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STUDY DAYS
ON VENETIAN GLASS
Approximately 1600's



Istituto Veneto
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ISTITUTO VENETO DI SCIENZE, LETTERE ED ARTI

STUDY DAYS ON VENETIAN GLASS
APPROXIMATELY 1600's

edited by
ROSA BAROVIER and CRISTINA TONINI

VENEZIA
2014

Si raccolgono qui alcuni dei contributi presentati il 27 e 28 febbraio e 1° marzo
2013 al Corso di alta formazione organizzato dall'Istituto Veneto sul tema:

Study Days on Venetian Glass. Approximately 1600's

Giornate di Studio sul vetro veneziano. 1600 circa

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STUDY DAYS
ON VENETIAN GLASS

ROSA BAROVIER MENTASTI and CRISTINA TONINI

TOOLS TO STUDY GLASS: INVENTORIES, PAINTINGS AND GRAPHIC WORKS OF THE 16TH CENTURY

Introduction

There are different tools that may contribute significantly to the story of Venetian glass from the fifteenth to the eighteenth century. Amongst them inventories and figurative sources have an important role. Fundamental are the Muranese documents – among them many inventories – published by Luigi Zecchin and in more recent years by his son Paolo Zecchin. New research on these documents is fundamental, particularly in reference to the types of glasses reported in old Venetian language or dialect, which is sometimes very difficult to interpret even by Venetians themselves. Other archival documents used in this study are inventories belonging to European nobility and upper middle class. Figurative sources, from paintings to frescoes, from graphic works to sculpture reliefs, will give an important contribution for dating, for attribution to Venetian or to *façon de Venise* glassworks and for the function of glass objects. Our paper will focus on some Italian archive documents and on figurative sources of the sixteenth century and early seventeenth century.

The first document discussed is the *Memoria di vetrerie che si cava di Murano*. It's a report, undated and unsigned, found among the correspondence of the Medici's secretary, Lorenzo Usinbardi, in a file with letters dated 1592, so the same dating may be attributed to it¹. The written language reveals the origin of the author: a Tuscan

¹ Corti 1971: 649-654.

resident in Venice. This *Memoria* is particularly interesting in showing the products of Murano's glassworks, which encountered the taste of foreign markets with different shapes for each country. The writer explains that Murano is going through a crisis: its glassworks, which were forty more or less before, now are twenty four and they are selling half quantity compared to past years. The total production of Murano brings in 142,000 ducats only 25,000 of which is income from glass sold in Venice. Indeed glass is very rare in the inventories of rich Venetian families of that time.

Memoria di vetrerie che si cava di Murano 1592:

Per la Sicilia, Napoli, Roma e Puglia... alcuni bicchieri e ampolle dipinte, secondo l'uso di quel paese di niepitella, maiorana e fiori e simili...

To Sicily, Naples, Rome and Apulia... some beakers and bottles painted, according to the customs of that nation, with calamint, sweet marjoram, flowers and similar patterns...

It's difficult to connect such items with painted vessels of late sixteenth century, belonging to known glass collections. Generally scrolls and green vines are typical patterns of Venetian vessels dated early sixteenth century on the basis of their shape. In the Museo Duca di Martina in Naples a vase blown in a late Renaissance shape is decorated in rich green, yellow and dark blue enameled foliage but any connection with the items recorded in the *Memoria* is groundless today².

A very important Murano inventory has nevertheless some connection with vegetal patterns. It is an inventory, dated November 1569, of goods confiscated by the Venetian Republic in the glassworks of Bortolo d'Alvise, a glassmaker expatriated illegally to Florence some months before to work in the Medici's glassfurnace. There are three very significant items: *Gotti a fोगiame recoti*, Beakers

² Giusti 1994: 70.

with foliage fired, *Gotto a pimpinella*, Beaker with burnet saxifrage, and *Vasi a pimpinella recoti*, Vases with burnet saxifrage fired³. *Recoti* or fired means that the enameled decoration was already fixed by fire. The inventory, dated January 1578, of Giovanni Antonio Zanchi dal Castello lists *Franzosini con arme et altri goti con arme smaltade*, French beakers with coat-of-arms and other beakers with enameled coat-of-arms, and *Item altri doi a pimpinella*, Also two others with burnet saxifrage⁴. The *pimpinella* or burnet saxifrage has the same leaves which are enameled on vessels belonging to a well-known group, which has been alternately attributed to Innsbruck and Barcellona or to Venice⁵. Such vessels always have Venetian shapes and their enamels are bright and of good quality, different from other similar pieces, undoubtedly Catalanian (Fig.1) On the basis of the inventories of Bortolo d'Alvise and Giovanni Antonio Zanchi we can suppose that the *pimpinella* group was produced in Venice, probably for foreign markets. The chemical analysis of glass and enamels will be conclusive.

Per Costantinopoli... Guastade con il collo lungho con laticino bianco... In Alessandria d'Egitto vetreria simile a quella di Costantinopoli... Alcune guastade pichole con il collo sottile e lungho

To Constantinople... Long neck bottles with lattimo threads... To Alexandria of Egypt glasses similar to the ones sent to Constantinople... and some small bottles with thin and long neck.

Amongst the glasses usually sent to Constantinople there are some «guastade con il collo lungho con laticino bianco», bottles with long neck in filigrane or with lattimo threads. Glasses with similar shapes, «guastade pichole con il collo sottile e lungho»,

³ Zecchin 2009: 33.

⁴ Ibid.: 2009: 34.

⁵ Dreier 1998: 190-191, 289, 291. Baumgartner 2003: 90-91. Page 2004: 56-58, f. 28.

bottles with thin and long necks, are sent to Alexandria of Egypt. *Guastada* is a Tuscan word for bottle. Those quoted in the above document, with long neck, are probably *acanini*, mentioned in some sixteenth century Muranese documents. The shape of these glasses was inspired by the Islamic *qumqum*, which was in production, in glass and metalware, in Syria, since the Medieval period. They were used for scented waters. The word *acanino* came from the Arab word *al-qinnina*, which means bottle, phial. The production of *acanini* in Murano is supported by archival documents, by objects in public collections and by fragments found both in excavations, dated to the XVI century, and scattered in the sand of the Venetian lagoon.

In an inventory of Dragan's Muranese glasshouse (1508), amongst the top quality glasses quoted, are some «acchanini grandi et mezzani lavoradi a la damaschina n.XII», twelve bottles of large and medium size with damascene decoration⁶. These are bottles with long necks painted with Islamic ornamentation. The same decoration is present on two objects, one in the Victoria & Albert Museum and the other in the Museum für Angewandte Kunst in Wien. Both of these are also painted with the coat of arms of two important Nuremberg families and were probably commissioned for the wedding of Endres I Hirschvogel and Katharina Hölzel, celebrated on 14 July 1511⁷. An *acanino* fragment in cristallo decorated with blue enamel similar to the previous ones has been found in the excavations of S.Chiera's convent in Padua with other glasses and ceramics that have been dated to the second half of fifteenth century till the first half of sixteenth century.

Sprinklers for scented water were particularly appreciated by Isabella Gonzaga. At the beginning of the XVI century in Gonzaga's correspondence with her envoy in Venice, Lorenzo da Pavia, is recorded that an «acanino pieno d'aqua moscheta» was sent to her on 22 May 1502⁸. This is a bottle with a long neck holding a

⁶ Zecchin 1989: 59.

⁷ Barovier Mentasti and Tonini 2013: no. 26.

⁸ Archivio di Stato di Mantova, *Carteggio Isabella d'Este - Lorenzo da Pavia*, Busta 1440, c.38.

special kind of rose water, «moscheta». Lorenzo da Pavia, during the same year, sent to the Gonzaga's marquise «2 cucche d'aqua rosa damaschina», two big pumpkin-shaped bottles with rose water of Levant origin. These scented waters were particularly expensive in Damascus and very difficult to find in that period on the Venetian market, as he reported in his letter⁹. In the same paper he also mentioned that two other bottles, containing «acqua di nanfa», orange scented water, will be sent to her.

In another sixteenth century archive document, the inventory of the Palazzo Magno, a wing of Buonconsiglio Castle in Trent (1536), quoted to be amongst the glasses, are eight «Angsterlin gleserin zu Rosenwasser», which can be identified with long neck sprinklers¹⁰. The words «angsterlin» and *angster* come from the Venetian term *angastara* (derived from the Greek words ἄγγος=vessel and γαστήρ=belly). The word *angastara* or *inghistera* was used in Murano during the Medieval and Renaissance period for bottles with long necks and large bodies. The «Cinque Achatine de vetro» quoted in another inventory, belonging to Girolamo Scopulo (1537), jurisconsult and auditor at the Gonzaga's court, were probably the *acanini* mentioned in Murano's documents. The *achatine* were part of his wide collection of Venetian glass, numbering more than one hundred pieces, some enamelled, some cold-painted and others in filigree (*vetro a retorti*), displayed in the *studiolo* of his house in Mantua¹¹.

Mention of this kind of sprinklers is found in one of the *Lettere in Sei Libri* of the Tuscan writer Pietro Aretino (1492-1556) who lived in Venice. He was an *habitué* of some glasshouses in Murano, particularly that of Serena, where they produced a type of glass called the *aretini*, still unidentified¹². In the letter which Aretino sent to Francesco Priscianese (26 February 1540) he compares the high quality of good teachers and the insolence of pedagogues, the

⁹ Archivio di Stato di Mantova, *Carteggio Isabella d'Este - Lorenzo da Pavia*, Busta 1890, c. 329 e c. 345.

¹⁰ Archivio di Stato di Trento, *Archivio Principesco Vescovile*, sez. tedesca capsa 53 lett 3 e bis; Castelnovo 1995: 162; Barovier Mentasti, Tonini 2013: 215.

¹¹ Barovier Mentasti and Tonini 2013: 214-215; Rebecchini 2011: 87-89.

¹² Zecchin 1989: 182, 189.

latter are similar to «vasi strozzati nel collo, i quali ne lo sforzarsi di volere empire i strumenti simili di ciò che mandan fuori a gocciola a gocciola ne versano più che ce ne mescano», vases with strangled necks that pour the liquid drop by drop ; in the attempt to fill them the majority of the liquid is spilled outside rather than inside¹³.

The Muranese origin of these sprinklers is documented also by sixteenth century archeological findings in the lagoon and in the territories of the Venetian Republic¹⁴. Another contemporary archive source to the *Memoria di vetrerie che si cava da Murano* confirms the exportation of these kinds of vessels to the Levant. There were a significant number of glasses that the glassmaker Pietro Ballarin has prepared to send to Constantinople in 1590. Amongst them are some «Acanini indoradi», bottles decorated with gold decoration and «Acanini chiari indoradi», clear glass gilt bottles¹⁵. The glasses found in the wreck of a Venetian ship, the *Gagiana*, sunk near a small island, Gnalić, not far from the city of Zadar, in 1583 ca., were probably destined to the Levant. Several of them are *cristallo* sprinklers without decoration and others are decorated with lattimo threads (*vetro a fili*). In the *Memoria di vetrerie che si cava da Murano* bottles with «laticinio bianco» were listed; these might be very similar to the ones in the *Gagiana*'s wreck or to some glasses in public collections like the one in the British Museum¹⁶. These examples find a perfect correspondence with a drawing by Giovanni Maggi in the *Bichierografia* (1604), dedicated to the cardinal Del Monte (Fig. 2).

These kinds of vessels were not made only for export to the Levant, but also for the western markets, as confirmed by the two sprinklers with two German coats of arms, mentioned above (V&A and MAK collections), and also by some Venetian iconographic sources, too. Two bottles with long neck in red and black are painted by Vittore Carpaccio in *S. Agostino in his study* (1502), in the School of San Giorgio degli Schiavoni (Venice). In this case the

¹³ Aretino [1542]1998-2002: vol. 2, 181.

¹⁴ Minini 2009: 173.

¹⁵ Zecchin 1989: 166.

¹⁶ Tait 1979: 66-67, no. 84.

artist has reproduced either Levantine or local products¹⁷. Also of possible Venetian origin, are some *cristallo* bottles with long necks, depicted in the fresco *S. Anthony rise a child fallen ih hot water* (1524) painted by Girolamo Tessari (Padova 1480-1561), in the School of the Saint in Padue, a town under the political control of the Venetian Republic. The miracle of the young child takes place in a domestic setting with a bed with a *padiglione*, a table in a white linen tablecloth on which there is a bottle and some glasses in *cristallo*. On a wall shelf are displayed three *acanini*, sprinklers in *cristallo*. The fresco is also very interesting in regards to the history of Venetian glass because also a *cesendello*, an oil lamp, is depicted in front of a holy image, *The Virgin with a child*. This custom is mentioned in Venetian inventories and in sixteenth century documents¹⁸.

Another iconographic source of the Venetian area is insightful showing the sprinklers for scented waters as part of the beauty trousseau of Italian Renaissance ladies. In one of the wooden tarsia by Lorenzo Lotto and Giovanni Francesco Capoferri in Bergamo's cathedral, *Suzanne and the Elderly* (1524), an *acanino* is amongst other toilette objects¹⁹.

Per Costantinopoli... Bochali di vetro coperti ,detti mastrapani

To Constantinople... glass lidded tankards [or jugs], called mastrapani

The words *mastrapà* and *mastrapani* (plural form of *mastrapàn*) isn't inusual in ancient Murano papers and is also used in Venetian documents. These terms have been reported in published inventories of Murano glassworks dated from 1483 to 1590. These *mastrapani* are made of different varieties of glass and are decorated by different techniques. We know that the decorator, Valentino Ungaro, fired *mastrapà doradi*, gilt, in the oven of Jacobo d'Angelo in 1483, to

¹⁷ Auld: 2007: 233.

¹⁸ Palumbo Fossati 1984: 124, 132.

¹⁹ Barovier Mentasti and Tonini 2013: 46.

fix the gold leaf. While the inventory of the goods belonging to glass entrepreneurs Giovanni Barovier and Marieta Barovier (1496) lists 18 *mastrapà de marmoro, azuro d'oro et azuro bianchi, mastrapà* made of marble glass, of gilt blue glass and of blue and white glass²⁰. *Marmoro* or *marmorin* was a kind of translucent glass, similar to alabaster, whose semi-opacity was obtained through creating close and tiny air bubbles containing saline crystals (sodium chloride and sodium sulphate). Such glass is also quoted in an inventory of pieces produced by Giovanni Ballarin in 1511, which lists 100 *poti de marmorin cum figure, marmorin* beakers decorated with figures, and in two inventories of Dragan glassworks. The latter lists contain several *mastrapà de calzedonia et marmorini, mastrapà* made of chalcedony glass and of marble glass, as well as of crystal and of gilt blue glass (1508) and sixteen *mastrapà de calzedonia et marmorin* (1532) that's of chalcedony glass and marble glass²¹. A beautiful standing bowl in the Civici Musei di Arte e Storia of Brescia and a ribbed jug kept in the Musée du Verre in Liège are rare examples of *marmoro* or *marmorino* glass vessels, produced in early XVI century²².

About forty years after the later Dragan's inventory list, thirty three *mastrapà* are mentioned in the inventory of goods found in the glassworks of Bortolo d'Alvise in 1569. Only six of them are without decoration, five are *tutti d'oro*, wholly gilt, the others *intagiadi*, diamond-point engraved. In the inventory of Giovanni Antonio Zanchi dal Castello, dated January 1578, there are recorded five *mastrapà de latimo doradi*, gilt lattimo *mastrapà*, and four without any detail²³. Meanwhile, exactly in 1549, in Murano, Vincenzo d'Angelo had gotten a patent for diamond-point engraving, which expired ten years later, so that this technique spread in the workshops of Murano and became fashionable among the most up-to-date purchasers.

Unquestionably significant is the rich list of glass vessels, lamps

²⁰ Zecchin 1989: 212, 214, 348, 338. Zecchin 1990: 120.

²¹ Zecchin 1989: 164. Zecchin 1990: 59, 61.

²² Clarke 1974: 56. Barovier Mentasti and Tonini 2012: vol. 1/1.

²³ Zecchin 2009: 33-34.

and sheets, which were produced by Pietro Ballarin in 1590. They were ready for shipping to Constantinople, therefore they document what Islamic market required from Venetian glassworks²⁴. Listed are ninety-six *mastrapà*, some made of blue glass or generally of coloured glass. Only two are diamond-point engraved. Twelve are rare and interesting because they are listed as *inarzentadi*, silvered, and eleven are gilt, two of which are *miniadi d'oro*, illuminated with gold, which may mean decorated with dense and delicate gilt patterns. Two *mastrapà* are *a pigna indoradi*, which literally means pine-cone-shaped or with pine-cone decoration, and gilt. Other types of the inventory are *a pigna indoradi* or *indoradi a pigna*. The «pine-cone» might be a pattern obtained by gold-leaf engraving or by gilt painting, but it might be also a mould-blown pattern, highlighted by gold.

The word *mastrapà* comes from the Arabic term *mašraba*, meaning «tankard»²⁵. Of course, the Venetian glass, called *mastrapà*, comes from an Eastern type of tankard. We believe that both the Venetian vessel and its Eastern model had a globular body, a slightly flattened, a large straight cylindrical neck with round mouth without any spout, a handle and a ring foot or flared pedestal foot. In the Islamic world such vessel was made of inlaid brass in XV and early XVI century²⁶ and of Iznik pottery in the XVI century²⁷. Iznik tankards of this kind, documented by several pieces in the British Museum and in the Gulbenkian collection, were probably lidded (British Museum, no. 1878, 1230.514), but the lids are generally lost. Vessels of this shape were made also of glass, such as the outstanding Mamluk gilded and enameled jug belonging to the collection of Baroness Batsheva de Rothschild, auctioned off in 2000, and the blue one in the Ashmolean Museum in Oxford²⁸. Regarding shape, such works made of metal, pottery or glass resemble some Timurid stone works, like the famous white

²⁴ Zecchin 1989: 166.

²⁵ Pellegrini 1972: 68.

²⁶ Curatola and Spallanzani 1981: 13, no. 3. Komaroff 1991: 257, cat. 5.

²⁷ *Pur Décors?* 2007: 336, cat. 136; Queiroz Ribero 2009: 36-37.

²⁸ Newby 1998: 37-38, Figs. 10.12, 10.13. *The collection of the Late Baroness Batsheva de Rothschild*: 58-65. Carboni 2006: 122, 340, no. 154.

jade jug, dated 1417-1449, in the Museu Calouste Gulbenkian in Lisbon (inv. no. 328), which reveals the influence of Chinese art and is correctly called *mashraba*²⁹. Indeed some Chinese jugs of the Ming Dynasty, produced in the first half of the XV century, have the same shape³⁰.

Venetian glassblowers produced many types of tankards, jugs and ewers in the Renaissance period. Among them were the *mastrapani*. While some *mastrapani* are variations with a narrower and flared neck, others are more similar to their Islamic models. Several rigorous *mastrapani* with straight cylindrical neck can be found in international museums. For instance two pieces decorated with enameled scrolls of leaves and flowers are shown in the Museo del Vetro at Murano³¹ (Fig. 3). Two tankards in the Hermitage are completely decorated with rows of scales, enameled and gilt. A piece in the State Museum of History in Moscow is decorated with a geometrical pattern, another made of unusual purple glass has a ribbed body, like the *marmorino* tankard in Liège³². The date of these pieces is between the late XV century and the early XVI century. The well-known unique *mastrapà* made of *lattimo* glass, kept in the Toledo Museum of Art (Ohio) has a complex enameled decoration: a battle of sea-gods. Two figures are taken from *The Battle of Sea-Gods*, an engraving by Andrea Mantegna of the late 1480s. The other figures are taken from an unknown drawing or painting, which was also the model for the *Frieze of Tritons and Nymphs*, an engraving by Girolamo Mocetto³³. Two dogs emerging from seashells, connected by a chain, are painted around the neck of the vessel. They could be a symbol of fidelity rather than a coat-of-arms, as it was supposed. It can be dated to 1500-1510.

Very late lidded *mastrapani* have been found among the

²⁹ *Calouste Gulbenkian Museum Guide* 2013: 45.

³⁰ Catalogue of the Special Exhibition 1998: 75-79. Harrison-Hall 2001: 3, 14.

³¹ *Mille anni* 1982: 96, no. 96.

³² Barovier Mentasti 1982: 58, f. 38. Kramarowsky 1998: 98, 100, ff. 22.3, 22.4, 22.5.

³³ Clarke 1974: 29, 41-43, 53. Page 2006: 83-85.

remains of a shipwreck at Gnalić, near Zadar, in Dalmatia. The wreck belonged to the Venetian ship *Gagiana*, which left Venice in November 1583. Thousands of glass fragments were recovered during several underwater campaigns. The *mastrapani* found are made of undecorated glass, with opaque white trailing, with a decoration in *filigrana a retortoli* and with diamond-point engraving³⁴. The engraved pieces can be related to the *mastrapà intagiadi* noted in the inventories of Bortolo d'Alvise (1569) and of Pietro Ballarin (1590).

This type of vessel survived until the early XVIII century, at least. We can see these tankards at Rosenborg castle in Copenhagen where the glass collection, donated by Venetian Republic to the King Frederick IV in the winter of 1708-1709, is kept. There are lidded *mastrapani* made of red glass and of opaque yellow glass. In the same years the painter Cristoforo Munari reproduced a similar piece, diamond point engraved, in three still-life paintings dated 1706-1714³⁵. Then the term *mastrapà* was no more quoted in the inventories of Murano glassworks. Perhaps it had been substituted by the term *bocale* (Italian *boccale*=tankard) or *bocaleto/bocaleta* (Italian *boccaletto*=small tankard), which are listed, for instance, in the inventory of the glassworks of Giacomo Darduin and his brothers in 1689³⁶.

Two well-known English tankards, made of *filigrana a retortoli* and of clear glass with white vertical bands, with flattened globular body are kept in the British Museum. They were blown by Venetian craftsmen working in London in 1549³⁷. Their shape probably derived from the Murano *mastrapà* rather than from the Flemish tankards, called «Malling jugs», which instead had a bulbous shape, as it was proposed. Nevertheless their silver-gilt mounts with hinged covers did not belong to the Venetian tradition.

³⁴ Lazar and Willmott 2006: 40-42, 75-76, 114-115.

³⁵ Boesen 1969: nos. 80-82. Baldassari 1998: 46, 88, 94, 152-153, 188-189, 195. *Trasparenze e riflessi* 2006: 191-193.

³⁶ Trivellato 2000: 285-286.

³⁷ Tait 1991: 172, f. 215.

Per Costantinopoli... lampane di moschee al modo delli ebrei e altre foggie, secondo l'ordine e le bizzarrie di tal gente...

To Constantinople... mosque lamps in the fashion of Jews and of other shapes, according with costumes and with eccentricities of such nations...

The export of mosque lamps, produced in Murano, to Costantinople and generally to Islamic countries since XV century is supported by documentary evidence and several scholars dedicated articles and essays to this subject. Such hanging lamps had already been in use also in Italy for centuries, as well as cone-shaped and cylindrical lamps in the European style. The author of the *Memoria* proves to be well-informed about this export so that we can believe that his whole report is based on reliable investigations.

Per Alemagnia... bichieri grandi, alti, di più sorte

To Germany... big, tall glasses, of different shapes

The majority of glass historians are keen to consider that some glasses with specific shapes, produced in Murano, were only for export. For the German market were blown 'Stangengläser' and probably also 'Wilkommen' as confirmed by a muranese inventory (1578) of the glassmaker Giovanni Antonio Zanchi dal Castello³⁸. Some glasses listed in this document are named *goti da cil* or *de acil*, expression of unintelligible etymology. Some of them are enamelled also *cum arme*, with coat of arms; others have a *friso d'oro*, a gilt frieze, and a lid. An item in the inventory: *Goti da cil overo canonicini*, helps to identify them as small cannon-shaped glasses. Some years before Zanchi's inventory, the *goti d'acil* are mentioned in another Muranese document concerning the glassworks of Bortolo d'Alvise expatriated to Florence. In the list, dated 1569, of his goods confiscated by the Venetian Republic 51 *goti d'acil*

³⁸ Archivio di Stato di Venezia, *Podestà di Murano*, busta 94; Zecchin 2009: 33-34.

are reported. Four are gilt and engraved, of course diamond-point engraved, (*indoradi et intagiadi*) and two others only engraved. In another of Bortolo's inventories, concerning his goods found in his glasshouse and sold by public authorities in September 1570, there are mentioned 41 *goti de acil*³⁹. The glasses of this type were exported not only to Germany but also to Spain as confirmed by an inventory of the Palacio de El Pardo of Charles V in Madrid. In this inventory (1564), amongst the *Vidrios de Venecia* are mentioned: *seis cañones lisos con sus tapadores, otros quatro elados de la misma manera e otro cañon de vidrio abollado*⁴⁰. These *cañones* were cannon-shaped glasses with a lid, some undecorated, some made of 'ice-glass' and others, are «indented». The decorations of the last ones were probably obtained with a mould. Some *canoni di cristallo* were produced in the year 1573, in Murano, by commission of the duke William Gonzague⁴¹.

Some of the 'Stangengläser', kept in museums, are enamelled, like one object with *Commedia dell'Arte* characters in the Kestner Museum Hannover (Figs. 4-5). In Giovanni Antonio Zanchi dal Castello's inventory (1578), mentioned above, is reported a *Goto de acil smaltado a magnifichi*, that is possible to identify with a *canoncino*, a cannon-shaped glass, called in German 'Stangenglas', enamelled with 'Magnifico' characters which signify Pantaloon characters. This glass quoted in the inventory matches the Hannover's 'Stangenglas' whose decoration depicts two similar 'Magnifico' characters and a 'Zanni'. Another glass, in the British museum, with a gilt scale pattern and enamelled with 'Commedia dell'Arte' characters, two 'Magnifico' and a 'Zanni', has a conical bowl on a low trumpet-shaped foot, a type fashionable in Germany, also depicted in Italian paintings of the end of the XV and XVI centuries. This goblet has been attributed by Gasparetto and Tait to Venice and dated to the second half of the XVI century⁴².

The two glasses of the London and Hannover museums are related

³⁹ Zecchin 1989: 174. Zecchin 2009: 33.

⁴⁰ Sanchez Canton 1934: 746.

⁴¹ Sogliani 2002: 186-187.

⁴² Gasparetto 1958: 91; Tait 1979: 42 no. 38, tav. 13.

to the beginnings of 'Commedia dell'Arte' (named in this way only from the eighteenth century) based on a skeleton draft, used by the actors who, with their long experience in acting, improvised during every play in a different way. For this reason during the sixteenth century it was named 'commedia all'improvviso' or 'improvvisa'. It was based on stories similar to erudite plays but distinguished by a parodistic representation of the characters of contemporary society. The 'Magnifico', named later on Pantaloone, personifies the Venetian merchant with his typical dress, old, very mean, fussy, grumbler, who sometimes falls in love but is not reciprocated and for this reason is ridiculed. In opposition there is 'Zanni', an urbanized farmer from Bergamo's area, awkward, ignorant, always hungry, sometimes naively slick. He was mocked for his poor dresses with patches and for his dialect, he was keen to do the most humile, lowly paid jobs. Often these jobs were done in Muranese glassfurnaces by immigrants from Bergamo and the surrounding area. His character changed during the sixteenth century, becoming the dumb and ignorant servant, as 'Brighella' or the stupid and headless servant, as the famous 'Arlecchino'⁴³. In the 'commedia all'improvviso' the character of Zanni and Arlecchino were both acting in the play, as documented by a series of xylographies of *Recueil Fossard*, dated recently around the last two decades of the sixteenth century⁴⁴. The 'Commedia dell'Arte' originated in Veneto around the mid-sixteenth century and from the beginning was based on the two characters of Magnifico and Zanni⁴⁵. It was fashionable at the Gonzague court so Mantua became a place of attraction for actors, this is documented also by some frescoes, of modest artistic quality, with the characters Magnifico and Zanni⁴⁶. The success of the two masks of the 'Commedia dell'Arte' is documented by engravings and drawings, made in Venice or in Padua⁴⁷. Very soon the 'Commedia dell'Arte' was exported, first in Bavaria, due to the very strong economic and cultural relations

⁴³ Pandolfi 1969: 169-176; Jonard 1982: 36-54; Bourqui 1999: 49-50.

⁴⁴ Katritzky 2006: 108.

⁴⁵ Del Cerro 1914: 123.

⁴⁶ Artioli 1999: 20-25; Morselli 2002: 179, 182.

⁴⁷ Padoan Urban 1986: 22-23; *Costume book* of Nicolauss Kippell with drawings, 1588 ca., The Walters Art Gallery Baltimore, no. W.477.

between this area and Venice. In occasion of the wedding of Bavaria's crown prince, the future William V, with Renate of Lorraine (1568), a play took place at the court in Munich. The *scenario*, produced by the Neapolitan musician and court comic, Massimo Troiano, in the same year of the wedding, had as main character *Magnifico Messer Pantalone* with his *Zanni*⁴⁸. This play was followed by others in the following years, but the first one was so memorable to be frescoed on the walls of the *Narrentreppe*, the comics' stairs, in the Trausnitz fortress in Landshut, near Munich, where duke William V lived. The frescoes were painted by Alessandro Scalsi, named Padovanino, of Florentine origin, based on drawings by Federico Sustris, art director of the Bavarian court⁴⁹. It's not surprising that Venetian glasses were enamelled with characters of the 'commedia all'improvvisa' and were exported, particularly to Bavaria.

The Hannover "Stangenglas" has been dated to the end of the sixteenth century⁵⁰. A similar dating is proposed by Gasparetto for the British Museum's goblet, on the other hand Tait dated it to the second half of the sixteenth century⁵¹. On the base of Zanchi's inventory we definitely attribute these two glasses to Venice and date them to 1570-1580. These are the same years in which the frescoes of Trausnitz's fortress were executed, a period of extraordinary success of the Italian 'commedia all'improvvisa' in Bavaria.

Per Alemagnia... Altri [vetri] in modo di Tabernacoli, alcuni messi a oro

To Germany... Some other [glasses] Reliquary-shaped, some of them gilt

Glasses «in modo di tabernacoli, alcuni messi a oro», in reliquary-shape, some gilt, were exported to Germany. These are lidded bulb-

⁴⁸ Pandolfi: 1957: 79-83.

⁴⁹ Rauhut 1971: 241-271; Corrain 1986: 159-170.

⁵⁰ Mosel 1979: 53, no. 12.

⁵¹ Gasparetto 1958: 91; Tait 1979: 42 no. 38 tav. 13.

shaped reliquaries, gilt and diamond-point engraved, like one piece in the Museo del Vetro in Murano. Its provenance is known: it comes from St. Martin's church in Burano. This confirms its attribution to Venice and not to Hall or to Innsbruck in Tyrol, as argued in the past by Egg⁵². To this object are related two cylindrical-shaped reliquaries with lion stem, in San Damiano's convent in Assisi, with similar diamond – point engravings including a heart pattern, with the same gilt frieze and with a painted portrait of an armiger (Figs. 6-7). A Venetian provenance is plausible also for them and it underlines that San Damiano is a Franciscan convent as S. Maria Gloriosa dei Frari in Venice, where is preserved a similar cylindric reliquary with a lion stem, a diamond-point engraving and a gilt, cold-painted decoration. The painted friezes on the two reliquaries of Assisi is similar to a glass in the Kunstsammlungen in Veste Coburg, which has been ascribed to the glasshouse of Sebastian Hochstetter in Hall⁵³. It's possible that this piece is a Venetian product or that it was made by a glassmaker and painted by a decorator coming from Murano. Commercial relations between Austria and the Venetian Republic were frequent during the sixteenth century; Venetian glasses were imported to Tyrol for the Austrian archduke Ferdinand II (1525-1595), because he was unsatisfied of the poor quality of the glasses blown in Hall and in the court's glasshouse in Innsbruck. Muranese glassblowers went to work at the Austrian court's glasshouse and Venetian raw materials for glass were exported to Innsbruck⁵⁴.

Similarly a diamond-point engraved glass, a vase with three spouts in the Bargello's museum in Florence, is attributable to Venice, based on a comparison with two fragmentary glasses from Gnalić, similar for decoration and shape, while in the past this type was ascribed to Hall⁵⁵. The dating of the Bargello's vase to the last decade of sixteenth century is sustained thanks to a Muranese inventory (1590) where, amongst the blown glasses that the glassmaker, Pietro Ballarin, has to

⁵² Egg 1962: ff.27-48; Barovier Mentasti and Tonini 2013: no. 41

⁵³ Theuerkauff-Liederwald 1994: no. 224.

⁵⁴ Zecchin 2009: 29; Egg 1962: 43-44.

⁵⁵ Petricioli 1974: 88, Figs. 14, 90, Fig. 20; Lazar and Willmott 2006: 120, pl. 15 pl. 12.

send to Constantinople are mentioned fourteen «Vasi da fiori con pipii inquartadi», bouquetières *inquartadi* with small spouts and also eight «Vasi detti con pipii et maneghi inquartadi», vases *inquartadi* with spouts and handles⁵⁶. The first item quoted is an equivalent to Bargello's vase and the latter one to a type found in contemporary figurative sources. The Venetian word «pipio» means, like in nineteenth century Italian, spout. We don't know the meaning of the word *inquartado*, or *inquartato*, in this case referred to the vases, often found in Murano's Renaissance documents. This kind of vase has been associated to the Catalan almorratxa used as a sprinkler, but the Venetian vase is clearly a bouquetière as seen in an engraving by Francesco Villamena (Fig. 8). The first edition of the engraving dated 1603 is derived from the *Annunciation* by Ippolito Andreasi in the church of S. Maria Assunta e S. Cristoforo in Castello in Viadana (Mantua); the vase reproduced in the engraving is not depicted in the painting (1602). The bouquetière shows flowers in the mouth and in the spouts. The Muranese inventory and the Roman engraving are useful to date the design of this vase between the end of the sixteenth century and the beginning of the seventeenth century. The dating is confirmed also by other figurative sources of the period⁵⁷. Another painting of unknown location by Tiberio Titi (1578-1637), *Ritratto della famiglia di Giovanni Battista Strozzi*, shows a similar silver bouquetière with spouts. A vase with three spouts in silver is in the museum of Tesoro di S. Maria, Impruneta (Firenze), with three coats of arm, Strozzi, Corsini and Nicolini. It was made for the procession of the 2 October 1633⁵⁸.

Per Lisbona... foggie di liono, ... Per Spagna vetraria come sopra...

To Lisbon... Lion shapes... to Spain glass products as above...

This information cannot be ignored as the late Renaissance type of the lion-shaped ewer is generally considered to be of

⁵⁶ Zecchin 1989 : 166.

⁵⁷ Barovier Mentasti and Tonini 2013: 46, no. 53; Gregori 2003: 46.

⁵⁸ Benporad 1992: 178-179, no.112.

Catalonian origin. Lion-shaped ewers were blown in a two-part mould, are crowned and their tubular tail forms the spout of the ewer. Some are winged lions, as the lion of Saint Mark, symbol of Venice. Several of them lost their glass stem, which was replaced by a metal one. Few examples have an original glass stem and foot, which have nothing specifically Spanish as in the glass lion depicted in a drawing of the *Bichierografia* by Giovanni Maggi, dated 1604. Such lions are sometimes made of coloured glass or are gilt or decorated with coloured flecks or slices of millefiori canes, embedded in the wall. The *Memoria* supports the attribution of the lion in the Waddesdon Manor collection to Venice by Robert J. Charleston, who considered the high technical quality⁵⁹. The problem is still open.

The *Memoria* of 1592 concerns general exports but inventories of royal or noble families list Venetian glass vessels, commissioned by eminent purchasers eager to get rare novelties, which could not be found in the local market. Among these particular inventories *El primero inventario de el Pardo 1564* is very important for glass history. The inventory of el Pardo Palace (1564), related to Charles V (1500-1558) and Philip II (1527-1598), where 300 *Vidrios de Venecia* are mentioned, is very useful, if compared with Venetian documents. It gives an interesting overview of the glasses exported from Murano to Spain, twenty-eight years earlier than the Tuscan document, *Memoria di vetrerie che si cava di Murano*. As stated previously, the *cañones* quoted in the Spanish inventory have been identified with the *bicchieri grandi, alti*, the Stäggenglaser, sent to Germany. Particularly interesting are also the quotations of some glasses, jugs and bowls, diamond-point engraved (*garafas pequenās ...labradas; copas pequenās ...labradas*). The request of further diamond – point engraved Venetian vessels by Philip II in the following years (1585) is well documented in the correspondence of the Spanish ambassador in Venice, D. Cristobál de Salazar⁶⁰.

There are other documents which confirm the export of Venetian glass to the Spanish court. These are preserved in the

⁵⁹ Charleston 1977: 21, 96-99.

⁶⁰ Rodríguez García 1995: 51.

Archivo General de Simancas and are dated 1559-1570. They report the shipment of several boxes with glasses along with Titian's paintings to Philipp II by the Spanish ambassador in Venice, Garcíá Hernández⁶¹.

Once calderas de vidrio elado por dorar

Eleven ice-glass bucket gilt or to be gilt

The above Spanish inventory is particularly interesting because ice-glass objects are quoted in the consistent number of sixty-five. It is an early documentary source in relation to the well-known Muranese Bortolo d'Alvise's inventory (1569) and it anticipates the Venetian production of ice-glass at the beginning of 1560s. In Bortolo's document *un sechielo a giasco con fil d'oro*, an ice-glass bucket with a gilt thread, is reported⁶². In another inventory of the same Muranese glassmaker, recently published, *sechieli a giasco cornisadi d'oro*, ice-glass buckets with gilt frames are listed. These may find a parallel with a glass in Brescia's Musei Civici⁶³ (Fig. 9). The holy dimension of these kind of objects is quoted in Venetian and Italian documents of the sixteenth century. Amongst the glasses in *cristallo* stolen to the chaplain of S. Maria degli Angeli in Murano (1458) there was a *sechielo ad aqua santa*, a bucket for holy water⁶⁴. In the inventory of the Dragans' important Murano glasshouse, dated 1508, are reported *tre sechii grandi cum certi spergoli*, three big buckets with some aspersories, all of them made of glass⁶⁵. In Venetian language *spergolo* means aspersory, used for holy water. A holy use of buckets, made also of other materials, was conceived also when these objects were part of Renaissance ladies' trousseaus. It was suggested to young brides to place them in their

⁶¹ Mancini 1998: 252, 255, 258-260, 265-266, 273, 281, 294-295, 326, 358, 362.

⁶² Zecchin 1989: 174.

⁶³ Zecchin 2009: 33; Barovier Mentasti and Tonini 2012: I/21.

⁶⁴ Zecchin 1990: 60.

⁶⁵ Ibid.

bedroom and to bless every day their bedroom, the bed itself and themselves⁶⁶. In the important and rich inventory *post mortem* of Eleanor of Aragon, wife of Ferrara's duke, Ercole I d'Este, dated 1493, there are several Venetian glasses and among them there are three glass buckets. For two of them, with their aspersory, their holy destination is clearly quoted, instead the third one's specific use is unknown: *uno sechio de acqua sancta de vedro calcedonio col suo asperges*, a chalcedony glass bucket for holy water with its aspersory, *un altro sechiello de vedro azuro de aqua sancta col suo asperges*, another blue glass bucket for holy water with its aspersory, and *un sechiello de vedro biancho dorato*, a gilt *cristallo* bucket⁶⁷. The chalcedony glass bucket quoted above might be particularly precious; until now any existing ones are unheard of. Such an object is also reported in the inventory *post mortem* of the Venetian noble lady Elena Capello, dated 24 May 1503: «uno secchietto de vero di calcedonio fornito di rame dorado con el suo spergolo da aqua sancta cum una cusilier di buovolo», a chalcedony glass bucket with gilt copper finishings with its aspersory for holy water with a spoon shell-shaped or made of shell (?)⁶⁸. As to Murano inventories, *uno sechielletto de calzedonia*, a small chalcedony glass bucket, is listed in Giovanni and Marietta Barovier's inventory in 1496, while there are some small ones also in a group of enameled and gilt vessel in the Dragan's inventory (1508) quoted above⁶⁹.

A secular, non religious, destination is hypothesised for «due secchielli di christallo, lavorati a giaccio et oro», two gilt *cristallo* ice-glass buckets, set with *dodici gotti et quattro ampolle da aqua tutti con oro*, twelve goblets and four ewers for water, all of them gilt. They were sent to the duke of Mantua, Guglielmo Gonzaga, by his envoy in Venice, who was in charge of buying commodities for the court. These pieces bought in July 1572 would be probably used as *rinfrescatoï*, cooling bowls⁷⁰. The use of another bucket is unknown:

⁶⁶ Musacchio 2008: 175-176.

⁶⁷ Archivio di Stato di Modena, *Amministrazione Guardaroba*, b. 114, 107; Barovier Mentasti and Tonini 2013:213.

⁶⁸ ASV, *Giudici del Proprio, Mobili 2*, fol. '223-225 or 5'-7; Jestaz 1998: 711-712.

⁶⁹ Zecchin 1989: 212. Zecchin 1990: 59.

⁷⁰ Sogliani 2002: 176-177.

un calderon de vidrio de Venecia, cincelado, con su asa y unas medallas dorada, a glass bucket from Venice, engraved, with its handle and with some gilt prunts, quoted in a Spanish inventory, belonging to the third duke of Albuquerque, D. Beltrán de la Cueva, dated 1560⁷¹. The mention of such a piece in these years is interesting, revealing the appreciation for Venetian blown glass decorated by diamond-point engraving, which was recently fashionable. This technique had been developed by the muranese Vincenzo d'Angelo who obtained a patent for its application on blown glass in 1549.

APPENDIX

The inventories discussed are listed chronologically

El primero inventario de el Pardo 1564

In Sánchez, Cantón. 1934. *El primero inventario de el Pardo*(1564). In *Archivo Espanol de Arte y arqueologia*, Vol. 10. Madrid, 1934: 70-75.

Inventario de las cosas que al presente estan en la Casa del Pardo...

VIDRIOS DE VENECIA

*diez y ocho copas imperiales con sus sobre copas de vidrio elado
tres copas grandes imperiales con sus sobre copas de vidrio elado
otras nueve copas con las armas imperiales en las sobre copas de diferentes hechuras y algunas doradas y otras no
otraz diez copas con sus sobre copas sin armas
veinte garafas pequeñas con vnos botoncillos dorados y otras sin ellos y algunas dellas labradas
una garafa grande elada con dos botones dorados
trece copas con sus sobre copas abolladas
otras doce piezas de la misma hechura lisas
veinte y cinco de vidrio con sus sobre copas abolladas con sus asas y sobre copas
otras veinticinco piezas de vidrio raso con sus asas y sobre copas
mas veinte piezas de vidrio elado con sus sobre copas
otras catorce piezas de la misma manera de vidrio por elar abolladas
más veintiseis copas de dos piezas que sirven para agua y vino*

⁷¹ Inventario [1560] 1883: 102.

doce vidrios altos con sus sobre copas lisos
otros tres vidrios mayores de la misma hechura abollados del medio abajo
más quatroos flascos almarraxados con sus tapadores
más seis cañones lisos con sus tapadores
otros quatroos elados de la misma manera
otro cañon de vidrio abollado
diez y ocho vidrios con sus sobrecopas lisos
ocho toneles elados con sus sobrecopas
once copas labradas con sus sobrecopas entre grandes y chicas
ocho grandes de vuna hechura sin sobrecopas
veinte y tre copas pequeñas todas de vna hechura algunas labradas y otras no y otras doradas y
otras no
cinco calderas grandes doradas
otras tres medianas doradas
otras dos pequeñas por dorar
otras once calderas de vidrio elado por dorar
cinco copas largas ahusada y lisas

Inventario di Bortolo d'Alvise, 17 novembre 1569

Archivio di Stato di Venezia, *Podestà di Murano*, b. 207

In Zecchin, Paolo. 2009. Due importanti inventari muranesi del Cinquecento.

Rivista della Stazione Sperimentale del Vetro 39/5 settembre-ottobre: 27-34

Tanti vasi non specificati e tanti rui...

Bacileti schieti n.5

Bacili de più sorte n.8

Bacili schieti n.9

Basole spese n.3

Basole n.16

Bembi grandi de più sorte n.13

Benbeti n.11

Boccali schietti n.5

Botaci da dui calti n.22

Botesella cornisada de oro n.1

Boteselle azure dorade n.6

Boteselle verde n.13

Cadene de vedro dorade

Campane n.17

Campanelle piccole n.3

Candellieri n.2

Carafina con il manegho n.1

Catelane a gamba parte dorade n.28

Catelane squarade meze d'oro n.7
Catramessi grandi n.4
Cesendelli a zogia alla ceciliana n.4
Cesendelli alla romana da coeta n.9
Cesendelli alla turchesca n.6
Cestelle e basole de diverse sorte n.119
Cheba de lastrelle granda n.1
Coverchi doradi n.5
Ferali grandi n.5
Fiasco schieto con pé soto n.1
Filli de diversi colori n.12
Francioso intagiado n.1
Franzosi schietti n.6
Franzosini bufadi d'oro n.28
Franzosini schietti coverti n.3
Franzoso verde grandano n.1
Gotti thodeschi con Armi recoti de più sorte n.71
Gotti d'Acil indoradi et intagiadi n.4
Gotti d'Acil intagiadi n.2
Gotti d'Acil schietti n.42
Gotti d'Acil spessi grandi n.2
Gotti da cordes n.20
Gotti da tre gropi n.3
Gotti del duca con loro [orlo]d'oro n.17
Gotti grossi da thodesco da morise n.94
Gotti mesani da thodesco da morise n.60
Gotti recoti a fogiame n.10
Gotto a pimpinella n.1
Gotto d'Acil grande e schietto n.1
Impole da relógio grande per Costantinopoli n.47
Impoletine da chiesa schiete n.9
Inghistere da fresco n.3
Lavori cioè poci (?) et ducalini con loro de oro n.53
Lavori con maneghi a fil d'oro n.15
Lavori da gamba de più sorte n.144
Lavori d'azzurro doradi n.125
Lavori schietti con maneghi n.52
Lavori todeschi intagiadi n.4
Malmoreti schietti d'oro n.7
Mastellete da mortar n.48
Mastelli coverti intagiadi n.4
Mastelli n.7
Mastrapa intagiadi n.18

Mastrapa intagiadi n.3
Mastrapa intagiado n.1
Mastrapa tutti d'oro n.5
Mastrapani spessi n.6
Morteri grandi di lastrelle indonadi con coverchio n.2
Mostranza granda n.1
Oche turchesche n.7
Orinaleti de retortoli n.3
Orinali a zogia n.15
Orinali per Costantinopoli n.10
Orinali n. 7
Ornete depente n.8
Parlatine con fil de oro n.5
Piati con li Armi recoti n.3
Piati de vedro con un retortolo in bocca n.24
Pignatelle con il manegho n.12
Pomaci a scartozzo n.17
Pomaci con la orneta depoza (?) con fil d'oro n.15
Quadretto de lastrelle con uno Christo n.1
Quadri grandi con lastrelle figuradi n.3
Quadri grandi con lastrelle n.4
Saltanie grande con gropo schiete n.4
Saltanie intagiade n.5
Saltanie lavorade n.2
Scatolete et mastelleti alla fiorentina de cristallo n.72
Sechi mantoani con il fil d'oro et cornise n.9
Sechi mantoani schieti n.3
Sechieli a giacio cornisadi d'oro n.10
Sechieli schieti n.7
Cancellare sechieli
Sechieli n.20
Sechieli azuri doradi n.25
Sechieli bassi schieti con 2 maneghi n.7
Tabernacoli n.15
Tapsi intagiadi n.12
Tapsi n.7
Tondi con arme recote n.7
Tronchoni de retortoli Libbre 10
Vaseti a redeseo vechio n.2
Vaseti schieti stampadi n.93
Vaseti spessi stampadi n.5
Vasi a pimpinella recoti n.9
Vasi cornisadi d'oro n.9

Vasi grandi indoradi con aquile dentro n.4

Vieri chiari grandi n.4

Ziati lavoradi n.9

Zotole azure dorade n.40

Zotole e basolete spesse pizole n.18

Zotoli schieti con li maneghi n.86

Inventario G. Antonio Zanchi dal Castello, 22 gennaio 1577 (more Veneto, quindi 1578)

Archivio di Stato di Venezia, *Podestà di Murano*, b. 207, cc. 525-527

In Zecchin, Paolo. 2009. Due importanti inventari muranesi del Cinquecento.

Rivista della Stazione Sperimentale del Vetro 29/5 settembre - ottobre:27-34.

Artelarie de vedro n.7

Bacil de redesello con el fondi de lastrele n.1

Bacil de retortoli spesso n.1

Bacili grandi figuradi n.4

Bacileti et piateli diversi n.15

Bacili grandi n.2

Bacili mezani chiari e spessi n.4

Basole a figure n.2

Bembi doradi n.3

Bembi lavoradi de redesello n. 14

Bembo spesso de color n.1

Botesella indorà n.1

Boteselle schiette et a onde e a schachi n.50

Cadelela de vero fata a lume biancha granda n.1

Caenele [catenelle] fatte a lume nuove, mazeti

Caineli [catini piccoli] a giazio e sechii mantoani in tutto n.14

Candelier all'antiga spesso piccolo n.1

Candelieri a giazio n.2

Candelieri de vero n.8

Catelanete spesse chiare et schiete in tutto n.62

Cestele doi a figure, tonde n.2

Cestelle con figure n.3

Cestelle spesse squaræ n. 30

Credenziera verde dorade et intagiade, una con coverchio e l'altra senza n.2

Feral grandio storto n.1

Feraleti piccoli schieti n.2

Ferali n.7

Fontana n.1

Franzosini con arme et altri goti con arme smaltade n.33

Item altri doi a pimpinela n.2
Goti da cil smaltadi n.2
Goti con morisa verde n.2
Goti da cil chiari n.27
Goti da cil con arme et altre sorte con arme ,in tutto n.18
Goti da cil con arme smaltadi n.9
Goti da cil grandi e schieti n.5
Goti da cil overo canoncini chiari, diversi piccoli et grandi n.34
Goti da cil piccoli a friso d'oro coverchiadi n.16
Goti da cil schieti informadi n.10
Goti da cil smaltadi n.2
Goti da cordes verdi intagiadi n.6
Goti intagiadi con aquile n.6
Goti intagiadi e inquartadi d'oro et uno con friso,in tutto n.4
Goto da spander n.1
Goto de acil smaltado a magnifichi n.1
Goto grando da spander n.1
Hora de vero n.1
Impolet con pipio n.2
Lavoreti diversi azuri et negri n.44
Lavoreti piccoli azuri n.8
Lavoreti diversi piccoli schieti n.13
Lavori diversi n.44
Mastelli grandi doradi doi et uno de redesello in tutto n.3
Mastelli mezani con coverchio con aquila doradi n.4
Mastrapà nuovo e un tapsi n.2
Mastrapani de latimo doradi n.5
Mastrapani lavoradi n.3
Meza nosa con coverchio a schachi n.1
Morisete verde n.2
Paternostri de vero biancho, mazo n.1
Paternostri verdi filze n.4, in tutto sono n.46
Piati mezani e picoli schieti e chiari e a giazio n.72
Quadreto lustrado a figure con la cassa d'ebano n.1
Quari de lastrelle figuradi (doi piccoli e tre grandi) n.3
Quare spese longhe n.7
Quare ditte schiete n.12
Saliere a zate [zampe] n.2
Saliere spese a medusa n.6
Sechie mantoane con un lion biancho drento n.2
Sechieli a giazio con zate de lion n.2
Sechieli diversi n.7
Sechieli doradi n.12

Sechieli pizoli et grandi schietti, azuri et spessi, in tutto n.25
Specchio de cristal mezan con la casseta d'hebano lustrado n.1
Tabernaculi schietti e a schachi e a onde et morteri con coverchii n.50
Tabernaculo grandio con zate d'oro n.1
Terace senza coverchio spesse chiare et a zogia et schiete in tutto n.116
Vasi schietti n.2
Vasi chiari n.11
Vasi de redeseello grandi con coverchio e senza rotti e boni n.6
Vasi diversi doradi n.26
Vasi diversi lavoradi, parte mezani, parte grandi, parte piccoli n.290
Vasi doradi a fuogo a giazzi et schietti con aquila e senza n.32
Vasi doradi a fuogo con li maneghi a foza de lion doradi a fuogo n.8
Vasi doradi nuovi doradi a putini [puntini] n.3
Vasi grandi a giaso cornisadi d'oro con li coverchi con aquila e senza n.6
Vasi in stampa n.5
Vasi mezani et piccoli, schietti et a giazio et in stampa et no in tutto n.50
Vasi spessi n.6
Vaso nuovo dorado a figure n.1

Memoria di vetrerie che si cava di Murano 1592

Firenze, Archivio di Stato, Mediceo, 1240, c. 110.

In Corti, Gino. 1971. L'industria del vetro di Murano alla fine del secolo XVI in una relazione al Granduca di Toscana. *Studi Veneziani* 13:649-654.

Venetia si consuma vetri di più sorte, e sono delle fazzioni sotto scritte,
per circa

duc. 25.000

Guastade ordinarie in grosso lire 7 ½ il cento
Dette larghe di boccha lire 8 il cento
Dette di cristallo bollito lire 40 il cento
Bicchieri ordinarii lire 3 in 3 ½ il cento
Detti di cristallo ordinarii lire 7 in 7 ½ il cento
Detti con oro lire 20 in 21 il cento
Detti di cristallo bollito schietti lire 40 il cento
Detti lavorati lire 45 cento
Occhi da finestre di cristallo ordinario lire 8 fino a 10 il cento
Detti piccholi comuni lire 30 in 35 il cento delle libbre;
tutti gli altri vanno a numero

Per tutta la terraferma del dominio e la Lombardia per
e va della sorte sopra detta

duc. 15.000

Per la Sicilia, Napoli e Roma e Puglia per

duc. 12.000

nel qual luogo va alcune guastade picchole e bicchieri di cristallo ordinario e de' bolliti la maggior parte, per li prezzi detti di sopra, con alcuni bicchieri e ampolle dipinte, secondo l'uso di quel paese, di niepitella, maiorana, fiori e simili.

Per Costantinopoli vetreria di più sorte, per *duc. 10.000*
Guastade con il collo lungo con laticino bianco, che
vagliano lire 30 fino a 35 il cento
Bochali di vetro coperti, detti mastrapani, simili,
lire 50 e 60 e 70, secondo la grandezza
Lampane di moschee al modo delli ebrei e altre foggie,
secondo l'ordine e le bizzarrie di tal gente.

In Alessandria d'Egitto vetreria simile a quella di Costantinopoli, per *duc. 5.000*
Nel qual luogo vanno cose come in Costantinopoli e
Alcune guastade picchole con il collo sottile e lungo

Per Alemagnia ne va pochi, potria esser per *duc. 3.000*
Nel qual luogo va bichieri grandi, alti, di più sorte,
ma tutti passono lire 25 fino a 30, 35 il cento.
Altri coperti e lavorati con laticino et altri colori, che
Costano fino a 80 e 90 il cento. Altri in modo di
Tabernacoli, alcuni messi a oro, di prezzo di lire 1 ½,
lire 2 e 3 e 3 ½ il pezo

Per Lisbona vetraria fina e cristalli assai per *duc. 10.000*
Cristalli bolliti, grandi, di lire 40 fino a 50 cento,
foggie di liono, nave, sporte, fontane, tal pezo lire 1,
1 ½, lire 2, 2 ½ e lire 3 il pezo, e spechiere fornite.

Per Spagna vetraria come sopra e specchi *duc. 12.000*
Margherite, smalti, contarie, paternostriami

Per Soria e Aleppo questi mercanti mandano per *duc. 20.000*

Per Spagna e per l'Indie, per *duc. 30.000*

Spechiami grezzi di più sorte, da lavorare, che vanno per
tutto il mondo, per *duc. 40.000*

Avvertendo che questi dua anni non si è venduto per la metà per le penurie passate; e di fornace 40 in circha, che lavorano giorno e notte continuamente, son ridotte al numero di 24 in circha, con apparizione di scemare, se la stagione non restaura, e questi haverne gran quantità adosso.

Consuma Murano in vetrerie e paternostrani per meglio di un milione e dugentomila migliaia di sode l'anno.

Questo è quanto si è potuto ritrarre, e ci pare che siano tutti li capi che avete domandato. Se bisogna qualche cosa di più, replicate.

REFERENCES

- Aretino, Pietro [1542] 1998-2002. *Lettere*. Edited by P. Procaccioli. 4 vols. Roma: Salerno editrice.
- Artioli, Umberto. 1999. Le grottesche di Palazzo Berla. *Primafile* 52:20-25.
- Auld, Sylvie. 2007. Il Maestro Mahmud e i metalli ageminati nel XV secolo. In *Venezia e l'Islam (828-1797)*, edited by S. Carboni. Venezia: Marsilio.
- Baldassari, Francesca. 1998. *Cristoforo Munari*. Milano: Federico Motta Editore.
- Barovier Mentasti, Rosa. 1982. *Il vetro veneziano*. Milano: Electa.
- Barovier Mentasti, Rosa and Cristina Tonini. 2012. I vetri. In *Collezioni e collezionisti. Arti applicate dei Civici Musei di Arte e Storia di Brescia*, edited by Antonio B. Spada and Elena Lucchesi Ragni. Brescia: Grafo.
- Barovier Mentasti, Rosa and Cristina Tonini. 2013. *Fragile. Murano, chefs-d'oeuvre de verre de la Renaissance au XXIe siècle*. Paris: Gallimard.
- Baumgartner, Erwin 1998. *Venise et Façon de Venise. Verres Renaissance du Musée des Arts Décoratifs*, with contribution of Jean-Luc Olivie. Paris: Union Centrale des arts décoratifs.
- Benporad, L. E., ed. 1992. *Argenti fiorentini dal XV al XIX*. Firenze: Spes.
- Boesen, Gudmund. 1960. *I vetri veneziani del castello di Rosenborg. Venetian Glass at Rosenborg Castle*. Copenhagen: De danske Kongers Kronologiske Samling på Rosenborg – I commission hos G. E. C. Gads Forlag.
- Bourqui, Claude. 1999. *La commedia dell'arte, Introduction au théâtre professionnel italien entre le XVIe et le XVIIIe siècle*. Liège: Ed. Sedes.
- Calouste Gulbenkian Museum Guide. 2013. Edited by J. Castel-Branco Pereira and Nuno Vassallo e Silva. Lisbon: Calouste Gulbenkian Foundation.
- Carboni, S., ed. 2006. *Venice and the Islamic World 828-1797*. Paris: Gallimard.
- Castelnuovo, Enrico. 1995. *Il Castello del Buon Consiglio. Percorso nel Palazzo Magnò*. Trento: Cassadi Risparmio di Trento e Rovereto e Temi.
- Charleston, Robert J. 1977. *Glass*, in Charleston, Robert J. – Archer, Michael – Marcheix, Madeleine, *Glass and Stained Glass. Limoges and other painted Enamels. The James A. de Rothschild Collection at Waddesdon Manor*. London: National Trust. Friburg: Office du Livre.
- Clarke, Timothy H. 1974. Lattimo-A Group of Venetian Glass Enameled on an Opaque-White Ground. *Journal of Glass Studies* 16:22-56.
- Cocco, E. 1915. Una compagnia comica della prima metà del XVI secolo. *Giornale Storico della Letteratura Italiana* 65:55 ss.

- Corrain, Lucia. 1986. La commedia dell'arte nelle corti tedesche. In *Venezia e la Germania, Arte, politica, commercio, due civiltà a confronto*. Milano: Electa.
- Corti, Gino. 1971. L'industria del vetro di Murano alla fine del secolo XVI in una relazione al granduca di Toscana. *Studi Veneziani* 13:649-654.
- Del Cerro, Emilio. 1914. *Nel regno delle maschere, dalla commedia dell'arte a Carlo Goldoni*. Napoli: Francesco Perella S. A. Editrice.
- Curatola, Giovanni and Spallanzani Marco, ed. 1981. *Metalli islamici delle Collezioni Granducali. Museo Nazionale del Bargello*. Firenze: S.P.E.S.
- Dreier, Franz Adrian. 1988. *Glass*. In *The Hockemeyer Collection. Maiolica and Glass*. Bremen: H.M. Hauschild GmbH Verlagshaus.
- Du Bellay, Joachim. 1948. *Les regrets suivis des Antiquités de Rome, Texte établi, annoté et précédé d'une introduction par Pierre Grimal*. Paris: Éditions de Cluny.
- Egg, Erich. 1962. Die Glashütten zu Hall und Innsbruck im 16. Jahrhundert. *Tiroler Wirtschaftsstudien* 15:1-100.
- Garzoni, Tommaso. 1585. *La piazza universale di tutte le professioni del mondo*. Venetia: Gio. Battista Somascho.
- Gasparetto, Astone. 1958. *Il vetro di Murano dalle origini ad oggi*. Venezia: Neri Pozza Editore.
- Giusti, P., ed. 1994. *Il Museo Duca di Martina di Napoli* 1994. Napoli: Electa Napoli.
- Gregori, Mina, ed. 2003. *La natura morta italiana da Caravaggio al Settecento*, 2003. Milano: Electa.
- Harrison-Hall, Jessica. 2001. *Catalogue of Late Yuan and Ming Ceramics in the British Museum*, London: British Museum Press.
- Inventario del Moviliario, Alhajas, Ropas, Arméria y otros efectos del excmo. Sr. D. Beltrán De La Cueva, tercer duque de Albuquerque, hecho el año 1560. 1883. *Revista des Archivos, Bibliotecas y Museos* 1: 101-102.
- Jonard, Norbert. 1982. *La commedia dell'arte*. Lyon: Editions Hermes.
- Jestaz, Bertrand. 1998. L'orfèvrerie et les objets précieux à Venise dans la première moitié du XVIe siècle d'après les inventaires. *Mélanges de l'Ecole française de Rome. Italie et Méditerranée* 2:702-729.
- Katritzky, M.A. 2006. *The Art of Commedia, A Study in the Commedia dell'Arte 1560-1620 with Special Reference to Visual Records*. Amsterdam-New York: Editions Rodopi BV.
- Lazar, Irena and Hugh Willmott. 2006. *The Glass From The Gnalić Wreck*. Koper: Annales Mediterranea.
- Komaroff, Linda. 1992. *The Golden disk of Heaven, Metalwork of Timurid Iran*. Costa Mesa - New York: Mazda.
- Kramarowsky, Mark. 1998. The import and manufacture of glass in the territories of the Golden Horde. In *Gilded and Enamelled glass from the Middle East*, edited by R. Ward. London: British Museum Press: 96 - 100
- Mancini, Matteo. 1998. *Tiziano e le corti d'Asburgo nei documenti degli archivi spa-*

- gnoli*. Venezia: Istituto Veneto di Scienze, Memorie classe di Scienze Morali, Lettere e Arti, Vol. 85.
- Minini, Martina. 2009. Reperti vitrei da un'indagine archeologica presso piazza San Marco a Venezia: 'intervento nell'ex-cinema San Marco. Atti del Convegno intorno all'Adriatico. *Quaderni Friulani di Archeologia* 19:171-177.
- Morselli, Raffaella, ed. 2002. *Gonzaga. La Celeste Galleria. L'esercizio del collezionismo*. Ginevra-Milano: Skira.
- Mosel, Christel. 1979. *Glas, Mittelalter - Biedermeier, Sammlungskataloge des Kestner - Museums Hannover*. Hannover: Zweite Bearbeitete Auflage.
- Musacchio, Jacqueline, M. 2008. *Art, Marriage and Family in Florentine Renaissance Palace*. Los Angeles: Getty Foundation.
- Newby, Martine S. 1998. The Cavour Vase and gilt and enamelled Mamluk coloured glass. In *Gilded and Enamelled glass from the Middle East*, edited by R. Ward. London: British Museum Press:35 - 40.
- Padoan Urban, L., ed. 1986. *Il carnevale veneziano nelle maschere incise da Francesco Bertelli*. Milano: Il Polifilo.
- Page, Jutta-Annette. 2004. *Beyond Venice. Glass in Venetian Style 1500-1750*. With contributions by Ignasi Doménech, Alexandra Gaba-Van Dongen, Reino Liefkes, Marie-Laure de Rochebrune, Hugh Willmott. Corning (N. Y.): The Corning Museum of Glass.
- Palumbo Fossati, Isabella. 1984. L'interno della casa dell'artigiano e dell'artista nella Venezia del Cinquecento. *Studi veneziani* 8:109-153.
- Page, Jutta-Annette. 2006. *The art of glass. Toledo Museum of Art*. Toledo-London: Toledo Museum of Art in association with D. Giles Limited.
- Pandolfi, Vito. 1957. *La commedia dell'arte*. 2 vols. Firenze: Edizioni Sansoni.
- Pandolfi, Vito. 1969. *Il teatro del Rinascimento e la Commedia dell'Arte*. Roma: Lerici editore.
- Pao Show, Lino, 1998. *Catalogue of the Special Exhibition of Selected Hsüan-te Imperial Porcelains of the Ming Dynasty*. Taipei: National Palace Museum.
- Pellegrini, Giovanni Battista. 1972. *Gli arabismi nelle lingue neolatine con special riguardo all'Italia*. 2 vols. Brescia: Paiadeia.
- Petricioli, Sofia. 1974. The Gnalić Wreck: The glass. *Journal of Glass Studies* 15:85-92.
- Rauhut, Franz. 1971. La commedia dell'arte in Baviera. In *Studi sul teatro fra Rinascimento ed età barocca*, edited by M.T. Muraro. Firenze: Olschky.
- Rebecchini, Guido. 2011. Portraits by objects. Three 'Studioli' in sixteenth-century Mantua. In *Mantova e il Rinascimento italiano. Studi in onore di David. S. Chambers*. Mantova: Sometti.
- Rodríguez Garcíá, Justina. 1995. La Façon de Venise en Castilla. *Espacio, Tiempo y Forma.H.a Moderna* 8:49-61.
- Sanchez Canton, Francisco Javier. 1934. El primer inventario del Palacio de El Pardo (1564). *Archivo Español de Arte y Arqueología* 10: 69-75.

- Sogliani, Daniela. 2002. *Le collezioni Gonzaga. Il carteggio tra Venezia e Mantova (1563-1587)*. Milano: Silvana Editoriale.
- Sterling, Charles. 1943. Early paintings of the commedia dell'arte in France. *The Metropolitan Museum of Art Bulletin* 1:11-32.
- Tait, Hugh. 1979. *The golden age of Venetian glass*. London: The Trustees of the British Museum.
- Tait, Hugh. 1991. *Europe from the Middle Ages to the industrial Revolution*. In *Glass. 5,000 Years*, edited by H. Tait. London: The Trustees of the British Museum. 145-187
- The Collection of The Late Baroness Batsheva de Rothschild. Auction Thursday 14 December 2000*. 2000. London: Christie's.
- Trivellato, Francesca. 2000. *Fondamenta dei Vetrai. Lavoro, tecnologia e mercato a Venezia tra Sei e Settecento*. Roma: Donzelli.
- Zecchin, Luigi. 1987: vol. 1; 1989: vol. 2; 1990: vol. 3. *Vetro e Vetrai di Murano*. Venezia: Arsenale Editrice.
- Zecchin, Paolo. 2009. Due importanti inventari muranesi del Cinquecento. *Rivista della Stazione Sperimentale del Vetro* 5:27-34.



Fig. 1 - Small vase, Venice, second half of 16th century. Brescia, Musei Civici di Arte e Storia, Dono Alessandro Sala, *ante* 1841, inv. VT 93.

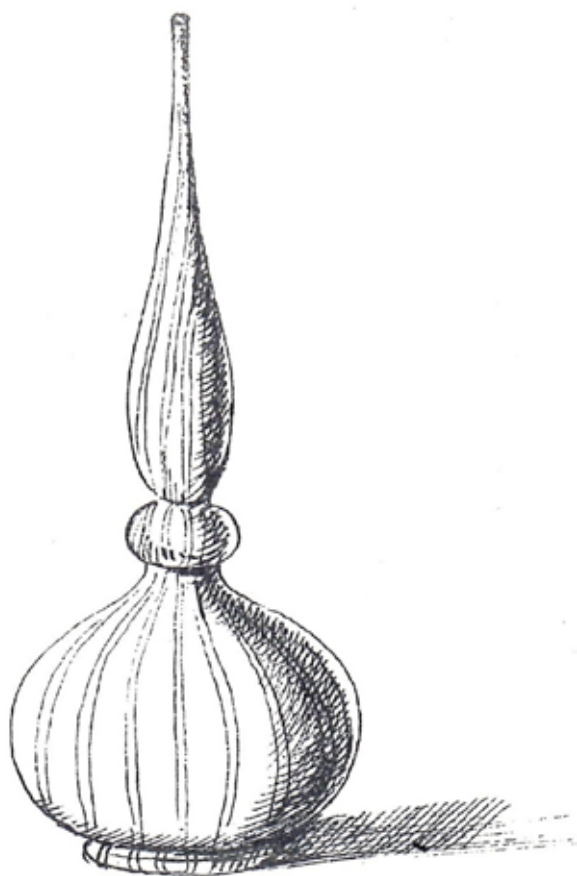


Fig. 2 - Giovanni Maggi, *Bichierografia*, 1604.



Fig. 3 - Enameled *mastrapà*, Venice, early 16th century. Murano, Museo del Vetro, inv. classe VI, n. 1004.



Figs. 4-5 - Stangenglas with 'Commedia dell'Arte' characters, Venice, 1570-1580. Hannover, Kestner Museum, inv. R 1906, 61.



Figs. 6-7 - Two Reliquaries, Venice, second half of 16th century. Assisi, Convento di San Damiano.



Fig. 8 - Francesco Villamena, *Annunciation*, print, 1603. Budapest, Szépművészeti Múzeum, inv. 52358.



Fig. 9 - Bucket, Venice, second half of 16th century. Brescia, Musei Civici di Arte e Storia, Legato Camillo Brozzoni, 1963, inv. VT 66.

PAOLO ZECCHIN

THE INVENTORY OF MATTEO PRIULI
IN THE YEAR 1700

Reading inventories is one of the most boring activities which a frequenter of Venetian archives can pursue. The goods kept in ordinary houses is quite negligible and all palaces were furnished in the same way: a *portego*, a main hall, decorated by *cuori d'oro*, gilt leathers, but generally rather empty (sometimes there is a fountain to wash one's hands or a *renfrescadora con brocca e scudelin*, that's a cooler with jug and bowl, then a lantern with its glasses, or a *cesendello di laton*, that's a brass hanging lamp) and the other rooms of the mansion decorated by *cuori d'oro* too, by usual furnishings and sometimes by a mirror.

Before the XVIII century no glass chandelier (rooms were lit by brass candlesticks, as a rule kept in the kitchen and used jug only when a little light was required) and some mirrors. Pewter and *latesin* (very light blue pottery) vessels and seldom glass vessels in the kitchen. Indeed if one looks for glass items in old inventories, he finds very few of them, also in glassblowers' homes, save in Murano workshops. There are some exceptions, nevertheless, as the palace in Padua, inhabited by a Venetian nobleman. On 3 August 1700 there were a lot of paintings (but few books), many silver and ivory items, musical instruments, plaster and alabaster animals, but above all many glass items, *la maggior parte bagatelle e cose di pochissimo prezzo*, the majority bagatelles and very cheap things. The owner of such things was the noble abbé Matteo Priuli of the Priulis, called Scarponi, from S. Felice quarter in Venice. In the Museo del Vetro at Murano there are samples of glass types which could be the same as *volti interi, sive mascare di cristallo* (complete crystal faces, or masks), a flacon similar to flacons generally attributed to Perrotto.

As to the glass musket, in the Museo del Vetro there is a glass pistol.

The Murano Museum keeps also some table wares similar to some pieces in the Rosenberg castle. To the glass collection of Frederick IV of Denmark are related also the candlesticks and the *canevete* of our inventory, estimated incredibly much less than the pieces of the same years quoted by Gudmund Boesen in his catalogue of the Rosemborg castle glass collection.

Inventario de mobili et altro ritrovati al tempo della morte del quondam N. H. Abbate Matteo Priuli nella casa dal med.o abitata in Padova
(Archivio di Stato di Venezia, Giudici di Petizion. Inventari, b. 397)

In the house the most interesting items, listed and estimated, were:

- <i>Specchi tra grandi e piccoli</i> (large and small mirrors)	n. 5	L. 80:-
- <i>Quoridoro in diversi pezzi pelle</i> (many pieces of gilt leather)	509	360:-
- <i>Careghe grande di bulgaro</i> (large leather chairs)	14	200:-
- <i>Armari di pezzo con veri</i> (fir-wood cupboards with glass pieces)	5	80:-
- <i>Candelieri d'argento a sonde</i> (ribbed silver candlesticks)	4	m. v.
- <i>Agnus papale legato in argento, pietra stellaria legata in argento</i> (Agnus Dei medal with silver mounting, aventurine stone with silver mounting...)	2	3:2
- <i>Piati de peltre</i> (pewter dishes) [unusually no majolica or lattesin dish]	28	97:-
- <i>Possade d'argento e di ferro</i> (silver and iron cutlery)		
- <i>Comodità di nogara</i> (walnut close-stools)	8	16:-
- <i>Canevete grande in diverse misure con bozze</i> (large containers of different sizes with bottles)	3	20:-
- <i>Canevetta coperta in corame con 4 bozze con bocchini d'argento</i> (container with leather cover and 4 bottles with silver mouth and cap)	1	36:-

Glass items were kept "*in una camera col titolo di galleria*", in a room called gallery:

- <i>Balle di cristallo con i suoi piedistalli</i> (crystal glass globes with their stands)	2	1:-
- <i>Candellieri di cristallo a filigrana con sopra due balle di cristallo</i> (filigree crystal glass candlesticks with two crystal glass globes on them)	2	2:-
- <i>Chioche una di cristallo di montagna l'altra di cristallo ordinario</i> (chandeliers one made of rock crystal and another of crystal glass)	2	36:-
- <i>Graduario de tempo caldo e freddo con vetro</i> (measure for warm and cold weather with its glass)	1	m. v.
- <i>Lucerna perpetua di cristallo</i> (perpetual crystal glass lamp)	1	:2

- <i>Piati imperiali di cristallo uno con arma Priuli</i> (Imperial crystal glass platters, one of them with Priuli arms)	3	9:-
- <i>Specchio grande ad horologio con soaza d'intaglio dorata</i> (large mirror with clock, with engraved and gilt frame)	1	200:-
- <i>Scrigno grande di pero negro a rimessi d'avorio con sei collone di cristallo</i> (large casket made of ivory veneered black pear wood with six crystal columns)	1	310:-
- <i>Vasi da fiori di cristallo a filigrana</i> (filigree crystal bouquetière)	2	2:-
- <i>Crocifisso d'avorio in vetro con fiori</i> (ivory crucifix in glass with flowers)	1	2:-
- <i>Microscopio rotondo di cristallo</i> (round crystal microscope)	1	:4
- <i>Tazza di cristallo figurata</i> (figured crystal cup)		
- <i>Tazze di cristallo a fiori tre e una di diaspro</i> (three crystal cups with flowers and one jasper cup)	4	5:-
- <i>Calamario di vetro con pennarolo</i> (glass ink-stand with pen-holder)	1	:6
- <i>Ampoline di cristallo da messa 2, altre simili su un piatto di legno 2, bastone di cristallo</i> (crystal mass-cruets 2, other similar ones on a wood dish 2, crystal stick)	5	1:10
- <i>Carafine per acqua della Regina 4 vuote e una con acqua separata (?) con bocchino</i> (small flacons for Acqua della Regina, 4 empty ones and one full of water with spout or small mouth)	5	4:-
- <i>Carafine per acque rinfrescative 1, campanello di cristallo dipinto 1, fontana di cristallo che butta acqua 1, goti varij di cristallo 3, luci da oglio di cristallo 2</i> (small flacons for refreshing waters 1, small bell made of painted crystal 1, crystal fountain which pours water 1, different crystal beakers 3, crystal oil-lamps 2)	8	2:14
- <i>Mandolini di cristallo 1, rinfrescatoria di cristallo rotta 1, stoco simile 1, scetro Simile 1, sciaboletta simili 3, tazza con dentro altre 8, tazzette simili 1, tazze simili 9</i> (small crystal mandola 1, broken crystal wine cooler 1, crystal rapier 1, crystal sceptre 1, small crystal sabres 3, eight small cups inside another cup, small similar cup 1, similar cups 9)	26	9:10
- <i>Tabachiera di cristallo 1, altre simili una in forma di gallo e una in figura curva</i> (crystal snuff-bottle 1, a cock-shaped crystal one and a bent figure-shaped crystal one)	3	:14
- <i>Tartane piccolo di cristallo</i> (small crystal boats)	2	:12
- <i>Volti intieri, sive mascare di cristallo</i> (complete crystal faces or masks)	5	1:-
- <i>Armellino animale di vetro 1</i> (glass ermine, animal)		:6
- <i>Caneveta di cristallo a filigrana</i> (filigree crystal bottle container)	1	1:10
- <i>Capello di cristallo a filigrana</i> (filigree crystal hat)	1	1:-
- <i>Candellieri di girasole 2, altri di cristallo a filigrana</i> (<i>girasol</i> candlesticks 2, other crystal ones) [Fig. 1]	5	7:-

- <i>Campanello di girasole 1, carafine simili 2</i> (small <i>girasol</i> bell 1, small <i>girasol</i> flacons 2)	3	2:-
- <i>Carafine di cristallo a filigrana</i> (Small filigree crystal flacons)	2	1:-
- <i>Altre caraffe sive tazzette violete</i> (other small purple flacons or small cups)	3	1:-
- <i>Cervo di cristallo 1, cocumero simile 1, cedro simile 1</i> (crystal deer 1, similar water-melon 1, similar citron 1)	3	:18
- <i>Goto di cristallo a filigrana</i> (filigree crystal beaker)	1	:16
- <i>Grapolo d'uva vetro giallo</i> (a bunch of grapes made of yellow glass)	1	1:-
- <i>Piati da capon de cristallo</i> (crystal capon platters)	4	6:-
- <i>Piati di cristallo</i> (crystal dishes)	2	2:-
- <i>Porchetto marino di cristallo</i> (crystal sea pork)	1	:6
- <i>Sottocope di cristallo</i> (crystal bowl stands)	6	6:-
- <i>Altre con caraffine</i> (others with small bottles)	2	2:-
- <i>Saliera di cristallo</i> (crystal salt - cellar)	1	2:-
- <i>Tondi lavorati di cristallo</i> (worked crystal dishes)	4	2:-
- <i>Tabacchiere di cristallo diverse</i> (different crystal snuff-bottles)	3	:12
- <i>Vasi di cristallo finti latesin</i> (fake latesin crystal vases, looking like very light blue pottery)	2	1:-
- <i>Vasi di cristallo con manichi</i> (crystal vases with handles)	2	2:-
- <i>Botte di cristallo agghiato</i> (ice-crystal barrel)	1	1:-
- <i>Broche di cristallo una un poco rota</i> (crystal ewers, one a little broken)	2	:10
- <i>Carafine con bocchini 2, altre in forme di tabachiera</i> (small flacons with spouts 2, other flacons shaped like snuff-bottles)	4	1:-
- <i>Capriolo di cristallo, drago di cristallo</i> (crystal roe, crystal dragon) [Fig. 2]	2	:14
- <i>Cortelli, pironi, chochiari di cristallo</i> (crystal knives, forks, spoons)	8	1:10
- <i>Goti diversi di cristallo</i> (different crystal beakers)	6	1:-
- <i>Grapo d'uva di vetro turchino</i> (a bunch of grapes made of deep blue glass)	1	:10
- <i>Mondi di cristallo 3; medaglia con l'effigie di S. Carlo</i> (crystal worlds 3; medal with the portrait of S. Charles)	4	1:-
- <i>Piati mezi reali di cristallo</i> (half royal crystal platters)	6	6:-
- <i>Pavone di vetro tabacchiera, secchia di cristallo con sua cassa, tondo di cristallo, tazza di cristallo a fontana, triangolo di cristallo</i> (peacock-shaped glass snuff-bottle, crystal bucket with its box, crystal dish, fountain-shaped crystal cup, crystal triangle)	5	3:8
- <i>Tazza di cristallo di montagna a filigrana</i> (filigree rock crystal cup ?)	1	1:-
- <i>Vaseti da fiori di cristallo</i> (small crystal bouquettiers)	2	:16
- <i>Vaseto lavorato di cristallo con manichi fato a saliera</i> (small worked crystal vase with handles, shaped like a salt-cellar)	1	1:-

- <i>Allabarda grande di cristallo</i> (long crystal halberd)	1	1:-
- <i>Canna d'India di cristallo</i> (crystal rattan cane)	1	1:-
- <i>Schioppo grande di cristallo</i> (long crystal musket) [Fig. 3]	1	1:-

NOTES FOR A GLOSSARY

The *Candellieri di cristallo a filigrana con sopra due balle di cristallo*, filigree crystal glass candlesticks with two crystal glass globes on them, could be two candlesticks, which hold a globular oil reservoir, instead of a candle¹ (Fig. 4).

The *Balle di cristallo con suoi piedestalli*, crystal glass globes with their stands, should be simpler lamps².

The *chiocche*, chandeliers, are the most interesting items. This is the first time – I believe – in which we find a *chioca*, that's a Venetian chandelier with glass decoration. Here glass is called *cristallo ordinario*, to distinguish it from rock crystal (*cristallo di montagna*). Venetians began to replace rock crystal ornaments and pendants, which decorated bronze and brass chandeliers, by glass ones; the oldest (1709) known Venetian chandelier decorated by glass is kept in the Rosenborg castle in Copenhagen³.

The bunches of grapes (one made of yellow glass and the other made of deep blue glass), the water-melon, the citron were mould blown. The inventory, written on 9 April 1694, of the goods kept in the Croce d'Oro glassworks of late Ettore Bigaglia lists a *raspo*

¹ They could be similar to the lamp reproduced at the page 227 of the *Dizionario del vetro* by H. Newman (1993) or the lamp (formerly in the Florio collection) reproduced at the page 53 of: Molmenti 1929.

² Perhaps as the lamp kept in the Veste Coburg collection (Theuerkauff-Liederwald 1994: 496).

³ Boesen 1960: 138.

In the Priuli gallery there was also a *Chioca piccola d'avorio*, a small ivory chandelier. I think that ivory was not much used for such items unlike wood. In the Lippomano Donà Giovannelli palace in S. Fosca quarter (Venice) there were *tre chioche d'intaglio con cordonzin d'oro con 4 lumi per una*, three carved chandeliers with gilt cord with four lights each, in 1700 (Archivio di Stato di Venezia [ASV], *Notarile Atti*, b. 13905, in Rössler 2010). I believe they were made of wood.

d'uva in bronzo (a bronze bunch of grapes) and *stampi di cedro e naranza e cocumero e melon* (citrus and orange and water-melon and melon moulds)⁴.

Were the several animals (deer, dragon, roe, sea pork) oil lamps?

REFERENCES

- Newman, Harold, ed. 1993. *Dizionario del vetro*. Milano: Garzanti publ.
- Molmenti, Pompeo. 1929. *La storia di Venezia nella vita private*. vol. 3. Bergamo: Istituto Italiano di Arti grafiche.
- Theuerkauff-Liederwald, Anna-Elisabeth. 1994. *Venezianisches Glas der Kunstsammlungen der Veste Coburg*, Lingen: Luca Verlag.
- Boesen, Gudmund. 1960. *I vetri veneziani del castello di Rosenborg*. Copenhagen: F. Hendriksens Eftf. Reproduktions Atelier.
- Rössler, Jan-Christoph. 2010. *I palazzi veneziani: Storia, Architettura, Restauri. Il Trecento e il Quattrocento*. Venezia: Fond. Giorgio Cini.

⁴ ASV, *Podestà di Murano*, b. 206.



Fig. 1 - *Girasol* candlesticks, Venice, 1700 circa. Brescia, Civici Musei di Arte e Storia, inv. VT 176; VT 177.



Fig. 2 - Small crystal glass dragon, Murano, 1700 circa. Murano, Museo del Vetro, Classe VI, inv. 1266.

Fig. 3 - Crystal glass musket, Murano, 1700 circa. Murano, Museo del Vetro, Classe VI, inv. 0031



Fig. 4 - Crystal glass oil lamps, Murano, 1700 circa. Murano Museo del Vetro, Classe VI, inv. 1922; Classe VI, inv. 2214.

MARCO VERITÀ*

SECRETS AND INNOVATIONS OF VENETIAN GLASS
BETWEEN THE 15TH AND THE 17TH CENTURIES:
RAW MATERIALS, GLASS MELTING AND ARTEFACTS

From the fifteenth to the end of the seventeenth century, Venice has been the world leader in glassmaking. Murano's primacy was due to the extraordinary quality of its glass (homogeneity, transparency, palette of colours, etc.), the style of Venetian glassware, the skill of glassmasters and the wide range of products. This supremacy could be reached and maintained thanks to the fact that glassmaking in Venice has always been a dynamic craft. Since its beginnings it underwent radical changes and incorporated many innovations along the centuries. The oldest extant document attesting a production of glassware in Venice is a manuscript dating to 982 A.D.; nevertheless archaeological evidence of glassworking since the 7-8th centuries was found in the island of Torcello in the Venetian lagoon.

Since the origins the Venetian glass was (and is still today) of the soda-lime-silica type, that is mainly composed of sodium (Na_2O), calcium (CaO) and silicon (SiO_2) oxides¹. The reluctance of Venetian glassmakers to change the composition of their glass is rather complex to explain. Any glass represents a combination of properties: thermal (viscosity, workability), optical (colour, transparency), chemical (resistance to environmental attack, ...), etc., which cannot be modified separately and vary by changing the composition of glass (type and ratios of the components).

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¹ Other types of glass were created and manufactured in Venice, such as lead silica glass for the production of imitation gemstones, not discussed in this paper.

Glass technology and raw materials

Our present knowledge of the Venetian glass technology is based on the information supplied by historical documents and the scientific investigation of well dated pieces. Scientific analyses are useful to determine the composition of glass, and to identify the raw materials used and colouring techniques. A significant number of analyses of ancient Venetian glass remains is available today².

A major source of information on the ancient Venetian glass technology is the chronology drawn up by Luigi Zecchin³. Several treatises of Venetian glassmakers dating from the fifteenth to the seventeenth centuries have also been published. They include the 2nd and 3rd books of recipes of the three *Trattarelli* (booklets) lying in the State Archives of Florence (second half fifteenth century, Milanesi 1864), the so-called Montpellier (dated 1536), partially translated and commented by Luigi Zecchin⁴, the Anonymous of the fifteenth century⁵, the Darduin (16th, early 18th centuries⁶) and the recipe book of the Venetian glassmaker Brunoro found in Gdansk (Poland) dated 1645⁷. The first published book on glassmaking, *L'Arte Vetraria* by Antonio Neri⁸ includes a number of recipes of Venetian origin.

Historical documents describe the use of two basic raw materials to melt glass: quartz (sand or pebbles) as a silica source and plant ash as a fluxer and stabilizer source. The glass technology until the 18th century ignored the use of lime as a stabilizer. It was introduced accidentally into the composition in the form of a plant ash component.

In the Middle Ages and Renaissance period ashes of coastal plants (*Salsola kali*, *Salicornia*, etc.) were used in Venice and in the Mediterranean area, while in northern-central Europe ash of

² Verità 2013.

³ Zecchin 1987, 1989, 1990.

⁴ Zecchin 1987: 247-76.

⁵ Moretti and Toninato 2001.

⁶ Zecchin 1986.

⁷ Moretti *et al.* 2004.

⁸ Neri 1980.

inland plants (fern, beech, oak, etc.) was used. Coastal plant ashes are mainly made of sodium and calcium carbonates (soda ash); chlorides, sulphates, phosphates and small amounts of potassium, magnesium, iron, aluminium and silica are also found.

Inland plants ashes are mainly made of potassium and calcium carbonates (potash ash). In these ashes traces of manganese and of other coloring elements are present and important compositional variations exist, according to plant species, provenance (same species growing in different locations), plant parts (leaves, wood, bark), burning temperatures, etc. These differences caused serious problems to the glassmakers and lowered the quality of the glass. This is why the use of inland plants ash was expressly forbidden to the Venetian glassmakers.

Glass batch and glassmaking

The Renaissance Venetian glass quality was the result of an unceasing improvement of the raw materials selection and of the melting process that began several centuries before. Documents attest since the end of the 13th century and up to the 18th century the import of plant ash from Egypt (*alumen album de Alexandria*), Syria (*allume di Soria*) and later also from Spain (since the 16th c.). Its trade was protected by the Venetian government, with a view to restricting its use to the Venetian glass houses. Efforts to use ashes of local plants (mid-17th c.) gave poor results and were soon abandoned.

Since the mid-14th century, Venetian glassmakers had obtained high quality products by replacing sand (*sablonum ad facendum Vitrum*, from Levant, Sicily, Vicenza, etc.) with quartz pebbles (*cogulo*) from the rivers Ticino and Adige (inferior in quality), and their use continued in the following centuries.

To obtain a finely ground powder suitable for melting, the pebbles were roasted, cast into water, and subsequently ground and sieved. The change from sand to pebbles led to a decrease of colouring contaminants (iron, chromium).

Glass melting was performed in two steps: the batch of

raw materials was preliminary fired in a reverberatory furnace at a relatively low temperature (800 °C) to be transformed in a crystalline intermediate product (the frit). This treatment, eliminates the carbonaceous residual of the ash, transforms the sodium and calcium carbonates into oxides which react with quartz forming low-melting silicates and eliminates CO₂, making the glass fining easier. The frit was then transferred to a pot furnace where it was melted at a high temperature (about 1100 °C). This second stage could last from twelve hours to several days. During melting, the glassmakers would be faced by several problems. The considerable amounts of insoluble salts (sodium sulphates and chlorides) of the plant ash are not reactive with the silica and could not be incorporated into the glass. If not removed, these salts form droplets that cause a dispersion of light resulting in glass turbidity. In Venice transparency was improved by casting molten glass into water and subsequently re-melting it. This procedure, repeated several times, together with the scumming of the salts floating on the molten glass, helped to reduce salt droplets.

Glass colour

The quality of the raw materials was not as high as today and colouring impurities (mainly iron) were introduced into the glass. The iron content depending on its oxidation state produces a more or less intense hue ranging between yellow, green and blue-green. The iron concentration in the best clear Renaissance Venetian glass was 100 times higher (Fe₂O₃ 0.2-0.3 wt%) as compared to modern Venetian glass (less than 0.02 wt%).

To obtain a colourless glass, the natural colour was neutralised by adding manganese oxide (first mentioned in a document of 1290); the glass obtained with this process is gray in colour, more intense with increasing iron contents. In Venetian glass furnaces, manganese was added directly to the melt in controlled amounts, until decolouration was obtained. In this way the use of manganese was limited to the lowest amount necessary. Manganese was imported from Catalonia (end of 14th c.), Piemonte, Germany and France.

Until the middle of the 15th century, Venetian clear glass was classified into 2 groups: common glass and *Vitrum Blanchum* glass. It is not clear which was the distinctive feature of the two glasses; we can reasonably suppose they were different in aspect, common glass with a light natural colour (from green-blue to yellow) and a well decolorized (gray) *vitrum blanchum*.

Cristallo is the term used around the middle of the 15th century in Venice to indicate a transparent glass which had acquired such a clarity (perfect decoloration and high light transmittance) and homogeneity as to be compared to natural rock crystal (quartz). *Cristallo* glass, invented by the Muranese Angelo Barovier, soon was traded throughout the world, and the secret formula was one of the main factors that allowed Venice to maintain its predominance over other European glassmaking sites for about two centuries. For the preparation of *cristallo*, Barovier added a preliminary step to the existing technique, consisting in the purification of the plant ash. The raw ash was ground, sieved, dissolved in boiling water; the resulting solution was filtered, concentrated and dried. The salt obtained was mixed in the right proportion with silica to prepare the frit. The purification process led to the elimination of insoluble coloring impurities (mainly iron compounds) as well as calcium and magnesium compounds, which are essential to stabilize glass against weathering⁹. The glass obtained thereby (practically sodium silicate) would become coated with an opaque, weathered layer even shortly after being produced, with consequent loss of the brightness and transparency. The good state of preservation of most of the Renaissance Venetian luxury glass attests that Muranese glassmakers searched for and discovered a solution to this problem.

The analyses of Venetian samples dated to the sixteenth-seventeenth centuries allow to identify the new glass. The first analyses identifying the *cristallo* composition are reported in Verità 1985. In fact, despite the lowest level of iron, the Venetian *cristallo* shows also a higher level of sodium than *vitrum blanchum*, and concentrations of calcium, magnesium and phosphorous which are lower by about one half. These compositional differences are

⁹ Verità 1985.

in contrast with the *cristallo* recipes in Venetian treatises. In fact, calcium and magnesium carbonates are insoluble also in boiling water and during the purification procedure of coastal plant ash they were completely eliminated. On the other hand, the absence of CaO and MgO would compromise the chemical durability of *cristallo* and objects made with this glass would be rapidly attacked by the atmospheric moisture becoming bloomed and crizzled, with consequent loss of the main characteristics of *cristallo* glass. Most likely, the Muranese glassmakers soon realized that the purification of the fluxing agent removed not only undesired colouring elements but also the components that ensured glass stability. The most easily available source of lime and magnesia readily accessible and controllable was *vitrum blanchum* glass frit (or cullet). The glassmakers probably melt a batch made of equal amounts of *cristallo* and *vitrum blanchum* frits. This process would yield a product of higher quality than *vitrum blanchum*, and assuring a sufficient amount of calcium and magnesium to stabilize the glass (Fig. 1).

The incomparable quality of Renaissance Venetian glass is assessed also in the scientific field. Galileo Galilei made the first «occhiali da veder lontano» (telescope lenses), using selected Muranese mirror glass. No special glass was made for lenses in Galileo's time and the optical quality of the glass produced was affected by several defects: seeds, cords, a certain turbidity and colour (grey). In the attempt to improve this quality, in 1610 Galileo succeeded in persuading the Granduca of Tuscany to make in Florence a furnace where special glass for lenses could be made. This experiment was probably not successful, for in 1618 Galileo asked a Venetian gentleman (Sagredo) to find good quality glass for making lenses in Murano¹⁰. For Galileo, too, the quality of the Muranese transparent glass was unbeatable.

For the preparation of coloured glass the Venetian glassmasters used the same elements as other glassmaking centers, i.e., cobalt (blue), manganese (purple), copper (green, red and turquoise) and iron. The clarity of their glass clarity and their skill in controlling

¹⁰ Verità 2008.

colours allowed the Venetian glassmakers to make glass in an infinite range of colours. An example of this skill is the production of coloured glasses imitating natural gemstones, which was one of the most successful items of the Venetian glassmaking.

«There is no kind of precious stone which cannot be imitated by the industry of the glass workers ...», wrote Sabellico in its *Opera Omnia*, about the town of Venice, 1502. In the glassmakers treatises several recipes concern the production of glass for imitation of an incredible variety of precious stones. The most extensively used colours are: blue (recipes for making sapphire, lapis lazuli, aquamarine, turquoise are reported), yellow (amber, topaz), green (emerald, chrysophase), ruby red (ruby, cornelian, coral, garnet balas), purple (amethyst) and clear (rock crystal).

Lattimo

A document dating to 1359 (the purchase in Venice of glass slabs for the mosaics of the Orvieto cathedral) is the earliest written evidence for the production of opaque white glass in Venice. The term *lattimo* (used in Venice for opaque white glass) appears in the Muranese documents from the 15th century (Fig. 2).

The first opacifier used in Murano was the *calce di piombo e stagno* (lead-tin calx). Prepared by firing a mixture of metallic lead and tin (lead to tin ratio: 1/2 to 1/1), the lead-tin calx was added to the transparent glass (clear or coloured). Lead dissolved during melting yielding a lead glass in which microcrystals of cassiterite (SnO_2) were dispersed. The *lattimo*, initially used only for mosaic and enamels for glass or metals, from the second half of the 15th century was used also to decorate blown items. In 1527 was invented in Murano a sophisticated decorative technique which used rods of *cristallo* with a core of *lattimo* (*filigrana*).

Lead tin calx continued to be used in Murano until the 19th century, partially replaced by other opacifiers such as calcium antimonate (from middle of the 16th c.), calcium phosphate (bone ash) (second half of the 15th c.) and lead arsenate (from 1693).

Chalcedony

New coloured glasses were created by Venetian glassmakers. Towards the middle of the 15th century a glass called chalcedony was created in imitation of naturally occurring agate and jasper¹¹. It is a striped layered glass with green, blue, red, violet and yellow translucent or opaque layers. Moreover, when the chalcedony is illuminated by transmitted light it often displays a deep reddish colour. Fig. 3).

Venetian recipes for chalcedony glass in the Renaissance Venetian texts, dating from the 15th to the 17th century (the Montpellier collection has 17 recipes for chalcedony!) are similar in the respect that they call for a lead-soda-lime-silica glass composition with silver as coloring agent (metallic silver particles of colloidal nature), sometime together with others metals. The instructions in the Darduin recipe call for the silver mixture to be added only 2-3 hours before working the glass to not allow for complete mixing. Once the object had been fashioned, the glassmaker was instructed to return to the furnace hole several more times to heat it until the colours of chalcedony were seen. Some of these recipes are very similar to those used in the furnaces of Murano today.

The use of silver added in very small amounts have antecedents in Islamic lusterware glazes as well as Byzantine glass decoration¹².

Girasole glass

A new glass called *girasole* (sunflower), an imitation of opal gemstone developed from the 17th c. by Venetian glassmakers has been produced with great success up today. The name *girasole* (today replaced by *opalino*) refers to a translucent, opalescent glass changing its colour from light blue (reflected light) to yellow reddish (transmitted light). This variation in appearance with the light source, is referred to as dichroism (Fig. 4).

¹¹ McCray *et al.* 1995.

¹² Gudenrath *et al.* 2007.

The first known literary reference to *girasole* glass appears in Neri's 1612 *L'arte vetraria* (Book 4, Chapter 74)¹³, while the first mention in the Ricettario Darduin is dated 1st June 1693 (*Girasole per perleri*, sunflower for beadmakers). Recipes for *girasole* continued to be collected in this treatise until 1711.

The recipes for *girasole* are quite complex: to the batch of silica (obtained by grinding quartz pebbles) and soda ash, potassium nitrate KNO_3 (a fluxing-oxidizing agent), lead oxide and arsenic (arsenic oxide As_2O_3 prepared by firing a mixture of orpiment (As_2S_3) and sodium chloride) were also added. In this way the traditional Venetian soda-lime-silica glass is replaced by a soda-potash-lead-silica glass.

The opalescence is given by very small microcrystals of lead arsenate $[\text{3Pb}_3(\text{AsO}_4)_2\text{PbO}]$ which separate during melt cooling (light scattering). The intensity of this phenomenon depends on arsenic and lead concentrations and on melting and cooling procedures (sizes and concentration of the particles)¹⁴.

Aventurine

Aventurine is a translucent brown glass flecked throughout with sparkling metallic copper particles (Figs. 5a and 5b). *Aventurine* was obtained by chance in a furnace of Murano probably in the second half of the 16th century. Darduin explains that the name *venturina* came from the fact that such a glass, can be obtained successfully *più per ventura che per scientia* (more by chance than for the skill of the glassmaker).

This glass is usually worked as a precious stone (grinding and polishing) and only skilful and expert glassmakers can use aventurine in blown artefacts. In fact, if warmed up at a too high temperature or for a too long time, copper-crystals are dissolved and aventurine is transformed into a greenish, transparent glass.

¹³ Neri 1980.

¹⁴ McCray and Kingery 1996.

The decline of the Venetian glassmaking

Several reasons caused the decline of the Venetian glassmaking in the seventeenth century.

From the second half of the sixteenth century onwards, some glassmakers left Murano to set up glassworks all over Europe, where objects imitating Renaissance Venetian glass were produced (*Façon de Venise*). The same production methods, forms and decoration techniques were used in Venice and in the glasshouses in Europe.

The secrets of Venetian glassmaking were first made public in a printed manual entitled *L'Arte Vetraria* published by the Florentine priest Antonio Neri in 1612. Neri observed and possibly even worked with Venetian masters in Murano, Tuscany and the Low Countries.

This is a well ordered compilation of glass recipes probably taken from an earlier manuscript similar to Montpellier's, which Neri tested personally. The text was translated into numerous languages. Christopher Merret published in 1662 the English translation; from this text to which important observations were added by the translator, the French and German versions were compiled. This text probably inspired some of the experiments carried out by the major inventors of new types of glass in England and Germany

Another cause of this decline was the invention in Bohemia and in England of new glasses more clear and bright and less expensive than the Venetian *cristallo*. In Bohemia, invented by Johan Kunckel in 1676, a potash-lime-silica crystal glass (potash was obtained by lixiviation of the wood ash following the process used in Venice with the soda ash; the glass was probably stabilized by addition of a source of lime like chalk). In England, in the second half of the seventeenth century a lead-silica glass was brought to perfection by George Ravenscroft and the new lead-crystal glass became available on the market.

The Venetian glassmakers reacted to this menace by renovating their traditional *cristallo*. The reasons why these attempts were not so successful as expected are considered in an interesting study of Trivellato, where the decline of Venetian glassmaking is reconsidered¹⁵.

¹⁵ Trivellato 2007.

REFERENCES

- Biron, Isabelle and Marco Verità. 2012. Analytical investigation on Renaissance Venetian enamelled glasses from the Louvre collections. *Journal of Archaeological Science* 39: 2706-13.
- Gudenrath, William and Lisa Pilosi, Marco Verità, David Whitehouse, Mark T. Wypyski. 2007. Notes on the Byzantine painted bowl in the treasury of San Marco, Venice. *Journal of Glass Studies* 49:57-62.
- McCray, Patrick W. and Zoe A. Osborne, W. David Kingery. 1995. The history and technology of Renaissance Venetian chalcedony glass. *Rivista della Stazione Sperimentale del Vetro* 25:259-69.
- McCray, Patrick W. and W. David Kingery. 1996. The unusual optical properties of two Venetian glasses. *Glass Technology* 37:57-68.
- Milanesi, Gaetano. [1864] 1968. *Dell'arte del vetro per mosaico. Tre Trattatelli dei secoli XIV e XV*. Reprint, Bologna: Forni.
- Moretti, Cesare and Tullio Toninato. 2001. *Ricette vetrarie del Rinascimento. Trascrizione da un manoscritto anonimo veneziano*. Venice: Marsilio.
- Moretti, Cesare and Carlo Stefano Salerno, Sabina Tommasi-Ferroni. 2004. *Ricette vetrarie muranesi. Gaspare Brunoro e il manoscritto di Danzica*. Florence: Nardini.
- Neri, Antonio. 1980. *L'arte vetraria, 1612*, edited by R. Barovier Mentasti. Milan: Il Polifilo.
- Trivellato, Francesca. 2007. Murano glass, continuity and transformation (1400-1800). In *At the centre of the old world*, edited by P. Lanaro. Toronto: CRRS: 143-77.
- Verità, Marco. 1985. L'invenzione del cristallo muranese: una verifica analitica delle fonti storiche. *Rivista della Stazione Sperimentale del Vetro* 15:17-29.
- Verità, Marco. 1995. Analytical investigation of European enamelled beakers of the 13th and 14th centuries. *Journal of Glass Studies* 37:83-98.
- Verità, Marco. 2008. European glassmaking in Galileo's time: glass composition and quality. In *Galileo's telescope. The instrument that changed the world*, edited by G. Strano. Florence: Giunti: 78-85.
- Verità, Marco. 2013. *Modern Methods for Analysing Archaeological and Historical Glass, Section 6.2 Venetian Soda Glass*, edited by J. Koen. Chichester: John Wiley Book: 515-33.
- Zecchin, Luigi. 1986. *Il Ricettario Darduin, un codice vetrario del Seicento, trascritto e commentato*. Venice: Arsenale.
- Zecchin, Luigi. 1987: vol. 1, 1989: vol. 2, 1990: vol. 3. *Vetro e vetrai di Murano*. Venice: Arsenale.



Fig. 1 - *Cristallo* glass. Paris, Musée du Louvre.



Fig. 2 - Cake of *lattimo* glass. Murano, Museo del Vetro.



Fig. 3 - *Calcedonio* glass. Brescia, Museo di Santa Giulia.



Fig. 4 - *Girasole* glass. Brescia, Museo di Santa Giulia.

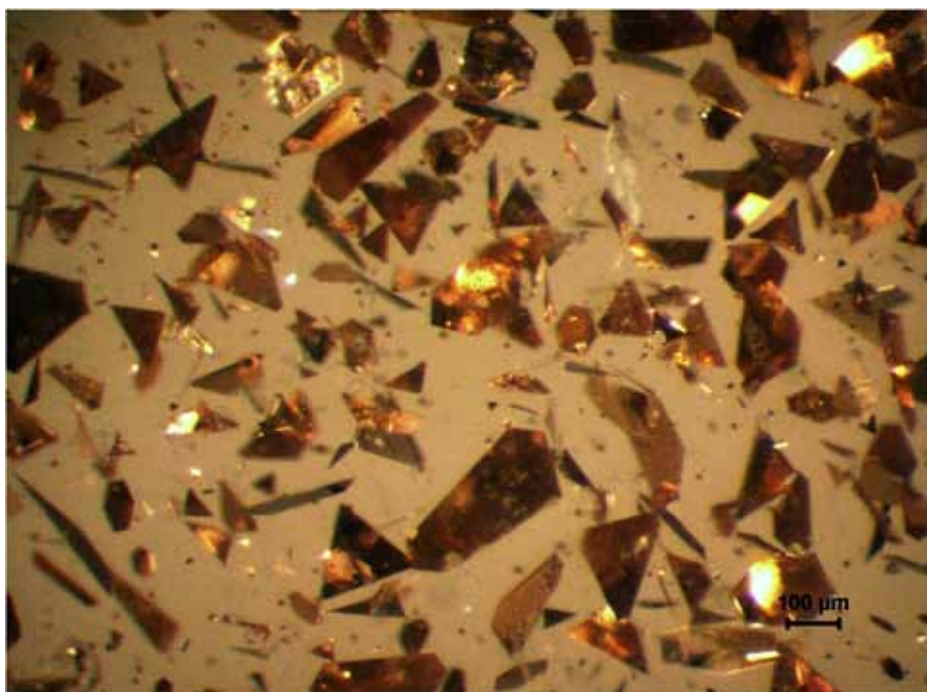


Fig. 5a - Aventurine glass.

Fig. 5b - Sample of aventurine prepared in thin section and observed at the optical microscope.

JUANITA NAVARRO AND SUZANNE HIGGOTT

WORK IN PROGRESS: 'VENETIAN AND *FAÇON DE VENISE* ALL-GLASS COMPOSITES OR HYBRIDS: MANUFACTURE, DETECTION AND DISTRIBUTION'

Background

During the second half of the 19th century demand for certain types of works of art, including historic Venetian and *façon de Venise* glass, exceeded supply. Rich collectors were avid buyers and this, combined with political upheavals and other factors, resulted in entire collections changing hands. Repairs of varying complexity ensured that damaged objects could continue to be enjoyed. Such is the case with all-glass hybrids - damaged glass vessels repaired by the addition of one or more pieces from one or more other glass objects in order to make up a complete glass vessel. Metal and other materials may have been used in the repairs only to secure the glass parts. Little is known about who was carrying out the work or the scale of production. It seems increasingly likely that some enterprising antique dealers and talented craftsmen were working together in order to find more works of art to introduce into the market.

In the middle of such a feeding frenzy, it was probably not difficult to introduce the hybrids into the art market. Production included examples intended to appeal to the most elite and discerning buyers: even hybrids of highly prestigious Venetian Renaissance enamelled glasses changed hands. Were the buyers advised of the repairs? Or were they deceived into thinking the glasses were in good condition? Perhaps the fact that the object was a hybrid was of no consequence?

We now know that collector and dealer Frédéric Spitzer (1815-1890), who opened a shop in Paris in 1852, and his highly talented collaborators Alfred André (1839-1919) and Reinhold Vasters (1827-1909), were particularly active in the lucrative field of 'old' art manufacture¹. Might Spitzer and his collaborators have been involved in the production of hybrid Venetian Renaissance glasses and, if so, were they created with the intention to deceive? An all-glass hybrid enamelled goblet was bought by the South Kensington Museum, London², from the posthumous Spitzer sale, held in Paris from 17 April to 16 June 1893³. The bowl dates to the 15th century but the stem and foot may have been made in the 19th century. The goblet was illustrated in the sale catalogue, where there was no reference to its being a hybrid. Its hybrid status was not detected by the museum's representatives when they went to Paris to select items of interest to the museum, prior to the sale⁴. Nor was it discovered when the glass entered the museum's collections. In fact, the repair remained undetected until about 1982⁵. Another hybrid Venetian enamelled glass in the Spitzer sale, a footed bowl dating to around 1500, was also described without reference to its hybrid status in the sale catalogue, where it, too, was illustrated⁶. The bowl is now in the Musée Curtius, Liège⁷.

¹ See Truman 1979; Distelberger 1993: 282-87; Distelberger 2000; the Baroness Batsheva de Rothschild sale, Christie's, London, 14 December 2000, essay on Vasters, Spitzer and André, '19th Century "Renaissance" Works of Art: A Question of Supply and Demand': 102-07.

² Now the Victoria and Albert Museum. The glass is inv. 698-1893.

³ Twenty-sixth day, 31 May 1893, lot 2017.

⁴ V&A Archive, nominal file for acquisitions from the Spitzer sale, MA/2/S16.

⁵ For the description of the glass on its entry to the museum see V&A Archive, Central Inventory for inv. 698-1893. For information concerning the dating of the goblet's components and when the goblet's hybrid status was first noted by the museum, the authors are grateful to Reino Liefkes. As Reino Liefkes and Rainer Zietz observed during discussion following the presentation of this paper in Venice, this glass would originally have been a beaker (for an example of the type see Barovier Mentasti and Tonini 2013, cat. 19, illus. p. 60).

⁶ Spitzer sale, twenty-sixth day, 31 May 1893, lot 1983.

⁷ Inv. B/1057 (Chevalier and Merland 1999, cat. 41, illus. on the cover). The authors are grateful to Erwin Baumgartner for drawing their attention to this glass.

Another hybrid glass at the Victoria and Albert Museum belonged to the jeweller, collector and museums advisor Alessandro Castellani (1823-1883). The enamelled goblet (inv. 674-1884) was acquired on behalf of the South Kensington Museum by Charles Drury Fortnum (1820-1899) at the posthumous sale of Castellani's collection, held in Rome from 17 March to 10 April 1884. The glass was illustrated in the sale catalogue, where its hybrid status was not mentioned⁸. Until about twenty years ago, the museum was unaware that the piece was a hybrid, its Venetian bowl and upper stem made around 1500-1525, the lower part of the stem and the foot probably made for Castellani in the 19th century⁹. It seems unlikely that the auctioneers for the Castellani sale realized that the goblet was a hybrid, since in the case of another hybrid glass in the sale, illustrated in two views in the catalogue, the cataloguer made a point of noting that, «Le pied, y compris le nœud, a été refait»¹⁰. This glass appears not to have been sold. The lot entry is inscribed 'Riservato' in the National Art Library's annotated copy of the sale catalogue and Alessandro's son, Torquato Castellani, lent it to an exhibition in Rome in 1889¹¹. Might this mean that the glass failed to sell because it was described as being a hybrid?¹²

At least one hybrid Venetian glass in the Wallace Collection was sold privately by Alfred Beurdeley (1808-1882), a Parisian dealer¹³, to Alfred-Émilien O'Hara, comte de Nieuwerkerke (1811-1892), in 1865 (Fig. 3). In the receipt that Beurdeley gave to Nieuwerkerke, the glass is described as «une aiguière avec émaux à anse bleue dentelée avec goulot» [an enamelled ewer with jagged blue handle

⁸ Eleventh day, 28 March 1884, lot 407.

⁹ The authors are grateful to Reino Liefkes for information about the discovery that the glass is a hybrid. For further discussion of the glass see Barovier Mentasti and Tonini 2013, cat. 9, illus. p. 54.

¹⁰ Eleventh day, 28 March 1884, lot 405.

¹¹ The glass, with Castellani named as the lender, is illustrated in Wallis 1890: 273. It is now in the Metropolitan Museum of Art, New York, inv. 17.190.730a, b.

¹² The other glass annotated 'Riservato' in the 'Verrerie' section of the sale catalogue is lot 406, which is not described as being a hybrid glass.

¹³ Beurdeley's business address was Pavillon de Hanovre, Au coin du Boulevard des Italiens & rue Louis-le-Grand, 32.

and neck], without reference to its hybrid construction (described in case study 3 below). At least two more hybrid Venetian-style glasses in the Wallace Collection also appear to be identifiable as items sold by Beurdeley to Nieuwerkerke in the mid-1860s. Again, the receipts do not describe them as hybrids (case study 2 below is one of these; see Fig. 2). At that time, as *surintendant des Beaux-Arts*, Nieuwerkerke held the key post in Napoleon III's art establishment. Following the fall of the Second Empire, he sold his extensive art collection to Richard Wallace in Paris in 1871¹⁴.

Among the forty-five glasses acquired by the British Museum from the posthumous sale of the collection of Venetian glass owned by the artist Edward William Cooke (1811-1880), held at Christie, Manson & Woods, London, on 15-16 June 1880, there were three hybrid examples¹⁵. None was described as such in the sale catalogue, but each was recorded as a hybrid glass in the museum's accessions register¹⁶. Cooke travelled extensively in the years when he was assembling his collection¹⁷, so further research into its formation may shed more light on the ways in which dealers satisfied the demand for historic Venetian glass in the mid-19th century.

Current research continues in order to find out more about historic repairs and whether Spitzer, Castellani, Beurdeley and other dealers were knowingly associated with the production and/or sale of all-glass hybrids.

Judging by the uneven quality of the repairs it seems likely that some buyers must have been aware of them because of their poor quality. Or an owner may have wanted a damaged glass to be made

¹⁴ The receipts that Beurdeley gave to Nieuwerkerke were among those that the latter passed on to Wallace with his collection. They are in the Wallace Collection Archive. Wallace Collection C559 was sold to Nieuwerkerke by Beurdeley in 1865. C530 and C555 were probably sold by Beurdeley to Nieuwerkerke, either in 1865 or 1867 (Higgott 2011, cat. 48, 19 and 44 respectively).

¹⁵ The forty-five glasses are inv. 1880,0617.1-45. The three hybrid pieces were lots 63, 208 and 527 in the Cooke sale, respectively British Museum inv. 1880,0617.15, 1880,0617.16 and 1880,0617.17.

¹⁶ British Museum, P&E, Antiquities Register, vol. 14, February 1879-December 1884.

¹⁷ Munday 1996.

whole, with the addition of alien components when necessary. In certain cases the repairs are so incredibly well hidden and difficult to detect that the temptation for a dealer to 'forget' to mention the repair must have been irresistible. Some repairs were almost certainly carried out with the intention to deceive the buyers.

The 19th century was a time when the synthetic adhesives we commonly use today had not been invented. Plant or animal-based materials, such as gelatine and other animal glues, were often used for bonding glass. When freshly applied, and depending on their thickness, some adhesives were relatively translucent and colourless and therefore 'invisible' to the untrained eye. As these adhesives age they darken and become more visible and unsightly, but more importantly, they also become brittle, weaken and may not be able to support the weight of the glass. A variety of 'cements' suitable for glass were also used. These were usually white, sometimes very strong and insoluble in water. When old repairs are removed, all treatments should be fully documented and a sample of the original adhesive should be kept when possible for future reference.

Alien glass components have been discovered in wine glasses, goblets, ewers, cruets and vases. The stem or foot areas are the most likely places for the repair, but they were also made to spouts, handles, etc. To detect the all-glass hybrids close examination of the object is required.

Setting up to have a close look

Often an object will be closely examined because it looks 'wrong'. Similar objects may be available to be used as comparatives, always bearing in mind that examples studied from available images may have undetected repairs themselves.

Most repairs should become apparent after a visual examination. The following are needed:

- A strong table or similar surface with a soft protective cover. The glass ought to be held as close to the table as possible. All parts of the object should be supported, especially the base, in case the old adhesive fails and a part of the object falls off [and they

do!]. The table should be uncluttered and large enough to move the object safely.

- A good general light source placed far enough from the main examination area, e.g. ensuring the overhanging part of a lamp with a flexible arm is out of the way.

- A torch, preferably plastic and not too large, with a strong ray. Large, heavy or metal torches tend to be unwieldy and are more likely to cause damage.

- Magnification is crucial, either a strong magnifying hand-held lens, preferably mounted in plastic rather than metal, or a binocular magnifier. A small hand-held microscope connected to a computer is not crucial but may be useful.

A conservator/restorer will be familiar with the appearance and behaviour of restoration materials and may use precision tools to explore the repairs.

Examination and detection of the repairs

During examination the object or light source should be turned around so that reflected light on the surface exposes any discordant features or discontinuities such as changes of texture or manufacturing features. A torch will be useful for close-up examination and it is preferable to move the torch rather than a heavy or delicate object, or one where the adhesive may be weak. Its focused ray can be placed under a foot to see if the light goes through the stem unhindered.

The first stage of examination is an overall look at the object and, if possible, a comparison with similar objects. Does anything look 'wrong'? Are there components out of central alignment? Are there any 'illogical' components? Are there colour differences in the glass, such as in paired handles? Does enamelled or engraved decoration appear to be by different hands? This is not final evidence, but adds weight to other observations.

If there are obvious repairs: the main giveaway is the texture caused by grinding, such as rough surfaces or deep scratches. Are there any straight lines which do not make sense? Straight edges

result from fitting the spare parts by grinding. And is there fine chipping along the lines? Does the line cut through any tooling, surface textures or decoration, e.g. enamel?

Do inclusions, quantity, type or shape of air bubbles 'match' on both sides of a repair? Comparing wear patterns, abrasion, stains and the way dirt has accumulated in recesses can yield crucial evidence. Are there any signs of chemical instability on one side of the repair but not on the other? These include a smeared surface or crystallised soluble salts on the surface, opacity, crizzling (micro-cracks), etc. Note that an unstable vase may have a chemically stable feature applied during the original production process, such as a handle or foot, and colourless and coloured glass may behave differently, etc. Each case is different and anything that does not seem 'right' should be questioned.

Features to look for in the repairs include:

- Evidence of glass preparation: grinding marks (the strongest evidence for repairs; uncharacteristic straight edges and chipping along those edges, deep rough scratches).

- Change to the original adhesives and ageing materials (originally: colourless and relatively invisible to the untrained eye; later: yellowed, shrunk and cracked, peeling or flaking, weak, brittle). Note that there may be raised lines, adhesives may have a different colour from the surrounding area, there may be excessive adhesive around the repaired area and/or adhesive dribbles or smears).

- Additional materials may have been used to hide or strengthen the repairs (such as metal bands and supports, metal and wooden dowels, opaque fillers and putties, paint and other unfired colorants). Some of these materials also undergo noticeable ageing processes (becoming yellow/brown, opaque; bronze powders which were once golden acquire a greener appearance caused by metal corrosion, etc.) Note: dowels have been used in 'genuine' repairs to add structural strength and do not necessarily imply that the two parts do not belong together.

- Later adhesive replacements (such as two-part epoxies and cellulose nitrate adhesives, which are usually more difficult to detect).

Scientific analysis and other examination

Generally speaking, scientific analysis is not the top priority but may help in some instances. Practical considerations include: cost of procedure and time required for the procedure, e.g. overnight, distance to the facilities, logistics of transporting the object and personnel required, insurance, etc. The choice of technique depends on the questions to be answered and must be carefully thought through.

Dating the glass components: it is possible to date some glasses by their chemical composition when crucial markers are present, e.g. a colorant that became available only after the supposed manufacturing date. A comparative database may be needed and the results may be inconclusive or the range of dates too wide. A preliminary consultation with the relevant scientist is necessary. Examination by X-radiography and ultraviolet light (UV) is more easily accessible and may prove useful.

X-ray examination may show what is under certain paints or patterned glass, but metal and metallic paints may be too opaque for the X-rays to yield any answers. Also the radiographs may not show enough contrast or be detailed enough to provide useful information.

An ultraviolet (UV) light source is used in the dark; a variety of low intensity hand-held lamps are easily available. A more powerful UV light source must be used with specific personal protection equipment. The heat produced by the lamp may damage the repairs or the glass, for instance opening up cracks. Working in the darkness may also lead to glass breakages. UV light usually makes plant and animal-based adhesives, fillers, putties and painted areas fluoresce a brighter colour than the glass. Synthetic adhesives, such as epoxies and cellulose nitrates, are less likely to fluoresce sufficiently to be noticeable, especially when occurring as thin lines in joins.

Finally, a hand-held metal detector of the type used for detecting metal pipes in walls may help to find hidden metal dowels.

Mechanics of the repairs

The simplest repair method consisted of grinding flat the two surfaces to be joined until they fitted. Adhesive was applied and the two pieces were brought together. This is a structurally weak join which depends on the strength of the adhesive to hold the weight. These repairs often fail as the adhesives age and are more likely to have been removed and replaced by synthetic adhesives.

A metal or wooden dowel could be added to strengthen the join. Both sides would need to have cavities for the dowel, either already present (e.g. a hollow knop) or drilled out. The dowel would be held in place with adhesive fillers or putties. These are opaque, generally white or a light colour and very obvious in translucent glass. This is a stronger repair, but when the adhesive fails all the components may be replaced by clear synthetic adhesives, becoming difficult to detect. The craftsmen had clever stratagems to hide the repairs, perhaps within patterned glass, or by placing a metal band around the repair. These repairs may be visible but they appear to be 'honest' repairs and do not give away the fact that the two parts do not belong together.

A more invisible and stronger repair could be achieved by leaving an integral stump-shaped end on one component and preparing a 'receptacle' for it on the other. Patterned glass could hide the repairs very successfully.

Separate discs were added to a stem repair for height, colour, etc. More complex and specific repairs are being discovered, demonstrating the ingenuity and adaptability of the craftsmen. Each object posed a new challenge and there appears to have been no shortage of raw materials.

Case studies

The following examples show a range of the repairs found on all-glass hybrids with Venetian or *façon de Venise* components¹⁸.

¹⁸ For discussion of these and two additional all-glass hybrids in the Wallace

1. Goblet, Venice or *façon de Venise*, 1650-1700, The Wallace Collection (inv. C553); in Sir Richard Wallace's collection by 1890

Fig. 1 shows a goblet with an aubergine-coloured bowl, one light green knop and five translucent blue knops, all hollow, above a colourless folded foot. The goblet is listed in the Hertford House inventory taken in 1890, following Sir Richard Wallace's death. The foot is thought to be larger than usual for this kind of goblet and comparatives show that this type of stem would have only four or five knops. There was an unsightly band of putty under the top knop to strengthen the repair, which appeared to date from the 19th century. Why was the top knop not blue? Close examination showed the glass was colourless with a coating of green paint inside. It seems probable that the paint was originally blue but the ageing process had yellowed the medium, turning the blue to green. It became clear this object was a hybrid but evidence was needed.

By 2001 the old unsightly repair had become brittle and there was a risk that the top section could give way and break, maybe damaging another object in the display. This danger justified replacing the adhesive and provided an opportunity for a closer look. It was decided to retain the green paint because of its historic significance. Once the repair had been removed, the ground surfaces were exposed – the final evidence this object was made up from two separate objects.

A bonding method was designed to prevent any damage to the green paint and allowed the future removal of the adhesive if it should become necessary. The new repair is strong and visually unobtrusive. Although the old repair was obvious, the craftsman used his ingenuity to hide the deception. It is likely that the colourless top knop was left in place to achieve a longer stem that would balance the proportionately large foot.

2. Ewer, Venice, late 16th century, The Wallace Collection (inv. C530); known provenance possibly 1865 or 1867; in Sir Richard Wallace's collection by 1890 (Fig. 2)

This ewer does not have a particularly complex repair, but it is very well hidden and its discovery was a complete surprise while studying the manufacturing technique under magnification. What gave it away? Immediately above the merese, and noticeable on one side, there is a tiny matt area which is the characteristic texture left by grinding (Fig. 2, right). There was no possible reason for grinding marks here except in a repair. Further examination revealed all that could be seen of the adhesive - a very thin white line of some sort of cement. However, a ray of light travels unhindered down the stem: there is no filler in the hollow knop to stop the light. The glass pattern and internal reflections of the glass hide the construction method completely when looking from the side.

The construction method appears to be as follows: the top of the foot was shaped by grinding leaving a short stump of colourless glass. The knop was prepared so as to accommodate the stump. The two components would fit tightly together and a very small amount of cement would be required and only around the 'shoulder' of the stump, which is why the light travels through the stem. This is not the work of a beginner, but of someone who had a lot of practice and a choice of high-quality parts available for use. It was not possible to remove a sample of the cement for chemical analysis. The cement appears to be in good condition and strong and the repair remains in place.

3. Cruet, Venice, late 17th - 18th century, The Wallace Collection (inv. C559); known provenance since 1865

The cruet in Fig. 3 has a known provenance since 1865, when it was acquired by the comte de Nieuwerkerke in Paris from the dealer Alfred Beurdeley. There are two repaired areas: at the base of the spout, and the stem and foot. On the right image there is a straight line behind a mask prunt. The line is the join of an alien spout to the body. Both edges are badly chipped from the grinding.

A mask prunt covers up the obvious join line and grinding marks are visible around its sides. The old repair was removed, probably in the 1970s and most likely due to adhesive failure. A new adhesive was applied then but unfortunately no record has been found of the old repair.

The repair to the foot is more complex and visibly aged; luckily the original materials are still in place. The repair is mostly opaque, but visual examination indicates it was probably constructed as follows:

- The merese below the hollow knop was ground down flat, leaving an opening into the knop, but ensuring the inner surface of the cruet was undamaged.

- The hollow knop was 'gilded' inside with bronze powder in an organic paint medium and allowed to dry. (The bronze paint has now degraded and is patchy with dark spots.)

- A foot with a long stump was prepared and a separate blue disc. The disc was inserted onto the stump, bonded with translucent adhesive and allowed to dry.

- The gilded knop was half-filled with soft white putty and the stump (with the blue disc) was pushed into the putty. Excess putty was removed and the repair allowed to set.

A ray of light travels through the stem because there is no putty on the tip of the stump where it touches the bottom of the cruet.

Originally the adhesive was not as noticeable as it is now. The adhesive is probably a water-soluble gum or gelatine and it is visible underneath the foot. Over the years the clear adhesive has yellowed and become more visible.

This repair required planning, expertise based on previous work and a range of spare parts. The complex and accomplished repair to the foot is clear evidence that a lot of this kind of work was being carried out and undoubtedly testifies to the market demand for historic Venetian-style glass even of a relatively modest type.

Conclusion

Nineteenth-century repairs to translucent glasses are sometimes difficult to see. Opaque glass could be even more challenging. It

is important to identify these hybrid objects. From the point of view of scholarship, we cannot construct reliable knowledge and theories about authentic objects on inaccurate foundations, and it is also crucial to our understanding of the history of collecting in the second half of the 19th century to find out as much as possible about who was creating hybrid glasses, who knew about it and to what extent it mattered at the time.

It is clear that they are the work of highly accomplished craftsmen who had developed their 'repair' techniques over a period of time and had many opportunities to acquire a great deal of experience. A picture is starting to emerge of a well-established market in which damaged glass objects were available to craftsmen who drew on their knowledge of historic glass to carry out the work required using the spare parts available to them.

Venetian glass was highly sought after in the later 19th century, leading to the production of a high number of repairs and all-glass hybrids. The same repair techniques were used for other glasses with selling potential. Research continues into the originators of all-glass hybrids, the techniques used to produce them and the routes by which they entered public and private collections. Further results of this research will be presented at the AIHV Congress in Switzerland in 2015.

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REFERENCES

- Barovier Mentasti, Rosa and Cristina Tonini. 2013. *Murano, chefs-d'œuvre de verre de la Renaissance au XXI^e siècle*. Exh. cat. Paris: Gallimard. Musée Maillol.
- Chevalier, Ann and Monique Merland. 1999. *The Golden Age of Venetian Glass*,

- Collections du Musée du Verre de la Ville de Liège, exh. cat. (Station Gallery, Tokyo; Daimaru Museum, Umeda; Municipal Museum, Yokkaichi). Tokyo.
- Distelberger, Rudolf. 1993. 'Alfred André 1839-1919', in Distelberger, Rudolf, Luchs, Alison, Verdier, Philippe and Wilson, Timothy H. 1993. *The Collections of the National Gallery of Art Systematic Catalogue: Western Decorative Arts, Part I: Medieval, Renaissance, and Historicizing Styles including Metalwork, Enamels, and Ceramics*. Washington D. C.: National Gallery of Art.
- Distelberger, Rudolf. 2000. Les moulages en plâtre et modèles de bijoux de l'atelier du restaurateur Alfred André (1839-1919), in Kugel, Alexis. 2000. *Joyaux Renaissance: Une Splendeur retrouvée*, exh. cat. (J. Kugel, 279 rue Saint-Honoré, Paris), Paris: J. Kugel.
- Higgott, Suzanne. 2011. *The Wallace Collection Catalogue of Glass and Limoges Painted Enamels*. London: The Trustees of the Wallace Collection.
- Munday, John. 1996. *Edward William Cooke R.A., F.R.S., F.S.A., F.L.S., F.Z.S., F.G.S.: a Man of his Time*, Woodbridge, Suffolk: Antique Collectors' Club.
- Navarro, Juanita. 2011. 'Conservation of glass and Limoges painted enamels in the Wallace Collection', in Higgott 2011.
- Truman, Charles. 1979. Reinhold Vasters, "the last of the Goldsmiths"? *The Connoisseur*, March, 200, no. 805:154-61.
- Wallis, Henry. 1890. The Exhibition of Ceramic Art at Rome, 1889. *The Art Journal*, New Series, September: 273-75.



Fig. 1 - Goblet, Venice or *façon de Venise*, 1650-1700. London, The Wallace Collection, inv. C553 (© by kind permission of the Trustees of the Wallace Collection).



Fig. 2a-b - Ewer, Venice, late 16th century. London, The Wallace Collection, inv. C530. Left: ewer; right: detail of join (© by kind permission of the Trustees of the Wallace Collection).





Fig. 3a-b - Cruet, Venice, late 17th - 18th century. London, The Wallace Collection, inv. C559. Left: cruet; right: detail of spout base showing straight line and applied mask prunt (© by kind permission of the Trustees of the Wallace Collection).



CHIARA BERICHILLO

THE SMALL CENTRE OF PIEGARO
AND ITS ANCIENT LINKS WITH GLASS PRODUCTION

The small village of Piegarno, of medieval origins, rises among the green hills of Umbria in the western part of the region and a little south of the Lake Trasimeno basin.

The location is marked by extensive wooded areas, which cover most of the surrounding hills, alternating with cultivated land and limited but significant industrial areas. Among the latter, the Vetreria Cooperativa Piegarese, two kilometres from the town centre, is of particular importance with regard to the subject considered here. The presence in this area of a large glass industry, one of the biggest in Italy, is the result of a centuries old tradition that saw glass already being made in Piegarno in the 14th century¹. It is furthermore the landscape itself that provides initial testimony of this peculiarity: the fact that most of the land is still covered in forests is actually the inevitable result of the high demand for wood over the course of the centuries. The constant and voracious consumption that the Piegarno glass furnaces made of it must often have led to the local wood resources being exploited to the limit, given that in 1565 Cipriano Piccolpasso notes, regarding Piegarno, that «pate di legne per il gran logro che ne fanno le fornace da vetro» (shortage of wood due to its massive use by the glass works)², in his work *Le piante et i ritratti delle città e terre dell'Umbria sottoposte al governo di Perugia*.

¹ As printed in Fumi 1891b: 118.

² For the references see Munaretto and Batinti 2007: 59.

Unfortunately there is no systematic study collecting all the documentary references to Piegaro, but an attempt to make a summary analysis of the sources was made by the local scholar Gabriella Munaretto, who some years ago published a collection of fragments, providing an excellent starting point for any future (necessary) studies³. Piegaro's link with glass had already been pointed out in previous publications by local scholars⁴ and the name of the locality had already appeared in some notes by Zecchin⁵, who had not failed to note the interest of this isolated locality.

The most immediate testimonies of Piegaro's historic production are, however, the physical ones, represented mainly by the remains of the buildings in the old town centre: various structures that were originally used for glass production. The main one was the premises of the already mentioned *Vetzeria Cooperativa Piegarese* until 1968, when it was decided to definitively move the production of glass out of the town centre. After a systematic and accurate restoration⁶, it became the Piegaro Glass Museum, opened in 2009. The old building retains signs in its various parts of the complex history of the glassworks, which reached its greatest extension in the 19th century under the ownership of the family of the Misciattelli marquises. Munaretto claims, on the basis of land register data she has analysed, that a glassworks already stood in the same place in the town in the 17th century⁷. That which can be directly noted is that the building certainly developed from a smaller initial nucleus, to then expand taking in part of a street and eventually including a considerable section of the medieval wall in its structure, including a tower whose rooms were reused as service areas for the factory itself. The building that can now be visited is obviously the final result of this long process of change, and is of particular interest

³ Munaretto and Batinti 2007.

⁴ Corgna 1941; Pistelli 1976.

⁵ Zecchin 1987-1990: vol 2, 312.

⁶ The events relating to the recovery and restoration of the building, carried out by the Piegaro municipal council, were the object of an operation made by the undersigned in association with Paolo Bracciali, presented at the XVII Giornate Nazionali di Studio dell'AIHV (Massa Martana - Perugia, 11 and 12 May 2013).

⁷ Munaretto and Batinti 2007: 71-72.

for the study of fairly recent periods, but it is probable that the lower level of the building, consisting of a basement floor where the heating plant for the big basin furnace was located, holds some surprises. A summary analysis of the structures seems to show the existence of another level below this, with vaulted rooms full of rubble, which would be interesting to explore.

In addition to the glassworks described there was another glass workshop in Piegara until the 1950s, also in the town centre, of which some structures are conserved, including part of the smelting furnace. The monumental testimonies related to glass are completed by the church of the Madonna della Crocetta, located near one of the access roads to the town, on whose choir there is a painting portraying the crest of the Confraternita di Signoria dei Vetrai, which was based here. The existence of this brotherhood is documented by 15th-century papers⁸ and is another clue to the importance of glass making in the town at that time.

The few clues collected so far allow us to state that glassmaking in Piegara existed at least from the 14th century, and that it continued uninterrupted through the subsequent centuries to the present.

The few known archive documents, which must be reviewed and carefully analysed, will certainly be joined by others. Piegara was repeatedly cited during the recent AIHV Massa Martana meeting, for example, particularly in the context of the archive documents presented by Paolo and Sandro Zecchin⁹.

The characteristics of the museum building and the limited urbanisation of the areas immediately outside the medieval centre of Piegara offer a further possibility for making closer studies of the archive research. Indeed, it would be good to have the chance to undertake recognition and excavation campaigns, both inside the building and in the surrounding area, to identify any remains of ancient furnaces.

⁸ Ibid.: 65-67.

⁹ The talks by the two scholars will soon be published in the proceedings of the XVII Giornate Nazionali di Studio dell'AIHV (Massa Martana - Perugia, 11 and 12 May 2013).

This is obviously a proposal for the future, but it was certainly a good starting point to have been able to present the Piegaro situation in such a stimulating context as the Study Days of Venetian Glass 2013 and to have aroused at least the curiosity (if not the interest) of the many scholars present¹⁰.

(Translation by David Graham)

REFERENCES

- Corgna, Francesco. 1941. *Le vetrerie di Piegaro dal 1250 al 1941*. Roma: Tipografia Petrignani.
- Fumi, Luigi. 1891b. *Il duomo di Orvieto e i suoi restauri*. Roma: La Società Laziale Tipografico-Editrice.
- Munaretto, Gabriella and Antonio Batinti. 2007. *Parole di vetro. Arte e tradizioni a Piegaro dal XIII secolo*. Perugia: EraNuova.
- Pistelli, Senofonte. 1976. *Storia di Piegaro e delle sue vetrerie*. Castiglione della Valle: Cosucci.
- Zecchin, Luigi. 1987-1990. *Vetro e vetrai di Murano: studi sulla storia del vetro*. 3 vols. Venezia: Arsenale.

¹⁰ I here once again thank Rosa Barovier Mentasti for the opportunity offered to me, for her kind helpfulness and precious suggestions.



Fig. 1 - One of the rooms in the Piegara Glass Museum (photo: Nicola Biancucci).



Fig. 2 - The big cast of glass conserved on the basement floor of the museum (photo: Nicola Biancucci).



Fig. 3 - The big cast of glass conserved on the basement floor of the museum, detail (photo: Nicola Biancucci).

KINGA TARCSAY

STUDIES ON GLASS IN VENETIAN STYLE OF THE 16TH
AND 17TH CENTURIES IN AUSTRIA

This paper presents the results of archaeological research into glass from the 16th and 17th centuries in Austria, and in particular in the east of the country in Lower Austria and Vienna.

Chemical analyses of glass finds from the 13th to 17th centuries, which were carried out in cooperation with the TU Berlin, reveal a dissimilar pattern of development between western and eastern Austria in the composition of the colourless glass¹, although these results should be tested by further research. It seems that soda ash glass remained common into the 17th century in the west, while in the east a definite shift from soda ash glass to wood ash glass took place in the 15th century. Vessels of wood ash glass are very common in the east from then on and presumably represent the production of local glassworks, which according to written sources were erected in large numbers in Lower Austria in this period.

Today the early glasses from the 15th and early 16th centuries, made originally of colourless glass, generally show strong signs of corrosion, ranging from a silver-brown disintegration of the glass surface to complete devitrification. The glasses maintain known medieval forms and diversify on this basis, for example with prunted beakers or with bottles with blue filament overlays, but there are also unknown forms such as a vessel, which is either a tabletop lamp or a mannerist goblet².

Green-blue glasses crop up for a short period in the first half

¹ Müller and Tarcsay, Stege 2004.

² Tarcsay 2003a: 169. Tarcsay 1. Tarcsay 2.

of the 16th century³, but the 17th century is dominated again in its turn by the production of colourless wood ash glass for tableware.

According to written sources glass production in Venetian style began in this region in Vienna, where the first in a string of glassworks was founded in 1486. These installations were under urban or imperial patronage and evidently produced soda ash glass⁴. Without archaeological data however, we cannot know what these Viennese glasses looked like.

A long drawn out rivalry developed between Vienna and Hall in Tyrol, after the Hall glassworks was founded in 1534. This would appear to indicate a similar product range and an identical clientele.

The glassworks in Hall is well-known in art historical circles because of several early publications on the subject⁵. Archaeological excavations were carried out there by Alexander Zanesco in 2008 and 2009⁶. Post-excavation analysis is not yet complete, but it is clear that the finds will be good for several surprises, as they do not entirely reflect the product range as postulated to date.

Past and present excavations at the sites of 16th and 17th century glassworks in Austria⁷ appear to show, however, that many glassworks were now specialising in the production of glass in Venetian style – albeit of very clear wood ash glass. In this way it is becomingly increasingly clear that modern-day Austria was one of the production centres of this glass ware.

The glassworks from the manor of Reichenau form the only glass production centre, which has been comprehensively presented to date. They are well described and illustrated in the so-called “*Topographia Windhagiana*”. There were 4 glassworks in the 16th century, which were succeeded around 1600 by a new glasshouse in Reichenau, which continued until 1686. The technical structure of the glassworks and their furnaces can be

³ Tarcsay 2003a: 170. Tarcsay 3.

⁴ Tarcsay 1999: 7-11.

⁵ Egg 1962.

⁶ Zanesco 2009.

⁷ Felgenhauer-Schmiedt 1994.

partly reconstructed. A high level of technology, influenced not only by Italian glassmaking, but also showing further development towards the “Bohemian furnace”, is shown not only by the detailed views in the “*Topographia Windhagiana*”, but also from the use of standardized furnace stones.

The glass produced was wood ash glass rich in silicon. The production range included hollow, flat and solid glass. From the waste glass it is possible to say that almost half the glass vessels were colourless, almost a third were greenish and a fifth were otherwise green coloured; the rest were blue, violet, emerald green, opal as well as red, white and blue opaque. Colourless glass of Venetian style (Fig. 1), colourful plates, bowls and jugs, as well as simple everyday forms were found.

The Venetian-type glasses included above all goblets, plates, bowls and four-cornered bottles, which could be decorated with filigree, enamel or cut glass decoration, berry-shaped pruned add-ons, lion's heads and snake-shaped or coloured filaments. Some of these possibilities can be related to well-known, art historically narrowly-determinable, stylistic circles⁸.

Unfortunately apart from the glassworks there is a general lack of well-stratified glass finds complexes from the 16th century in Eastern Austria, yet the source base for the 17th century is considerably better. This means that on the basis of archaeological data it is not always possible to tell apart 16th and 17th century glass unambiguously.

A rather curious goblet from Orth Castle (Lower Austria), which was found in the fill of a 16th century drain, serves to illustrate the transition from the Middle Ages to the Renaissance period at this point. The glass is endowed with large filigree-decorated nodes and pruned add-ons on the bowl (Fig. 2)⁹; a comparable object can be found in the collections of the Museum of Applied Art in Vienna¹⁰.

Large glass complexes with better than average everyday ware

⁸ Tarcsay 2003b, Tarcsay 2009.

⁹ Tarcsay 2011.

¹⁰ Egg 1962: Tafel IX, Abb. 17.

from the second half of the 16th and from the 17th centuries have been excavated for example in St. Pölten (Lower Austria)¹¹ and the former university in Vienna¹². Extremely richly decorated glasses were recovered from the monastery at Pernegg (Lower Austria), (Fig. 3)¹³: They were decorated with branded and painted enamel, cut glass decoration and gold-plating and date as a group to the first quarter of the 17th century. The chronological end of the glass discussed here takes the form of a finds complex from the Herrengasse 13 in Vienna, which was disposed of c. 1700 and already included thick-walled scratched and cut objects of crystal glass, which illustrate the newly increased influence of Bohemian glassmaking¹⁴.

These previous results of research into glass in Austria confirm that archaeological examinations at the sites of glassworks not only provide us with new findings, but are also essential for new impulses in a glass research field dominated by historical and art historical approaches. They also show Austria's importance as the geographic link between Venice and Bohemia, the two important Central European glass centres, and its mediating role in the transfer of technological knowledge and innovation between these two poles.

(Translation: Paul Mitchell)

REFERENCES

- Egg, Erich. 1962. *Die Glashütten zu Hall und Innsbruck im 16. Jahrhundert*. Innsbruck: Tiroler Wirtschaftsstudien.
- Felgenhauer-Schmiedt, Sabine. 1994. Archäologische Untersuchungen in der Glashütte Sulzbichl bei Puchenstuben, N.Ö. *Beiträge zur Mittelalterarchäologie in Österreich* 10:23-36.
- Müller, Katharina and Kinga Tarcsay, Heike Stege. 2004. Materialanalytische Betrachtungen zu entfärbtem Glas aus Österreich vom Mittelalter bis zur frühen Neuzeit. *Beiträge zur Mittelalterarchäologie in Österreich* 20: 149-78.

¹¹ Few examples see Tarcsay 2003a: 175, Abb. 9.

¹² Tarcsay 1.

¹³ Tarcsay 2000.

¹⁴ Tarcsay 4.

- Tarcsay, Kinga. 1999. *Mittelalterliche und neuzeitliche Glasfunde aus Wien - Altfunde aus den Beständen des Historischen Museums der Stadt Wien*. Beiträge zur Mittelalterarchäologie in Österreich - Beiheft 3.
- Tarcsay, Kinga. 2000. Renaissancezeitliche Glasfunde aus Altenburg, Pernegg und Wien. In *Fundort Kloster - Archäologie im Klösterreich, Katalog zur Ausstellung im Stift Altenburg*. Fundberichte aus Österreich, Materialheft A 8: 239-46.
- Tarcsay, Kinga. 2003a. Zum Stand der mittelalterlichen und neuzeitlichen Glasforschung in Ostösterreich. *Beiträge zur Mittelalterarchäologie in Österreich* 19:165-78.
- Tarcsay, Kinga. 2003b. Archäologische Erforschung zu Glas und Glashütten des Mittelalters und der Frühneuzeit im Osten Österreichs. In *Beiträge zur historischen Archäologie. Festschrift für Sabine Felgenhauer-Schmiedt zum 60. Geburtstag*. Beiträge zur Mittelalterarchäologie in Österreich, Beiheft 6: 83-94.
- Tarcsay, Kinga. 2009. *Frühneuzeitliche Glasproduktion in der Herrschaft Reichenau am Freiwald, Niederösterreich*. Fundberichte aus Österreich, Materialheft A 19.
- Tarcsay, Kinga. 2011. Ein Meisterwerk aus Glas. In *Orth an der Donau. Von der Wasserburg zum Renaissanceschloss*. Fundberichte aus Österreich, Materialheft A 15, Sonderheft: 56-61.
- Tarcsay, Kinga. 1. in preparation. Glasfunde der Ausgrabungen in der Alten Universität Wien 1997-2002.
- Tarcsay, Kinga. 2. in preparation. Die römerzeitlichen, mittelalterlichen und neuzeitlichen Gläser der Grabung Wien 1, Stallburg.
- Tarcsay, Kinga. 3. in preparation. Die mittelalterlichen und frühneuzeitlichen Gläser der Grabung Wien 1, Herrengasse 10.
- Tarcsay, Kinga. 4. in preparation. Die neuzeitlichen Gläser der Grabung Wien 1, Herrengasse 13.
- ZanESCO, Alexander. 2009. KF Hall, SG Hall in Tirol, PB Innsbruck-Land. *Fundberichte aus Österreich*: 511, 31/Abb. 23.



Fig. 1 - Some glassfinds from the glasshouse Reichenau am Freiwald/Lower Austria (picture from Tarcsay 2).



Fig. 2 - Goblet from Orth Castle/Lower Austria (picture from Tarcsay 2011: 60).



Fig. 3 - Goblet from the monastery at Pernegg/Lower Austria (picture from Tarcsay 2000: 243, Fig. 21.40).

KITTY LAMÉRIS

SOME NEW INSIGHTS ABOUT 16TH
AND 17TH CENTURY *VETRO A RETORTOLI*

Last year we were fortunate enough to have a collection of over 40 *filigrana* glasses in our shop. *Filigrana* glass is glass made out of canes, decorated with, in this case white, glass threads. There are three types of *filigrana* glass: *Filigrana a fili*, *filigrana a retortoli*, *filigrana a reticello*. *Filigrana a fili* is glass made with canes of clear glass with a single white thread in the middle. *Filigrana a retortoli* is glass made with canes of clear glass decorated with white twisted threads. *Filigrana a reticello* is glass with a diamond-shaped pattern of white threads, often with small air bubbles in-between the crossed threads. The pattern looks like a net (the Italian word 'rete' means 'net'). Having so many of these glasses was a real opportunity. It offered us a unique chance to do some real in-depth research, to look at them and study them, and above all, to compare them with each other.

We decided to write a book about the collection, in honour of the collector. The core of the collection consisted of glasses made in the sixteenth and seventeenth century.

Besides cataloguing all the glasses, I wanted to introduce them in two chapters, dealing first with the history and secondly with the technique. And we made a film with glass artist Marc Barreda about how the glasses were made. The film will be on show on the site of the ivsla (www.ivsla.it) and on the website of our shop (www.frideslameris.nl) to illustrate the texts about the techniques of making *filigrana* glass.

So much has been written about *filigrana* glass, that I thought I would mainly register some facts and illustrate them with beautiful

pictures. But much to my surprise I actually discovered some interesting things.

For the second chapter, about the techniques used in making these glasses, I started by reading Eduard Schmid¹. His second book on making glass is partly dedicated to Venetian techniques. In delightful drawings, he sketches the various ways *filigrana* glass was and is made. Reading this furnished me with the appropriate terminology and the names of the various tools used in making glass, which was very useful in the later conversations I had with three glassblowers and artists. I spoke with Davide Salvatore, a glass artist of Murano, whose family has been working in glass since the sixteenth century, with Bill Gudenrath, the famous glassblower at the Corning Museum of Glass, who studies old glass techniques and Marc Barreda, an American glass artist who works in The Netherlands. They shared their knowledge, experience and expertise with me without reservation. Thanks to the lessons and demonstrations given by these glassblowers and my discussions with them, I discovered several things that could turn out to be helpful in dating *filigrana* glass. In this paper I would like to show you two of them. Both findings concern *vetro a retortoli*, made with or without *vetro a fili* (Figs. 1-2).

Even though in most English literature the term *vetro a retorti* is used, I choose to use, like the Italian writers usually do, the original term used by the Serena brothers, who first mentioned the technique in 1527: (*vetro a*) ‘retortoli’².

From a technical point of view it is possible to divide *vetro a retortoli* in two groups. Some glasses consist of two layers, others only of one. As I said before, *filigrana* glass is made with canes. The glasses consisting of two layers have a layer made of *cristallo* glass and a layer of canes. The glasses consisting of a single layer are only made with canes.

This is a result of how they were made.

¹ Schmid 1997: 133-211.

² Archivio di Stato di Venezia. Consiglio dei X, Parti Comuni, filza 6, n. 84. In Zecchin 1989: 213.

There are several different ways to make glass having two layers. It's still not clear (and a much debated issue) what method of manufacture was used in the early days.

I will explain here one of these techniques, called: pick up on a bubble.

Pick up on a bubble

Canes are put in the desired pattern next to each other on a *pastorale* (an Italian term for the metal tool that picks up the plate or cane marver on which canes are laid out).

This group of canes (*la piera*) is fused together. The glassblower blows a glass bubble and rolls it over the canes picking them up.

By repeated heating in the oven and shaping on the marver, the bubble with the canes around it is made homogeneous. Now you have a bubble with a clear base and striped sides. To be able to make a glass entirely out of *vetro a filigrana*, it is necessary to get rid of the clear base. While the assistant is blowing, the master is squeezing the canes together just above the clear base and then cuts it off. This leaves a small ball of glass which is thrown away and a striped bubble. This bubble can be handled to make a glass.

This is one of the techniques a glass with two layers can be made.

To make a glass with only a layer of canes another technique is used: pick up on a collar.

Pick up on a collar

Canes are put in the desired pattern next to each other on a *pastorale*. This group of canes is fused together. The glassblower takes them up on a collar, a clear circle of glass on the end of a blowpipe, by rolling up the canes on the edge of the collar. Now you have an open cylinder of canes on a blowpipe. To make a bubble of it, the glassblower closes the open end and cuts off the excess of glass. Now the bubble can be handled like every other bubble to make a glass.

The difference between a glass made with two layers or in a single layer is clearly visible. Not easy to see, but a trained eye can see the difference. It's easier to feel it. If you touch a glass made

out of two layers, it has ribs of the canes on the outside, whilst it is smooth on the inside, where the *cristallo* layer is. A glass made out of one layer of canes has ribs of the canes on both sides.

Up until a few months ago, it was thought that both techniques were used alongside one another throughout the sixteenth and seventeenth centuries³.

But, comparing the glasses with one another, it turned out that the early glasses, made in the sixteenth and most of the seventeenth century, all consisted of two layers (Fig. 1).

Only the glasses made around 1700 were made in a single layer (Fig. 2).

These are glasses of a special type, that I called 'The Rosenborg castle type'. In 1709 this type of *filigrana* glasses was presented to the King of Denmark, when he visited the city of Venice. Back home, the King made a special glass room in his castle in Copenhagen, the Rosenborg castle, for all his new glass. Here they are still on show, in a glass room that has remained unchanged since the early eighteenth century. Usually a date around 1700 is accepted for this type of glass⁴.

Of course I had to check at Rosenborg castle in Copenhagen itself. The 'pick up on a collar technique' for the glasses with only one layer could also have turned out to be a nineteenth century technique, which would have meant that our glasses were made in the nineteenth century. Nobody could tell me how many layers these Rosenborg glasses were made from, so I had to go there myself. I made an appointment at Rosenborg castle and was allowed to enter the glass room.

It turned out that the *filigrana a retortoli* glasses there were made out of a single layer, which confirmed our theory.

Later I spoke to the Dutch archaeologist Jaap Kottman, who is specialised in sixteenth and seventeenth century pits and who regularly finds shards belonging to *filigrana* glasses. I told him about my findings and he confirmed them. He was even very much

³ See for example Dorigato 2002: 96-99 and Gudenrath 2012: 262-263 and all the glassblowers I did talk to.

⁴ Boesen 1960.

surprised to hear that some *filigrana* glasses were made from a single layer, for the only type of shards he finds all comprise two layers. Since he is working only with sixteenth and seventeenth century glass, this is now what you would expect. Another proof that the early glasses consist out of two layers.

It provides us with a tool for dating *filigrana* glass. When in doubt one can check out of how many layers a glass is made. If a glass is made with two layers, canes and *cristallo*, it can be sixteenth or seventeenth century.

If it comprises a single layer with only canes, it was probably not made earlier than around 1700.

Now for the second thing I wanted to show you.

There are many types of canes (Fig. 3). In this collection alone no fewer than twenty-seven different types of canes have been used⁵.

When I talked with Davide Salvatore, he mentioned in passing that there are two types of canes, 'canne con una decorazione esterna e canne con una decorazione interna', meaning canes with external decoration and canes with internal decoration.

The base of every type of *vetro a retortoli* canes, are *a fili* canes, with one thread in the middle. All patterns are made with them.

A fili canes (Fig. 3a)

During the Renaissance *a fili* canes are made with three layers: *cristallo/lattimo/cristallo*. To make an *a fili* cane a glassblower takes a dot of hot colorless glass on a punty or blowpipe. It is marvered into a cylinder and covered evenly with white glass. The white glass is then covered with colorless glass again. In the meantime an assistant prepares the post, a punty with clear glass to attach to the other side of the cylinder with cased white glass. The glassblower attaches the post on the other side of the glass cylinder and gives the punty back to the assistant. Now they pull the glass until it's a long thin cane with a white thread in the middle. They put it on wooden paddles that are laid out on the

⁵ Laméris 2012: 20-23.

floor. The punties are broken off of the cane. Once the cane has cooled it is ready and can be broken in several pieces of the same length to work with.

Canes with external decoration (Fig. 3b)

To make a cane with an external decoration, the glassblower puts several *a fili* canes next to each other on a flat surface. They are put into the oven to fuse together. The glassblower measures the width of the piece of canes and takes a gather of clear glass, that is marvered into a cylinder and picks up the canes by rolling them up from the beginning to the end, where they come together.

Then the canes are marvered into the core of clear glass and the whole piece of glass is thus shaped into a cylinder. In the meantime an assistant prepares the post, a punty with clear glass to attach to the other side of the cylinder. The glassblower puts the post on the other side of the glass cylinder, twists and pulls it as far as he can and gives the punty back to the assistant. Now they pull and twist the glass until it's a long thin cane with twisted threads on the outside. This type of cane is called *canna a rete*, a *rete* cane. ('rete' means 'net'). Other canes with external decoration do exist. The glass on picture 1 on made with two types of external canes: a *canna a rete* and a cane with a band of five threads.

Canes with internal decoration: *canna a ballottini* (Fig. 3c)

Instead of twisting around the exterior of a cane, canes with internal decoration twist around their own centre inside the cane. They are called *canne a ballottini*, which means 'canes with little balls' because of the decoration that looks like a row of little balls. To make *ballottini* some *a fili* canes are put together on a flat surface. They are fused together, taken on a punty with a flattened broad piece of glass and then covered with clear glass. This is marvered into the shape of a cylinder. In the meantime an assistant prepares the post. The glassblower puts the post on the other side of the glass cylinder and gives the punty back to the assistant. Now they twist and pull the glass continuously until it cools down and shows a row of little balls made out of several white threads. Canes with *ballottini* are clearly visible in the glass at the right of picture 2.

Back home I made a new division of the canes used for the glasses in our collection. I had made designs of all the different canes that were used in the glasses and I divided them into *a fili* canes, canes with external decoration and canes with internal decoration. Alongside I put the numbers of the glasses, which I had ordered chronologically⁶.

It appeared that the canes with the *ballottini*, with the internal decoration, were only used in the glasses of the Rosenborg castle group (Fig. 2).

Up until now it was known that these glasses had much more elaborate decorations than the earlier ones. But what exactly this difference was, was unknown.

I studied this collection, comparing it with glasses held in various museum collections and with pictures. I examined over 900 *filigrana* glasses. And this observation seems to hold true, however strange it might be: before 1700 or thereabouts, no glasses with *ballottini* appear. Until now this had not been remarked, and why it should be so no-one knows. Maybe the glassmakers of the time had to stick to certain rules, or maybe it simply didn't occur to them to make canes with *ballottini*, I don't know. However, it does give us another tool in dating *filigrana* glass.

The early glasses are all made with canes with external decoration. Usually the base is *canna a fili* (Fig. 3a) in combination with *canna a rete* (Fig. 3b).

We know now that the canes 'a facete a retortoli a fil' that the Serena brothers were making in 1527 must have been the canes made with external decoration.

Other external decorations are known, but are much rarer. In our collection there were only a few, like a bowl with a combination of *canna a rete* together with an external decoration of a band of five threads (Fig. 1).

Once the canes with the *ballottini* (Fig. 3c) were discovered, it opened up lots of new possibilities. For example, internal decorations can be combined with external decorations in a single

⁶ Laméris 2012: 20-23.

cane. I called these canes, *canne miste*, or “mixed canes”⁷ (Fig. 3d).

The *canna a rete* was not abandoned. Instead, it’s usually the base cane for the glasses with *ballottini* (Fig. 2, glass to the right). *A fili* canes become very rare. Whilst the earlier glasses usually comprise a combination of one or two types of cane (Fig. 1), the Rosenborg-type glasses are mostly made with three types of canes (Fig. 2).

The gift including the glasses presented to King Frederik IV of Denmark in 1709 was more valuable than all the gifts given by the government of Venice to royal visitors during the whole seventeenth century put together. Back then Frederik was not the only one to be given a large number of *filigrana* glasses. While his is the only collection still intact since it was received, other royal visitors were gifted with collections of comparable size⁸.

I guess that such gifts, including loads of *filigrana* glasses, were a response to the threat posed by the clear glass that was being made in Bohemia and in England, which had undermined the demand for *cristallo* glasses made in Venice. But the Venetians didn’t only have *cristallo*, they had another weapon at hand: *vetro a filigrana*. So at a time when these glasses weren’t made outside Venice any longer, the Venetians developed new ways of making this type of glass, rendering them even more elaborate and attractive.

This is illustrated beautifully in the Italian painting ‘Still life with a parrot’ made by Gabriele Salci in 1716 (Lichtenstein, The Princely Collections, Vaduz-Vienna). Here we see an early eighteenth century beaker which represents the newly invented *Kreide* glass made in Bohemia. It kept its transparency even when blown thick-walled, so it could be used for wheel engraving. Next to it is a *filigrana* glass. It does not belong to the collection of the Danish King, but he had comparable glasses. This *filigrana* glass, this time made out of *vetro a reticello*, is a thousand times more extravagant and desirable than the beaker and makes the Bohemian glass fade away.

⁷ Laméris 2012: 22-23.

⁸ Boesen 1960: 82, note 36.

Aknowledgments

Thank you for sharing part of my investigations into *filigrana* glass. I became so inspired that even now most of the glasses in our catalogue have been sold, I'm thinking of continuing my research. There are many more things about *filigrana* that I would like to investigate. Starting with the question why glassmakers in the sixteenth and seventeenth centuries confined themselves almost exclusively to making white rather than coloured *filigrana* glass.

REFERENCES

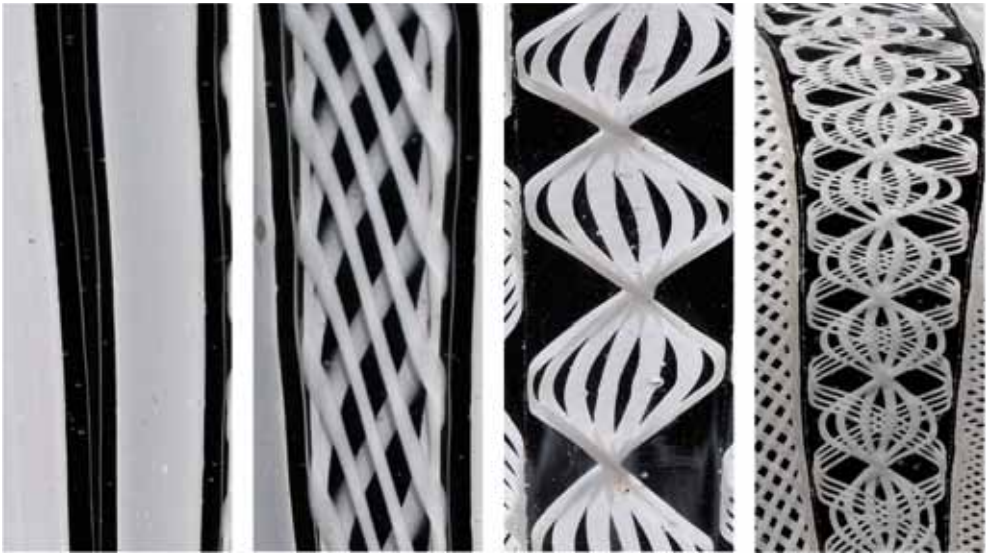
- Boesen, Gudmund. 1960. *Venetian glass at Rosenborg castle*. Copenhagen.
- Dorigato, Attilia. 2012. *L'arte del vetro a Murano*. Verona: Arsenale editrice.
- Gudenrath, William. 2012. Techniques of glassmaking and decoration. In *5000 years of glass*, edited by H. Tait. London: The British Museum Press.
- Laméris, Kitty. 2012. *A collection of filigrana glass*. Amsterdam: Frides Laméris Art and antiques.
- Schmid, Edward. 1997. *Advanced glass working techniques, an enlightened manuscript*. Bellingham Washington: Glass mountain press.
- Zecchin, Luigi. 1989. Una fornace Muranese all'insegna della Sirena. In *Vetro e vetrai di Murano, Studi sulla storia del vetro*. Vol. 2. Venice: Arsenale.



Fig. 1 - Large twelve-lobed bowl, Venice, second half of the 16th century. Height: 9 cm, diameter bowl: 27 cm, diameter foot: 16 cm.



Fig. 2 - Two wineglasses, Venice, around 1700. Height: 8.3 and 16.9 cm.



a.

b.

c.

d.

Fig. 3 - a) *A fili* cane; b) Cane with external decoration: *canna a rete*; c) Cane with internal decoration: *canna a ballottini*; d. mixed canes.

ANDREW MEEK*

QUALITATIVE COMPOSITIONAL ANALYSIS OF A LATE 16TH CENTURY ENAMELLED GLASS GOBLET

[a] Introduction

The goblet shown in Fig. 1 is thought to have been produced in either Venice or the Tyrol in the late sixteenth century (for a detailed discussion of this object see Thornton, this volume). It is enamelled with an image of a lady holding a fan on one side, and on the other side with an as yet unidentified coat of arms. Gold decorates the goblet on the rim, knop and throughout the enamelled areas. The aim of this study was to use compositional analysis to provide more information about the raw materials used to produce the goblet. The analysis focussed on the enamels, but the glass body itself and the gold were also analysed.

[a] Methodology

[b] X-ray fluorescence (XRF)

A Bruker ARTAX X-ray spectrometer was used with a helium atmosphere, 50 kV voltage, 0-50 keV spectral range, 0.5 mA current, 0.65 mm diameter collimator and 100 seconds live time.

The type of analysis carried out is entirely non-destructive and does not even require contact with the surface of an object. In the case of this study it has been used to provide qualitative data about the elements present. Even though measurements were made in a

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helium atmosphere, it has not been possible to obtain any data for elements lighter than silicon, including aluminium, magnesium, sodium etc.

[b] Visible light microscopy

Macro images were taken using a Leica MZ APO microscope with attached Leica DFC 500 digital camera at magnifications of 8-32x.

[a] Results

Tab. 1: XRF results summary.

Analysis	Colour	Significant elements
Woman's Hair	Yellow	Pb, Sn, Fe
Woman's Forehead	Pink	Pb, Sn, Fe
Rim Circle	Blue	Co, Ni, As, Bi, Pb, Sn
Woman's Fan	Black	Co, Ni, As, Bi, Mn, Pb, Sn
Woman's Sleeve	Light Blue	Pb, Sn, Co, Ni, As, Bi
Woman's Bodice	White	Pb, Sn
Woman's Bodice	Gold	Au (+elements from underlying enamel)
Woman's Chest	Brown	Pb, Sn, Fe
Woman's Neck	Dark Pink	Pb, Sn, Fe
Grass	Green	Cu, Zn, Pb, Sn
Woman's Chest	Black	Co, Ni, As, Bi, Fe, Pb, Sn
Crest: Lion's Tongue	Red	Fe, Pb, Cu
Shield	Black	Co, Ni, As, Bi, Mn, Pb, Sn
Shield	Red	Fe, Pb, Cu
Mantling	Black and Gold	Fe, Pb, Au
Helmet	Black	Fe, Co, Ni, As, Bi, Pb, Sn
Vessel Body	n/a	Si, K, Ca, Mn, Fe (Ti, S, Cl, Pb, Br, Sr)

*[b] Enamels**[c] Blue*

The blue enamel is coloured by the addition of cobalt (Tab. 1). The opacity results from the presence of lead and tin, either in the form of lead stannate or tin oxide (cassiterite) crystals. There have been many sources of cobalt exploited by glassmakers since glass was first produced¹. It is often possible to suggest the source used by studying other elements in the glass which are suspected to have been added unintentionally along with the cobalt as impurities in the source.

In the case of this goblet, the cobalt added appears to be from minerals associated with nickel, arsenic and bismuth (Tab. 1). This cobalt type was used in the sixteenth to eighteenth centuries. Geochemical and historical sources suggest it came from the Erzgebirge Mountains, on the German-Czech border². The associated elements are not only linked with the geological source, but also the method of processing. Gratuze *et al.*³ suggest that the geological source was either smaltite ((Co,Fe,Ni)As₂) or erythrite (Co₃(AsO₄)₂·8H₂O). They suggest that these minerals were roasted to produce a colourant. In earlier periods this roasting was more intense, resulting in a lower level, or absence, of volatile arsenic.

[c] Yellow and white

These two colours of enamels both contain significant levels of lead and tin, which suggests the use of a lead-tin calx (a residue formed when metals are heated together⁴). It is possible to produce both white and yellow enamels by the addition of varying levels of lead and tin alone⁵. The yellow enamels of the goblet contain higher lead and lower tin levels than the white. The yellow enamel

¹ Henderson 2000: 30-32.

² Zucchiatti *et al.* 2006: 134-5.

³ Gratuze *et al.* 1999: 125-6.

⁴ See Biron and Verità 2012: 2711.

⁵ *Ibid.*; Henderson 2000: 36.

also contains significant levels of iron (Tab. 1). Due to the size of the XRF beam some 'black' enamel was also included in the yellow enamel analysis. It is therefore suggested that the iron detected in the yellow enamel was caused by the accidental analysis of some black enamel also present in the hair.

The Erzgebirge Mountains, Cornwall or Brittany were the sources of tin exploited in Europe at this time. It is therefore suggested that the tin used in the enamels on the goblet is likely to have come from one of these regions. Sources of lead are more widespread, and as such it is much harder to suggest a provenance for this raw material.

[c] Black

The 'black' colours found on the goblet were created using different combinations of colourants. The 'blacks' of the fan and on a quarter of the crest are actually very dark blue enamels produced with the addition of cobalt from the same source as the blue enamels discussed above (Tab. 1). These enamels have a slightly elevated level of manganese, but not sufficient to suggest that this is the reason for the colouring.

The 'blacks' on the woman's chest and the helmet are also produced using cobalt, but with the addition of iron. This may be the result of a mixing of a dark blue enamel with a brown iron-rich enamel to produce this colour.

Finally, the analysis of the mantling enamel, which is a dark decoration underlying gold, does not contain any cobalt. This analysis appears to show that a brown, high iron, high lead enamel was used. However, the possibility that a cold painted pigment containing a brown-coloured iron compound mixed with lead white was added in place of enamel later cannot be excluded.

[c] Red, pink and dark pink

The red enamels are characterised by elevated levels of iron and lead (Tab. 1). It appears that the red colouration is formed by

particles of iron oxide (hematite) within the enamel⁶. The pink and dark pink enamels appear to have been produced by mixing red enamel with varying quantities of white enamel (see above).

[c] Green

The green colour of this enamel is produced by the addition of copper (Tab. 1). Zinc is also present, suggesting that the copper may have been added as brass (copper and zinc) rather than simply as pure metallic copper. The opacity of this enamel is caused by the presence of lead and tin (see section on white enamels above).

[c] Brown

The brown enamel on the woman's chest is coloured with the addition of iron (Tab. 1). Lead and tin are also found in this analysis and may be part of the brown enamel or from the white enamel underneath.

[b] Gilding

The gilding on the goblet was also analysed and was confirmed as gold. It was also possible to observe that the gold on the goblet was applied as leaf around the rim and inside the knop, and painted on as powder, probably suspended in a liquid medium, around the enamelling on the body⁷.

[b] Body Glass

As noted above it is not possible to identify elements with a lower atomic number than silicon with the XRF methodology employed in this study. It is therefore not possible to comment on some of the most important elements contained in this glass, i.e. sodium, magnesium and aluminium. However, it is possible to

⁶ See Verità 1998: 132.

⁷ Eastaugh *et al.* 2004: 171.

show that this glass contains many of the elements expected for a glass type known as *vitrum blanchum* (Tab. 1)⁸.

Vitrum blanchum is an almost colourless glass produced from the 14th to 18th century⁹. It can be differentiated from *cristallo*, a glass of higher clarity produced from the 15th to 17th century, by its slight grey colour and increased iron and calcium levels. Excavated examples of *cristallo* glass have been found to contain c.4-6 wt% calcium oxide, whereas *vitrum blanchum* glasses contain c.8-12 wt%¹⁰. By comparison with XRF analyses of glass standards of known composition it is possible to suggest that the levels of calcium in the goblet are around 8%.

Many examples of sixteenth century glass vessels have suffered because of their unstable composition due to a deficiency in calcium¹¹. However, the levels of calcium in the goblet must be high enough to produce a stable glass as the body glass shows no signs of deterioration.

[b] Macroscopic examination

Low magnification images were taken of portions of the enamelled decoration. Fig. 2 shows the woman's head and illustrates how the enamel was applied to the cheek. Clearly the temperatures achieved in the furnace were high enough to vitrify the enamel, but not to melt it entirely, leaving ridges where it was applied (Fig. 2). From this investigation it was possible to see how the decoration was built up. A series of firings must have been carried out to produce the layering of enamels seen on the goblet.

[a] Conclusions

The compositional analysis of the enamels allowed the use of various colouring agents to be identified. Of particular note is

⁸ See McCray 1999; Biron and Verità 2012.

⁹ Verità and Zecchin 2009.

¹⁰ Ibid.: 607.

¹¹ Newton and Davison 1989: 143.

the use of a cobalt-based blue colourant which it can be suggested came from the Erzgebirge Mountains. The analysis of the glass itself suggests that it was produced from a glass type known as *vitrum blanchum*.

By examining the enamels and gold decoration under magnification it was possible to observe how they may have been applied, and also the order in which each of the colours was added.

While the data collected during this study allows a greater understanding of the processes employed to produce this goblet it does not provide enough information to suggest whether it was made in Venice or the Tyrol. Further scientific investigation of similar vessels of more secure provenance and date will be necessary to establish criteria for differentiating between the two manufacturing areas¹².

REFERENCES

- Biron, Isabelle and Marco Verità. 2012. Analytical investigation on Renaissance Venetian enamelled glasses from the Louvre collections. *Journal of Archaeological Science* 39:2706-13.
- Eastaugh, Nicholas and Valentine Walsh, Tracey Chaplin, Ruth Siddall. 2004. *Pigment Compendium: A Dictionary and Optical Microscopy of Historic Pigments*. Oxford: Butterworth-Heinemann.
- Gratuze, Bernard and Isabelle Soulier, Jean-Noël Barrandon, Danièle Foy. 1995. The origin of cobalt blue pigments in French glass from the thirteenth to the eighteenth centuries. In *Trade and Discovery: The scientific study of artefacts from post-medieval Europe and beyond*, edited by D. Hook and D. Gaimster, British Museum Occasional Paper 109. London: British Museum Press.
- Henderson, Julian. 2000. *The Science and Archaeology of Materials*. London: Routledge.
- McCray, Patrick W. 1999. *Glassmaking in Venice. The Fragile Craft*. Aldershot: Ashgate.
- Newton, Roy and Sandra Davison. 1989. *Conservation of Glass*. Oxford: Butterworth-Heinemann.
- Thornton, Dora. Venice or façon de Venise? Two enamelled glasses in the British Museum. In *This Volume*.

¹² See Biron and Verità 2012.

- Verità, Marco. 1998. Analyses of early enamelled Venetian glass: a comparison with Islamic glass. In *Gilded and Enamelled Glass from the Middle East*, edited by R. Ward, London: British Museum Press.
- Verità, Marco and Sandro Zecchin. 2009. Thousand years of Venetian glass: The evolution of chemical composition from the origins to the 18th century. In: *Annales of the 17th AIHV Congress*, 2006, edited by K. Janssens and P. Degryse, P. Cosyns, J. Caen, L. Van't Dack, Antwerp: Antwerp University Press:602-13.
- Zucchiatti, Allesandro and Anne Bouquillon, Ildiko Katona, Alessio D'Alessandro. 2006. 'The 'Della Robbia Blue': A case study for the use of cobalt pigments in ceramics during the Italian renaissance', *Archaeometry*, 48(1):131-52.



Fig. 1 - Late 16th century enamelled glass goblet. London, British Museum, Prehistory and Europe S.853, width of rim is 11.5 cm (© Trustees of the British Museum).



Fig. 2 - Enamelling of the woman's face (width of field of view is approximately 2.5 cm; © Trustees of the British Museum).

DORA THORNTON*

VENICE OR *FAÇON DE VENISE*? TWO ENAMELLED
GLASSES IN THE BRITISH MUSEUM

The British Museum holds one of the world's finest collections of Venetian glass¹. Most of the collection was bequeathed by Felix Slade (1788-1868), whose estate also founded the Slade Professorships in the History of Art at Oxford, Cambridge and London Universities². Slade was particularly proud of his “fragile Venetian beauties”, and the enamelled Venetian and *façon de Venise* glass of the 16th to the early 17th Century is one of the highpoints of the Slade collection, allowing us to trace the diaspora of Venetian craftsmen from Murano to glassmaking centres all over Europe and to document the high regard for Venetian culture and fashion in Europe around 1600.

I recently curated an exhibition, *Shakespeare: staging the world*, at the British Museum for the Cultural Olympiad in 2012³. One section of the exhibition looked at Venice as the city of dreams for Shakespeare and his audiences; the city of luxury and excess, famous for its fair women and for its sex trade. Venice was renowned for its openness to “strangers” or immigrants and aliens, and admired as a trading city and as a bulwark against the Ottoman Turk. Londoners saw in Venice something to admire and criticise at the same time.

* British Museum.

¹ Glass discussed here can be studied on the British Museum's collections online database under http://www.britishmuseum.org/research/collection_online/collection_search_results.aspx.

² Griffiths 1996: 113-33 for Slade and his print donations; Tait 1979: 7-8 for his glass collection and bequest.

³ Bate and Thornton 2012.

Venice was the proxy setting for London on the stage of the London playhouse. In the British Museum exhibition, we explored the world of *The Merchant of Venice* and of *Othello*, and in doing we displayed two examples of enamelled glass from the British Museum's collection which gave new insights into the way in which Venice was regarded and viewed by contemporary Europeans⁴.

The first glass is a large goblet with a deep, wide bowl, a hollow baluster stem and a folded foot⁵ (Fig. 1). The body of the goblet is enamelled on one side with the figure of a well-dressed woman in Venetian dress. Her hair, which has been dyed blond, is teased into a distinctively Venetian style of horned headdress of the 1580s and 90s, which helps to date the glass⁶. She leans back on her hips as she is wearing high platform shoes under her voluminous blue and white silk dress: they can be seen peeping out at the base of the bowl⁷. Her delicate white undershirt is visible beneath the lacing of her corseted bodice and puffs out where her sleeves are laced at her shoulders. She holds a black ostrich feather fan as a luxury accessory in one hand and a large white linen handkerchief – reminiscent of Shakespeare's Desdemona – in the other⁸.

The glass presents the stereotypical view of the kind of Venetian blond beauty for which the city was famous in the 1590s and into the first decade of the 1600s. The image has long been thought to have been copied from a woodcut showing a Venetian noblewoman in Lent, which appears in Cesare Vecellio's famous costume book, *Degli habiti antichi et moderni di diverse parti del mondo*, printed in Venice in 1590⁹. Vecellio's book is probably the source for the image of a lady which is enamelled on one of a pair of stangengläser in the British Museum¹⁰. The other glass in the pair is enamelled with a male figure, in German dress, and both glasses bear the paired arms of the Praun and Roming families and the inscription

⁴ Ibid.: 147-69.

⁵ Slade 853; Tait 1979: Fig. 2, no. 40.

⁶ Rosenthal and Jones 2008: 182.

⁷ Semmelhack 2009: 56.

⁸ Bate and Thornton 2012: 155-56.

⁹ Rosenthal and Jones 2008: facing fol.133.

¹⁰ Ibid.: facing fol.135.

JACOB PRAVN in gold. It is thought that the figures are intended to be read as generic “portraits” of the Nuremberg couple, Jacob Praun and Clara von Romig, who married in 1589¹¹. Tait thought in 1979 that the dependence on Vecellio for the image of Clara Roming argued in favour of Schmidt’s hypothesis, put forward in 1911: that Venetian glasshouses might still, at this date, have been making glasses for German clients in what was by then an unfashionable style in Venice¹². Lanmon and Whitehouse did not openly contradict Tait’s view in publishing the glass in 1993, but it now seems that the glass could not be Venetian given its heavy and ponderous form. Shakespeare’s Portia in *The Merchant of Venice* decoys an unwelcome German marriage candidate with “A deep glass of Rhenish wine”; one wonders if this is the kind of oversized glass to which she is referring, associated in the minds of Shakespeare’s London audiences with German glass and drinking habits¹³. The greyish tint of the metal is also uncharacteristic of Venetian products. The use of full-length figures, as well as the sketchy style and fairly crude nature of the enamelling on the arms, would in addition argue for an origin outside Venice. Finally, the stangenglas form itself indicates a Southern German or Austrian origin.

The blue lady on the goblet in the British Museum may not be based on Vecellio’s print. An alternative source is provided by a very similar image in an interactive print by Pietro Bertelli, printed in Venice around 1588¹⁴. This shows a demure Venetian noblewoman in a watery lagoon. Or so she appears at first sight. However the viewer can lift the flap of her skirt to show her

¹¹ Slade 845-846. Tait 1979: 42-43, no. 39; Lanmon and Whitehouse 1993: 66-67, Fig. 21.2. Compare the glass of same type in Coburg with portrait of Jacob’s brother, Hans Praun as a young man, with his name and arms; see Theuerkauff-Liederwald 1994: no. 171. Two similarly enamelled glasses were sold at Sotheby’s, London, 26 June 1978, which commemorate the marriage of Hans Praun with Magdalena Gammersfelder, 1598. These are now in the Franco Deboni collection.

¹² Schmidt 1911: 249; Lanmon and Whitehouse: 67.

¹³ MacGregor 2012: 170.

¹⁴ Lawner 1987: 20-21; Bayer A., ed. 2008: cat.103; Bate and Thornton 2012: 155-56, Fig.14.

breeches and platform shoes underneath, revealing her identity as one of the famous courtesans of Venice. Bertelli's print, like Vecellio's depictions of Venetian noblewomen and courtesans, was frequently copied in the miniatures in friendship albums produced for German-speaking merchant and noble travellers in the late 1500s¹⁵. These albums – a large number of which are preserved in the British Library-- provide an image bank for the way in which Italian, and specifically Venetian, culture appeared to Northern European strangers and travellers; a source which should be much more widely used by historians¹⁶. Given the popularity of these images, we may never be able to identify a precise source for the blue lady on the British Museum glass. But the Bertelli image is telling nevertheless. As we handle the goblet and turn it in our hand to drink from it, are we meant to enjoy the witty conceit of the Venetian courtesan who specialises in what Shakespeare's Iago calls "a seeming": the notorious ability of the Venetian prostitute to emulate the ways and manners of "respectable" women?¹⁷ It was this very Shakespearean aspect of the glass which was brought out by Neil MacGregor, Director of the British Museum, in his examination of the glass for his radio series, *Shakespeare's Restless World*¹⁸.

On the back of the British Museum glass (Fig. 2) is a Germanic coat of arms which has not been identified. Scientific analysis by Dr Andrew Meek of the British Museum indicated that the cobalt blue used so liberally in the enamelled decoration is likely to have been derived from the Erzgebirge region on the border of Germany and the Czech Republic¹⁹.

The form, and the gilt and enamelled scale decoration on the rim, has been compared by Lanmon and Whitehouse to a glass in

¹⁵ Bertelli's print was copied into the album of Sir Michael Balfour, c1596-9; National Library of Scotland, Edinburgh, ms 16000, fol.128r. Bate and Thornton 2012: 156, Fig.15 and 290.

¹⁶ Rosenthal and Jones 2008: 19-20; Schlueter 2011.

¹⁷ Bate and Thornton 2012: 155.

¹⁸ MacGregor 2012: 160-73.

¹⁹ See Andrew Meek, Qualitative compositional analysis of a late sixteenth century enamelled glass goblet in this volume as part of the same conference papers.

the Lehman Collection in New York. The Lehman glass is dated 1592 and is enamelled with the arms of Welsperg and Madrutz of Tyrol, both of which are Southern Tyrolean families. Lanmon and Whitehouse attributed the glass to Southern Germany or Tyrol, perhaps to the Hofglasshutte at Innsbruck²⁰. During the discussion at the conference, Erwin Baumgartner pointed out to me that fragmentary baluster stems of very similar form have turned up in excavations at Hall. It is to be hoped that further research will clarify the exact origins of this fine glass with its delightfully witty enamelled decoration.

The second British Museum glass is of conical form on a low, spreading foot²¹. It is vividly enamelled all the way round, almost like a strip cartoon, with three male figures in masquerade; three of the Masks of the Italian popular theatre known as the *Commedia dell'arte*, including Pantaloon in Fig. 3 and Zanni in Fig. 4²². It represents a very early depiction of this theme on any object, despite the popularity of the *Commedia* throughout Europe in the late 1500s²³. Magnifico [later known as Pantaloon] is shown as Shakespeare describes him in *As You Like It* as “the lean and slippered Pantaloon”, an aged and decayed figure representing the sixth of the seven ages of man²⁴. Magnifico duels with the servant figure, Zanni, in his distinctive loose white garments and red hat with a feather. The duelling pair are watched by the Doctor. All three figures wear black masks. The enamelled figures on this glass may be copied from contemporary prints, like those in *Gli Inganni*, printed in Venice in 1592, which includes small woodcuts of the principal masks – Pantaloon, dottore, Zanni and Tedesco – in different combinations. Independent prints also feature these figures. However, no precise source for the three figures interacting as they do on the glass has not as yet been identified. Venetian print-makers seem to have regarded these as a kind of advertising

²⁰ Lanmon and Whitehouse 1993: 66.

²¹ Slade 852.

²² Harden *et al.* 1968: no. 213; Tait 1963; Tait 1979: no. 38; Ciappi 2006: no. 27; Bate and Thornton 2012: 167.

²³ Katritzky 2006: plate 339.

²⁴ Bate and Thornton 2012: 167.

for the culture of their city, although prints by Northern European artists such as Julius Goltzius's print, dated 1581 in the plate, show just how popular a theme the *Commedia* was throughout Europe²⁵.

The glass has long been identified as belonging to a group of seven glasses in the British Museum: three goblets (including the lady in blue described above); and four Stangengläser, of which all but one are enamelled with German, Austrian or Swiss arms and full-length figures of men and women²⁶. This is the only one of the group to lack arms, which suggests it is not a special commission. Tait argued for the Venetian origin of this glass, commenting that the choice of a *Commedia dell'arte* subject would seem to him to be "a curious subject for a German patron to commission from a local South German glasshouse or, indeed, for such a glasshouse to produce for general sale"²⁷. During the discussion at the conference, Paolo Zecchin and Rosa Barovier argued for the Venetian origin of this glass, dating it several decades earlier than I have, to the 1560s or 70s. They kindly drew my attention to the postmortem inventory of Giovanni Antonio Zanchi, dated 22 January 1577. Zanchi was the head of a glasshouse in Murano at the sign of the castle, and his inventory, preserved in the State archives in Murano and published by Paolo Zecchin, lists the contents of his workshop. Among the products are unidentified glasses described as "Goti da cil overo canoncini chiari", which Rosa Barovier suggests may have been glasses of the same form as German Stangengläser. Later in the same inventory one of these glasses is described as a "Goto de acil smaltado a magnifichi" which Barovier interprets as being a possible reference to a stangenglas enamelled with a *Commedia* subject featuring il Magnifico, Pantaloon²⁸. I am extremely grateful to Rosa Barovier and Paolo Zecchin for this fascinating suggestion, though it is as yet unproven and it is to be hoped that further research will clarify the meaning of inventory terms used for

²⁵ See for example the anonymous print of Pantalone, Innamorata, and Zanni, printed in Venice c1580-90, in the British Museum: PD1880,0710.854. Katritzky 2006: Fig. 248 for Goltzius.

²⁶ Tait 1979: 42-46, nos. 38-39 and 41-44.

²⁷ Tait 1979: 27-8; Schmidt 1911: 249.

²⁸ Zecchin 2009: 27-34, esp. 34.

glass and how they may or may not be matched with surviving glass types. This is one of the declared aims of the *Glass in Venice Project* and it is one which is particularly to be welcomed and supported by all students of Venetian glass.

An alternative possibility for the origins of this British Museum glass, and the group to which it belongs, is that it was made in Southern Germany or Tyrol. Two beakers of very similar form, but with a slightly more spreading foot, are in Coburg. They are enamelled with the arms of the couple, Matheus Spennesberger and Ursula Müllerin, and Theuerkauff-Liedewald has attributed them tentatively to Hall [?] c1570-80²⁹. She has situated the two Coburg glasses within a large group of similar form, enamelled with Germanic arms. Two of these, in Prague and Ecouen, are closer in form to the British Museum *Commedia* glass: they are enamelled with the arms of Philip Oyrlls von Herzogenbosch, and dated 1590 and 1591 respectively³⁰. The enamelled decoration of the *Commedia* need not be necessarily Venetian or Italian in origin, for the *Commedia* was, by the 1590s, a pan-European artform with a high reputation in the German-speaking countries. Northern European artists loved to depict the travelling players and their audiences, and prints of the kind mentioned above circulated widely. German glasshouses, especially those employing Venetian glassworkers, might well have chosen to illustrate such an appealing subject on their wares given the familiarity of the *Commedia*. A possible source for the enamelled decoration might again be the painted miniatures in friendship albums³¹. Many of these albums, such as that of an anonymous German owner in Bamberg compiled around 1600, contain picture postcard-type views of the *Commedia* masks in action as part of mountebank performances on makeshift stages³². The setting for the miniature in the Bamberg album is Venice itself, judging by the dress of the spectators, but miniatures

²⁹ Theuerkauff-Liederwald 1994: cats. 167-68.

³⁰ Ibid.: 183.

³¹ Katritzky 2006: Figs. 248-60.

³² Schlueter 2011, frontispiece and 109-110, 111, Fig. 49. From the album of an unidentified owner, Bamberg Staatsbibliothek, I QC 75 [unnumbered], circa 1600. Katritzky 1998: 104-25 discusses and reproduces the Bamberg and similar images.

in other albums set the scene in Northern European cities where travelling troupes of Italian players are known to have performed. The only comparison in terms of the *Commedia dell'arte* decoration on the British Museum glass, as Rosa Barovier kindly reminded me during the discussion at the conference, is a stangenglas in Hannover, which appears not only to include the same figures as the British Museum glass, but to have been painted by the same enameller after the same source³³. The form of the Hanover glass would surely argue for a Southern German or Austrian origin for the British Museum glass, too, if they were indeed made by the same craftsman in the same glasshouse.

Wherever they were made, the two glasses reveal the role of Venice and Venetian culture in the European imagination in the years around 1600. Art objects of this quality and interest have an intellectual context which is worth exploring. We need to consider not only the technical finesse of Venetian and *façon de Venise* glasses, but their contemporary status and significance for the men and women who first owned and handled them.

REFERENCES

- Bate, Jonathan, and Dora Thornton. 2012. *Shakespeare: Staging the World*. London: British Museum Press.
- Bayer, Andrea, ed. 2008. *Art and Love in Renaissance Italy*. New York: The Metropolitan Museum of Art.
- Ciappi, Silvia. 2006. *Il vetro in Europa*. Milan: Electa.
- Griffiths, Antony. 1996. *Landmarks in Print Collecting: connoisseurs and donors at the British Museum since 1753*. London: British Museum Press.
- Harden, Donald and Keith Painter, Ralph Pinder-Wilson, Hugh Tait. 1968. *Masterpieces of Glass in the British Museum*. London: British Museum Press.
- Katritzky, Margaret A. 1998. Was *Commedia dell'arte* Performed by Mountebanks? *Album amicorum* Illustrations and Thomas Platter's Description of 1598. *Theatre Research International* 23.2:104-26.
- Katritzky, Margaret A. 2006. *The Art of Commedia: the study in the Commedia dell'arte with special reference to the visual records*. Amsterdam: Rodopi.

³³ Harden *et al.* 1968: no. 213.

- Lanmon, Dwight P., and David Whitehouse. *Glass in the Robert Lehman Collection*. New York: Metropolitan Museum of Art.
- Lawner, Lynne. 1987. *Lives of the Courtesans*. New York: Rizzoli.
- MacGregor, Neil. 2012. *Shakespeare's Restless World*. London: Allen Lane.
- Rosenthal, Margaret F. and Ann Rosalind Jones. 2008. *Cesare Vecellio's Habiti antichi et Moderni; The Clothing of the Renaissance World, Europe, Asia, Africa, The Americas*. London: Thames and Hudson.
- Schmidt, R. 1911. Die Venezianischen Emailgläser des XV und XVI Jahrhunderts, *Jahrbuch der königlich Preussischen Kunstsammlungen* 32:249-86.
- Schlueter, June. 2011. *The Album Amicorum and the London of Shakespeare's Time*, London
- Semmelhack, Elizabeth. 2009. *On a Pedestal: From Renaissance Chopines to Baroque Heels*. Toronto: Bata Shoe Museum
- Tait, Hugh. 1963. The *Commedia dell'arte* in glass and porcelain. *Apollo* 78:October:261-73.
- Tait, Hugh. 1979. *The Golden Age of Venetian Glass*. London: British Museum Press.
- Theuerkauff-Liederwald, Anne-Elizabeth. 1994. *Venezianisches Glas der Kunstsammlungen der Veste Coburg*. Coburg: Kunstsammlungen der Veste Coburg.
- Zecchin, Paolo. 2009. Due Importanti invenatri muranesi del Cinquecento. *Rivista della Stazione Sperimentale del Vetro* 5.



Fig. 1 - Late 16th century enamelled glass goblet. London, British Museum, Prehistory and Europe, width of rim is 11.5 cm (© Trustees of the British Museum).



Fig. 2 - Late 16th century enamelled glass goblet. London, British Museum, Prehistory and Europe, width of rim is 11.5 cm (© Trustees of the British Museum).



Fig. 3 - Late 16th century enamelled glass goblet. London, British Museum, Prehistory and Europe (© Trustees of the British Museum).



Fig. 4 - Late 16th century enamelled glass goblet. London, British Museum, Prehistory and Europe: Zanni (© Trustees of the British Museum).

KÄTHE KLAPPENBACH*

VENETIAN CHANDELIERS
FROM THE 16TH CENTURY ONWARD
AND THEIR INFLUENCE ON CHANDELIER
PRODUCTION IN EUROPE AND BRANDENBURG-PRUSSIA

Thank you for the opportunity to speak to you about very illustrious glass objects that, although they are very well known, no systematic research has yet taken place. I am speaking about Venetian and Muranese glass chandeliers.

Even for me they were just a side panel as my field of research focuses on the chandeliers of the Brandenburg Prussian Palaces¹. This of course requires a preoccupation with all European manufacturers and royal courts.

The reasons for the lack of systematic research are surely

- the fragility of glass chandeliers;
- subsequent changes during cleaning and relocation of the chandeliers;
- often times ruthless modifications and refitting of lighting fixtures to accommodate more contemporary lighting requirements and needs;
- the dislocation and removal from their initial context and the lack of knowledge of later generations concerning the value of these objects.
- Uncertainty about the provenance since chandeliers with coloured glass elements are not always automatically of Venetian origin. Works «à la façon de Venise» were manufactured early on in various glass factories throughout Europe.

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¹ Klappenbach 2001.

During my years of research I have been able to bring to light many things, but much still awaits to be discovered.

With this speech and through examples of resources and photographs from Venice and Europe, I aim to awaken an interest in this topic. The time has come to explore the history and impact of glass chandeliers and to search for existing originals.

I would like to accomplish an awareness of the importance of these objects as valuable/worthy European artworks. I want to encourage and motivate all collections worldwide, to examine their existing Venetian chandeliers. The results can then be merged into an interdisciplinary research project where these can be evaluated.

This is why I am addressing following issues in my speech:

1. The significance of Chandeliers as royal representation- and status objects.
2. Chandelier manufacturing throughout the region of present day Italy.
3. The Venetian Glass Chandelier in Resources and Illustrations since the end of the 16th Century.
4. Examples of Glass chandeliers throughout Europe.

The significance of Chandeliers as royal representation- and status objects

Primarily, they are part of the interior furnishings, such as furniture or table and wall sconces. Precious, light reflective materials and the symbolism contained therein make them a highlight in royal chambers. Their exquisite value predestined them to serve as status symbols for their owners.

During evening festivities, they were indispensable as carriers of precious light, which was generated by very expensive beeswax candles. The emanating light was insignificant in comparison to the Chandelier itself. However, the amount of burning candles was a reflection of the owners financial resources. To 'illuminate' the importance of the court, to dazzle with the splendour of power and to set the stage for a radiant, enlightened ruler. Up until the

mid-18th Century, chandeliers adorned only representational and festive rooms. This changed during the Age of Enlightenment. Since then, in accordance with the French model, they are hung in most living rooms within a royal palace.

Even today, the ownership of chandeliers made of precious materials symbolises luxury. Luxury represents wealth and prosperity. Within the word itself, one can find the latin root 'lux', a unit used to measure the intensity of light.

Chandelier manufacturing throughout the region of present day Italy

The origin and the development of Chandeliers with hangings made of glass and rock crystal, as well as those made entirely of glass, lies within the region of present day Italy. Milan played a central role in the development of chandeliers. Since the 15th-16th Century it was a central point in manufacturing and processing of rock crystal and for steel refinement. Both materials are vital for chandelier manufacturing.

Well known for their chandeliers was the Milanese family Cattaneo (end of the 17th up until the middle of the 18th century)² as well as the workshop of Giovanni Battista Metellino (deceased before 1724)³.

Since ca. 1737 crystal cutters or 'Cristallari' from Milan delivered cut rock crystal hangings to Paris. At that time brass frames were fire gilded there for a new type of chandelier that was assigned by King Louis XV⁴.

The enchanting creations of Venetian glass artists were certainly assembled early on into chandeliers. Almost all known techniques were used to this end. These Venetian glass chandeliers as well as the bohemian crystal chandeliers were best known.

By the 18th century they had found their way into numerous palaces and private houses throughout Europe – but not in the

² Ibid.: 39, 45, 68, 114, 115; Fig. 56.

³ Ibid.: 30, 32, 39, 63, 66, 67, 71, 81, 114, 115, 372; Figs. 15, 22, 60, 62, 63, 114.

⁴ References: <http://www.fotothek.spsg.de>, Photograph no. F0027992.

Prussian Palaces. Everyone was trying to imitate Venetian glassware and chandeliers.

The bohemian Glassmakers excelled herein – their «à la Façon de Venise» chandeliers from the 19th c. are very difficult to distinguish from the real thing. Presumably this strong Bohemian competition led to a prolonged interruption in the production of glass chandeliers in the early 19th c. Venice. During the second half of the 19th c. the production picked up again. To date, here in Venice, these delicate works of art are made using historic models as an inspiration for new designs. The popularity of these works remains undiminished.⁵

The Venetian Glass Chandelier in Resources and Illustrations since the end of the 16th Century

Due to there highly exposed position and their fragility, glass chandeliers were extremely vulnerable. They broke relatively easily, so that few have survived. Often times, those that survived are no longer in their original state and have been strongly altered. Most likely, the earliest existing examples stem from the early 18th c. The earliest known written reference, that I am aware of, stems from the estate of Henri I de Bourbon, Prince de Condé (1552-1588). In the inventory of the estate furnishings there is mention of a coloured glass chandelier: «Ung chandelier de salle á quatre branches suspendu en la salle [...] fasson de croustalle, faict au tour et figuré de plusiers couleurs»⁶.

Due to the high rank of its former owner, the chandelier was certainly state of the art and highly modern for that time. However it is unclear whether the chandelier came from Venice or not. Targeted research could certainly provide further evidence of such objects.

Written evidence of such a chandelier can be found in the Inventory of the Garde Meuble in Paris dating from 1673: there is

⁵ Refer: Theuerkauff-Liederwald 1993.

⁶ D'Allemagne 1891: vol. 1, 250.

mention of a «chandelier de cristal de Venise»⁷. Unfortunately this work has no longer exists and its appearance is unknown.

In 1692 the Elector of Brandenburg, Frederick III purchased three «Christallene Cronen» – crystal crowns – from the Glass factory in Pretzsch. The factory, located in the Electorate of Saxony by Wittenberg, was founded in 1692⁸ and was operated by a Muranese Glassmaker Ludovico Savonetti. There is no mention of metal frames on the invoice, so it can be assumed that the chandeliers were made entirely of glass⁹. In the same year Savonetti delivered nine «glass chandeliers» to the court in Dresden¹⁰. It has not yet been proven, that the existing chandelier in Schloss Moritzburg near Dresden is one of the above mentioned.

We know that Ludovico Savonetti produced a «very clear, pure crystal glass, large magnificent, expensive Chandeliers, delicate reticella, some coloured flowers of unbelievable height and size»¹¹.

If these descriptions are of «à la Façon de Venise» Chandeliers which were decorated with flowers and others decorative blown glass elements is not known.

The earliest records of glass Chandeliers that were produced in Venice are those found in the Amalienburg in Munich. They were specifically made in 1739 for these rooms and are made of colorless crystallglass. In 2012 the Venetian chandelier located in the mirror cabinet of the resident palace in Würzburg was restored. It is verified that it was made in Venice in 1756 (Fig. 1: Venetian Glass Chandelier, before 1756, Photograph and restorer 2012 by Ingrid Thom Bayerische Verwaltung der Staatlichen Schlösser, Gärten und Seen). Its composition and style is closely related to the large chandelier in Ca' Rezzonico¹². This Chandelier, accredited to

⁷ Guiffrey 1886: 93.

⁸ Baumgärtner 1977: 25.

⁹ Geheimes Staatsarchiv Preußischer Kulturbesitz Berlin (GStA PK). I. HA, Rep. 9, EEE, Paket 2, Bl. 690, 691.

¹⁰ Hauptstaatsarchiv Dresden. Hausmarschallamt, R XVI no. 5, p. 297.

¹¹ Schmidt 1992: 131, 132 («sehr weisses reines Christallglas, grosse prächtige Cronen, [...] von hohem preiss, [...] fillagrame Fadenglas mit mancherley farbigen Bluhnen und von ungemeiner grösse und höhe»), and 115, 120.

¹² Theuerkauff-Liederwald 1993: Fig. 1.

Giuseppe Briati, also stems from the 18th century. Also the blown glass parts are mounted on metal arms.

The paintings by Pietro Longhi and Francesco Guardi quite accurately represented chandeliers that are certainly of Venetian origin.

The evidence for this has yet to be adduced. Or has it already been found? I would like to close my speech with an enumeration of Venetian chandeliers made entirely from glass that can be found throughout Europe.

Examples of Glasschandeliers throughout Europe

I venture the proposition that all European Chandeliers, in the broadest sense, are based on venetian chandeliers in design and technology.

Bohemia: With the discovery of crystal glass, the production of glass arm chandeliers took place here¹³. The systematic study of locally produced chandeliers is also lacking in Bohemia.

A manufacturing of glass arm chandeliers existed very early on in England. These differed primarily through their perfect execution and brilliant finishing¹⁴.

The Chandeliers from the Real Fábrica de Cristales de la Granja located in San Ildefonso de La Granja in Spain, the Venetian influence is unmistakable¹⁵.

Also in Norway it is obvious that the Glassworks Nøstetangen knew of the Italian designs and techniques¹⁶.

It is indicated in written sources, that the Potsdam Glass factory, which was famous for its excellent cut glass, also manufactured glass chandeliers. Unfortunately I am unable to allocate existing chandeliers to this factory. These are only assumptions. (Fig. 2: Glass arm Chandelier in Sanssouci castle, Glassfactory Potsdam or Zechlin, SPSSG, Photo Nr. F0019594, Photograph Hagen Immel). It is certain, that the Royal Glass factory in Zechlin produced

¹³ Klappenbach 2001: Figs. 78, 83.

¹⁴ Mortimer 2000: Plate 15-31 and Klappenbach 2001: Figs. 34, 35.

¹⁵ Ruiz Alcón 1971: 29-36.

¹⁶ Klappenbach 2001: Fig. 20.

Glass chandeliers in large numbers. Single components of these chandeliers are still preserved today.

After the separation from Bohemia, through the Prussian King Frederick II (1712-1786), Silesia continued to manufacture Chandeliers made of glass. Although these chandeliers resemble those made in the factory in Zechlin, there are distinctive features that differentiate the two¹⁷.

An outstanding example can be found in Saxony. I had mentioned that the factory of the Venetian Savonetti, Chandeliers were purchased not only by Prussia but especially by the Elector of Saxony. They are pictured in large numbers on description of the festivity surroundings of the marriage of the Prince Elector 1719 and a few examples are preserved there.

Another reliable source, which documents the appearance of historic chandeliers, is an incomplete chandelier made of an entirely different material namely Meissen Porcelain.

These sources attest that the Dresden Glass factory supplied parts of a Glass arm chandelier as a model for the porcelain version. The similarity is obvious. The Chandelier is now located in the Rijksmuseum in Amsterdam (Inv. Nr. BK-17463)¹⁸.

Through this observation my not yet proven theory arose; the second type of Chandelier that was produced by Meissen 1762 for Frederick II must also have used a Glass arm chandelier as a model. Only, in this case, the model was Venetian with a very intricate design (Fig. 3: Porcelain Chandelier in the New Palace in Potsdam-Sanssouci. Meissen, Johann Joachim Kändler 1762, Photo: SPSPG, Nr. F0027989, Photograph Wolfgang Pfaunder).

Many details show quite clearly, how techniques that were used by glassblowers were transferred into porcelain. This phenomenon is unique to the Meissen Porcelain Manufactory.

I am still looking for a written proof.

I would be very pleased if I have been able to awaken your interest in the systematic research of Venetian chandeliers.

(Translation by Bettina K. Schneider)

¹⁷ Klappenbach 2001: Fig. 148.

¹⁸ Den Blaauwen 2000: 72-74.

REFERENCES

- Baumgärtner, Sabine. 1977. *Sächsisches Glas, die Glashütten und ihre Erzeugnisse*. Wiesbaden: Steiner.
- D'Allemagne, Henry René. 1891. *Histoire du luminaire*. Paris: A. Picard.
- Den Blaauwen, Abraham L. 2000. *Meissen Porcelain in the Rijksmuseum*. Amsterdam: Rijksmuseum Waanders.
- Guiffrey, Jules M. 1886. *Inventaire Général du Mobilier de la couronne sous Louis XIV*. (1663-1715). 2 vols. Paris: J Rouam.
- Klappenbach, Käthe. 2001. *Kronleuchter mit Behang aus Bergkristall und Glas sowie Glasarmkronleuchter bis 1810. Bestandskatalog der Kunstsammlungen*, Berlin: Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg.
- Mortimer, Martin. 2000. *The English Glass Chandelier*. Woodbridge: Antique Collectors' Club.
- Ruiz Alcón, Teresa. 2001. Arañas de la Real Fábrica de la Granja. *Reales Sitios* 8, 27, 1971:29-36.
- Schmidt, Robert. 1922. *Das Glas*, 2. Auflage, Berlin/Leipzig: Walter de Gruyter.
- Theuerkauff-Liederwald, Anna-Elisabeth. 1993. Blütenpracht im Kerzenlicht. Venezianische Kronleuchter vom 18. bis 20. Jahrhundert. *Kunst und Antiquitäten* 12:42-45.



Fig. 1 - Venetian Glass Chandelier, before 1756. Bayerische Verwaltung der Staatlichen Schlösser, Gärten und Seen (Photograph and restorer 2012 by Ingrid Thom).



Fig. 2 - Glass arm Chandelier in Sanssouci castle, Glassfactory Potsdam or Zechlin (Photo SPSG, no. F0019594, Photograph Hagen Immel).



Fig. 3 - Porcelain Chandelier in the New Palace in Potsdam-Sanssouci, Meißen, Johann Joachim Kändler 1762 (Photo: SPSG, no. F0027989, Photograph Wolfgang Pfauder).

BETTINA K. SCHNEIDER

THE RESTORATION OF A GLASS ARM CHANDELIER
FROM THE MIDDLE OF THE 19TH CENTURY
BELONGING TO THE PRUSSIAN PALACES
AND GARDENS IN BERLIN-BRANDENBURG

Introduction and Description

To begin this project, it was necessary to clarify whether there were enough original pieces left to make a restoration possible. There were several boxes with unassigned, broken and filthy pieces of glass. It was unclear which pieces belonged to which object and how many of these pieces were assignable. In question came two candelabras and two chandeliers. The parts were unpacked and laid out. Based on the glass color, degree of soiling and shape, the parts were then sorted and assigned to the various objects.

Through sorting it became clear that there were enough pieces left for a restoration of the Chandelier Inv. Nr. VIII 1010. The other assigned pieces were merged into appropriate fragments and packed for a restoration at a later date. The chandelier had been stored in the depot of the 'Neue Palais' in Potsdam since 1978. Since there are no entries regarding the origin of the object, the provenance is very difficult to clarify. Käthe Klappenbach inventoried the chandelier in 1984. Without doubt this is the work of a virtuoso, a very skilled glassmaker. The color scheme is elegant, yet understated and its form harmonious and balanced. Apparently, the majority of the parts were formed freely, using mainly a glass blower's pipe, pliers and shears. The way it was made, indicates that this type of glass-arm chandelier was most likely produced in series by highly experienced glassblowers. The lighting was provided with gas (not

common until after 1830), which flowed from an outlet in the ceiling through a metal pipe that was covered by a glass baluster, consisting of three hollow glass pieces. At the base of this shaft, there is a divider that directed the gas into the five glass branches. At the end of each branch there is a gas nozzle that controlled the flame. Quite an impressive effect when imagined how it must have looked turned on, with flames illuminating the room.

The colors of the chandelier are mainly opalescent white, blue and raspberry. Green raspberry stamps decorate the leaves. These stamps, which were made by pressing a mold into the hot glass, were common in Venice and Bohemia in the 19th century. Interestingly, the glass looks slightly yellow in front of a light background but glows blue iridescent with a dark background. The techniques used to make opalescent glass were newly discovered and utilized in Central Europe approximately during the first half of the 19th century.

Restoration and Reconstruction

The framework is made of metal and a wooden receiving plate, which is covered by a glass bowl for the glass branches and leaves. Tinfoil on paper was adhered to the wooden pieces and the metal center shaft, as this highly accentuated the light reflection. One of the five arms was broken, but luckily was still connected through an electric wiring that had been installed at a later point in time. This arm also had a layer of amorphous silica towards the bottom. It is possible that the broken end was bedded in soil or in an environment with a higher humidity than the rest of the chandelier. However, this is hypothetical since there are no records concerning its history or storage. The leeching of minerals to the surface of the glass is known to be caused by exposure to highend humidity over a prolonged period of time.

The other arms were stable and could be cleaned using de-ionized water, ethanol and a non-ionic detergent. After cleaning the metal parts, they were coated with a protective layer of Paraloid B48N (methyl methacrylate copolymer) dissolved in Dowanol.

Layers of grime were removed from the wooden receiving bowl and loose pieces affixed. The electric fittings and wiring were removed. It has not been possible to date when this chandelier was electrified. The cleansing and merging of broken fragments sheds a new light on the pieces of glass and the chandelier itself. It became possible to see what it may have looked like right after production and before the adversity of time had taken its toll. Historically, this chandelier does not appear to be highly significant. None the less, it is certainly an impressive piece of work. Glass-arm chandeliers were relatively inexpensive to manufacture, which made them accessible to the general public interested in reading and education. Therefore, it is most certain that they were more widely spread. However, due to their fragility, very few of them have survived.

The receiving bowl had been badly damaged, but again, luckily the majority of pieces had been saved. Almost all of the broken fragments of leaves, receiving bowl, flames and sleeves, could be allocated and then fixated with an UV adhesive. This adhesive was chosen because of its reversibility and adhesive properties. The glass leaves were refitted in metal sleeves with a pine resin and chalk putty. Afterwards, these could be placed into the bore holes in the receiving plate.

There were missing sections in the receiving bowl that were first contained by wax moulding and then filled with polyester resin. Afterwards, the various sections were ground and polished. The polyester resin fill gives the object more stability and is necessary to prevent further loss of substance through the exposure of the fractured edge. Closing the openings also prevents dust and dirt collecting on the interior of the vessel.

The broken arm needed to be addressed separately, as there were a few issues to be considered. Not only was it important to re-attach the broken piece, but also to stabilize and to reduce strain at the leverage point. The solution was found in a triple stabilizing system. First, a plastic tube was fitted into the curvature of the glass arm, which evenly distributed the weight of the arm to the surrounding area. Second, the site of fracture was connected and affixed with an UV adhesive. Third, a thin stainless-steel wire was inserted through the center of the arm and pipe. The wire was

fastened on both ends of the arm with a loop/pin combination and serves as an additional back-up. This conservational intervention is completely reversible and barely visible.

Putting the pieces together

After the documentation, reconstruction and restoration of the various pieces and parts of the chandelier were completed, they could be re-assembled on the metal frame and in the receiving plate. Although the chandelier is preserved fragmentarily, it can be aesthetically perceived and experienced as a whole. Through cleaning, merging and fixing of the fragments that were initially found in boxes, it was possible to reconstruct about three-quarters of the chandelier. Taking the historicity into account, it was possible to give the chandelier its initial appearance and profile. The provenance could not yet be clarified and whether the newly designed end piece (knop) will be replaced at a later date in time, remains open.



Figs. 1, 2 - Glass arm chandelier, mid-19th century, before and after restoration. Potsdam, Neue Palais, inv. VIII 1010.

CORINNA MATTIELLO

RESTORATION TECHNIQUES

When I started working as a glass restorer almost 40 years ago, there was only extremely limited experience in the field in Italy. Specific products with the required characteristics had not yet been developed, so only a few products that could be used were available on the market and these were generally intended for other purposes. Neither were there any clear guidelines to follow from a formal point of view, so the formal or aesthetic choices were agreed on each time with those who supervised the work, with the consequent subjective assessments. During my work I gathered experience over the years, also empirically, which allowed me to improve and more confidently decide on the aesthetic choices and the products to use, whose range has anyway increased over the years.

I have in any case always kept in mind the basic guidelines of modern restoration formulated by Cesare Brandi in his *Teoria del Restauro*, particularly the concept of reversibility, or the future possibility of being able to return the item to its original state before the restoration without alterations or deterioration in its state of conservation. In addition, the need to differentiate between the products used is still essential, so that these can always be distinguished from the original material.

In the past, the materials used for gluing glass consisted mainly of animal glues, natural waxes and resins (colophonies), plaster of Paris (stucco) and even in some cases sheaths of iron or lead wire attached through holes made in the pieces, as was the case with repairs to ceramics and porcelain. Because of their intrinsic characteristics of perishability and limited durability, and their unsatisfactory aesthetic appeal, they do not respond to modern restoration criteria.

The range of products in use expanded considerably with the advent of synthetic resins, allowing the most suitable product to be chosen to meet the requirements.

In the case of restoring glass, the glues and resins for joining and filling must ensure good transparency and lack of colour, so that the joins between the pieces are as imperceptible as possible, the absence or at least very limited appearance of any exothermic reaction, so as to not extend the phenomena of crystallisation and the formation of *fêlures*, inalterability with aging to guard against perilous detachments or ugly yellowing and finally reversibility over time.

After having for years tried various glues and resins not specifically formulated for glass restoration, I have identified one that in general still meets all the required characteristics. It is a colourless, very fluid, transparent, epoxy resin that can be easily coloured, is reversible with organic solvents and has a limited propensity to yellowing under the action of UV rays, which can be alleviated in advance with a light violet colouring that neutralises the yellow.

The normal procedure follows an established course. After a first provisional assembly with adhesive tape, which helps one find the position of all the pieces (it is almost impossible to insert a piece after gluing the others), the item is disassembled and definitively reassembled, starting from the largest piece or those that make up the base. It has been seen that the slightest error of positioning at the beginning multiplies, producing tiny gradients or very obvious fissures. The position is provisionally held with small dabs of cyanoacrylate glue (an almost instant glue, but subject to weakening over time). The definitive adhesive is then made to penetrate along the cracks, and the excess removed after catalysis with scalpels and solvent soaked swabs.

Sometimes it is necessary to work on items already glued in the past with unsuitable or even dangerous materials, where the glues or resins have attacked and corroded the surfaces, and in this case it is impossible to eliminate the damage.

A more complicated gluing operation is that between the foot, stem and cup of goblets or other tall objects whose contact surface is minimal and glue alone cannot ensure the hold. Very small holes are made on the surfaces of the crack with small diamond studded burrs

and Plexiglas pins of the same diameter are inserted into these and glued. This procedure reinforces the hold of the joins.

The items very often have gaps requiring both structural and aesthetic additions, because a glass item that has gaps is certainly more fragile and can more easily detach or break up again. This also provides a complete image of the piece, which simplifies its reading, also by non-specialist observers.

The work process is the following: after gluing, the missing parts are added by bordering the portion to be completed with a double wall of wax, protruding some millimetres above the glass walls around the gap. It is fixed there by pressing the edges with a heated spatula so as to perfectly seal the cavity into which the resin will be poured. The resin is then slowly poured through small cast openings to prevent the formation of air bubbles. Once it has catalysed and the wax moulds have been removed, the resin can be finished with small burrs, laps and polishing pastes.

In the case of the restoration of the lid of a blue jar (Fig. 1) carried out about 30 years ago, the aesthetic choice was dictated by the attempt to imitate the original colour as closely as possible. I now prefer to slightly differentiate the colour of the additions for museum restorations so that these can be distinguished from the original material. This is a more correct solution than those of early restorations, where matching the work was an absolute requirement (Fig. 2).

At times it may be necessary to add one or more repetitive elements to allow an easier view of the work or to ensure greater stability, if there is certainty about the shape and position, resorting to moulded reproduction of the part to be copied making imprints with mouldable silicon rubber. When polymerisation is complete, the epoxy resin in a colour matched to that of the original glass is poured into the mould obtained.

The 19th-century *Salviati Mirror* (Fig. 3), whose frame is covered with little leaves of girasol glass, had many of its leaves missing. These were reproduced with coloured resin in imitation of the originals, at the specific request of the client who wanted an antiquarian procedure.

Another reproduction example is a 17th-century zoomorphic lamp with one foot missing (Fig. 4).

At times, when the object is missing an indispensable part that ensures its support but there is no indication as to the shape or size of the missing part, a schematic support in Plexiglas may be used, which intentionally does not suggest the shape but only the possible size (Fig. 5).

The most complicated restoration I have carried out was that made in 1997 on the *Centrepiece* or «deser» from the Palazzo Morosini (mid 18th century) (Fig. 6), now in the Murano Glass Museum. This is a large (175 x 150 cm), composite work with trays in shaped wood with mirrored glass, now almost completely altered, which hold architectural elements and border the central area occupied by other compositions that stand directly on the table and form a miniature garden. The long period of abandon in a storeroom awaiting financing for restoration and placement had led to the obvious deterioration of the work. The old (animal) glues had lost their hold, so many of the constituent elements had detached and become mixed up, and layers of dust had made the work greyish and almost illegible. Having only a few old, general, black and white photos as a guide, the most difficult aspect was identifying and understanding the relevance and position of the architectural elements, almost all made up of numerous segments and small sheets, in order to reconstruct all the parts. After cleaning each decorative group the known fragments were assembled and, given that many repetitive elements were missing, and because of static and structural problems, these were reproduced with a silicon rubber mould and inserted to allow easier reading of the work. Observation of the work showed that there were many non-original parts from a previous period, which was explained by the custom of lending the centrepieces out for big parties, and then, afterwards, the broken or missing parts were counted and remade. Additions in plaster were also evident, along with summary gluing with more modern adhesives, especially vinyl glues, and various replacements of flat sheets with modern glass.

I have tried in this summary text to give some examples of the problems and possible solutions in the field of glass restoration, taking as an example the restoration methods developed on some significant objects over the years.

(Translation by David Graham)



Fig. 1 - Insertion on the lid of a Roman jar.



Fig. 2 - Insertion of the side of a cup. Murano, Museo del Vetro.



Fig. 3 - Insertion of some leaves in *girasol* glass on a mirror, Fratelli Salviati, 19th century.



Fig. 4 - Mould insertion of a foot on a zoomorphic oil lamp, 17th century. Murano, Museo del Vetro.



Fig. 5 - Vase with Plexiglas support at the base. Murano, Museo del Vetro.



Fig. 6 - Centrepiece from Palazzo Morosini, mid-17th century, before restoration. Murano, Museo del Vetro.

Fig. 7 - Centrepiece from Palazzo Morosini, mid-17th century, after restoration. Murano, Museo del Vetro.

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PROTECTION OF HISTORICAL GLASSES BY HYBRID SOL GEL COATINGS

Introduction

The protection of historical windows is usually achieved by the installation of protective glazing – glass or plastic slabs installed on the external surface of the windows¹ – or by using acrylic resins on the altered glass surface. In the first case the protective effect by physical and chemical attacks is usually obtained with a negative impact on the esthetics of the monuments, also inducing a reduction of sound and light transmission, with a consequent darkening of colors². The acrylic resins, normally used also for other very different substrates as frescos, wood and metals have the advantage of good adhesion, theoretical reversibility and ease of use by restorers. On the other hand, the main problems of these materials are the incompatibility with the inorganic substrate, the occurrence of yellowing phenomena and their thermal instability, mainly because of their low glass transition temperature (T_g) values.

In this work we studied silica-based protective hybrid coatings obtained by sol gel process to achieve the chemical and physical compatibility with the glass substrate. The addition of organic

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¹ Romich 2004.

² Ibid.

functionalities gives the surface water repellency, since water is the most dangerous alteration agent for glass³.

Materials and Methods

Sols have been obtained mixing TEOS (Tetra-ethyl-ortho-silicate), organically functionalized Si-alkoxides (Tab. 1), isopropanol, water and HCl (pH =2) as catalyst in round bottom flasks for about 4 hours at room temperature (Tab. 2). The deposition on the surface of very alterable medieval-like glass samples⁴ (containing about 25 wt% of K₂O) was performed by dip-coating technique and the deposited films have been characterized by UV-VIS, FT-IR, TGA and performing static contact angle α was measurements (following the indications of the UNI 11207:2007 Protocol).

Coatings have been aged under UV-light and SO₂ saturated atmosphere to test their light and chemical stability⁵. Color and contact angle data were collected before and after the ageing experiments. Colorimetric measurements were performed by means of a spectrophotometric scanner using a D65 illuminant. As reference, a white standard certified by a metrological laboratory was used, in the same optical geometry as for the image acquisition. Color values were obtained in the CIE L*a*b* space and were used to obtain the average color difference ΔE^{*6} :

Results and Discussion

Table 2 reports all the tested sol compositions. Some of them have been immediately excluded since the deposited coatings appeared opaque and/or inhomogeneous, while characteristics as

³ Melcher and Schreiner 2004.

⁴ De Ferri et al. 2012.

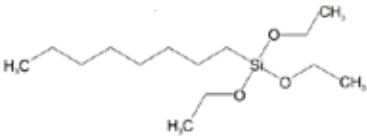
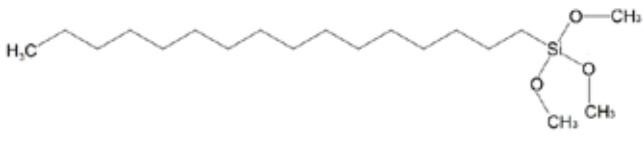
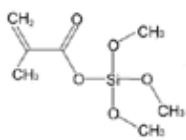
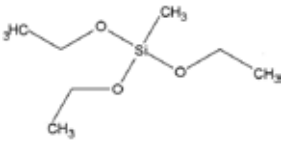
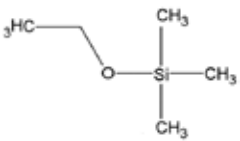
⁵ DIN 50018:1997 Standard norm.

⁶ Oleari 1998.

transparency, homogeneity and absence of color are fundamental when working on transparent glass.

The transparent films have been characterized by UV-VIS absorption: Fig. 1 reports the spectrum of the 20% OTES film, confirming the absence of absorption features in the spectra.

FT-IR spectra were collected on the dried hybrid gel to get information about their degree of poly-condensation. The ratio between the intensities of the Si-O-Si anti-symmetric stretching (about 930 cm^{-1}) and of the Si-OH stretching (about 1030 cm^{-1})

	Octyl-triethoxy-silane (OTES)
	Hexadecyl-trimethoxy-silane (HDTMS)
	Methacryl-trimethoxy-silane (MTMS)
	Methyl-triethoxy-silane (MTES)
	Trimethyl-ethoxy-silane (TMES)

Tab. 1 - Structural formulae of the organically functionalized Si-alkoxides added to TEOS for the synthesis of the hybrid sols.

Composition	Organic fraction (wt%)	Homogeneity/transparency	α ($\pm 3^\circ$)	α_{UV} ($\pm 3^\circ$)	α_{SO_2} 10 ppm	α_{SO_2} 60 ppm	α_{SO_2} 120 ppm	ΔE^*	ΔE^*_{UV}	$\Delta E^*_{SO_2}$ 10ppm	$\Delta E^*_{SO_2}$ 60ppm	$\Delta E^*_{SO_2}$ 120ppm
5% HDTMS+ 95% TEOS	8.6	✓	104	104	104	100	93	2.6	0.6	0.5	1.31	2.11
10% HDTMS +90%TEOS		X										
20% HDTMS +80%TEOS		X										
5%OTES+95%TEOS	5.6	✓	100									
10% OTES+90%TEOS	11	✓	101									
20%OTES+80%TEOS	20	✓	105	104	105	100	93	1.8	1.7	0.74	0.74	2.19
30%OTES+70%TEOS	27	✓	103									
40%OTES+60%TEOS	34	✓	103									
5%HDTMS+20% OTES+75%TEOS	31	✓	107	107	108	102	95	2.2	1.1	0.41	1.46	1.32
10%HDTMS+10%OTES+80%TEOS	35	✓	97									
20%MTMS+80%TEOS	14	✓	38									
60%MTMS+40%TEOS	31	✓	48									
10% MTMS+10% OTES		X										
15% MTMS+5% EDTMS		X										
20%MTES+80%TEOS	2.7	✓	81									
60%MTES+40%TEOS	6.6	✓	79									
10% MTES+ 10% OTES		X										
40% MTES+ 20% OTES		X										
20%TEMS+80%TEOS	9	✓	94									
60%TMES+40%TEOS	29	✓	86									
10% TMES + 10% OTES		X										
10% TMES+ 20% OTES		X										
40% TMES+ 20% OTES		X										
5%TMES+15%MTES+80%TEOS	4	✓	93									
15%TMES+45%MTES+ 40%TEOS	11	✓	91									

Tab. 2 - Composition of the sols, optical appearance, amount of organic fraction (wt%), static contact angle ($\alpha \pm 3^\circ$) and ΔE^* values before and after the UV and SO_2 ageing experiments and ΔE^* values before and after the application of the coatings

peaks was evaluated (Fig. 2): this ratio increases with increasing the amount of organic functionalities, meaning that the structure is more linked and, as a consequence, the poly-condensation degree is higher.

This result was confirmed by the TGA data collected on the gels powder showing that the amount of OH group in the TEOS gel is higher than in the 40%OTES gel.

Since the main aim of this study was the production of water repellent coating, contact angle measurements have been performed and Table 2 reports the obtained results. On the basis of these values and of the amount of the organic component, three sol compositions were selected for the accelerated ageing tests. Generally the best results are obtained with the addition of Si-alkoxides functionalized with long linear chains: the 5% HDTMS sol shows the lower amount of organic component and displays high static contact angle values; the 5%HDTMS-20%OCTES

composition gives the highest contact angles and the 20% OCTES sol was chosen as an intermediate composition.

Colorimetric measurements show that the $L^*a^*b^*$ parameters, and consequently the ΔE^* value, do not vary significantly, before and after the deposition of the coatings and after the UV-light ageing. The same holds also for the static contact angle values (Tab. 2).

The ageing under SO_2 saturated atmosphere evidenced that the coatings are quite stable for low concentrations of SO_2 (10 and 60 ppm), while they start losing the water repellency after the exposure to 120 ppm, even if the colorimetric data do not change significantly (Tab. 2).

Conclusions

The water-repellent hybrid coatings designed for the protection of exposed historical windows seem matching quite well the requirements for the Conservation of Cultural Heritage field since they do not give reaction by-products or unreacted fractions that could damage the ancient substrate, are transparent and colorless, and chemically and light stable.

REFERENCES

- De Ferri, Lavinia and Danilo Bersani, Andrea Lorenzi, Pier Paolo Lottici, Giovanna Vezzalini, Guilhem Simon. 2012. Structural and vibrational characterization of medieval like glass samples. *Journal of Non-Crystalline Solids* 358:814-19.
- DIN 50018:1997 Standard norm "sulfur dioxide corrosion testing in a saturated atmosphere".
- Melcher, Michael and Manfred Schreiner. 2004. Statistical evaluation of potash-lime-silica glass weathering. *Analytical and Bioanalytical Chemistry* 379:628-39.
- Oleari, Claudio. 1998. *Misurare il colore*. Milano: U. Hoepli.
- Römich, Hannelore. 2004. Evaluation of protective glazing systems. *e-PRESERVATIUNscience* 1:1-8.
- UNI 11207:2007 Protocol, "Cultural heritage - Natural and artificial stones: Determination of static contact angle on laboratory specimens".

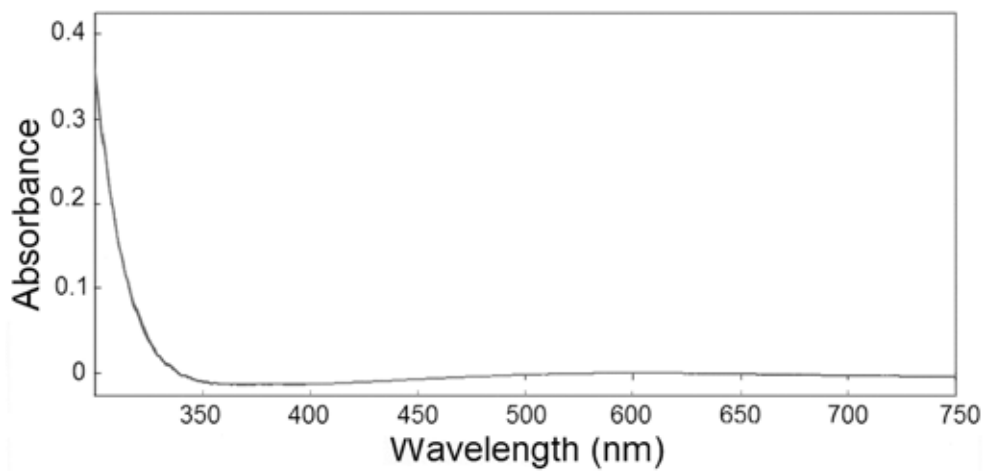


Fig. 1 - UV-VIS absorption spectrum of the 20% OTES film.

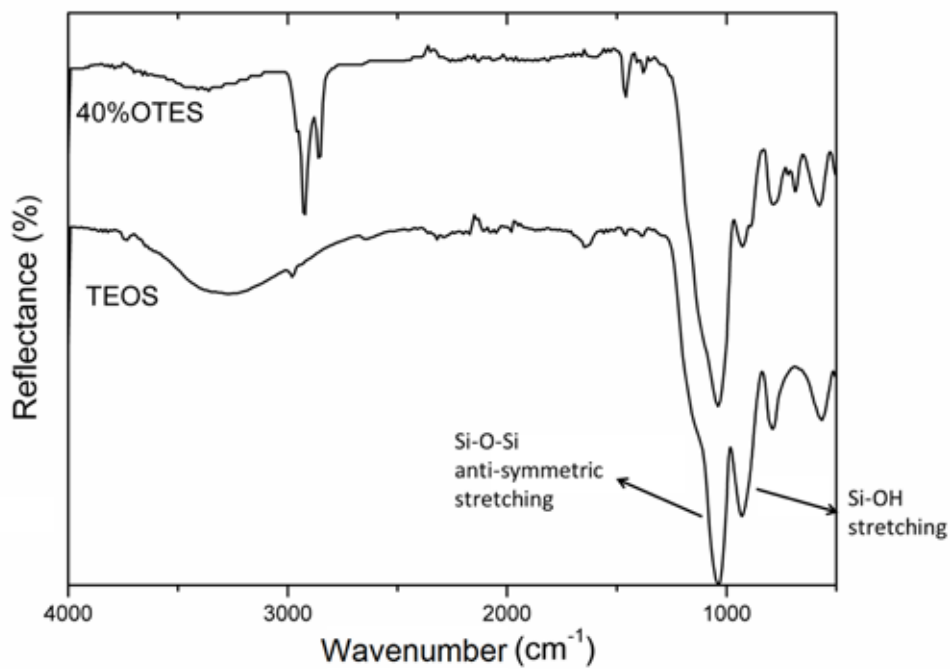


Fig. 2 - FT-IR spectra of the TEOS and of the 40%OTES powdered gels.

ANTÓNIO PIRES DE MATOS*, ROBERT WILEY*, MAGDA TROEIRA*,
CARLOS QUEIROZ*, ANDREIA RUIVO***, NUNO PAULINO***
and CÉSAR LAIA**

VENETIAN GLASS IN CONTEMPORARY ART

There are many examples of beakers, flasks, wine glasses, stemmed bowls and vases made in the 16-17th Venetian Style which are referred to in a wide variety of literature¹. Many of the glass factories in Murano continue to use the ancient Venetian style in the production of a great breadth of objects. Contemporary glass art is almost missing in Venice with the best work being mainly in 'glass design' by a few factories.

Two recent exhibitions are referred here, the first of which resulted from a collaboration of Pino Signoretto, a worldwide well known Master of Venice and Mauro Bonaventura, a Laguna artist. The glass sculptures made by the first were encased in a complex network of thin rods of glass made by the second artist. The second was a solo exhibition in Venice by Mauro Bonaventura². A citation of one phrase of Rosa Barovier in the catalogue of this exhibition is made here and can be interpreted as a call for more contemporary art in Venice: «The growth of the studio glass in recent times has accustomed us to a boldness, a desire to rise above the limitations

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¹ Tait 1979; Page 2004; Baumgartner 2003.

² Bonaventura 2012.

traditionally imposed on artists by selected glass techniques, and Mauro Bonaventura shares this spirit of today fully».

Another example of the development of contemporary glass is the work made in Berengo Studio. They invite artists all over the world, who do not know how to work with glass, and want to express their artwork ideas in this fascinating material. Examples are the mirror of Fred Wilson and the chandelier of Javier Perez shown in the exhibition of Glasstress 2009, Berengo studio.

In this short communication a new approach to contemporary glass is made by using luminescent glass to make objects in Venetian style. Due to the short space allowed to this communication only two examples are given.

Reticello is one of the glass techniques that was used in Venice since the middle of the XVI century and copied in many countries. A beautiful example is given in Fig. 1.

In the Research Unit VICARTE, luminescent glass of several colours under ultraviolet light have been developed with base compositions similar to utilitarian or decorative glass, float glass and more recently borosilicate glass. It is well known that glass with small quantities of rare earths display luminescence under ultraviolet light (broad band centered at 380nm)³. Five colours can be obtained depending on the rare earth oxide added. Moreover several LEDs developed in UNINOVA are being used in our Laboratories to excite several glasses with rare earth oxides. In Fig. 2a is an example of a reticello bowl made with luminescent sodalime silicate glass made in VICARTE by Christopher Taylor from the Rhode Island School of Design. A cane made with luminescent glass encased in clear glass made for this work is also shown in Fig 2b.

More recently, a Venetian Glass Master, Cesare Toffolo, known worldwide for his skill with borosilicate glass, is now collaborating with VICARTE. Fig 2c. shows two objects under ultraviolet and natural light. It is important to note that to make luminescent glasses with borosilicate has been a very difficult task and research is continuing to improve their compatibility with commercial borosilicate clear glass.

³ Weyl 1951: 465-74; Bamford 1977: ch. 3, 67-76.

VICARTE continues to develop the luminescent glasses hoping that they might play an important role in contemporary glass art.

Aknowledgments

We thank Cesare Toffolo, a Glass Master from Murano, for his valuable collaboration. We thank Christopher Taylor, Rhode Island School of Design; Corning Museum of Glass; Augusta Lima and José Luís Liberato from VICARTE. We are also grateful to the Fundação para a Ciência e a Tecnologia for financial support (Project PTDC EAT AVP 118520 2010)

REFERENCES

- Bamford, C.R. 1977. *Colour Generation and Control in Glass*. Amsterdam and New York: Elsevier Science Publishers B.V.
- Baumngartner, Erwin. 2003. *Venise e Façon de Venise, Verres Renaissance du Musée des Arts Décoratifs*. Paris: Union Centrale des Arts Décoratifs.
- Bonaventura, Mauro. 2012. *Reticolamente*, Catalogue of an exhibition, Venice Projects, Berengo Studio.
- Page, Jutta-Annette. 2004. *Beyond Venice, Glass in Venetian Style 1500-1700*. New York: The Corning Museum of Glass.
- Tait, Hugh. 1979. *The golden age of Venetian glass*. London: British Museum Publications Limited.
- Tait, Hugh. 1995. *Five Thousands Years of Glass*, British Museum Press.
- Weyl, Woldemar A. [1951] 1999. *Coloured Glass*, Society of Glass Technology.



Fig. 1 - Goblet with whistle, *Façon de Venise*, probably Venice, Italy (beaker), 1630, and Low Countries (mount), 1673; Transparent colorless glass with *vetro a reticello* decoration; blown and tooled; H. 20.5 cm. Corning, New York, Collection of The Corning Museum of Glass (51.3.280).

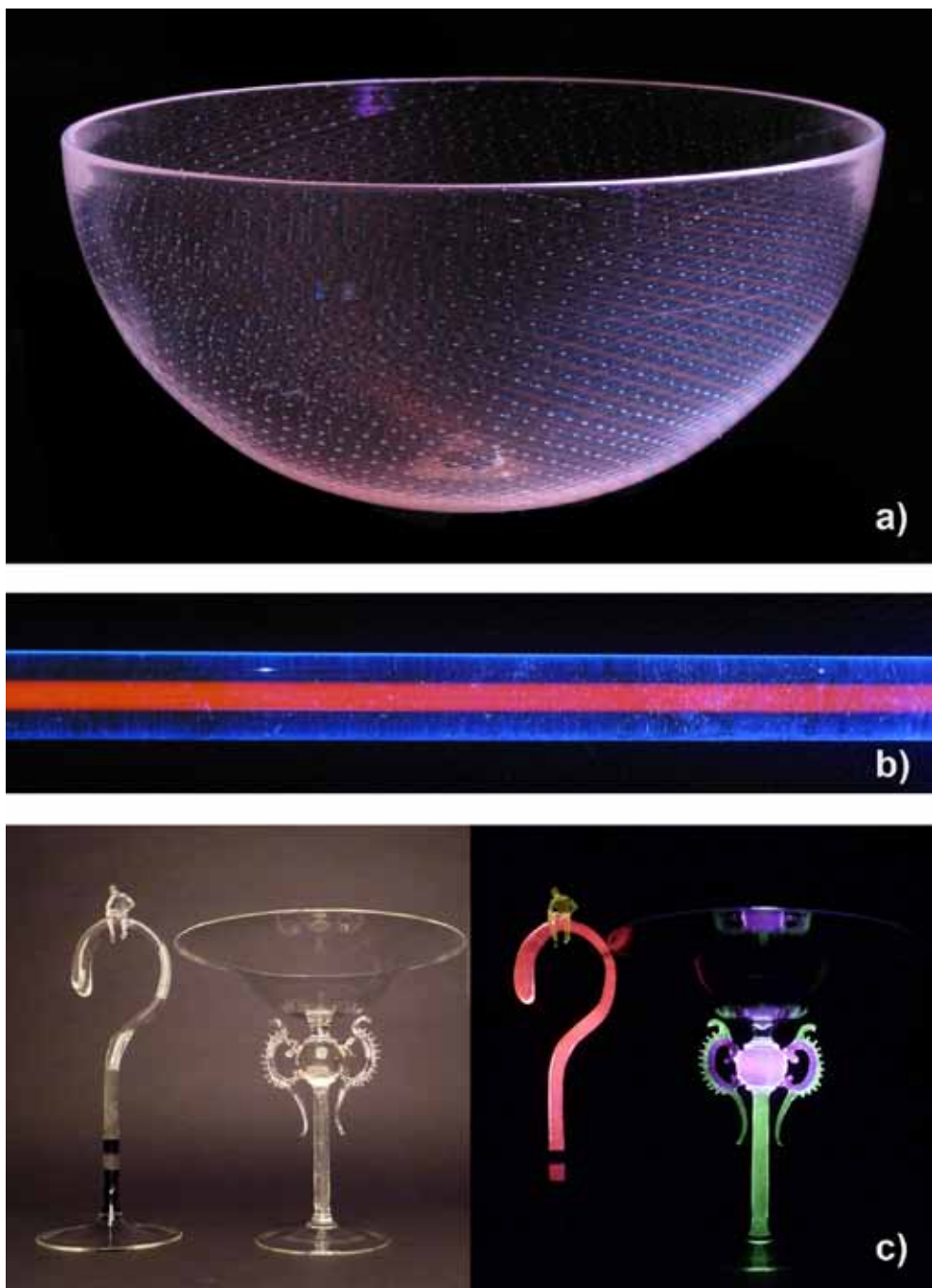
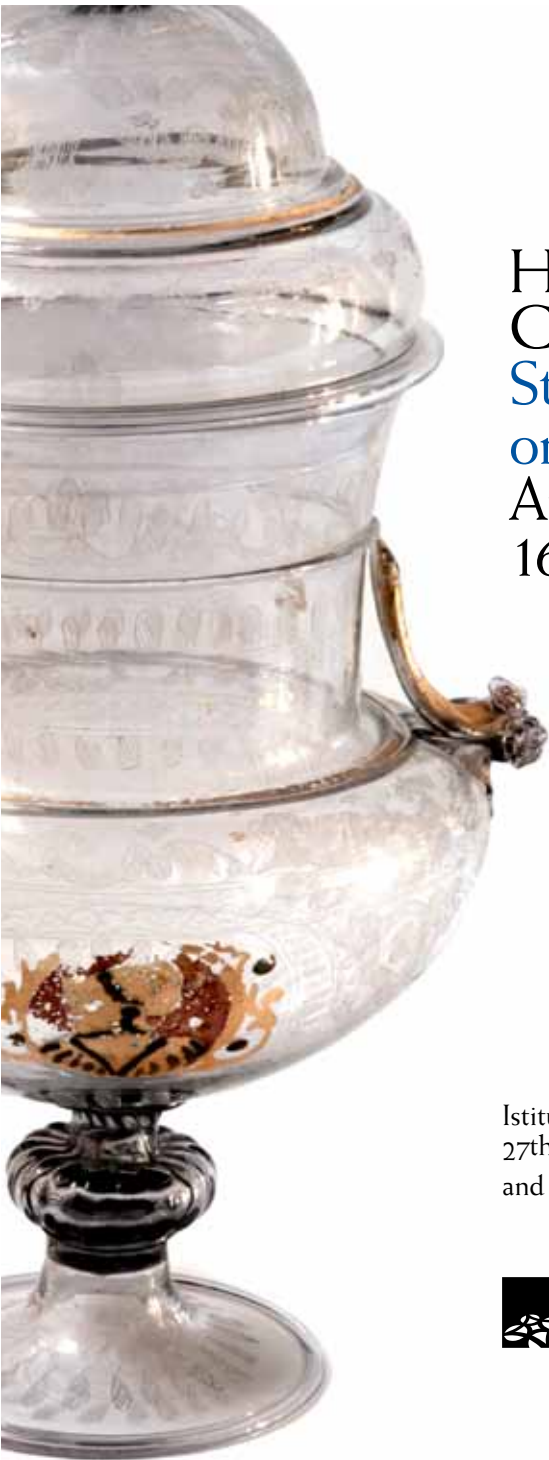


Fig. 2 - a) Luminescent bowl using the reticello technique, Cristopher Taylor, VICARTE, 2010;
 b) Cane made with thin rods of sodalime glass encasing luminescent glass doped with europium oxide;
 c) Two objects made by Cesare Toffolo using borosilicate luminescent glasses doped with europium, terbium and dysprosium oxides. Left, under natural light; right, under UV light.



Higher Education Course Study Days on Venetian Glass Approximately 1600's

Istituto Veneto di Scienze, Lettere ed Arti
27th and 28th of February,
and 1st of March 2013



Istituto Veneto
di Scienze Lettere
ed Arti

glass in venice

Glass in Venice Project

Agreement between the Istituto Veneto di Scienze, Lettere ed Arti and the Fondazione Musei Civici di Venezia in relation to glass and the Muranese glass production

Glass in Venice Prize, Study Days on Venetian Glass, Website, Exhibitions

Glass in Venice is the important convention between the Istituto Veneto di Scienze, Lettere ed Arti and the Fondazione Musei Civici di Venezia presented last November on the occasion of the first edition of the Glass in Venice Prize. The pact is the expression of the two Venetian institutions' decision to launch a close collaboration for a series of events promoting the legacy of glass art on an international level. The aim is to sustain the lagoon city in its own intrinsic role as a cosmopolitan laboratory of culture and a meeting place for the masters of the exquisite Muranese art, artists, and institutions.

The agreement, signed by Gian Antonio Danieli, President of the Istituto Veneto, and Walter Hartsarish, President of the Fondazione Musei Civici di Venezia, entails joint action regarding the Prize, the Study Days and the creation of a website that should become an authoritative source of information and documentation on Venetian glass and international glass production, up-to-date on the most important exhibitions and events.

For the Istituto Veneto today, Glass in Venice is the natural outgrowth of its commitment to the art and technique of glass ever since the 19th Century. Among the Istituto's cultural activities, especially in the past ten years, exhibitions, lectures, and since last year seminars for specialists have focused on the glass arts.

The Fondazione Musei Civici di Venezia, directed by Gabriella Belli, and the Glass Museum of Murano play an essential role in promoting the preserved art heritage and diffusing knowledge about this ancient artistic expression.

Founded in 1861, first as an archive, and now recognised as one of the most interesting exhibition venues of the international circuit, the Murano museum will soon benefit by an important extension and consequently a new museological design.



Istituto Veneto
di Scienze Lettere
ed Arti



The Study Days on Venetian Glass 2013, in its second edition, register the presence of forty or so glass experts from all over Europe, Russia and the United States, including museum curators, scholars, collectors, restorers, glass artists. In the three Study Days a rich programme features seminary lessons, visits and practical demonstrations of the ancient techniques, with reports and communications by professors and participants, all specialists in the field, making this event one of the most important of its kind organised on an international level.

Our aim is again to offer the scholars of Venetian glass, but also glass of the most varied traditions, an opportunity for in-depth study and encounters, with an ample exchange of knowledge and experience. In addition we hope that, again with this event, Venice may become more than ever the world centre for the study of ancient glass, but also that Venice be reconfirmed as one of the outstanding meeting places for scholars, artists, collectors of ancient and contemporary glass in its most diverse expressions and schools.

This substantial and high-profile programme, particularly significant for the city, is undertaken by the Istituto within our agreement with the Fondazione Musei Civici di Venezia for various activities and events in the field of art glass.

The President of the Istituto Veneto
di Scienze, Lettere ed Arti

Gian Antonio Danieli

Higher Education Course Study Days on Venetian Glass Approximately 1600's

Istituto Veneto di Scienze, Lettere ed Arti
27th and 28th of February, and 1st of March 2013



With the support of
Corning Museum of Glass
Ecole du Louvre
Fondazione Musei Civici di Venezia
Institut national du patrimoine
Victoria & Albert Museum

With the participation of
UNESCO Regional Bureau for Science and Culture in Europe
Venice (Italy)

Organised with the collaboration of
AIHV – Association Internationale pour l'Histoire du Verre – National Italian Committee
LAMA – Laboratorio Analisi Materiali Antichi dell'Università IUAV, Venezia
Museo del Vetro, Fondazione Musei Civici di Venezia

Our acknowledgements go to the Regione del Veneto and Scuola Abate Zanetti



The "Study Days on Venetian Glass" are an opportunity for in-depth study on Venetian glass and are tuned to an audience of Museum conservators, collectors and experts.

The programme includes lessons by experts who, after a general overview, will guide participants through the direct study of methods and pieces, encouraging participants to actively take part, also through presentations. Lessons and discussions will be held in English; contributions in Italian will be translated into English by the seminar curators.

The topics that will be touched upon will include:

General overview of the history and art history of glass;

Raw materials and casting/processing techniques;

Archaeometrics;

Conservation and Restoration.

The seminars will be completed by a tour of the Murano Glass Museum and by practical demonstrations in glassmaking studios.

Scientific and Organizing Committee

ROSA BAROVIER MENTASTI, Glass historian

SANDRO FRANCHINI, Cancelliere Istituto Veneto di Scienze, Lettere ed Arti

LORENZO LAZZARINI, LAMA- IUAV University of Venice

SANDRO PEZZOLI, Collector

LINO TAGLIAPIETRA, Artist and glass master

MARCO VERITÀ, LAMA- IUAV University of Venice

WEDNESDAY 27TH FEBRUARY

SESSION 1

9.30 a.m. General historical and artistic overview

10.00 a.m. **ROSA BAROVIER MENTASTI, CRISTINA TONINI**

Tools for studying ancient glass: paintings and graphic works, inventories

Abstract - Between the 16th and 17th Centuries, Venetian glass and à la Façon de Venise: shapes and decorations. Comparison and contrast of similarly dated inventories from Murano, Italy and Europe, and figurative sources. Both are used to suggest dating strategies, identify specific glass products and terminological references. Special attention is attached to diamond-tip etched glass, some cold decorated.

11.30 a.m.

MARCO VERITÀ

Raw materials, casting and handling techniques

Abstract - Scientific assays and ancient recipes are compared to reconstruct the main features and innovations of Venetian glass between the 15th and the 17th Century.

SESSION 2

2.30 p.m.

WILLIAM GUDENRATH AND LINO TAGLIAPIETRA

Processing and decorating techniques

3.30 p.m.

Speeches by **SUZANNE HIGGOTT**

All-glass composites/hybrids: how were they made, who might have made them and how to detect them?

(Curator of Glass, Limoges Painted Enamels and Earthenwares, the Wallace Collection), in collaboration with Juanita Navarro (independent ceramics, glass and enamels conservator-restorer)

Abstract - Close observation reveals that numerous Venetian/façon de Venise glasses in collections today are hybrids assembled from two or more parts of different and often authentic 16th and 17th Century glasses. The quality of their assemblage ranges from crude to invisible. This talk will provide a brief overview of how they were made and how to detect them as well as considering whether some of them were produced by later 19th Century dealers.

ISABELLE BIRON and **MARCO VERITÀ**

About the difficulty to distinguish between Renaissance enamelled Venetian glass and façon de Venise glass

Laboratoire du Centre de Recherche et de Restauration des Musées de France, Paris e Laboratorio di Analisi dei Materiali Antichi LAMA, Università IUAV, Venice

Abstract - The analytical results obtained on about twenty enameled Venetian glass objects from the Louvre collections are presented. Interesting details are disclosed on the glassmaking technology and the raw materials and colorants used. The comparison between these data and the recipes in Venetian glassmaking treatises allowed identifying a group of objects corresponding to the genuine Venetian Renaissance production, while some discrepancies were found for other objects, probably being ascribable to contemporary productions outside Venice (façon de Venise), or to Muranese or European manufactures from the 17th – beginning of 20th.

COMMENTS BY PARTICIPANTS

CHIARA BERICHILLO

Documents attesting to the glass production at Piegara between the 15th and the 17th Centuries

KINGA TARCSAY

Studies on glass of the 16th and 17th Centuries in Austria

KITTY LAMÉRIS

Some new insights about sixteenth and seventeenth Century vetro a retortoli glass

SYLVIE LHERMITE KING

French Glass, 1550-1750

THURSDAY 28TH FEBRUARY

SESSION 3

9.30 a.m.

MARCO VERITÀ

*Adventurina, girasole and other innovations
between the 16th and the 17th Centuries in Murano glass*

Abstract - Case studies focusing of artefacts dated between the 16th and the 18th Centuries compared to period texts enable the description of some of the main innovations in Venetian glass.

Speeches by **REINO LIEFKES**

*17th Century Venetian glass in the V&A Museum, London,
Victoria and Albert Museum, London*

Abstract - Reino Liefkes will discuss highlights of 17th Century Venetian glass in the V&A collection and discuss the issues surrounding their attribution.

EVA PUTZGRUBER

*The lampworked glass collection of Archduke Ferdinand II of Tyrol
– history and technique of lampworking in the 16th Century
Universität für Angewandte Kunst Wien*

Abstract - Lampwork is a technique, in which glass rods and tubes are heated in front of an oil lamp's flame, shaped and fused together. The *Collection of Sculpture and Decorative Arts of the Kunsthistorisches Museum Vienna* holds a unique and largely unexplored collection of lampworked glass items. They were most likely made at the Innsbruck court glasshouse (1570-1591). Archduke Ferdinand II. employed Venetian glassmakers and two lampworkers there, who only furnished the needs of the court and returned to Venice immediately after fulfilling their contracts. The in-between position of the glass collection enables insights into the production at the Innsbruck glasshouse, as well as the workshops at Venice.

COMMENTS BY PARTICIPANTS

ANGELO AGOSTINO

Limoges enamels in Piedmont, non invasive analysis

ANDREW MEEK

Recent scientific investigation of Venetian glass at the British Museum

DORA THORNTON

Venice or façon de Venise. Two glasses in the British Museum of c1600

KATERINA MAVROMICHALI

Venetian glass as "lustro e decoro della città": Social routes, collections and consumer cultures in the 17th Century and the current cultural crisis

2.30 p.m.

CORINNA MATTIELLO

Restoration and conservation issues associated to glass artefacts

Abstract - Following a general overview on the issue of restoration, there will be a presentation (accompanied by images) of the different solutions implemented depending on specific issues, and aesthetic and formal choices associated to the artefacts considered.

SPEECH BY KÄTHE KLAPPENBACH

Venetian chandeliers from the 16th Century onward and their influence on chandelier production in Brandenburg-Prussia

Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg
Prussian Palaces and Gardens Foundation Potsdam.

Abstract - Chandeliers are very complex works of art and most important glass working techniques are resembled in these precious objects. For their owners chandeliers represented objects of prestige, functioning to show their financial power and appreciation of art. Although Venetian glassmakers belonged to the first producers of chandeliers, which is proven by a source from the 16th Century, the history of Venetian glass chandeliers is not studied yet.

Therefore it is time to search for early Venetian pieces and to investigate their history and impact as a model.

SESSION 4 - COMMENTS BY PARTICIPANTS

LAVINIA DE FERRI

Hybrid sol-gel based protective coatings for historical window glasses

Co-authors A. Lorenzi, P. P. Lottici, A. Montenero, G. Vezzalini

DANA ROHANOVÀ

Potassium glasses produced in Bohemia – raw materials and batches

FILOMENA GALLO

Medieval glass from Rocca di Asolo: local production or Venetian importation? Co-authors A. Silvestri e G. Molin

ANTONIO PIRES DE MATOS

Venetian Glass in Contemporary Art

FRIDAY 1ST MARCH

SESSION 5

9.30 a.m. Demonstration of workmanship at the Glassworks of the Abate Zanetti Glass School in Murano
(Lino Tagliapietra and William Gudenrath)

2.00 p.m. Visit to the Murano Glass Museum

FINAL SESSION AND DIPLOMAS IN IVSLA

6.00 p.m.

CONCERT

7.00 p.m.

TEACHING STAFF

ROSA BAROVIER MENTASTI



Descending from one of Venice's ancient glass making families, Rosa Barovier Mentasti was awarded a degree in Ancient Literature by the University of Padua in 1973 with a thesis on antique glass. Since then, she has been dedicated to studying the history of both ancient and modern Venetian glass. In addition to many articles and publications, including *Il Vetro Veneziano dal Medioevo ad oggi* published in 1982, she has curated several international exhibitions of ancient and contemporary glass, including *Vetri. Nel Mondo. Oggi*, hosted by the Istituto Veneto di Scienze, Lettere ed Arti in Venice in 2004.

WILLIAM GUDENRATH



As resident advisor for the Studio of the Corning Museum of Glass, he teaches introductory and advanced courses in Venetian techniques. A glassblower, scholar, lecturer and teacher of glassblowing, he is an authority on historical hot glassworking techniques from ancient Egypt through the Renaissance and has presented lectures and demonstrations throughout the world. He demonstrates techniques he believes to have been employed by glassmakers of the past and these are described in a number of books and video segments including: *Chronicle: the Portland Vase, Five Thousand Year of Glass*, *Journey through Glass: A Tour of the Corning Museum Collection* and *MasterClass Series II: Introduction to Venetian Techniques*, *Glass Masters at Work: William Gudenrath, Glassworking Processes and Properties*.

CORINNA MATTIELLO



Following a degree in architecture at the University of Venice, she was awarded a diploma by Istituto Centrale del Restauro in the area of ancient metal works and ornaments. She then attended a higher education course in stone works. She has been working as freelance consultant since 1975, initially mainly for the Superintendence and Museums of Latium in the area of archaeological restoration and then, after her move to Venice, as consultant for Foundations, Museums and Superintendents of the Veneto Region, mainly in the area of glass restoration (Museo Vetrario in Murano, Museum of Altino), sacred gold treasures (Tesoro di San Marco, Tesoro della Scuola Grande di San Rocco) and the restoration of large bronze works (the horses of the Basilica, Cappella Zen).

LINO TAGLIAPIETRA



Exceptional glass master and well known world-round as glass artist. He was born in Murano and was just a young man when he first entered a glass makers shop: he became a glass *maestro* in the 1950's and has worked for some of the most prestigious glass makers in the island. Since the late sixties his creativity resulted in models of great quality, both from the point of view of technique and beauty, that were a clear success on the market. He has been an independent glass artist since 1990 and is now committed to creating unique pieces that are exhibited in the most prestigious private collections and museums worldwide. In 2009, the Tacoma Art Museum dedicated a retrospective to his works with an exhibition that was then lent to other US museums. In 2011, the Istituto Veneto dedicated to him the exhibition *Lino Tagliapietra, da Murano allo Studio Glass*.

CRISTINA TONINI



With a degree in History of Art awarded by the State University of Milan under the guidance of Prof. De Vecchi, from 1989 to 2004 she acted as Conservator for the classification and the new layout of the Bagatti Valsecchi Museum in Milano. Together with Rosa Barovier she published the catalogue of the museum's Venetian glass. She also curated the catalogues of the Medieval and Modern glass collections of the Civic Museums of Pavia, of the Pinacoteca Ambrosiana in Milano and the Pogliaghi Museum in Varese, the latter is about to be published. Other articles on Venetian and Medicean glass have been published by *Decart* and the *Journal Glass Studies* of Corning Museum of Glass. She is part of the Board of Directors of the Italian section of the Association *Internationale Histoire du Verre*. She is professor of art in the Orsoline Artistic Liceo in Milano.

MARCO VERITÀ



Holding a degree in Chemistry, he worked for over thirty years in the *Stazione Sperimentale del Vetro* in Venice-Murano, performing research and assessments on glass materials, both modern and ancient, the latter for archeometric purposes and also to assess issues relating to conservation and restoration. Member of numerous international organisations, since 2009 he has been working with the Laboratory for the Assessment of Ancient Materials (LAMA) of the IUAV University of Venice.

LIST OF PARTICIPANTS

ISABELLE BIRON

Initiated the study of glass and enamel in the laboratory; all periods, all types of objects: glass elaboration, fabrication techniques of objects, material characterization, raw materials, authentication, dating, alterations of chemical and mechanical origins, conservation, establishment of a technical and analytical data-base, glass and enamel elaboration.

In charge of studies on Objets d'Art and Archaeological artefacts made of glass held by the French Museums, Historical Monuments, National Archaeological Institutions (DRAC) and foreign museums. In charge of the scientific research of «glass» material, mechanisms of chemical degradation, technologies of antimonate opacified glass and gilding techniques throughout History.

SUZANNE HIGGOTT

After completing her university studies, Suzanne Higgott joined the staff of the Wallace Collection as the Museum Assistant. Since 1999 she has been Curator of Glass, Limoges Painted Enamels and Earthenware. Her publications on glass include articles on French Renaissance enamelled glass and 19th Century British glass associated with Sir Richard Wallace, as well as, most recently, The Wallace Collection Catalogue of Glass and Limoges Painted Enamels (2011).

Suzanne Higgott is a long-serving member of the Board of the Association for the History of Glass (the British section of the AIHV) and a Fellow of the Society of Antiquaries of London.

KÄTHE KLAPPENBACH

is Curator of Luminaria and Minerals and Head of the Inventory Department in the Palaces and Collections Department from the Prussian Palaces and Gardens Foundation Berlin-Brandenburg. She is specialist for glass and rock crystal chandeliers as well as other Luminaria. Since 1977 she is working in the Palaces Department of the Palaces and Gardens Administration Potsdam-Sanssouci and since 1983 in Inventory and research of the Luminaria Collection; She has written numerous scientific publications, papers and given scientific advices to museums in Europe and the United States concerning Chandeliers and glass.

REINO LIEFKES

Senior Curator and Head of Ceramics & Glass at the V&A Museum, London, Reino specialises in glass and European earthenware and was Lead Curator of the new V&A Ceramics Galleries which opened in 2009-10. Reino is the author/editor of *Glass* (V&A 1997) and contributed to many V&A exhibitions and catalogues including «At Home in Renaissance Italy» (2006). He is Board Member

of the ICOM International Glass Committee and served as Chairman/President on the committee from 1995 to 2001.

EVA PUTZGRUBER

finished her studies in Conservation and Restoration at the University of Applied Arts Vienna in 2006. After two years as a free-lance conservator for metals, porcelain and glass, she joined the Collection of Sculpture and Decorative Arts / Conservation Department at the Kunsthistorisches Museum Vienna. Since 2010 she is Assistant Professor at the Institute of Conservation of the University of Applied Arts Vienna. She is responsible for the academic training of students at the Objects Conservation Department and is presently working on her dissertation in the field of glass history and technology.

ANGELO AGOSTINO

Ph.D. in Chemistry, is researcher at the University of Turin, Italy. He boasts an international experience in large-scale facilities (i.e. European Synchrotron Radiation Facility - Grenoble) and over ten years of experience as scientist in an academic environment. He developed an expertise in X-ray Fluorescence (XRF) and X-ray Powder Diffraction (XRPD) and a high-level experience

in sophisticated research techniques and technologies involving materials analysis, surface technology and superconductors. He is now working on the application of quantitative approach in the study of light matrix (enamels, glasses) by means of portable XRF.

FRANÇOIS ARNAUD

has been a glassblower for 19 years. For 7 years he learned and worked in several workshops in France. Then, he worked for 5 years in various countries including Italy, Canada, South Africa, Argentina, Czech Republic, India and Syria. After these 12 years of experiences he decided to create his own studio in a process of experimental archaeology, «Atelier PiVerre - Souffleur de Verre» at La Plaine-sur-Mer, France. Today François Arnaud is a glassblower working alone on his thighs like Mesopotamian craftsmen.

FRANÇOISE BARBE

Curator in the Louvre Department of Decorative Arts, Françoise Barbe is responsible for the Renaissance ceramics, painted enamels and glasses. She is currently involved in several research projects with the Centre de recherche et de restauration des Musées de France, especially on Venetian enamels and glasses. She recently organised the exhibition «Majolique. La faïence au temps des Humanistes. 1480-1530» (Musée national de la Renaissance, Ecouen, 2011-12).

STEFANO BARENGHI

Bachelor graduate in Chemistry at the University of Milan, Master graduate in Chemistry for Conservation and Restoration at Ca' Foscari Venice University. In 2012 he wrote his Master thesis at the University of Antwerp, Belgium, where he is presently employed as visiting researcher. The object of study is glassmaking from natural raw materials, according to ancient recipes, and analyzing natural glasses.

MARC BARREDA

is an American artist who has been working with glass for nearly 14 years. He currently lives in Amsterdam where he completed his Master of Applied Art at the Sandberg Institute in 2012. Marc Barreda has studied and worked around the world with artists and craftsmen and at various institutions including: The Corning Museum of Glass (US), The Vrij Glas Foundation (NL), Fundacion Centro Nacional del Vidrio (ES), Domaine de Boisbuchet (FR) and the Creative Glass Center of America (US). Currently he is developing a project in the Netherlands focused on exploring and highlighting the extensive Dutch glass history through academic and practical approaches.

ERWIN BAUMGARTENER

studied art history at the Basel University. Master thesis on a private collection of medieval glass (Amendt collection, exhibited in Düsseldorf, Rotterdam and Coburg, 1987/88). 1988 together with Ingeborg Krueger catalogue and exhibition «Phoenix aus Sand und Asche. Glas des Mittelalters». Since 1989 work for the Denkmalpflege Basel. Several publications on European glass (mainly concerning Venetian and «façon de Venise» specimen, e.g. museum/exhibition catalogues Musée Ariana, Genève, 1995, Musée des Arts décoratifs, Paris, 2003). Member of the «Association Internationale pour l'Histoire du Verre» since 1979, actually member of the Executive Committee and of the national Committee preparing the 2015 Congress in Switzerland.

CHIARA BERICHILLO

After graduating in 2003 in Classics with archaeology as her major, she earned her diploma at the School of Specialisation in Archaeology of the University of Padua. She operated in cultural popularisation and museums, working for several Umbrian firms active in museum management. She teaches in secondary schools and since 2009 is director of the Glass Museum of Piegara (PG).

FRANCESCA COLANGELI

She is graduating in Cultural Heritage, Archaeology, at the University of Rome «Tor Vergata». She has participated in excavations led by the University of Siena (Castle of Cugnano, with the direction of Prof. G. Bianchi) and the Pontificio Istituto di Archeologia Cristiana (Basilica circiforme Via Ardeatina, with the direction of Prof. V. Fiocchi Nicolai). During her studies she had the opportunity to participate in various classification workshops of archaeological material, particularly of medieval pottery and generally focusing on post-classical archaeology. She is currently studying the medieval glass finds from the archaeological excavation of the Colosseum, with the direction of Prof. R. Santangeli Valenzani and the supervision of Prof. A. Molinari.

INÊS COUTINHO

Currently doing Ph.D. on Conservation Science entitled «A new insights on the 17th and 18th Century Portuguese glass collections study and preservation» being developed at Vicarte (research unit «Glass and Ceramic for the Arts»). Solid academic training in Conservation and Restoration with Master and Graduation at FCT--UNL. This scientific background resulted on several communications.

LAVINIA DE FERRI

She graduated in 2008 in «Science for Cultural Heritage» at the University of Parma and she obtained the Ph.D. at the University of Modena e Reggio Emilia, defending a thesis entitled «Characterization and ageing of medieval-like glass for the design of protective coatings». Currently she has an INSTM fellowship at the Politecnico di Milano and she works on the functionalization of different substrates by sol-gel process.

ANTÓNIO PIRES DE MATOS

Degree in Chemical Engineering, Technical University of Lisbon 1962. Ph.D. in chemistry, Cambridge, U.K., 1970. Fellow of the Society of Glass Technology, U.K. since March 2009. Emeritus Invited Full Professor at the Universidade Nova de Lisboa. Current research activities at the Research Unit Glass and Ceramics for the Arts, VICARTE (www.vicarte.org): Provenance studies of Portuguese glass; Science applied to contemporary glass art.

FRANCESCA DE MUNARI

She is graduating in a master degree, Art History and Conservation of cultural heritage, from Ca' Foscari in Venice, with a thesis in History of Modern Art Collection. She worked for Vicenza Diocese for catalogation of ecclesiastical heritage, a project of the Italian Bishops' Conferenze and she

collaborated with Vicenza Diocesan Museum from 2005 to 2009. Daughter of collectors and collector herself, since 2009 she manages the family antiques store. Since 2012 is registered as antiques and liturgical objects expert at Vicenza Chamber of Commerce.

FILOMENA GALLO

Always passionate about the application of scientific methods for studying ancient materials and artifacts, in 2007 she graduated in Science for Cultural Heritage from the University of Florence. In 2009 she started a Doctorate, successfully completed in 2012, at the University of Padova, under the supervision of Prof. G. Molin. The project focused on the geochemical characterization of Roman and Late Roman glasses coming from the North Adriatic area, in order to identify the type and the provenance of raw materials employed in their production. So far, she is a Post-Doctoral fellow at the Department of Cultural Heritage of University of Padova, where she is carrying on a project on the geochemical characterization of Roman and Medieval North Adriatic glasses.

AURELIE GERBIER

is a curator at the National Museum of the Renaissance (Chateau d'Ecouen, France) since July 2012. She is in charge of the glass collection, the stained glass collection, the German stonewares and Palissy wares.

KEITH KING

In his youth, early English lead-glass captivated his imagination as an expression of good design, in which form and function are harmoniously unified. So grew the seeds of a glass collection. In more recent years, he and his wife, Sylvie, have significantly expanded that collection, notably with acquisitions of Italian Renaissance and 17th Century French glass. He has been an active member of the AIHV, acting as General Secretary, and is a member of the Glass Circle in the UK.

KITTY LAMERIS

With a degree in Italian language and literature Kitty Laméris is, together with her sister Anna and brother Willem, the owner of the antique shop Frides Laméris Art and Antiques, specialized in glass and ceramics. One of her specialties is Venetian and Façon de Venise glass of the sixteenth and seventeenth Century. In the past 20 years she has written different articles about the subject, together with her father Frides Laméris she made an exhibition and catalogue about Venetian and Façon de Venise glass in the church at the Dam Square de Nieuwe Kerk. Kitty also teaches future restorers of glass at the University of Amsterdam (UVA), and gives lectures about the subject. In 2012 she wrote a catalogue about filigrana glass entitled: *A Collection of Filigrana Glass*.

PATRICK LEMASSON

University of Paris-Sorbonne (degree, master's, DEA)

History teacher between 1984 and 1996. Curator of numerous exhibitions and of 17th and 18th Century Decorative Arts in the Petit Palais, Paris, and of Ancient Decorative Arts (from the Middle Ages to the 18th Century). Since 2010 is chief curator.

SYLVIE LHERMITE-KING

Italian Renaissance and façon de Venise glass of the 16th and 17th Centuries has been the prime area of Sylvie's professional and private interests for over 30 years. As a well-established antique dealer in Paris, she has helped create several major private collections in France and advises a number of French and North American museums on their own public collections. She is a member of the leading antique dealers association in France and of the vetting committee of the Tefaf Fair in Maastricht, with responsibility for Renaissance and later European glass. Among her specialist subjects are French glass and her exhibition in 2008, presenting objects from 1550 to 1750, accompanied by a catalogue, Cent Verres Français, provided a unique opportunity to study the many facets of French glass production over that period.

JULIA A. LIKHTER

Moscow State University diploma (History faculty, Department of Archaeology), 1974. Ph. D. degree (Moscow State University, History faculty, Department of Archaeology), 1988.

Membership: Association Internationale pour l'Histoire du Verre – 1998-1999. Russian Association of Glass Historians (2011). She is the author of 35 articles about ancient Glass.

AUGUSTA LIMA

Augusta Lima is a glass and ceramics conservator and Assistant Professor at the Department of Conservation and Restoration of the Faculty of Sciences and Technology of the New University of Lisbon. With a master degree in Conservation Sciences, she is currently doing a PhD on corrosion of historical and contemporary glazes. Moreover, her main research interests are the study of reliable analytical techniques for the characterization of ceramics and glass and provenance studies of Portuguese glasses, with publications in scientific journals. She did an internship at The Corning Museum of Glass (USA) and has collaboration work with the Materials Research Institute (Pennsylvania State University, USA). She is member of the Research Unit VICARTE «Glass and Ceramics for the Arts».

DENISE LING

Denise Ling began her career in 1978 as a precious gemstone buyer and sorter for a jewellery manufacturer and a precious gemstone importer in Hatton Garden, London. In 1986 she moved into a career in conservation and joined the British Museum as an assistant conservation officer in the Ceramics and Glass Conservation Section. She has worked in all areas of ceramics and glass conservation including low fired ceramics and porcelain and is now senior conservator specialising in the deterioration and treatment of glass and enamel.

KATERINA MAVROMICHALI

Archaeologist-museologist, completed her graduate and postgraduate studies (BA, MA, PhD) at the Department of History and Archaeology of Aristotle University of Thessaloniki, with specialization in Classical Archaeology; she also holds a master's degree in Cultural and Creative Industries, from King's College London University. She has worked in departments of Prehistoric, Classical and Byzantine antiquities, as well as at the State Museum of Contemporary Art in Thessaloniki, as Head of the Department of Research, Education and Conferences. Detached from the SMCA, her current position is at the Archaeological Museum of Thessaloniki, supporting the exhibition and communication

activities of the museum. She has participated in European programs as a member of the scientific team and as a national trainer; she has teaching experience on graduate and postgraduate level and her research work has a special focus in the history of glass, both ancient and modern, and also includes subjects on archaeology, history of art, cultural management, museology and conservation of cultural heritage.

ANDREW MEEK

currently works at the British Museum as a scientist, specialising in the analysis of vitreous materials. He graduated with a PhD in Archaeology from the University of Nottingham in 2011. The title of his doctoral thesis was *The chemical and isotopic analysis of English forest glass*. Since starting at the British Museum in 2009 he has worked on, and published, archaeometric studies of glasses from various time periods and provenances. He is a board member of the Association for the History of Glass and co-editor of their biannual publication *Glass News*.

GIULIA MUSSO

is an art historian. She graduated in History of Art and Heritage Development at the University of Genoa in 2009, with a final discussion on «The production of the SAV in Altare between tradition and innovation».

Since 2008 she has been working for the Museo dell'Arte Vetraria Altarese, dealing with the overall layout and management of the collection, international loans and organisation of exhibitions. She works as a Curator since 2011.

DANA ROHANOVÀ

Since childhood she has been interested in glass. She started Glass study at the «Industrial secondary school» focused on Glass technology (1984). Then she continued to study at the University (Institute of Chemical Technology Prague) and graduated with the diploma thesis *Vitrification of the middle radioactive waste from the Nuclear power plant* (1989). Her post-graduate studies were oriented to biomaterials: *Interaction of glass-ceramics with Simulated Body Fluids* (1993). From 2005 she has been concerned with archaeological glasses research (stained glass, potassium Bohemian glass, glass mosaics *tesserae*, etc.). She is Assistant Professor in the Department of Glass and Ceramics of the Institute of Chemical Technology, Prague. She also teaches practical conservation and restoration of historical glasses.

BETTINA SCHNEIDER

For more than 25 years she has been working with glass in various disciplines and combines academic knowledge with well founded craftsmanship (certificate of apprenticeship).

She has a Masters degree (MA) in Restoration with a main focus on glass conservation and restoration (stained-glass, vessel glass) as well as a Bachelors degree (BA) in Museology. Presently she is working as a free-lance conservator with a focus on historic chandeliers and vessel glass. On an interdisciplinary level Bettina develops and implements documentation structures for glass and crystal collections.

EKATERINA STOLYAROVA

She is an archaeologist graduated from the History Faculty of M.V. Lomonosov Moscow State University with specialization in Archaeology in 1988. She received her Ph.D. in Archaeology from the M.V. Lomonosov Moscow State University in 1996. From 1997 she works as an assistant professor at the Department of Conservation of the Russian State University for the Humanities (Moscow), where she teaches courses on the history of glass, ceramics and enamel, scientific methods of studying glass, glass and enamel technology, ceramics, glass and enamel storage conditions for museum displays and storage facilities. From 2012 she works as a research fellow in the Institute of Archaeology, Russian Academy of Science (Moscow). She is a member of European Association of Archaeologists (EAA) from 1996 and the Russian Association of Historians of Glass (ROISt) from 2011. Her research work has a special

focus on the history, technology and chemical composition of glass, ancient, medieval and post-medieval. She published the results of her research in numerous publications (more than 60). Currently she is involved in a research project «Necropolis of Some Russian Grand Princesses and Tsarinas of the Ascension Convent in the Moscow Kremlin». She is studying glass vessels found in burials from 16th-17th Century used as vessels for the last rites. Part of these vessels may be attributed to Venetian production or «façon de Venise».

KINGA TARCSAY

Glass studies have been at the centre of her work since reading archaeology at the University of Vienna. She has concentrated on Roman, medieval and post-medieval glass finds from Austria and communicated the results of her research in numerous publications, lectures, exhibitions and university courses. An important part of her research is the production of glass, i.e. research into glassworks; among other things, she is the author of a comprehensive publication about the glass production sites from the 16th-17th Centuries in the lordship of Reichenau, published in 2009.

DORA THORNTON

Curator of Renaissance Europe at the British Museum, and the collections for which she is responsible include

one of the world's most important collections of Venetian glass from the Felix Slade Bequest of 1868, and the Waddesdon Bequest. From her first book, *The Scholar in His Study* [New Haven and London 1997], through *Objects of Virtue* [co-written with Luke Syson] British Museum 2009, she has included research on Venetian glass in its wider intellectual and artistic context. She selected and catalogued Venetian glass for the exhibition «Art and Love in Renaissance Italy» at the Metropolitan Museum of Art in 2008, and published an article in *Glass Studies* on a single enamelled dish from the British Museum's collection in 2009. She is now writing a book on the Waddesdon Bequest which will include new research on the important glasses in the collection.

KAROL B. WIGHT

She became executive director of The Corning Museum of Glass in 2011, after 26 years at the J. Paul Getty Museum. Before joining the Corning Museum she was senior curator of antiquities at the Getty Villa. A specialist in ancient glass, Wight received her Ph.D. in Art History from the University of California, Los Angeles. She has curated numerous exhibitions on ancient art and glass, including «Molten Color: Glassmaking in Antiquity» (Getty Villa), «Athletes in Antiquity: Works from the Collection of the J. Paul Getty Museum» (Utah Museum of

Fine Arts during the 2002 Winter Olympics). In 2007, she co-curated the exhibition, «Reflecting Antiquity», with David Whitehouse, which was shown both at the Getty Villa and The Corning Museum of Glass. Wight now serves as both executive director of The Corning Museum of Glass and as curator of ancient and Islamic glass. She is responsible for overseeing the Museum's extensive collections, the Rakow Research Library, The Studio, publications, education programs, and conservation and scientific research.

RAINER ZIETZ

after studying History of Art at Heidelberg University, he started his own business in 1969 in Hannover, Germany and has been based in London since 1980. As an art dealer and adviser, he worked from the beginning with specialised collectors and museums in the field of European Decorative Arts and Sculpture. Amongst work in other fields, he particularly focused on Ancient and Modern Venetian Glass and Italian Renaissance Maiolica. His contributions led to the forming of some of the most prestigious private collections and their publication (Biemann Coll., Zurich, Hockemeyer Coll., Bremen, Kuckei Coll., Berlin, Steinberg Coll., Vaduz). Acquisitions from Rainer Zietz are represented in many of the world's leading museums. He is a member of the British Antiques Dealers' Association. He is

also a patron of museums in England (V&A and The Wallace Collection); a member of The Friends of the German Cultural Foundation and The Green Vaults, Dresden. He is a fellow of the Corning Museum of Glass and The Ennion Society.

VENERDÌ 1 MARZO 2013

CHIUSURA DELLE GIORNATE DI STUDIO SUL VETRO VENEZIANO 2013

ore 18

GIAN ANTONIO DANIELI

Presidente dell'Istituto Veneto di Scienze, Lettere ed Arti

GABRIELLA BELLÌ

Direttore della Fondazione Musei Civici Veneziani

SALUTO DELLE AUTORITÀ

ROSA BAROVIER MENTASTI

Relazione sui lavori presentati

SALUTO A NOME DEI PARTECIPANTI

REINO LIEFKES

*Senior Curator and Head of Ceramics
& Glass at the V&A Museum, London*

KAROL B. WIGHT

Executive director of the Corning Museum of Glass

CONCERTO

PROGRAMMA DEL CONCERTO

PALAZZO FRANCHETTI - ISTITUTO VENETO DI SCIENZE, LETTERE ED ARTI

JOHANN SEBASTIAN BACH — ANTONIO VIVALDI

concerto n. 1 in re magg. BWV 972, trascrizione da L'Estro
Armonico Op. 3. N.9 di A. Vivaldi (*allegro - larghetto - allegro*)
cembalo Andrea Zepponi

GEORG FRIEDRICH HAENDEL

cantata : *Mi palpita il cor* per alto, flauto e bc.
contraltista Angelo Bonazzoli - flauto Antonio Martino -
cembalo Andrea Zepponi

BENEDETTO MARCELLO

sonata per flauto e bc n 1 in fa magg. dall'Op. 2
(*adagio - allegro - largo - allegro vivo*)
flauto Antonio Martino - cembalo Andrea Zepponi

ANTONIO VIVALDI

sonata per flauto e bc n 2 in do magg dall'Op. 13, RV 59
Il Pastor Fido
flauto Antonio Martino - cembalo Andrea Zepponi

RICCARDO BROSCHI

dall'opera Idaspe, aria di Dario: *Ombra fedele* per alto
contraltista Angelo Bonazzoli - cembalo Andrea Zepponi

BALDASSARE GALUPPI

sonata in mi bem. magg. (*cantabile - allegro moderato - allegro*)
cembalo Andrea Zepponi

ANTONIO VIVALDI

dall'opera Orlando furioso, aria di Medoro: *Sol da te mio dolce
amore* per alto, flauto e bc
contraltista Angelo Bonazzoli - flauto Antonio Martino -
cembalo Andrea Zepponi

The Istituto Veneto and Glass

The sequence of events

Already in the 19th Century a great many Murano glassworks, with their capacity to innovate processing techniques, won the Industry Prizes the Istituto Veneto awarded to the leading manufacturers in the Veneto.

Glass came back to the fore in 2004 when the Istituto Veneto opened its new premises in Palazzo Franchetti with the great exhibition "Vetri. Nel mondo. Oggi" (Glass in the World. Today): a vast survey of art glass from all over the world with works by contemporary artists from Murano, America, Australia, Belgium, Bohemia, Finland, France, Germany, the Netherlands, Sweden.

In 2010 for the first time the Istituto opened the new ground floor rooms of Palazzo Loredan with the exhibition "Galanterie di Vetro" (Glass Galantries). The Murano glass revival in the De Boos-Smith collection: 250 exquisite items, selected and arranged according to the different glass techniques attesting the ancient 19th Century 'working process' at Murano.

In 2011 the Istituto held a solo show in Palazzo Franchetti dedicated to the great artist Lino Tagliapietra: a large selection of one-offs of the past ten years including several impressive installations. In 2012 the Istituto presented the exhibition "Miniature di vetro" (Glass Miniatures) in Palazzo Loredan. Art bonbonnières: 400 small glass articles from private collections revealing great artists' technical prowess in the art of glass. In Palazzo Franchetti from September to November 2012 the Bertil Vallien exhibition: "Nine Rooms" produced and organised by Berengo Studio displayed to the Venetian public sixty glass works crafted by the Swedish master during his career in the Swedish Kosta Boda studios.

The Istituto Veneto is one of the partners of *Glasstress*, presented at Palazzo Franchetti in 2009 and 2011 by Berengo Studio during the International Art Exhibition of the Venice Biennale. 2013 schedules the third edition of this outstanding art exhibition which explores developments in international design with sculptures and installations specially created by leading international artists and designers vying with their use of glass.

As a commentary on the various exhibitions the Istituto Veneto organised for the general public many occasions for reflection, with lectures and conversations with the artists by scholars and collectors.

In 2012 the Istituto Veneto introduced and organised *Study Days* on Venetian Glass to gather each year scholars of Venetian glass but also glass of the most varied traditions: an occasion for further discussion and encounters, with broad

exchanges of information and experience, making this event one of the most important of its kind held on an international level.

Last, in 2012 the *Glass in Venice Prize* was created, awarded by the Istituto Veneto and the Musei Civici Veneziani in recognition of the glass artists and masters particularly outstanding for their work in the great Murano tradition, or else, all over the world, through different techniques and schools. The first Prize was awarded on 22 November 2012 to the master Pino Signoretto and the artist Bertil Vallien.

The Glass in Venice Prize

The first edition of the *Glass in Venice Prize* was awarded on 22 November 2012 by the Istituto Veneto di Scienze, Lettere ed Arti to the Muranese master Pino Signoretto, whose expertise and technical refinement are renowned worldwide, and Bertil Vallien, the Swedish artist whose glass works are shown in the leading international contemporary art museums and presently on exhibit at Palazzo Franchetti, the institution venue.

The Fondazione Musei Civici di Venezia shared in awarding the Prize.

The Prize is a highly regarded tribute awarded to the glass artists or masters who outstandingly distinguished themselves with their work proceeding in the wake of the Muranese tradition or else, abroad, in different schools and techniques.

With this event we wish to show that Venice, thanks to Murano, is not only the famed and noble centre of a refined art and a prodigious glass technique which still lives in the work of outstanding masters and artists, but is also the city regarded with admiration and respect by many internationally acclaimed masters, even if their own works are executed in techniques other than Muranese.

The personal experiences of many world-famous artists and important contemporary art exhibitions held in the greatest capitals attest that the glass art world, infinitely variegated and different in its multiple forms and techniques, considers Venice and Murano an indispensable point of reference, a prestigious and challenging presence to confront and with which they can vie, even experimenting with the most specific and intrinsic techniques of the Muranese tradition.

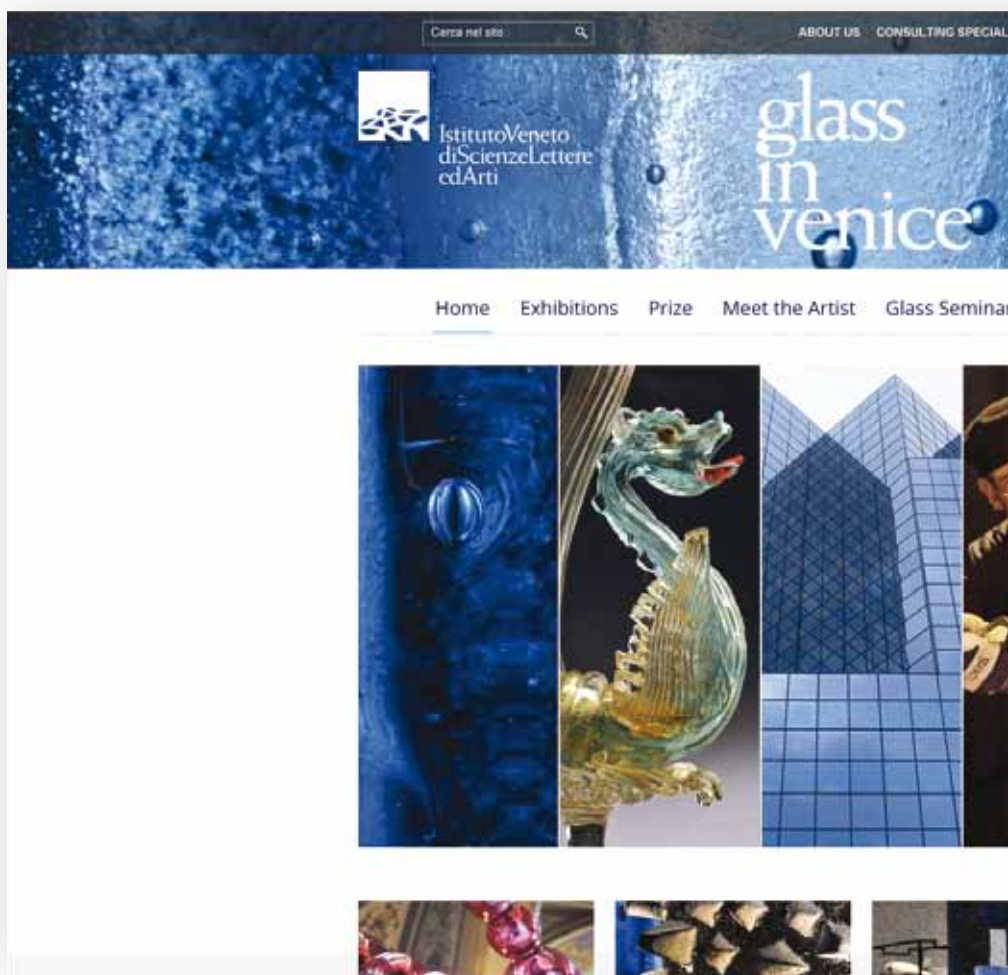
The Prize, awarded every year, is an essential part of *Glass in Venice*, the project arisen from the collaboration between the Istituto Veneto and the Fondazione Musei Civici di Venezia.

The Website

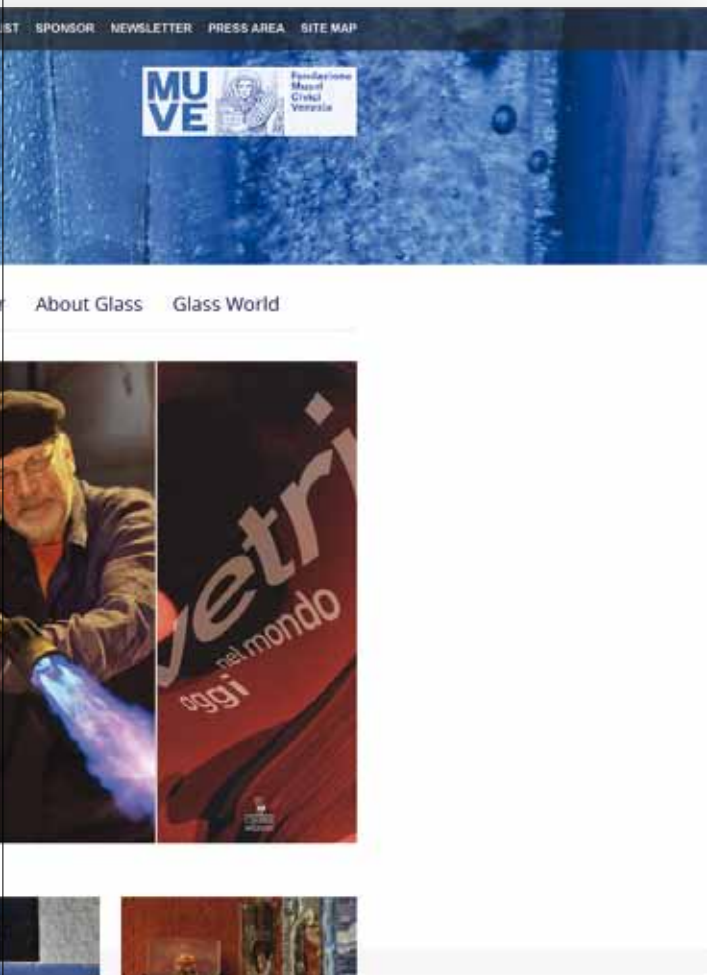
In the ambit of the *Glass in Venice Project* a website devoted to Venetian glass is forthcoming.

The website intends to become an authoritative hub of documentation on Venetian glass and glass art production worldwide: a functional, accessible, updated tool available to the broadest international public.

To achieve our project we formed alliances and partnerships with museums, research centres, industries and businesses reputed for their commitment to the promotion of glass.



The site is organised in several sections, enriched with material produced in the course of the activities of the Istituto and the Murano Glass Museum, as well as texts, documents, interviews, announcements of exhibitions and events the world over. In addition a section will be created featuring the curriculums of glass artists from all over the world and recordings of the courses and lessons held by specialists during the Venetian Glass *Study Days*. The contents of the site are supervised by a scientific committee whose members are: Rosa Barovier, Sandro Pezzoli, Chiara Squarcina, Lino Tagliapietra, Cristina Tonini, Marco Verità.



glass
in
venice

*Reliquary from the Church
of San Martino in Burano-Venice,
now exhibited in the Glass Museum
Fondazione Musei Civici Venezia,
Inv. Class VI, nr. 1124*



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ATTI

Gli ATTI rappresentano da oltre un secolo una delle voci più significative nel panorama italiano degli studi superiori e specialistici, fornendo ogni anno decine di saggi su temi di storia, letteratura, critica d'arte, filologia, diritto, filosofia e delle scienze umanistiche in genere, e nelle scienze naturali, fisiche e matematiche. Una attenzione particolare è data a temi relativi alla cultura veneta e veneziana. A partire dal 1993 gli Atti escono in fascicoli trimestrali ed è possibile sottoscriverne l'abbonamento, ricevendone i vari numeri non appena editi.

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Istituto Veneto
di Scienze, Lettere
ed Arti

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The "Study Days on Venetian Glass" are an opportunity for in-depth study on Venetian glass and are tuned to an audience of Museum conservators, collectors and experts.

The programme includes lessons by experts who, after a general overview, will guide participants through the direct study of methods and pieces, encouraging participants to actively take part, also through presentations.