Glass News

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IN THIS ISSUE

In the last issue of Glass News (25) we reported that Juanita Navarro, co-editor of Glass News with Sarah Paynter had decided to stand down after many successful years of a well produced and dynamic newsletter. We also reported that Juanita's shoes would be hard to fill, but into the breach has stepped Rachel Tyson. Rachel, a specialist in Medieval glass, is well known for her book on Medieval Glass Vessels in England 1200-1500. She brings to the newsletter not only an expertise in glass which will complement that of Sarah, but also has experience of editing for the medieval Finds Research Group newsletter. We welcome her warmly to the editing team and along with Sarah she is happy to receive any contributions to future issues of Glass News – her address is given at the back of this newsletter.

A subscription to Glass News including Membership of AHG has up to now been available at the bargain price of £5 per year. At the last Board meeting it was decided that, due to increasing production and postage costs and the extra activity of the Association in study days and grant awards, we need to raise the subscription to £10 per year. The new rate, which we feel is still a very fair price for everything AHG does, will come into effect when you renew (as we hope you will) for the year 2010.

AHG Spring Study Day 2010

GLASS FOR VESSELS, GLASS FOR WINDOWS
MEDIEVAL GLASS 1066-1550
March 2010 (date and venue to be confirmed)

Following increased research and general interest in medieval glasses in recent years, this study day will bring together speakers looking at new excavations and surveys of glass sites of the medieval period, techniques of medieval glass production and decoration, and specific case studies looking at medieval glass in context. More information will follow in GN 27.
Caroline Jackson [c.m.jackson@sheffield.ac.uk]

AHG Autumn Study Day 2009

'INTERPRETING FINDS FROM GLASSHOUSE EXCAVATIONS'
LAARC Saturday 7 November 2009

Colin Brain, Angela Wardle and David Dungworth

The AHG Autumn study and AGM will be held at the London Archaeological Archive and Research Centre (LAARC) based at Mortimer Wheeler House in Hackney. This study day will have a large practical component, with the opportunity to handle glassworking finds, ranging from Roman to 17th century in date, as well as introductory presentations on glassworking structures, materials, tools and practices for each period.

09.30 – 10.00 Arrival & coffee
10.00 - 10.10 Introduction - Caroline Jackson
10.10 - 11.05 Session 1
Introductory sessions on glassworking as it affects urban glasshouse archaeology, with two presentations: one on the Roman period and the other focused on the 17th century. Each will aim to cover the following topics relevant to London glasshouses:

- Structures, including locations, buildings, furnaces and layouts
- Glass melting, including fuels, materials, melting pots, fritting
- Glass forming, including tools, processes and annealing

11.05 – 11.30 Coffee
11.30 – 12.30 Session 2
Groups of participants will examine and handle either Roman glassworking finds from London or 17th century finds. Each group will have at least one facilitator and will focus in particular on what the material can tell us about the topics listed above.

12.30 – 14.00 Lunch ***(Lunch is not provided. Nearby cafes may have limited opening on Saturday)***

13.30 AGM of the Association for the History of Glass (AHG members only)
14.00 - 1500 Session 3
Repeat of Session 2 but with each group covering material from the other period.
15.00 – 15.25 Tea
15.25 – 16.25 Session 4
Groups feed back their conclusions from looking at the material and contrasting the information from the Roman and the post-medieval sites, followed by a general discussion and questions.
16.25 – 16.30 Close

If you would like to attend, please send your full contact details and a cheque for ***£25.00*** (non-members), ***£20*** (AHG members), or ***£10.00*** (students – proof required) payable to *The Association for the History of Glass Ltd* to: Colin Brain, 10, College St, Salisbury, Wilts SP1 3AL. Receipt by email or with an SAE. Participants who normally live outside the UK may pay upon arrival at the venue in UK sterling). Members wishing to attend the AGM only may do so free of charge.

AIHV Triennial Meeting

18th International Congress

21-25 September, 2009
Thessaloniki, Greece

The 18th Congress of the Association Internationale pour l'Histoire du Verre (AIHV) takes place in Thessaloniki, Northern Greece, organized by the Hellenic Committee of the AIHV and the Hellenic Ministry of Culture - Archaeological Museum of Thessaloniki. Special attention will be given to Greek glass from prehistory through to the Byzantine period.

It is still possible to submit poster presentations and details of the congress themes can be found on the website. All authors of abstracts must pay the participation fee before June 30th, 2009.

DRAFT PROGRAMME

Sunday 20th
Evening – Registration and Opening Reception
Monday 21st
am – Registration
am – Opening
All-day sessions:
A. 2nd millennium BCE
B. Byzantine
Tuesday 22nd
All-day sessions:
A. 1st millennium BCE

B. Byzantine, Islamic, Conservation
Early pm – Poster Session A
Wednesday 23rd
Morning sessions:
A. Roman
B. Post-Roman West
pm – City visits
Thursday 24th
All-day sessions:
A. Roman
B. Byzantine, Post Byzantine
Early pm – Poster Session B
Friday 25th
All-day sessions:
A. Roman to Late Antiquity
B. Venetian / Façon de Venise, 18th and 19th centuries, Asia, Africa
Early pm - General Assembly
Late pm – Closing
Evening – Farewell party
Saturday 26th
All day - 1st and 2nd Post-Congress Trip
Sunday 27th
All day - 1st, 2nd, and 3rd Post-Congress Trip

Congress fees
Members of the AIHV are entitled to a reduced congress fee and to one copy of the proceedings. Information on how to become a member is available from <http://www.aihv.org/>
Participation fees are as follows:
AIHV member €290
Non-member €330
Non-members from low-wage countries €150
Students €150
Accompanying person €150

(Please note grants are available from AHG. For more information see opposite or the website www.historyofglass.org.uk)

Information
The main source of information about the congress is the website <www.aghv.gr>. the second circular is available at <http://www.aghv.gr/pdf/2nd_CIRCULAR_Eng.pdf>

All enquiries to the official congress secretariat:
SYMVOLI Conference & Event Organizers, [aihv18@symvoli.gr]
Enquiries concerning scientific issues:
Dr Despina Ignatiadou [dignatiadou@culture.gr], or
Dr Antonaras Anastassios [andonar@physics.auth.gr]

AHG Grants

Grants are available from the Association for the History of Glass for educational or research activities consistent with the Association's charitable aims. These aims include, for example, attendance at a conference to present a lecture or poster, a study visit, fieldwork or publication of scholarly works.

There are no restrictions on who may apply or on the topics of applications, which will be judged on merit. Multiple applications in different years will be considered with individual awards up to £500. See also the AHG website for details (www.historyofglass.org.uk).

Applications for a bursary application form should be made to Sandy Davison, AHG Hon Secretary,
68 East Street, Thame, Oxfordshire OX9 3JS
Email: [sandbill@gotadsl.co.uk]

Society of Glass Technology

Annual Conference 2009

16-18 September 2009
University of Lancaster

The Society of Glass Technology's Annual Conference takes place in September with Friday 18th September devoted to the History and Heritage of Glass. Glass Science sessions will be held on Wednesday 16th (pm) and all day Thursday 17th. Wednesday 16th will be dedicated to Glass Technology, with a works visit to Quinn Glass Elton Plant. The New Research Forum will also be held on Wednesday 16th September.

More information will be added to the website as it becomes available:
<http://www.lancaster2009.sgthome.co.uk>

History and Heritage of Glass Programme
Plenary Session:
10.00am The invention of the float glass process: The mythology revisited - Dr David Bricknell, Manchester Metropolitan University
10.40am Refreshments

11.00am	One Family's Journey in Bottlemaking - Mr.P.J.Pearson
11.40am	Glass Colours at Marinha Grande by the last quarter of the 18th century - Antonio Pires de Matos
12.20am	Conservation of Glass Objects: Two Case Studies - Ms Dana Norris, Ashmolean Museum
1.00pm	**Lunch**
1.40pm	What is Glass? - Adrian Wright
2.20pm	Archaeology of glass furnaces - Ian Miller
3.00pm	Window Glass Manufacture 1500 to 1950 - David Dungworth
3.40pm	**Refreshments**
4.00pm	The Savile Chapel window at Thornhill: is there a case for the palliative care of geriatric glazing? - Ruth Cooke
4.40pm	Protective Glazing Systems for Ancient Windows Keith Barley
5.20pm	The new MA course in stained glass conservation at York University - Sarah Brown
6.00pm	**Close**

24th and 25th Annual Meetings

AFAV

The 24th annual meeting of the Association Française pour l'Archéologie du Verre (AFAV) will take place on the 20th and 21st November 2009 at Frejus, Cote d'Azur. The topic will be research into the history and archaeology of glass, from Antiquity through to contemporary periods, in France and abroad. More information, as well as forms for submitting abstracts and registering by e-mail, is available from the website at: <www.afaverre.fr> or <www.arkaeos.fr>

Visits around the venue will be organised in collaboration with the *Pôle archéologique du Var* and the *Service archéologique de la Ville de Fréjus*, and will include opportunities to see collections of archaeological glass, such as the cargo of the Embiez wreck and glass from excavations at Frejus. The Glassmakers of Biot will also host a half-day visit of the glassmakers market, *l'Ecomusée du verre* (archaeological and historical glass) and of the *Galerie Internationale du Verre Serge Lechaczynsk*i (contemporary creations of international artists).

The 25th Meeting of the Association Française pour l'Archéologie du Verre will be held in Orléans, on May 28th and 29th, 2010. Organised in association with the Musée des Beaux-Art, the meeting will be devoted to current work on the archaeology, archaeometry and history of glass, in France and elsewhere, from Antiquity through to the Industrial period, with a special session devoted to Bernard Perrot and Italian glassworkers.

Booking is recommended, as soon as possible. Information and forms are also available on the website AFAVerre (www.afaverre.fr)

AHG Grant Reports

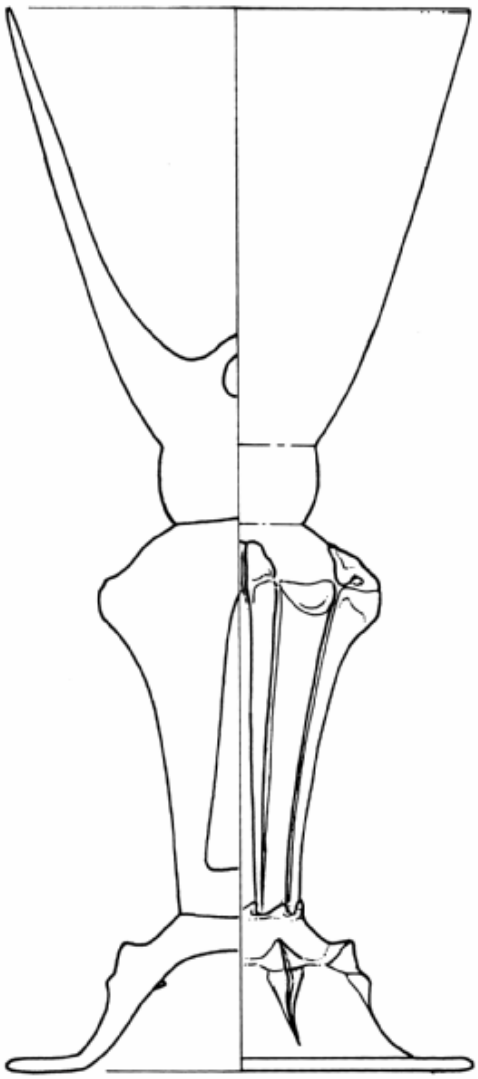
18TH-CENTURY TABLE GLASS IN COLONIAL VIRGINIA

Hugh Willmott

The town of Williamsburg in Virginia was one of the most important early settlements in North America. Originally founded as Middle Plantation in the late 17th century, it was renamed when the state capitol was transferred there in 1698. Home of some of the leading political and social figures in early American history, it played a pivotal role first as a prosperous colonial settlement, but latterly as home to many of the key figures of the War of Independence. In 1780 the state capitol was again moved to Richmond, a more secure location, and in the following decades Williamsburg faded from the limelight becoming a small provincial town. During the 1920s John D Rockefeller purchased most of the town with the intention of restoring it back to its 18th-century appearance, and since then excavations have taken place that reveal the full richness of Williamsburg's historic past, and its unique collections of material culture.

Williamsburg is fortunate to possess a near unique archaeological and historical resource. Due to its declining importance after the 1780s it never underwent the large scale 19th-century redevelopment that other early colonial towns experienced, and thus many of its archaeological deposits remained undisturbed. Furthermore, documentary accounts, probate records and household inventories survive for most of the 18th-century town, allowing the attribution of archaeological deposits to not only recorded household plots but in many cases known individuals and businesses.

Many readers of *Glass News* will no doubt be familiar with Ivor Noël Hume's 1969 *Glass in Colonial Williamsburg's Archaeological Collections*, an informative and incisive overview of glass that had been found up until that date. Although the impressive collection of bottle glass at Williamsburg has subsequently received some of the attention it deserves, since Noël Hume's publication no in-depth archaeological study of the table glass had been undertaken. With the generous aid of an AHG Research Grant, the author travelled to Williamsburg earlier this year to start the first stage of a new comprehensive study of the 18th-century tablewares. The aim of this project is to not only record the individual vessels so that a better understanding of the archaeological range and date of forms can be achieved, but also to undertake a comparative analysis of consumption patterns between the various households.



Goblet with moulded stem (155mm in height): one of the 18th-century glasses belonging to John Custis

In its first phase, the study has concentrated on cataloguing, drawing and photographing the five largest and best-dated assemblages, which together include a minimum number of nearly 500 vessels. These groups come from a variety of households and businesses. The largest is perhaps the best known, being 162 glasses from Wetherburn's tavern, a site excavated in 1965. As well as the large number of stemmed wares and tumblers that might be expected for a such a business, the tavern also produced a varied collection of jelly glasses, as well as bowls, footed salvers, and a candelabra arm. A second commercial group examined came from Richard Charlton's coffee shop, one of the most recently excavated properties in Williamsburg. This assemblage included nearly ninety individual vessels, the most common of which were wine glasses with plain drawn or air twisted stems. The largest domestic group comes from the household of Anthony Hay one of the town cabinetmakers operating between 1751-67. This family, as well as using a large number of wine glasses and tumblers, also discarded a range of other vessels including decanters, handled mugs and footed salvers. Slightly earlier in date is an assemblage of sixty vessels belonging to the family of James Geddy the town gunsmith and brass founder, which also contained a wide range of drinking vessels. Perhaps the most interesting deposit consists of thirty-nine wine glasses, tumblers, jellies and mugs belonging to John Custis the father-in-law of the future Martha Washington. Most of the glasses were found in an almost complete state at the bottom of a well (see figure to the left), probably as the result of a household clearance following the death of Custis in 1759.

Analysis of this material has only just begun, and there are other equally important groups that still require recording. However, once this work has been finished not only will the full range of table glass being used in 18th-century Virginia be apparent, interesting questions concerning the use and discard of glass in a colonial setting shall be explored.

The Charles Darwin Bicentenary

Don Tyzack

We shouldn't allow the Charles Darwin's Bicentenary and the Sesquicentennial anniversary of his book pass without recording the connection that exists between him and glass! Darwin and his family lived for for 40

years at Down House, and it was here he researched and wrote *On the Origin of Species*. Less widely known is that Jacob Verselini, the Elizabethan glass monopolist, was a previous owner of Down House.

Recently while in the archives at Guildford I came across an original copy of the will of Jacob Verselini. Quite a bulky document, when it finally came up from the vault. Seven skins! After I had painstakingly read and transcribed it into my word-processor it amounted to ten thousand words. Clearly the scribe of 1604, one William **ff**rith, was paid by the word! He never wrote any word once if he could find some way of repeating it. I read through it hoping to find something about Verselini's glass business.

Verselini lived in London in 1571. Jean Carré, a native of Arras, had arrived in London in 1567 and set up glass works to fulfil his monopoly from Queen Elizabeth, at the ***Priory of Crutched Friars*.** Jacob Verselini took over the works in 1572 after the death of Jean Carré. The transfer was probably due to the fact that Verselini had the fashionable technique of making glasses in cristallo. So on 15 December 1574 Verselini was granted a patent for twenty-one years, which prohibited others from manufacturing Venetian-style (cristallo) glass. Verselini could make "*drynkyne glasses such as be accustomable in the town of Murano*". The monopoly required him to teach his craft to Englishmen, which he never did. His manufactory was burn down and rebuilt in 1575 and he then moved the works to Winchester House, Broad Street. He is said to have retired in 1592, before his patent expired, and died in 1607.

By the time of his death Jacob Verselini was a wealthy man. Most of his wealth was in property around the Manor of Downe in Kent. His principal house was the Downe House later to be lived in by Charles Darwin. In a book called *"Down: The Home of the Darwins***"**, it is said that Verselini bought Down from Henry Manning, Knight Marshal of the Household under Henry VIII, when Manning left for Greenwich in 1560. Verselini's own will contradicts that. It says he bought it from John and Simon Smythe. (In any case the 1560 date seems too early because Verselini was in Antwerp in 1566 marrying Elizabeth Vanburen. Verzelini took over the ***Crutched Friars*** glassworks in 1572 after the death of Jean Carré, when he was granted the patent that made him wealthy).

Although Verselini owned several properties in and around Downe, even right up to the end he apparently preferred to live in London. We find him there when he dictated most of the will, for example :- "*And he saieth that on the last daie of Maye One thousand sixe hundred and fower and in the fforenoone this deponent was sent for to his howse in the* ***Crutched ffreers London*** *to be a Wittnes.*"

The will starts off with £20 for a marble gravestone to be engraved with pictures of himself and his wife. Such a gravestone still exists. His eldest son Franncis seems to have blotted his copybook; his problems are not revealed but he only gets a couple of Annuities worth about £60 per year. The will shows that Verselini did not trust Franncis at all but Jacob, his younger son did quite well out of the will. Verselini was at pains to work out the subsequent inheritance of his various bequests after the death of each original beneficiary. He always sought to nominate an alternative beneficiary if the first issue failed to survive. After the death of his wife, and then of her subsequent inheritors, there are detailed sequences listing seven or eight successive outcomes.

I don't know whether Verselini's attempt to second guess the future succeeded but the affairs of Downe Manor were the subject of much litigation for the next fifty years or more after Verselini's death. After his wife's death the Downe property went to his second son Jacob as provided in the will but, in 1614, son Jacob leased it to Jacob Manning the grandson of Verselini. Now under the will, because son Jacob died childless, the property should have gone to Marie, Verselini's daughter and her husband, the grocer Michael Palmer, who were already living in Downe Court. By 1646 Thomas, the son of Jacob Manning, went to court claiming that his father was in possession of the property when he died in 1621. Litigation continued until 1652 when the manor seems to have come back into the Palmer's hands.

So after ten thousand words, in an Elizabethan secretary hand, and interminable legal jargon, I found nothing at all about glass. If it had not been for the mention of the **Crutched Freers** I might have begun to wonder whether I had found the right will.

Down House became the home of Charles Darwin from 1842 till his death in 1882. Here Darwin worked on his scientific theories and wrote "***On the Origin of Species*"** – the book which both scandalised and revolutionised the Victorian World when published in 1859. Downe House was used as a girls' boarding school from 1907 until 1922 and was acquired by the Royal College of Surgeons of England in 1953. The ground floor of the house became a museum dedicated to Darwin, and Sir Hedley Atkins moved

into the upper floor - he was the honorary curator of the museum.

A copy of the full Verselini will can be found at:-
<http://www.tyzack.net/verselini.htm>
More information and another copy of the will is at:-
http://www.antiquecolouredglass.info/verzelini.htm>.
More information on Down House is available at:
<http://www.english-heritage.org.uk/server.php?show=nav.14922>

Review:
AHG Spring 2009 Study Day

Sarah Paynter

The AHG spring study day, held in March in the sumptuous surroundings of the Wallace Collection, London, was on the theme 'Recent Archaeological research into the manufacture of glass in the British Isles'. This was guaranteed to appeal to many, as there were a scattering of archaeological and archaeometrical presentations covering a broad time span.

John Shepherd (Islington Heritage Services) started proceedings with **The earliest glassworking in Roman London**. This fascinating journey through several centuries described glassworking debris from various areas in London. John touched on sampling strategies and included pictures of different types of glassworking waste, discussing how they were formed, which was especially enlightening. Richard Campbell followed with **Romano-British glass working waste from Thearne, near Hull,** describing over 180 pieces of Romano-British glass including fragments of vessels, bangles and twisted cords. Jerzy Kunicki-Goldfinger presented an interesting paper co-authored with Ian Freestone on the **Compositional investigation of the glass of John Thornton, glazier of the Great Window of York Minster.** Glass from three windows of York Minster was analysed and the results showed differences in composition associated with varying date and colour, which will no doubt lead to some intriguing theories on the production and trade of window glass.

David Dungworth, in his first appearance of the day, provided a taster of **New field work on the glass industry of the Weald**, which will be undertaken by the Surrey Archaeological Unit (funded by English Heritage), plus a succinct overview of current understanding of the Wealden glass industry from the 13th century onwards. Colin Brain's subject was **A 17th-century Dublin crystal glasshouse** encompassing many aspects of the process for producing lead crystal, including the raw materials, pot clay and fuel used. David returned to finish the morning session with a summary of **New work on residues from urban glassworks excavations**. His presentation demonstrated the benefits of applying scientific techniques to artefacts and residues from glassworking sites using a number of larger post-medieval sites as examples. Like the first presentation of the day, this talk included some useful descriptions of diagnostic glassworking waste from different processes.

The afternoon focused on the archaeological remains of the later glass industry, with cone bases and flues abounding. Many of the presentations shared a similar theme, attempting to establish the extent of this vanishing archaeological resource in different areas, and then how best to manage, investigate and record remains. Peter Bone, described **A survey of the glass industry in Manchester and Salford**, to characterise the companies involved, identify the glass-working sites, and record them on the Greater Manchester HER. In a similar vein, Mike Hodder described how the below ground survival of several recently excavated Birmingham glassworks would influence the approach to such sites in future and Ray Holt presented **Excavations at the site of the Walsh Walsh glass works at Lodge Road, Birmingham.** Ian Miller spoke on **A regenerative revolution: the adoption of Siemens' furnace technology at the Powell and Ricketts glass works, Bristol**, and Pete Boland on **Recent work on the archaeology of the Dudley and Stourbridge glass industry.** There was sufficient evidence at some of these sites to not only identify structures, but to speculate about the processes taking place, enabling more in depth discussions encompassing the impact of the evolving technologies on the industry and those involved with it. Finally Anne Mortimer vividly described the excavation of the 19th / 20th-century Hightown Glassworks in **Bottles, Bricks and Prohibition - the extraordinary site of Hightown Glassworks, Castleford, West Yorkshire.** The scale and complexity of the site were astonishing and work on the glass recovered continues.

The day was very enjoyable and served as a useful grounding for the forthcoming autumn study day, when there will be an opportunity to handle glassworking waste of different periods - more details can be found on page 2.

Broadfield House Glass Museum

Since the last issue of Glass News, there has been considerable publicity concerning Dudley Council's plans for Broadfield House Glass Museum. A summary of the press coverage can be found at the Friends of Broadfield House Glass Museum website: <http://www.friendsofbroadfieldhouse.co.uk>

Award-winning Broadfield House Glass Museum is situated in the historic Stourbridge Glass Quarter and has a magnificent collection of British glass, much of it made locally, dating from the 17th century up to the present day. A programme of events and temporary exhibitions compliment the glass displays and celebrate the magical art of glassmaking. There is also a glassmaking studio on site where visitors can watch and wonder at the glassblowers' skills. Admission to the Glass Museum is free.

The Council reports that it is exploring the feasibility of amalgamating its two glass heritage facilities (one of which is Broadfield House). The practicalities of doing this and the costs and timescale involved are to be the subjects of a comprehensive feasibility study. The progress of the feasibility study, and also a list of frequently asked questions, can be accessed via the website at: <http://www.dudley.gov.uk/leisure-and-culture/museums--galleries/glass-museum/broadfield-house-feasibility-study>

Cecil Higgins Art Gallery **Ravenscroft Glass**

Victoria Partridge

In 1676, George Ravenscroft was authorised by the Glass Sellers Company to impress a seal on his work. This first seal was probably plain, but by May or June 1677 he started to mark his work with a seal bearing a raven's head. There is no record of the number of pieces which were marked by the seal but it is known that only about twenty intact pieces exist today, two of which are in the Cecil Higgins Collection.

The Bedford brewer Cecil Higgins, on his death in 1941, left his collection of ceramics, glass and *objets d'art* to the town "for the benefit, interest and education of the inhabitants and of visitors to Bedford". Through the generous endowment included in the bequest, the collection has grown to include an internationally renowned watercolour and print collection as well as one of the most important decorative art collections outside of London.

In the 1930's, when Cecil Higgins was in his seventies, he conceived the idea of forming a museum collection. With advice from Jim Kiddell, an assistant director at Sotheby's and a ceramics expert he set about this task. Kiddell suggested names of dealers in ceramics and furniture who could supply suitable pieces and recommended a dealer, Cecil Davis to be entrusted with sourcing the glass. Higgins' ceramics collection totals over 1000 pieces and illustrates the history of European ceramics from medieval times to the early 19th century. The glass collection though smaller (about 300 pieces) includes Venetian, Renaissance, Jacobite and Anti Jacobite glass, as well as an outstanding collection of over 20 pieces of late 17th-century English glass.

Buying from private collections and auctions, Higgins was lucky to be collecting in a period when many important collections were being dispersed and could be bought at relatively low prices. One such sale was the Kirkby Mason sale at Sotheby's in 1929. C Kirkby Mason, a travelling salesman, though not well off had made up for his lack of funds by obsessional searching. The sale contained much early glass, including two sealed Ravenscroft pieces: a bowl and helmet jug as well as an unsealed jug all acquired by Higgins.

The helmet jug (G.8) (see the picture on page 8) is dated about 1676 -1678 and has the Raven seal on the handle; it is almost identical to an unsealed jug in the V&A. The bowl (G.9), similar to two in the V&A dates from 1676 and has a gadrooned flared bowl with the raven's head between two gadroons. The unsealed jug (G.7) is the earliest of the three dating from about 1670-1675; it has an ovoid body with pinched ribbing in a diamond relief pattern.

George Ravenscroft (1618-1681) applied to the crown in March 1673 for a patent to manufacture an improved kind of glass. For a period of two years from when the patent was granted in May 1674 until the spring of 1676, Ravenscroft experimented and developed his new Christaline Glass. This new glass revolutionised the English glass industry, but the new invention was not without problems. Early pieces such as those in the Cecil Higgins collection suffer from the deterioration known as crisseling, caused by its unstable composition. This has meant that the glass has always been kept in a different environment from other parts of the collection to stop the deterioration from spreading further. In the 1950's a specially constructed airtight case costing £62 was built for it, then in the seventies when a modern extension was added, a purpose built case with climate controls became the glass's new home. Though the glass has never been lent to other institutions due to its fragility it has always remained on permanent display, that is, until now.

The gallery has seen a dramatic change in the last two years, the main building which housed the collection has closed, to allow building work to begin on Bedford Gallery, a historic building on the site that had not been used since the 1970's. The newly refurbished building is now a state of the art two storey exhibition space. Opened in April 2009, Bedford Gallery is phase one in the overall plan to refurbish Cecil Higgins Art Gallery and Bedford Museum. Phase 2 will see the total refurbishment of Cecil Higgins and Bedford Museum, with the inclusion of an updated Ceramics and Glass gallery. Provisionally titled the Design Gallery, the gallery will explore stylistic developments in the applied arts from the 17th century to the 20th century. Key themes will include design and manufacturing techniques, supported by craft technique interactive areas focusing on glass, ceramics, enamel and glazes and of course the new gallery will include a new climate controlled case for the Ravenscroft Glass. The glass will remain in storage until the completion of the project, hoped to be in 2012.

Thames Plate Glass Company

David Dungworth

Plate Glass manufacturing technology had been introduced to Britain from France in the later 18th century and for nearly 50 years one company (the British Plate Glass Company at Ravenhead, Lancashire) had dominated the industry. The early 19th century saw the establishment of a number of rivals, including the Thames Plate Glass Company in Poplar, London. The expansion in plate glass production was sustained by building booms and changing architectural fashions which prized large windows.

The production of plate glass was a complex and labour-intensive sector of the industry. Considerable attention was first devoted to obtaining the most pure ingredients possible. The sands used were the best available (i.e. with minimal iron content), with significant sources being the Isle of Wight and Kings Lynn. A variety of fluxes were used depending on technological, political or economic factors. By 1823 the Ravenhead works started to make use of soda from the double decomposition of common salt and potashes. Many also made use of Leblanc soda from the 1830s onwards. The source of lime used to stabilise the glass was usually chalk or high-quality limestone and this was often slaked prior to use.

The raw materials were melted in a crucible for 1 to 2 days and then transferred to a second refractory container (a cuvette) where the glass was further refined for several hours to remove any imperfections in the glass (especially bubbles). When the glass in the cuvette was judged to be ready it was lifted out of the furnace using a crane (Figure 1) and transported to a casting table which was positioned in front of an annealing chamber. The molten glass was poured onto the metal casting table and then flattened with a large metal roller, the thickness of the plate being determined by two metal strips placed along either side of the casting table (Figures 1 and 2). Cast plates of glass were generally half an inch (12.5mm) thick with an area (prior to cutting) of up to 100 square feet (10.8m^2) in 1836, and up to 270 square feet (29m^2) in 1876. The casting-tables were on wheels and typically weighed 14 tons (the plate glass formed on them typically weighing 0.3–1 tons). Once it had been rolled flat, the glass plate was pushed into the annealing chamber where it remained slowly cooling for several weeks. The tops of the casting tables were

level with the floor of the annealing chamber to ease the transfer of the plate glass after casting (Figures 1 and 2).

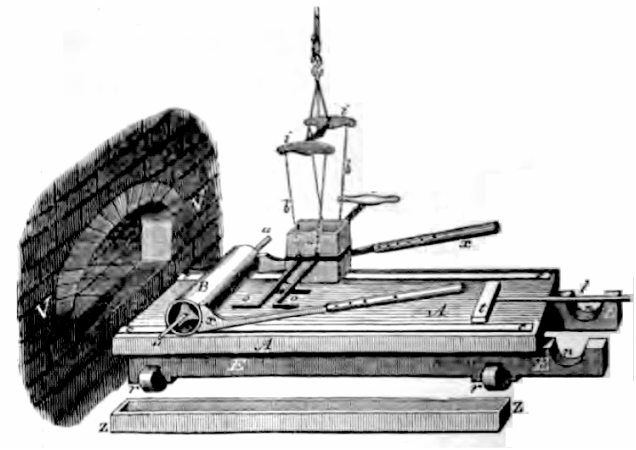


Figure 1. Plate glass casting table showing the cuvette, heavy roller, and side rails (Knapp)

The annealed glass plates had rough surfaces that were not perfectly flat and required laborious grinding and polishing before they were ready for sale. The grinding and polishing was carried out by embedding a plate of glass in plaster of Paris to prevent its movement. The first stage consisted of grinding using sand and water which served to provide the surface of the glass with a plane surface. In some cases several different grades of sand were used progressively to grind the surface of the glass. Grinding was initially carried out by hand but the British Cast Plate Glass Company obtained a Boulton and Watt steam engine for grinding in 1789.

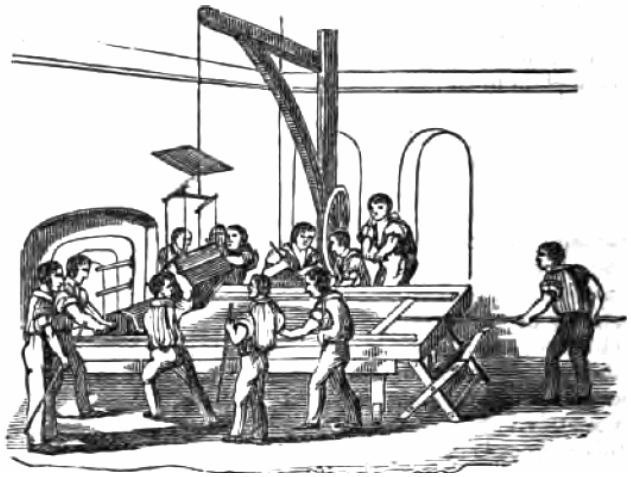


Figure 2. Casting plate glass (Porter 1832). The illustrator appears to have reused (but not understood) the illustration in Diderot's Encycopédié *as this version is very similar but seems to show workers tilting the cuvette with their bare hands!*

The next stage was called smoothing and made use of emery, a naturally occurring mineral largely made up of corundum (aluminium oxide) but often with various other iron-bearing minerals. Emery has long been valued as an abrasive because of its hardness and it was traditionally obtained from the Greek island of Naxos. Like the abrasive sand, the emery was usually used in several increasingly fine grades. The smoothing stage appears to have been carried out by hand even after the introduction of mechanical power for grinding. The final stage of the process (polishing) made use of carefully prepared iron oxide powder. This was traditionally obtained as *crocus martis* or *colcothar*, a waste product from the manufacture of sulphuric acid from iron sulphate. The grinding, smoothing and polishing would typically reduce the thickness of the glass by one half.

At each stage of grinding, smoothing and polishing of the cast plates they were carefully inspected for bubbles and other blemishes. Where these were detected, the plate was cut so that these now occupied marginal positions of little importance. This process, however, meant that relatively few cast plates survived the process intact and the price per square foot of plate glass increased with the size of the plate (Figure 3). The maximum size of plates of glass produced increased during the late 18th and early 19th century (Figure 4) with considerable improvement from the 1830s onwards.

In 1843 Timbs records that the 'largest plate of glass yet cast has been finished by the Thames Plate Glass Company, at Poplar. Its dimensions are 14 ft. 8 in. long and 8½ ft. wide'. In 1845 Thames Plate Glass Company glass was selected for use in British light houses after tests carried out by Trinity House's scientific advisor Michael Faraday. Faraday was scientific advisor from 1836 to 1865 to Trinity House (the body responsible for safe navigation round the shores of England and Wales).

In 1846 the Thames Plate Glass Company was mentioned in a paper read by Brayley to the Pharmaceutical Society on the subject of glass manufacture. Brayley explained the method of manufacturing cast plate glass with specific reference to the Thames Plate Glass Company. He lists the raw materials silica sand, lime, sodium carbonate, sodium nitrate and arsenic oxide. He further records that the sand was obtained from Kings Lynn and that the sodium carbonate was produced by the double decomposition of common salt and potashes, 'in the way formerly pursued in the plate-glass works at Ravenhead'. He describes Thames Plate Glass

Company glass as 'remarkably free from colour' and suggests that this was because the alkali used was completely free of sodium sulphate (soda prepared by the Leblanc process frequently contained some sulphur.

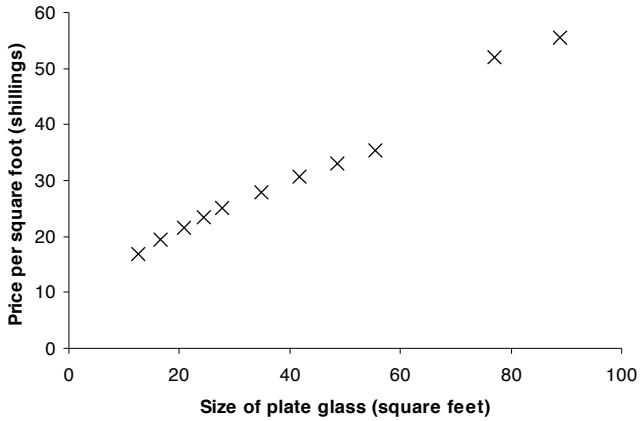


Figure 3. Prices of plate glass (per square foot) in 1823

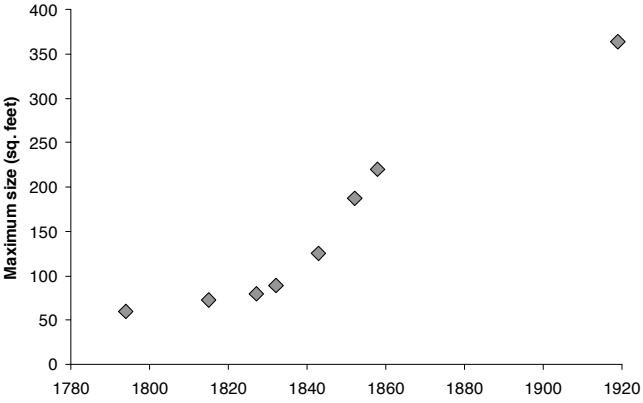


Figure 4. Maximum size of plate glass produced

The Thames Plate Glass Company did not win the contract to provide the glass for the Crystal Palace (which was famously awarded to Chances of Birmingham) but at the Great Exhibition in 1851 it did exhibit the 'the largest plate of glass in the world; its dimensions are eighteen feet eight inches by ten feet'. This plate was further described, 'There is not a blemish on its brilliant surface, and it is as "true" as possible. It is placed in such a position that it reflects the whole length of the main avenue of the Crystal Palace, and the effect produced is superb'.

An account of a visit to the Thames Plate Glass Company was published by William Henry Wills in 1860. Wills was a successful journalist who contributed to and even edited popular journals of the period, such as *Punch*, the *Monthly Magazine*, *Chamber's Journal*, the *Daily News*, and *Household Words*. The latter, which was a joint venture with Charles Dickens from 1850 to 1859, was the source of the articles which were published by Wills in 1860 as *Old Leaves from Household Words*. The article is written in a colourful and entertaining style,

> Having, by this time, crossed a yard, we stood on the edge of a foul creek of the Thames, so horribly slimy that a crocodile, or an alligator, or any scaly monster of the Saurian period, seemed much more likely to be encountered in such a neighbourhood than the beautiful substance that makes our modern rooms so glittering and bright, our streets so dazzling, and our windows at once so radiant and so strong.

but many of the details appear to be consistent with other known facts, for example it refers to the recent introduction of mechanical smoothing which is mentioned by Muspratt writing in the same year.

During the early 1860s the largest plates of glass were in very high demand from some theatres. Henry Dircks had patented a method for producing the illusion of a ghost on stage (the technique uses the same basic principles as the autocue). A plate of glass was placed between the main stage and the audience which was used as a mirror to project an image from a second, hidden stage. The reflection produced by the glass plate was slightly translucent and so gave people or objects a ghostly appearance. Obviously the technique could only work if the plate glass had no detectable colour and was perfectly polished so that its presence was not obvious to the audience. By manipulating lighting on the second stage, the audience had the impression that people and objects on the main stage appeared and disappeared. The apparatus (essentially the plate glass and the second stage) was known variously as *The Dircksian Phantasmagoria*, after the inventor, or as *Doctor Pepper's Ghost*, after Dr John Henry Pepper who with Dircks first displayed the apparatus at the Royal Polytechnic Institution, Regents Street, London in December 1862. The apparatus was a sensational success with an estimated quarter of a million people coming to the Polytechnic in the first fifteen months that the *Ghost* was displayed. In the year that followed, six theatres in Britain installed the necessary plate glass but the illusion required plates of 12 feet square which were the largest that could then be produced. Dircks further records that a visitor to the Thames Plate Glass Company in 1862 or 1863 was told that it had completely sold out of the largest plates that the company could make.

Despite the high regard in which the Thames Plate Glass Company was clearly held and the apparent high demand for plate glass, the company failed in 1874. The most likely reasons for the failure of the company are the actions of larger competitors, both domestic and overseas. From the middle of the 19th century Belgium, and then America, began to export window glass and later plate glass. The later 19th century saw the demise of many traditional plate glass manufacturers and the largest glass producers (e.g. Pilkingtons and Chances) bought out the smaller specialist plate glass firms and successfully moved into the plate glass business.

Recently the site of the Thames Plate Glass Company was excavated by Wessex Archaeology ahead of the planned construction of offices and flats. Later development on the site destroyed much of the archaeological evidence for the manufacture of glass, although traces of the annealing ovens and grinding rooms survived. Much of the archaeological stratigraphy consisted of a cream-pink mottled deposit which has proved to be a mixture of calcium sulphate and iron oxide. This presumably represents the use of plaster of Paris and hematite during the polishing process. Substantial quantities of plate glass were recovered showing varying degrees of finish from rolled but un-ground, through to smoothed (but not polished). The results of the scientific analysis of the glass and associated materials will be presented at the AIHV meeting in Thessaloniki in September.

Glossary of Mosaic Terms

The Leverhulme Network of the Composition of Mosaic Glass Tesserae' s publication 'Glossary of Mosaic Terms' has been published. It can be downloaded and viewed here:
<http://www.sussex.ac.uk/arthistory/1-4-16-1-1.html>

We consider the Glossary finished in its present state but there is always room for improvement, so if you see things that need tweaking or are burning to add an essential category please get in touch. We hope that you will find the Glossary useful.

With best wishes
Liz James [e.james@sussex.ac.uk] and Bente Bjornholt [b.k.bjornholt@sussex.ac.uk]

Books and Publications

Ancient Glass Research Along The Silk Road

Gan Fuxi, Robert Brill and Tian Shouyun

World Scientific Publishing (9 May 2009)
Hardcover, 23.2 x 15.8 x 2.6 cm, 496 pages
ISBN-10: 9812833560
ISBN-13: 978-9812833563

Price £64.00

The Silk Road is a main artery connecting Europe and Asia for political, economical, cultural and technical exchange in antiquity, and glass is one of the earliest artificial materials to be invented. Studying the origin and evolution of ancient glass along the Silk Road is thus significant for understanding the development and exchange of culture and technology between China and abroad. This book, for the first time, traces the origin, evolution and spreading of ancient Chinese glass technology. It collects a wealth of data contributed by Chinese and foreign experts regarding the history and background, visual characteristics and chemical compositions of the unearthed ancient glasses from along the Northern (Oasis) Silk Road, especially from the Xinjiang Province (known as the Western Region in ancient times). The book presents new results of the studies on ancient glasses along the Southern and Sea Silk Roads, and discusses the influence of the Silk Road on ancient Chinese glass technology and art. The contents include:

- Origin and evolution of Ancient Chinese glass *(F-X Gan)*
- The Silk Road and Ancient Chinese glass *(F-X Gan)*
- Glass and bead trade on the Asian Sea *(I Lee)*
- Ancient lead-silicate glasses and glazes of Central Asia *(A A Abdurazakov)*
- On the glass origins in Ancient China from the relationship between glassmaking and metallurgy *(W Qian)*
- The inspiration of the Silk Road for Chinese glass art *(C Lu)*
- Chemical composition analyses of early glasses of different historical periods found in Xinjiang, China *(Q-H Li et al.)*
- Ancient Glass in the Grassland of Inner Mongolia *(X-Y Huang)*

Study of the Ancient Glasses Found in Chongqing *(B Ma et al.)*

Archäometrie – Methoden und Anwendungsbeispiele Naturwissenschaftlicher Verfahren In Der Archäologie

Andreas Hauptmann and Volker Pingel

Schweizerbart'sche Verlagsbuchhandlung (2008)
Hardback, 24.4 x 17.6 x 1.6 cm, 264 pages
German

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ISBN-13: 978-3510652327

Price: €49.80
To order e-mail: order@schweizerbart.de

Th. Rehren

This book consists of edited lectures originally presented in 2001-02 in a series jointly organised by the Ruhr-Universität Bochum and the Deutsches Bergbau-Museum. Its stated aim is to offer archaeologists and scientists alike an introduction to the basics of archaeometry. Thirteen individual contributions serve as case studies, conveniently grouped in five sections: organic archaeological finds (archaeozoology; physical anthropology; stable isotopes in animals; and paleo-DNA); inorganic archaeological finds (ceramics; glass; metals); quantitative dating (radiocarbon; dendrochronology; luminescence); geoarchaeology (environmental and landscape archaeology); and prospection methods in archaeology (aerial photography; geophysical prospection). Surprisingly, some areas are missing; there is nothing on lithics or pigments, archaeo-botany, uranium series dating, or the increasingly important non-invasive imaging methods based on X-rays, neutrons, or laser-based scanning of individual artefacts or whole sites and monuments. But then, offering 'examples', as the title does, implies a degree of selectivity, and the range is certainly wide enough to offer something for most readers.

For the sake of the readers of *Glass News*, this review will focus on the chapter on ancient glass. The authors (Peter Hoffmann, Professor of Analytical Chemistry at the Technical University Darmstadt, Martin Heck, his former doctoral student, and Claudia Theune, who did her PhD on the archaeological aspects of the study) chose the investigation of Merovingian glass beads as their case study. Based on about one thousand individual beads excavated from several cemeteries mostly in southwest Germany and northern Switzerland they combine a number of analytical approaches, from non-invasive XRF analysis of corroded surfaces to minimally invasive SEM-EDS analysis, to XRD analysis for the identification of colorants and opacifiers, to detailed optical and electron microscopy of selected bead fragments and finally lead isotope analysis for provenancing the lead component of the glass. Such a multi-method approach is a hallmark of the science side of archaeometry, selecting the most suitable cocktail of methods available within the given curatorial, financial and institutional constraints of any one project.

Unfortunately this reviewer can not recommend this chapter as an introduction to either the methods of ancient glass studies, nor as an example for archaeometric work. As a case study, generously funded over a four-year period, the material offered rich opportunities for exemplary work, and the quality of the underlying research, both analytical and archaeological, appears sound; some of it has been published in various peer-reviewed journals, and two doctoral theses have emerged from it. However, the integration of the two main strands in archaeometry, namely an understanding of the fundamentals of the historical sciences (archaeo-) with a critical evaluation of analytical data (-metry), is painfully missing from this chapter.

One key problem is the lack of emphasis on the time-sensitivity of ancient glass technologies. The section titled 'Some basics about glass' lists among the decolourants not only the traditional oxidants manganese and antimony oxide and the decolouration of the remaining Fe^{3+} chromophor by complementary coloration with manganese oxide; without comment it also refers to various selenates as complementary colourants, or to Cr^{3+} and the cadmium compounds CdS, CdSe and CdTe as colorants. The leading sentence here refers to Roman methods of coloration, and no mention is made of the modern nature of these particular colorants, implicitly suggesting to the novice (to whom this book is addressed!) that these are all Roman methods of coloration and decolouration. This may be an unlucky abbreviation in a necessarily dense introductory section; but the authors then state (page 120) as (the main?) archaeological hypothesis that the Romans themselves did not produce glass but imported it from the Near East (with reference to a personal communication rather than a publication), and to offer as support 'Mediterranean ship wrecks carrying glass ingots from the East to Rome (Bass 1986).' Bass (1986), of

course, refers to the 1984 campaign at Uluburun, excavating the famous Late Bronze Age ship probably en route from Egypt and the Levant to the Aegean, but certainly not to Rome and not during the Roman period. The nature of the glass industry had changed beyond recognition in the two millennia between the loss of the ship at Uluburun, and the production of the glass used by Late and post-Roman society.

Unfortunately, this is not an isolated slip in unfamiliar territory. The discussion of the colorants is obviously central to these brightly coloured beads. For green beads (presumably opaque green) the authors report finding only tin oxide as an opacifier, and suggest that the green colour is due to Cu^{2+} ions in the glass matrix. The glass matrix appears to be a typical soda-lime-silica glass; this surely should result in an opaque blue / turquoise if copper is present as Cu^{2+} ions in solution together with a white opacifier? The figure giving the underlying XRD spectrum showing only tin oxide (2.18E) is missing; however, in a later sentence the authors do mention that in some beads 'occasionally' lead-tin oxide pigment was found together with the copper ions. The fundamental difference in colour between lead-tin oxide (yellow) and tin oxide (white) does not appear to register; page 120 informs us that the oxidation of a tin-lead alloy results in the formation of a pure white pigment, 'in contrast to the oxidation of pure tin', the colour of which is not further specified. This reviewer would be much more comfortable if there had been at least a discussion of the possibility that the green beads were actually coloured by a combination of lead-tin yellow pigment (with typical excess lead oxide from the production of the pigment, and necessary to stabilise it in the glass matrix) and copper ions (blue) in solution, giving a green opaque glass. Archaeological evidence for the production of lead-rich lead-tin yellow pigment from a Merovingian context in northern Switzerland was published by two of the authors of this chapter (Heck *et al*. 2003), as part of the project presented here, and copper-blue coloration is common among ancient glass.

An important step in the interpretation of intensively coloured glasses is to separate the 'base glass' from any additives, typically transition and heavy metal oxides. This concept of a base glass, first championed by Robert Brill, enables the identification of likely raw materials and glass compositions before the addition of colorants. The compositional definition of major Late Roman to early Islamic glass groups, such as the blue-green glass prevalent in Romano-British and northern German contexts or the Levantine I glass dominating Near Eastern glass assemblages in the second half of the first millennium AD, relies on the same principle. The authors report these base glass compositions sensibly, based on SEM-EDS data rather than the skewed XRF data from corroded surfaces, as a typical base glass with 68 wt% SiO_2, c 18 wt% Na_2O and 8 wt% CaO. However from this they then calculate the ratio by weight for the raw materials sand, soda and limestone as 80 : 10 : 10. The most likely soda source is sodium carbonate, which contains about half of its weight as carbon dioxide and or structural water, while silica is added as pure silicon dioxide, quartz. Thus, the ratio by weight of soda to silica has to be greater with the raw materials than with the glass, not less as suggested here and the same applies for lime, which is also added as a carbonate. It would have been interesting to hear the authors' opinion on whether lime (as limestone or shells) was a conscious third component in glassmaking recipes and whether they believe that the glass was locally made rather than imported from the East, or which of the known glass groups (if any) their glasses match and what this may tell us about trade connections, recycling and glass supplies in post-Roman central Europe, but there is no further elaboration.

The technical presentation is also less than ideal. Figure 2.18E was already reported missing; Fig. 2.19, a series of histograms, has the X axis missing in half of them, and is insufficiently explained; Table 2.6 has an unexplained and impenetrable date code; the main analytical tables are based on qualitative analyses of corroded beads, while the only table of quantitative data (by SEM-EDS on polished fragments) does not give any colorants, but only the re-normalised base glass composition. There is a Bibliography at the end of the chapter, listing authors and year of publication for the literature referred to in the text, however, for the full bibliographic details the reader still has to consult the collective Bibliography at the end of the book, and so the purpose of this chapter-specific listing is unclear to this reviewer.

Overall, I find it hard to see how this chapter is providing the basics of archaeometric practice to mainstream scientists or archaeologists. What are billed as the main findings are long-established practice and knowledge (use of multiple methods; general identification of metal oxides as colorants); and the text contains factual errors or unusual opinions which are neither explained nor justified.

To finish this review on a more upbeat note I am glad to add that the other chapters seem to be of a consistently high standard, often giving clear

explanations of principles and instructive case studies, presented by leading scholars in their respective fields. An index offers easy access to special topics, and the overall quality of images and production is high. As a hard-cover book it should withstand regular use over long periods of time; most of its content would deserve routine consultation by newcomers to archaeometry, and offers good case studies for use in the classroom.

Vitreous Materials in the Late Bronze Age Aegean: A Window to the East Mediterranean World

Caroline Jackson and Emma Wager.

Paperback 240p, b/w and 8p col ills, tabs

Price: £32.00

(Sheffield Studies in Aegean Archaeology, Oxbow Books 2008)
ISBN-13: 978-1-84217-261-2

P. Manti

Vitreous Material in the Late Bronze Age Aegean collects the papers delivered at the 9th annual round table of the Sheffield Centre for Aegean Archaeology, held in 2005. The aim of this meeting was to bring together colleagues working in archaeology (archaeology, philology, art history and archaeological science) not only to review current thinking on the technology, innovation, organisation and control of production of vitreous materials in the LBA Aegean but also to discuss the impact of such technologies and innovation within wider social structures, and examine their value, meaning and significance. The papers therefore cover a wide range of subjects within the topic. The writing style inevitably varies from author to author, but all papers are relevant, interesting and thought provoking.

The book starts with an exceptionally useful introduction written by the editors Jackson and Wager, which bridges well the 10 chapters of this volume, and sets the themes of discussion to follow in a coherent and intelligent manner. They summarise current knowledge on the production and role of vitreous materials in LBA Aegean and place it within the broader framework of the geographical occurrence and developments. The strong links and interactions with Egypt are recognised and Nicholson (Chapter 1) reviews the archaeological evidence from production sites of glass and faience in Egypt, with focus on industrial evidence from Malkata, Tell el-Amarna, Qantir, Menshiyeh and Lisht. He provides useful discussion on the relationship between faience and glass making industries and their links to royal authority, control and organisation in New Kingdom Egypt.

A technical paper by Rehren and Pusch provides new exciting scientific analyses on two different types of vessels that are associated with the glass industry at Qantir. Their analysis shows the potential of scientific techniques for recognising vessels that were used for the making of glass from its raw materials, hence providing a "powerful diagnostic criterion for the positive identification of glass making".

Chapter 3 reviews evidence of technological developments directly from the LBA Aegean. Panagiotaki, in a rather personal style, provides fascinating details of material evidence mainly from Crete and the mainland, and offers a comprehensive overview of current understanding of vitreous materials industries and their links to palaces and shrines. The chronological correlation chart prepared by J. Phillips is particularly helpful in this chapter.

Nightingale's extensive study focuses on the typology of glass and faience beads from LBA Mycenae and discusses their occurrence in Minoan Crete, Rhodes, and the Levant. He convincingly supports the view that bead exports found in places where Mycenaean pottery is also discovered, may be seen as what Jackson describes as a 'badge of ethnicity'.

Tite and co-workers present materials' analyses in an attempt to identify raw materials used in the production of vitreous materials found in the LBA Aegean. Their analyses support previous archaeological hypothesis that faience was made locally using local raw materials. Although there is evidence for different glass compositions from the Aegean, they suggest that glass was imported but they do not exclude the possibility that some glass may have been produced in Greece itself.

Hughes-Brock compares and contrasts the typology and technology associated with relief beads, glass seals and their moulds. She places their chronological distribution and development within the organisation of the crafts, whilst discussing the significance of those objects to the people who used them.

Bennet uses evidence from the production, use and repair of elite items from various industries such as

Mycenaean beads, bronzes and perfumed oil, and argues for a "trademark" of palatial production. He sees these as witnesses of ideologies in the palatial period and the institutionalisation of power, and convincingly suggests that they were "part of a system of materialising relationships between the palace and members of the non-palatial elite".

Polinger Foster revisits the subject of LBA Aegean faience 30 years after her landmark work. She reviews other notable contributions and focuses discussion on artistic, geopolitical and religious inquiries relating to faience. She sets questions on the role that this material played in the intellectual and aesthetic development of Minoan art and demonstrates that faience was not simply a cheap substitute for lapis lazuli as was thought 30 years ago.

Peters explores social and technological aspects of the use of colour and its symbolism. Although the discussion is not predominantly on glass or faience, it provides useful arguments for a better understanding of the perception and use of colour in the Minoan world. He argues for the symbolic use of different colours in different industries, and he suggests how blue can have a symbolic association with the technology of copper and bronze.

Finally, Sherratt closes the book with a paper focusing on the questions of value. Starting from a valid comment on difficulties related to the visual identification and terminology of vitreous materials, she centres discussion on the significance of economic values, restrictions of technological knowledge and monopolies and links these to social, cultural and ideological values during the LBA. This permits understanding of both the introduction of such materials and technologies and how their social and economic value declined when the palace lost exclusivity of production of objects such as glass seals.

This book certainly captures our current understanding of the production, circulation and use of vitreous materials in the social, economic, and political context of the LBA Aegean. It is an excellent contribution to the archaeology of the LBA Aegean, and will be of interest to a variety of specialists working within this area. This volume is a major contribution to the field.

Excavations at Chester, 25 Bridge Street 2001 Two Thousand Years of Urban Life in Microcosm

D Garner, Diane Backhouse and John Carrott

Chester City Council
(Archaeol Serv Excav Surv Rep 14)
A4, xiv + 437 pp. ISBN 978-1-872587-21-9

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Available from: Grosvenor museum Shop,
27 Grosvenor Street, Chester CH1 2D
E-mail: grosvenormuseum@chester.gov.uk
http://www.chesterarchaeolsoc.org.uk/CHE_25BS01_publ_flyer.pdf

Excavations in the backlands on the east side of Bridge Street have provided a wealth of archaeological evidence for 2000 years of the city's history. Combined with documentary references, this has enabled us to build up a detailed picture of the evolution of Chester's urban form and the trades, lifestyle and status of the people who lived in the area. The groups of Roman and early post-medieval ceramics, clay pipes, vessel glass, well preserved animal bones and plant remains are the largest to be published from the city and, in some cases, from the north-west. Finds are catalogued and often drawn. The glass reports include Roman Glass by Hilary Cool (pages 287-288), Medieval and Post-Medieval glass by Hugh Willmott (288- 301) and Glass Frit Beads and Ornaments by Hilary Cool (302-303).

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1st December 2009
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