GLASS VESSELS IN MYCENAEAN GREECE: MANUFACTURE, PROVENANCE AND THEIR FUNCTION IN CONTEXT

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The current paper presents and discusses the occurrence of glass vessels in Mycenaean Greece through published evidence from cemetery sites in the Peloponnese. In the first place, a definition of this distinctive category of glass artefacts with an overview of their main types is provided on the basis of their manufacturing techniques. Glass vessels are not included amongst the typical artefacts produced by the thriving Mycenaean glass industry, which was orientated primarily to glass-bead making. Taking into consideration that glass vessels are characteristic products of alien glass industries, their provenance is explored within the network of external relations of the Peloponnese with the Eastern Mediterranean and the Near East during the Late Bronze Age. Their rarity and uneven geographical and chronological distribution in Mycenaean Greece are discussed in conjunction with the occurrence of glass vessels outside the Peloponnese, in regions such as Boeotia, Crete, Rhodes and in distant Mycenaean sites on Cyprus. The paper also examines the role of glass in gift exchange and diplomatic relations in the Late Bronze Age. Given that Late Bronze Age glass vessels, as in the case of glass minor objects in general, are principally found in burial contexts mostly associated with luxuries and exotica, the paper aims to explain their function in relation to their burial deposition, their possible symbolic attributes and the social status of the dead.

Kevwords

Glass vessels, Mycenaean Greece, Manufacture, Provenance, Function, Gift exchange

THE BLUE OF BARBARIANS: GLASS ORNAMENTS AS MIRROR OF IDENTITIES IN LA TÈNE SOCIETIES

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When the societies of La Tène began to produce glass objects in the 5th century BC, they did so exclusively to produce ornaments that reflected their stylistic and symbolic codes. By reconstructing the various processes involved in the production of these glass beads and bracelets, it is now possible to see the technical evolution of production and identify the typological changes associated with the skills of the craftsmen. At the same time, however, it is also possible to recognise the limitation of these skills, which may be due to economic or stylistic choices. This article aims to examine the place of glass in La Tène societies by looking at the elements of identity it was supposed to reflect. What symbolism is associated with these objects, their shapes and colours? What stylistic or symbolic choices shape their production? Prestigious ornaments in a "barbaric blue", with designs that symbolise identity... the technical and social study of these objects has recently brought to light many elements about the values and role of glass as a social and cultural marker, as a reflection of individuals and societies in evolution.

Keywords

Late Iron Age, Prestige, Technological Change, Identities

TRANSPARENT TIMES - GLASS VESSEL FRAGMENTS FOUND AT TAYMA (ARABIAN PENINSULA)

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The excavations at the oasis and ancient settlement of Tayma (Saudi Arabia), amid the ancient incense trade route, revealed numerous prestige goods such as metals, incense, and glass. Of over 180 glass fragments found in late Iron Age to Islamic contexts, 101 are the focus of the investigation, which aims to identify their provenance. Were these locally produced glasses, or were they acquired through supra-regional trade networks?

The presence of glass in Tayma for several centuries, both in residential and public contexts, has led to various interpretations of the objects. In this regard, the place and time of deposition of glass fragments will be analyzed by placing them within their archaeological framework, including stratigraphic context, distribution, and chronological classification. For the archaeometric investigation, the non-destructive portable energy-dispersive X-ray fluorescence analysis (p-ED-RF) was employed. All 101 glass fragments underwent chemical characterization to assess their composition and production techniques. The combination of archaeological and chemical classification allows the interpretation of the glass fragments as common commodities, material versus exchange value, and prestige goods.

The acquired data sets the stage for an area frequently demonstrated as an intersection in the commerce paths between major entities. However, this area provides implications for understanding the distribution and trade of glass artifacts across Egypt, Mesopotamia, the Mediterranean, and the Arabian Peninsula.

Keywords

glass, Arabian Peninsula, p-ED-RFA, trade

TRANSFORMATION OF THE ROMAN GLASS PRODUCTION - CASE STUDY ROMULA-SLOVENIA

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From the end of the 1st century BC through the 1st century AD the Roman glass production faced significant changes in technology, production and trade. On the example of the Roman road and customs station Romula in Slovenia (the Roman province of Pannonia) we would like to present these changes. We would present and compare the finds from the settlement, including mould-made mosaic, coloured and decolourised glass, imported mould-blown objects (Ennion beakers) as well as a wide range of free-blown glass (including a Sentia Secunda bottle from Aquileia) for everyday use.

All these find can be compared with the glass discovered in necropolises of the site, which reflects the use of glass as a grave good. There are important differences observed on these two groups of glass on the site, regarding the quality and dating of the glass items. Archaeometric analysis of the glass from the site was also made and will be mentioned.

Keywords

Roman glass, mould made glass, coloured glass, colourless glass, Pannonia, custom station

ROMAN GLASS INSTRUMENTS FOR MEASURING LIQUID CAPACITY

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This paper deals with Roman square bottles housed in the Museum of Ancient Glass in Zadar. They were used primarily for commercial needs of transport or to sell liquids in retail. There are two ways of production of these vessels: free blowing and then pressing on the flat surface or by blowing in open molds which enables getting many regular and uniform shapes.

In our analysis we paid attention only to products made in open molds including several unpublished specimens. Precise analysis of their capacity enabled identification of a series of bottles and some other shapes with square bodies which had various dimensions but always with regular proportions of capacity which are parts or multiplicands of one another.

All these finds which are dated to the 1st and 2nd centuries AD have common characteristics such as capacity corresponding to classification of Roman hollow measures, thick walls and sturdy production, and other morphological particularities such as specifically flattened rim, wide ribbed handle, pronounced shoulder etc. These particularities in design which distinguish them from other similar forms indicate that there was standardized packing in the Roman period which could be used as a measuring instrument for liquid capacity.

It seems to us that the methodology of fine volume calibration can be recognized especially in the way the shoulder bend is performed, which compensates for errors in achieving the precise measurements of the item, that can occur during the process of glassworking.

The use of glass objects in this context of measuring devices should therefore be seen as a set of changes that occurred in Roman times in the perception of glass in general, primarily in terms of the exceptional expansion of the fields in which it is used, but also in the area of improving glass processing techniques.

Keywords

Roman glass, Square bottles, Measuring instruments, Liquid capacity

THE SIGNIFICANCE OF USING GLASS IN EARLY ROMAN AQUINCUM

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The custom of using glass vessels arrived in the area that later became Pannonia in the first century with the conquering Romans. As Aquincum is located in the north-eastern part of the province, and had been integrated into the Empire only in the last stage of the conquest, it would be easy to assume that it would take time to adapt these new habits. Yet we found glass debris even in the earliest layers of the settlement complex. Not just in the newly founded parts, like e.g. the Civil town, but also in the the so called Víziváros settlement, which was already in use by the indigenous celts. This would suggest, that not only the new settlers brought their vessels with them, but the original inhabitants were also eager to use them. However, this need could be only supplied via trade, at least in the beginning, but it did not deter the consumers. With the evaluation of the finds we see common vessel types for everyday use, but unique luxury pieces, too. This indicates, that however fast was the integration of glass ware into the life of Aquincum's inhabitants, the vessels could also indicate the identity and social standing of its owner.

In this lecture I'd like to present case studies from different parts of the settlement to highlight the multilayered significance of the vitreous finds of early Aquincum.

Keywords

roman glass, Aquincum, Pannonia, early settlement

LATE ROMAN GLASS WEIGHTS FROM LAODICEA AD LYCUM

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Laodikeia ad Lycum, located 6 km north of Denizli province in Southwest Turkey, has been one of the most important political, commercial, and religious centres of ancient Anatolia and especially the Phrygian region since the 3rd century BC. After the heyday of the Roman Empire, the city managed to maintain its political and economic power during Early Christianity. It is well known that Laodikeia hosted one of the seven privileged Christian communities named in the Book of Revelation in the New Testament. A monumental and central church -known as the Laodikeia Church- was built in the public center of the city during the 4th centuries A.D. and has been a focal point until the abandonment of the city as a result of a major earthquake at the beginning of the 7th century AD.

This presentation aims to evaluate the disc-shaped glass weights, which constitute a very rare finding group unearthed in Laodikeia. This type of object which became popular, especially in the Late Antiquity appeared in a wide distribution area. They were used to determine the weights of delicate products as well as coins.

The disc-shaped glass weights of Laodicea have been unearthed in two different findspots: Two of them are from shops adjacent to the Syrian Street i.e. the decumanus of the city. On the other hand, two examples with busts of administrators and important depictions related to Christianity have been found during the work carried out in the Laodikeia Church, within the debris of the church on Eastern Street. They draw attention in terms of the industry they are affiliated with. These examples should be considered as indication of the role that the church/the religious organization plays in economic activities and they emphasize the influence of the Empire on the control of commercial activities.

Keywords

Late Roman, Glass Weight, Laodikeia ad Lycum

GLASS IN THE CONTEXT OF THE ANCIENT IADER NECROPOLIS

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This study focuses on a contextual analysis of glass found in graves from the ancient lader necropolis (present-day Zadar), one of the best-known necropolises in Roman Dalmatia. The analysis covers more than two thousand graves, comprising different types with both burial rites (inhumation and cremation) and dating from the 1st to 5th century AD. A large amount of glass was found in them, especially in graves with cremated individuals dating from the 1st to 3rd century AD. Using a multidisciplinary approach, the research examines the role of glass objects within Roman funerary practices, social structures, and belief systems. By examining the typology, distribution, and symbolic meaning of glass artifacts, this analysis aims to decipher the cultural and socio-economic contexts in which they were deposited in the tombs. In addition, the study examines trade networks that facilitated the circulation of Roman glass and the connections of Roman lader with the wider Mediterranean basin.

Keywords

Roman Dalmatia, ancient lader, necropolis, glass

MYTHOLOGICAL DEPICTIONS ON ROMAN GLASS FROM THE EASTERN ADRIATIC

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Along the eastern coast of the Adriatic Sea, a variety of glass artifacts with cult and mythological features have been discovered that shed light on the cultural and religious customs of the ancient Romans in the area of the former province of Dalmatia. These glass items served not only practical purposes, but also had symbolic significance associated with various cults and mythological beliefs prevalent in the ancient period. During the 1st century, Roman glass production experienced a significant boom, as evidenced by many archaeological finds from Roman colonies such as Jadera, Salona and Narona. This period was marked by the fruitful development of the aesthetic and creative component of glassmaking. The master glassmakers of that time found their place in the creation of glasses and bottles with embossed and engraved decorations inspired by characters from Greek and Roman mythology.

The paper particularly emphasizes the connection of glass artifacts with the cult of Dionysus and with other eastern deities. By examining the symbolism, iconography, and cultural contexts surrounding these artifacts, researchers can gain a deeper understanding of ancient religious traditions and their significance in society.

Keywords

Roman glass, Mold-blown technique, Mythology

PLAYING AT (DEMI-)GOD: HERCULES' CLUB, MOULD-BLOWN GLASS, AND SENSORY EXPERIENCES IN THE ROMAN EMPIRE

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Roman glass studies are dominated by considerations around typology, production techniques and glass compositional analysis. The approaches provide important insights into the Roman glass industry and the circulation of vitreous materials in antiquity. However, there is room to do more to explore the cultural and social significance of glass in Roman society. This paper takes as its case study a class of early imperial mouldblown beaker known by many names today—bossed, lotus-bud, amygdaloid, teardrop, pineapple, and finally club beakers. I argue that a host of evidence in other media suggests that the beakers are most likely to represent Hercules' club and thereby served as a means through which mortals could symbolically take on hero's most prominent attribute and therefore emulate or embody this demi-god. In this contribution I identify these vessels, contextualize them among classical depictions of Hercules and his club—especially in relation to the deity's role as a drunken reveller, competing with the likes of Dionysus and Silenus—and consider their symbolic meaning. I then explore the use of these vessels as humorous set pieces within the Roman dining tradition, allowing diners to emulate Hercules with regard to his mythic alcohol tolerance, and investigate some practical considerations regarding their use, including sensory perceptions.

Keywords

Roman glass, Classical art, Roman dining, humour

THE MANY LIVES OF BLACK GLASS: LATE ANTIQUE AND MEDIEVAL BLACK-GLASS BANGLES IN IBERIA

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Black glass bangles are a fairly common find in late antique and medieval archaeological contexts in the Iberian Peninsula and in the Mediterranean and the European continent more broadly, and they have been interpreted from a variety of perspectives. Through the chemical analysis of a number of these bangles found in Spain and Portugal, the presentation aims to explore differences in technology and raw materials over time. In addition, chemical composition, in combination with other archaeological and historical evidence, will be used to explore differences in the value assigned to these bangles in various cultural settings, from the apparent attempts to imitate jet and other semi-precious stones in specialised workshops during the Late Roman period in the northwest of the Iberian Peninsula, to the seemingly apotropaic properties associated to heavily-recycled glass in Islamicate al-Andalus and also in the Christian territories to the north, where these bangles are often found in graves of children and women.

Keywords

Glass, Iberian Peninsula, Late Antiquity, Middle Ages, Bangles

MATERIAL AND TECHNOLOGY OF EARLY MEDIEVAL (7TH-9TH CENTURY AD) GLASS BEADS IN THE CARPATHIAN BASIN

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The entire Avar period (late 6th-early 9th century AD) in the Carpathian Basin was characterised by a diverse assemblage of glass beads in graves. However, there are several differences between Early and Late Avar bead wearing. The first half of the Avar period (late 6th-early 7th century) is characterised by shorter strings of more colourful beads and eye beads were one of the most popular bead types, whereas in the late Avar period (late 7th-early 9th century) new bead types appeared (e.g., melon-shaped, amphora-shaped), bead strings became longer, brighter colours were replaced by darker shades and various technological solutions were introduced. The aims of our analyses is to demonstrate if there were any changes in the material of the beads as well as to examine the factors responsible for the significant changes.

Early Avar-period glass beads from the Carpathian Basin were formerly extensively studied, however, Late Avar-period beads received little attention. To reveal the innovative beadmaking techniques and other specific technologies, such as copper metal tubes in thread holes and 'hair effect' decorations, used in the late Avar period, we studied bead strings from 172 graves from 12 archaeological sites in the Carpathian Basin. Additionally, to expand our knowledge on glass recipes and coloring technologies of the Early Medieval period (glass raw materials, colorants, opacifiers), we analysed fifty-eight Late Avar-period beads of various forms and colours, in addition to fifteen Early Avar-period beads, by SEM-EDX and LA-ICP-MS methods.

Keywords

early Middle Age, Avar Period, Carpathian Basin, glass bead, technology

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ISLAMIC PLANT-ASH GLASS TRADE AND RECYCLING IN THE EASTERN SILK ROADS: NEW INSIGHT FROM NISHAPUR, IRAN

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Islamic plant-ash glass (circa 9th-15th century) was extensively traded along the Silk Roads, and its use and reuse offer insights into the inter-regional connectivity and local material culture development in medieval Eurasia. Research on plant-ash glass has largely focused on evidence from the Near East, while the role of various plant-ash glasses in the eastern Silk Road societies, including Iran, Central Asia, and Xinjiang (China), is not well understood. This paper presents our ongoing research progress on Islamic plant-ash glass in the eastern Silk Roads, in particular focusing on an 11th-12th century assemblage unearthed in Shadyakh, Nishapur, Iran, suggesting diverse origins for the glass artefacts and potential recycling practices. An integrative approach for plant-ash glass provenance is employed, which incorporates chemical composition, Sr and Nd isotopes, Nd isotope mixing lines, and Sr-Nd isotope baselines. Chemical and isotopic compositional signatures reveal provenance and trade relations, while the Nd isotope mixing line may capture the dynamics of the mixing process in glass recycling. The results suggest that trade brought glass from Iraq, Syria, Central Asia, and potentially Iran to Shadyakh for consumption, showing that both eastward and westward flows of glass products occurred and that utilitarian glass was traded across distances. Within many of the analysed assemblages from the eastern Silk Roads, glasses with compositional signatures of Central Asia, the Tigris-Euphrates River Basin, and possibly Iran are often found in the same context, implying a common trade network for glasses with different origins, designs, and functions. It is plausible that trade hubs such as Nishapur and other major metropolises, where various types of glass were gathered, traded, and sometimes reworked, facilitated the "mix and match" of diverse glasses along this major trade artery. (DOI: 10.1016/j.jas.2022.105695; 10.1016/j.isci.2023.108450)

Keywords

Islamic glass, Sr-Nd isotopes, Silk Roads, trade, plant-ash glass, recycling

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

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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. 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 insights from a chemical analysis (primarily by means of pXRF with preliminary LA-ICP-MS results) of a representative study assemblage of Early Medieval Irish glass and what that information can reveal about the role that glass as an object of display and ornamentation may have played in organizing the social and economic structures of the period.

Keywords

Ireland, Glass, Archaeometry, Early Medieval, Trade and Exchange, Craft Production

WINDOW GLASS IN SACRAL SPACES FROM LATE ANTIQUITY TO THE MIDDLE AGES:

STATE OF RESEARCH ALONG THE EASTERN ADRIATIC COAST

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Due to the nature of the material susceptible to breakage even in the most favorable storage conditions, direct confirmations of window glazing in buildings of ancient origin are quite modest. The glass panes are regularly found in pieces and the recognition of the fragments as window glass is often very difficult. The context of the finds is of great importance, so are the traces of the technological process characteristic of the window glass production that can be recognized on the glass fragment surface or in its inner structure.

The aim of this lecture proposal is to present the historic window glass used in sacral architectural context along the eastern Adriatic coast, particularly in the area of Dalmatian region, from Late Antiquity to Late Middle Ages (from 5th to 15th century). The focus is on the material traces of the window glazing of early Christian basilicas, churches and medieval cathedrals on the basis of which the characteristics of the practical use in orginal architectural environment and the reflections of such practice in social context will be presented.

The archaeological sites considered in the area are situated outside the urban centres (e.g. Podvršje near Zadar, Bilice near Šibenik, Brzet near Omiš...), inside the historic centres with urban discontinuity in the Middle Ages (Salona, Narona) and in urban centres tipical of the Dalmatian medieval communes with origins dating back in Antiquity and Late Antiquity (Zadar, Trogir, Split, Dubrovnik...). The secundary material evidence of glazing – the elements of window-pane framing, metal and wooden holders or the pieces of transennae, found in the considered archaeological sites will also contribute to the interpretation of the window glazing practice on the eastern Adriatic coast.

Keywords

windows, early Christian - late Medieval churches, eastern Adriatic coast

ASSEMBLING MEDIEVAL WINDOWS IN A MONASTIC SETTING

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There were over 800 monasteries in England in the medieval period until the Dissolution in the C16th. These housed a number of different religious orders but all were high status and built and finished to a high specification. These large imposing stone structures carried expansive glazing to not only provide light in a practical sense but also to enhance the spiritual atmosphere. Many windows were highly decorated, primarily with biblical scenes, using coloured glass and painted panes to create glazing schemes that were decoratively very complex, symbolic, didactic and magnificent. In contrast, other windows employed a restrained palette and range of motifs reflecting religious dictates, fashion or parsimony.

The glass used to glaze the buildings was known, from documentary evidence, to be procured from different sources particularly from France where coloured glasses such as deep blue are known to have been produced, especially for high status buildings. However, the English glazing industry was developing during the 13th century, possibly with the help of immigrant workers, and English glass may also have been used to glaze these windows.

This paper examines the excavated window glass from seven monasteries in England from two distinct orders, Benedictine and Cistercian. This type of archaeological material is understudied due in part to the difficulties in interpreting small and often degraded fragments. Using techniques developed for the study, the glass is analysed stylistically to see what images and decorative effects might have been used and to date the glass, and also to ascertain where the monasteries were obtaining their glass from by complementing the stylistic study with chemical analysis. These results are then used to elucidate the complex nature of the use of glass in a monastic setting in medieval England.

Keywords

Glazing, Medieval, Monastic, Decoration, Religion

GLAZED TOWNSCAPE - GLASS WINDOWS IN MEDIEVAL TALLINN, ESTONIA

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Although with a far longer history in the rest of Europe, windows were first glazed in Estonia only by the end of the Livonian Crusades (1198–1227). The local use of glazed windows has not been studied thoroughly – for example, the oldest glass window is currently unidentified. The oldest preserved stained glass window is a crest from 1606 kept in the Church of the Holy Spirit in Tallinn, no longer in situ. As no medieval windows are known to have been preserved, and the oldest depiction of Tallinn hails from 1561, written sources and archaeological finds are the only way to study the use of window glass in medieval Tallinn. With the discovery of a 15th-century landfill where window and stained glass fragments constitute for 80% of the glass artefacts and data collected from 2013–2024 from other archaeological collections, it has been possible to trace the use of window glass in medieval Tallinn. From urban residences and other secular buildings such as the Town Hall and Town Hall Pharmacy to churches and chapels, this paper examines the changing townscape and relationship with daylight through glazed windows and the work of glaziers in 13th–15th-century Tallinn.

Keywords

glass windows, townscapes, glaziers