and origins of glass base is scarce. To fill this gap, this study combines an archaeometric and archaeological characterization of glass artefacts (28 glass beads and 4 fragments of unguentaria) from the Etruscan site of Forcello di Bagnolo San Vito (Mantua, Italy), founded in 540 BC. This research aims to reconstruct the manufacturing techniques of the glasses; determine their chronological origin; identify the raw materials and their provenance area. The analytical techniques applied include: Stereomicroscopy (SM) to identify the production markers, useful to define the working techniques of artefacts; Optical Microscopy (OM) to underline markers of production process (e.g., flux lines); Scanning Electron Microscopy with Energy Dispersive System (SEM-EDS) to provide information about the chemical composition of the glass phase; Laser Ablation Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) to give details regarding the raw materials provenance; μ -Raman, to have data about colouring and opacifying technologies and on furnaces conditions and craftsmen's pyrotechnological knowledge. In addition, the archaeological study allows to identify the chronological range of production and distribution of the studied artifacts.

The preliminary results confirm the typological classification of beads into “eye beads” or “annular beads” typologies, whereas the vessels typologically unclassifiable. Moreover, the SM analyses suggest that the beads are made by winding technique, and the vessels are core-formed made, reliably with the Iron Age production techniques. SEM-EDS analyses confirm that the production of the artifacts consistent with the glass compositions of the 1st millennium B.C. (Low Magnesium Glasses, or LMG), characterized by the use of natron as a flux and μ -Raman technique confirms the use of calcium and lead antimonates. All this information combined will help to obtain data on the raw materials used, reconstruct the production processes of the archaeological glasses, and understand cultural contacts and trade routes in which the site of Forcello di Bagnolo San Vito was involved from the 6th to the 4th century BC.

Recent years have witnessed the emergence of a significant number of glass samples whose chemical composition indicates the use of mixed plant ash and mineral natron fluxes (Intermediate Plant Ash Natron; IPAN) in Roman, late Roman, and late antique contexts, suggesting the existence of a/several glassmaking tradition/s that coexist with the dominant production of 'only natron' glass.

This presentation briefly explores the chemical characterisation of these glasses from the 1st to the 9th century AD and discusses the fit of IPAN glasses in the overall structure of glass production in 'Natronland', taking into consideration not only its compositional features, but also other factors such as the organisation of glassmaking, the role it may have played in meeting demand for glass, and technological change.

DAVID GOVANTES-
EDWARDS
(UNIVERSITY OF
CÓRDOBA), with P.
Cosyns, P. Degryse, C.
Duckworth, I. Freestone,
M. Frenken, C. Jackson,
A. Oikonomou, Th.
Rehren, J. Alberto
Retamosa, D. Rosenow,
A. Shortland and M.
Zimmerman

**PLANT ASH GLASS IN
NATRONLAND: THE
USE OF PLANT-BASED
FLUXES IN
GLASSMAKING FROM
THE 1ST TO THE 9TH
CENTURY CE IN
EUROPE AND THE
MEDITERRANEAN
BASIN**

THOMAS DERRICK
(MACQUARIE
UNIVERSITY,
SYDNEY)

**THE RECEPTION
OF ROMAN GLASS
UNGUENTARIA IN
MODERN
GLASSWORKING
AND
CONTEMPORARY
PERFUME AND
COSMETIC
CONTAINERS**

This paper aims to consider to what degree the archaeological discoveries of Roman glass unguentaria influenced contemporary (19th-21st century) cosmetic and perfume packaging and marketing. These items flooded into publications and museum and private collections throughout the 19th and 20th centuries, that they represented ancient social practices, analogous to the present day, was taken for granted. Indeed, these archaeological vessels seem morphologically so familiar that the inherent difference between the ancient use of these substances and those of the 19th century - not to mention the 20th and 21st centuries – was not problematised. It stands to reason that the rediscovery of these artefacts – which seemingly provided ‘golden-age’ aetiologies for modern behaviors – may have influenced contemporary marketing given the rampant neoclassicism of the time.

However, extensive interaction with, and imitation of, Roman unguentaria in the 19th and 20th centuries only centred around a few short-lived reproduction makers in in the Rhine Valley, art glass vases and perfume bottles produced by Louis Comfort Tiffany, and erroneous Victorian romantic portrayals of lachrymatories (tear-bottles). There is one key interesting outlier, however, the perfume Bat-Sheba by Israeli perfumer Judith Muller. From the late 1960s onwards this biblically themed perfume’s marketers traded on the uniqueness of their bottles, which were hand painted glass ‘urns’ which were (anachronistically) inspired by Roman glass unguentaria in the museums and collections of Israel (much of which was heavily devitrified). I will finish the talk by discussing some potential reasons for the lack of engagement with Roman glass unguentaria in these industries (even when the products themselves have classical themes).

After the Ottoman conquest of the Balkans in the 14th – 15th c., Sofia – a city that has existed continuously for already two millennia and nowadays is the capital of Bulgaria, became the main administrative centre of the peninsula.

Because of its role as a provincial capital of the Rumelia region Sofia became an important economic and commercial centre for the Ottoman Empire. There is information about active trade between the Ottoman Balkans and the other parts of Europe, as attested in the written sources and also confirmed by the archaeological material found in the city. One of the products of interest are the glass vessels. Significantly, glass is not mentioned in the preserved trade documents. However, the archaeological material from Sofia from the 15th – 16th c. shows a great diversity of glass vessels, among which is an important luxurious group – the one made with filigree decoration.

This technique was invented in Venice after the beginning of the 16th c. and is in essence glass in which twisted threads or tubes are embedded to create different patterns in the vessel body. Glass with filigree decoration became so popular that imitations of it were produced across Western and Central Europe (façon de Venise). The examples from Sofia made using the filigree technique are diverse in their patterns and colours. An attempt will be made to distinguish imitations from original Venetian products and place them in the context of the city. This could provide more information not only about glass trade during the 16th – 18th c., but also give opportunity for a better understanding of the everyday life in an important Ottoman Balkan city such as Sofia.

VERONICA
NIKOLOVA
(BULGARIAN
ACADEMY OF
SCIENCES)

**RENAISSANCE
AND BAROQUE
FILIGREE GLASS
VESSELS IN SOFIA**

STEPHEN DRAPER
(INDEPENDENT
RESEARCHER)

**GLASSHOUSE AT
KNOLE 1585-8:
FURTHER
FINDINGS, A
FULLER STORY**

When Thomas Barrett Lennard was conducting genealogical research in the family archive he came across three curious documents, relating to glassmaking at Knole, in Sevenoaks, Kent. He published these in *The Antiquary* of 1905, making it the best-documented glasshouse of the Late period, mentioned in every book about English glass. The archives contain more references to the Knole glasshouse, particularly documenting difficulties and disputes over the wood supply, which reveal much more about the project and people.

This paper will present the additional evidence and propose a complete timeline for the operations at Knole, including the link between the enforced closure of the Burgate glassworks and the opening of a second, smaller furnace at Knole. Costings and production rates are considered and cross-checked with other contemporary sources.

Glass cinerary urns in Roman-period Britain were last examined over thirty years ago. With new data, discoveries, and approaches towards funerary archaeology, this evidence can now be re-examined.

Drawing from a dataset of 112 urns, the largest currently available, this presentation suggests that mourners selected glass containers for their visual impact. The striking visuality of the ashes through the glass was exploited to create an intricate and oftentimes unique spectacle at the funeral, manipulating lighting, colour, and enclosure. Communities used these spectacles to memorialise those important to them, expending a great deal of time, effort, and care in the process. The material characteristics of glass were thus central to its appeal as a cinerary container.

LUCY HALFACRE
(UNIVERSITY OF
CAMBRIDGE)

**A CLOSER LOOK:
THE GLASS
CINERARY URNS
OF ROMAN-
PERIOD BRITAIN**

ELIZABETH
FOULDS
(E&F ARTEFACT
SPECIALISTS), with
FRANCES
MCINTOSH
(ENGLISH
HERITAGE)

Roman Corbridge, Northumberland (*Coria*) was occupied from the mid-80s CE, initially as a fort with a town that grew alongside it, until it was abandoned in the 5th century. Various excavations throughout the 20th century revealed a large assemblage of glass that is currently held within the museum at Corbridge Roman site. This collection has never been fully catalogued and is largely unpublished, although Allen's (1988) report covers approximately 700 fragments from the 1947–1980 excavations.

**DELVING INTO
MUSEUM
ARCHIVES: THE
CORBRIDGE
GLASS PROJECT,
2024 UPDATE**

The Corbridge Glass Project started following the 2022 AHG conference, where Frances McIntosh brought some Corbridge glass as part of the conference artefact handling. The project aims to fully record the collection, publish the assemblage, and enable access for future researchers. Elizabeth Foulds has been working towards these aims by identifying and recording each fragment of glass since Autumn 2022. This paper will provide an update on the progress completed over the last year and how the project is developing.

Most of what we know about how ancient Roman glassworkers made their wares comes from clues we gather from the objects themselves. While much of the physical evidence of the making process can be identified with a trained eye, oftentimes the nature of production marks (e.g. if they are very shallow) and the reflectiveness of glass makes them difficult to photograph in normal light. This means that the person studying the object must hold it in their hands and rotate it around to see the marks.

With Reflectance Transformation Imaging (RTI), the user can manipulate angles of light to reveal textures in the surface. This digital documentation of production marks can be easily studied, categorised, and shared. RTI also allows for less handling, which is better for objects with degraded surfaces. However, RTI has very rarely been used for glass objects.

This presentation details preliminary research into using RTI on several ancient Roman glass objects in the Allard Pierson collection, as part of the 2024 Bospette Fellowship for Roman Glass. The results show that it is a promising technique that can help us document production marks, which in turn can be used to derive conclusions about techniques and tools used in ancient Roman times.

THERESA COSTELLO
(COSTELLO
CONSERVATION)

**DOCUMENTING
PHYSICAL
EVIDENCE OF
ROMAN GLASS
PRODUCTION
WITH
REFLECTANCE
TRANSFORMATION
IMAGING**

DAVID GROGAN
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NOTRE DAME, IN)

Glass is a common find on early medieval Irish sites, having been found in association with native Irish settlement-enclosures, monastic centers, and Viking towns. Evidence for secondary production (the recycling and reworking of existing glass to form new objects) has also been identified for each of these site types.

**EARLY MEDIEVAL
IRISH GLASS
PRODUCTION
AND EXCHANGE
NETWORKS IN
CONTEXT: THE
ROLE OF GLASS
IN SOCIAL AND
ECONOMIC
ORGANIZATION**

Documentary evidence from the period describes a hierarchical social system with mutual obligations between noble patrons and their freeman farmer clients. The patron provided their clients with both military equipment and luxury goods. With most glass recovered from Early Medieval Irish sites being either items of personal adornment (e.g., beads and bracelets) or decoration (e.g., enamel on high status metal work), the period's defined hierarchy and the symbolic potential of glass within that system raise questions about the organization of glass crafting. If glass objects carried symbolic weight, it is

possible that glass acquisition, production, and distribution practices differed between social groups as part of boundary making. On the other hand, the divisions between those groups may not have been as rigid as is popularly depicted, with evidence of hybridization between the Irish and the Vikings over time and the concentration of both secular and ecclesiastical authority within the hands of Irish dynastic families.

A thorough compositional analysis would allow us to identify acquisition networks, production strategies, and distribution systems that may (or may not) have been patterned along social group boundaries. In this paper, I explore the role of glass in the structure of Ireland's Early Medieval social and economic systems, discuss the archaeological context of the glass evidence, and provide initial insights generated from compositional analysis.