

Glass News

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Glass from Tell el-'Ajjul, Palestine, collected by Flinders Petrie © Courtesy of the UCL Institute of Archaeology Collections

Welcome to Glass News Issue 36!

This issue of Glass News is filled to the brim with great features!

Hopefully there is something for everybody. If you feel that your particular areas of interest are not represented in this issue, why not send us a piece for the next issue? We are always on the lookout for information on interesting finds, new research, ideas, queries, new books and reviews, and any other glass-related news or meetings. The editors' details are given on the final page. We look forward to receiving your contributions for issue 37!

The autumn 2014 meeting of the AHG is being co-organised with the Early Glass Technology Research Network (EGTRN) and will be held at the Wallace Collection and University College London on the 28th and 29th of November. The main theme of this conference is glass production and trade around the Mediterranean in the first millennium AD. For more details please see page 2.

Many thanks to everyone who has sent in contributions for this issue! We could not produce this publication without your wonderful texts.

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REMINDER

MEMBERS AND SUBSCRIBERS ONLY. Would you like to enjoy all the wonderful Glass News pictures in colour? If so, please email one of the editors (see back page) and we will also email future issues of Glass News to you as a full colour PDF!

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AHG MEETINGS

Things that travelled – Mediterranean Glass in the First Millennium AD

28-29 November 2014

Wallace Collection, University College London and
The British Museum

This meeting is being organised by the Early Glass Technology Research Network (see page 4) in co-operation with the Association for the History of Glass and the British Museum. It will take place at the Wallace Collection and UCL Institute of Archaeology. A pre-conference visit to the British Museum (Thursday 27th of November) providing the opportunity to have a look at Late Roman and Byzantine glass will be available for registered participants on a first-come, first-served basis.

In his book *Origins of the European Economy*, Michael McCormack more than ten years ago expressed the hope that archaeologists would continue to shed light on the movement of glass, one of the “things that travelled”. Thanks to archaeological and scientific evidence we know today that during Roman, Byzantine and Early Islamic times glass was made on a large scale in the Eastern Mediterranean, particularly Egypt and the Levant, and much of the glass reaching Northern Africa, the Western Mediterranean and Northern Europe originated there. However, there are big questions surrounding the possibilities of independent manufacture in Western Europe, the role of recycling and the effect of Roman decline in the West on the trade in glass. Furthermore, glass compositions underwent marked shifts with time, suggesting major changes in production location, yet our understanding of these changes remains vague and their dating is imprecise.

This conference will address key issues on the production and distribution of glass in this period and provide an international forum to exchange relevant archaeological and analytical data. The aim of the meeting is to provide a forum to discuss key questions including the location and change of primary production centres, production methods, regional supply patterns, recycling, chronology and the impact of political, social and economic change on glass production and distribution throughout the first millennium AD. It will present the results of current research from across the region of interest and speakers who have agreed to attend include Patrick Degryse (Leuven), Yael Gorin-Rosen (Jerusalem), Marie-Dominique Nenna (Lyon), Thilo Rehren (Doha) and Ian Freestone (London).

The conference fee is £30 for AHG members, £40 for non-members and £10 for students.

For further information please visit:
www.ucl.ac.uk/archaeology/research/directory/glass-technology-network/conferences

To register please visit:
www.eventbrite.co.uk/e/things-that-travelled-mediterranean-glass-in-the-first-millennium-ad-registration-11823260691

OTHER MEETINGS

Glass Science in Art and Conservation and Society for Glass Technology Conference “Living Glass”

Durham - 10-12 September 2014

York - 13 September 2014

This conference, like previous conferences in the GLASSAC series, is dedicated to breaking down barriers, building bridges, and allowing us to share our glassy passions with experts from other strands. For once, let's meet one another in mutual respect and talk to one another in plain language, so that together we may learn.

The scope of GLASSAC14 embraces all strands of glass knowledge, celebrating those occasions when one area of glass expertise has collaborated with and been of help to another different area. Authors were invited to contribute posters and exhibitions from the growing points of their particular strand of glass passion. Don't wait for your endeavours to become stale and old - bring work-in-progress as well as finished achievements, experiences which raise questions as well as those which provide answers.

The programme gives each paper or presentation a 20 minute time slot, (40 minutes for Keynote Lectures) and we ask presenters to allow time for active discussion and debate within the slot. Each paper can be a catalyst, fomenting creative engagement across the diversity of glass interest. The organisers fervently hope that out of this will come a cascade of new thinking and creative new friendships.

All the presentation time slots have now been allocated, so no more abstracts can be considered for oral presentation. However the organisers would be glad to consider submission of ePosters.

For further details please see: www.glassac14.sgt.org

**3rd International Archaeological
Colloquium:
*Roman Ceramic and Glass Manufactures;
Production and Trade in the Adriatic
region***

Crikvenica, Croatia
4-5 November 2014

The 3rd International Archaeological Colloquium will be held at Crikvenica on the 4th and 5th of November 2014, organised by the Institute of Archaeology, the Crikvenica Town Museum and the City of Crikvenica. Co-organiser of the colloquium is the Museum of Ancient glass, Zadar. The theme of the colloquium is Roman Ceramic and Glass Manufactures; Production and Trade in the Adriatic region.

Subthemes

- Pottery workshops in the ancient economy.
- Regional fine wares production: particularities and distribution.
- Pannonische Glanztonware and its distribution in the Adriatic area.
- Directions of influences on glass production and distribution: Adriatic – Danubian area.

During the colloquium there will also be a discussion dedicated to the theme: Northern Liburnia from the Raša river (Arsia flumen) to Karlobag (Vegium), new findings.

The official colloquium languages are: Croatian, Italian and English.

Abstract submission deadline is 1st of September 2014.

For more information visit the Institute of Archaeology website at: www.iarh.hr

**53rd Annual Seminar on Glass:
René Lalique: Enchanted by Glass**

Corning Museum of Glass, NY, USA
17-18 October 2014

This year's Annual Seminar on Glass will focus on the life, works, and legacy of the master French artist and designer, René Lalique, through lectures and live demonstrations. Presentations will be focused around the topics represented in the Museum's 2014 major exhibitions, *René Lalique: Enchanted by Glass*, and *Designing for a New Century: Works on Paper by Lalique and his Contemporaries*. Seminar participants will have the opportunity to press their own glass medallion (included in the price of Seminar).

MEETING REVIEW

**40th International Symposium on
Archaeometry**
19-23 May 2014

The 40th International Symposium on Archaeometry (ISA) was held on the 19th to 23rd of May 2014 in Los Angeles, California. Hosted by the Getty Conservation Institute and the Cotsen Institute of Archaeology, it was held at the majestic Getty Villa and the California NanoSystems Institute, situated in the impressive surroundings of the University of California Los Angeles (UCLA). The conference, attended by 370 delegates, is the premier conference on the application of the physical sciences to archaeology. This year featured stimulating sessions on a broad spectrum of topics and enjoyable social events at both the Getty Villa and the UCLA campus. Various inorganic material sessions included those on stone, plaster, pigments, metallurgy, ceramics, and glass, glaze and other vitreous materials. Other disciplines included sessions on forensic archaeology, biological archaeology, and remote sensing. Furthermore, a fascinating special session was held on the Bronze Age – Iron Age transition.



The Getty Villa © Matt Phelps

The subject of glass and vitreous materials was well represented with 13 oral presentations spanning three sessions and 25 poster presentations. As usual, a perpetual theme was provenance, however, issues relating to technology and production played an active or central role in many presentations, such as the excellent oral presentations "*Technological Change and Provenance of Glass in Early Islamic Palestine*" (M. Phelps *et al.*), where compositional analysis was used to identify diachronic technological change in the Islamic

glass industry, and *“Technology and Indigeneity in Mughal Glazed Tile-Work”* (M.S. Gill *et al.*) comparing two different tile production technologies from India.

A wide range of time periods, geographical locations and techniques were featured. A fascinating talk *“An isotopic trip through the first Millennium BC glass history”* was professionally delivered by A. Bloome, who indicated the effectiveness of using neodymium isotopes as a discriminator in glass provenance studies, showing that a glass trade from the Levant to Carthage operated as early as the 6-5th centuries BC. Isotopes proved to be a popular technique with presentations by V. Devulder *“Boron isotope composition of Roman natron glasses to provenance the flux raw material”* who successfully used boron isotopes to match the natron in Greco-Roman vessels to sources in the Wadi Natrun, Egypt; and L. Dussubieux *“Iron Age Glass from Myanmar: Addressing Provenance with Trace element and isotopic compositions”* who used Sr, Nd and Pb isotopes to investigate the origins of glass production. Trace elemental techniques were used to good effect in S. Conte’s paper, *“First Archaeometrical data of glass from Sarno Necropolis (9–6th century BC).”* Trace and rare earth elements (REE) were used to characterize the raw materials, matching the cobalt colourant to Egyptian sources in the Western Desert.

The Friday session finished with three methodological papers; the first, well delivered by J. Lankton *“Glass chemical analysis: assessing the new heterochy”* presented results comparing LA-ICP-MS and EPMA, showing the techniques to be commensurable but each with benefits, concluding that your method should support your aim. Of particular interest to those working with complete objects was *“Non-invasive techniques applied to the characterization of art nouveau glasses”* (C. Fornacelli *et al.*) showing that archaeologically useful information can be gained using non-invasive techniques. Lastly, *“Glass and diagrams: a Review (Roman and Medieval glasses from the Mediterranean area)”* (E. Gliozzo) used a database of 6819 glass vessels to illustrate how graphical methods are used to present data and the effects that colourants and recycling has on bi-plots.

The poster session similarly showed the breadth of current research, notable posters included; D. Brems *et al.* *“Characterization of Byzantine Primary Glass Furnaces”*; A. Ceglie *et al.* *“Shedding light on the glass industry in late antique Cyprus”*; J. Dunster *et al.* *“Assessing the use of elemental compositional data for provenancing and dating British soft-paste porcelain from 1740-1820”*; and L. Posadas *“Local production and long-distance trade: Chemical analysis of Medieval glass beads from Imperial Mali”*.

During the conference a theme emerged on the need to go beyond simply identifying compositional groups and provenance. This idea was well encapsulated in the engaging and enjoyable keynote by Prof. Ian Freestone from University College London, whose talk *“Small compositional groups, production events and the organization of production”* used three case studies (metal, glass, ceramic) to highlight how compositional analysis, when linked to sufficient contextual information, can identify choices and organisation in production. One case study, using data from stained glass from York Minster collected by L. Ware, found that compositional data was able to show production steps in a single glass panel and discovering that glass workers had specialisms; some worked on figures, others borders and some backgrounds.

Overall, it was very encouraging to see the glass research encompassing new themes, regions and techniques. Particularly satisfying was the shift in focus from provenance to production, with trade no longer being considered simply as a result of technological change, but instead actively serving as a driver for it. Enthusiastic congratulations goes to the ISA Standing Committee for their choice of research presentations and to the ISA Local Organizing Committee for an enjoyable and smoothly-run conference. It is the hope of this reviewer that a continued presence by glass researchers at events such as ISA will lead this field of research in embracing new ideas and techniques, while maintaining the discernment required to produce quality results and to keep building the reputation of the discipline.

Laura A. Conger

EXHIBITION

“Made by Ennion”: Master of Roman Glass

The Metropolitan Museum of Art, New York, USA
9 December 2014 - 13 April 2015

The invention of glassblowing in the late first century BC was one of the most momentous technological advances of the ancient world, stimulating the growth of a glass industry throughout the Roman Empire. It also provided the impetus for the flowering of glassworking as an artistic endeavor, allowing craftsmen much greater flexibility in the shapes of vessels they could create and the types of decoration they could employ. Mold-blowing, which developed around the turn of the millennium, played an important part in this phenomenon. Glass vessels signed by Ennion are the most outstanding examples of Roman mold-blown glass

production in the first century AD. His work displays a creativity, elegance, and innovation that are unsurpassed. This special exhibition will be the first devoted to ancient glass ever to be held at The Metropolitan Museum of Art.

www.metmuseum.org/about-the-museum/press-room/exhibitions/2014/ennion

NEWS

Early Glass Technology Research Network

A new research network, Early Glass Technology, has recently been founded at UCL's Institute of Archaeology, aiming at bringing together researchers based in and around London who undertake research on ancient glass. Current network members are Ian Freestone (UCL Institute of Archaeology), Justine Bayley (Honorary, UCL Institute of Archaeology and Association for the History of Glass), Andrew Meek (British Museum and Association for the History of Glass), Thilo Rehren (UCL-Qatar), St John Simpson (British Museum), Daniela Rosenow (UCL Institute of Archaeology), Matt Phelps (UCL Institute of Archaeology), Harriet White, Anastasya Cholakova (UCL Institute of Archaeology), Rose Broadley (UCL Institute of Archaeology) and Nadine Schibille (Alumna and Honorary Research Associate, UCL Institute of Archaeology, based in Sussex Art History). Our network partners are the Association for the History of Glass and the British Museum. Although initially our research network will focus on studies of glass dating to the first millennium AD in western Europe, the Mediterranean and the Near

East, other time periods and regions (China, Africa, Medieval glass etc.) will also be incorporated in the future.

All members of the network are involved in current glass research, many of them combining archaeological approaches, such as chrono-typological studies, and scientific analyses, such as X-ray fluorescence (XRF), electron probe micro analysis (EPMA) and trace element and isotopic studies, applied in order to determine the chemical composition of a glass object. The network seeks to address crucial questions about raw glass ingredients, their places of origin and production, technology and possible patterns of early glass distribution and trade, thus contributing to the larger discussion concerning economic, cultural, social and historical aspects of past cultures. It will serve as a forum for the discussion of new analytical techniques such as Nd isotope analysis and laser ablation ICP-MS or the application and interpretation of the data.

The EGTRN will organise conferences, seminars and events at UCL or elsewhere in London in co-operation with our network partners, the Association for the History of Glass and the British Museum, in order to share knowledge, techniques and data to further research into this field.

For further information, please visit our website:

<http://www.ucl.ac.uk/archaeology/research/directory/glass-technology-network>

or contact Daniela Rosenow at: d.rosenow@ucl.ac.uk

AHG Grant Report All-Glass Hybrids: Damaged glasses repaired with other glasses

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Introduction

Glass objects break and have been repaired throughout the history of glass. Different materials, such as metal, wood and various opaque fillers, have been used to replace missing parts or to make up losses. Glass tends to be transparent and, until the development of clear epoxy and acrylic resins, the materials used were visible. Metal in particular was used to replace missing areas, often

being fashioned into highly decorative features such as handles, knobs and stems.

A glass 'marriage' denotes a situation where two components in good condition are joined up although they do not originally belong together, for instance a goblet and cover. This is interesting but not the central theme of this research, which is **all-glass hybrids: individual glasses created to salvage damaged**

originals by assembling parts from two or more glasses, including newly manufactured parts. Non-glass materials were used for structural or other reasons (e.g. dowels or fillers) but the main components used are glass. The quality of the repairs ranges from crude to nearly invisible...and suspiciously sophisticated. Glasses repaired in this way may appear complete even to the trained eye. The all-glass hybrid research aims to collate as much information as possible about how the repairs were carried out and to disseminate this knowledge in order to detect them.

The grant provided by the AHG contributed greatly towards meeting the costs of travelling to Paris and Écouen to identify all-glass hybrid vessels in the collections at the Musée du Louvre and the Musée de la Renaissance, Château d'Écouen. My collaborator Suzanne Higgott (The Wallace Collection) and I are grateful to curators Françoise Barbe (Louvre) and Aurélie Gerbier (Écouen) for their interest and generous help with this research, and to Paris dealer Sylvie Lhermite-King who kindly allowed us to visit her after hours and showed us around her important exhibition, "*Verres de la Renaissance: Origines & Influences*", which enabled us to see many glasses from French private collections.



Figure 1: Cruet, Venice, late 17th-18th century, The Wallace Collection (inv. C559) © by kind permission of the Trustees of the Wallace Collection.

The complexity of the repairs varies from a simple horizontal bond to complex arrangements of multiple components. The cruet in Figure 1 has four added components (spout, mask prunt, blue ring, foot) plus opaque filler with golden paint (now degraded) inside the hollow knop. Evidence has been found to indicate that new glass parts were being manufactured for particular repairs, e.g. a 19th-century foot replacement for a 16th-century goblet.

The interest in this research continues to grow as well as its scope, which now includes the historical aspects of collecting, provenance and distribution, with an emphasis on Venetian and *façon de Venise* glass. This side of the research is being carried out by Suzanne Higgott. The historical aspect considers the provenance of the glasses, and whether some of the repairs were produced by later 19th-century dealers, to clarify the intentions of the people who commissioned them and to investigate whether the fact that a glass was a hybrid was of concern to the collector.

The results of the search for all-glass hybrids in Écouen and Paris are as follows:

- Écouen: 16th-century enamelled hanging lamp made into a goblet by the addition of three glass components (E.CL.2538). One marriage of a vase and cover (E.CL.1192). We were also able to ascertain that a suspected goblet was not a hybrid (E.CL.14523).
- Louvre: two goblets (OAP38 and R94), a 19th-century glass stem and foot made for a 17th-century Limoges enamelled bowl (MR2445) and two marriages (OA1131 and OA1098). We were alerted to the existence of two footed tazze with modern bases in another museum.
- Exhibition "*Verres de la Renaissance: Origines & Influences*": one *kuttrolf* and a couple of interesting modern repairs.

The results of the research undertaken in Paris will be included in a presentation at the AIHV Congress in Switzerland in 2015 and will be published in the Congress 'Annales'. Suzanne Higgott will present and publish the historical aspects of the research at the same Congress.

This new information is added to examination of all-glass hybrids in The British Museum, Victoria and Albert Museum, The Wallace Collection, The Courtauld Gallery and Museum of London. We are grateful to the individuals who have alerted us to all-glass hybrids in the UK and abroad and hope that more information leading to the examination of other all-glass hybrids will continue to be forthcoming.

More Roman glass from Hungate, York

Hilary Cool

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In Glass News 30 at the request of the editors, I wrote a short note about some glass from a grave York Archaeological Trust had dug as part of their Hungate excavations. Last winter whilst writing up all the finds from the cemetery, I encountered other interesting pieces, and the Trust have very kindly allowed me to present this note in advance of full publication.

They consist of four fragments of a colourless cylindrical cup of the type in use during the later second to mid third century (Price and Cottam 1998, 101) which have a currently unique inscribed decoration. The vessel is very large with a rim diameter of c.115mm, whereas normally such cups have rim diameters of about 80mm. It has a very slightly outbent, fire-rounded rim with a narrow horizontal trail on the upper body. Below this, the inscription occupies the central part of the wall of the vessel and is formed of abraded letters. These were carefully formed, probably by using a wheel given the very straight edges to the serifs. Two joined pieces read LISS, and then the back of a letter that will have been either C O or Q. The surface is clouded but no convincing stops can be seen between any of these letters. Another fragment has the letter S, and the bent and raised arm of a human who may possibly have held something in their right hand. The fourth fragment retains only a tiny amount of abrasion with a slightly curved upper edge. A fifth (body) fragment might be attributed to this vessel with more caution. On one broken edge there are four lines that might have come from a figured abraded design. These fragments were found in different contexts, and are not grave goods as they come from ditch and grave fills.

Examples of colourless cylindrical cups with inscriptions are rare. The commonest type belongs to the classic form of cylindrical cup with vertical rim and without a trail. It has a frieze of swimming fish above an inscription zone. Allen (in Wheeler 1986, 268-9) knew of ten examples from Britain, including both ones with just letters and just fish parts, and to my knowledge only three more may be added. These come from Wellington Row, York (unpublished Acc No. 1989.24.20929), from 1, Poultry, London (Hill and Rowsome 2011, figure 172) and from Nettleton, Lincs (Willis forthcoming). The last-mentioned I had seen just before looking at the Hungate finds. You wait forever for an inscribed colourless cup and then.....

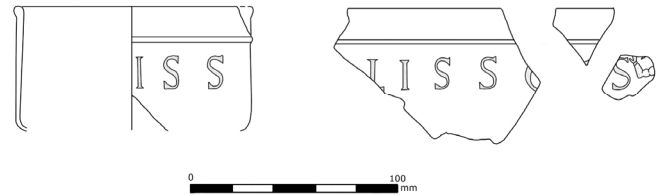


Figure 1: The inscribed colourless cup from Hungate as both reconstruction and with fragments unrolled © Hilary Cool

The Hungate vessel clearly does not belong to the fish frieze cups. Other figured cups of this sort are much rarer. There is blue/green one decorated with scenes of the arena from St Matthias, Trier (Goethert-Polaschek 1977, 48, no. 150, taf. 37). It has the drinking motto BIBAMUS below the rim and then three scenes of gladiators below, in two cases labelled with their names. The only other figurative one known to me is a large fragment found at Bishophill, York (Charlesworth in MacGregor 1978, 55, no. 169). This again has some form of motto running around the upper body below the rim with a scene below consisting of a column and part of a figure with a tambourine. The motto includes the letters LVMP, possibly from the name Olympus, and the cup is thought to depict the Apollo and Marsyas legend. The cutting of the letters on both of these, the fish frieze cups and the Hungate vessel are identical.

At present the Hungate vessel appears unique in having a motto running around the centre of the wall interspersed in at least one point with a figured scene. Research is continuing on what the motto might mean.

The fact that such a large part of this vessel has been preserved does open up questions of what this unusual vessel was doing at Hungate. What may be noted is that this 3rd-century cemetery has a truly disproportionate number of contemporary glass drinking cups incorporated in ditches, grave fills and other contexts where they are clearly not grave goods. It could be suggested that what we have are the remains of the ceremonies that surrounded both the interments and the remembrance ceremonies. Work on the pottery is currently ongoing. It will be interesting to see if that too, reflects any unusual focus suggesting drinking in the graveyard.

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Overview of the Roman glass from excavations at St Algar's Farm, Somerset, 2010-2013

Rachel Tyson and Ceri Lambdin

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Background

Excavations at a Roman villa site at St Algar's Farm, south of Frome, Somerset, were conducted over four seasons between 2010 and 2013 by the St Algar's Project Group (Bath and Camerton Archaeological Society), directed by Ceri Lambdin and Robin Holley. The site includes a structure interpreted as a winged corridor villa surrounded by a linear enclosure, dating evidence from the 1st to 4th centuries, and industrial activity including glass and silver-lead working. A total of 1646 glass fragments were found: c.560 were waste fragments from glass-working, over 1000 were vessel and window fragments, and 29 came from glass objects. Other evidence of glass-working at the site was provided by large numbers of ceramic glass-melting crucible fragments (Wessex Archaeology 2011), as well as fragments of probable furnace structure. No furnace site was located.

Glass-working waste

Approximately 560 glass fragments provided irrefutable evidence that glass-working was taking place. They comprised several different types of the typical waste found on pre-industrial glass-working sites (Paynter and Dungworth 2011, 19-21). The majority were pale yellow-green or green glass.

Over 70 detached glass layers from glass-melting crucibles were found, up to 18mm deep. Amongst the other 276 fragments of molten waste were 'chunks' comprising angular broken pieces (Figure 1), the largest being 47mm long. Their significance is discussed below. Amorphous 'lumps' up to 66mm long had rounded, rough or pitted surfaces, probably waste glass that fell into the furnace area. Related to these were c.15 'peas', small rounded lumps that shot out of the crucible into the ash when the glass was heated up (pers. comm. Mark

Taylor and David Hill). Approximately 25 small lumps of 'glass-covered waste' were excavated. Thirty-five thin threads were identified, and at least 13 fragments of tooled waste.



Figure 1: Angular glass waste 'chunks' © Rachel Tyson

Heat-distorted and fused fragments provided some evidence that glass fragments were being re-melted. Most significant were four cobalt blue fragments fused one above another, and a heat-distorted blue fragment with a small fragment fused to its cordon. These blue fragments are likely to date to the 1st century, suggesting that their context was as cullet collected for recycling. Chemical analysis of one strongly coloured blue vessel fragment by Caroline Jackson supported a 1st-century type (Jackson 2014).

The evidence above shows that glass was being melted and worked; the fragments that demonstrate that glass was being *blown* are moils, the waste cylinder of glass left on the blowing iron when vessels are cut off. The lid moil is the wider waste part directly next to where the vessel rim is cut. Although these are hard to identify, one definite and two probable lid moils were recognised at St Algar's. Approximately 17 fragmentary moil ends were identified, some with iron stains on the inner surface or crizzle spots on the edge, all in pale shades of green.

Glass products made at St Algar's

The question of what products were being made at St Algar's is problematic. A large number of the vessel fragments found were the same pale shades of green as the waste, and it is likely that these were products of the site. However, if contemporary broken glass cullet was being collected for re-melting this would make distinguishing new products from old much more difficult.

Vessels

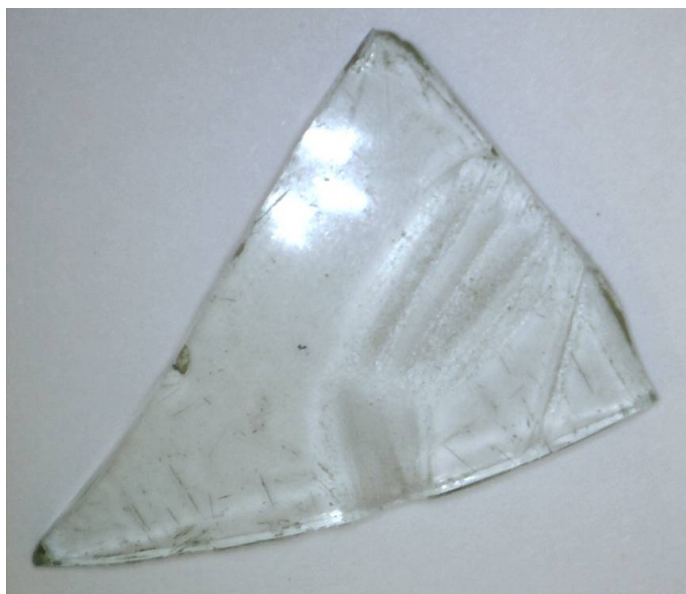


Figure 2: Facet-cut glass fragment © Rachel Tyson

The majority of the vessel fragments came from 4th-century types. These included nearly 130 fragments from conical beakers, cups or bowls with curved cracked-off rims and slightly pushed-in concave bases of pale blue-green, pale yellow-green and greenish-colourless glass. Many had lightly abraded horizontal bands just below the rim and further down the gently tapering body walls. Beaker and cup fragments, with a rim diameter of up to c.90mm, were most numerous, unsurprising since these types were the most common vessel form in 4th-century Roman Britain (Price 2000, 5). Seven fragments of yellow-green glass were much thicker than the other fragments, with a wider concave base suggesting a late 4th-century cup or small bowl form (*ibid.*, 6). One much larger pale yellow-green curved rim is probably from a mid to late 4th-century shallow convex bowl with abraded bands (*ibid.*, 12-14). A further 18 fragments in pale shades of green came from indented vessels, mainly S-shaped fragments from either beakers or bowls of equivalent form and date to those above. Two pale green or blue-green fragments of funnel mouths each with a thick trail below the rim are also late 4th-century types.

Perhaps the most impressive fragments excavated had linear- and facet-cut decoration, and were probably from

shallow bowls. They were made from colourless and greenish-colourless glass. One showed a facet-cut limb, probably a leg, with spiky lines around the top representing clothing, and a straight line across the fragment possibly from a spear (Figure 2). Facet-cut decoration was not common in Britain, but a 4th-century shallow bowl with facet-cut Bacchic scenes has been found at Chilgrove, West Sussex (Price 2000, 14). Other linear-cut fragments from St Algar's were decorated with incised lines with short lines aligned along one side; two fragments each had a letter ('V' and 'E') inscribed in a very similar style to the 'Wint Hill' bowl, a 4th-century shallow bowl depicting a hunting scene (Price and Cottam 1998, 124-6, figure 51a).

About 25 fragments with optic-blown decoration were excavated, and nearly 20 fragments were found with different numbers and widths of trails. These are found over a long period and small fragments cannot be dated very precisely. A type likely to date to the late 4th - early 5th century is an olive green fragment with very faint optic-blown honeycomb decoration, with mould-blown cup parallels from York and Fishbourne beach (Price 2000, 6-7, figure 3.7).

A few fragments could be dated earlier than the 4th century. Most notable were several fragments with richly coloured shades such as cobalt blue, some of which were fused or partially melted, which are very likely to have come from vessels of the 1st or early 2nd centuries (Price and Cottam 1998, 15). Two fragments of trailed greenish-colourless glass had a profile suggesting they came from a discoid jug, in use in the 2nd and 3rd centuries (*ibid.*, 159-60), and a pale yellow-green body spout probably came from a more practical utilitarian glass type, such as jug to feed a baby or pour oil; a rare example of which has been found in a 2nd- or 3rd-century British context (Allen 1998, 41 & 45, fig. 29.5).

Objects

About 30 fragments of glass objects were excavated. These included intaglios, beads, stirring rods and gaming counters. One of the two oval intaglios was cobalt blue depicting a standing figure with a shield on one side and one knee bent (Figure 3). The other imitates blue onyx, and shows Victory standing on a globe holding a wreath and shouldering a palm. Martin Henig identifies them as coming from a group of crude Romano-British imitations of the 3rd century (Henig 1974, 77-79, pl. XVII-XVIII, nos 564-6; *ibid.*, 45, pl. x, nos 306-310). Twelve blue and green globular, segmented, cylinder and annular beads with a wide date range were found. A yellow/amber annular bead not common in Roman contexts was also recovered.



Figure 3: Cobalt blue glass intaglio © Rachel Tyson

Five gaming counters included an opaque white counter decorated with red and blue spots on the upper surface, a type also found at Lullingstone villa in Kent, and Cirencester. The remaining examples were undecorated pale green and blue/green counters, common finds throughout the Roman period. At least three fragments of stirring rods, used for mixing cosmetics and medicines, were found. Most were pale shades of green, twisted along their length and undecorated, but one was unusual being pale blue-green with a purple blob on the rounded end.

Discussion

The excavations have provided irrefutable evidence to show that glass-working, including melting and blowing, was being carried out at St Algar's. The vessel fragments found can be dated by style to the 4th century. Recent research into the late Roman glass industry has shown that primary glass production took place in large tanks in the eastern Mediterranean. This glass was made in large tanks in Egypt or the Levant, and then broken into blocks that were exported to other parts of the Empire to be re-melted and worked into products. In Roman Britain it was the usual practice either to reheat blocks or chunks of imported glass, or to recycle broken glass fragments (Price 2002). It is not clear which was taking place here, but the raw imported blocks found at sites such as Basinghall Street in London (Shepherd and Wardle 2009, 34-5) were significantly larger than the chunks excavated here. Chemical research by archaeological scientists has identified a glass type emerging in the 4th century known as HIMT (high iron, manganese and titanium oxide glass), characteristically yellow-green in colour, which shows an Egyptian provenance (Foster and Jackson 2009).

Caroline Jackson has chemically analysed 26 fragments of waste and vessel glass from St Algar's using a scanning electron microscope with an attached energy dispersive spectrometer (SEM-EDS) (Jackson 2014). The results showed that 20 of the 26 fragments were HIMT

glass (HIMT 1, 2 and 1/2), supporting a date of the mid-4th century or later. Two waste fragments had a Levantine composition, found in Britain from the mid-4th century, but usually as finished vessels rather than waste glass. Both waste glass, including chunks and moils, and vessels were represented in HIMT glass. Although not conclusive proof, this makes it possible that those HIMT vessel types analysed (conical beakers) were being made at St Algar's. Recycling of glass was evident in most of the compositions, which is usual in HIMT glass from Britain (Jackson 2014).

The blue heat-distorted and fused fragments excavated at St Algar's suggest that some glass cullet may have been re-melted. It is possible that this was special to coloured glass as it was more difficult or expensive to acquire.

St Algar's is a highly significant site in the context of Roman Britain not only for the presence and quantity of glass-working evidence, but because it is the only identifiable example of Roman glass-working in the south west; the nearest published sites are at Caerleon in south Wales, and Silchester in Berkshire (Price 2002, 86, fig. 5). St Algar's is also the first rural Roman glass-working site to be excavated, supporting Price's suggestion that 'much of the late Roman glass production was rurally based' (Price 2000, 22).

Acknowledgements

A number of bodies assisted with funding this research including the Association for the History of Glass, the Roman Research Trust and the Maltwood Fund of the Somerset Archaeology and Natural History Society. The authors would also like to thank the Roman Glassmakers, Martin Henig, Jenny Price, Caroline Jackson and Marek Lewcun for their comments and assistance.

Separate reports on the glass were written for each season by Rachel Tyson. The glass was catalogued in an Excel database. Selected vessels have been drawn by Nick Griffiths. These and the glass will be deposited in the Museum of Somerset, Taunton.

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East Lenham – The story of its Tudor Glass

Lesley Feakes

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Background

To fill in the background...East Lenham, Kent, (now a farm) is listed in the Domes Day Book; it was part of Calehill Hundred and owned by the Archbishop. Its western boundary is the dividing line of East and West Kent. West Lenham Manor is Lenham Court, on the western side of Lenham, given by Queen Elizabeth I to William Cecil. Queen Ediva in 961 AD gave 'Lenham' to the Archbishop of Canterbury and that must have been East Lenham (see *Archaeologia Cantiana* 1923 Vol 36.).

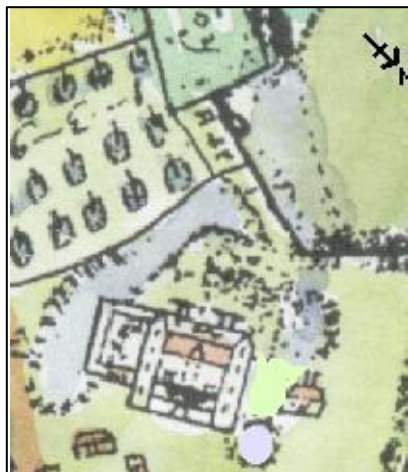


Figure 1: East Lenham house. As it was drawn on Thomas Boycote's Map of 1660. It is coloured in here to show the lake
© Kent History & Library Centre, Maidstone

If Archbishop Lanfranc owned East Lenham manor where was the original house, if there was one? Was there a Medieval or a Tudor house on the same site?

The present farmhouse dates from the early 18th century and stands NE of a horseshoe-shaped moat but not within it. Strangely the moated site had missed the records completely until Lenham Archaeological Society (LAS) recorded findings this century. Yet the 1664 Hearth Tax

lists a house with 14 hearths and it is drawn on a map of 1660!

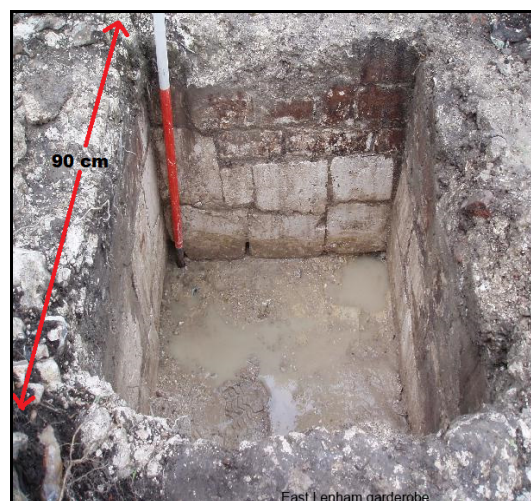


Figure 2: The excavated Garderobe :-note the reddish stain on the top chalk blocks © Lesley Feakes

Any trace of the demolished building(s) was lost beneath a 19th-20th-century stockyard of crushed brick, chalk and tons of flint. This flint layer, some 60cm thick in places, is a great problem in excavations. No clues suggested that it is flint from house construction (very few were knapped) but it would appear to have been dumped from nearby field collection, possibly a Roman road. Only the ground resist plan and a ground radar investigation gave insistence that a large rectangular building once lay beneath this deep blanket of added flint and demolition rubble.

LAS took part in the 'Time Team, 2003 Big Dig', with no luck in finding any of the house footings, but the LAS trench was shown on TV! Had the garderobe been located just 2 metres away the glass would have hit the headlines!



Figure 3: Looking down into the sludge with one of the tazzas showing clearly © Lesley Feakes

The garderobe lay at the rear of the house in the south east corner (only discernable in retrospect from the ground radar scan). Only its base, of neatly cut chalk blocks with a trace of red brick facing to the south, was found in 2008. It would have extended up the (four?) floors of the house and would have been cleared out from near its base. Evidence suggests the section found was below the mucking out hole. The chasm was just 60cm deep with no break in the chalk blocks and with no drain hole into the lake. But the base was level with the water table and kept filling up. The constant presence of water might explain why only the top three layers of chalk blocks retain staining from excrement (not to be confused with any brick work). Within the 60cm of fill were the remains of two Venetian tazze, a piece of window glass with painting of a bishop or archbishop, four 16th-century wine glasses and a handled decanter. Considerable numbers of small animal bones were distributed amongst the glass: rabbits, pigeon, bantam, fish and three lower jaws of mole. Moles were possibly not the remains of Tudor feasts, but had burrowed down for worms, then later drowned as they frantically tried to escape a rise in water level in their chalk block prison!

Details of Finds

Painted window glass with an archbishop (Figure 4)

The curve around the face to the left is the halo. The crozier is on the right resting on the archbishop's left shoulder. The design on the mitre is identical to the depiction of a 15th-century archbishop in Canterbury Cathedral.

The first tazza (Figure 5)

The cup had two bands of white glass both consisting of two narrow bands separated in each case by diagonal thinner strands of white glass (*vetro a retorti*).

The base has concentric raised wheels of glass. No pieces of stem were present but one piece of the foot was

retrieved (as shown in the photograph) and the edge of the glass was neatly rolled inwards.



Figure 4: Painted glass window © Lesley Feakes

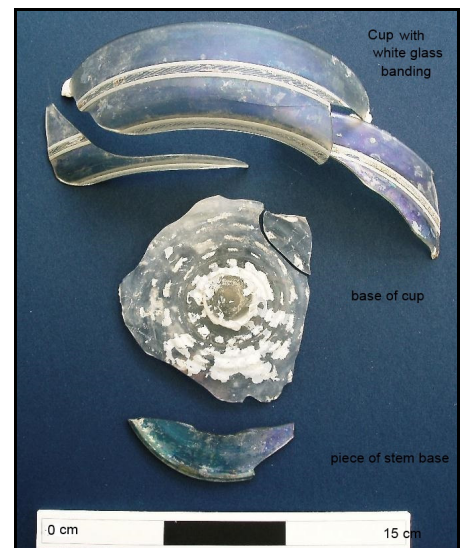


Figure 5: The first tazza © Lesley Feakes

The second tazza (Figure 6)

The second tazza found was slightly different and its stem was present; an elaborate twisted design of fine strands of white glass (*vetro a retorti*). The stem was caught in just below the cup base by a strand of grey (or clear) glass and caught in a second time just 1cm below that.

The base of the cup has radiating trails of white glass laid on the lower surface (they are raised). The cup itself was not present. It was possibly lost in sludge that had been demolished above it, being not so heavy as the base it had not sunk so deeply, or had been smashed into many pieces?

The lattice design of the stem and foot has wider strands of white glass separated by bands of clear glass but within this clear glass are at least four threads of white glass the whole system convoluted down the stem and

then flared out on the foot. The foot base then had the glass folded, rolled inwards, to form a neat edge. The craftsmanship is superb.

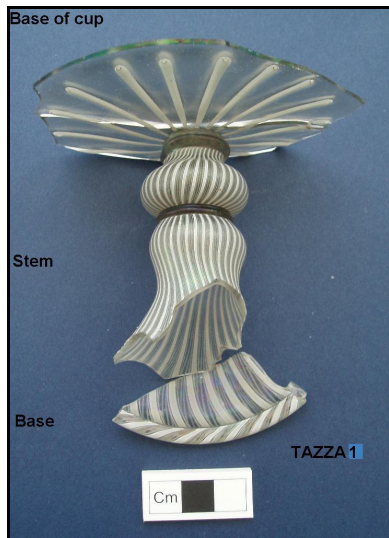


Figure 6: The second tazza © Lesley Feakes



Figure 7: The wine bottles © Lesley Feakes

The wine bottles (Figure 7)

None of the LAS group had ever seen any like these but apparently these writhen-necked bottles are ubiquitous, being made in the glasshouses of the Surrey Weald (see Kenyon, 1967, 90) dating from the mid-15th century (possibly earlier) to the mid-17th century.

Those ones found in the garderobe are of greenish-brown weathered glass and extremely thin; only the necks and bases have survived.

Glass decanter (Figure 8)

This is a more yellowish-brown weathered glass (not its original colour) and has a handle. The neck has vertical fluting. The type is rarer and dates to the late 16th or early 17th century (see Willmott, 2002, 77).



Figure 8: Glass decanter © Lesley Feakes

Dating of the Site and its Glassware

The Venetian tazza would appear to be late 16th century and indeed the second one matches one on the ITV programme *Britain's Secret Homes* led by Bethany Hughes in which a very similar tazza was dated at 1545 (Henry VIII). Various similar examples, also dated to the second half of the 16th century are mentioned in Tait (1979, 67-78). The writhen wine bottles would also fit that date. The window glass could have been earlier.

If anyone wishes to lead a dig to discover a second garderobe of the house (GPR indicates there could be one) then contact the author, or Mr and Mrs Barr of East Lenham Farm. Glassware will also be held by them to view.

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QUERY

The writer is an elderly (67) Masters Candidate in History at the University of Northern British Columbia in Prince George, British Columbia. My thesis topic is "The Windows of Barkerville". Barkerville was our Gold Rush Town of 1858, the establishment of which led to the union of the colonies of Vancouver Island and British Columbia which led to British Columbia joining Canadian Confederation.

I have traced the route taken by shipments of window glass from Europe (Great Britain, Germany, and France) and the northeast of the United States to San Francisco. The cargos of two ships carrying glass have been found. What is needed now is to determine (1858-1885):

1. The sale price of window glass in England, the typical size of glass cargos, special handling, and other details and any information relative to the shipping of glass from England to San Francisco or the west coast of the Americas.
2. The purchase and sale price of window glass in San Francisco or other American Ports on the West Coast.
3. The purchase and sale price of window glass in Victoria, B.C.
4. The purchase and sale price of window glass in Barkerville, B.C.

In addition, I would like to obtain the freight rates for steamers, clippers, and other freight ships that may have carried from the manufacturers in the East to San Francisco, then up to Victoria or any other details concerning the shipment of window glass to ports on the west coast of North America.

Glass not being then mass-produced and with no transcontinental railway, It must have been more expensive with each step along the way. My objective is to find out how much the price increased and of that, how much was directly attributed to the costs incurred in freight.

Much of the window glass in present-day Barkerville (now an historic site) is of modern manufacture but I have been successful in finding many examples of crown and Cylinder Glass in situ. Given B.C.'s status as a colony at that time, it is assumed that much of the early glass to Victoria came from the UK.

Might you be able to assist with this quest? Do you happen to have a member – amateur or professional – who is interested in glass, specifically window glass – to whom you may refer me? Please forward this e-mail to any of your members who may have interest in early window glass.

Regards,
Willow Arune
arune@unbc.ca

Response

This extract comes from Wikipedia
http://en.wikipedia.org/wiki/British_Society_of_Master_Glass_Painters :

‘The British Society of Master Glass Painters (BSMGP), founded in 1921, is a British trade association for the art

and craft of stained glass. It promotes the trade, encourages high standards in the art and craft of glass painting and staining, and acts as a locus for the exchange of information and ideas within the craft, as well as helping to preserve the stained glass heritage of Britain.’

The Society’s web page gives more details:
www.bsmgp.org.uk

For glass originating in the USA I would ask Corning Museum of Glass: www.cmog.org. They may also have general information about trade in window glass and its price in North America.

Justine Bayley

Response

Theo Barker's book *The Glassmakers* covers the English flat glass scene in the period of interest, including a discussion of imports to the UK from Belgium, the effects of the American Civil War, and the export trade to the United States. There are some tables of price information, but whether the detail is full enough. I'm not certain.

The book was published in 1977 and the ISBN number is: 0 297 76909 X

It can be purchased from the Society of Glass Technology (www.sgt.org)

David Martlew

BOOK REVIEWS



Transparent Beauty: Glass from Croatian Museums, from Prehistory to the Middle Ages

Lada Ratković Bukovčan and Zoran Gregl
Zagreb: Archaeological Museum in Zagreb, 2013

120 Pages

ISBN 978 953 6789 74 0

£10.00

Available from: www.amz.hr

This is the first in a series of three catalogues published to accompany the large eponymous exhibition of glass objects co-authored by Lada Ratković Bukovčan and Zoran Gregl, which was held simultaneously in three museums in Zagreb, Croatia: the Zagreb Archaeological Museum, the Museum of Arts and Crafts, and the

Mimara Museum. The exhibition, organised as part of the celebrations accompanying Croatia's accession to the European Union in July 2013, displayed around 600 glass artefacts gathered from 33 Croatian museums. The other two catalogues feature glass artefacts dating from fifteenth to the twentieth century and glass in contemporary Croatian sculpture. The catalogues were published in both Croatian and English editions.

The catalogue covers the period from 2000 BC to the 14th century AD. A short introductory text on the history of glass, dealing mostly with Roman glass production techniques, is followed by a lavishly produced full-colour catalogue of 180 glass artefacts, organized according to periods (prehistoric, classical, medieval and Islamic). The largest number of items represented in the catalogue is from the classical period. The material, ranging from jewellery and urns to beakers and *fondo d'oro* vessels, is mostly of Croatian origin, but there are also examples of imports from Greece, Egypt, Syria, Italy, and Serbia. All entries contain complete descriptions of the artefacts, including date, site of recovery and production technique, along with information on previous publications of the material and its analogies.

This is an informative and aesthetically pleasing catalogue, very useful as an overall introductory guide to the scope and diversity of the Croatian archaeological glass collections, both for the scholarly and general public.

Ana Franjic



**New Light on Old Glass:
Recent Research on Byzantine
Mosaics and Glass**

Edited by Chris Entwistle and Liz James
London: British Museum Press
2013
250 Pages
ISBN 978 0 8615 9179 4
RRP £45.00

The 30 papers in this volume arose from a conference held in the BM in 2010, under the auspices of the Leverhulme Trust funded network on the Composition of Byzantine Mosaic Glass Tesserae. They cover a wide range of material, bringing together research on the use of glass in mosaics and other specialised types, including cage cups, windows, enamels, gold glass and pendants, and from perspectives ranging from art history to chemistry. On the other hand, there is limited coverage of common glass vessels and profile illustrations are almost absent.

There is some essential reading here, with several unique contributions which are unlikely to be published elsewhere. Tucked away towards the end of the volume, James and colleagues present the preliminary finding of the survey of Byzantine mosaics undertaken as part of the Leverhulme project. A series of maps and histograms illustrates the distribution of newly made mosaics century by century. I suspect this will be something of an eye-opener for many of us, and the authors draw attention, for example, to the more-or-less continuous production of mosaics in Italy from 4th-14th centuries and the possibility of a continuous Italian tradition throughout this period. Entwistle and Corby-Finney review Byzantine glass pendants, a category of artefact rarely considered in any detail, with a fully illustrated catalogue of the British Museum collection. Robin Cormack argues persuasively that consideration should be given to the possibility that the mosaics of Daphne, Hosios Loukas and Torcello are the products of a single workshop. A number of papers focus upon chemical composition of individual mosaics or groups of objects and one of the encouraging signs throughout the volume is that the findings from technical studies are finding their way into the more humanistic contributions, suggesting that the network succeeded in its aim of interdisciplinary communication.

Several papers focus on technique. In two important papers, Dan Howells discusses the technique of gold glass, while Lisa Piloni and David Whitehouse address the use of silver stain. Francesca dell'Acqua discusses the unique enamelling on the frame of the enigmatic Mandyllion of Genoa. There are many excellent papers on individual mosaic schemes and buildings, for example the Umayyad mosque of Damascus, and the coverage extends forward in time to address fakes and the Victorian mosaics of Westminster Abbey.

In an extension of her earlier publications, Rosemarie Lierke considers the manufacture of diatreta or cage cups. Over the past decade or so, Lierke has drawn attention to some interesting features on a number of categories of ancient glass, arguing that these are at variance with the conventionally accepted models of manufacture. While there may be an apparent contradiction in some cases, in my view it by no means necessitates the overturn of accepted models in all of them. In normal scientific investigation, one seeks a solution for anomalies within the current paradigm, rather than immediately jumping to a new one. Furthermore, the fact that there may be a question mark over one model of fabrication does not prove, or even suggest, that the model that is proposed in its place is correct, yet the two arguments have frequently been conflated in Lierke's publications.

In the case of the cage cups, Lierke has in the past dismissed production from a thick-walled blank and has

favoured a double-walled blank, produced by forcing glass through holes in a plaster mould. This has been advocated by her in a number of publications, although the use of a plaster mould has no supporting archaeological evidence and the idea of squishing hot glass through a plaster colander in the fourth century itself raises many problematic issues. Firstly, plaster was not widely used for three-dimensional objects in the Roman world. The objects with which I am familiar are funeral masks from Graeco-Roman Egypt and these do not appear to have been very robust. There are a few mirrors from Egypt and the Levant where the glass mirror fragment is set in a gypsum plaster base but these appear to be an extension of the idea of wall plaster, rather than models in the round. While it is not entirely clear to me if the purported cage cup moulds are thought to have been made from lime or gypsum plaster, they are unlikely in any case to have been robust enough to withstand the high temperatures and heavy handling needed to produce double-walled blanks connected by glass bridges. These moulds would have been very thin, a matter of millimetres. Could they really have withstood the pressure needed to force through a viscous silica-rich (c. 70% SiO₂) glass? What temperature would have been needed to maintain the fluidity of the glass? How would the glass have been kept hot enough to flow freely? These technical questions have not been addressed. What are the thermal properties of plaster? Would not the loss of water and/or carbon dioxide at high temperatures have caused it to disintegrate? The moulds needed to produce a double walled blank are likely to have been held at higher temperatures for considerably longer periods than those used in mould-blowing vessels and, as noted by van den Dries (2007, *J Glass Studies* 49, p. 34) plaster was “rarely, if ever used as a mold material” by Roman glassmakers.

Individual technologies do not occur in isolation but in a complex web of related technologies and materials which occur in space and time. Unfortunately Lierke’s explanations invariably involve a technique which she suggests was used for a short period with no clear contemporary linkages, and no precedents or antecedents. Examples of similarly isolated technologies with which she has been associated include the shaping of hot glass on a potters’ wheel and the use of clay pipes to blow glass. These are equally improbable, not simply because there is no archaeological evidence in the form of residues from workshops, but because the materials proposed would not be suitable (blowpipes made of Roman pottery clay would) or because no one has since found it practicable to shape glass bowls on a spinning wheel, rather than slumping, for reasons which surely seem obvious.

Lierke has made much of the difficulty in cooling a “thick-walled blank” from which the various diatreta,

including the Lycurgus Cup, could be cut. However, stresses in cooling glass are not simply a matter of thickness but also of shape. Rounded shapes typically generate less stresses than sharply angled ones, for example (think about the preference for rounded bases in pottery cooking pots). It is very possible therefore, that damage from thermal stress is more likely in a double walled blank, where the two walls are linked by numerous thin bridges essentially perpendicular to the walls, than in a single thick-walled blank. In spite of her perceived problem with the use of a thick-walled blank to make cage cups, Lierke is finally obliged in the present paper to acknowledge the evidence for the use of a thick-walled blank in the manufacture of a recently excavated cup from Grenoble. This has led her to propose a range of different techniques for the manufacture of this very limited class of vessels, which she suggests might have evolved chronologically. It is to be hoped that this tentative chronology, now published, is not presented as a “fact” in her next paper on the subject.

Overall, this is a well-edited, well-produced and extremely well-illustrated volume which is likely to become an important point of reference for researchers into Byzantine glass and particularly mosaics. The range of papers makes this an ideal reader. The level of scholarship is for the most part very high indeed, and I recommend the great majority of its contents. The production and use of colour images throughout make it good value for money.

Ian Freestone

Please send your contributions:
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for *Glass News* 37
by

28th November 2014

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