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One question we are often asked is, What is the relationship between AHG and AIHV? With apologies to those of you who already know, the following provides the answer, and summarises the history of the two bodies.

The Association for the History of Glass [AHG] is the British National Committee of the International Association for the History of Glass/Association Internationale pour l'Histoire du Verre [AIHV].

AIHV was established in Belgium in 1957, and its objective is to promote the knowledge of the history of glass in its widest sense. It has a board of management composed of elected officers and members, an executive committee composed of elected members and representatives of national committees, and the general assembly of ordinary members. The membership of around 400 is drawn from more than 30 countries worldwide. The chief activities of AIHV are to hold a major congress on the history of glass at approximately 3-year intervals at the invitation of one of the national committees, and then to publish the proceedings in the Annales.

The British national committee invited the 8th Congress to London and Liverpool in 1979, and became a company limited by guarantee and an educational charity, with elected officers and a board of directors, in order to organise the event effectively. The company was called the Association for the History of Glass Ltd [AHG]. Since 1980, AHG has continued to be the British national committee, but as the board represents a wide range of interests in the history of glass it has also been possible to organise study-days, meetings and conferences in London, Edinburgh and regional centres in Britain, produce occasional monographs, and publish a newsletter, *Glass News*. In 2000 changes were made to the articles of association of AHG to permit wider membership, and subscribers to *Glass News* have been invited to become members, propose themselves or others for election to the board, and play a fuller part in the activities of AHG. At the present time we have around 110 members, mostly from Britain but also abroad. If you would like to become a member, or convert your subscription to *Glass News* into membership of AHG, please fill in the form on the back page.

The current AHG Board comprises:
President: Jennifer Price
Hon Secretary: Justine Bayley*
Hon Treasurer: David Crossley
Ordinary members: Patricia Baker*, John Clark, Hilary Cool, Ian Freestone*, Charles Hajdamach*, Suzanne Higgott, Reino Liefkes, David Martlew, Juanita Navarro*, Martine Newby, Ray Notley, Julia Poole, Rachel Russell, John Shepherd and Veronica Tatton-Brown.

Those members elected at the AGM in November 2002 are marked with an asterisk.

IN THIS ISSUE

AIHV 2003

The 16th Congress of the Association Internationale pour l'Histoire du Verre will take place in London from Sunday September 7th 2003 to Saturday September 13th 2003 at Imperial College in London. There will be a full programme of lectures, two poster sessions, opportunities to visit collections (including material on display in galleries and from reserve collections) and a full social programme including evening receptions. Over 170 delegates have already booked so if you have not done so, hurry to make sure there is still a place available. It is possible to register for single days or for the whole week. Details and registration forms are available on the AHG website (www.historyofglass.org.uk) or from the Congress organiser, Martine Newby, 17 Steeles Road, London NW3 4SH; email: martine.newby@virgin.net

Congress programme
Sunday 7th - Evening opportunity to register and socialise.
Monday 8th - All day lecture sessions.
Tuesday 9th - Morning lecture sessions, afternoon poster session.
Wednesday 10th - All day visit to London collections.
Thursday 11th - Morning lecture sessions, afternoon poster session.
Friday 12th - All day lecture sessions.
Saturday 13th - All day visit to collections outside of London.

Post-Congress Tour
A 5-day tour has been organised visiting collections in the south-west of England starting on Sunday 14th September. The packed proposed itinerary includes the workshops of Mark Taylor and David Hill, makers of reproduction 1st-century mould-blown glass, Mompesson House, the House of Marbles, Dartington Crystal factory, the Roman Baths and Assembly Rooms at Bath, Bristol City Museum and Art Gallery, Caerleon Roman fortress, Red House Glass Cone, Birmingham City Museum and Art Gallery and Waddesdon Manor. Details are available on the website or from Martine Newby on 020 75866702. *The tour is also open to AHG members not attending the Congress but let Martine know before the end of July if you would like to go.*

The Annales of the 15th AIHV Congress have just been published. Copies are available from Hilary Cool, 16 Lady Bay Road, West Bridgford, Nottingham NG2 5BJ. E-mail: Hilary.Cool@ btinternet.com. The 268-page volume contains 55 papers given at the Congress in New York and Corning in October 2001 considering topics from the 15th century BC to the present day around the world. It costs £24 (including postage in the UK) if paid for by sterling cheque.

Exhibition and study days at the Wallace Collection

A stunning exhibition, curated by the Glass Circle, is being mounted at the Wallace Collection from 21st August to 26th October 2003. 'From Palace to Parlour: A Celebration of 19th-Century British Glass' includes sumptuous Regency cut glass tableware made for the Prince of Wales and even a section about glass associated with Richard Wallace. The multitude of new manufacturing and decorative techniques pioneered in Stourbridge, London and the North East are represented, from the rediscovery of cameo engraving to the introduction of mould-pressed glass for the masses. A colour catalogue will accompany the exhibition and introductory talks will be given on the 28th August and the 4th and 25th September (all Thursdays) at 1p.m. Further details are available from The Wallace Collection, Hertford House, Manchester Square, London, W1U 3BN, phone +44(0)20 7563 9500 or on the website www.wallacecollection.org Three related study days are also being held, which can be booked via the website or by phoning 020 7563 9551. Prices for the days in October will be announced nearer the time.

Diamonds, drills and wheels!
Tuesday 30th September. £45 incl. morning coffee and all materials. Admire the skills of 19th-century British glassmakers and engravers on a tour of 'From Palace to Parlour' with exhibition curator Martine Newby. Discover the contemporary glass engraving scene and engrave your own glass blank in Victorian style with eminent glass engraver Katharine Coleman.

From Palace to Parlour: Aspects of 19th-century British Glass.
Saturday 18th October. A fascinating and wide-ranging study day, arranged in conjunction with the Glass Circle, with a distinguished panel of speakers.

From celebration to demonstration – glass then and now!
Tuesday 21st October. Tours of the permanent glass collection and special exhibition at the Wallace Collection & a visit to Peter Layton's studio, London Glassblowing, for a glassblowing demonstration and exhibition combining Haiku and contemporary glass.

AHG meeting

The replication of early glass making and glass working techniques

The autumn meeting of the Association for the History of Glass will include the AGM of the company, which has to elect a new President (Jennifer Price is not eligible for re-election) as well as a Treasurer and 5 oridinary board members. It is hoped to hold this meeting in late November/early December at the Wallace Collection. A programme is being compiled by Ian Freestone and full details will follow in the next issue of Glass News. Provisional speakers include Paul Nicholson (Cardiff) on Egyptian Glass making, Caroline Jackson (Sheffield) on Medieval glass making, Pamela Vandiver (Smithsonian Institution, Washington) on selection of plant ashes and William Gudenrath (Corning Museum, New York) on glass working. Offers of contributions should be sent to ifreestone@thebritishmuseum.ac.uk

18th meeting of AFAV

The 18th meeting of l'Association Française d'Archéologie du Verre will take place on the 14th and 15th November in Berck-sur-Mer. The meeting will feature 10-20 minute presentations on glass research and discoveries as well as visits to museums at Berck and Amiens. The cost is Euro 60 before the end of June and details are available from George Dilly, CRADC, BP 6, 62601 Berck-Sur-Mer cedex 01. Phone: 03 21 84 07 80, e-mail: musee@berck-sur-mer.com

Workshop and conference:

Inspirational awakening

The Glass Society of Ireland and Contemporary Makers are holding a conference and workshops on historical and contemporary glass topics. These will be held in Waterford, between the 19th and 21st of September. More information is available from the website: www.glassartireland.com, or by e-mail: info@glassartireland.com, or by phone: 00 353 (0)51 845 488.

Meeting report

Glass in the Islamic world: new discoveries, new ideas

The meeting, held at the Wallace Collection, London, March 5th, 2003, was introduced by Patricia Baker, who drew attention to the "cinderella status" of glass in the field of Islamic Art. She also noted the existence of around a dozen significant assemblages of excavated glass from the period that remain to be written up. The first paper was presented by Michael Rogers (SOAS) who introduced the audience to a group of glass discs from Central Asia. In deeply coloured glass with moulded figurative decoration, they are found associated with stucco work and appear to have been used in dados.

St John Simpson (British Museum) then provided an enlightening overview of Sasanian glass. Important assemblages are known from 19th century excavations at Nineveh, Kish and Babylon, the Italian excavations at Choche and recent work at Kush and Merv. Large amounts of Sasanian glass are found on urban sites; typically mould blown, naturally coloured and commonly bubbly. Deliberately coloured glass is rare and decoration was commonly by pinching (cf. "nipped diamond waies") or by partially inflating a gather in a mould, withdrawing it and further inflating. From the mid-4th century, cold-working was used to decorate more expensive types of vessels, notably the classic faceted hemispherical bowls. High quality Sasanian glass emulated semi-precious stones and was valued for its reflective properties.

Daniel Keller (Basle) discussed glass finds from the monastic site Jabal Harun, near Petra in Jordan excavated by Helsinki University. He described the marked differences in the quality of the glass found before and after the mid-7th century, and related these to the Sasanian invasion of the early 7th century, which reduced the volume of East-West trade in the region and ended the importance of Petra as a trading city. In the early Islamic period, North-South trade routes became more important. Jabal Harun remained a holy place, and some high quality glass vessels were brought there by pilgrims.

Sally Worrall (UCL) described the glass assemblage from Kush, Ras al Khaimah in the United Arab Emirates, excavated by Derek Kennet. The substantial glass assemblage falls into three chronological groups, imperial Roman (including fragments of two

mosaic vessels), Sasanian (mostly faceted hemispherical bowls) and Islamic, covering the 7/8-13th centuries but mostly 9/10th. The Islamic glass has been categorised as: open bowls/drinking vessels, flasks/large closed vessels, small closed vessels and a distinctive group of plain shallow bowls with a horizontal tooled groove beneath the rim. The range of forms seems to relate to Iran and Mesopotamia.

Margaret O'Hea (Adelaide) discussed the glass from Pella in Jordan. She noted that the glass typology showed continuity from the Byzantine period into the Umayyed. An earthquake that destroyed Pella in the middle of the 8th century has allowed a clear separation of the late Umayyed glass and the forms of the early Abassid dynasty which, with its centre in Damascus, led to influences from the Persian tradition. The finds on the site included lustre-painted and gilded fragments of Umayyed date in near-surface pits. Margaret considers that the lustre-painted wares were "elite" in that they were more expensive in terms of greater labour input than the undecorated vessels.

Sarah Jennings (English Heritage) reported her discovery of staggeringly large tank furnaces from Tyre, Lebanon thought to date to the 10th-12th centuries. Here vast quantities of glass were melted from raw materials in furnaces with capacities of up to 37 tonnes. The furnaces appear to have incorporated pre-existing structures when built. Rectangular in size, they had a double firing chamber at one end and a loading platform at the other. Among the statistics presented, we learned that the largest furnaces would have produced the equivalent of a minimum of 500 000 Coke bottles.

Ian Freestone (British Museum) discussed the composition of glass produced in tank furnaces at Bet Eli'ezer, near Hadera, Israel. Although apparently working in the Roman tradition, the glass strongly resembles vessel glass from Ramla, the early Islamic administrative capital of Palestine, which was founded early in the 8th century. Thus it seems likely that the furnaces are Umayyed. A comparison between the technologies used at Bet Eli'ezer and Tyre, a few centuries later showed that although superficially similar, the approach used differed in many respects. Judith Kolbas (Independent scholar) discussed the colours of the glass coin weights of Egypt, which can be precisely dated from the 8th to 15th centuries by the names of officials that they bear. Some 10 000 such weights are to be found in public collections world-wide. Remarkably abrupt changes in colour occur over time, reflecting changes in taste.

Rachel Ward (independent scholar) discussed the dating of the gilded and enamelled glass of the 13-14th centuries. Her chronology differs by up to a century from that assumed by most other workers. Using the small number of dated mosque lamps as milestones, she proposed a technical development of gilded and enamelled glass, incorporating a number of innovations, such as the enamelling of one colour over another, underdrawing in fluid gold and the use of fluid enamelled grounds behind the glass. The meeting was closed by Jenny Price, AHG Chair, who thanked Patricia Baker for convening a successful meeting and Suzanne Higgott and the Wallace Collection for providing an excellent venue.

Ian Freestone

Meeting report

Symposium on the History and Heritage of Glass

On Friday 4th April 2003 a one-day symposium on the History and Heritage of Glass was held by the Society of Glass Technology, in collaboration with the Association for the History of Glass and the British Society of Master Glass Painters. SGT President Professor Adrian Wright welcomed about 100 delegates. The first session, on the theme of archaeology, began with Christopher Welch (English Heritage) on the *Archaeology of Glassmaking in Staffordshire*. Over three years, eighteen glassmaking sites in Bagot's Park, near Abbots Bromley, Staffordshire, had been studied. Archaeomagnetic techniques were used to date the sites to between 1300 and 1615. Although the sites were largely destroyed in the 1960's, when the area was converted to arable farming, the distribution of glassmaking debris discovered during fieldwalking in some of the areas provided considerable information about the workings and the development of glassmaking technology in this region through time.

David Martlew then presented a paper about *Victorian Glassmaking in St Helens*, where industrial archaeology revealed the surprisingly complete remains of an early Siemens continuous regenerative glass furnace. Only the substructure remained, but this revealed much about what was perhaps the first conscious attempt to create a differentiated flat glass manufactory. Very few records survive from this period, but the application of modern furnace design techniques to the interpretation of what had been

found showed the site's importance to the evolution of glassmaking technology.

Peter Boland (Dudley MBC) completed the session with *The Archaeology of Stourbridge Glass.* Dudley's Historic Environment Team started to research the 'lost' glassmaking sites of the Borough's glass industry in the 1980's in response to a national initiative by English Heritage. The concept that the story of glassmaking could be studied by reference to its physical remnants, preserved below ground, as well as by the study of its people and products was quite a new one. The team identified over 50 previously unrecognised sites where archaeological remains may survive and this paper presented the results of archaeological excavations recently undertaken on a number of these. A wealth of information regarding glassmaking, its techniques and evolving technology does indeed survive, offering major potential for future study.

The second session began with Martin Harrison (author of a definitive text on Victorian stained glass) who discussed Pugin's emergence as a propagandist for the revival of the 'true principles' of stained glass and how, through his merging of morality, religion and aesthetics, these became identified with 14th-century Gothic. By contrast, Charles Winston advocated the involvement of academically trained artists. These influential figures stimulated the glass technology of their day; Winston devoted considerable energy to the analysis of medieval glass, while Pugin frequently expressed his dissatisfaction with the commercial glass at his disposal.

Peter Cormack (William Morris Gallery) considered *Style and Materials in Arts & Crafts Stained Glass.* A pre-occupation of the Arts & Crafts Movement was the nature and 'proper' use of materials in applied art. Renewed interest in the raw material of stained glass arose especially in the 1880s, pioneered by Burne-Jones and Morris. Innovations in glass-manufacture led to enhanced intensity and variation of colour and more emphatic texture. E. S. Prior's novel 'Early English' slab glass was exploited by designer-craftworkers such as Christopher Whall who in the latter part of the 19th century exerted a profound influence on the craft's teaching, practice and aesthetics.

Neil Moat (DAC advisor, Durham and Newcastle) concluded this session with his deliciously witty paper on *Arts & Crafts Stained Glass – of Definitions, Misunderstandings and Boojums.* He grasped that perennial nettle, the question of how we define 'Arts & Crafts Stained Glass'. Definitions are important and necessary, but in this debate definitions are not the precise delineations beloved by the world of science, but those more fluid concepts commonly accepted in the arts. William Morris and Edward Burne-Jones were founding fathers of the Arts & Crafts Movement, but should their stained glass be truly referred to as "Arts & Crafts"? Much as Lewis Carroll ventured in 'The Hunting of the Snark', the author of this paper enjoined his audience to risk the hunt for that most illusive of creatures, the true "Arts & Crafts" spirit in stained glass.

The final session was on conservation. Victoria Oakley (Victoria and Albert Museum) was able to speak with authority about *Moisture Attack on Historical Glass Objects*. Glass deterioration in museum collections is a widespread phenomenon and a source of concern for those involved in its care. It is known that the rate of deterioration can potentially be slowed down by preventive and interventive conservation. For a number of years conservators at the Victoria and Albert Museum have been collaborating with scientists at Imperial College investigating the problem. The current phase of the research, funded by the Leverhulme Trust, is emphasising the value and importance of establishing common ground and an active dialogue between curators, conservators, scientists and craftsmen.

Russell Hand (Sheffield University) brought a different perspective to the problem of *Water Attack on Glass: from Archaeology to Vitrified Radioactive Waste*. We are used to thinking of glass as a durable material, and vitrification is the preferred solution for immobilising high level radioactive waste, which are required to remain intact for thousands of years into the future. However, although many glasses are undoubtedly durable, they are not immune from chemical attack, including attack by water. Understanding the mechanisms by which water attacks different glasses is of crucial importance, and allows us to predict the performance of vitrified waste-forms far into the future as well as yielding insight into the decay of historical glass artefacts.

Ending on a practical note Joanne Howdle spoke of the issues surrounding the *Conservation and Digitisation of the Vickers Photographic Archive*. This archive consists of approximately 10,000 glass plate negatives, film negatives, positive glass slides and cine films providing detailed visual evidence of a wide cross-section of work undertaken by the Barrow Shipyard between the 1870's and 1960's. Due to its size and scope, this collection is considered to be of

international importance. Discovered as a large collection of waterlogged cardboard boxes, it was acquired by the Museum and a structured program of rescue work was initiated in 2000. To date over 8000 glass and film negatives have been cleaned, scanned on to a computer database and repacked in acid free materials. The paper described the challenges and triumphs of this process, which quite literally was focused on the interface of glass science and art.

Overall the day was a great success and a similar event is planned for April of next year.

David Martlew

Excavations and science at the site of Silkstone Glasshouse

In 2002 English Heritage carried out a limited archaeological excavation at the post-medieval glass house site at Silkstone, South Yorkshire. Documentary evidence shows that the Pilmey family produced glass in Silkstone during the late 17th and early 18th centuries (Ashurst 1992). The Pilmeys arrived in Silkstone in the 1650's after the glasshouse at Haughton Green, Manchester ceased production (Vose 1994). When Abigail Pilmey died in 1698, her will mentioned the presence of two glasshouses: one for 'greenglass' and one for lead glass. The will also listed a variety of raw materials used in the manufacture of glass, e.g. rape ash and lead oxide. Abigail's descendants continued producing glass at Silkstone until the mid-18th century. Importantly, glass manufacture starts at Silkstone before the invention of colourless lead glass (Ravenscroft 1676) but continues for at least half a century after.

The initial aim of the archaeological excavation was to determine if one of the standing buildings at the site was associated with the historically attested industry. The excavation of a trial trench demonstrated the survival of over 0.5m of stratigraphy associated with 17th century glass working but no sign of a surviving furnace. The excavation showed that there were at least 5 phases of activity and direct evidence for glass working was obtained from phases 2 and 4. The current building clearly post-dated the glass working layers.

A wide range of glass and glass working debris (slag, crucibles, etc) were recovered during the excavation. In addition soil samples were taken and these have provided fragments of glass that are too small to have been recovered during normal excavation. The most impressive examples are the threads of glass (see picture) that form when a glass worker gathers molten glass from the crucible (Ashurst 1970: 173). Samples of glass and glass working debris have been selected, with careful regard for the archaeological stratigraphy, for chemical analysis (being undertaken by English Heritage's Centre for Archaeology). The analytical results to date for the glass recovered from phases 2 and 4 are summarised in the table opposite.

Samples from phase 2 have provided evidence for the manufacture of two different types of alkali glass. The first type of glass (type I) is rich in potash and lime but does not easily fall into either the medieval forest glass or post-medieval high-lime low-alkali glass

		Threads	Glass Fragments	Total
Phase 2	Alkali	41	56	97
	Lead	1	2	3
	Total	42	58	100
Phase 4	Alkali	38	70	108
	Lead	6	29	35
	Total	44	99	143

categories. The second type (type II) contains equal proportions of soda and potash (as well as some lime) and also does not fall easily into existing glass categories. Type II glass contains less iron oxide and is generally less coloured than type I. It is possible that type I glass was used to produce bottles and windows while type II glass was used for tableware. Three samples from phase 2 are lead glasses (containing lead oxide, potash and silica). They all have the same chemical composition and one of the samples is a glass thread. If it is assumed that colourless lead glass was first produced by Ravenscroft in 1676, then phase 2 must date to shortly after this. Samples from phase 4 provided evidence for the manufacture of an alkali glass and a lead glass. The alkali glass has a high-lime low-alkali composition typical of post-medieval glass. The lead glass is made predominantly from lead oxide, potash and silica.

The results of this research will be published in full in a Centre for Archaeology report and presented at AIHV this September and a summary will be published in *Post Medieval Archaeology* (2003/2004).

Dr David Dungworth and Tom Cromwell
English Heritage Centre for Archaeology,
Portsmouth.

Speculating on spectacles: aspects of innovation

Researchers in the USA, C. Letocha, M.D and D. L. Simms, Ph.D, are investigating innovations in spectacles before the end of the 18th century. They have asked for help with the following queries.

1. Ibn-al-Haitham described how to make plano-convex lenses by pouring glass into moulds. Presumably one mould was placed on top of the other whilst the glass was sufficiently molten for the two lenses to form one. As Leonardo made his magnifying glasses by pouring glass into a mould, presumably the basic method was still in use till at least 1520. Was this how the convex lenses were made for spectacles?

2. Were concave lenses made in the same way and was it more difficult to make concave lenses than convex ones?

3. How long did it take to make these lenses, given the large output in Venice and Florence by the mid-15th century?

4. By the third quarter of the 16th century, Della Porta in *Naturalis Magia*, and William Bourne describe an entirely different method. A pole was fixed to the floor with a mushroom-like object fixed to the top having the curvature required for the lens. The glass was fixed to the top and a second pole with the opposite curvature placed on top. This was then moved across and round the glass with an abrasive in between. When the glass was in the shape required, the abrasive was removed and a polishing agent used in its place. We have been unable to discover the inventor. It is unlikely to be Della Porta since he made no claim. Does anyone know who that might have been? The technique must have spread rapidly since it was described in Italy (a best-seller) and known in England (London at any rate.) Sirtirus also described the method somewhat later, though he did not invent it. Despite its rapid spread, there is little evidence that the method was accurate. Hooke was scathing about the results and he and Halley welcomed the modification made John Marshall in 1693. That method spread rapidly to the principal London Opticians.

5. The invention of side-pieces is usually ascribed to Edward Scarlett on the basis of its being shown on one of his trade cards of about 1730. But was he the inventor?

6. Who introduced the screws to give flexibility to the side-pieces? They were in use by the time Jane Austen wrote Emma. Frank Churchill appears to take an interminable time to mend Mrs Bates' spectacles!

Any help would be most gracefully received. Please contact Charles Letocha at 444 Rathton Road, York PA 17403, USA. Phone: 717-846-0428. FAX: 717-854-9728. e-mail: cm.letocha@gte.net

British Glass Bibliography 2002-2003

This bibliography covers work on glass found or made in Britain and more general books on glass that have been published within the UK. My thanks to Euan Campbell and Jennifer Price for drawing my attention to items I'd missed, and especially to Paddy Baker for providing the references to works on later glass. All contributions to the next bibliography gratefully received at hilary.cool@btinternet.com The British Glass Bibliography 2000-2002 was included in Issue 12 of Glass News.

General

As the secretariat of the AIHV is now based in Britain, the latest *Annales* has been published here but space limitations preclude the listing of all 55 articles here. Instead please visit the web site www.aihv.org or www.historyofglass.org.uk for a contents list, or alternatively contact me (H. Cool) and I'll be happy to send you one. I have noted articles on British glass topics below but there is much of interest in the whole volume.

Scientific and Conservation

Two articles look at early Egyptian glasses. Shortland (2002) looks at the origins of the colorants used, and Tite and Shortland (2003) review work on blue vitreous materials. The latter topic appears to be attracting much attention currently and there will be a session devoted to it at the London congress in September. There is further work on establishing the origins of the sands used in various Byzantine glasses found in Israel (Freestone *et al* 2003) and a crucible provides information about the production of a pigment used in Merovingian glass bead production (Heck *et al* 2003). The proposal that the antimony used to produce yellow glass in antiquity was a by-

product of silver refining (Mass *et al* 2002) is the subject of some debate in the latest *Archaeometry* (volume 45, p.185-98). There are also two methodological papers Falcone *et al* (2002) explores the sample sizes needed for X-ray fluorescence and Azzoni *et al (*2002) describe the use of electron paramagnetic resonance to investigate colour. (See also Bayley 2003; Jackson *et al* 2003, Smedley *et al* 2003 discussed below). Anyone with an interest in, or responsibility for, stained glass will find a new handbook on its care invaluable (Brown and Strobl 2002).

Roman and early Medieval

Two articles have appeared reviewing production and trade. Despite appearing in a regional synthesis, Price (2002) is a wide-ranging paper looking far beyond the Roman north. Cool (2003) concentrates more on the social background that may have influence people's choices. On a similar theme of production and trade, Jackson *et al* (2003) discuss the difficulties of using chemical analysis to explore provenance for a group of 2nd/ 3rd century drinking cups. There has been a large crop of reports on glass found at a variety of sites. Be warned, however, that due to the delays associated with archaeological publishing, some have been waiting to appear for a decade or more. For the Roman period glass from a legionary fortress (Cool and Price 2002a), several small towns (Allen 2001a, 2001b; Cool *et al* 2002; Monk 2001) and a late Roman cemetery (Cool and Price 2002b) may be noted. The publication of the glass from the fort at Cramond (Price 2003) is especially useful because of the tight late Antonine / Severan dating.

Two reports on early medieval glass from Scottish sites may also be noted (Campbell 2000a, Campbell 2000b). There are two articles on beads. Hoffman (2003) provides an overview of the beads and bangles from two sites on the northern frontier, and Brugmann (2003) draws attention to some splendidly gaudy late 5th century beads. Bayley (2003) looks at raw materials for enamelling. The important 2nd century cullet dump from London has been discussed in Spanish by Perez-Sala I Rodes (2001).

Medieval and Post Medieval

Two works deal with the production of glass. A new, unabridged edition of Antonio Neri's classic work *The Art of Glass* has been published (Cable 2001). This was first printed in 1612 and translated into English in 1662. It details the ingredients for glass-making and pigments, with some descriptions by the original translator, Christopher Merrett, of then contemporary furnace types. This edition includes a useful essay by WES Turner explaining the relevance of the book, and its importance for English glass-making in the 17th century. Smedley *et al* (2003) provide a preliminary report on their experimental work to identify the raw materials used for glass making in the Midlands. There is a small report on the excavated medieval and post medieval glass from Pontefract Castle (Ratkai 2002).

Modern

English chandeliers of the 17th to early 19th century are the subject of a monograph (Mortimer 2000) and a small guide to decanters has also appeared (Leigh 2002). Two books published in the USA will be of interest to collectors of English glass. Gulliver (2002) includes 30 pages of sketch illustrations of registered designs 1850-1914 by seven major British producers and Skelcher (2002) has produced a detailed study of vaseline *and* uranium glass but, mindful of the American market, the publishers omitted the term 'uranium' from the title. This includes author's research into radioactivity, density and UV fluorescence of these glasses, products of 17 English glasshouses and some American factories. Finally a small introduction to modern studio glass (McLaren 2002), a practical handbook on calligraphy on glass (Mocatta 2001) and a guide to stained glass in Worcestershire (Albutt 2002) may be noted.

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Hilary Cool

The Bear Garden Glasshouse, Southwark

The recent publication of an excavation report (Mackinder et al, 2000) reawakened my interest in the early history of this glasshouse. It appears to be unique, in that it was associated at different times with all common forms of glass making: mirror, vessel, bottle, window (crown) and plate glass. The following are a few notes on my researches.

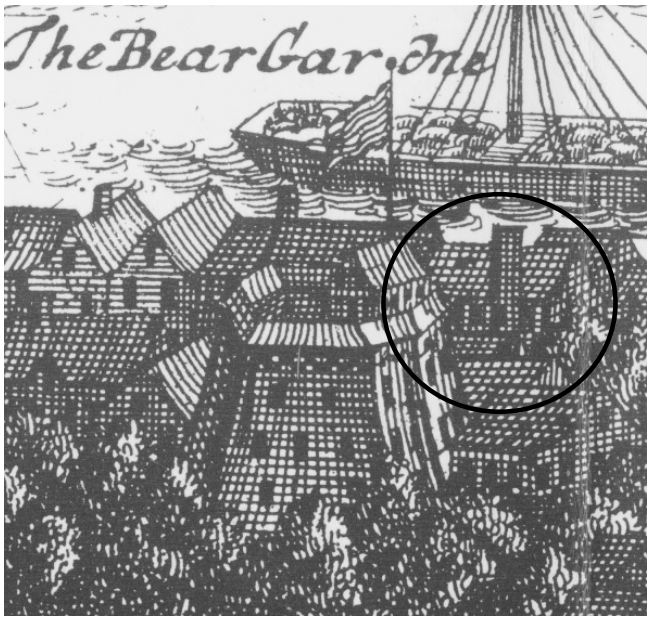
The Bear Garden glasshouse stood in Bear Alley on the Bankside (Buckley, 1915). John Bowles and William Lillington probably owned the Bear Garden glasshouse in 1678. Then they were described as *'Masters of another glasshouse … for making white and green glasses in Southwark'*; white then almost certainly meant clear glasses. William Lillington had taken a lease from John Squibb on 1 August 1671 on property at the Bear Garden, then said to include a pothouse and a glasshouse. It is thus possible that it was one of the *'two new furnaces opened for very fine large crystal'* referred to by Alberti, the Venetian secretary in London, in September 1673 (Charleston, 1984). By 1684 it was probably owned by Bowles alone, when an agreement described him as: "*Master of several glasshouses at St Mary Overye's and the Bear Garden in Southwark for making Green glass"* (Powell, 1922). He is said to have mainly produced bottles, but by 4 June 1689, "*There is now made at the Bear-Garden Glass-house on the Bank-side crown window glass much exceeding French glass in all its qualifications*". Bowles, who came from a rich Lincolnshire family, sold the glass works and transferred to another site in 1691. In 1695 he was one of the commissioners for managing the duty on glass.

The following extract from Matiskainen and Haggren (1995) most likely concerns the Bear Garden glasshouse. Gustav Jung had received a Swedish state scholarship for a long study trip in Europe during which he visited 'over a hundred glasshouses' and made notes on them: Gustav Jung's notebook from his study trip is in the collections of the Uppsala University Library. Of special interest are his drawings of two different furnace types. The first clearly shows a winged furnace that became common in the glass industry in England and Western Europe around the beginning of the century…. The side view drawn by Jung shows three openings in the middle part, suggesting that the furnace was for six crucibles… The furnace shown in the illustration is probably from England, where Jung travelled in 1667-1668. Notes survive concerning three sites, which Jung called the "Sudriks" mirror-glass works, the "Tur glasshouses in "Lunh" (London) and the Commoncard mirror-glass works. Mentioned as the owners of "Sudriks" were 'Gebril Harper, Thomas Uettin, and Welem Lilieston"; the masters included "Bastian Miato, Johannes Babtist and Robert Salsberg". According to Jung's diary, he also saw winged furnaces in Brittany, but he only made detailed notes of them in England. He even recorded the melting mixtures and instructions for building the furnace at "Sudriks" (UUE D1616).

'Sud' means south, so 'Sudriks' probably means Southwark and Welem Lilieston is almost certainly William Lillington. The last line suggest that Jung witnessed the Bear Garden glass furnace being built, or rebuilt, and also thought the mixtures used were noteworthy, probably because they were a new 'crystal' type formulation. There is no record of the mirror works being a success, so it looks like vessel glass may have been made there when Lillington took over the lease in 1671. Crystal glasses were then probably melted in wood-fired furnaces and it is possible that Bear Garden glasshouse was originally wood fired, since there are references to woodmongers and timber merchants in Western Southwark from 1664 (Higham, 1955). However, it would almost certainly have been coal fired when used for 'green & window glass', which ties in with references to fines for the nuisance caused by smoke from 1689 (Watts, 1990).

In the 1670s, drinking glasses often had a small glass disc attached to the stem, imprinted with a device on them, similar to the way that wax seals were used for documents. Fragments of a drinking glass with a bear's head or a boar's head seal have been excavated at Tunsgate, Guildford (Fryer and Selley, 1991). It has been suggested that this seal is linked to the Bear Garden glasshouse. This would seem reasonable, since it was probably the closest one to Guildford at that time. On stylistic grounds, this sealed glass dates from c1675 and is made from a high soda, mixed alkali, non-lead 'crystal' metal. This is probably the type of glass the Bear Garden glasshouse was making, since if it had been using lead in the glass, it would probably have been referred to as making 'flint' glass rather than 'white' glass in 1678. The fragments of vessel glass found on the site and illustrated in Mackinder et al (2000) appear to date from before about 1680.

Below is an illustration from "A Prospect and Street Plan of London by Johann Homann". The prospect is clearly a composite, produced at a number of different times. What is interesting about this segment of it is that it lines up with archaeological evidence reported in reference 1. The ringed building is the one associated with archaeological glass-making finds and the smaller building closer to the Thames is designated building 2 (phase 2). The Bear Garden Glasshouse was probably made up of parts, or all, of buildings 13, 14, 27, 28 (phases 1 & 2) in reference 1. In particular the description (p.41) of 'a small vaulted brick cellar, possibly for the storage of coal' *under the* eastern wall of the building suggests an air duct to feed a glass furnace.



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A brief history of M'dina & some other contemporaneous Maltese art glass firms

This article is based on information received from Mrs Elizabeth Harris, Director of Isle of Wight Glass. Mrs Harris recalls:

"My husband Michael had been a tutor at the Royal College of Art, teaching industrial glass, for six years when he decided to start up in business on his own. This all happened during the time of the studio glass movement. The company M'dina Glass Limited was founded in Malta in 1968 and run by Michael Harris and Eric Dobson, his partner until 1971/2 when Michael sold his shares. Today it is still operating and is a thriving tourist attraction. We chose Malta for various reasons. The Maltese government was keen to encourage small industries on the island. They offered various incentives; premises, help with establishing a foothold and last but not least a ten year tax holiday. The reality however was quite different.

In 1969 Michael Harris arrived in Malta with his family and tonnes of equipment with the blessing of the then Nationalist Government of Malta. 13th century St. Thomas's Tower, in the south of the island, had also been promised as premises; hence the logo also used for labels later on. The tower being of historical value, they decided it wasn't going to be a glass studio but did not say so until six months later. At this time the commissioner of land said there were no other suitable premises available for us. After considerable time spent searching for alternatives, a disused cinema was found, a long lease was paid for and everything made ready, furnaces built etc. Only the fuel tanks needed to be installed and a permit required to supply fuel. A petition had to be raised with local people - all agreed but one, so no fuel tanks. Rather than wait any longer to begin manufacturing, as money was running out by now, we went on to consider the airfield at Ta Qali. The Air Ministry had only just handed it back to the Maltese government and it was somewhat derelict. Ta Qali, in the fields below M'dina (the capital city of Malta during the Medieval period) proved ideal with plenty of space and no inhabitants to worry about. So the decision was made to move all the equipment to the airfield. (The air base was famous as the Second World War home of the three aeroplanes 'Faith', 'Hope' and 'Charity', which defended the island during the threat of the German invasion).

At the time that the furnace was first fired, weeks later, we heard that the fuel permit for the previous site had been turned down – so moving had been a good decision and third time lucky. Lucky or not, money and enthusiasm were getting very thin. Samples had been made in the UK ready for a training programme. The sun shone, as it mostly does in Malta, and we soldiered on. We employed several young boys to trains, some from the fields; Michael was determined to achieve what he set out to do and the outcome was instant success. The boys with no skills became pioneers of Malta's glass industry with many splinter groups. The colours of our glass were indicative of the Maltese countryside and of the sea and sky of the Mediterranean. My husband and I designed the colours and shapes. We did not have any trade brochures during my time. Most of the glass we made included a label depicting St Thomas's Tower and the Maltese Cross. As the business grew, more skill was needed so we employed two Italians – Vincente Boffo and his son Etore Boffo whom we had poached from Whitefriars (a glassworks in Middlesex, closed in 1980 ending 300 years of glassmaking).

When Dom Mintoff became Labour Prime Minister in 1971 he began a policy to expel certain foreign nationals and to negotiate the closure and removal of British and other foreign military bases. The Maltese government, in conjunction with various countries, developed in many directions, one being with the Chinese to build a glass factory (which no longer exists) because they saw how successful M'dina was. Paperweights and other glass objects of dubious quality for the tourist trade were manufactured. The situation was very uncertain as to how much longer we would be able to remain in Malta. Many ex-patriots had already been expelled. In 1971, Michael and I finally decided to sell the business and return to the UK. One of those who purchased shares and became a new owner was a former employee, Mr Joe Said. Mr Boffo remained working at M'dina until Mr Mintoff came to power, when he was given an ultimatum – either work under the Chinese or leave the island. He decided to stay but unfortunately, and all to soon, his son Etore developed leukaemia and died a year later. His father was heartbroken. 1971 saw us settled on the Isle of Wight on our return to Britain. The island has many similarities to Malta – sea and sky etc. So began Isle of Wight Glass founded in 1972 – now 25 years old.

Other Maltese glass companies include:
Malta Decorative Glass Co. The glass factory only proved to be a show place. Mr Boffo was seconded to work there and train boys or leave Malta and he worked for the government for as long as it survived. It was the end of his glass-making days – very sad.
Mafta Glass. A second unit of glass making on Ta Qali run by a brother of Joe Said, the new owner of M'dina.
Phoenicia Glass. Owned and run by ex-M'dina workers since Joe Said took over M'dina. This unit is at present on Manoel Island in Sliema, Malta's leading resort.
Gozo Glass. In 1990 Michael and I started Gozo Glass as a retirement interest for Michael, who by this time was not enjoying very good health. Gozo, a sister island to Malta, needed some attractions for the, by now, large tourist trade. Sadly Michael died in 1994 and my sons and I have put all our resources into Isle of Wight glass since then. Gozo glass is owned and run by Mr R Brook, who was Michael's partner during its development. Gozo Glass is probably the most progressive of Malta's glass industries and continues to prosper."

Acknowledgements
My sincere thanks to the following: Mrs Elizabeth Harris, Director of Isle of Wight Glass and a "busy mother and grandmother" for her help and encouragement in my endeavours to record art glass history. Her (and I quote from her own note) "rather rushed efforts at outlining M'dina Glass" during hectic preparations for Christmas of 1997 are greatly appreciated. Also many thanks are extended to Jonathan Harris Director of Isle of Wight Glass and last but not least John Smith of Broadfield House Glass Museum Kingswinford. This monograph is dedicated to Eleanor Moorhouse.

Michael Thomas Vaughan

Recent work on early glass production in Egypt

Over the past five years or so, a number of groups have published on the production of glass in New Kingdom Egypt. A session of the forthcoming AIHV Congress in London is devoted to Bronze Age glass, and below I summarise as background some of the key findings and the issues that have arisen in the recent studies. Not surprisingly, considerable attention has been directed towards the well-preserved glass factory at Tell el Amarna and the materials recovered from the excavations there by Petrie in the 19th century, and most recently as part of the Amarna project directed by Barry Kemp of Cambridge.

Furnaces and workshop organization

In the past it has been speculated that raw glass was not made in Egypt in the 14th century BC but imported from Mesopotamia. However, Nicholson and Jackson have shown that furnaces recently excavated at Amarna and apparently associated with the glass industry, may be replicated and fired to successfully melt glass from quartz and seaweed ash raw materials (1). Although this does not prove that glass was made in such furnaces, it demonstrates that they could have been used in this way. Cylindrical pots found at Amarna by Petrie were originally suggested by him to have been supports for fritting pans, but similarities in their form and dimensions to the blue glass ingots from the Uluburun shipwreck (c.1300 BC) were noted by Nicholson, who interpreted them as moulds in which the ingots were melted (2). Rehren and Pusch (3) have interpreted similar vessels at the slightly later glass workshop at Qantir (ancient Piramesses), in the Nile delta, as crucibles used to colour red glass. At Qantir, these authors have recorded a series of high temperature industries (production of faience, Egytian blue, red glass and bronze objects), which shared not only the use of copper as a raw material, but also specialised working conditions such as furnace atmosphere and temperature. They argue that glass was made from its raw materials and coloured in primary workshops, then distributed in ingot form to secondary workshops for the fabrication of vessels (4). The organisation of vitreous materials production at Amarna has been considered by Shortland, Nicholson and Jackson (5) through a re-analysis of the distribution of materials from excavation records. They conclude that at this time the production of glass, a new material, was virtually a royal monopoly, while faience was a cheap and widely-available material.

Chemical compositions, colourants and origins

The origins of raw materials and technologies, inferred from physico-chemical analysis, have generated considerable discussion. Following earlier work by Lilyquist and Brill (6), Shortland, Nicholson and Jackson (7) have analysed yellow glass, coloured by lead antimonate, for lead isotopes. They conclude that while Egyptian yellow glass from the reign of Tuthmosis III has Mesopotamian characteristics, those of the succeeding Amarna period could have been coloured using Egyptian lead. Mass, Wypyski and Stone (8) suggest that the lead antimonate in these glasses was derived from the use of antimony-bearing litharge, a lead-rich by-product of silver smelting. Shortland, on the other hand, argues that the lead and antimony were obtained separately, and reacted together to make a pigment before addition to the glass. He suggests that the source of antimony was Caucasia, where antimonial copper alloys were widely used (9). Furthermore, Rehren and Shortland have argued that the chemical and isotopic compositions the yellow glasses are inconsistent with the addition of litharge, while Mass *et al* have defended their position (10).

Shortland and Tite (11) examined cobalt blue glasses of the New Kingdom and concluded that they were made using cobalt derived from alum from the Western Oases, along with Egyptian natron. With arguments based upon texts and the objects themselves, Shortland suggests that, while glass may have been invented in Mesopotamia in the late 16th century BC, perhaps by the mid-15th century glass was being made in Egypt (12). While there appears to be no dispute concerning the source of the cobalt, Rehren (13) has argued that the peculiar compositional characteristics of cobalt blue glass may be the result of the use of plant ash of a distinctive composition. Tite, Shortland and Paynter (14) have suggested that the cobalt blue glass was the result of mixing a cobalt-rich frit found in the workshop at Amarna, which was made using natron, with a colourless glass plus additional plant ash. It remains to be seen if this is the last word on the production of New Kingdom cobalt blue glass, which again is crucial to our understanding of innovation in the Egyptian glass industry and its interaction with Mesopotamia. It appears to have been widely traded, as it is compositionally identical to the glass of the ingots of the Uluburun wreck and also to Mycenaean blue glass.

Finally, Rehren (15) has questioned how the remarkably consistent compositions of Bronze Age glasses were derived from an intrinsically variable material such as plant ash. He has noted that glasses cluster around those compositions which have the lowest melting temperatures and, with Shugar, has carried out experiments to determine if the melting process itself exercised some control on the final composition of the glass.

Ian C Freestone

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R G (ROY) NEWTON

OBE DSc Hon FSGT

1912-2003

Roy Newton's professional involvement with glass began with his appointment as Director of the British Glass Industry Research Association, on its creation in 1955 from part of the Department of Glass Technology at the University of Sheffield, which had been established in 1915 specifically to aid the glass industry. He at once threw himself into building up the Association with characteristic single-minded energy, emphasizing the importance of keeping accurate records and ensuring communication with the Association's members. Despite his lack of previous knowledge of the glass industry, he quickly recognized that the performance and efficiency of glass melting furnaces was a crucial subject on which there was little reliable quantitative data. He therefore began to collect and analyse comprehensive data on furnace fuel consumption and performance, not just from the British

industry but internationally, to which he applied novel statistical methods of his own devising.

He began to develop an interest in the deterioration of stained glass church windows which led him to investigate their conservation. His activities included setting up laboratory models to measure and record air flows, temperatures, and humidity around typical church window installations. He also became an authority on the chemical durability of glass. He was the founder and editor for a considerable time of the Newsletter of the *Corpus Vitrearum Medii Aevi*. After retirement from BGIRA in 1974 he continued that work as Honorary Professor in the Department of Physics at the University of York where he was able to make *in situ* measurements on some of the Minster windows, considerably expanding the factual basis for deciding questions about the conservation of such valuable windows. He subsequently held a similar post at the University of Sheffield from which he received an Honorary DScTech, having earlier earned his DSc from London. He was awarded an OBE in 1969 and was President of the Society of Glass Technology in 1973--75, later being elected an Honorary Fellow of the Society. In 1977 he became a founder member of the Association for the History of Glass, serving on its Board until 1985. *The Conservation of Glass*, written with glass conservator Sandra Davison, was published in 1989; a second edition has recently appeared.

Michael Cable

A fuller version of this obituary appeared in *The Independent* on 21st May 2003.

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(Juanita has very kindly agreed to edit issue 14 of Glass News whilst I am on maternity leave. All being well, I shall be back for issue 15.
Sarah Paynter.)

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