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ON VENETIAN GLASS
Enamelled and Gilded Glass of the Renaissance

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STUDY DAYS ON VENETIAN GLASS
Enamelled and Gilded Glass of the Renaissance

edited by
ROSA BAROVIER MENTASTI and CRISTINA TONINI

VENEZIA
2020

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al Corso di alta formazione organizzato dall'Istituto Veneto sul tema:
Higher Education Course. Study Days on Venetian Glass.
Enamelled and Gilded Glass of the Renaissance

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Rosa Barovier Mentasti and Cristina Tonini

PECULIAR SOURCES OF INSPIRATION FOR SOME VENETIAN ENAMELLED GLASS VESSELS OF THE RENAISSANCE

Since the 19th century, glass art historians have mostly been prone to dating Venetian Renaissance enamelled vessels to the 15th century but recently several of the most refined Renaissance pieces turned out to be products of the early 16th century. This is consistent with many documents of the early 16th century, concerning the Venetian glassmaking and frequently mentioning enamel decoration. Some Venetian enamelled glass pieces can even be dated to the thirties of the 16th century or later. Significantly, in the same decade, probably in the years 1534-1535, Vannoccio Biringuccio (1480-1537/39), Sienese metallurgist, wrote his treatise *De la Pirotechnia*, where he mentions Murano, its techniques and its artisans who decorate glass with paintings and enamels (*lornano di pitture & daltri finissimi smalti*)[1]. Actually, old Murano documents evidence a continuous production of enamelled glass until the second half of the 16th century. Indeed, during the whole century, at least until the late seventies, long and short glassworks inventories mention gilt and enamelled glass and archive papers do the names of decorators active in Murano[2]. Unfortunately, enamelled glass vessels are mostly itemized but not described.

The 1508 inventory of Alvise and Bernardino Dragan, entrepreneurs in Murano, lists luxury glass items, many of them gilt and enamelled. Among the patterns mentioned in this inventory, we can quote scales

[1] Biringuccio 1540: 43v.

[2] Documents generally include inventories or mention decorators only when they concern trials, in which decorators are involved, or inherited goods, which are under dispute.

(*schiame*), lilies of the valley (*zii*) and damascene motifs (*a la damaschina*)[3]. Still surviving pieces with such enamelled patterns are not rare.

An inventory of Giovanni Ballarin, dated 23 January 1511, includes forty *lattimo* saltcellars with figures (*saliere de latimo cum figure*), forty-two *lattimo* beakers with figures (*goti de latimo cum figure*) and one hundred *marmorin* beakers with figures (*poti de marmorin cum figure*). Moreover, in his post mortem inventory, dated 16 August 1512, we find two hundred *lattimo* beakers with figures (*poti de latimo cum figure*)[4]. Giovanni Ballarin certainly produced a substantial amount of enamelled vessels, as an enamel workshop was active inside his glassworks[5]. The *lattimo* saltcellars with figures, quoted in Ballarin's inventory, can be related to the *lattimo* saltcellar, enamelled with the bust of a lady, excavated in the site of Santa Chiara Convent in Padua,[6] and the *lattimo* saltcellar decorated with two medallions with *Agnus Dei*, belonging to the collections of the Hermitage[7]. The beakers with figures probably were similar to the *lattimo* beaker of the Cleveland Museum of Art with the busts of a Carpacciesque lady and a youth and the beaker kept in the Museo Civico in Bolzano. The latter shows two medallions, one with St Francis and the other with the Man of Sorrows[8].

In 1516, the list of enamelled vessels decorated by Francesco and Battista da Lodi, in Murano, includes thirty-three beakers with rays (*goti cum razi*). This is an important reference to date several Venetian vessels decorated with enamelled rays[9]. In 1532, another Dragan inventory lists several gilt and enamel decorated (*lavoradi d'oro e di smalti*) glass vessels, among which five small gilt and enamel painted baskets (*cesteli doradi depenti a smalti*)[10].

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[3] Zecchin 1990: 59.

[4] Zecchin 1989: 164, 348. Here *goto* and *poto* seem synonyms. *Goto* is an usual term meaning beaker in old Murano papers while *poto* is rare. The latter, as well as French pot, derives Mediaeval Latin *potus*. See: Du Cange 1885: 383, vox: potus. *Marmorin* was a kind of translucent white glass.

[5] Barovier Mentasti, Borrelli and Tonini 2019: 160.

[6] Cozza 2011: 93, fig. 117. The missing opposite part of the wall was probably decorated with the bust of a gentleman.

[7] Clarke 1974: 30-31, 46, 55-56.

[8] Clarke 1974: 28-29, 49, 55.

[9] Zecchin 1990: 128; Barovier Mentasti, Borrelli and Tonini 2019: 178-179.

[10] Zecchin 1990: 59-61.

Much later, the inventory of the glassworks run by Bortolo d'Alvise, dated 17 November 1569, includes enamelled vessels: seventy one German style beakers of different kinds, with coats-of-arms, refired (*goti thodeschi con Armi recoti de più sorte*), ten beakers decorated with foliage, refired (*gotti recoti a fogiame*), three large dishes with coats-of-arms, refired (*piati con li Armi recoti*), seven smaller dishes with coats-of-arms, refired (*tondi con arme recote*), nine vases decorated with burnet, refired (*vasi a pimpinella recoti*). Such vessels are described as refired (*recoti*), therefore the coats-of-arms (*armi*), foliage (*fogiame*) and burnet (*pimpinella*), which decorate them, were surely enamelled, because refiring was the last stage of enamelling process. Other pieces in this list seem cold painted[11]. The enamelled *goti thodeschi*[12] might be the footed conical beakers with large bottom, much in fashion in Germany and so frequently decorated with German arms. This type is depicted in *Convito dell'Agnello Pasquale* painted by Alessandro Bonvicino called Moretto in 1554-1555, kept in the Duomo Vecchio, Brescia; in the portrait of Lienhard III Hirschvogel, painted by Georg Pencz in 1542, kept in the Bayerische Staatsgemäldesammlungen, Munich, and in the portrait of Erhard Schwetzer, painted by the same Pencz in 1544, kept in the Bode-Museum, Berlin. A glass with the same shape is the covered beaker, gilt and enamelled with the coat-of-arms of Alfonso II of Este and Barbara of Austria, dated in the years between their wedding (1565) and her death (1572)[13]. The dishes with coats-of-arms and the beakers with foliage, mentioned in Bortolo d'Alvise inventory, were not necessarily produced for the German market.

Also the inventory of Giovanni Antonio Zanchi dal Castello, dated 22 January 1578, lists enamelled vessels: thirty three French style beakers with coats-of-arms and other beakers with coats-of-arms, enamelled (*franzosini con arme et altri goti con arme smaltade*),

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[11] Zecchin 2009: 33.

[12] We do not know if 'German' beakers meant beakers similar to German beakers or beakers in fashion in Germany, that are produced for the German market. The same question concerns 'French' beakers and 'Catalan' bowls, mentioned in Murano documents, as well.

[13] Barovier Mentasti and Tonini 2013: no. 27. This beaker is kept in the Victoria & Albert Museum (inv. no. 18&A-1867).

two other similar beakers decorated with burnet (*item altri doi a pimpinella*) and thirty two Stangengläser (*goti da cil* or *de acil,* here called also *canoncini*) and other vessels, enamelled (*smaltadi*). Some of these Stangengläser are decorated with coat-of-arms and one with figures of *Magnifici*[14]. In the 16th century Pantaloon, a main character of the Italian *Commedia dell'Arte*, then in fashion in Europe, was called *Magnifico* (litt. Magnificent). This Stangenglas of the Zanchi list can be connected with a Stangenglas kept in the Kestner Museum, Hannover, and a conical goblet, kept in the British Museum, each enamel decorated with two *Magnifico* figures and an Harlequin. Both beakers can be attributed to Venice and dated 1570-1580[15].

Nine vases of Bortolo d'Alvise (1569) and two beakers of Giovanni Antonio Zanchi dal Castello (1578) are enamel decorated with burnet (*pimpinella*). A little later, in 1588, the inventory of the collection of cardinal Ferdinando de' Medici includes two barrel-shaped jars painted with burnet pattern, with their lids (*2 giari dua a modi di botte dipinte a pimpinella con loro coperchi*)[16]. The typical rounded and indented leaves of the burnet (*sanguisorba minor*) are enamel depicted on some glass vessels, all dated to the second half of the 16th century, whose origin is still discussed[17]. The study of these vessels cannot prescind from the above-mentioned documents.

Not always documents can be useful to attribute and date individual glass artifacts. The majority of Venetian enamelled pieces, dated to the first decades of the 16th century and decorated with figurative scenes, show classical subjects but no old document

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[14] Zecchin 2009: 34.

[15] Tait 1979: 42, no. 38, tav. 13; Mosel 1979: 53, no. 12; Barovier Mentasti and Tonini 2014: 14-17, 28, figs. 4-5; Bate and Thornton 2012: 167, fig. 30; Thornton 2014: 131-134, figs. 3-4.

[16] Cecchi and Gasparri 2009: 442. These jars are listed among other glass vessels. A barrel-shaped glass jar, decorated with burnet leaves and birds, is kept in the Certosa di San Martino, Naples. It is considered Catalonian. See: Causa Picone 1967: 78-79.

[17] Barovier Mentasti and Tonini 2012: 60, 96-97, no. I/19. Some pieces, such as a vessel in Brescia museum (Barovier Mentasti and Tonini 2012: 60, 96-97, no. I/19), differ in their bright colours from a group of vessels, which are unanimously attributed to Catalonia. Blown vessels decorated with burnet leaves were probably produced in more than one glass center.

mentions this kind of decoration. Therefore, their dating is based on other considerations. The same happens with some glass artworks whose highly symbolic decoration, of difficult interpretation, derives from Medieval sources.

We shall analyze some goblets of the early 16th century, which stand out for their unusual but refined enamelled decoration.

1. *The Toledo lattimo jug and the conical beaker in the British Museum*

The Venetian glass vessels showing classical scenes, mainly inspired by archaeological reliefs, as well as Renaissance reliefs, in Venice sometimes sculpted by Pietro Lombardo and his sons, Tullio and Antonio, often include tritons. These are depicted as humans with a long curling fish tail. Nevertheless, a conical goblet in the collection of the British Museum (inv. no. S 391) (Fig. 1) shows four dolphins and four bearded men with a Phrygian cap, who are coming out from snail shells even if, at first sight, they may look like creatures of half-dolphin half-man form or mermen[18]. Similarly, two dogs, each coming out from a snail shell, are enamel painted on the neck of a *lattimo* jug, kept in the Toledo Museum of Art, Ohio (inv. no.1969.287) (Fig. 2)[19]. The latter is so interesting that it would deserve many remarks. Its shape is of eastern origin, as well as its Venetian denomination, *mastrapà*[20]. The quality of its glass material, *lattimo*, invented in Murano in 1450 ca., imitated Chinese porcelain, which was much in fashion in Europe. Indeed porcelain was well known in Venice, which, in that period, was the main European port of import for porcelain and the first porcelain vessel mentioned in a collection of the city is a tankard (*un bochal de porzenagya*, the same called *un bocal de porzelane* in another paper) belonging to Jacobello del Fiore, Venetian painter, and auctioned with other goods in 1439-1440[21].

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[18] Both interpretations are successively proposed by Hugh Tait. Tait 1979: 32, no. 12; Tait 1991: 158-159, fig. 200.

[19] Clarke 1974: 28, 41-43, 52-53; Page 2006: 83-85.

[20] Barovier and Tonini 2014: 9-13, fig. 3.

[21] Zecchin 1989: 348-349, note 10.

The body of the Toledo jug is enamel decorated by a frieze with mythological sea creatures, which are copied both from the *Battle of Sea Gods*, a print by Andrea Mantegna (1470-1480), and *Tritons and Nymphs*, a print by Girolamo Mocetto (early 16th century)[22]. The dogs painted on the neck seem to have no iconographic link with the frieze on the jug body (Fig. 3).

Timothy H. Clarke, who published all the enamelled *lattimo* vessels of the Venetian Renaissance known in 1974, was inclined to consider the dogs of the Toledo jug, enchained to each other, as heraldic figures, but they are most probably symbols of fidelity, as frequently chained animals are in works of art of the 16th century. For example, the roebuck painted on the verso of the portrait of Alvise Contarini (1485-1495) by Jacometto Veneziano, in the Lehman collection of the Metropolitan Museum of Art (inv. no. 1985.1.86), is chained to a stone with the Greek inscription AIEI (forever). The roebuck alludes to the fidelity between the nobleman portrayed on the recto and the lady of a paired portrait, kept in the same museum (inv. nr. 1985.1.85)[23]. Actually, the dog is the best symbol of fidelity, mainly between lovers, as some examples evidence. A Tuscan bas-relief in Museo Casa Rodolfo Siviero, Florence, dated 15th century, shows a Cupid keeping a dog on a chain. In the painting *Fidelity* (1485) by Francesco di Giorgio Martini, Sienese artist, belonging to the Norton Simon Museum of Pasadena (CA) (inv. no. F.1965.1,022.P), a young woman, embodying Faith, stands on a dog. This symbol was used for centuries so that in the *Self-Portrait before a Painting of «Amor Fedele»* (1655) by Francesco Barbieri, called Guercino, kept in the National Gallery of Washington (inv. nr. 2005.13.1), faithful love is symbolized by a Cupid keeping a dog.

Therefore, if the enchained dogs enamelled on the neck of the Toledo jug seem to be an usual symbol of fidelity, the snail shells, which they are coming out from, are more difficult to be explained.

The motif of a human or animal being, coming out from a shell,

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[22] The explanation of the frieze on the jug is not simple. Indeed, while two groups of figures from Mantegna are similar to the original print, two groups from Mocetto are reversed, probably because deriving from a printed copy of the original Mocetto print. Moreover, the frieze includes a satyr, inconsistent with a sea subject. The satyr may derive from another print, for instance the *Metamorphosis of Amymone* by the same Mocetto.

[23] Humfrey *et al.* 2004: 68-69, no. 6; Bayer 2008: 265-268, no. 123.

is rare in Venetian Renaissance art but it is recorded in two main works of the late 15th century and early 16th century. The capital of a pillar of the Eastern ground-floor arcade in the courtyard of the Ducal Palace shows a man holding a snake and coming out from a shell (Fig. 4). All the figurative reliefs of this capital are inspired by archaeological marbles, except for the one with the Lion of St Mark. The inscription «MARCHUS BARB D» (*Marchus Barbadicus Dux*, that is Marco Barbarigo Doge, who reigned from 19th November 1485 to 14th August 1486) proves that this capital was sculpted within the nine-month period when Marco Barbarigo was the Venetian doge. Here the man coming out from a shell might be an astrological symbol[24]. Moreover, also one of the four allegorical paintings on wood by Giovanni Bellini, which decorated a *restello,* a piece of furniture*,* belonging to Vincenzo Catena, pupil of Bellini himself, now in the Gallerie dell'Accademia, shows a man coming out from a shell and holding a snake[25].

As early as in 1871, Giovanni Battista Cavalcaselle and Joseph Archer Crowe perceptively commented these paintings: «The art is classic like that of an old cameo,...[it] reveals the study of the antiques treasured in the museums of Venetian palaces»[26]. Indeed, Greek and Roman engraved gems sometimes show unusual scenes, among which also animals coming out from snail shells. Animals much bigger than the real size of a snail shell, for example elephants, squirrels, rabbits, wolves, dogs. They may be allegorical figures but scholars generally include them in the genre of *grylli* or *grylloi,* caricatural and bizarre characters of Alexandrine origin[27]. Significantly, Charles William King, English collector and expert of ancient gems, wrote the following caption of a gem kept in his collection: «Elephant emerging from a small shell: surprise»[28].

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[24] Sperti 2007: 205, 208, fig. 16.

[25] The Venetian *restello* was a piece of furniture hang to the wall, which included a mirror, a shelf and hooks, fit to keep tools for personal care. Ludwig 1906: 185-262. A summary about the dating and interpretation of these Bellini paintings in: Bumbalova 2005: 249-276; Lucco and Villa 2008: 272-277. See also: Bordignon 2015: 255-276.

[26] Crowe and Cavalcaselle 1871: 170-171.

[27] The genre γρύλλος is generally connected with a passage of *Naturalis Historia* (XXXVI, 114) by Pliny, which mentions Antiphilus, a Greek painter of the age of Alexander.

[28] King 1872: 72, Pl. LVI. His collection is now kept in the Metropolitan Museum

The peculiar relief of the capital in the Ducal Palace and the intriguing painting by Giovanni Bellini, above mentioned, as well as the men coming out from snail shells, painted on the goblet of the British Museum, and the dogs coming out from snail shells, painted on the Toledo *lattimo* jug, might derive from ancient engraved gems, which were frequent in the collections of the Renaissance, in Venetian collections too.

Actually, ancient gems were already appreciated in early and late Medieval period when they were reused and applied to new jewelry works. Consequently the *grylloi*, depicted on such gems, were already known and sources of inspiration for Medieval decorative arts, notably for illuminations of manuscript codices. Animals, as well as human busts or heads, coming out from snail shells, are frequent among the frame decorations and *marginalia* of illuminated pages of French and Flemish Gothic codices, mainly dated from the early 14th century to the early 16th century[29]. Such figures belong to the category of *drôleries*, bizarre images, examples of a *monde renversé*[30]. French and Flemish illuminated codices were frequently purchased or commissioned by Italian personalities, so that they were important vehicles for the transmission of Northern iconography to Italy[31]. Therefore, the sources of inspiration for these strange motifs on Venetian enamelled glass vessels were, probably, ancient gems or, possibly, Flemish illuminations.

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of Art. Richter 2006: 110, Pl. LXI. Such scene is engraved in similar gems, such as one in the British Museum, one in Naples Museo Archeologico Nazionale (Farnese collection), another in the Correr Museum, Venice, and elsewhere.

[29] Among the later codices with these figures are the Book of Hours of Joanna I of Castile, dated 1486-1506 (British Library, Add Ms 18852), the Breviary of Guy de Castelnau-Bretenoux, dated 1511 ca (Morgan Library, MS M. 8), the so called Da Costa Book of Hours, dated 1515 ca (Morgan Library, MS M. 399).

[30] Directly from ancient gems or through illuminations derived also some reliefs decorating Gothic buildings in France, for instance the ones with a dog and a hare coming out from snail shells on the façade of Lyon Cathedral and a little devil or bat in the hall of Pas-perdus of the Palace of Justice in Rouen. Adeline 1878: 193; Bégule 1913: 61.

[31] For example, the famous and magnificent *Grimani Breviary* (Biblioteca Nazionale Marciana, Cod. Lat. I, 99=2138), dated to the first or second decade of the 16th century, was purchased for the enormous sum of 500 ducats by the Venetian Cardinal Domenico Grimani around 1520. Morelli 1800: 77-78, 226-229.

2. *The goblet of the Worshipful Founders' Company*

If we consider surviving enamelled vessels of the Venetian Renaissance, the piece which shows the most enigmatic decoration is the magnificent goblet housed in the seat of the Worshipful Company of Founders, one of the old livery companies in the City of London (Fig. 5)[32]. Founders were workers in brass and brass alloys or tinplate, known as *latten* or *laton*, producing small cast articles such as candlesticks and pots and pans. On the 1st August 1644 Richard Weoley (1584-1644), master of the Company in 1631 and 1640, bequeathed to the Company the goblet, probably as Donatio Mortis Causa, dying a few days later. He declared that the glass had been brought, being part of the pillage, by a Yeoman of the Crown from "Bullen" [Boulogne], when the French city had surrendered to Henry VIII in 1546. The cup remained in the Yeoman's family until Weoley purchased it. In his will, Weoley stated that the retiring master must drink from this goblet to his newly elected successor every year. Therefore, since the 17th century, this «glase coope with sillver futte gillt, the gifte of Richard Weoley» has been traditionally used[33].

The lower part of the stem and the foot of this goblet were broken very early, perhaps during or just after its transfer to England. Therefore, they were replaced with a gilt silver mount, which shows the London hallmark for the years 1547-1548. This is consistent with the tradition of its 1546 origin from Boulogne[34].

The flat bottom of the ogee-shaped bowl is surrounded by a pincered and frilled trail. The upper part of the stem, still existing, is separated by a merese from the bowl and it consists in two blown ribbed knops. Probably, another lower similar knop is covered by the gilt silver mount.

The Founders' goblet is similar to other well-known enamelled

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[32] We thank Mr. Andrew Gillett, Clerk Emeritus, for showing us the goblet and permitting us to photograph it in 2007. He gave us important information about Richard Weoley and the Weoley cup in his letter of the 23rd November 2007.

[33] Meade Williams 1867: 247-248, coloured plate. Hippocras was a drink made from red wine mixed with sugar and spices.

[34] Charleston 1984: 45, pl. 9a; Liefkes 2003: 208; Kerssenbrock-Krosigk 2009: 523-524.

pieces, such as a goblet with enamelled young and older tritons in the V&A Museum (Figs. 6 a,b)[35], a goblet with enamelled winged *putti* in the Corning Museum of Glass[36] and a goblet in the Waddesdon Manor collection[37]. Another piece, once kept in the City Museum, Dresden, belonging to this group, is very important, because dated 1511. It was decorated with the arms of the Bohemian Georg Kopidlnansky von Kopidlna[38]. The shape of these goblets, which can be dated to the period 1500-1520, is the evolution of a type already produced in the 15th century, which is distinguished by the straight, almost vertical, wall of its cup. This older type is depicted by Giovanni Boccati, in the *Virgin nursing the Child*, dated within the seventies of the 15th century, now in the Galleria Nazionale dell'Umbria. The Boccati goblet resembles the goblet kept in Berlin Kunstgewerbe Museum, decorated with scenes derived from the Genesis book of the Bible[39]. Known since the year 1840, it may be dated to late 15th century, if its authenticity will be confirmed.

The goblet of the Worshipful Founders' Company is decorated, along the border of its cup, with a band of gold and blue enamel scales and, above and below, series of white enamel dots. The main decoration is a continuous scene with three figures, riding sea horses, interspersed with *candelabra* which look like altars. The figures are a king and two naked youths, the latter only wearing boots (Figs. 7-10)[40]. The naked figures actually are young men, as Reino Liefkes correctly writes, not *putti*, as Robert J. Charleston supposes. Indeed, they have the same size as the king and they show body features different from the ones of the *putti* depicted on Venetian enamelled glass of the Renaissance.

On each flat altar top, from which flames rise, is set a skull. Two torches are placed on both sides of two of the three altars. The altars are

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[35] Barovier and Tonini 2013: no. 9. This goblet has an unusual plain foot which is too flat and results to be a later addition, together with the lower part of the stem, probably a newly made foot in the 19th century. Therefore this goblet is an hybrid; Navarro and Higgott 2014: 71. We thank Juanita Navarro for her advise.

[36] Charleston 1980: 84-85. This goblet has a ribbed foot.

[37] Charleston and Archer 1977: 87-90. This goblet has a plain foot.

[38] Schmidt 1911: 277-278; Saldern 1965: 32-33. This goblet has a ribbed foot.

[39] Dreier 1989: 38-41.

[40] Charleston 1984: 45, pl. 9a; Liefkes 2003: 208.

surely *memento mori* images. They are inspired by a print of Giovanni Antonio da Brescia, dated 1490-1507 (Fig. 11), which belongs to a set of prints of decorative ornaments, made for craftsmen working in all fields of decorative arts[41]. Craftsmen, like enamellers on glass, did not generally use, as sources of inspiration, the whole compositions of the prints, but only some elements of them. The *prothyrum*, dated 1500 ca, of Santa Maria dei Miracoli Church in Brescia is decorated by complex marble bas-reliefs. One of them shows an altar with flames and a skull and it clearly derives from the above-mentioned *memento mori* print by Giovanni Antonio da Brescia (Fig. 12)[42]. From the same *memento mori* print derives a wood inlay by Fra Damiano Zambelli da Bergamo, dated 1528-1530, in San Domenico Church, Bologna. This panel is included in the Presbytery inlaid dossal between the inlaid depiction of the head of St Dominic and the one of St Peter[43].

The *memento mori* allegory is complex and enigmatic because of the three handsome men riding sea horses, who apparently contrast with the altars, symbols of death. Such contrast between carefree life and death, actually, recalls the *Legend of the three living and the three dead*. This story, whose origins are somewhat mysterious[44], was known, in many versions, through French poems and paintings (also illuminations), since the 13th century[45]. The basic version concerns three young noblemen who are hunting and suddenly come across three corpses, which are in varying states of decay but, generally, still animated. The latter admonish the three youths to consider the transience of life and to improve their behaviour before it is too late. Life, in this story, is always happy and attractive, therefore the three living generally are not only young and handsome but also members

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[41] British Museum, inv. 1870, 0514.383. Also the inscriptions included in this print refer to death.

[42] Another bas-relief of Brescia *prothyrum* is supposed to derive from a print of the same set by Giovanni Antonio da Brescia. For this bas-relief see: Ceriana 2002: 79-80, figs. 14-15.

[43] Alce 2002: 34, 37-38. The heads of beheaded saints, set on plinths and footed dishes, are most probably inspired by the head of St John the Baptist set on a bowl, depicted in Medieval and Renaissance Herod's Banquets.

[44] Perhaps they are eastern origins. Baltrušaitis 1997: 45.

[45] Glixelli 1914: *passim*.

of the highest level of the society. Among them are often portrayed a king, an emperor, a pope.

In Italy too, the *Legend of the three living and the three dead* was the subject of paintings, mainly fresco paintings, since the 13th century[46]. Quite near Venice are a fresco painting in Santa Maria in Sylvis Church at Reghena (Pordenone), dated to the middle 14th century, and another in San Fermo Church, in Verona, dated to the early 15th century. A drawing by Jacopo Bellini (1400 ca - 1470/71), included in his sketch-book kept in the Louvre, is much more noteworthy because he was the founder of an important workshop and the chief of the most influential Venetian artistic family of the 15th century and early 16th century, until the death of Giovanni, one of his sons, in 1516. The subject of his drawing (inv. no. RF 425) is the scene of the *Three living and the three dead,* with three youths riding horses and a monk showing them three corpses in open sepulchres. The Louvre book by Jacopo, dated 1430-1450, as well as a later sketch book, kept in the British Museum, was inherited by his son Gentile Bellini and used in the workshop he ran after the death of his father.

Probably the enamel painted scene on the cup of the Weoley goblet is an allegorical version of the *Legend of the three living and the three dead*, where the altars substitute the macabre corpses, while the knights are still handsome and young. But with a difference: the horses are sea horses and two of the knights are naked. These details might be connected with the antiquarian interests of Venetian artists and collectors in the 15th and 16th century, as nudes and sea horses were among the usual figures in works inspired by ancient marbles.

Indeed, in the first two decades of the 16th century, when most probably the Weoley goblet was made in Murano[47], the topic of the *Three living and three dead* was going out of fashion. Therefore, artists began to find subtler and less direct ways to inspire meditation about life's caducity and death[48]. Following this trend, a century later, in

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[46] Settis Frugoni 1967: *passim*. Pantani 2005: 111-124. www.storiadelmondo.com/42/fornari.incontro.pdf.

[47] Such dating is based on the style of painting as well as on the comparison with other goblets of the same shape, mainly the Kopidlnansky goblet.

[48] Pantani 2005: 121.

1618-1622, Giovanni Francesco Barbieri, called Guercino, devised the famous *Et in Arcadia ego* painting, where two shepherds look at a sarcophagus in an idyllic pastoral background. A skull is set on the flat top of the marble tomb, which bears the carved inscription: *Et in Arcadia Ego* (I [death] am also in Arcadia). It introduced a new genre of *Memento mori*, which, however, was still based on the contrast between carefree life and death.

3. *The goblet with hybrid beings*

The goblet (Figs. 13, 19), belonging to Muhleib glass collection, was auctioned at Bonhmas (London) in 2013 and is, currently, kept in a private collection. It has been ascribed to the Venetian glass production of the early 16th century[49]. Its trumpet-shaped foot is directly attached to its large bowl, whose flat bottom is surrounded by a pincered frilled trail, partially enamelled. This bottom form characterizes several colorless goblets decorated with enamelled. Similar shaped goblets were in production in the first half of the 16th century as attested by some examples. A such specimen is housed in the Musée des Arts Décoratifs, Paris, bearing the coat of arms of Pope Leone X de' Medici (1513-1521) or Clemente VII de' Medici (1523-1534)[50]. Another is kept in the Rothschild collection of Waddesdon Manor painted with the Sergardi family coat of arms, surmounted by an ecclesiastic hat (Fig. 14), suggesting that it belonged to a cleric, identified with Filippo di Giovanni Sergardi (?- 1502/03) by Robert J. Charleston[51]. Despite this attribution, another member of this influential Sienese family, Filippo di Niccolò Sergardi (1466-1536), has to be taken into account as a potential recipient of the Waddesdon Manor goblet. Both of them, Filippo di Giovanni and Filippo di Niccolò, were clerks of the Camera Apostolica, the financial and administrative body of the Roman Church. The former held this role during the pontificate of Pope Alessandro VI

[49] Sheppard 1991: 62.

[50] Baumgartner and Olivié 2003: 28-30, no. 1.

[51] Charleston 1977: 82-86. For Filippo di Giovanni see also: Ugurgieri Azzolini 1649: vol. I, 113-224; Baker-Bates 2017: 35-36.

Borgia (1492-1503) and the latter during Giulio II della Rovere (1503-1513), Leone X de' Medici (1513-1521) and Clemente VII de' Medici (1523-1534) papacies. Filippo di Niccolò Sergardi played an important role as the chief executor of Agostino Chigi's estate, a powerful Sienese banker and munificent patron who commissioned the Villa Farnesina in Rome to Baldassarre Peruzzi. Filippo came close to becoming cardinal twice and, although he did not succeed, he had an influential role in Vatican. Moreover, he ordered works of art to established artists in his home town, Siena, and in Rome[52]. Most likely, the goblet belonged to Filippo di Niccolò Sergardi which was a powerful personality in the Roman Curia and had strong ties with eminent families living in Rome, such as the Colonnas and Chigis. Therefore, this goblet might be dated from the early 16th century until the year 1535. Furthermore, this kind of Venetian goblet was still in fashion in the fourth decade of the 16th century as attested by a similar kind of colorless glass goblet with gilt frieze, painted by Albrecht Altdorfer in *Lot and his daughters* (Wien, Kunsthistorisches Museum), dated 1537 (Fig. 15). Among goblets with a similar form, one, housed in the Jagiellonian University Museum in Krakow, is decorated with the coat of arms of the Jagiellons, Grand Dukes of Lithuania and kings of Poland (Fig. 16)[53]. Probably, it belonged to Alexander Jagiellon (r. 1492-1506). Other similar shaped goblets with different decorations are known: one, painted with centaurs (Kunstmuseum den Hague); another example with rays and scales, was recovered from archaeological excavations in Bratislava's castle, in Moravia, dated to the first half of the 16th century[54].

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[52] Ugurgieri Azzolini 1649: vol. I, 225, 322; Barbieri 2014: 155-161; Baker-Bates 2017: 35-62. Filippo di Niccolò Sergardi ordered to Pinturicchio a work for his chapel in the Church of San Francesco, Siena, which was destroyed later in a fire. Filippo was one of the most consistent patrons of the Venetian artist Sebastiano del Piombo and, before his death, he commissioned to him a mural painting, *The Visitation*, for the church of S. Maria della Pace, Rome, which was detached and dismembered before 1614; the surviving fragments are kept in Alnwick Castle, Northumberland.

[53] We thank Suzanne Higgott, London, Wallace Collection and Beata Frontczak, Krakow, Museum Collections, The Jagiellonian University Museum, Collegium Maius. The goblet was auctioned in Rome coming from Alessandro Castellani collection, see *Catalogue* 1884: 209, fig. 406; Molinier 1889: 187. For the attribution of the coat of arms to Alexander Jagiellon see his seal, dated 1503: Piech 2003: 103-106, fig. 16.

[54] Kunstmuseum den Hague, inv. no. 0723492; Sedláčková *et al*. 2016: 355, fig.

The foot of the Bonhams goblet is enamelled with blue, red and yellow gadroons. A decorative motif which is found on other Venetian glass vessels of the first and second decades of the 16th century. The bowl of the goblet is decorated with a peculiar subject, a monstrous creature with a human torso, a long animal neck with a muzzle and a beak, similar to a crane head, depicted on both sides. It is, therefore, a hybrid creature, part human and part animal with wings, represented as natural leaves, and a long animal tail. Hybrids with long tails, such as mermen, are depicted on Venetian enamelled glass vessels of the Renaissance, such as the Toledo jug and a goblet in the Victoria & Albert Museum, both of them just discussed above (Figs. 2, 6 a,b). These creatures belong to the classical mythology. They were in fashion during Renaissance times and they were included among *all'antica* themes which were appreciated by patrons and clients in the artworks of the period. Hybrids and monstrous creatures were also proliferating in early Renaissance illuminated manuscripts and, later, in some frescoes with grotesque decorations[55]. In a few cases, these motifs may be found on Renaissance glass vessels such as on a goblet (Fig. 17), kept in the Kovacek Gallery, Wien, which is identical, as to its form, to the Founders' one (Fig. 5). The former vessel is painted with dragons showing human upper body. These hybrids, whose bodies come out from vegetal scrolls which are held in their human hands, are depicted alongside monkeys. Monsters, similar to chimeras or hybrids, are found in some Renaissance 'grotesque' ornamentations. Animals, both real and imaginary, and human beings, portrayed among natural scrolls, are some of the features of 'grotesque' decorations. Woodcuts are some of the mediums for the widespread dissemination of 'grotesque' patterns. A dragon, with long neck, similar to the ones depicted on Kovacek's goblet, is engraved, next to a monkey and natural scrolls, in a woodcut made by Giovanni Antonio da Brescia, formerly known also as Zoan Andrea, dated

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2; 368, photo 1; 371. Others, with a knop in the stem and with the coat of arms of the Slovakian town Bardejov are known, some of them are in Bardejov, Sarisske Museum, Slovakia, inv. no. H712; H713.

[55] Toniolo 2016: 37, 47-53; Chastel 1989: 17; Caneva and Carpaneto 2001: 210-211.

1510-1520, kept in the British Museum (inv. no. 1970, 0714.1) (Fig. 18). His engravings contributed to the widespread use of 'grotesque' motifs in the decorative arts of the period.

Another hybrid, half man and half animal, is depicted on the Bonhams goblet (Figs. 13, 19). Although it derives from the above-mentioned models, it evidences a peculiar aspect of the Renaissance world: the interest and the fascination for monstrous races thought to live in far-away lands, i.e. exotic creatures, and for the unknown and otherness. This topic began to flourish in the ancient world and then, through Medieval times, reached the Renaissance, the period in which our goblet was painted. Monsters and hybrids living in exotic lands are recorded, first of all, by Plinius in his *Naturalis Historia* (77 A.D.) and in several Medieval literary works, such as *De Universo* (844 A.D.) by Rabanus Maurus, *Marvels of the East*, written in English around 1000 A.D., *Buch der Natur* of Conrad von Megenberg (14th century) and the chronicles of the travels and adventures of Alexander, the Great, based mainly on *Historia de preliis* (10th century) by Leo Arciprete. These manuscripts continued to be in favor also during early Renaissance times as documented by some illuminated versions of them[56]. Among monstrous creatures, headless human beings with faces incorporated in their chests, dog-headed men, six-armed creatures, one-eyed men and other hybrids are depicted in these illuminated manuscripts. These imaginary races are sometimes portrayed together with hairy wild men and located in exotic countries, very often in Africa which was considered a «land of monsters» and «portents». Despite the increasing exploration of this continent in the 15th and 16th century, this concept of Africa continued to be in favour, nourished by invented travels such as the *Marvel of the East*[57]. It became part of the collective imaginary considering Africa as a place full of mystery, unexplored and unknown.

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[56] For instance Rabanus Maurus, *De Universo*, illuminated manuscript kept in the Apostolica Vaticana Library of Rome (Pal. Lat. 291), dated 1425; *Buch der Natur* of Conrad von Megenberg (ca. 1350, New York, The Pierpont Morgan Library, PML 135); *Marvels of the East*, written around A.D. 1000 (New York, The Pierpont Morgan Library, M. 461, 1450-1500); *Historia de preliis,* illuminated manuscript in the British Library, London, MS 15 E vi, 1444-1445 ca.). Husband 1980: 6-7, 39-47, 51-53.

[57] Leon Battista Alberti, «Teogenio» (1440 ca.), see Bonucci 1845: 207; Benzoni 1986: 94-95; Perocco 1986: 71, 91.

A similar vision of Africa, as a land of monstrous creatures, was in favour also in Venice, i.e. in a world map, dated 1436, signed by Andrea Bianco, a Venetian experienced ship master and navigator of merchant galleys. In his *mappamundi*, part of a nautical atlas, *L'Atlante*, kept in the Libreria Marciana, Venice (inv. no. MS. IT Z, 76), Bianco located hairy wild men and monstrous races, such as the dog-headed creatures, in Africa and the headless men (*omine[s] q[ui] no[n] ab[ent] capides*) in India. Hairy wild men were also portrayed in some Venetian sculpted works. Two of which, dated to the late Gothic period, are still displayed on the façades of two buildings: a high relief on Casa Brass in Campo San Trovaso and a statue in the round on Ca' Bembo, in Campo S. Maria Nova, former house of Gianmatteo Bembo, nephew of cardinal Pietro Bembo[58]. Nevertheless, Fra Mauro's world map (1460), one of the most important documents of the Venetian cartography before the discovery of America, shows a different approach. Despite the opinion of illustrious cosmographers and erudite men, Fra Mauro, friar of the convent of San Michele in Isola (Venice), who compiled this world map, is doubtful about the presence of monstrous men and animals in Africa[59]. His thought, revealing a more rational approach, was, probably, almost marginal, in the 15th century. On the contrary, other sources, considering Africa as a land of monstrous creatures, had a peculiar spread in Venice and Italy, in this period. Among them, the *Liber Chronicarum* or *Weltchronik*, enriched by woodcuts, published in Nuremberg in 1493 by Anton Koberger, conceived by Hartmann Schedel, a physician and historian, was probably known by artists and decorators. This chronicle, edited in Latin and German, is a compendium of geography, history and

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[58] Rizzi 2014: 471, 321.

[59] «Perché sono molti cosmographi e doctissimi homeni i qual scriveno che in questa affrica, maxime ne le mauritanie, esservi molti monstruosi homeni e animali, parme neccessario qui notar el parer mio, non perhò che io vogli contradir a le autorità de tanti, ma per dir la diligentia ho habuta in inquirir tute le novità se à possudo investigar per molti anni de questa affrica, ... e per tuti queli regni de negri non trovi mai alguno me ne sapesse dar aviso de quelo io trovo scripto da queli; vunde non ne sapiando altro non ne posso testificar, lasso a çerchar a queli che sono curiosi de intender tal novitade»; https://pdfslide.net/documents/mappamondo-di-fra-mauro-ca-1450.html visited in 2/6/2020; https://engineeringhistoricalmemory.com/?fbclid=IwAR332j visited in 29/02/2020.

wonders of the world, through seven ages beginning with the Creation of the world and ending with the Habsburg empire of Maximilian I. The second age (*Secunda Etas Mundi*), corresponds to the end of the Biblical Deluge when some monstrous races appeared. Depictions of these races are engraved in two pages of the *Liber Chronicarum*, some of them are depicted next to a Ptolemaic map (Fig. 20a)[60]. Among them, a dog-headed man, a headless man, a hairy wild woman, a man with six fingers on each hand, a Hermaphrodite, half woman and half man, a Cyclops with a single eye, a man with a hanging under lip, all of them often portrayed in Medieval and Renaissance illuminated manuscripts, are also depicted. Moreover, a hybrid, a man with the head of a bird, which is the crane-head man, is portrayed in the same folio of the Ptolemaic map in the *Liber Chronicarum*, similar to the one depicted on the Bonhams goblet (Fig. 20b). This monstrous being is more rarely described or shown than others above mentioned. Schedel located him in Africa, in Eritrea (*Eripia*). These fabulous hybrids have been previously recorded in German Medieval epic manuscripts *Herzog Ernst B* and *Herzog Ernst G*, concerning the journey of the Duke Ernst of Bavaria to the East[61].

In Medieval times these monstrous races and hybrids were subjected to moralistic interpretations or seen as warning signs. On the other hand, during the Renaissance, they became subjects of curiosity and they were interpreted as portents and wonders of the human body. This idea is expressed in the *Prodigiorum ac Ostentorum Chronicon*, conceived by Conrad Lycosthenes and published in Basel in 1557, which contains a list of human prodigies and portents, located in some areas of the world. Some woodcuts of *Prodigiorium* are punctually derived from Schedel's chronicle as are the descriptions

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[60] Humphreys 1868: 170-171, tav. 61; Husband 1980: 48-50.

[61] The first version of this epic is dated to the last decades of the 12th century and others editions were issued in the late Medieval and Renaissance periods. The German duke travelled to the East where he encountered several monstrous races. Among them, crane-heads, living in a land called Grippia: Stock 2017: 391-394, fig 1. Crane-men are, also, recorded in a later medieval collection of European chronicles: the *Gesta Romanorum* (Deeds of the Romans). The men with crane heads, mentioned in this chronicle, are no longer described as exotic figures but as beautiful European men; *Gesta Romanorum* 1824: vol. II, 381.

of some races such as the one concerning the crane man[62]. Also Ulisse Aldrovrandi (1522-1604), a professor of natural sciences at Bologna University, who assembled one of the most comprehensive cabinets of curiosities from the natural world, shows an interest towards portents and monsters. These creatures are documented in several woodcuts, some of them made in 1585 by Giovanni Battista de' Cavalieri, an artist from Trent and active in Rome. Among them, one shows a crane head man, living in Africa, and another a griffon head man with a long neck, living in Tartaria[63]. Aldrovrandi, in his publication, *Monstrorum historia* (1642), published after his death, expressed some doubts about these monstrous creatures. Indeed, after a punctual description of «homines oblongi colli» (men with long neck), he concludes «Id iuvabit magis legere, quam credere» (it is worth reading this but not believing it), showing a more rational opinion, similar to the one expressed by Fra Mauro, a century earlier [64].

Nevertheless, Schedel's *Liber Chronicarum* contributed to the idea of monstrous races living in exotic countries, such as Africa and Asia. Its relevant widespread, after its publication in 1499, was also quite consistent in Venice. Indeed, Anton Kolb, a Nuremberg merchant, resident in Venice, received thirty-four copies (twenty-four in Latin and ten in German) of this book from the Nuremberg publisher Koberger, before 1499; he sold half of them[65]. The price of this publication is considered quite high in comparison to other publications sold in the Venetian market at that time. Being an expensive commodity, it is

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[62] Lycosthenes 1557: 8. Partially based on the classical work of the Roman writer Julius Obsequens (IV A.D.) and on Sebastian Münster's Cosmographia (1544) see Bates 2005: 15, 65-70.

[63] These woodcuts, in addition to others, are currently housed in the University of Bologna (Fondo Ulisse Adrovrandi, Animali) and were kept by Aldrovrandi in wardrobes named «Pinachoteche»: Olmi 1992: 54, 46-47; Antonino 2004: 246, 48. University of Bologna (Fondo Ulisse Aldrovrandi, Animali, vol. VI, c. 53, p. 198). Some Cavalieri's engravings are kept in an album printed in Rome in 1585, *Opera nela quale vie molti Mostri de tute le parti del mondo antichi et moderni,* housed in the British Museum, Department of Prints and Engravings, inv. nos. 1841,0509.249; 1846,0509.249 to 270. Antonino 2004: 246, 48.

[64] Aldrovrandi 1642: 12, 14.

[65] We thank David Landau to draw this information to our attention. Landau and Parshall 1994: 43; Wilson 1976: 46; Oakes 2006: 132.

supposed that the buyers belonged to a wealthy and cultured élite. Among the Venetian readers of the *Liber Chronicarum*, we have to mention a friar of San Giorgio Maggiore convent, Giovanni Antonio, pupil of the renowned philosopher Paolo della Pergola (died 1455). A handwritten note, concerning glass history, written by him was stitched to a copy of Schedel's publication[66].

Some woodcuts of the *Liber Chronicarum*, portraying monstrous creatures, were used as models by decorators and artists of the 16th century in Italy. For instance, the painter of the Bonhams goblet as well as Antonio Bazzi, called il Sodoma, an Italian artist active in Central Italy, were certainly inspired by this source. Sodoma painted some frescoes in the convent of Monteoliveto (Siena), in 1505-1508, with the stories of Saint Benedict. In the *grotesque* decorations, that frame these frescoes, Sodoma introduces, among the peopled scrolls, exotic races which are clearly inspired by some woodcuts of the second age of Schedel's chronicle (Fig. 21). In particular, he painted a headless man, a Cyclops, a dog-headed man, a six-armed man, a man with a hanging under lip and one a crane man which has some link with the Bonhams hybrid. It was common to introduce, in the Italian painted ornament of this period, the oddities (*bizzarie)* coming from the North. These have been depicted, primarily, in the borders of illuminated manuscripts and in some paintings of the Flemish artists[67] of the 15th century to the early 16th century. Therefore, the spread of these hybrids and monsters in the Italian Renaissance figurative culture of the 16th century seems quite consistent.

Besides Schedel's publication, which was circulating in Venice,

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[66] The transcription of the note, made by Sante della Valentina, was found and kept by Emmanuele Antonio Cicogna and it is today housed in the library of Museo Correr, Venice: Segarizzi 1916: 656; Zecchin 1987: 202-203. The reason of the note of the friar was that Schedel did not mention his master, Paolo della Pergola, who was dean of San Giovanni Elemosinario Church and the director of the school of philosophy, Scuola di Rialto, founded by the Venetian republic in 1408 ca. Della Pergola was strictly linked to Angelo Barovier, the recognized glass master of *vetri cristallini*, who attended his lessons. In the same note, the friar also reported information regarding two significant families among Murano glassmakers, the Baroviers and the Ballarins.

[67] Chastel 1989: 41-42. See note 31 for the spread of Flemish illuminated codex in Italy.

other sources might have inspired the decorator of the Bonhams goblet (Fig. 19). A woodcut with *Saint George and the Dragon*, attributed to 'Master I.B. with the bird' (Giovanni Battista Palumba?), possibly of Lombard origin, regarded as his earliest work and datable perhaps to 1500[68], shows in the rendering of the dragon some similarities with the monster depicted on our goblet (Fig. 22). In this engraving a hybrid is portrayed: the upper part of the body is clearly human-like while the lower part of the body belongs to a beast with paws, claws and a long tail. Moreover, his arms, transformed in wings, the long neck and the muzzle belongs to a monstrous animal. Therefore, an unusual representation of the dragon as a hybrid which, customary, in the history of Saint George, is just an imaginary animal. Woodcuts were used as a source of inspiration, by decorators of glass and maiolica in the Renaissance. Indeed, some punctual comparisons between the woodcut with *Saint George and the Dragon* and a maiolica dish confirms this use. The dish, part of a wider set, housed in the Edinburgh National Museums, is attributed to Nicola da Urbino (Fig. 23)[69]. It is decorated with the coat of arms of the Calinis, a wealthy Brescian family, and Saint George fighting the dragon to save the princess. It clearly shows, in the depiction of the dragon, its derivation from the abovementioned woodcut. The connection between this maiolica dish and the woodcut was proposed by James Byam Shaw, in 1932, who attributed the plate to Nicola Pellipario, who at that time was wrongly identified as Nicola da Urbino[70]. Another Italian outstanding maiolica piece, *Leda and the Swan*, made by the famous maiolica maker Francesco Xanto Avelli (Urbino), dated 1530 ca, also,

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[68] *The Illustrated Bartsch* 1984: vol. 25 (formerly 13 - Part 2), 138-139; Levenson *et al*. 1973: no. 160.

[69] Curnow 1992 :59-63, no. 62.

[70] Shaw 1932: 19-25, figs. D-E. The figurative source put forward for this dish in the maiolicas catalogue of National Museums of Scotland, see Curnow 1992, is not the I.B. Master's engraving, which is not mentioned, but a painting by Raphael, *St. George and the Dragon* (National Gallery Washington, Mellon Collection). The latter, instead, most surely inspired another maiolica dish, housed in the National Museums of Scotland, Edinburgh, made by Alfonso Patanazzi workshop, Urbino, in the early 17th century (inv. no. A.1871.7.4).

shows a hybrid creature[71]. Indeed, in addition to Leda and the swan, as it is customary, the decorator portrayed Jupiter's metamorphosis, the result of which is a hybrid with the head of a swan and a human body.

Therefore, hybrids and monsters were part of the Renaissance culture. The patron, who ordered the goblet with a crane head man, participated in the imagery of his time, which was fascinated by the otherness, the unknown and the exotic, suggesting the idea of monstrous races living in far-away lands.

REFERENCES

Adeline, Jules. 1878. *Les sculptures grotesques et symboliques (Rouen et Environs)*. Rouen: E. Augé.

Alce, Venturino. 2002. *Il coro intarsiato di San Domenico in Bologna*. Bologna: Edizioni Studio Domenicano.

Aldrovrandi, Ulisse. 1642. *Monstrorum Historia cum paralipomenisi historiae omnium animalium*. Bologna: Nicolai Tebaldini.

Antonino, Biancastella. 2004. *Animali e creature mostruose di Ulisse Aldrovrandi*. Milano: Federico Motta.

Baker-Bates, Piers. 2017. *Sebastiano del Piombo and the World of the Spanish Rome*. New York: Routledge.

Baltrušaitis, Jurgis. 1997. *Il Medioevo fantastico. Antichità ed esotismi nell'arte gotica*. Milano: Adelphi.

Barbieri, Costanza. 2014. Le «Magnificenze» di Agostino Chigi. Collezioni e passioni antiquarie nella villa Farnesina. *Atti della Accademia Nazionale dei Lincei. Memorie* Anno CDX, serie IX, vol. XXXV, fasc. 1 (2013).

Barovier Mentasti, Rosa, Luciano Borrelli and Cristina Tonini. 2019. Venetian conical goblets of the Renaissance. *Journal of Glass Studies* 61: 157-195.

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 A.B. Spada and E. Lucchesi Ragni. Brescia: Grafo.

Barovier Mentasti, Rosa and Cristina Tonini. 2013. *Fragile: Murano chefs-d'oeuvre de verre de la Renaissance au XXI^e siècle.* Paris: Gallimard and Musée Maillol.

[71] Paolinelli and Wilson 2019, no. 63.

Barovier Mentasti, Rosa and Cristina Tonini. 2014. Tools to Study Glass: Inventories, Paintings and Graphic Works of the 16th. In *Study Days on Venetian Glass. Approximately 1600's*, edited by R. Barovier Mentasti and C. Tonini. Venezia: Istituto Veneto di Scienze, Lettere ed Arti: 3-41 (*Atti dell'IVSLA* 172/1, 2013-2014, Classe di scienze fisiche, matematiche e naturali).

Bate, Jonathan and Dora Thornton. 2012. *Shakespeare: Staging the World*. London: British Museum Press.

Bates, Alan W. 2005. *Emblematic monsters: unnatural conception and Deformed Births in Early Modern Europe.* Amsterdam-New York: Rodopi B.W.

Baumgartner, Erwin and Jean-Luc Olivié. 2003. *Venise et Façon de Venise. Verres Renaissance du Musée des Arts Décoratifs*. Paris: Union centrale des Arts Décoratifs.

Bayer, A., ed. 2008. *Art and Love in Renaissance Italy.* New York - New Haven and London: The Metropolitan Museum of Art -The Yale University Press.

Bégule, Lucien. 1913. *La Cathédrale de Lyon*. Paris: Henry Laurens.

Benzoni, Gino. 1986. L'Africa Affabulata. In *Africa. Storie di viaggiatori*. Milano: Nuovo Banco Ambrosiano.

Biringuccio, Vannoccio. 1540. *De la Pirotechnia, Libri X.* Venice: per Curtio di Navò et Fratelli, al Segno del Lion.

Bonucci, A., ed. 1845 [1440 ca]. *Opere volgari di Leon Battista Alberti*. Firenze: Tipografia Galileiana.

Bordignon, Giulia. 2015. Un possibile modello archeologico per le tavolette di Giovanni Bellini. Nota per una fuga dall'iconologia. In *Pietre di Venezia. Spolia in se spolia in re.* Atti del convegno internazionale (Venezia, 17-18 ottobre 2013), edited by M. Centanni and L. Sperti. Roma: L'Erma di Bretschneider: 255-268.

Bumbalova, Laura. 2005. Circolo vizioso e circolo metodologico dell'interpretazione critica: l'esempio delle cinque tavolette allegoriche di Giovanni Bellini delle Gallerie dell'Accademia di Venezia. In *L'originale assente. Introduzione allo studio della tradizione classica*, edited by M. Centanni. Milano: Bruno Mondadori: 249-276.

Caneva, Giulia and Giuseppe M. Carpaneto. 2011. *Raffaello e l'immagine della natura. La raffigurazione del mondo naturale nelle decorazioni delle Logge Vaticane*. Milano: Silvana Editoriale.

Catalogue des Objects d'art, antiques, du Moyen-Age et de la Renaissance dépendant de la succession Alessandro Castellani Rome. 1884. Paris: L'Imprimerie de l'Art.

Causa Picone, Marina. 1967. *Vetri a San Martino*. Napoli: l'Arte Tipografica.

Cecchi, Alessandro and Carlo Gasparri. 2009. *La Villa Médicis*. Vol. 4. *Le collezioni del cardinale Ferdinando. I dipinti e le sculture*. Rome: Académie de France à Rome - École Française de Rome - Académie des Beaux-Arts.

Ceriana, Matteo. 2002. Il santuario civico della Beata Vergine dei Miracoli a Brescia. *Annali di architettura* 14: 73-92.

Charleston, Robert J. 1977. Glass. In *Glass and Enamels. The James A. de Rothschild Colletion at Waddesdon Manor*. London-Fribourg (CH): The National Trust for Places of Historic Interest or National Beauty - Office di Livre: 11-280.

Charleston, Robert J. 1980. *Masterpieces of Glass. A World History from the Corning Museum of Glass*. New York: Harry N. Abrams.

Charleston, Robert J. 1984. *English Glass and the glass used in England, circa 400-1940*. London: George Allen and Unwin.

Chastel, André. 1989. *La grottesca*. Torino: Einaudi.

Clarke, Timothy H. 1974. *Lattimo* - A Group of Venetian Glass Enameled on an Opaque-White Ground. *Journal of Glass Studies* 16: 22-56.

Cozza, Francesco. 2011. Le memorie trasparenti: i vetri. In *Le Memorie ritrovate del monastero di Santa Chiara di Cenna Nova a Padova*, edited by F. Cozza. Casalserugo (PD): Nuova Grafotecnica: 93-99.

Crowe, Joseph Archer and Giovanni Battista Cavalcaselle. 1871. *A History of Painting in North Italy, Venice, Padua, Vicenza, Verona, Ferrara, Milan, Friuli, Brescia, from the fourteenth to the sixteenth century*. Vol. 1. London: John Murray.

Curnow, Celia. 1992. *Italian Maiolica in the National Museums of Scotland*. Edinburgh: National Museums of Scotland.

Dreier, Franz Adrian. 1989. *Venezianische Gläser und Façon de Venise. Kunstgewerbemuseum Berlin*. Berlin: Staatliche Museen Preussischer Kulturbesitz.

Du Cange, Charles. 1885. *Glossarium mediae et infimae latinitatis*. Paris: Firmin Didot.

Gesta Romanorum or entertaining moral stories translated from Latin by rev. Charles Swan. 1824. London: J. and G. Rivington.

Glixelli, Stephan. 1914. *Les cinq poémes des Trois Morts et des Trois Vifs*. Paris: Éduard Champion.

Humfrey, P., T. Clifford, A. Weston Lewis and M. Bury, ed. 2004. *The Age of Titian. Venetian Renaissance Art from Scottish Collections.* Edinburgh: Trustees of National Galleries of Scotland.

Humphreys, H. Noel. 1868. *A History of the Art of Printing from Its Invention to Its Wide-spread to its Development in the middle of the sixteenth century*. London: Bernard Quaritch.

Husband, Timothy, with the assistance of Gloria Gilmore-House. 1980. *The Wild Man. Medieval Myth and Symbolism*. New York: The Metropolitan Museum of Art.

Kerssenbrock-Krosigk, Dedo von. 2009. Venetian enamelled glass: a survey of tasks for future research. In *Annales of the 17th Congress of the International Association for the History of Glass. 2006 Antwerp,* edited by J. Janssens, P. Degryse, P. Cosyns, J. Caen and L. Van't Dack. Antwerp: Antwerp University Press and AIHV: 523-528.

King, Charles William. 1872. *Antique Gems and Rings.* Vol. II. *Illustrations*. London: Bell and Daldy.

Landau, David and Peter Parshall. 1994. *The Renaissance Print: 1450-1550*. New Haven and London: Yale University Press.

Levenson Jay A. *et al*. 1973. *Early Italian Engravings from the National Gallery of Art.* Washington: National Gallery of Art.

Liefkes, Reino. 2003. The Weoley Cup. In *Gothic Art for England 1400-1547*, edited by R. Marks and P. Williamson. London: V&A Publications: 208.

Lucco, M. and G.C.F. Villa, ed. 2008. *Giovanni Bellin.* Cinisello Balsamo (Milano): Silvana Editoriale.

Ludwig, Gustav. 1906. Restello, Spiegel und Toilettenutensilien in Venedig zur Zeit der Renaissance. *Italienische Forschungen* 1: 185-360.

Lycosthenes, Conrad. 1557. *Prodigiorum ac ostentorum chronicoron*. Basel: Per Henricum Petri.

Meade Williams, W., ed. 1867. *Annals of the Worshipful Company of Founders of the city of London*. London: Worshipful Company of Founders.

Molinier Émile. 1889. *Venise, ses arts décoratifs, ses musées et ses collections*. Paris: Imprimerie de l'Art.

Morelli, I., ed. 1800. *Notizia d'opere di disegno nella prima metà del secolo XVI Esistenti in Padova Cremona Milano Pavia Bergamo Crema e Venezia scritta da un anonimo di quel tempo* [Marcantonio Michiel].

Mosel, Christel. 1979. *Glas, Mittelalter - Biedermeier, Sammlungskataloge des Kestner - Museums Hannover*. Hannover: Zweite Bearbeitete Auflage.

Navarro, Juanita and Suzanne Higgott. 2014. Work in Progress: Venetian and *Façon de Venise* All- Glass Composites or Hybrids: Manufacture, Detection and Distribution. In *Study Days on Venetian Glass approximately 1600's*, edited by R. Barovier Mentasti and C. Tonini. Venice: Istituto Veneto di Scienze, Lettere ed Arti: 69-88 (*Atti dell'IVSLA* 172/1, 2013-2014, Classe di scienze fisiche, matematiche e naturali).

Oakes, Simon P. 2006. *The presence, the patronage and artistic importance of the German community in early Cinquecento Venice* (unpublished Ph.D Thesis, University of Cambridge).

Olmi, Giuseppe. 1992. L'inventario del mondo. Catalogazione della natura nella prima età moderna. In *Annali Istituto Storico Italo Germanico. Trento*. Bologna: Mulino.

Page, Jutta-Annette. 2006. *The art of glass. The Toledo Museum of Art*. Toledo-London: Toledo Museum of Art - D Giles Limited.

Pantani, Luciano. 2005. La Signora del Mondo: note sull'iconografia della Morte, *Annali Aretini* 13: 105-137.

Paolinelli, Claudio and Timothy Wilson. 2019. *Raphael ware. I colori del Rinascimento.* Urbino: Galleria Nazionale delle Marche - Palazzo Ducale di Urbino.

Piech, Zenon. 2003. *Monety, pieczęcie i herby w systemie symboli władzy Jagiellonów,* Warszawa:Wydawn.

Perocco, Daria. 1986. L'invenzione dell'ignoto: il cuore dell'Africa nelle relazioni dei viaggiatori italiani. In *Africa. Storie di viaggiatori italiani*. Milano: Nuovo Banco Ambrosiano.

Richter, Gisela M. A. 2006. *Catalogue of Engraved Gems. Greek. Etruscan. And Roman*. Roma: L'Erma di Bretschneider.

Rizzi, Alberto. 2014. *Scultura esterna a Venezia. Corpus delle sculture erratiche all'aperto di Venezia e la sua laguna*. Seconda Edizione Ampliata. Venice: Filippi Editore.

Saldern, Axel von. 1965. *German Enameled Glass. The Edwin J. Beinecke Collection and Related Pieces*. Corning (NY): The Corning Museum of Glass.

Schmidt, Robert. 1911. Die Venezianischen Emailgläser des XV. Und XVI. Jahrhunderts. *Jahrbuch der Preussischen Kunstsammlungen* 32: 249-286.

Sedláčková, Hedvika *et al*. 2016. Late Gothic and Early Renaissance Glass from Bratislava ca. 1450-1550. *Památky Archeologické* CVII: 353-394.

Segarizzi, Arnaldo. 1916. Cenni sulle scuole pubbliche a Venezia nel secolo XV e del primo maestro di esse. *Atti del Regio Istituto Veneto di Scienze Lettere ed Arti*.

Settis Frugoni, Clara. 1967. Il tema dell'Incontro dei tre vivi e dei tre morti nella tradizione medioevale italiana. *Memorie dell'Accademia dei Lincei, Classe di Scienze Morali, Storiche e Filologiche* serie VIII, vol. 13, fasc. 3.

Shaw, Byam J. 1932. Jacopo Ripanda and Early Italian Maiolica. *Burlington Magazine* LXI: 19-25.

Sheppard, Christopher. 1991. The Renaissance Period. In *Sotheby's Concise Encyclopedia of Glass*, edited by D. Battie and S. Cottle. London: Conran Octopus Limited.

Sperti, Luigi. 2007. *Un capitello tardoquattrocentesco a Palazzo Ducale, la metamorfosi di un motivo antico e l'Allegoria dell'«Invidia» di Giovanni Bellini*. In *Tullio Lombardo scultore e architetto nella Venezia del Rinascimento*. Atti del convegno di studi, Venezia, Fondazione Cini, 4-6 aprile 2006, edited by A. Scapin. Venezia: Fondazione Giorgio Cini.

Stock, Markus. 2017. Knowledge. Hybridity, and the King of the Crane-heads.

Herzog Ernst *B*, Herzog Ernst *G*, and the Forchheim Crane-Head. *Daphnis* 45: 391-411.

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-New York: The Trustees of the British Museum - Harry N. Abrams, Inc.

The Illustrated Bartsch. Early Italian Masters. 1984. New York: Abaris Book.

Thornton, Dora. 2014. Venice or façon de Venise? Two enamelled glasses in the British Museum. In *Study Days on Venetian Glass. Approximately 1600's*, edited by R. Barovier Mentasti and C. Tonini. Venezia: Istituto Veneto di Scienze, Lettere ed Arti (*Atti dell'IVSLA* 172/1, 2013-2014, Classe di scienze fisiche, matematiche e naturali).

Toniolo, Federica. 2016. Creature fantastiche, naturalismo e ascendenze classiche nella miniatura del Rinascimento italiano. *Matèria. Revista internacional d'Art* 10-11: 37-54.

Ugurgieri Azzolini, Isidoro. 1649. *Le Pompe Sanesi o'vero relazione delli Uomini e donne illustri di Siena e di suo Stato*. Pistoia: Stamperia di Piero Fortunati.

Wilson, Adrian, assisted by Lancaster Joyce Wilson. 1976. *The Making of the Nuremberg Chronicle*. Amsterdam: Nico Israel.

Zecchin, Luigi. 1987. *Vetro e vetrai di Murano*. Vol. 1. Venice: Arsenale.

Zecchin, Luigi. 1989. *Vetro e vetrai di Murano*. Vol. 2. Venice: Arsenale.

Zecchin, Luigi. 1990. *Vetro e vetrai di Murano*. Vol. 3. Venice: Arsenale.

Zecchin, Paolo. 2009. Due importanti inventari muranesi del Cinquecento. *Rivista della Stazione Sperimentale del Vetro* 5: 27-34.

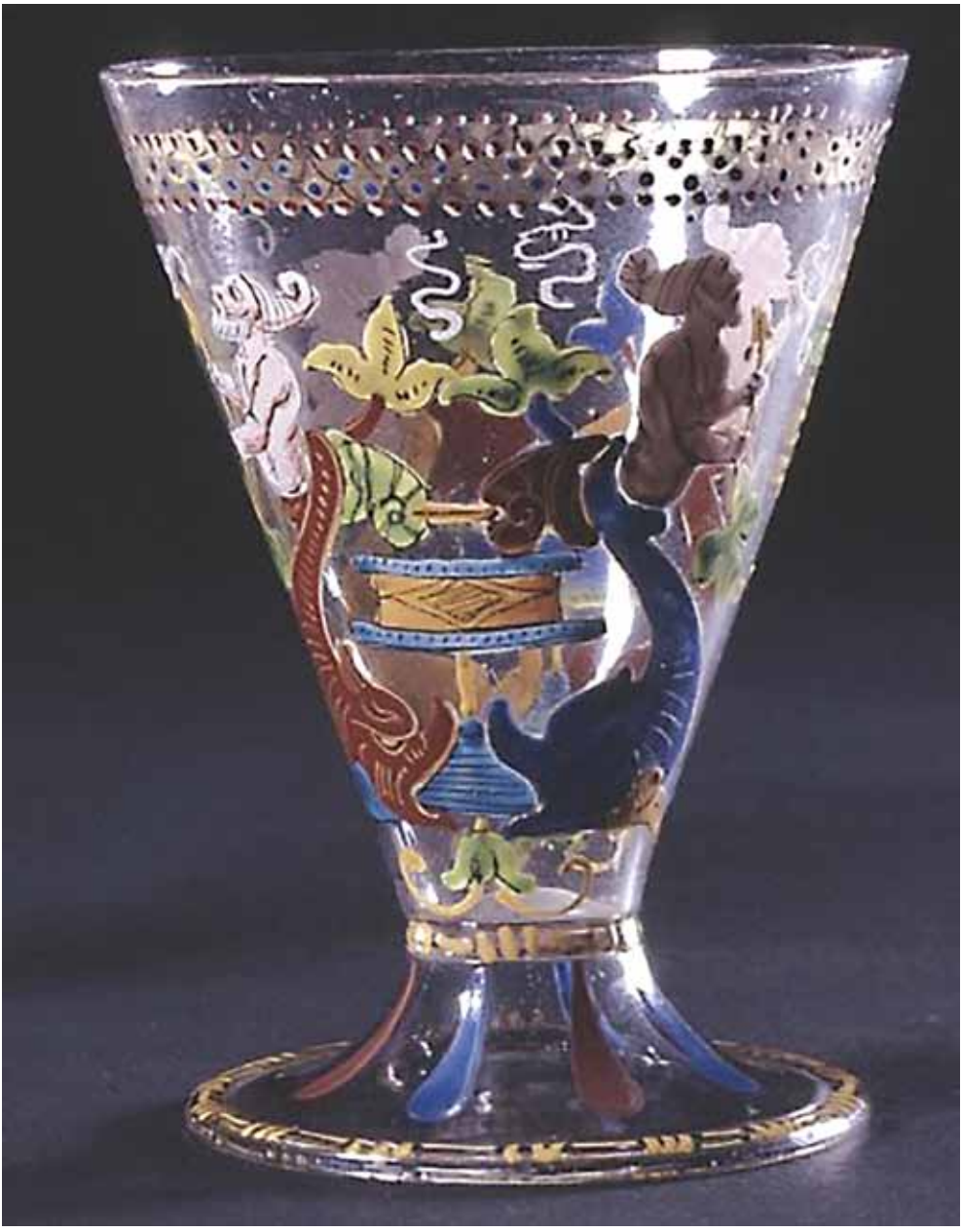

Fig. 1 - *Conical goblet enamelled with dolphins enveloping bearded men coming out from a snail shell*, Venice, 1510-1520. London, British Museum, inv. no. S 391 (courtesy of).

Fig. 2 - *Lattimo jug enamelled with Tritons and Nymphs,* Venice, 1500-1520. Toledo, Ohio, Toledo Museum of Art, inv. no. 1969.287.

Fig. 3 - *Lattimo jug enamelled with Tritons and Nymphs*, detail, Venice, 1500-1520. Toledo, Ohio, Toledo Museum of Art, inv. no. 1969.287.

Fig. 4 - *Sculpted capital with a man holding a snake and coming out from a shell*, detail, 1485-1486. Venice, Ducal Palace, courtyard.

Fig. 5 - *Goblet of the Worshipful Founders' Company*, Venice, 1500-1520, the upper part of the stem with two blown ribbed knops; the lower part the stem and the foot were replaced with a gilt silver mount bearing London hallmark - years 1547-1548. London, Worshipful Founders' Company.

Fig. 6 a,b - *Goblet enamelled with Tritons*, full and detail, Venice, 1500-1520. London, Victoria & Albert Museum, inv. no. 674-1884 (courtesy of).

Fig. 7 - *Goblet of the Worshipful Founders' Company*, detail, Venice, 1500-1520. London, Worshipful Founders' Company.

Fig. 8 - *Goblet of the Worshipful Founders' Company*, detail, Venice, 1500-1520. London, Worshipful Founders' Company.

Fig. 9 - *Goblet of the Worshipful Founders' Company*, detail, Venice, 1500-1520. London, Worshipful Founders' Company.

Fig. 10 - *Goblet of the Worshipful Founders' Company*, detail, Venice, 1500-1520. London, Worshipful Founders' Company.

Fig. 11 - Giovanni Antonio da Brescia, *Woodcut*, 1490-1507. London, British Museum, inv. no. 1870, 0514.383.
Fig. 12 - *Sculpted relief with memento mori*, 1500 ca. Brescia, Santa Maria dei Miracoli, façade, detail.

Fig. 13 - *Goblet enamelled with a hybrid*, Venice, 1500-1530. Private collection (Photo Bonhams Auctioneers, London, courtesy of)
Fig. 14 - *Goblet with Sergardi coat of arms*, Venice, 1500-1535. Waddesdon Manor, Rothschild Collection.

Fig. 15 - Albrecht Altdorfer, *Lot and his daughters*, detail, 1537, Wien, Kunsthistorisches Museum-Gemäldegalerie, inv. no. 2923 (courtesy of KHM-Museumsverband).
Fig. 16 - *Goblet with Jagiellon coat of arms*, Venice, early 16th century. Kracow, Treasury of Jagiellonian University Museum-Collegium Maius, inv. no. 8719 (© photo Grzegorz Zygier).
Fig. 17 - *Goblet enamelled with grotesques, hybrids*, Venice, 1510-1530. Wien, Kovacek Gallery (courtesy of).

Fig. 18 - Giovanni Antonio da Brescia, *Woodcut*, 1510-1520. London, British Museum, inv. no. 1970, 0714.1.
Fig. 19 - *Goblet enamelled with a hybrid*, detail, Venice, 1500-1530. Private collection (Photo Bonhams Auctioneers, London, courtesy of).
Fig. 20 a,b - Hartmann Schedel, *Liber Chronicarum*, 1493, folio XIII recto, full and detail, woodcut.
Fig. 21 - Antonio Bazzi, called il Sodoma, *Grotesque*s, fresco, detail, 1505-1508. Siena, Convent of Monteoliveto.

Fig. 22 - *Woodcut with Saint George and the Dragon*, attributed to «Master I.B. with the bird» (Giovanni Battista Palumba?), perhaps 1500 ca. (Photo from *The Illustrated Bartsch* 1984, Vol. 25).

Fig. 23 - Nicola da Urbino, *Maiolica dish with Saint George and the Dragon*, 1520-1530. Edinburgh, National Museums of Scotland, inv. no. A 1897.327e.

Jorge Rodrigues

THE MAMELUKE GLASS COLLECTION AT THE CALOUSTE GULBENKIAN MUSEUM: THE LIGHT OF GOD AND THE PRIDE OF MAN

Calouste Sarkis Gulbenkian was an avid and enlightened collector of art objects from all cultures, religions and regions of the globe, with a lively interest in world history and civilizations, and an infinite curiosity about the people behind the production of all kind of artistic artefacts, from the humble pottery to the masterpieces of Rembrandt, Turner or Manet. The Calouste Gulbenkian Museum, part of the Foundation of the same name, was his legacy to the city of Lisbon, to Portugal and to the world since it opened to the public, in a building purposely commissioned to host his collection, in 1969.

Calouste Gulbenkian always valued beauty, authenticity and the mint condition of the pieces he bought over its age or rarity, by art market standards. The Mameluke mosque lamps in gilded and enamelled glass were clearly amongst his preferred ones. And not just because they are a testimony to such an important empire or dynasty, that from 1250 to 1517 spread across the Islamic world, from Egypt to Syria, the Arabic peninsula and most of the Middle East, but mainly because they testify to such a complex process of manufacture, ornamentation and symbolic meaning, as we will try to elaborate on.

In this Museum, in a space specially designed for it – refurbished in the major overhaul of 2000 – the small but pristine collection of ten Mameluke glasses has been on display as an example of both the diversity of design and a complex statement of faith and power.

Diversity because our collection encompasses seven Mosque lamps, of different sizes, shapes and ornamentation, but also two bottles and a precious beaker with depictions of birds – both in flight

and just 'hovering' on the surface – that look more like something inspired by a treaty of ornithology than a depiction out of nature…

And a statement of power because the *Nur* – the light of God – is made omnipresent through these lamps inside the prayer rooms of the Mosques. But the earthly patrons, that commissioned and effectively payed for them, always found a way of associating their name and status – their *fame* – to the commissions, rendering their presence, in a sense, almost as eternal as that of Allah.

The Mamelukes, freed military slaves of Turkish or Caucasian origin that ruled over such a vast territory, successfully overthrew the former Ayyubid dynasty and became dominant in all of Eastern Mediterranean, with a wide network of contacts and trade not only in the scope of the Muslim world, but also throughout all of Southern Europe, including the Christian rulers of Italian merchant city-states such as Genoa or Venice.

A good example of the fascination exerted on the West by the craftsmanship of the Ayyubid and later Mameluke artists is the Freer Canteen, made around mid-13th century and depicting Christian scenes – the *Enthroned Madonna and Child*, plus *Presentation at the Temple* and *Nativity* – in an Ayyubid made piece.

The collecting of the Mameluke glasses by Calouste Gulbenkian still has a few undisclosed aspects for us, since we do not know the provenance of them all, but what we do know is that some of the pieces had previously belonged to some high profile owners, including members of the crowned heads of Europe and the Shah of Persia.

For instance, the lamp with inventory number 170, purchased in 1921 at the sale of the M. S. Williams Collection, had been given to Williams by the Shah of Persia. It is one of five, in a total of seven lamps in our collection, to present the *Ayat-al-Nur* inscribed on the neck, the *Sura of the Light*, Koran 24:35:

> God is the light of the Heavens and Earth. The likeness of His light is that of a niche holding an oil lamp; it is inside a receptacle and it is like a shining star, fed by the olive oil of a blessed tree, the olive tree, which is neither Eastern nor Western, and whose olive oil shines, even if it does not touch the fire. It is light over light! God shines His Light over whom He pleases. God sets the example for the humans because he is Omniscient.

Calouste Gulbenkian always relied on the professional opinions of experts for his acquisitions, given his own lack of artistic and historical background, as were the cases of Otto van Falke and Professor Sarre who advised him on the purchase of the lamp with inventory number 2272, that had belonged to the collection of the Italian royal family, It was procured through an intermediary, as was often the case: in this instance it was Stiebel, who acquired it from Lippman Rosenthal in Amsterdam, in March 1936.

According to the documents for the purchase of another Mosque lamp, inventory number 1022 (the first lamp he ever bought), including the invoice from Seligman's at Place Vendôme, Paris, dated 6 December 1909, this lamp was previously given to the King of Belgium Leopold II by Khedive Isma'il of Egypt, when the Suez Canal was opened in 1869.

And when the Eumorfopolous Collection was sold in London, Gulbenkian was firstly informed about the state of preservation of the lot he was considering, and then M. Giraud-Baudin acquired two pieces for him at the Sotheby's auction on 5 and 6 June 1940: these were a magnificent and uncommonly large beaker with gilded and enamelled decoration, showing a series of mythical and real birds, with inventory number 2378, and an also uncommon cylindrical Mosque lamp, inventory number 2377, both rare objects in terms of their decoration and morphology.

Many of the pieces that make up the Calouste Gulbenkian Collection were purchased directly or indirectly from the Rothschilds. Otto van Falke gave his expert opinion on one such piece, a bottle, inventory number 2293, already signalled by Sir A.W. Franks in 1862 in the catalogue of an exhibition in South Kensington as coming from the succession of Lord Lionel Rothschild, later appearing in the Victor Rothschild Collection in London, where it was procured through the intermediation of Stiebel in 1937.

The other bottle in our collection, inventory number 2370, decorated with two lions, was the last Mameluke glass bought for the Gulbenkian Collection, also by Stiebel at the Béaghe Sale, in New York, January 1949, since it had belonged to the Béaghe Countess, in Paris.

All the remaining lamps are either of unknown origin, as is the

case of inventory number 1060, or had belonged, at some point, to the Rothschilds: inventory number 1033, previously in the Collection of Baron Gustave de Rothschild, was acquired through Joseph Duveen from Sir Philip Sassoon in London, 8 November 1919; the same happened with the lamp inventory number 1032, that had previously belonged to the Posno Collection before being bought by the Rothschilds, Gustave and Alphonse, at an undisclosed date.

The seven Mosque lamps in our collection are all floating wick lamps fuelled by olive oil and suspended inside the Mosque, for all to behold. The gilded and enamelled ornamentation, combined with the whimsical effect of the flickering light, would cause a strong impression on the prayers gathered inside the room, as the light with which *God shined* on the faithful 'danced' over their heads, whose eyes had to be raised to see it, enhancing the mystical aspect of the *Ayat-al-Nur*.

But that was not all, since the Mameluke rulers, in a period of prosperity, also embraced a strong patronage of the arts that reflected the court's magnificence and symbolised the state's power and political dominance. One of the ways they found to express this dominance and effective *power* was present in the lavish and imposing ornaments that covered most of the surface of the glass lamps.

The first of these were the inscriptions, common throughout Islamic art from the very beginning: the 240-metre inscription in the *Dome of the Rock*, Jerusalem, from the 8th century, testifies to this. They were a token of the presence of Allah, He who could not be depicted, as *ineffable*, but that was made present in the Mosque trough His written *word*, usually quotes from the Koran or other religious texts. And the Mamelukes really 'upgraded' these inscriptions by developing and perfecting a new type of elongated cursive script, the *thuluth*, that worked wonders enamelled in strong colours and/or gilded on the surface of the transparent glass.

The fact is, though, that these religious inscriptions that spread through the outer surface of the lamps, and where the *Sura of the Light* was dominant, were in fact *shared* with a new type of script that glorified the pious role of the patron who offered the lamp to the Mosque or mausoleum, often also under his patronage. As such, the top of the lamp – the neck – was usually reserved for the religious

script, whilst the body was used for the expression of this patronage, a pattern only inversed in the cylindrical lamp of our collection. A few examples shed some light on this matter:

- In lamp inventory number 1032 (Fig. 1) the inscription reads: «This is one of the objects made for his most noble and high excellency, the learned, the just, the administrator, the councillor, the regent, the vizier, Najm al-Din Mahmud ibn ʻAli ibn Shirwin [*officer*] of al-Muzaffra, regent of the noble Islamic provinces. May God the Exalted make his victories glorious». The same text exalts his pious character and his competence and power as ruler and enlightened man!
- Lamp inventory number 1033 was meant as a more private object, although not deprived of the same statement of power of the patron, in this case for his own final dwelling: «This is one of the objects made for the mausoleum of the late Amir ʻAla al-Din ʻAli, son of his excellency the late Saif al-Din Baktamur, al-hajib [*chamberlain*], may God cover him with His mercy».
- Several other lamps (inventory numbers 1022, 1060 and 2272) have inscriptions dedicated to one of the most powerful Mameluke Sultans, *al-malik al-Nasir Hasan ibn Muhammad*, that ruled from ca. 1354 to 1361, all praising his Glory and his victories.

The second token of the patronage of the Mameluke rulers is the presence of *heraldic* emblems on the Mosque lamps, something that was already common amongst Western nobility, where shields bearing coats-of-arms had been used since late 12th century to identify the clans and boast their power, but that would become a novelty amongst Muslim rulers with the Mamelukes, but under strict rules: used by the Amirs but granted or revoked by the Sultan only.

It is possible that the adoption of these symbols began as a consequence of the Crusades, where the Muslim rulers may have seen these heraldic symbols in Christian flags and banners, and the fact is that the ones they adopt seem to copy – even mimic – the Western ones: the horse with a ceremonial saddle in the lamp commissioned by *Saif al-Din Baktamur*, inv. 1033 (Fig. 2) and a fleur-de-lis in the lamp of *Mahmud ibn Shirwin* (Fig. 1), not surprising if we think of the high percentage of French knights and nobility involved in the Crusades.

A final interesting aspect of the ornamentation of these pieces is

present in the iconography on the three non-religious glass vessels: the two bottles and the beaker.

The bottle with the lions, inv. 2370 (Fig. 3) is reported to have come from China, something that does not specifically relate to the depiction of the lion, that is common in most cultures, but to the *way* it is depicted, that seems to convey an obvious Chinese *maniera* or style. The trade with China and the Mongol invasions made the presence of Chinese patterns and symbols usual in the context of the Muslim territories, from the Umayyads to the Mamelukes, but the presence of high placed Muslim officials in the Chinese court, especially from the 13th century on, may also help to explain why this bottle was traced back to China.

The lion, as a symbol of might and strength, is also commonly assumed as a fortune and solar symbol, namely by the Muslims but also by the Chinese. And it is also a *regal* symbol, something that can be seen in the cloak of coronation of Roger the 2nd – the Norman knight that defeated the Fatimid's and conquered Sicily in the 12th century – where a *Lion* [the Norman King] is attacking the prey, a *Camel* [the Fatimid's], subjugating it; some authors also see in this depiction an image of *submission* not deprived of sexual significance, with the lion acting as the dominant male character, and the Camel as the feminine and submissive.

The same interpretation seems to suit the other bottle, inv. 2293, where on the upper part we see the depiction of a typically Chinese theme in medallions with the mythical phoenix, a symbol of immortality – *resurrection* – and of the human virtues (Fig. 4). On the side of the body, in opposing medallions, a lion seems to submit a deer or gazelle: once again, the love for hunting that characterized the Mameluke court and the symbolic role of the lion are present in this depiction, both in an obvious political and not so apparent sexual meaning, with the slim and elegant gazelle acting as the feminine element, and the powerful lion as the masculine one.

The most original of our mameluke glasses is, nevertheless, the large beaker with an iconography that mixes elements from China and the Middle East and that, at 33,5 cm tall, is the largest of these pieces in Western museums, comparable only to three others: those from the Bayerishes Nationalmeuseum (Munich), the Freer Gallery

(Washington) and the Städtisches Museum (XXX). The beaker is decorated with mythical and natural birds against an abbreviated landscape setting with a small red cloud of Chinese shape symbolizing the sky, and these birds include the phoenix, vulture, hoopoe, goose, parrot, magpie, ground fowl and a hawk attacking a duck. Most of the birds seem to just 'hover' on the surface, only the phoenix and the hawk seem to be in actual flight (Fig. 5).

The scene is mirrored on both sides, with slight differences in the depiction of the birds – especially in the combination of the colours of the plumage – and the transparency of the vessel creates the effect of the *air* that would support their movement. The relative scale of the birds is respected in this free-hand representation, with a certain kind of hierarchy – topped by the phoenix and the vulture – being also taken into account by the artist.

Although there is a Chinese influence present in the phoenix and the cloud, this is typically the work of Mameluke craft, and the curious assembly of birds, as if *posing* for the painter, seems to relate to a manuscript preserved in the Real Biblioteca of San Lorenzo del Escorial, near Madrid, compiled by Ibn al-Durayhim al-Mawsill in 1354, with ninety miniatures: the *Kitab Manafi' al-Hayawan*, or 'Book on the Usefulness of Animals', dividing the various animals in a number of classes that include Man, Domestic and Wild Quadrupeds, Fishes, Insects and, of course, Birds.

Two interesting aspects about this very unique beaker: first the debated depiction of a parrot, more commonly known in Europe after the contact with the American continent in the late fourteen hundreds, but that was a bird well known in Persia long before that, and precisely in that colour: green. The second has to do with the function of the beaker, that given its size and exquisite and intricate detailing, seems to have been more intended as an object of prestige and display, in a powerful and prosperous Mameluke court or office, rather than a utilitarian one.

REFERENCES

Al-Khemir, Sabiha, dir. 2014. *Light Nur: light in Art and Science From the Islamic World*. Seville: Focus-Abengoa Foundation.

Bloom, Jonathan and Sheila Blair, ed. 2015. *God is the Light of the Heavens and the Earth*. New Haven and London: Yale University Press.

Goldstein, Sidney M., dir. 2005. *Glass. From Sasanian antecedents to European imitations*. London: The Nour Foundation.

Hallett, Jessica, dir. 2019. *The Rise of Islamic Art, 1869-1939*. Lisbon: Fundação Calouste Gulbenkian.

Makariou, Sophie, ed. 2012. *Islamic Art at the Musée du Louvre*. Paris: Musée du Louvre.

Ribeiro, Maria Queiroz and Jessica Hallett. 2000. *Os vidros da Dinastia Mameluca no Museu Calouste Gulbenkian* [*Mamluk Glass in the Calouste Gulbenkian Museum*]. Lisbon: Fundação Calouste Gulbenkian.

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Fig. 1 - *Mosque lamp*. Calouste Gulbenkian Museum, inv. 1032.

Fig. 2 - *Mosque lamp*, detail. Coat-of-arms of *Saif al-Din Baktamur*: the horse with a ceremonial saddle. Calouste Gulbenkian Museum, inv. 1033.

Fig. 3 - *Bottle*. Calouste Gulbenkian Museum, inv. 2370.

Fig. 4 - *Bottle*, detail. Calouste Gulbenkian Museum, inv. 2293.

Fig. 5 - *Large beaker with depictions of birds*. Calouste Gulbenkian Museum, inv. 2378.

Isabelle Biron and Marco Verità

THE SECRETS OF RENAISSANCE VENETIAN ENAMELLED GLASS

IDENTIFICATION OF GENUINE ITEMS AND COPIES BY CHEMICAL ANALYSIS

1. *Introduction*

Enamelled and gilded Venetian Renaissance glass masterpieces were made in Venice from the late 15th through the 17th centuries and were imitated in other European glassmaking centres during this period (*à la façon de Venise* glass). Copies and fakes of Renaissance enamelled Venetian glasses have been made in Murano and other European workshops up to today.

In spite of the interest shown by collectors, museums and scholars, several questions are still being debated as to distinguishing genuine Venetian from *à la façon de Venise* pieces and later copies or fakes in the collections. A research project called *cristallo* was started in 2009 in the attempt to provide answers to these issues. In this framework, technical observations and ion beam chemical analyses were performed on a number of masterpieces from French and Italian collections, broken objects and archaeological sherds from Italian and English institutions as well as SEM-EDS analyses of micro-fragments sampled from the sherds.

The glass chemical composition reveals the nature of the raw materials used and their percentage in the glass batch. The silica source (SiO_2) can be more or less contaminated by other minerals (containing also alumina, iron and titanium oxides), the type of fluxer used (soda plant ash or potash plant ash) and its provenance (geological fingerprint) modify the final glass composition. The type and provenance of some colorants (for instance, the cobalt source) and opacifiers introduce other elements typical of a specific technology. Any preliminary treatment of the raw materials (plant ash purification, use of synthetic pigments…) and the glassmaking technology (melting temperature, pouring the melt into water, addition of cullet…) also influence the glass composition.

A reliable data base on Venetian Renaissance glass compositions is already available[1]. To extend the database to enamelled Venetian Renaissance products, a large set of well dated glass samples of certain provenance is required. Furthermore, analytical devices which permit a full, accurate quantitative analysis of the glass and enamels components without sampling (non-invasive, non-destructive technique) are required.

In this paper the results obtained up to now in the chemical classification of Venetian Renaissance, *façon de Venise* (late 15th - 16th century) and later copies (end 17th, 19th century) or even fakes of enamelled gilded glass objects are summarised. Some parameters specific of genuine Venetian products helping to recognize different origins are presented. More details are given elsewhere[2].

2. *Analytical method*

Non-invasive and non-destructive ion beam analysis was used to determine the quantitative chemical composition of the glass body and the enamels on the museum items and the archaeological sherds. Analyses were made directly on the surface of the objects by using an external proton beam of 2.95 MeV on the target, produced by the AGLAE accelerator of the C2RMF laboratory in PIXE and PIGE modes (respectively Proton induced X and Gamma rays emission). More details on the experimental set-up have been published previously[3].

For samples where micro-fragments could be sampled a small piece was cut, embedded in acrylic resin, polished down to 1 μm and analysed by PIXE-PIGE and by scanning electron microscopy with energy dispersive X-ray spectrometry (SEM-EDX) and wavelength dispersive X-ray spectrometry (EPMA).

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[1] Verità 2013: 515-533.

[2] Biron and Verità 2012: 2706-2713; Verità and Biron 2015: 177-190; Verità and Biron 2017: 444-452, and forthcoming paper 2021.

[3] Verità and Biron 2015: 177-190.

3. *Results for genuine Venetian Renaissance items*

The creation of the first database on genuine Renaissance Venetian gilded and enamelled glass was the purpose of the authors in a paper accepted for publication in the JGS issue 2021. This database is composed of well dated reference Venetian Renaissance enamelled archaeological samples (12), two well dated objects from museums, and 29 items from museum collections of uncertain origin and dates, but corresponding to the Venetian production from a compositional, stylistic and technical point of view (Fig. 1, 2). For these objects and samples the composition of the glass body is compatible with the *cristallo* or *vitrum blanchum* genuine reference Venetian Renaissance glass composition[4]. Similarly, the composition of the enamels fits well with the enamel compositions of our reference archaeological samples (for all the colours or for the main part).

The body glass - Analyses of colourless glass vessels confirmed that they are made of soda-lime-silica glass (Fig. 1). The general glass composition, the presence of chlorine and the amounts of potassium, magnesium and phosphorous oxides are consistent with a glass melted from a batch made of a silica source and soda plant ash. The high quality of the glass is attested by the low dispersion of the measured values (that confirms the use of selected raw materials of a same provenance) and the low contents of alumina, titanium and iron oxides (use of pure silica sources). The existence of two compositional groups differing mainly for their calcium, magnesium and iron contents, corresponding to the *vitrum blanchum* and *cristallo* glass was also attested. The addition of not perfectly selected colourless glass cullet (traces of lead and tin from white opaque glass) to the *vitrum blanchum* samples, but not (or much less) in the case of the *cristallo* glass was also ascertained.

The analyses of blue transparent glass vessels evidenced the same two compositional groups, together with some differences due to recycling of larger amounts of glass cullet contaminated by lead and tin and the presence of elements introduced through the cobalt ore used as a colorant (Fig. 2).

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[4] Verità 2013: 515-533.

Two important criteria appear from our study. The 43 items associated to Venetian genuine production were made mainly following *cristallo* recipes and can be dated to before 1520-30 from the cobalt source used for blue glass and enamel (see below blue enamels). 38 items (9 blue ones) date to before 1520-30 and only five are *vitrum blanchum* type.

The enamels - The enamels of the genuine Venetian Renaissance vessels are made of a glass phase (base glass) to which colouring metals (cobalt, copper, manganese, iron) and/or pigment particles were added[5]. According to our analyses, the particles are white (cassiterite, SnO_2), yellow (lead antimonate or lead stannate) and red (hematite, Fe_2O_3).

The base glass composition of the enamels was estimated (not for high-lead yellow and green enamels). It is of the same type (*cristallo* or *vitrum blanchum*) as the glass of the objects on which they are applied. Nevertheless, their composition show some differences. In particular, a higher sodium content is often found, probably ascribable to the need to decrease their viscosity and softening during firing.

The chemical analyses of white enamels evidence high amounts of lead (PbO 15% to 27%) and tin (SnO_2 13% to 20%). The total amount of lead plus tin oxides is up to about 40%. The ratio PbO/SnO_2 varies from about 1:1 to nearly 2:1. These results are in agreement with the use of a lead-tin calx added to the batch and the dispersion of tin oxide crystals.

The blue enamels are coloured with cobalt in remarkable amounts (CoO 0.5 to 3%). In this study, two cobalt sources were identified, one containing arsenic and bismuth (As_2O_3 1.5-3.5%; Bi_2O_3 1.0-2.5%) and another one with traces of arsenic (As_bO_3 less than 0.1%) and without bismuth (cobalt ores containing also iron, nickel and copper). According to several studies, the arsenic-bismuth surce was found only in the majority of the blue samples dated to later than 1520-1530[6]. The difference may be explained by the use after this date of a cobalt ore of different origin. The presence or not of bismuth in blue glass and enamels is therefore a useful indicator for the dating of Renaissance items.

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[5] Verità and Biron 2015: 177-190.

[6] Biron and Verità 2012: 2706-2713.

The turquoise enamels are almost manganese-free; their colour is due to large amounts of copper dissolved in the glass (CuO 3.3-9.6%). In few cases a blue-turquoise colour was obtained by adding also small amounts of cobalt (CoO 0.02-0.2%). Turquoise enamels were observed almost exclusively in the genuine Venetian Renaissance objects. This is probably due to the fact that glasses containing CuO are more difficult to melt and work than other ionically coloured glasses owing to their poor conductivity of thermal radiation. Only the most experienced and skillful glassworkers were able to work this colour.

The red enamels analyses show very high iron contents (Fe_2O_3 5-35%). Iron oxide flakes (probably hematite, Fe_2O_3), are accounted for this colour.

Blue, turquoise and red enamels may or not contain tin oxide particles (SnO_2 0-18%) added to opacify and clarify the enamels in the form of lead-tin calx, with a PbO/SnO_2 ratio varying from about 1:1 to nearly 1:2.

The compositions of yellow and most of the green enamels are markedly different form the other enamels. The colour of yellow enamels varies from orange-brown to yellow-orange and to yellow-lemon. They are characterised by high lead contents (PbO 44-62%) and variable amounts of antimony (Sb_2O_3 3-16%), zinc (ZnO 0.4-6.8%) and tin (SnO_2 0.1-8.4%). The colouring particles are made of lead and antimony (yellow-orange colour), lead and tin (lemon yellow) or of lead, tin and antimony. Other analytical techniques (Raman, XRD) will be required to exactly identify these pigments.

The glass of the pale to dark green enamels is coloured with copper and iron. Yellow particles similar to the ones described for yellow enamels were added to obtain different green-yellow hues.

Only few black enamels were analysed; they are applied in thin layers on other enamels and only a qualitative analysis is possible. Cobalt and iron in large amounts were used to obtain this colour.

4. *Results for* façon de Venise *or later copies*

As concern the *façon de Venise* or later copies, many similarities with the genuine Venetian Renaissance glass and enamels were found (Fig.

3-7). The glass of the vessels and the base glass of the enamels are of silica-soda-lime type and the colorants and opacifiers (lead-tin calx) are similar to the Venetian ones. This similarity attests that the recipes remained almost the same also outside Venice and for a long period, probably until the 18th century and may be the middle of the 19th century.

The body glass of the enamelled objects is characterized by contents of some components (mainly alumina, potassium and magnesium oxides) which often exceed their contents in the *vitrum blanchum* Venetian glass (Fig. 3). The use of a less pure silica source than the Ticino pebbles used since the 14th century in Venetian glass factories, and of a soda ash obtained from plants growing in other regions than the Levantine ones are a possible explanation for these differences. Probably, these compositions correspond to the use of a soda ash from Spain or southern France indicated in Venice with the name of *barilla*. This flux was introduced in Venice in the second half of the 16th century, but its use was limited to the manufacture of low value glass items due to its lower quality as compared to Levantine plant ash[7].

Other differences highlighted by the analyses concern the use of lead-tin calx as an opacifier, sometimes prepared with different PbO/SnO_2 ratios and a different cobalt-rich product (smalt instead of zaffre). The potassium contents of some blue enamels (K_2O 5-10%) exceeds largely the content of genuine Venetian enamels (K_2O less than 4%). A high potassium content is considered as an indicator of the use of smalt (a finely ground cobalt-potash-silica glass used by painters as a blue pigment from mid-15th c.) as a cobalt source in *façon de Venise* glassmaking. In Venice zaffer, a cobalt ore extracted in Germany that was powdered, calcined and mixed with silica sand (ratio 1/2 or more) was used.

Addition of lead - The composition of the transparent colourless body glass of five objects is of the soda-lime-silica *cristallo* type, but with levels of lead (PbO 3-16%) never detected in Venetian Renaissance glass (PbO absent or less than 0.06%) (Fig. 4). The use of lead compounds as raw materials in glassmaking was well known before the Renaissance but was restricted to coloured glass.

[7] Verità 2013: 515-533.

The addition of lead to transparent colourless glass is mentioned in Venetian recipes since the last years of the 17th century. Then the vessels of this group can be classified as being items produced not long before the end of the 17th century or during the 18th-first half of the 19th century. Furthermore, several discrepancies with the Venetian enamels composition suggest that these objects were made in glasshouses outside Venice.

Compositional discrepancies - A second group of later copies includes some blue glass objects (Fig. 5). Their blue body glass apparently of *cristallo*: type composition shows some discrepancies compared to genuine Venetian *cristallo* such as a low chlorine content (Cl 0.3-0.4%).

A distinct group of four objects has been also identified. The composition of the body glass of these objects is compatible with the database of genuine Renaissance Venetian glass. Instead, the compositions of the applied enamels are not compatible (Fig. 6).

Late 19th century items - Completely different enamels easy to recognize by the analyses (high amounts of lead, zinc and boron, low alkali, new colorants such as chromium for green) were in use only since the second half of the 19th century when the static firing of enamels in a muffle replaced the traditional, complex dynamic firing in the mouth of the furnace (Fig. 7).

Blue enamels containing Al_2O_3 in high amounts due to the presence of synthetic pigment particles ($CoAl_2O_4$ and $Co(Cr,Al)_2O_4$) were found in the low-firing enamels manufactured at the end of the 19th century[8].

5. *Conclusions*

This study was carried out in the frame of a project aimed at characterizing Renaissance Venetian enamelled glasses and providing objective analytical evidence to help distinguishing these items from contemporary *à la façon de Venise* or later imitations.

[8] Beltrán, Brock and Pradell, 2019.

Non-destructive ion beam analysis of objects from museum collections and archaeological samples (integrated by SEM-EDX analysis) mainly from French and Italian collections provides information on the composition of the glass and the enamels.

The analyses revealed a more complex picture than expected. The Renaissance Venetian glass and enamels were imitated not only in the 16th and 17th century (*façon de Venise*) but probably also in the successive centuries. For instance, a production of enamelled glass in the 18th century and/or in the first half of the 19th century could be possible.

The glass of the Venetian objects and of the *façon de Venise* or later copies is of the soda-lime-silica type, in general obtained by melting a batch of a silica source and soda plant ash. The enamels of the genuine Venetian and *à la façon de Venise* items and the later copies also present similarities in the composition of the glassy phase and type of pigments used. These results suggest that similar recipes and raw materials of Venetian origin were in use since the 15th century and until the 18th century or the first half of the 19th century for the manufacture of enamelled gilded glasses.

Anyway, some differences for both glass bodies and enamels compositions allow us to define different groups, from genuine Renaissance Venetian objects, *à la façon de Venise* objects and later copies. Sometimes these differences are quite evident (for instance, the presence of PbO in the colourless glass of the objects, or the use of industrial enamels) but in other cases they concern the amounts of the elements present in each group. Therefore, accurate quantitative chemical analyses of all the components of the glass and enamels are mandatory to distinguish between genuine Renaissance Venetian items and other origins.

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REFERENCES

Beltrán, Marti, Fiona Brock and Trinitat Pradell. 2019. Thermal properties and stability of Catalan Modernist blue and green enamels. *International Journal of Applied Glass Science* 10: 414-425.

Biron, Isabelle and Marco Verità. 2012. Analytical investigation on Renaissance Venetian enamelled glasses from the Louvre collections. *Journal of Archaeological Science* 39: 2706-2713.

Mecking, Oliver. 2013. Medieval lead glass in central Europe. *Archaeometry* 55, 4: 640-662.

Verità, Marco. 2013. Venetian soda glass. In *Modern Methods for Analysing Archaeological and Historical Glass*, edited by K. Janssens. Chichester (West Sussex): John Wiley & Sons Ltd.

Verità, Marco and Isabelle Biron. 2015. Enamels on Venetian Renaissance Glass. An analytical and technical Approach. *Glass technology: European Journal of Glass Science and Technology* 56, 6: 177-190.

Verità, Marco and Isabelle Biron. 2017. Renaissance Venetian enamelled glass. Genuine, *façon de Venise* and fake or copy artefacts. In *Annales du 20e Congrès de l'Association Internationale pour l'Histoire du Verre*, edited by S. Wolf and A. de Pury-Gysel **(**Friburg/Romont**,** 7-11 septembre 2015**).** Rahden/Westf.: VML Verlag Marie Leidorf: 444-452.

Verità, Marco and Isabelle Biron. Analytical investigation of genuine Renaissance Venetian enamelled glass (accepted for publication in the 2021 issue of the *Journal of Glass Studies*).

Zecchin, Luigi. 1986. *Il ricettario Darduin, un codice vetrario del Seicento trascritto e commentato*. Venice: Arsenale.

Fig. 1 - *Blue enamelled and gilded Renaissance Venetian glass*, h. 6, d. 10.3 cm, identified as a genuine object from chemical analysis. Paris, Musée du Louvre, inv. OA1118 (© C2RMF, A. Maigret)

Fig. 2 - *Colourless translucent enamelled and gilded Renaissance Venetian glass cup on embossed foot*, h. 15.7, d. 28 cm, identified as genuine object from chemical analysis. Paris, Musée du Louvre, inv. R 9 (Photo © Musée du Louvre, Dist. RMN-Grand Palais / Martine Beck-Coppola).

Fig. 3 - *Colourless translucent enamelled and gilded large glass goblet on foot*, h. 42, d. 21 cm, identified as *façon de Venise* or later copy of Renaissance Venetian object from chemical analysis. Chantilly, Musée Condé, inv. OA1524 (© C2RMF, A. Maigret).

Fig. 4 - *Blue enamelled and gilded glass goblet on foot*, h. 16.4, d. 8.5 and foot d. 8.9 cm, identified as *façon de Venise* or later copies of Renaissance Venetian objects from chemical analysis. Paris, Musée du Louvre, inv. OA7561 (© C2RMF, A. Maigret).

Fig. 5 - *Colourless translucent enamelled and gilded cup on low foot with the arms of a pope of the Medicis family (Léon X or Clément VII)*, h. 8, d. 26,5 cm, identified as *façon de Venise* or a later copy from chemical analysis. Paris, Musée du Louvre, inv. R 100 (© Musée du Louvre, Dist. RMN-Grand Palais / Martine Beck-Coppola).

Fig. 6 - *Colourless translucent enamelled and gilded glass dish*, d. 14 cm, identified as a late 19th century item from chemical analysis. Murano, Museo del Vetro, inv. Classe VI, n. 3654 (© M. Verità).

Françoise Barbe

ON THE TRACES OF THE GILDED AND ENAMELLED PILGRIM FLASKS HELD IN THE TREASURY OF THE SAINT ANNE BASILICA IN APT

This study has been started as part of the Cristallo project devoted to the Renaissance gilded and enamelled glasses. Among the various themes of study that should be developed on each piece of this corpus, the study of provenance appears essential to identify unquestionable pieces[1].

Among the most significant objects preserved in the former cathedral in Apt[2] – an important pilgrimage site to Saint Anne in the South of France – are two gilded and enamelled pilgrim flasks of a well-known type (Fig. 1)[3]. Although the precious Saint Anne's treasure was the subject of many studies and publications from the XVIIth century to the present, a new study of the sources was necessary for two main reasons. First, there was a certain confusion from the XIXth century between the venetian flasks and an Islamic glass also present in the treasury[4]. Secondly, the many written sources were badly referenced, mainly because they are second-hand sources or copies.

A series of eleven minutes, still preserved inside the shrine of Saint Anne, inform us of the dates of the official examinations that have

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[1] Barbe and Filipponi 2017: 435-443. Glasses whose authenticity is unchallenged due to the fact that their history goes far back in time become points of reference useful for the dating of other comparable pieces and chemical database. One of the flask (with the broken foot) has been analysed by Isabelle Biron and Marco Verità in 2016. See Biron and Verità in this volume.

[2] The church was a cathedral until 1801 and has been elevated to the rank of basilica in 1867.

[3] The exhibition catalogue *Saintetés aptésiennes, Trésors, architecture et dévotions dans une cité épiscopale* is the most recent publication, however some historical points are not updated, specifically regarding the appearance of the flasks in the archives, see Poëzévara, Codou 2019: 204-205.

[4] Poëzévara and Codou 2019: 206.

been made to proceed to the relics' inventory during a pastoral visit or to pick a small portion of them. These precious archival documents were partially copied: on September 25, 1835, they were put in a lead box inside the XIXth century shrine of Saint Anne and listed by Frédéric Rousset, secretary of the fabrique[5]; on June 12, 1893, they were copied by André-Marius Garcin, a local scholar, also secretary of the fabrique[6]. They correspond to six events that occurred in 1602, 1617, 1623, 1713, 1805 and 1830. However, it appears that this series of documents doesn't reflect the real number of examinations because some of them did not leave official minutes. Thanks to other sources, such as the manuscripts written by the local scholar Joseph-François de Remerville (1653-1730), it can be ultimately argued that the treasury was opened more times from 1602 to 1790.

The case of the Apt flasks demonstrates the complexity of certain story and highlights the great amount of time required to establish precise sources, even for well-known pieces. The main objective of this article is to present the few archival sources which give us information on the pair of flasks from 1602 to 1790[7].

1. *The mentions of the glasses in the archives*

Despite the existence of various written sources, it is difficult to determine the exact date of arrival of the two flasks in the treasury of Saint Anne. Before making assumptions, it is therefore necessary to consider the other objects belonging to the treasury, in particular the Islamic glass and the veil of Saint Anne (Fig. 2). From 1602 to 1790, several mentions provide tangible indications about the glasses:

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[5] *Sommaire des authentiques des reliques de sainte Anne Patronne de la ville d'Apt* 1835. The French term «fabrique» refers to an organization which ensures the conservation and maintenance of the goods of the church.

[6] *Procès-verbal de l'ouverture de la chasse de sainte Anne* 1893. The signatories explain (fol. 17) that verbatim copies have been made of each minute before closing the lead box. Except the copy of the *Verbal des Reliques de Ste Anne Mère de la Glorieuse Mère de Dieu qui sont dans la cathédrale d'Apt et de St Elzéar* 1602, these copies are not localized today.

[7] Several people were involved in this study that I would like to thank: Jean-Paul Jouval, Marie-Claude Léonelli, Sandra Poëzévara, Blandine Silvestre, Laurent Vallière.

- *September 5-6, 1602*: minutes of the pastoral visit by Marc-Antoine Espagnet, councilor at the Parliament of Provence. Sources: the original is in the lead box in the shrine; known by the copy made by de Remerville circa 1714[8] and the copy made by André-Marius Garcin in 1893[9].

The text mentions «(…) *un vase de verre cristallin de deux pans de hauteur environ ouvré d'or et d'azur dedans et dehors*». A «crystalline glass decorated with gold and azure inside and outside» was used as reliquary for undetermined bones of the Saint Anne's body. The dimension given by the text (two «pans», that is to say around 50 cm) doesn't correspond exactly, but we can consider that it is probably the Islamic vase[10].

- *September 22, 1623*: minutes of the extraction of a portion of relics for the queen Anne of Austria by the chancellor Dagut. Sources: the original is in the lead box in the shrine; known by the copy made by Xavier Mathieu, published in 1861[11].

The text mentions «(…) [les ossements] *qui sont dans la sainte fiole que nous voyons posée au saint-autel* (…)» and further «(…) *aurions procédé à faire fermer l'embouchure d'un grand vase violet chargé de figures à la gothique d'un taffetas rouge cramoisi cousu au rond d'un cordon soie de même couleur* (…)». These two mentions deal with the islamic vase containing Saint Anne's bones: «a great violet vase decorated with Gothic figures» which was closed by a red taffeta.

- *March 12-13, 1673*: minutes of the pastoral visit by monseigneur Jean de Gaillard, bishop of Apt, and Marc-Antoine Despagnes, councilor of the court. Source: the original is held in the musée Paul Arbaud, Aix[12].

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[8] Remerville [circa 1714] 1844, vol. IX, fol. 8.

[9] *Verbal des Reliques de Ste Anne Mère de la Glorieuse Mère de Dieu qui sont dans la cathédrale d'Apt et de St Elzéar* 1602 [1893], fol. 11-12.

[10] H. 38, ø 23 cm.

[11] Mathieu 1861: 155-169, precisely 162 and 166. The author didn't give information on its source.

[12] *Extrait de la visite faite par Monseigneur Lill^me^ et R^me^ Evesque d'apt de son Eglise Cathédrale* 1673.

The text mentions «*Plus avons visité une urne de cristal ou sont de petit fragmens des ossemens de S[sainte] Anne*» (i. e. the Islamic glass containing the bones). This very precise document also testifies to the presence of the veil for the first time, contained at that time in a «white and blue enamelled Barcelona box». We must be careful when reading Mathieu's book: mixing the sources, its mention of «deux belles urnes en cristal» following the description of the visit of 1673 is at the origin of later confusions[13].

- *At an uncertain date, between 1696 and 1714*: Joseph François de Remerville studied the veil for his *Dissertation*[14]. Source: copy of the Remerville's *Histoire ecclésiastique* by Edouard Cartier (1844), Bibliothèque municipale d'Avignon - Médiathèque Ceccano, ms. 1780.

The text of the Avignon's manuscript mentions in a book IX named *Sainte Anne*: «*Reliques* (…) *les fragmens (sic) mêlés avec la poussière paraissent dans une urne diaphane* (…) *il y a encore le suaire des ossements de ste Anne dans une urne de verre* (…)». Two different glasses are mentioned: the «bones mixed with dust» appear in a «diaphanous urn» (the Islamic glass), while the veil is now contained in a «glass urn». It is the first mention of one of the flasks.

The fact that Joseph François de Remerville had access to the veil (he drew the two medallions with Arabic inscriptions) could be explained by his close relationship with the new bishop of Apt, Joseph-Ignace de Foresta de Collongue, just arrived in 1696 and with whom he shared interest for history. Around 1700, it seems that the veil has generated most interest among the scholars[15].

- *26 octobre 1790*, inventory of church ornaments and dishes,

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[13] Mathieu 1861: 75-76.

[14] His *Dissertation historique sur les reliques de sainte Anne* is contained in some exemplars of the *Histoire ecclésiastique du diocèse d'Apt* (it is the book VIII in the Avignon's copy by Cartier in 1844).

[15] Other drawings of the medallions are preserved in a manuscript held in the Apostolic Library in Vatican (ms. Barb. or. 130). They were first considered to be by the painter Paul Mignard in 1661 (Garcin 1912, 71: 1-4, Léonelli 2005: 137-142), but are not dated and could be from the XVIIth or XVIIIth century. See Fontana 1996.

by the mayor and municipal officers. Source: Apt, municipal archives, 5P2[16].

The text mentions «*une bouteille cassée par le pied* (…) *plus une ampoule de matière précieuse fermée d'une étoffe en soye rouge scellée aux armes du chapitre dans laquelle il y a des fragments des reliques de Ste Anne* » (folio 18) ; further in text and located near the more precious reliquaries: «*plus une bouteille de verre doré contenant le suaire de St Anne scellée du sceau du chapitre*» (folio 21). It is the first time that the two flasks are mentioned: an empty bottle with a broken foot (Fig. 1), another one containing the Saint Anne's veil. The Islamic glass containing the bones is still present. At the time, or just before the Revolution, the niche of Saint Anne is represented on a print (Fig. 3).

2. *Assumptions on the date of arrival of the two flasks in the treasure*

One flask is identified in the Remerville relics' inventory at the end of the XVIIth-beginning of XVIIIth century. Both flasks are clearly identified in the treasure only in 1790. When did they arrive? Let's quote the different hypothesis in question.

1st hypothesis: the flasks have joined the treasure shortly after their creation, around 1500 or in the first half of the XVIth century. Xavier Mathieu underlines the importance of the gifts related to the cult of Saint Anne from the XIVth to the XVIIth century[17]. Objects could have been offered to the chapel by eminent clergy members, rich inhabitants of the region or illustrious visitors from the country or foreigners. Italy is not far and has played an important role in the economy and culture of Provence. Avignon and the Comtat Venaissin belonged to the Pontifical States from the XIIIth century to 1791. However, if the flasks were already present in the treasury or in the church, they were not yet used as reliquary.

2nd hypothesis: the flasks could have been offered later to the church, during the XVIth or even the XVIIth century, when this type

[16] *Inventaire des ornements et vaisselle de l'église* 1790.

[17] Mathieu 1861: 70-91.

of object was no longer manufactured or popular. Precious works of art from Middle Ages or Renaissance taken from rich collection and offered later are known. The Chapel of Saint Anne in Apt had a close relation with royalty during the XVIIth: the queen Anne of Austria obtained Saint Anne's finger relics in 1623 and accomplished later the vow she made at that time for the birth of a son (the future Louis XIV). However the flasks did not appear among her precious gifts in 1661[18]. They would probably have been too modest in comparison to the goldsmith works.

3rd hypothesis: could the flasks be given just at the end of the XVIIth century, after 1673 – date of the pastoral visit by Jean de Gaillard whose minutes inform us that the veil was still conserved in an enamelled box – and before the redaction of the Book IX by Remerville (at the latest in 1714) where he evoked the veil contained in a flask? It can be assumed that the pair (the two glasses are almost perfectly identical) was present in the church around 1700.

Although this third hypothesis is very attractive, it remains impossible to precisely date the arrival of the flasks in the treasury of Apt. Nevertheless it is now accepted that one of them was used as a reliquary for the veil probably from around 1700. It is unfortunate that many first-hand documents have disappeared and there is still work to be done to locate them.

REFERENCES

Original manuscripts

Extrait de la visite faite par Monseigneur Lill^{me} et R^{me} Evesque d'apt de son Eglise Cathédrale. March 12-13, 1673. 8th document (without folio numbering). In *Registre des visites pastorales 1638-1659*. Aix-en-Provence, musée Paul Arbaud.

Inventaire des ornements et vaisselle de l'église. October 26, 1790. Apt, municipal archives, 5P2.

Sommaire des authentiques des reliques de sainte Anne Patronne de la ville d'Apt placés dans une boîte de plomb. September 25, 1835. Apt, parish archives.

[18] Mathieu 1861: 74.

Second-hand manuscripts

Procès-verbal de l'ouverture de la chasse de sainte Anne. June 12, 1893 (photocopy, original not localized). By the hand of André-Marius Garcin, secretary of the Fabrique. Apt, municipal archives.

Remerville, Joseph-François (de). *Histoire ecclésiastique de la ville et du diocèse d'Apt* [circa 1714]. Copied by Édouard Cartier, Apt, 1844. Bibliothèque municipale d'Avignon - Médiathèque Ceccano, ms. 1780. This exemplar contains the books VIII (*Dissertation sur les reliques de Sainte Anne*) and IX (*Sainte Anne*). A research still needs to be done to find the original Remerville's manuscript.

Verbal des Reliques de Ste Anne Mère de la Glorieuse Mère de Dieu qui sont dans la cathédrale d'Apt et de St Elzéar. September 4, 1602 (photocopy, original not localized). By the hand of André-Marius Garcin, secretary of the Fabrique. Apt, municipal archives.

Printed sources

Barbe, Françoise and Fernando Filipponi. 2017. Les verres émaillés vénitiens de la Renaissance : le projet *Cristallo*. In *Annales du 20e congrès de l'Association Internationale pour l'Histoire du Verre (Fribourg/Romont 7-11 septembre 2015)*, edited by E. Baumgartner, S. Fünfschilling, M. Gartenmeister *et al.* Fribourg/Romont: Verlag Marie Leidorf GmbH.

Fontana, Maria Vittoria. 1996. A 17th-18th century manuscript (Vatican Library, ms. / Barb. Or. 130) reproducing the inscription on Roger's mantle and the roundels of the 'Veil of St Anne'. *Oriente Moderno*, Nuova serie, Anno 23 (84), 2: 427-448 (Kunst und Kunsthandwerk im Islam 2. Bamberger Symposium der Islamischen Kunst 25-26 Juli 1996).

Garcin, André-Marius. 1912. Les pièces les plus curieuses du trésor de Sainte-Anne. Le voile ou suaire de Ste-Anne d'Apt conservé dans le trésor de la basilique d'Apt. *Bulletin paroissial et revue de Sainte Anne d'Apt* 1er novembre, 71: 1-4.

Léonelli, Marie-Claude. 2005. Le voile de sainte Anne de l'ancienne cathédrale d'Apt (Vaucluse). Une relique derrière les verres. In *Regards sur l'objet roman (Actes du colloque, Saint-Flour 7-9 octobre 2004)*, edited by B.H. Papounaud and H. Palouzié. Arles: Actes Sud.

Mathieu, Xavier. 1861. *De la dévotion à sainte Anne mère de la vierge Marie, ou Du culte que l'on rend à ses reliques dans l'ancienne cathédrale d'Apt en Provence*. Apt.

Poëzévara, Sandra and Yann Codou. 2019. *Saintetés aptésiennes, Trésors, architecture et dévotions dans une cité épiscopale.* Apt: Ville d'Apt Editions.

Fig. 1 - *The flask with the broken foot analysed by the C2RMF in 2016*, h. 36 cm., l. 20,3 cm., w. 9,6 cm. (© C2RMF / Anne Maigret).

Fig. 2 - *The flask with the veil and the Islamic vase put on the XIXth century copy of the veil*, 1895 (© Ministère de la culture, Médiathèque de l'architecture et du patrimoine, Diffusion RMN-GP, photo by Médéric Mieusement, 1840-1905).

Fig. 3 - *Sanctae Aptensis Ecclesiae Lipsanodochium* (Reliquary of the holy church of Apt) engraved by Basset in Paris, circa 1780-1790. At the center, the crowned bust reliquary of Saint Anne, below the busts of saints Castor, Auspice and Martian; on the two sides of Saint Anne, two shrines; ahead four arm reliquaries, statuettes and a long-naked vase which probably figures the Islamic enamelled glass (© Musée d'Apt).

Elena Anisimova

RENAISSANCE VENETIAN GLASS WITH ENAMEL PAINTING FROM THE STATE HERMITAGE MUSEUM COLLECTION (ST. PETERSBURG)

The State Hermitage Museum has a large collection of Venetian glass, located in the Department of Western European Decorative and Applied Arts. Its pride consists of twenty objects, decorated with enamel paintings and historically attributed to the Renaissance Venice. They date from the end of the fifteenth to the beginning of the sixteenth century. The importance of these items for the Hermitage collection is evidenced by the fact that almost all of them are on permanent exposition.

The history of their admission to the museum is different. The first 11 glasses were taken in the eighteen eighty-fifth as part of the collection of Alexander Basilewsky. Almost all of them were published in the catalog, written by Basilewsky himself and museum curator and art critic Alfred Darcel[1]. Unique handwritten letters made by Darcel in the Hermitage copy of the catalogue make it possible to trace the history of some objects. So the blue glass pitcher was bought by Alexander Basilewsky in eighteen sixty from the Paris collection of Louis Fould[2], and a jug of purple glass[3] was bought after eighteen seventy-fourth from the Alessandro Castellani collection.

Four objects entered the Hermitage in nineteen thirty-two from the collection of the Baron Stieglitz Museum. A dish with coat of arms was bought in eighteen eighty-six as part of the Adolphe Goldschmidt

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[1] Darcel and Basilewsky 1874.

[2] *Jug*, Venice, last quarter of the 15th century, colorless glass, painting with colored enamels, gilding, Inv. N F-473.

[3] *Jug*, Venice, last quarter of the 15th century - beginning of the 16th century, colorless glass, painting with colored enamels, gilding, Inv. N F-470.

collection. Four other objects were purchased in Frankfurt-am-Main in the same year from the Louis Ricard-Abenheimer collection.

Two glasses were transferred to the Hermitage in nineteen twenty-six from the nationalized private collection of Russian aristocrats Shuvalovs.

The last acquisition was a bowl purchased from a private collection in nineteen fifty. Its price was one thousand two hundred rubles[4]. The bowl has two handles and serpentine rays with white and black centers, similar to those depicted on the goblet from the Metropolitan Museum of Art[5]. Now it is attributed to Venice and dates around fifteen hundred.

A masterpiece of our collection are two unique objects of milk glass. The flask depicts a scene from the history of Apollo and Cypress, based on an engraving by Benedetto Montagna, crafted around 1510 (Fig. 1). The basis of the composition was a wood engraving from Ovid's Metamorphosis Venetian edition of 1497. In another medallion, a red enamel made drawing "alla porcellana" (Fig. 2), fashionable in the sixteenth century, imitating Chinese porcelain painting: on a white background, a monochrome pattern made from floral motifs[6].

Another jar with the image of the Agnus Dei, also dates around 1510 -1520[7].

The green glass jug was found as a result of archaeological excavations by Nikolay Veselovsky. Excavations took place near the village of Belorechensk, located in Krasnodar area, the North Caucasus region in Southern Russia. The jug was in a wooden brocade coffin. It stood at the head of the deceased and was covered with a piece of silk. At the bottom of the jug there were small grains[8]. Owing to its provenance, the jug is in the collection of the Oriental Department of the Hermitage.

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[4] *Bowl with two handles*, Venice, about 1500, colorless glass, painting with colored enamels, gilding, h. 11,4 cm, ø 13,4 cm, Inv. N F-3509.

[5] Lanmon and Whithouse 1993: 12-15, no. 2.

[6] *Flask*, Venice, 1510-1520, milk glass, painting with colored enamels, gilding, h. 20,0 cm, Inv. N F-468.

[7] *Jar*, Venice, 1510-1520, milk glass, painting with colored enamels, gilding, h. 6,0 cm, Inv. N F-519.

[8] *Report of the Archaeological Commission for 1896* 1898.

Traditionally attributed to Venice, a two-handled bowl, decorated with a gold-plated scaly ornament and with an enamel dot in the center[9] (Fig. 3). It dates to about 1500. The bowl was acquired by A. Basilewsky after 1874 and is not included in his catalog. The poor preservation of the object (the glass was badly damaged, the painting was partially lost) made us start its technological researching in February 2019. The study was conducted on 12.02.2019 by Alexander Kosolapov and Ksenia Chugunova in the Department of Scientific and Technical Expertise of the State Hermitage museum.

The analysis were made by using the ArtTAX spectrometer and a Scanning Electron Microscopy coupled with Energy Dispersive X-ray (SEM / EDX).

Visual inspections showed that the glass is badly damaged. On the surface there are craquelures and small flakes. Samples / flakes from the surface of the bowl have a more or less regular shape, often presented on archaeological glasses.

The results of the analysis showed that the bowl is made of potassium-silicon glass. Thus, the study refuted the attribution of this bowl to Venetian production (Tab. 1).

A very high chlorine content indicates the effect of acid on the glass surface.

The bowl was examined with an electron microscope: the morphology of the glass sample demonstrates a multilayer horizontal structure - the result of periodic leaching under the influence of chlorine, which probably occurred through periodic changes in relative humidity. They probably arose as a result of changes in humidity during annual floods, possibly under burial conditions (Fig. 4).

It was also conducted a study of the blue glaze. Its coloring matter is cobalt. In this case, we see lead glaze, the opacifier of which is tin oxide. The composition of the blue glaze is also not typical of Venetian glass (Tab. 2).

Since the bowl is made of potassium-silicon glass, we can attribute it not as Venice. The dating of the bowl also raises many questions. On the one hand, its painting is typical for Venetian glass

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[9] *Two-handled bowl*, pink glass, painting with colored enamels, gilding, h. 9,5 cm., ø14 cm, Inv. N F-469.

of the late 15-16th century. On the other hand, the shape of the bowl allows it to be dated no earlier than the 17th century. Analysis of the composition of the glass did not allow clarifying the attribution of the item. However, we cannot say with certainty that the bowl is a fake of the first half or mid-19th century. A. Bazilewsky acquired the bowl between 1874 and 1885. The state of its preservation, as shown by research in the Department of Scientific and Technical Expertise of the State Hermitage museum, does not exclude an archaeological origin of the item. In any case, the bowl has been exposed to negative environmental influences for a long time. Further research, perhaps, will clarify the time of its creation and place of production.

This study is a small contribution to the history of the research of the Venetian collection in the State Hermitage Museum. I hope that this research will continue in the future. Traditionally, these objects are considered in our museum as the work of the Venetian masters of the Renaissance. Perhaps now is time to take a different look at their attribution, but this work is in the near future. I will be glad to any lights that will help me in studying our collection.

REFERENCES

Darcel, Alfred and Aleksandr P. Basilewsky. 1874. *Collection Basilewsky. Catalogue raisonné, précédé d'un essai sur les arts industriels du I^er^ au XVI^e^ siècle*. Paris: Morel.

Kramarovsky, M. 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.

Lanmon, Dwight P. and David B. Whithouse. 1993. *The Robert Lehman Collection. Glass. The Metropolitan Museum of Art*, Vol. 11. New York: The Metropolitan Museum of Art.

Report of the Archaeological Commission for 1896 [ОТЧЕТ ИМПЕРАТОРСКОЙ АРХЕОЛОГИЧЕСКОЙ КОМИССИИ ЗА 1896 ГОД]. 1898. St. Petersburg: The Main Department of Domains Press.

Tab. 1 -The results of SEM / EDX analysis.

	Quantitative chemical composition of glass (SEM-EDX) in wt% of oxide								
	Na_2O	MgO	Al_2O_3	SiO_2	K_2O	CaO	MnO	FeO	PbO
Max	0,52	0,47	2,95	88,55	8,83	0,88	0,15	0,3	1,07
Min	0,29	0,22	1,91	83,96	6,33	0,53	0,03	0,11	0,82
Average value	**0,35**	**0,33**	**2,33**	**87,28**	**6,98**	**0,66**	**0,09**	**0,2**	**0,92**
Standard deviation	0,08	0,08	0,3	1,45	0,79	0,13	0,04	0,06	0,09

Tab. 2 - The results of x-ray microanalysis glaze.

	Weight.% Oxide													
	Na_2O	MgO	Al_2O_3	SiO_2	K_2O	CaO	MnO	FeO	CoO	NiO	CuO	As_2O_3	SnO_2	PbO
Max	1,2	0,36	5,36	53,03	11,17	1,28	0,14	1,56	4,62	0,42	0,36	0,82	1,5	28,54
Min	0,37	0,12	4,18	45,61	8,38	0,41	0	0,71	3,70	0,27	0,01	0,39	0,26	23,08
Average value	**0,69**	**0,24**	**4,85**	**49,82**	**10,52**	**0,64**	**0,05**	**1,03**	**4,17**	**0,35**	**0,19**	**0,63**	**0,75**	**26,07**
Standard deviation	0,31	0,09	0,46	3,05	1,06	0,32	0,06	0,35	0,39	0,05	0,14	0,16	0,49	2,15

Fig. 1 - *Flask depicting a scene from the history of Apollo and Cypress*, Venice, 1510-1520, milk glass, painting with colored enamels, gilding, h. 20,0 cm. St. Petersburg, The State Hermitage Museum, Collection A. Basilewsky, Inv. N F-468 (© The State Hermitage Museum, St. Petersburg, photo by Vladimir Terebenin).

Fig. 2 - *Back side of the flask* (Fig. 1), Venice, 1510-1520. St. Petersburg, The State Hermitage Museum, Collection A. Basilewsky, Inv. N F-468 (© The State Hermitage Museum, St. Petersburg, photo by Vladimir Terebenin).

Fig. 3a,b - *Two-handled bowl*, façon de Venise, first half of the 16th century, pink glass, painting with colored enamels, gilding, h. 9,5 cm., ø 14 cm. St. Petersburg, The State Hermitage Museum, Collection A. Basilewsky, Inv. N F-469 (© The State Hermitage Museum, St. Petersburg, photo by Vladimir Terebenin).

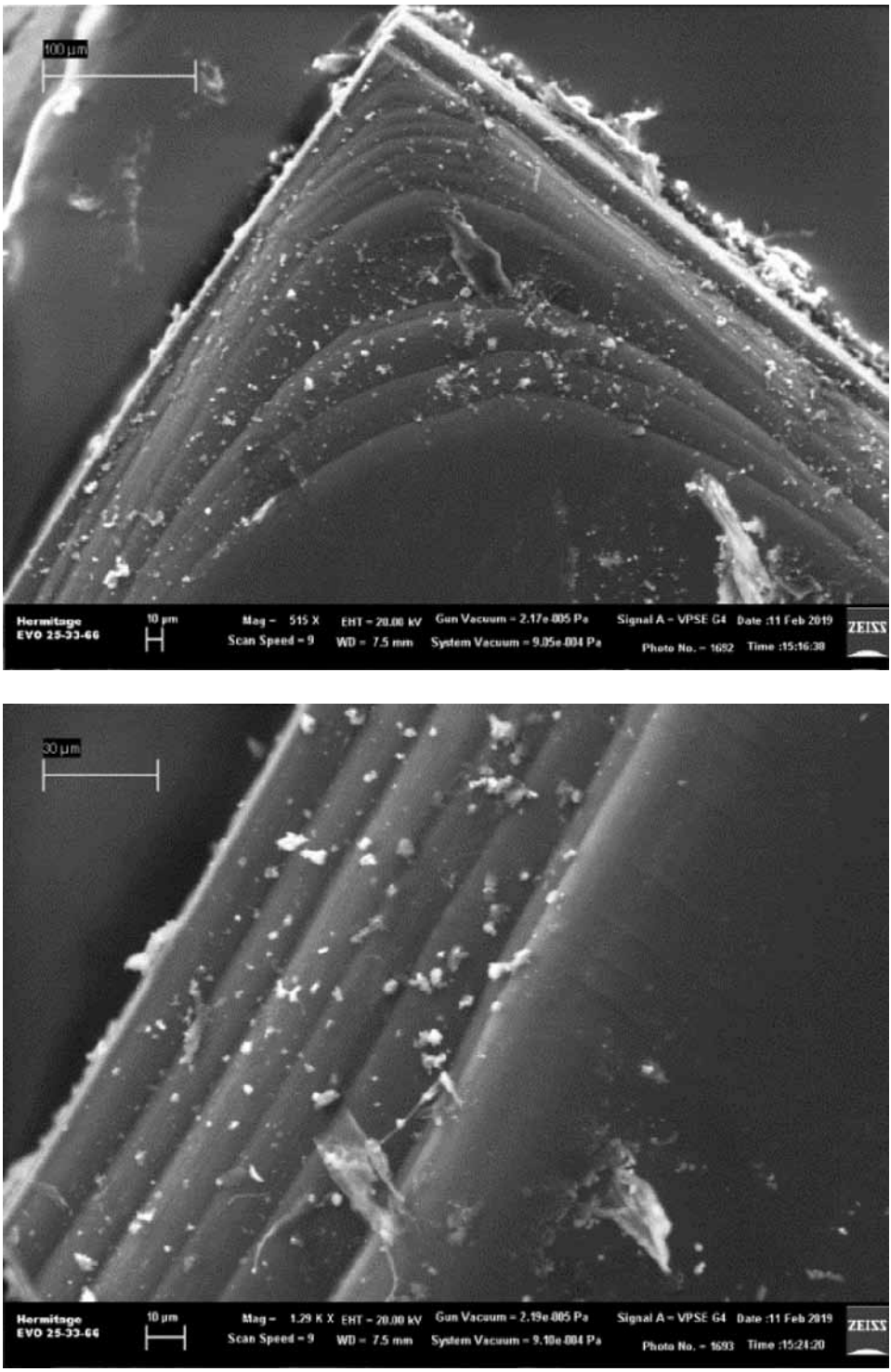

Fig. 4 - *The surface of the glass is covered with flaky particles, which are lighter than the glass itself.*

Silvia Ferucci, Rosa Barovier Mentasti and Cristina Tonini

THE RENAISSANCE ENAMELLED VESSELS FROM PADUA SANTA CHIARA MONASTERY

Foreward[1]

The glass vessels that underwent conservation treatments came from Santa Chiara monastery in Padua. The earliest information on the convent dates back to 1325[2]. The convent flourished between the 14th and the 18th century and after a period of decadency, it was eventually suppressed in 1797[3]. The religious building was demolished in the 1960s[4], to leave room to a new construction. What was left of it was found in 2000 during an archaeological excavation when a hexagonal structure came to light[5]. It was probably initially used as an icehouse, later becoming the domestic midden of the nuns. A large number of glass portions and fragments were found among other materials such as ceramic, worked bone, wood, fabric, leather and metal[6]. It was possible to remove the content just partially due to safety reasons[7]. The finds included domestic crockery and figured terracotta, personal ornaments and clothing accessories, personal care items, tools and elements connected with the furniture.

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[1] By Silvia Ferucci.
[2] Cozza 2011: 12.
[3] Cozza 2011:13-16.
[4] Cozza 2011:16-17.
[5] Cozza 2011: 29-33.
[6] Cozza 2011: 35.
[7] Cozza 2011: 115.

1. *Historical and artistic notes*[8]

1.1. *Beakers with Annunciation and putti*

During the archaeological excavation campaign in the old site of the Santa Chiara Convent in Padua hundreds of glass and maiolica fragments were found in the years 2000-2001. The glass fragments are consistent with the style and techniques of Murano luxury glass of the last quarter of the 15th century and the first quarter of the 16th century. Among the first restored glass pieces, one simple blue beaker, enamel decorated with the *Annunciation*, was published in 2002 (Fig. 1a,b,c)[9]. Finally, Silvia Ferucci, conservator, was able to put other fragments back together, obtaining overall four beakers with *Annunciation*[10] (Figs. 1a,b,c, 2a,b, 3-4). Moreover, two beakers of the same cylindrical shape, probably made in the same glassworks and likely enamelled by the same decorator, were also recovered (Figs. 6-7). On the walls of the latter are enamel painted playing winged putti. These six beakers seem uncommon, in comparison with other Venetian vessels of the Renaissance, because they show a very simple shape combined with a complex enamelled decoration.

Gold leaf bands with horizontal scratched lines and, below, a dogtooth pattern or an embattled pattern ornate their rim. This kind of gilt frieze characterizes some Venetian enamelled glass vessels dated from the sixties of the 15th century to the early 16th century[11].

The four Padua beakers with the *Annunciation* show the Virgin announced and the archangel Gabriel, each inside a roundel, respecting the same arrangement of visual elements (Figs. 1a,b,c, 2a,b, 3-4.) They only differ as to some details of the roundel frame and of the figures. While the frames on the other three *Annunciation* beakers are

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[8] By Rosa Barovier Mentasti and Cristina Tonini.

[9] Cozza 2002: 141, 143; Cozza 2010: 87, 282, 494, no. I.22; Cozza 2011: 95-97, f. 122.

[10] Cozza 2016: 92-93.

[11] We remember the blue goblet of the Museo Civico Medievale in Bologna and the Barovier standing bowl in the Murano Museo del Vetro as earlier examples, and three renowned *lattimo* pieces, the Trento goblet, the Bolzano beaker and the Cleveland beaker, as later ones.

undecorated, the roundel frame on one of the beakers (the first restored and published) is characterized by a laurel wreath. This individual beaker is surprisingly similar to an *Annunciation* blue beaker kept in the Musée Jacquemart André, Paris (Fig. 5)[12]. Édouard André (1833-1894) and Nélie Jacquemart (1841-1912), his wife, collected Italian art and decorative art, showing a particular interest also in Venetian art.

The Annunciation was a subject of Venetian enamelled decoration on glass since the early seventies of the 15th century, at least. Indeed, a list, dated 31 March 1474, of glass beakers painted by Giovanni da Lodi, enameller active in Murano, includes a beaker with the Annunciation (*uno cieto a nuntiata*). The cost of this decorative work is quite high (2 lire that is 40 soldi) in comparison with the cost (4 soldi and half) of vegetal decoration (*ad foiamina*) and with the cost (9 soldi) of decoration with figures (*cum figuris*), probably human figures not organized in a scene[13]. Just three years before, in 1471, Sixtus IV, became Pope. Belonging to the order of Conventual Franciscans, he promoted the devotion to Virgin Mary and the dogma of Immaculate Conception and restored the Sistine Chapel, dedicated to the Virgin herself[14]. The dogma of the Immaculate Conception states that the Virgin was preserved exempt from all stain of original sin in the first instance of her conception. Proofs of this were considered some passages of Old Testament and, in the Gospel of St Luke (I, 28), the salutation of angel Gabriel in the Annunciation: *Ave Maria, gratia plena* (full of grace; greek: κεχαριτωμένη) by Catholics. Therefore, the subject of the Annunciation was exceptionally successful in Italian arts and decorative arts, because considered dogmatically significant.

As to the beakers with winged putti, such figures of archaeological inspiration were frequent in early Renaissance art in Venice and in Veneto area: marble bas-reliefs, paintings, illuminations and also

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[12] Syson 2006: 101.

[13] Zecchin 1990: 126-127, 151.

[14] Franciscans promoted the dogma of the Immaculate Conception while Dominicans were doubtful about it, until the dogma of the Immaculate Conception was officially proclaimed by Pius IX in 1854. A crystalline vessel containing pure water is sometimes depicted in Annunciation paintings as a symbol of such privilege since the 15th century.

the upper, older part of the grand stained window in Venetian Santi Giovanni e Paolo Church, to mention a specific glass work[15]. Ancient models for this subject were not lacking. Very famous in the city were two marble reliefs, now in the Museo Archeologico Nazionale in Venice, pertaining to a single slab and conventionally known as the «putti from the throne of Saturn», dated to the 1st century AD. They came from San Vitale Church in Ravenna and were already mentioned in 1335 in Venice. Placed above an arch near San Marco Square since the first half of the 15th century, then moved to Santa Maria dei Miracoli Church, they were appreciated as outstanding examples of classical sculpture art by main artists, like Donatello, Pietro, Tullio and Antonio Lombardo, Andrea Mantegna, and, later, Titian. They all took inspiration from such reliefs[16].

A valid comparison for these Padua beakers, particularly for the beakers with enamelled *putti* (Figs. 6, 7), is the famous Fairfax cup, housed in the Victoria & Albert Museum (inv. no. C.17-1959) (Fig. 8a,b). The latter is actually a beaker, whose simple shape is the same as the one of the Padua beakers, even if a little smaller (H. 9,4 cm.; D. 6,7 cm.). Some details distinctively associate the Padua individual beaker decorated with blond-haired putti with the Fairfax cup: the gold band horizontally scratched just below the rim, the band with vertical dark segments (blades of grass?) which underlines the bottom of the scene, the dense spots on the background and the rendering of the figures' hair. Putti's hair style on one of Padua beakers is particularly significant because, almost always, antique and Renaissace putti or cupids have curly hair, while the Padua ones have straight hair as the figures painted on the Fairfax cup.

The Fairfax cup arrived at the V&A Museum enclosed in its own fitted wooden case bearing the seal of Sir Thomas Belasyse as Lord Fauconberg (1577-1653)[17]. The case was in turn enclosed in a wash-leather bag containing a slip of paper inscribed: «In this bag is the Antient Cup of our Familye putt into this bagg, August the 21 1694, by

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[15] The pointed arches of the upper part, dated to the late 15th century, of the grand stained window show other antiquarian motifs together with six playing putti.

[16] Favaretto 2002: 34-37; Beschi 2003: 203-209; Favaretto, De Paoli and Dossi 2004: 83.

[17] Charleston 1984: 46-47, pl. 9c; Liefkes 1997: 49.

me. C. ffairfax». The beaker was an heirloom. Indeed, the mother of Sir Thomas Belasyse, Ursula, was a Fairfax of Denton and his grandmother a Fairfax of Gilling Castle, belonging to a family well known since the 14th century. «C. ffairfax» was supposed to be Charles Fairfax of Emley (1631-1711).

In 1791, Lady Anne Belasyse married Sir George Wombwell, 2nd Baronet of Wombwell. Their son, George Wombwell, 3rd Baronet, inherited the Belasyse estates on the death of his aunt Charlotte Belasyse, when her family became extinct. Therefore, the Fairfax cup passed to the Wombwell family. In 1959 Captain Victor Malcom Wombwell (1893-1986) sold the glass at an auction of Sotheby's so that it was acquired by the V&A Museum[18].

The Fairfax cup was dated to the late 15th century - early 16th century or to the last quarter of the 15th century. Actually, it can be dated to 1480 ca or to the eighties of the 15th century, as well as the similar beakers found in Santa Chiara site, Padua, which might be included among the oldest glass pieces of that context.

The V&A Museum beaker is made of opaque turquoise blue glass, which changes to amethyst-red colour by transmitted light. This effect might be obtained by chance, as sometimes in glass working happens. Indeed, we know two other whole vessels of opaque turquoise glass attributed to Venetian Renaissance, besides some fragments found in Santa Chiara excavations, four fragments excavated in Southampton and one in Budapest[19]: the famous betrothal goblet in the British Museum and a standing cup in the V&A Museum, both profiled with *lattimo* threads and painted with enamels of the same colours[20]. All

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[18] The Fairfax Cup 1959: 32-33*;* Barovier Mentasti, Dorigato, Gasparetto and Toninato 1982: p. 83, no. 72, pl. X; Charleston 1984: 46-47; Liefkes 1997: f. 52.

[19] For the fragments of Southampton: Thornton *et al.* 2014: 4; The Padua fragments (Soprintendenza Archeologica, Padua, inv. no. PD 2000 US 1160) are profiled with white threads. We thank Hedvika Sédlačková, who gave the photo and information about the fragment found in Budapest. See: Gyürky 1981: 94, pl. XLIV. Several fragments of a handled vase of opaque turquoise glass were found in Urbino recently.

[20] Barovier Mentasti and Tonini 2013: no. 3. The goblet of the British Museum and the standing cup of the V&A Museum are probably products of the same glassworks and dated to the early 16th century. Thornton *et al.* 2014: 1-11.

these latter pieces are not dichroic and probably products of the early 16th century.

Opaque turquoise glass is mentioned in Muranese papers. Indeed, the inventory of Marietta and Giovanni Barovier, dated 1496, includes *sechieletti de turchese* (small buckets of turquoise glass) and the inventory of Tommaso Dragan, dated 1532 but referring to products of 1523, *coppe de latimo e rabico depente, parte dorade et manegade* (bowls of lattimo and opaque turquoise glass painted, some of them gilded and handled)[21]. Moreover, *una taza de smalto turchino dorata* (a gilt cup of opaque turquoise glass) was among the goods owned by Eleonora d'Aragona, duchess of Ferrara, when she died, in 1493[22] and a *vasetto de vitro turchino con le arme del sole suso* (a small vase of turquoise glass, painted with the device of the sun), is listed among the goods of Ludovico, son of Andrea Mantegna, in 1510[23].

The Fairfax beaker is enamel decorated with a continuous scene which synthesizes the most tragic moments of the story of Pyramus and Thisbe, which was narrated in *Metamorphoses,* a poem by Ovid. The poem survived in some manuscripts throughout the Medieval centuries. Dante mentions Pyramus and Tysbe in the *Divina Commedia* and Francesco Petrarca in his *Triumphi*[24]. In 1361-1362, Giovanni Boccaccio wrote *De claris mulieribus,* a Latin treaty which includes one hundred and six biographies of famous women. The thirteenth biography is: *De Tisbe Babilonia virgine,* for which Boccaccio heavily relied on the *Metamorphoses*. A youth and a girl fall in love but they are forbidden by their parents to be wed. The lovers arrange to meet in a forest, near a fountain. Thisbe arrives first but, threatened by a lion with its mouth bloody for a recent kill, she flees, losing her mantle, on which the beast leaves traces of blood. Pyramus arrives and stabs himself with a sword, thinking that his love died, seeing her bloodstained mantle. Thisbe returns and, finding her lover dying, she, too, throws herself on his sword.

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[21] Zecchin 1989: 212; Zecchin 1990: 61.

[22] Barovier Mentasti and Tonini 2013: 212.

[23] Signorini 1996: Ludovico inherited the goods of his father, died in 1506, who had obtained the use of the device of the sun from Ludovico Gonzaga in 1459, a part of the Gonzaga arms.

[24] *Divina Commedia*, *Purgatorio*, XXVII: vv. 37-39; *Triumphus Cupidinis*, III: v. 20.

This story inspired mainly craftsmen, who decorated caskets made of ivory, bone or rare wood in late Medieval period or *pastiglia* in early Renaissance, as well as combs, mirrors and other small beauty tools. Very similar to the scene of the Fairfax cup is the story painted on seven small wood tablets, which decorated, with many others, the ceiling of Ricchieri Palace in Pordenone, Friulian city. They are dated to the early 15th century[25]. Another piece strictly connected with the beaker and the Ricchieri tablets is a maiolica tile, belonging to a set of 346 floor tiles, kept in Museo Nazionale of Parma, Pilotta Palace. They were probably produced in Faenza in the years 1471-1482 and they come from San Paolo Convent, Parma[26]. The figures painted on these pieces wear modern dresses, while Pyramus and Thisbe on Italian maiolica vessels of the 16th century wear ancient style dresses.

The main group on Fairfax cup seems to be copied from one (fol. 15v) of the several woodcut illustrations of *Von Etlichen Frowen*, German translation, printed in Augsburg in 1479 (Fig. 9) of *De claris mulieribus* by Giovanni Boccaccio (fol. 14r)[27]. This woodcut shows the hexagonal fountain and, to its right, Pyramus, died, and Thisbe falling on the same sword which killed him. The lion biting her mantle is in the foreground, while, on the glass beaker, it is painted on the left side of the fountain. The continuous decoration of the beaker includes previous happenings of the story, such as the escape of Thisbe from the lion and the arrival of Pyramus at the fountain. On the opposite side to the dying lovers, an unexpected figure is painted: the bust of a woman, probably Thisbe herself, within a vegetal frame or wreath, high in the sky. This particular image recalls figures of saints, in the centre of a cloud or a circle of rays, who look at human beings or protect them from heaven, in devotional paintings and prints, or, less frequently, other figures in allegoric scenes[28]. Is, here, Thisbe considered a saint protector of thwarted lovers? Anyway, this figure fills an empty space on the wall of the beaker.

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[25] Ganzer 2008: 56-58, ff. 7-11.

[26] Fornari Schianchi 1988: 16, 46, 163, f. 92.

[27] The translator was Heinrich Steinhöwel and the printer Anton Sorg, Augsburg.

[28] We recall, for example, Justice, Temperance and Fortitude, looking, from a cloud in the sky, at *Minerva overcoming the Vices* in the well known painting by Andrea Mantegna (1500-1502), commissioned by Isabella d'Este, now kept in the Louvre.

The hexagonal shape of the fountain is not rare in the visual arts of the 15th century and early 16th century. For example, in Venice, several wooden stalls of the choir in the Santa Maria Gloriosa dei Frari Church are inlaid with similar fountains. This wooden inlaid, made by Francesco and Marco Cozzi from Vicenza, was finished in 1468. On the contrary the umbrella-shaped trees, perhaps unique in enamelled glass, are archaic. They are typical in scenes of carved ivories attributed to the Embriachi workshop, active from 1370 to 1430 (?) probably before in Florence then in Venice, but they are present also in later North-Italian carved ivories[29].

The woodcut of Pyramus and Thisbe in *Von Etlichen Frowen* was in turn a copy of the same illustration in the Latin *editio princeps* of *De claris mulieribus,* published in Ulm in 1473, whose woodcuts are reversed in comparison with the later German edition and the decoration on the Fairfax cup[30]. Therefore, the enamel decoration on the Fairfax cup derives from the German edition of 1479. The Venetian cup is probably dated shortly later, to the early eighties of the 15th century. This dating to the early eighties of the 15th century is consistent with the depiction of ancient figures (Pyramus and Thisbe) clothed in Gothic dresses, as ancient and mythological figures gradually began to dress in antique style during the last third of the 15th century in Italian visual arts[31].

1.2. *Sprinklers*

Among the glass fragments from Santa Chiara convent, two sprinklers were recovered. These are called, in old Venetian language, *acanini* (Figs. 10a,b, 11). The word derives from the Arabic language: *al-qinnina*, which means bottle, phial. Moreover, their shape derives from Eastern sprinklers, made in metal and glass, named *qumqum*, used for scented waters. Since Medieval times, these artefacts were in production

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[29] Martini 1993: 98-101 (an ivory plaque, dated third quarter of the 15th century, in the Museo Nazionale di Ravenna).

[30] The printer was Johannes Zainer, Ulm.

[31] It was «the re-integration of classical form and classical subject matter» in visual arts. It was anticipated by individual artists, as Jacopo Bellini and Andrea Mantegna in Veneto. See: Panofsky 1965: 177.

in the Levant, as attested by some pieces housed in public collections[32]. They were also exported to Italy as attested by some examples kept in some Tuscan houses. For instance, among the glass items, recorded in two household inventories (1397, 1399) of the Florentine home of the renowned merchant Francesco Datini, are quoted a *inpolla da ttenere aqua rossa, che vene di Domascho* (bottle or phial to contain rose water coming from Damascus) and one *anpola di Domascho d'aqua rosata chomese a oro* (one bottle or phial of rose water from Damascus ornamented [inlaid?] with gold) kept in the cupboard of glassware[33]. Rose and orange scented waters from the Levant were particularly appreciated and highly requested by Western markets. Thus, this luxury commodity was also imported to Venice during the Middle Ages and Renaissance. Evidence of this is found in a letter by Martino Merlini, a Venetian merchant, who had strong commercial ties with the Levant. In this letter, dated 1512, Merlini requests his brother, Giambattista, to bring back some specific goods, including *qualche achanin d'aqua ruoxa* (some sprinklers containing rose scented waters), from that region[34]. Unfortunately, the material of Merlini's sprinklers, either metal or glass, remains unknown.

Scented waters of Levantine origin, delivered to Venice, were sometimes poured in Venetian glass items, as was the case with the gifts sent to the duke of Burgundy, Philip the Good, and the King of England, Henry VII, by the Venetian Republic, in the years 1458-1468. These gifts included some *zuche de vero dorado d'aqua ruoxe* (Pumpkin-shaped gilt glass flasks containing rose water)[35]. The *zuche* were containers useful to store or transport various liquids, such as wine, rosewater or ink[36]. Therefore, the *zucchette de aqua rosa damaschina* (small pumpkin-shaped flasks with rose water of Levantine origin), sent to the marchioness of Mantua, Isabella Este Gonzaga, by one of her envoys in Venice in 1515,

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[32] Carboni 2001: 150-151.

[33] Spallanzani 2012: 58-59. Spallanzani quotes also another inventory of Coppo di messer Arnaldo Mannelli's estate (1425) where is mentioned *1 ampolla damaschina d'aqua rosa*.

[34] Dalla Santa 1916-17: 1579. In Martino Merlini's letters are, also, mentioned the export of *veri cristalini* to the Levant and the request of Venetian enamelled glasses from that country: Zecchin 1987: 244-245.

[35] Barovier Mentasti, Borrelli and Tonini 2019: 160.

[36] Barovier Mentasti and Tonini 2019: 6, 64, fig. 27.

were, probably, made of glass[37]. Earlier, in 1502, Lorenzo da Pavia, one of her trusted agents in the Serenissima, in charge of selected glass purchases, sent her another kind of scented water, a type of rosewater, named *aqua moscheta*, contained in an *acavino* i. e. *acanino*[38].

Throughout the 16th century, the word *acanino* recurs in the inventories of Murano glassworks to indicate sprinklers, similar to Islamic prototypes. For instance, these glass items are mentioned in a paper from Dragan glasshouse (1508) as *acchanini grandi et mezzani lavoradi a la damaschina* (sprinklers of large and medium size with Damascene decoration) and, at the end of the 16th century, in a list of glassware (1590) made by Pietro Ballarin. These are recorded as *acanini indoradi*, *acanini chiari indoradi* (gilt sprinklers and gilt clear sprinklers) to ship to Constantinople[39] . Therefore, in the 16th century, glass sprinklers of Islamic style were exported from Murano to the Levant, as attested also by other archive sources and archaeological glass finds[40].

Scented waters, contained in sprinklers or flasks, were a luxury commodity, purchased not only by Renaissance women of the élites but also highly appreciated by eminent male personalities. For instance, *7 fiaschi d'aqua rosata* (7 flasks of rosewater), mentioned in a Rome custom paper (1470-1485) were addressed to a cardinal and *8 angsterline gleserin zu Rosenwasser* (8 glass bottles of rosewater) are recorded in an inventory of goods (1536) of the prince bishop of Trent, Bernardo Clesio[41]. Moreover, some *acanini* for rosewater are portrayed in some Venetian figurative sources, such as in a painting by Vittore Carpaccio, *St. Augustin in his study* (1502), kept in the Scuola di San Giorgio degli Schiavoni, and in a woodcut of the *Sonetti, Strambotti* by Bernardo Accolti Aretino, published by Nicolo

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[37] Brown 1982: 251, footnote 9.

[38] *Ibid.*: 65*;* other purchases of *cuche* or *zuche* (modern Italian zucche) of rose water see *Ibid.*: 80, 87.

[39] Zecchin 1990: 59, 166.

[40] Corti 1971: 649-654, see *Memoria di vetrerie che si cava di Murano 1592*; Barovier Mentasti and Tonini 2014: 5, 8; Lazar and Willmott 2006: 40-42, 75-76, 114-115; *Gnalić* 2013: 146.

[41] Esch 2007: 179; Castelnuovo 1995: 162; Barovier Mentasti and Tonini 2013: 215.

Zoppino & Vincenzo de Polo, Venice, in 1515. Both sources show these items displayed in a distinctive, private, but sometimes social, and cultural space of the house, the *studiolo*. On the other hand, *acanini* belonging to women, were usually portrayed in a different setting. Indeed, Lorenzo Lotto, a Venetian artist, depicted an *acanino* in one of his wooden inlays, *Suzanne and the Elderly* (1524), executed by Giovan Francesco Capoferri, for Bergamo's cathedral. This object is part of Suzanne's bath trousseau as was the one depicted by Lorenzo Lotto, in *Allegory of Lust*, (1525-1542), probably one of two lost paintings, which were conceived as covers of a pair of portraits. We know such covers painted by Lotto through the copies made by David Teniers the Younger (1610-1690), which were recently published and studied[42]. In *Allegory of Lust*, a naked Venus, waiting for the arrival of Mars, is portrayed with several toilette objects for her bath, a big blue and white ceramic basin, a shallow bowl and some colourless glass bottles for scented waters. Among the latter, an *acanino* is depicted (Fig. 12). It was customary for Lorenzo Lotto, as for other Venetian artists, to include Murano glass artifacts in some of their works of art. Furthermore, on one occasion, Lotto received a payment for a painting (1547) commissioned by a member of Serena family, renowned glass entrepreneurs, partly in the form of glass artifacts[43]. Therefore, he was in touch with Murano glassblowers and he appreciated glass vessels.

Later, another Venetian painter, Paolo Caliari called Veronese, depicted an *acanino* in *Respect,* one of his four *Allegories of Love* (about 1575), kept in the National Gallery, London (inv. no. NG1325), attesting the use of these particular sprinklers, also, in the second half of the 16th century, as documented by archive sources.

Sometimes, sprinklers for scented waters are portrayed in a different context and with a different setting. This is the case for three *acanini*, made probably in metal or dark glass, depicted in a fresco, attributed to Girolamo Tessari, *St. Anthony revives a child drowned in hot water* (1524), in the Scuola del Santo, Padua (Fig. 13). These sprinklers, shaped like an enamelled piece found in Santa Chiara, are arranged with loafs of

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[42] Christiansen 2019: 161-168. The *Allegory of Lust* by Teniers is kept in the Philadelphia Museum of Art as *Toilet of Venus.*

[43] Zampetti 1969: 194; Barovier Mentasti and Tonini 2018: 34.

bread, on a high shelf of a Renaissance *camera*, room. The *camera* is portrayed with many details which give a consistent idea of a domestic interior in the Veneto area: a fireplace with a decorated hood and daily items such as a brass candlestick, a circular wooden box, a glass bottle, called *inghistera*, on its mantel and, over the fire, a cauldron of boiling water where the drowned child is shown; a pavilion bed with coloured curtains; a table set with linen cloth, undecorated colourless beakers and a glass bottle with wine. At this table, St. Anthony, a Dominican monk and the parents of the drowned and rescued child are seated. Moreover, just above the three sprinklers on the shelf, a painting with the Virgin and Child is displayed. In front of this sacred image, a colourless glass oil lamp with metal mounting, called *cesendello* in the Venetian language, is hanged, as was customary. A devotional use also confirmed by some Renaissance Venetian archive papers [44].

The two *acanini* recovered at Santa Chiara convent, as part of Renaissance female trousseaus, are perfectly consistent with the social level of the nuns who belonged to the high Venetian and Paduan society. One of the two *acanini,* whose body is missing, is colourless (Fig. 11). This shows some similarities with some glass fragments found in the Venetian lagoon (Fig. 14) and with finds recovered in archaeological excavations in Venice: at Rialto market; in the sestiere of St. Mark, near San Moisè church; in the Giudecca island. Not far from Venice, another similar finding in Guiccioli Palace, Ravenna[45].

The other sprinkler found at Santa Chiara shows a flattened globular body, enamelled, and a gilt compressed bulb at the base of a long neck, painted with blue brushstrokes, similar to gadroons (Fig.

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[44] In a posthumous inventory of patrician Marcantonio Michiel, dated 1577, is mentioned "un quadro de un Christo passo grando col suo cesendelo de vero in portego a Paluelo" (a large painting of a Dead Christ with its glass lamp in the *portego*, the central hall, in Paluello). Paluello was Michiel's country villa. This painting was identified with a *Pietà* by Giovanni Bellini, housed in Venice, Gallerie dell'Accademia, coming from Giovanni Donà delle Rose's collection, see: Hochmann, Lauber and Mason 2008: 59, 350. Another Venetian inventory, dated 1594, lists "un quadreto de nostra Dona con un cesendelo de vero grande" (a small picture of the Virgin with a big glass lamp), see: Palumbo Fossati 1984: footnote 32.

[45] Rialto inv. no. VE IG ERP 00 SP; Minini 2009: 173; Minini 2011: 150; Guarnieri and Sericola [forthcoming] .

10). The latter enamelled decoration recalls the one with blue and white enamels, ornamenting the neck of two sprinklers, one of which is kept in the Victoria & Albert Museum, London, and the other in the MAK (Museum für Angewandte Kunst), Wien (Fig. 15). The body of these sprinklers is enamel painted with Islamic patterns, such as knots and arabesque motifs. These patterns might be similar to the ones recorded in the Dragan's glassworks inventory, mentioned above, or to the ones decorating *quattro ampolle de vetro azurro da tenere acque odorifere, lavorate a la damaschina* (four light blue glass flasks to keep scented waters, with Damascene decoration), mentioned in a *post-mortem* inventory (1530) related to Rimini, a north-eastern town on the Adriatic Sea[46]. The V&A and MAK sprinklers are painted, on opposite sides of their body, with two coats of arms belonging to the Hirschvogels and the Hölzels, upper class Nuremberg families. Both have been dated to the years 1511-1525[47].These arms are related to Endres I Hirschvogel and Katharina Hölzel who married in 1511. Actually, the Padua *acanino* shows on its body, without foot, a different decoration. At the centre, is portrayed the bust of a lady, encircled by enamelled blue dots with gilt traces and by a naturalistic ornamentation with blue leaves, that recalls the decoration painted on a reliquary, coming from San Pietro Martire Church at Murano, today kept in Museo del Vetro Murano (inv no. Cl.VI 1014) and on a goblet or reliquary of the Veste Coburg Sammlungen[48]. The lady's blue dress is without sleeves, with a plated motif on its bodice, probably worn on a white shirt, almost totally missing. A similar type of sleeveless dress is worn by female figures in some Renaissance figurative sources such as two Raphael's paintings, *Santa Caterina* (1508) and *Madonna Aldobrandini* (1510), both of them housed in the National Gallery, London, or in a *Female Portrait* (1512) by Sebastiano del Piombo, kept in Galleria degli Uffizi, Florence. Therefore, Santa Chiara's enamelled sprinkler might be dated to the years 1510-1530, due, also, to the comparisons with the two examples housed in the Victoria &Albert Museum and in the MAK.

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[46] Delucca 1998: 452.

[47] Barovier Mentasti, Tonini 2013: 66, no. 26; Barovier, Borrelli and Tonini 2019: 174-175, fig. 24.

[48] Theuerkauff-Liederwald 1994: 204-205, no.183.

1.3. *Enamelled and gilt glass fragment with lozenges pattern*

Among the findings from Santa Chiara convent, a colourless enamelled glass fragment which is, probably, the upper part of a beaker, has been recovered (Fig. 16)[49]. This is decorated, along the rim, with a series of white enamelled dots, forming triangles, a horizontal gilt band with a series of white and red enamelled *rosette*, below, and a lower series of white enamelled dots shaped as triangles. The lower part of the wall is characterized by vertical ribs (obtained *by meza stampaura* or by application of solid glass threads), then pinched to create a lozenge relief-pattern ('nipt-diamond-waies'), partially still gilded. Within every lozenge, red and white enamelled spots with gold, are set (six spots encicling a central one on the original whole piece) to form large painted *rosette*. These flowers are very similar to the ones painted on three beakers: one housed in the Kunstsammlungen der Veste Coburg, another in the Metropolitan Museum, New York (Havemeyer collection) (Fig. 18) and a third one in the Kunstgewerbemuseum, Berlin[50]. These blown enamelled beakers and our fragment are linked to similar beakers and bowls with 'nipt-diamond waies', made in Venice, decorated with lilies of the valleys, such as a bowl recovered in the same Santa Chiara convent and others housed in several public collections[51]. In addition, a find coming from the Venetian lagoon, kept in the Museum of Ca' d' Oro, Venice, has to be added to this kind of enamelled vessels (Fig. 17). This is a gorgeous fragmentary beaker with gilt 'nipt-diamond-waies'. Every gilt lozenge includes a vertical foliage with typical stylized leaves, in white, red and blue enamels. Below the rim a similar horizontal foliate band with flowers, enamelled in white, light blue and red, is depicted. An applied pincered foot-ring is partially preserved. This kind of enamelled decoration is very often associated with lilies of the valleys as in a beaker with pinched ribs and a pincered foot-ring housed in the

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[49] The glass fragments of Santa Chiara are only partially studied and restored. Future campaigns of restoration will add more information.

[50] Theuerkauff- Liederwald 1994: 161-163, no.141; Cooney Frelinghuysen *et al.* 1993: 105, plate 95; Dreier 1989: 33-35.

[51] Cozza 2011: 94, fig. 118a, b; Klesse and Mayr 1987: no. 1; in this publication several other examples kept in public collections are mentioned.

British Museum, London[52]. Significantly, the Ca' d'Oro find has been analysed by Marco Verità who wrote that its composition is consistent with the Venetian *cristallo* recipe of the Renaissance, invented by Angelo Barovier before the middle of the 15th century[53].

Probably, beakers with 'nipt-diamond-waies' frequently had a lid, as documented by a fragmentary green glass beaker found in the excavations at the Royal Palace of Buda (Hungary) which has been dated about 1500[54].

Vessels decorated with lilies of the valleys, were not only made for export to the Near-East, as suggested by some glass scholars, mentioning some 'nipt-diamond waies' beakers coming from a Jewish cemetery in Damascus and a mosque lamp housed in the Museum of Islamic Art, Cairo[55] but they were also highly appreciated in the Western markets. Indeed, the bowl of Santa Chiara convent (Fig. 19), the Ca' d'Oro find and a fragmentary beaker (Fig. 20), recovered in the late 19th-early 20th century excavations and demolitions in Rome, housed in the Museo Nazionale Romano, formerly belonging to Evan Gorga's collection, are significant examples[56]. Moreover, a painting by Giovanni Bellini and his workshop, *The Virgin with the Child and four Saints* (1510), housed in the Metropolitan Museum, New York (Fig. 21), shows a colourless glass lamp in the hands of Sainte Lucy which is decorated with pincered ribs, with a frieze of gilt and enamelled rosettes and among the lozenges ribs some flowers are painted[57]. The latter are very similar to the ones depicted on the Ca' d' Oro find and the Kunstsammlungen Veste Coburg beaker, aforementioned. The painting by Bellini is also a useful reference to propose a dating for this kind of enamelled vessels.

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[52] Tait 1979: 28, no. 1.

[53] Verità 1985: 25-26, fig. 8.

[54] Holl- Gyürk 1986: 79, fig. 17. Another colourless fragment with 'nipt-diamond-waies' and green enamelled dots, unpublished, is kept in the National Museum, Budapest: we thank Hedvika Sedláčková for showing us a photo of this fragment.

[55] Charleston 1964: 159-162, figs. 48-49; Klesse and Mayr 1987, no. 1; Gasparetto 1979: 90-91.

[56] Saguì 2013: 418, 435.

[57] Barovier Mentasti 2006: 70, figs. 24-25; Barovier Mentasti, Tonini 2013: 15, 60, no. 19.

2. *The conservation treatment*[58]

Almost all the objects, even if for tiny parts in some cases, were incomplete when they were found: since these were materials for the convent's midden, it is plausible that they were already damaged upon being dumped[59]. The glass portions came from a wide variety of glass vessels; from simple tableware to rich polychrome enamelled and gold-leaf decorated ones which indicated the wealth and importance of the nuns' families[60]. The preservation state of the glass finds was heterogeneous, a large number of portions were unstable with a heavily altered and fragile surface, while others showed a vivid and well-preserved decoration and glass body (Fig. 1d). The most degraded pieces had lifting layers and were at risk of losing their decoration completely. Soprintendenza conservators came on-site to save as much as possible by cleaning and pre-consolidating[61]. The finds were selected twice, to be put on display at Restituzioni[62] exhibitions in 2002 and 2016. For each exhibition conservation treatments were put into place. In 2002 among the selected objects there were vessels decorated with enamel and gold leaf decoration, a blue cylindrical beaker with a representation of the *Annunciation* (Fig. 1a,b,c) and a small lattimo vessel with a women profile[63], in 2016 there were other blue cylindrical beakers with a representation of the *Annunciation* and putti (Figs. 6, 7). At present another group of the glass vessels is also the subject of a thesis of Bologna University, Ravenna Campus, Single cycle degree/Combined Bachelor and Master Conservation and Restoration of Cultural Heritage. Each conservation intervention represents a privileged moment, both to observe and record technical data and traces of use otherwise difficult to reveal, and to reconstruct the conservation history of the objects. The first group of vessels selected for Restituzioni exhibition in 2002 were better preserved and almost complete, making the search through

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[58] By Silvia Ferucci.

[59] Cozza 2011: 115.

[60] Barovier 2019: 33.

[61] Cozza 2002:144.

[62] Restituzioni is a two-year program of conservation and restoration of Italian works of art promoted, funded and curated by Intesa Sanpaolo bank.

[63] Cozza 2010: 280 fig. 20.

all the mixed fragments relatively easy. The situation of the second group, after fourteen years was a different one, the preservation state had generally worsened (Figs. 2a-b, 3, 4), some fragments were often wrongly associated with groups to which they did not belong. A rather complicated task was the search for connections because the big difference in the fragments belonging to the same object was highly misleading (Fig. 1d). Some portions were very well preserved, but others showed a deeply degraded body as well as the decorated surface where often the enamels and the golden leaf were altered and partially or completely lost (Fig. 6). So it was necessary, after a first pre-assembling step between the selected items, to search again among all the glass finds which were still in the Soprintendenza. Many portions connected with the vessels were found in this way, enabling the reconstruction of the complete profile of almost the whole group. The adhesive chosen for the first group in 2002 was epoxy resin[64] but in 2014 for the second group acrylic resin was used to make the reconstruction completely reversible[65]. The very fragile surface was examined under the microscope, to identify the most suitable treatment to stabilize it, this step was crucial to proceed with the vessels' reconstruction. During the microscope examination, it was possible to acquire very detailed information about the vessels and their enamelled decoration[66]. Each object needed a detailed analysis, to plan a tailored conservation intervention. Many factors made the second conservation treatment very complex, first of all, the presence of very fragile enamels and golden decoration on the unstable surface, so it was necessary to protect it by handling and interfering as less as possible with it (Fig. 7b). Fragmentation, cracks, chipping, opacity, iridescence and many missing parts were signs of the degradation of the glass body. The recognizable enamel degradations were colour alteration and complete or partial loss of the coloured layers (Fig. 7c). The analysis of the preservation diagram is a valuable tool because it can give a lot of information in just one image. The blue beaker preservation diagram shows that specific enamels are more corroded than others, this phenomenon is called differential corrosion and is due to the different

[64] Ferucci 2018: 555-562.
[65] Koob 2006: 57-74.
[66] Pilosi *et al*: 2001.

glass composition which can be weaker and easier attached by adverse conditions (Fig. 7d). The yellow enamel is visibly altered in many areas if compared to the white A. On the other hand, it is possible to see different preservation states in portions with the same colour, this is caused by inhomogeneous environmental conditions within the burial area. Other precious details can be gathered, by analyzing the map of the different coloured enamels and combining it with the stereomicroscope observation. The examination of the sequence of the application of the enamels can also give details about the painter's skillfulness (Fig. 7e). Extreme precision is the most distinct feature that reveals that the painter applied the enamel almost automatically The areas in which two different enamels overlap each other are limited and small, giving precious input to understand colour drafting. The first enamel applied to the glass surface seems to be white A (skin and base of the ground), the second is likely to be white B (wreaths), the third colour is yellow, yellow overlapping is noticeable in the ribbons. There is not a definite collocation for the red enamel that doesn't touch at all any other. The last white applied was probably white C (dots)which has the same shade of the white B, there is one dot over the yellow in the grass. Black was unmistakably the last enamel applied.

The enamelled sprinkler (Fig. 10) is one of the selected objects for the thesis of Bologna University, RavennaCampus, Single cycle degree/Combined Bachelor and Master Conservation and Restoration of Cultural Heritage. The main problem of this vessel is that there isn't a connection between the lower part and the upper one. The first step to reconstructing it was to search for fragments that could connect the two parts, but unfortunately finding them was not possible. Restoring the sprinkler's shape meant building a structure that could support the upper part by 3d modelling. This procedure started with the scan of all the sprinkler's portions with CAT (computerized axial tomography), glass can't be laser scanned due to its transparency. The images were assembled digitally to enable the extrapolation of the internal shape and the print of the structure with a chemically inactive resin. The 3D reconstruction was compared with a traditional drawing and they fit. Another task faced in the thesis is how to stabilize the surface and minimize the risk of losing part of it or the enamel decoration. Siox-5 RE20C has been tested, it is a liquid gel obtained with sol-

gel technology, the protection should be provided by molecular layers of silica; which is the main component of glass. For this reason, the product is characterized by a high compatibility with silicate materials and it's specially formulated to be applied to archaeological glass, but it has never been tested on enamel decorated glass. Once applied, it forms a thin, colourless, transparent layer of amorphous silica, compatible with the substrate, able to consolidate archaeological findings with flakes to protect from leaching. A selection of fragments will be analyzed as samples. Digital microscope surface images, taken before and after the application, will be compared. This procedure is still in progress and results will be studied. This product is irreversible but in cases in which the surface is at this level of degradation, not even the most reversible resin can be removed without damaging it. Some enamelled fragments have been also analyzed with RTI (Reflectance Transformation Imaging) with satisfactory results[67]. RTI is a method of computational photography that records and enhances details of an object's surface by using filters that algorithmically amplify the information recorded. RTI is been rarely used on glass and it gives better results on painted glass than on completely transparent one. This method can provide additional information of painted glass surface because it often helps to visualize and further investigate details barely visible in conventional photography.

REFERENCES

Barovier Mentasti, Rosa, Attilia Dorigato, Astone Gasparetto and Tullio Toninato, eds. 1982. *Mille anni di arte del vetro a Venezia*. Venezia: Albrizzi editore.

Barovier Mentasti, Rosa, ed. 2006. *Trasparenze e riflessi: il vetro italiano nella pittura*. Verona: Banca Popolare di Verona e Novara.

Barovier Mentasti, Rosa and Cristina Tonini. 2013. *Fragile. Murano, chefs-d'oeuvre de verre de la Renaissance au XXIe siècle*. Paris: Gallimard.

Barovier Mentasti, Rosa and Cristina Tonini. 2014. Tools to Study Glass: Inventories, Paintings and Graphic Works of the 15th-17th century. In *Study Days on Venetian Glass. Approximately 1600's*, edited by R. Barovier Mentasti

[67] Dittus 2016.

and C. Tonini. Venezia: Istituto Veneto di Scienze Lettere ed Arti: 3-41 (*Atti dell'IVSLA* 172/1, 2013-2014, Classe di scienze fisiche, matematiche e naturali).

Barovier Mentasti, Rosa and Cristina Tonini. 2018. Venetian Sixteenth Century Filigrana. In *Study Days on Venetian Glass. Venetian Filigrana Glass through the Centuries*, edited by R. Barovier Mentasti and C. Tonini. Venezia: Istituto Veneto di Scienze Lettere ed Arti: 13-60 (*Atti dell'IVSLA* 176/1, 2017-2018, Classe di scienze fisiche, matematiche e naturali).

Barovier Mentasti, Rosa, Luciano Borrelli and Cristina Tonini. 2019. Venetian conical goblets of the Renaissance. *Journal of Glass Studies* 61: 157-195.

Barovier Mentasti, Rosa and Cristina Tonini. 2019. Venetian Renaissance Vessels: Mould Decorations and Applied Bosses. In *Study Days on Venetian Glass*. *Moulding and Applying Hot Glass*, edited by R. Barovier Mentasti and C. Tonini. Venezia: Istituto Veneto di Scienze Lettere ed Arti: 1-74 (*Atti dell'IVSLA* 177/2/3, 2018-2019, Classe di scienze fisiche, matematiche e naturali).

Beschi, Luigi. 2003. "Quatuor pueri de Ravenna". In *Santa Maria dei Miracoli a Venezia. La storia, la fabbrica, i restauri*, edited by M. Piana and W. Wolters. Venezia: Istituto Veneto di Scienze, Lettere ed Arti.

Boccaccio, Giovanni. 1473. *De mulieribus claris*. Ulm: Johannes Zainer.

Boccaccio, Giovanni. 1479. *Von Etlichen Frowen*. Augsburg: Anton Sorg.

Brown, Clifford M. with the collaboration of Anna Maria Lorenzoni. 1982. *Isabella d'Este and Lorenzo da Pavia: documents for the history of art and culture in Renaissance Mantua*. Genève: Droz.

Carboni, Stefano. 2001. *Glass from Islamic lands*. London: Thames & Hudson.

Cappelli, Federica. 2008. Una brocchetta fatimida in cristallo di rocca dal Museo degli Argenti. Problematiche di intervento. In *A scuola di Restauro. Le migliori tesi degli allievi dell'Istituto Centrale per Il Restauro e dell'Opificio delle pietre dure negli anni 2003-2005.* Roma: Gangemi: 145-153.

Castelnuovo, E., ed. 1995. *Il Castello del Buonconsiglio. Percorso nel Palazzo Magno*, vol. I. Trento: Temi.

Charleston, Robert J. 1964. The import of Venetian Glass into the Near-East 15th-16th century. In *Annales du 3e Congrès des Journées Internationales du Verre*. Liège: Imprimeries Bérnard & Centrale Réunies.

Charleston, Robert J. 1984. *English Glass and the glass used in England, circa 400-1940*. London: George Allen and Unwin.

Christiansen, Keith. 2019. Thoughts Regarding Two Lost Portrait Covers by Lorenzo Lotto. *Artibus et historiae* 80: 161-168.

Cooney Frelinghuysen, A. *et al.*, ed. 1993. *Splendid legacy: the Havemeyer collection*. New York: The Metropolitan Museum of Art.

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

Cozza, Francesco. 2002. Maioliche e vetri rinascimentali. In *Restituzioni 2002. Capolavori restaurati. Undicesima edizione,* edited by C. Bertelli. Vicenza: Banca Intesa: 142-145.

Cozza, Francesco. 2010. Reperti vitrei da contesti archeologici. In *L'avventura del vetro dal Rinascimento al Novecento tra Venezia e mondi lontani*, edited by A. Bova. Milano: Skira; Trento: Castello del Buonconsiglio: 83-89, 280-282, 493-494.

Cozza, F., ed. 2011. *Le memorie ritrovate del monastero di Santa Chiara di Cella Nova a Padova.* Padova: Direzione Regionale per i Beni culturali e Paesaggio del Veneto, Soprintendenza per i Beni Archeologici del Veneto, Ministero per i Beni e le attività culturali.

Cozza, Francesco. 2016. Maestri vetrai muranesi. Vetri ultimo quarto del XV-primo quarto del XVI secolo. In *Restituzioni 2016. Tesori d'arte restaurati. Diciasettesima edizione*, edited by C. Bertelli e G. Bonsanti. Venezia: Marsilio: 175-179.

Dalla Santa, Giuseppe. 1916-17. Commerci, vita privata e notizie politiche dei giorni della Lega di Cambrai (da lettere del mercante veneziano Martino Merlini). *Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti. Scienze morali e lettere* Parte seconda, Serie 9, tomo 76: 1547-1606.

Davidson, Sandra. 2003. *Conservation and Restoration of Glass*. Oxford: Butterworth Heinemann.

Delucca, Oreste. 1998. *Ceramisti e Vetrai a Rimini in Età Malatestiana. Rassegna di fonti archivistiche*. Rimini: Patacconi.

Dittus, Alexander M.. 2016 Reflectance Transformation Imaging of Glass Objects. In *Recent Advances in Glass and Ceramics Conservation 2016: International Council of Museums - Committee for Conservation (ICOM-CC)*, edited by H. Roemich and L. Fair. Wroclaw: ICOM-CC: 145-156.

Dreier, Franz Adrian. 1989. *Venezianische Gläser, und Façon de Venise*. Berlin: Kunstgewerbemuseum; Berlin, Staatliche Museen Preußischer Kulturbesitz.

Esch, Arnold. 2007. *Economia, cultura materiale ed arte nella Roma del Rinascimento: studi sui registri doganali romani, 1445-1485*. Roma: Roma nel Rinascimento.

Favaretto, Irene. 2002. *Arte antica e cultura antiquaria nelle collezioni venete al tempo della Serenissima*. Roma: "L'Erma" di Bretschneider.

Favaretto, I., M. De Paoli and M. C. Dossi, ed. 2004. *Museo Archeologico Nazionale di Venezia*. Milano: Electa.

Ferucci, Silvia and Lamberto Tronchin. 2018. Resine epossidiche e Paraloid B72 a confronto. La ricostruzione dei reperti vitrei, come varia la progettazione dell'intervento e la metodologia applicativa a seconda dell'adesivo, i vantaggi e

gli svantaggi. In *XVI Congresso Nazionale IGIIC-Lo Stato dell'Arte-Castello del Buonconsiglio-Trento*, edited by F. Marzatico. Firenze: Nardini editore: 555-562.

Fornari Schianchi, Lucia. 1988. *Ai piedi della Badessa. Un pavimento maiolicato per Maria De Benedetti Badessa di S. Paolo dal 1471 al 1482 (Galleria Nazionale di Parma).* Parma: Artegrafica Silva.

Ganzer, G., ed. 2008. *Le favolose historie di Palazzo Ricchieri. Testimonianze tardogotiche nei soffitti lignei di Pordenone*. Treviso: Canova.

Gasparetto, Astone. 1979. Matrici e aspetti della vetraria Veneziana e Veneta Medievale. *Journal of Glass Studies* 21: 76-97.

Gnalić. Treasure of a 16th century sunken ship. 2013. Zagreb: Croatian History Museum.

Gyürky, Katalin H. 1981. *Az üveg Katalógus*. *Monumenta Historica Budapestinensia*. Budapest: Budapesti Történeti Múzeum.

Guarnieri, Chiara and Massimo Sericola. [forthcoming]. Ravenna, Palazzo Guiccioli. I vetri postmedievali. In *Atti XX Giornate Nazionali di Studio sul Vetro. La Multidisciplinarietà nella ricerca sul vetro (Ravenna, 18-19 maggio 2019).*

Hochmann, M., R. Lauber and S. Mason, ed. 2008. *Il collezionismo d'arte a Venezia. Dalle origini al Cinquecento.* Venezia: Marsilio.

Holl-Gyürky, Katalin. 1986. The use of Glass in Medieval Hungary. *Journal of Glass Studies* 28: 70-81.

Klesse, Brigitte and Hans Mayr. 1987. *European Glass from 1500-1800. The Ernesto Wolf Collection*. Wien: Kremayr & Scheriau.

Koob, Stephen P. 2006. *Conservation and care of restoration of glass objects*. London: Archeotype Publication.

Lazar, Irena and Hugh Willmott. 2006. *The Glass from The Gnalić Wreck*. Koper: Annales Mediterranea.

Liefkes, Reino. 1997. *Glass*. London: V&A Publications.

Martini, L., ed. 1993. *Oggetti in avorio e osso nel Museo Nazionale di Ravenna sec. XV-XVI*. Ravenna: Longo.

Minini, Martina. 2009. Reperti vitrei da un'indagine archeologica presso piazza San Marco a Venezia: l'intervento nell'ex-cinema San Marco. *Quaderni Friulani di Archeologia* XIX: 171-177.

Minini, Martina. 2011. Reperti vitrei da uno scavo archeologico nell'isola della Giudecca. In *Atti delle Giornate Nazionali di Studio dell'A.I.H.V. Comitato Italiano*. *Produzione e distribuzione del vetro nella storia: un fenomeno di globalizzazione,* edited by M. G. Diani, T. Medici and M. Uboldi. Paian di Udine: Lithostampa.

Ousset, Célestine. 2005. Présentation de la conservation-restauration des verres archéologiques. *Bulletin AFAV. Paris*: 45-48.

Palumbo Fossati, Isabella. 1984. L'interno della casa dell'artigiano e dell'artista nella Venezia del Cinquecento. *Studi Veneziani* VIII: 109-163.

Panofsky, Erwin. 1965. *Renaissance and Renascences in Western Art*. Stockholm: Almqvist & Wiksell.

Pilosi, Lisa and Mark Wypyski. 2001. Technical examination and conservation of glass. *Ars Vitraria: Glass in The Metropolitan Museum of Art: The Metropolitan Museum of Art Bulletin* 59/1: 66-68.

Saguì, Lucia. 2013. Vetri. In *Museo Nazionale Romano. Evan Gorga la collezione di archeologia*, edited by A. Capodiferro. Milano: Electa.

Signorini, Rodolfo. 1996. New Findings about Andrea Mantegna: an Inventory after Ludovico Mantegna's Death (1510). *Journal of the Warburg and Courtauld Institutes* 59: 103 – 118.

Spallanzani, Marco. 2012. *Vetri islamici a Firenze nel primo Rinascimento*. Firenze: S.P.E.S.

Syson, Luke. 2006. *Representing Domestic Interiors*. In *At Home in Renaissance Italy,* edited by M. Ajmar-Wollheim and F. Dennis. London: V&A Publications.

Tait, Hugh. 1979. *The Golden Age of Venetian Glass*. London: British Museum Publications Limited.

The Fairfax Cup. 1959. *The Connoisseur* 144: 32-33.

Theuerkauff-Liederwald, Anna-Elisabeth. 1994. *Venezianisches Glas der Veste Coburg*. Lingen: Luca Verlag.

Thornton, Dora, Ian Freestone, William Gudenrath, Martina Bertini, Andrew Meek and Denise Ling. 2014. Technical study of a rare Venetian turquoise glass goblet from the Waddesdon Bequest. *The British Museum. Technical Research Bulletin* 8: 1-11.

Verità, Marco. 1985. L'invenzione del cristallo muranese: una verifica analitica delle fonti storiche. *Rivista della Stazione Sperimentale del Vetro* 1: 17-29.

Zampetti, P., ed. 1969. *Lorenzo Lotto: Il "libro di spese diverse" con aggiunta di lettere e d'altri documenti.* Venezia: Albrizzi editore.

Zecchin, Luigi. 1987. *Vetro e vetrai di Murano*. Vol. 1. Venice: Arsenale.

Zecchin, Luigi. 1989. *Vetro e vetrai di Murano*. Vol. 2. Venice: Arsenale.

Zecchin, Luigi. 1990. *Vetro e vetrai di Murano*. Vol. 3. Venice: Arsenale.

Fig. 1a, b, c, d - *Enamelled blue beaker with Annunciation*, archaeological find, Santa Chiara convent, Venice, 1470-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 293418 (courtesy of); 1d before conservation.

Fig. 2a, b - *Enamelled blue beaker with Annunciation*, archaeological find, Santa Chiara convent, Venice, 1470-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 330845 (courtesy of).

Fig. 3 - *Enamelled blue beaker with Annunciation*, archaeological find, Santa Chiara convent, Venice, 1470-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 330846 (courtesy of).

Fig. 4 - *Enamelled blue beaker with Annunciation*, archaeological find, Santa Chiara convent, Venice, 1470-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 330847 (courtesy of).

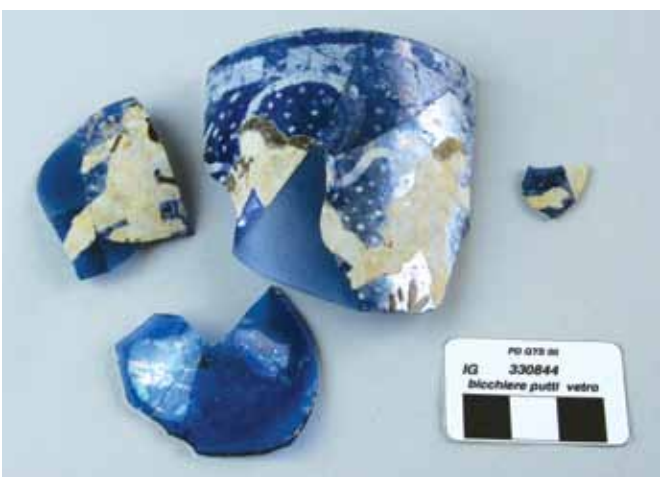

Fig. 5 - *Enamelled blue beaker with Annunciation*. Paris, Musée Jacquemart André, inv. no. MJAP OA 934 (courtesy of).

Fig. 6 - *Fragments of an enamelled blue beaker with dark haired putti*, archaeological find, Santa Chiara convent, Venice, 1480-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 33084 (courtesy of).

Fig. 7a, b, c, d, e - *Enamelled blue beaker with blond haired putti*, archaeological find, Santa Chiara convent, Venice, 1480-1490. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage inv. no. PD QST 2000/US, IG 33083 (courtesy of), 7b before conservation, 7c close up of a assembled fragments, 7e preservation diagram.


1 WHITE A
2 WHITE B
3 YELLOW
4 RED?
5 WHITE C
6 BLACK
7 OVERLAP


MISSING PART(glass body)
ENAMEL ALTERATION
MISSING ENAMEL
IRIDESCENCE

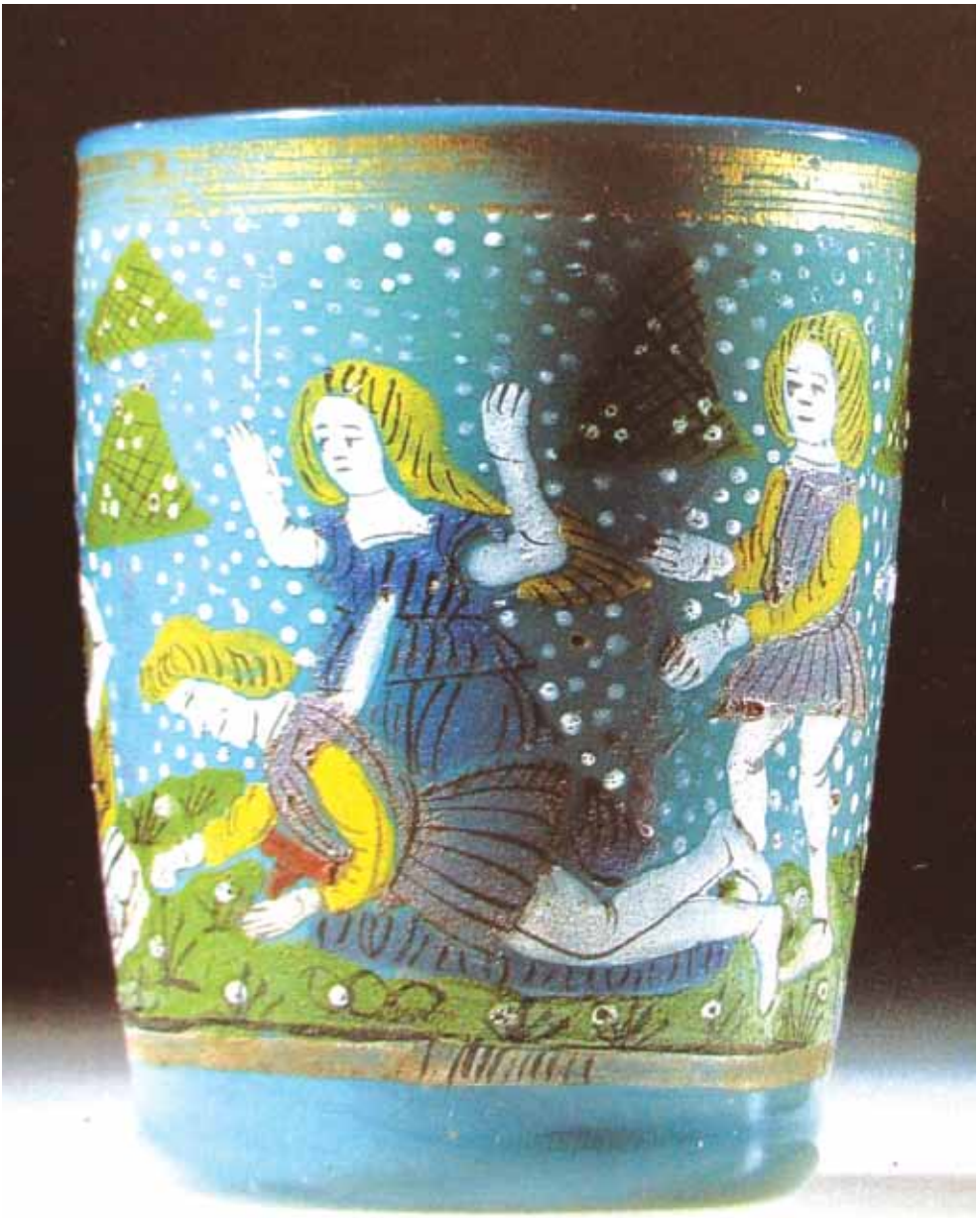

Fig. 8a, b - *Enamelled turquoise beaker with Pyramus and Thisbe*, 1480-1490. London, Victoria & Albert Museum, inv. no. C.17-1959 (courtesy of)
Fig. 9 - *Von Etlichen Frowen*, German translation of *De claris mulieribus* by Giovanni Boccaccio, woodcut, fol. 15v, Augsburg 1479.

Fig. 10 - *Enamelled Sprinkler*, archaeological find, Santa Chiara convent, Venice, 1510-1530. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua (storage), inv. no. PD QST 2000/US 1604 (courtesy of).

Fig. 11 - *Colourless sprinkler*, archaeological find Santa Chiara convent, Venice, 1480-1530. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua (storage), inv. no. PD QST US 1159 (courtesy of).
Fig. 12 - David Teniers the Younger, copy from Lorenzo Lotto's *Allegory of Lust* of the years 1525-1542, 1655-56, inv. cat. 696, detail. Philadelphia Museum of Art, Johnson Collection (courtesy of).
Fig. 13 - Girolamo Tessari, *Saint Anthony rise a child fallen in hot water*, 1524, detail. Padua, Scoletta del Santo (©Padova, Veneranda Arca; Photo Studio Ghirlandini Giuliano, courtesy of).

Fig. 14 - *Sprinkler*, find from the Venetian lagoon, 16th century. Private collection.
Fig. 15 - *Sprinkler with Hirschvogel and Höltzel coats of arms*, 1511-1525, inv. no. 1851-1855. London, Victoria & Albert Museum (courtesy of).
Fig. 16 - *Enamelled and gilt glass nipt-diamond-waies fragment with rosette*, archaeological find, Santa Chiara convent, Venice, end of the 15th-first decade of the 16th century. Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua, storage, inv. no. PD QST 2000/US 1604 (courtesy of).

Fig. 17 - *Enamelled and gilt cristallo nipt-diamond-waies fragments of a beaker with rosette*, end of the 15th-first decade of the 16th century. Venice, Ca' d'Oro (courtesy of).
Fig. 18 - *Enamelled and gilt cristallo nipt-diamond-waies fragments of a beaker with flowers and leaves*, end of the 15th-first decade of the 16th century. New York, The Metropolitan Museum of Art (courtesy of).

Fig. 19 - *Enamelled bowl with lilies of the valleys*, end of the 15th-first decade of the 16th century, Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Venezia e le province di Belluno, Padova e Treviso. Padua (storage), inv. no. PD QST 2000/US, IG 293414 (courtesy of).

Fig. 20 - *Enamelled and gilt cristallo nipt-diamond-waies fragmentary beaker with flowers and leaves,* archaeological find, end of the 15th-first decade of the 16th century. Rome, Gorga collection, Museo Nazionale Romano (courtesy of).

Fig. 21 - Giovanni Bellini and his workshop, *The Virgin with the Child and four Saints*, 1510. New York, The Metropolitan Museum of Art. Detail.

Adriana Bernardi

DEFINITION AND CONTROL OF MICROCLIMATE IN ENVIRONMENTS OF THE CONSERVATION AND EXHIBITION OF FRAGILE ARTIFACTS,
WITH PARTICULAR ATTENTION TO VENETIAN ENAMELLED RENAISSANCE GLASSES

1. *Introduction*

After a lot of studies in the last decades it is known that the atmospheric attack on the glass and on the *grisaille* (Fig. 1) depends mainly on a series of the factors where the microclimatic conditions (cycles of T, RH, condensation, etc.) have an important role. In fact, they can cause cracks, activation of corrosion, biological activity, etc[1].

Also other factors are very important like the deposition of aerosol particles and other potentially harmful compounds (soot, organic particles, S-rich or Fe-rich particles, $(NH_4)_2SO_4$, $CaSO_4$) that can cause soiling and visual degradation but also, in specific environmental conditions, chemical reactions (e.g. H_2SO_4) can occur accelerating its corrosion. The same can occur by the Biological attack that can bring to the formation of biolayers, biopitting, etc.

But finally all these phenomena are in some way related to the microclimatic conditions[2].

In fact, it is by now well understood by all those who deal with the conservation of works of art that all the physical, chemical or biological processes they undergo are in close correlation with the microclimate: the latter affects the onset of these processes and controls their speed of reaction or subsequent development. So controlling the

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[1] Bernardi 2002; Bernardi and Becherini *et al.* 2006; Pallot-Frossard and Bernardi *et al.* 2007; Becherini and Bernardi *et al.* 2008; Bernardi 2009; Bernardi and Becherini *et al.* 2012; Bernardi and Becherini *et al.* 2013.

[2] Bernardi 2008.

microclimate is essential for preventing the deterioration of any kind of materials, glass included.

What is less known or only partly understood is that the study of the microclimate:

- cannot absolutely be boiled down to a few numbers, in particular to two, i.e. temperature and relative humidity, as is done, unfortunately, in many cases;
- the numerous variables that are involved and must be considered, and the complex phenomena determined by their distribution, must be examined at the same time and in their dynamic: spatial distribution and time evolution.

Moreover, interdisciplinary work is indispensable: there must be an interchange between the people acting in scientific fields and those acting in practical fields (restorers, workers, etc.), in order to achieve an overall view of the problems involved and to determine the specific environmental conditions that are most suitable. A correct environmental management is essential, and must be based on a specific knowledge of the environment under consideration.

To study a microclimate means to analyse the environment that surrounds a work of art (Fig. 2), in all its moments, both in its natural temporal evolution (day-night, seasons, etc.) and in relation to external forcing (air conditioning, heating, lighting, opening of doors and windows, cleaning, admission of visitors, etc.), most of which are connected to utilisation. This makes it possible to take measures, to optimise the environmental conditions, and to try to achieve stability, as is desirable in any place that is intended to contain particularly important works of art.

2. *Main physical parameters to perform a microclimatic analysis*

The main parameters that need to be measured to perform a microclimatic analysis with specific instrumentation (with a higher or lower accuracy in function of the kind of analysis that needs to be performed) are the following:

- Air and surface temperature (°C)
- Specific humidity (g/kg)
- Relative humidity (%)
- Dew Point (°C)

Temperature (T) refers to how hot or cold something is. Physically it measures the average kinetic energy of the particles in an object. It is expressed in terms of several arbitrary, such as Fahrenheit, Celsius, or Kelvin.

Specific humidity (SH) is the amount of water vapour present in a certain air mass. It is an independent variable, and does not depend on the temperature of the air.

Relative humidity (RH) is the degree of saturation of the ambient air. It depends on both of the previous variables, decreasing when the temperature increases, and increasing when the specific humidity increases. A 100% value represents the saturation of water vapour in the air.

Dew Point (DP) is the temperature to which the air must be cooled down for the saturation of water vapour to take place with respect to free water, without any change in atmospheric pressure or SH.

The condensation of water on the surface is a very important problem because water is one of the basic elements in the deterioration processes of the materials. In particular, the formation of water on glass is particularly harmful to the glass, whose deterioration processes are all correlated with the presence of water. Condensation occurs on a surface when the temperature of the latter is lower than the dew point of the surrounding air, i.e. lower than the temperature at which the air becomes saturated and condensation can take place spontaneously on a surface. This phenomenon can be easily observed on a surface exposed to the external climate (Fig. 3), because of its spontaneous cooling by radiation, particularly during clear nights: as soon as the temperature of the surface drops below the dew point of the air, droplets begin to appear on the surface: this is dew.

The presence of atmospheric particulate on a surface may promote condensation: this process depends not only on the hygroscopicity of the surface, but also on its degree of contamination by pollutants. The

origin of these pollutants may be natural or anthropic, so the types of particles may be different; but all of them act, more or less efficiently, as «condensation nuclei», promoting the formation of droplets and consequently accelerating the deterioration processes correlated with them.

2.1. *Management of the environment*

The management of the environment is linked to different factors

- Heating and cooling
- Lighting (natural and artificial)
- Pollutants (particles and gas)
- Showcases

2.2. *Heating and cooling*

Indoor, the main goal is always to achieve hygrothermal conditions that are as constant as possible, both in time and in space.

In the control of microclimatic conditions for a good conservation of works of art, a very sensitive point is the management of the air conditioning and heating system. In many cases, as a matter of fact, the heating systems have been made on the basis of the know-how and technology applied to the field of civil buildings. In this area, technicians have all too often been trained to solve the problem of «heating for humans» and are completely unaware of the problems of the conservation of works of art. The heating of rooms where works of art are to be exhibited, on the other hand, must be based on criteria that are different from those usually adopted for the benefit of human beings: it is necessary, above all, to allow for the fact that any choice of a type of system, and of its layout, rating and setting, may affect the spatial-temporal distribution of the environmental variables, particularly those relevant to the temperature and relative humidity. These are the two parameters that control the stress of a material. Their mean values, and above all their variations (and the amplitude and frequency of the latter), are the greatest cause of the deterioration and more or less accelerated aging of works of art, and of all the other related chemical and biological phenomena. Unfortunately, in

the decisions about the development of a system, all too often the well-being of humans takes priority, because «the public must be comfortable».

For various reasons, controlling the hygrothermal conditions of an environment, when active systems such as air conditioning and heating are to be used, in particular to achieve a homogeneous spatial distribution of temperature and humidity, is a rather complex problem, much more than one can imagine. The inflow of hot/cold air or vapour from individual points gives rise to spatial inhomogeneous distributions of the hygrothermal parameters that are often quite marked and result in stress for the materials: the latter seek new equilibria that constantly change in time and space. Moreover, the damages due to the fact that the heating and air conditioning systems are switched off during the night and suddenly switched on during the daytime are among the most common ones.

2.3. *Lighting (natural and artificial)*

The radiation that is used for looking at a work of art is obviously the one whose wavelengths are within the visible range. The other wavelengths cannot be used for vision, but are more or less energetic in any case, so they are harmful to the materials. The spectrum of the light emitted by the source must therefore be centred around the frequency band of the visible range, reducing, as much as possible, the frequencies relevant to the infrared radiation (IR) and to the ultraviolet one (UV), both of them harmful, though for different reasons.

For conservation purposes, therefore, it is necessary, first of all, to endeavour to light the object with an energy whose emission is mostly within the visible range, eliminating, as much as possible, all the rest of the spectrum. We must remember that, even if the wavelengths of the radiation falling on the object are only within the visible range, the fraction absorbed by the material is subsequently transformed into heat. This means that an object that receives energy always tends to warm up.

The use of a suitable lighting system is therefore one of the problems that must be tackled in a correct and competent way, and in any case the solution is not easy to achieve. The warming undergone

by a work of art always leads to undesirable consequences from the viewpoint of conservation.

It is known, in any case, that the various types of radiation have different effects on the materials also in the visible fraction. The lower-X-radiation (violet, blue and the beginning of green), for instance, causes the colours to fade, but cannot be eliminated, because if some spectral components were absent, there would be a loss of overall chromatic performance in the lighting needed for the vision of the work of art. The UV radiation with an even lower wavelength gives rise to even more marked photochemical phenomena, particularly in the molecules of organic substances, but can be controlled more easily or even eliminated by means of suitable filters.

2.4. *Pollutants (particles and gas)*

The presence of visitors and the opening of doors and windows also have another result: the introduction into the rooms of pollutants, which settle on the surfaces and eventually blacken them. It is always advisable to filter the air before letting it into the room, though this operation may give rise to air movements between the intake and outlet points, thus promoting aerodynamic deposition. Despite this fact, the available filters are quite useful for eliminating the finest particulate, which is the most dangerous one, because it remains in the atmosphere for a longer time; but they do not avoid the introduction of pollutants brought in by people by means of their shoes and clothes.

An excessively large public may transform a room that is essentially suitable for the conservation of works of art into an environment that is characterised by considerable hygrothermal changes.

The fact that an exhibition room is visited by a great number of people also means that it must be cleaned often. Cleaning is carried out with more or less traditional methods, depending on the type of environment. In the simplest case, which is still the commonest one, the floor is directly cleaned with water, giving rise to an increase in the specific humidity, consequently also in the relative one, with all the problems involved, among which a greater probability of condensation on the walls or in the pores within the materials.

Furthermore, the main factors that promote microbiological

growth or speed up its process are temperature, humidity, light, nutrients, dust, etc., and all these factors are present in the management of an exhibition environment. So the prevention and control of biological deterioration are strongly determined by the environmental conditions.

There are some environments in which it is difficult to control the microbiological growth because of the particular position of the objects to be preserved. This is the case, for instance, of ancient windows with or without a protective glazing: their particular interface situation involves changes in the hygrothermal parameters that are rather marked, cannot be controlled, and are very often combined with temperature and humidity values within the range of the optimum conditions for biological proliferation. There is a great number of studies on this subject and several solutions for achieving an efficient remedy have been proposed but many subjects must still be studied and followed up in order to reach a satisfactory solution.

2.5. *Showcases*

Sometimes the microclimate of an environment is absolutely unable to meet the needs of the good conservation of a work of art. In these cases, the solution may be to create a micro-environment that is easier to control, such as that of a showcase. This solution, however, is not always simple or decisive: constructing an efficient showcase is not easy or inexpensive. In this field, too, there is still much debate. Many technological solutions are available, but the physical, chemical and biological parameters that must be controlled are quite numerous.

What type of showcase should be preferred? A completely closed one? A glass one? A ventilated or non-ventilated one? The lighting must or can be internal or external, near or far? What type of lighting should be installed? As we have already stated, glass is not transparent to infrared radiation, so a glass showcase, keeping in almost all the heat, will cause the object to heat up more than it would if it were outside the showcase. The infrared radiation remains trapped within the showcase, because glass does not allow the infrared radiation to

come out, so the temperature within the showcase is bound to rise: the showcase acts like a 'greenhouse' with all the related consequences.

The use of showcases, is not free from problems.

It is advisable, therefore, if there is not the financial possibility of purchasing a sophisticated showcase, to it needs to be take attention in the choice and the managing of a showcase.

Showcases can be an excellent means of preventing the passage of dust, therefore its deposition upon objects. Besides, they allow a careful filtering of the air that is introduced, so the air can be kept clean within this limited volume.

Great attention must be paid to the formation of mould. Where there is no ventilation at all, if the RH levels become too high, this may promote the proliferation of organisms. Moreover, though sealed showcases can solve several problems, for instance the control of RH or safety, they can give rise to other problems, such as the entrapment of harmful chemical substances (e.g. sulphur or nitrogen oxides, formaldehyde, etc.) produced by processes that take place directly in the showcase, or by an action of the materials of the showcase or of the object contained in it. It is not a trivial or simple matter.

3. *Conclusions*

To manage correctly the microclimate in an indoor environment whether it is a room or a showcase for any kind of materials is a complicate issue. Each material has its limits to be respected for a good conservation, include the glass. A lot of studies were performed in the last decades and a lot of information are available in literature that can help in this direction. The only thing that is sure regards the necessity to try to obtain the most suitable microclimate: a target far to be simple to be reached as often the people are convinced.

REFERENCES

Bernardi, Adriana, F. Becherini, M. Veritá, P. Ausset, M. Bellio, U. Brinkmann, H. Cachier, A. Chabas, F. Deutsch, M.P. Etcheverry, F. Geotti Bianchini, R.H.M. Godoi, V. Kontozova-Deutsch, R.A. Lefèvre, T. Lombardo, P. Mottner, C. Nicola, I. Pallot Frossard, S. Rölleke, H. Römich, G. Sommariva, M. Vallotto and R. Van Grieken. 2013. Conservation of stained glass windows with protective glazing: main results from the European VIDRIO research programme. *Journal of Cultural Heritage* 14: 527-536.

Bernardi, Adriana, F. Becherini, S. De Grandi and L. Pockelé. 2012. Conservation of stained glass windows: an innovative user-friendly portable device coming from the EU-VIDRIO Project. *Journal of Environmental Science and Engineering* B, 1B, 4: 519-526.

Bernardi, Adriana. 2009. VIDRIO Determination of conditions to prevent weathering due to condensation, particle deposition and microorganism growth on ancient stained glass windows with protective glazing. *EC publication "Preserving our heritage, improving our environment*" EUR 22050 EN, Vol. I-II: 112-113.

Bernardi, Adriana. 2008. *Microclimate inside Cultural Heritage Buildings*. Saonara (PD): Il Prato.

Becherini, Francesca, A. Bernardi, A. Daneo, F. Geotti Bianchini, C. Nicola and M. Veritià. 2008. Thermal stress as a possible cause of the paintwork loss in medieval stained glass windows. *Studies in Conservation* 53: 238-251.

Pallot-Frossard, Isabelle, A. Bernardi, R. Van Grieken, R.A. Lefèvre, S. Rolleke, H. Roemich and M. Veritià. 2007. Les Conclusions du Programme Européen Vidrio sur la Protection des Vitraux par Verriére Extérieure. *Monumental* 2: 113-123.

Bernardi, Adriana, F. Becherini, G. Bassato and M. Bellio. 2006. Condensation on Ancient Stained Glass Windows and Efficiency of Protective Glazing Systems: Two French Case Studies, Sainte Chapelle (Paris) and Saint Urbain Basilica (Troyes). *Journal of Cultural Heritage* 7,1: 71.

Bernardi, Adriana. 2002. Determination of Conditions to prevent weathering due to condensation, particle deposition and micro-organism growth on ancient stained glass windows with protective glazing - the VIDRIO project. Paper read at 5th EC Conference Cultural Heritage Research: a Pan-European Challenge!, 6-18 May.

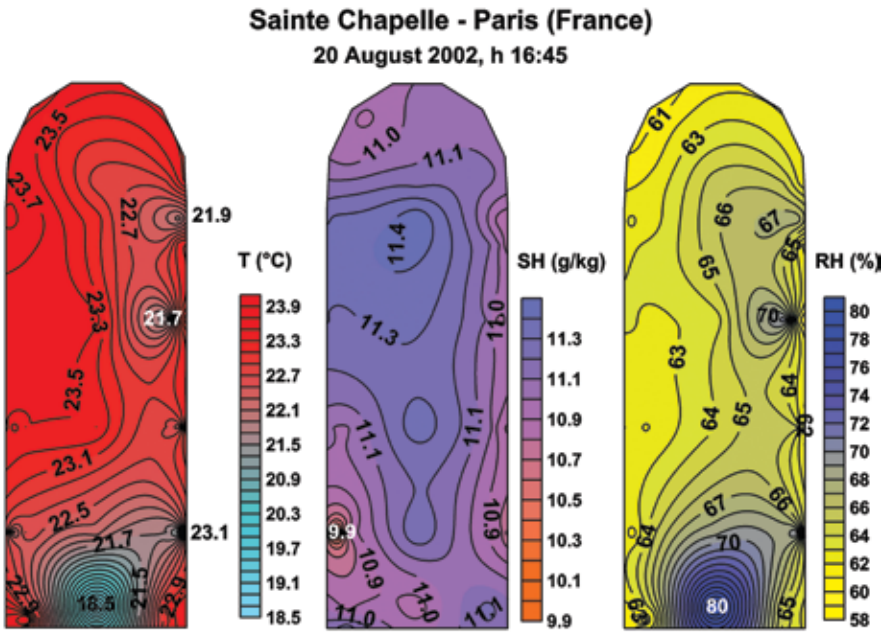

Fig. 1 - *Example of chemical weathering of the* grisaille *due to reaction between pollutants and water on an ancient stained glass window in Sainte Chapelle (Paris)* (from Bernardi 2008).

Fig. 2 - *Horizontal sections of the Sainte Chapelle (Paris), representing the isolines related to temperature, relative humidity and specific humidity during the visiting time and the opening of the doors for the air exchange* (from Bernardi 2008).

Fig. 3 - *Example of chemical weathering of the glass due to the reaction between pollutants and water on an ancient stained glass window in Sainte Chapelle (Paris)* (from Bernardi 2008).

Aurélie Gerbier and Suzanne Higgott

FRENCH RENAISSANCE GLASS WITH FIGURATIVE ENAMELLING

In the late 15th to early 16th centuries Europe's elite were under the spell of Venetian enamelled and gilded glass. France was no exception. During the 16th and 17th centuries both Italian and French glassmakers are known to have produced Venetian-style glass in France[1].

The glasses discussed here share characteristics that have, since the 1860s, been considered to indicate that they were made in France. They were inspired by Venetian precedents. A goblet in the British Museum is a fine example, exhibiting several of the characteristics of these glasses. It depicts a man and a woman and is inscribed with the names of the couple, «IEHAN.BOVCAV.ET ANTOYNETTE. BOVC», «IE. SVIS. AVOUS» and «MON CVER AVES» ('I am yours' and 'My heart is yours') (Fig. 1). The glasses are characterised by a predominantly blue, red and white enamel palette. The most refined examples are finely gilded, the gilding often taking the form of a band of gold leaf below the rim. They are enamelled with figurative images – couples, religious subjects, coats of arms, birds and flowers and/or inscriptions in French or Latin, though a few have only geometric patterns. The inscriptions can be incised in the gold leaf of the border, painted onto enamel scrolls, or directly onto the glass wall of the vessel. The dominant themes concern romantic love and Christian faith. Their production period may range from as early as the 1540s through to the early 17th century. Two examples

[1] Gaynor 1991: 73-74; Rochebrune 2004: 143, 146-49; Maitte 2009; Élise Vanriest, unpublished doctoral thesis, *Verre et verriers à Paris et en Île-de-France dans la seconde moitié du XVIe siècle (1547-1610): Production, commerce, usages*, Paris, École Pratique des Hautes Études, 2019.

– one of them from an excavation – are recorded as being inscribed with late 16th-century dates[2].

The glasses fall into two distinct groups: about thirty unexcavated examples, which began to be identified in the 1860s, and fragments from perhaps fifty glasses, excavated from the 1970s until now. Most of the unexcavated examples have unusual shapes and are of fine quality. Goblets comprise the largest group, pedestal beakers also feature strongly, and among the other forms are flasks and vases. The excavated examples are generally less refined and their forms usually fall in line with 16th-century glasses excavated in France, most notably pedestal beakers and conical footed goblets[3].

The goblet now in the British Museum (Fig. 1) was the first example to be identified as French. First recorded in the catalogue of the D'Huyvetter sale, held in Ghent in October 1851, it was described as Venetian[4]. It was later bought by the English collector Felix Slade. He lent it to the Art Treasures Exhibition in Manchester in 1857 and the Special Loan Exhibition at the South Kensington Museum in London in 1862. It was in the context of these exhibitions that the British Museum curator Augustus Wollaston Franks first identified the glass as French. In 1858 he published it as probably French[5]; in the catalogue of the Special Loan Exhibition of 1862 he stated that its French origin was 'unquestionable'[6]. When the French art historian Eugène Piot saw Slade's glass at the exhibition in London in 1862 it came as a complete revelation. Piot wrote of it in *Le Cabinet de l'amateur* in 1863, «We knew that enamelled glasses like those of Venice were made in France

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[2] A blue glass plate dated 1597 that was in the Musée de Rennes in the 19th century. It was irreparably dam aged in 1911. (illus. Gerspach 1885: 199). Fragments from a drinking vessel excavated at the Château des Rohan, Pontivy, Brittany, in 1990, inscribed with '158', the first three numerals of a date (illus. Gaynor 1994: 131).

[3] For a broad range of examples from both groups see Cabart 2011; Dawson 2011: 129-34; Gaynor 1991; Gaynor 1994; Higgott 2011, cat. no. 7, with appendix; Higgott 2015.

[4] *Description des antiquités et objets d'art qui composent le cabinet de feu M. Joan D'Huyvetter, à Gand*, Ghent: Vanderhaeghen-Hulin, 20 October 1851 «et jours suivant», lot 455. Glass was auctioned on the first day.

[5] Franks 1858: 10.

[6] Franks 1863: 397.

in the 15th and 16th centuries but we had never seen them»[7]. As a result, Slade's glass was the first of this group to excite French public attention. It entered the British Museum as part of Slade's bequest in 1868. Piot's publication was followed by the emergence of several further examples during the 1860s, predominantly in France[8].

The emergence and identification of these glasses was a manifestation of the growing enthusiasm for historic Venetian glass that reached its apogee during the 1860s. In France, this coincided with the confident nationalism of Napoleon III's Second Empire. It was the ideal environment in which the rediscovery of exquisite French Renaissance glass could flourish. That these glasses were much sought after is proved by the relatively high price of 2,000 francs paid by Alfred Émilien O'Hara, comte de Nieuwerkerke, at the Roux of Tours sale in Paris in 1868 for a spectacular goblet enamelled with the Crucifixion (Fig. 2). Nieuwerkerke's receipted *Bordereau d'Adjudication* shows that at the same sale he paid 490 francs for an exquisite *façon de Venise* glass (now Wallace Collection C552) (Fig. 3).

No unexcavated example has a proven provenance prior to the 19th century, including the so-called 'Clutterbuck-Muncaster' beaker (Fig. 4), which currently comes closest to having an earlier provable provenance. The beaker was first published in the specialist glass literature by Albert Hartshorne in 1897, when it belonged to Thomas Clutterbuck[9]. Hartshorne wrote that it was a «claimant to the Luckship of Muncaster». The Luck of Muncaster is said to be a glass that was a gift from the English king Henry VI (d. 1471) to

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[7] Translated from Piot 1863: 289.

[8] British Museum 1863,0508. It was acquired by the museum in 1863. Fillon 1864: 205-7 and pl. 6 included a beaker acquired by the Musée de Cluny in 1867 and now at the Musée de la Renaissance, Écouen, inv. E.Cl. 8627 (see Fig. 5 and p. 152-153); a goblet lent by Baron Davillier to the Musée rétrospectif in Paris in 1865 (no. 3141) and later part of his bequest to the Musée du Louvre (inv. OA 3111); by 1866 Baron Anselm von Rothschild in Vienna owned a vase now in the Museum of Fine Arts, Boston, inv. 51.2473; in 1867 several French enamelled glasses were lent to the Histoire du Travail et Monuments Historiques section of the Paris International Exhibition (nos 2747-50).

[9] Hartshorne 1897: 140-41 and pl. 24. Hartshorne gave it the name 'Clutterbuck-Muncaster' beaker.

Sir John Pennington of Muncaster Castle in Cumbria. Hartshorne stated that the beaker was said to have left Muncaster in 1756 through the marriage of Elizabeth Pennington[10]. Following its publication by Hartshorne, the beaker next surfaced in a sale at Sotheby's, London, in November 1929[11]. Subsequently lost sight of for many years, today it belongs to the Pennington Family of Muncaster Castle. The beaker postdates the 15th century, as Hartshorne recognised when he dated it to 1500-1510 at the earliest. New research carried out by Alex Beeton and Lily Tidman on behalf of Peter Frost-Pennington of Muncaster Castle during the summer of 2020 indicates that the beaker can almost certainly be traced back in the ownership of the heirs of a cadet branch of the Pennington family to at least 1820, when it appears to be mentioned in a publication, and very likely to the ownership of Elizabeth Pennington, of this cadet branch, who died in 1781[12].

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[10] Hartshorne probably established this provenance information from the inscription on the box associated with the beaker, where the glass is described as having been given by Henry VI to Sir John Pennington and as having passed into the Binchester family on Elizabeth Pennington's marriage to Farrer Wren (of Binchester Hall in County Durham) in 1756. While Hartshorne referred to the association of the beaker with the marriage of Elizabeth Pennington, he seems not have realised that Elizabeth belonged to a cadet branch of the Pennington family whose seat was not at Muncaster but at Seaton, also in Cumbria. For a Venetian glass bowl that belongs to the Pennington Family at Muncaster Castle and is known today as 'The Luck of Muncaster' see 'Cumbria - History - Cumberland Lucks - BBC' online. For new research on both glasses, carried out since the Study Days on Venetian Glass in 2019 and kindly made available to us by the authors and Peter Frost-Pennington, see Alex Beeton and Lily Tidman (post-graduate students, Oxford University), unpublished Report, 'The Luck of Muncaster', July 2020. Some archival material was inaccessible to Beeton and Tidman due to closures as a result of the COVID-19 pandemic, so it is possible that future archival research will shed further light on the history of the 'Clutterbuck-Muncaster' beaker. For more information contact Peter Frost-Pennington at Muncaster Castle or Alex Beeton (alexlaithbeeton@gmail.com).

[11] *Catalogue of Old English & Continental Drinking Glasses and Cut Glass*, Sotheby & Co., London, 22 November 1929, lot 59, the property of Miss E. E. Barlow. The annotated copy of the sale catalogue in Sotheby's archive shows that lot 59 was bought by the dealer Frank Partridge for £240.0.0. Partridge's records were destroyed during the London Blitz in 1942. In a written communication to Suzanne Higgott on 8 October 2019 Peter Frost-Pennington speculated that the beaker may have been acquired from Partridge by his wife Iona Frost-Pennington's great-grandfather, Sir John Ramsden (d. 1958).

[12] For the research by Alex Beeton and Lily Tidman see note 10. Their Report

As soon as the French glasses began to be identified, their possible place of production began to be discussed. Franks thought that Slade's goblet may have been made in Provence[13]. Other suggestions included Jules Labarte's speculation, published in 1875, that some glasses, including Slade's, may have been made by the glasshouse at Saint-Germain-en-Laye, for which Henri II had granted a ten-year privilege to the Italian Theseo Mutio in 1551 to make *façon de Venise* glass[14]. In recent years new archival research on glasshouses in France has shown the need for caution in attributing the glasses to specific glasshouses[15].

Archaeological fragments of French Renaissance vessel glass with figurative enamelling and inscriptions are rare, but examples have been found in Belgium, Britain, France, Germany and Luxembourg, with the greatest concentration of finds being in north-east France. Contexts include a number of castles and urban sites, including English ports. Most finds date to the second half of the 16th century[16].

The following additions to the corpus of excavated fragments have recently come to our attention[17]:

Paris, musée Carnavalet (unpublished): three fragments of enamelled glass, without precise provenance other than Paris. The first one bears

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cites the publication of 1820 in which the beaker appears to be mentioned, though the glass was probably not seen by its author (P. Fair, *A Description of Bishop Auckland…*, Bishop Auckland, the glass mentioned on p. 76). The handwriting of the inscription on the box associated with the beaker (visible behind the beaker in Fig. 4), which concerns the beaker's history and refers to its ownership by Elizabeth Pennington, seems likely to date to the later 18th or early 19th century. It is large-bodied, with a strong and consistent slope to the right, characteristic of the later phase of the 'English round hand', datable to that period. The 'English round hand' first appeared in the late 17th century and continued in use up to the early 19th century. For a discussion of this phase in English handwriting see Ambrose Heal, *The English writing-masters and their copy-books 1570–1800. A biographical dictionary & a bibliography*, with an introduction on the development of handwriting by Stanley Morison, Cambridge University Press 1931, pp. xxxviii-xl (with thanks to Gordon Higgott for this bibliographical reference).

[13] Franks 1858: 10.

[14] Labarte 1875: 397.

[15] See Maitte 2009 and Vanriest, cited in note 1.

[16] For summary information about many examples see the references in note 3 above, excluding Dawson 2011.

[17] These additions were researched and compiled by Aurélie Gerbier.

two letters, «M» and «E», of an incomplete inscription and a cross potent under a double line. This is a very common motif in heraldry but probably a simple ornament here. The second example shows an incomplete inscription between blue lines framed by white dots. The third one is the most interesting because of the male head, perhaps with part of a wing, probably an angel or an archangel, a figure also depicted on a goblet in the King Collection[18]. The lack of a precise context for these fragments is especially regrettable because they are the only fragments, apart from those discovered during the Grand Louvre excavations in the 1980's,[19] to have been found in Paris.

Meaux, rue du Grand-Cerf[20]: fragments from the bowl of a goblet found on the excavation site of one of the most important arteries of the city in the 16th century. The rim border, between two lines of dots, shows three letters, «RAN», which must be part of the word ESPERANCE. Under this border, the bowl is divided by vertical friezes of S-shaped scrolls and punctuated with hearts and fleur-de-lys. The shape of the bowl and the organization of the decor are very close to an example excavated in Châlons-en-Champagne in a 16th-century context[21].

Metz, Home Israëlite[22]: enamelled fragments of four pedestal beakers found in the excavations undertaken in a three-centuries-old Jewish institution near the synagogue of Metz. The high quality of the archaeological material found in the latrine pits gives a good idea of everyday life in the city's former ghetto. The fragments are decorated with friezes of white dots and white and blue lines and, on one of them, an inscription (three letters « …OI… » and «V»). The way the letters seem to «float» on the bowl is reminiscent of fragments from Strasbourg[23] dated to the third quarter of the 16th century, which fits with the Jewish occupation of the site.

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[18] Lhermite-King 2008: 12-13.
[19] Foy and Sennequier 1989: 297, cat. no. 316.
[20] Depraetère-Dargery 1998: 73-75.
[21] Cabart, Chossenot and Chossenot 1984: 37-41.
[22] Cabart 2011: 217.
[23] Foy and Sennequier 1989: 298, cat. no. 318.

Frankfurt-am-Main[24]: an incomplete goblet was found in 2005 during the excavation of a latrine pit north of Frankfurt Cathedral. Even though the glass is heavily corroded, the enamel decoration can be identified as French. The foot shows the combination of two of the most typical friezes seen on French glasses: the S-shaped scrolls and the vaulted-bridge-like arcature. Red and blue scrolls are painted on the knop. The three remaining letters in the border, «ANC», and the remains of a fourth one, «R», are from the word ESPERANCE[25]. Like fragments from Lübeck[26] and Arlon[27], this is one of the most interesting discoveries of French enamelled glass from Imperial territory.

Edinburgh, Greyfriars Kirkhouse[28]: fragments of a beaker discovered in a deposit linked to a 16th-century tenement and filled in the early 17th century. It combines two decorative techniques: the optic blown bosses and flowers and hearts painted in white enamel on these same bosses. This glass is published as French: the small flowers and hearts are common motifs on French enamelled glass[29]. Similar treatment of the bowl occurs on a glass attributed to France in the British Museum[30]. But the shape of the Edinburgh glass suggests that it may be a pedestal beaker of a type that is commonly associated with this kind of optic decoration and is sometimes attributed to the Netherlands in the first half of the 17th century[31].

Between the 1850s and the 1870s, when a number of the unexcavated glasses came to light, market demand for fine Renaissance *objets d'art* was high, resulting in the production of sophisticated fakes. In recent decades, the authenticity of at least some of the unexcavated glasses has been questioned, but doubts have mostly been

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[24] Krueger 2019.

[25] Cabart 2011: 188, fig. 144, no. 34.

[26] Steppuhn 2016: 130-132.

[27] Henrotay and Hercot 2012.

[28] Franklin 2017.

[29] New York, Metropolitan Museum of Art, inv. 83.7.130 and Depraetère-Dargery 1998: 73-75.

[30] Dawson 2011: 132, fig. 2.

[31] Willmott 2002: 38, fig. 8.

shared among glass historians and collectors. In a very typical way for Renaissance decorative arts, some of these doubts are due to the names associated with the glasses' relatively late appearance on the art market, in the second half of the 19th and early 20th centuries, and in some cases to their more or less direct links to known forgers or makers of historicist glass.

This is the case for an enamelled bottle bought by the British Museum in 1878 from Alessandro Castellani, an Italian antiquarian and collector[32]. He is best known for his reproductions of Etruscan jewels, some of them having been sold to museums as authentic Etruscan artefacts[33]. Benjamin Fillon is also now a problematic figure. It is no secret that his reputation has suffered much since the 19th century: in 1861, he produced a quote by the French ceramist Bernard Palissy for Catherine de Medici's grotto in the garden of the Tuileries palace[34]. This document has since been ruled a forgery[35]. Fillon is also notorious for quoting in his publications 16th-century archive material that had never been seen before and has never been found since. Among these lost documents, there is one of particular interest: a letter dating to 1572 from the Comte de Lude offering his protection to Muranese glassmaker Francesco Salviati, thereby proving that *façon de Venise* glass was made in Poitou[36].

Fillon's equivocal intentions cast a shadow of doubt on all glasses linked to him. Among them, the 'Hallebardiers' glass that was sold to the musée national de Cluny in 1867 by his intermediacy (Fig. 5)[37]. This piece has been studied and questioned by many scholars: the quality of the glass, which is very thin, its very clear color, and the brown enamel always intrigued them. To complicate the matter further, the 'Clutterbuck-Muncaster' beaker has a very similar iconography and the Baccarat glasshouse made a copy of the 'Hallebardiers' glass in 1908[38]. We could argue that a close comparison of the face of one of

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[32] Inv. 1878,1201.1.

[33] Weber Soros and Walker 2004.

[34] Bibliothèque Historique de la Ville de Paris, MS 3433, fol. 220.

[35] Bresc-Bautier and Bautier 1987.

[36] Fillon 1864: 208-211.

[37] Fillon 1864: pl. 6.

[38] Cappa 1998: 183, cat. no. 294.

the soldiers with the face of the woman on the British Museum goblet (Fig. 1) shows strikingly similar features. And the fragments found in Lübeck provide arguments in favour of the authenticity of these glasses[39]. The earliest mention of the 'Hallebardiers' glass dates to 1864, while the British Museum goblet, as previously mentioned, was first published in 1851[40]. While the enamelling on these glasses is very close, it does not exclude the possibility that the 'Hallebardiers' glass was modelled on one of the other examples by a very gifted enameller.

Two glasses enamelled with the arms of Catherine de Medici have also been questioned[41] (Figs. 6-7). The bottle is not under discussion here. The footed bowl was bought by the musée de Cluny for 500 francs in 1906 from M. Emile Brocard, son of Philippe-Joseph Brocard, the enameller of the late 19th century who produced many enamelled mosque lamps. There is no information so far on how and where Brocard bought this piece. But we know that Brocard made glasses inspired by Renaissance patterns. Among those glasses there are a set of purple plates (Fig. 8) and a turquoise plate in a private collection[42]. The gilding and enamelling on the footed bowl and the plates show the same foliate decoration. Could it be that the decoration of the footed bowl was used as a model for the plates? Are all these glasses 19th-century pieces?

The study of French enamelled glass is now at a turning point. It has recently begun to be studied in the way that Venetian enamelled glass has been studied during Project Cristallo[43], by searching for mentions in archives, and analyzing and comparing the compositions of both museum pieces and archaeological material. The purpose is to get a better understanding of these heterogeneous productions: to confirm (or not) groups that have been assembled by stylistic comparison, and to provide clues for forming new groups, including

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[39] Steppuhn 2016: 130-132.

[40] See note 4. The first mention of the 'Hallebardiers' glass is in Fillon 1864: 206-207.

[41] Painchart and Guyomar 2017.

[42] The purple plates are in Corning Museum of Glass, inv. 2008.3.38 and in New York, Metropolitan Museum of Art, inv. 53.225.108. For the turquoise plate, see Lameris 1991: 82-83, cat. 58.

[43] Barbe and Filipponi 2018.

19th-century productions. The results of this study will be announced in an exhibition that will be hosted by the musée national de la Renaissance in 2021-2022.

Acknowledgements

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REFERENCES

Barbe, Françoise and Fernando Filipponi. 2018. Les verres émaillés vénitiens de la Renaissance : le projet Cristallo. In *Annales du 20e congrès de l'Association internationale pour l'histoire du verre*, AIHV, septembre 2015. Fribourg. Rahden: Verlag Marie Leidorf GmbH.

Bresc-Bautier, Geneviève and Robert-Henri Bautier. 1987. Un faux du XIXe siècle: «Devys d'une grotte pour la Royne, Mère du Roy». *Revue de l'Art* 78: 84-85.

Cabart, Hubert, Daniel Chossenot and Michel Chossenot. 1984. Les fouilles de la rue Lochet à Châlons-sur-Marne en 1973 : topographie du site et étude de la céramique et du verre (du Moyen Âge au XVIIe siècle). *Bulletin de la Société archéologique champenoise* 77: 4, 31-42.

Cabart, Hubert. 2011. *La verrerie archéologique. Dieulouard et l'Est de la France aux XVIe et XVIIe siècles*. Nancy: Presses Universitaires de Nancy.

Cappa, Giuseppe. 1998. *Le génie verrier de l'Europe : témoignages : de l'historicisme à la modernité (1840-1998)*. Sprimont: Mardaga.

Dawson, Aileen. 2011. French Glass in the British Museum Collection. *Journal of Glass Studies* 53: 129-43.

Depraetère-Dargery, Monique. 1998. *Aspects méconnus de la Renaissance en Île-de-France.* Guiry-en-Vexin: Musée archéologique départemental du Val d'Oise. Paris: Somogy.

Fillon, Benjamin. 1864. *L'Art de terre chez les Poitevins; suivi d'une Étude sur l'ancienneté de la fabrication du verre en Poitou*. Niort: L. Clouzot.

Foy, Danièle and Geneviève Sennequier. 1989. *À travers le verre. Du Moyen Âge à la Renaissance.* Rouen: Musées et Monuments départementaux de la Seine-Maritime.

Franklin, Julie. 2017. The Development of Candlemaker Row, Edinburgh, from the 11th to the 20th Centuries: Excavations at Greyfriars Kirkhouse. *Scottish Archaeological Internet Reports* 71: 1-37.

Franks, Augustus W. 1858. Vitreous Art. In *Art Treasures of the United Kingdom from the Art Treasures Exhibition, Manchester*, edited by J. W. Waring. London: Day and Son.

Franks, Augustus W. 1863. Section 20. Glass. In *Catalogue of the special exhibition of works of art of the mediaeval, Renaissance, and more recent periods, on loan at the South Kensington Museum, June 1862*, edited by J. C. Robinson. London: Her Majesty's Stationery Office.

Gaynor, Suzanne. 1991. French enameled glass of the Renaissance. *Journal of Glass Studies* 33: 42-81.

Gaynor, Suzanne. 1994. More French Enameled Glass of the Renaissance. *Journal of Glass Studies* 36: 130-33.

Gerspach, Edouard. 1885. *L'Art de la Verrerie*. Paris: A. Quantin.

Hartshorne, Albert. 1897. *Old English Glasses*. London, New York: E. Arnold.

Henrotay, Denis and Catherine Hercot. 2012. Mise au jour d'un lot de verrerie du XVIe siècle dans un puits-latrines, rue du Marquisat à Arlon (Belgique). In *Le verre en Lorraine et dans les régions voisines*, edited by V. Arveiller and H. Cabart, Actes du Colloque International, 26e Rencontres de l'AFAV, Metz, 18 et 19 novembre 2011. Montagnac: éditions Monique Mergoil (Monographies Instrumentum 42).

Higgott, Suzanne. 2011. *The Wallace Collection Catalogue of Glass and Limoges Painted Enamels*. London: The Trustees of the Wallace Collection.

Higgott, Suzanne. 2015. Survey of Venetian and *façon de Venise* enamelled and gilded glass made *c*. 1500-1550 and excavated from reliably dated contexts in Great Britain. In *Study days on Venetian glass. Approximately 1700's*, edited by R. Barovier Mentasti and C. Tonini. Venice: Istituto Veneto di Scienze, Lettere ed Arti: 69-90 (*Atti dell'IVSLA* 173/1, 2014-15, Classe di scienze fisiche, matematiche e naturali).

Krueger, Ingeborg. 2019. Aus Frankreich nach Frankfurt: ein Glaspokal mit emaildekor. In *Grabung – Forschung – Vermittlung. Gedenkschrift für Peter Steppuhn,* edited by G. Dethlefs, W. Kramer, Ch. Leiber and H. Wessling. Wuppertal: Prometheus Verlag.

Labarte, Jules. 1875. *Histoire des arts industriels au Moyen Âge et à l'époque de la Renaissance*. Vol. 3. Paris: Ve A. Morel & Cie.

Laméris, Frides and Kitty Laméris. 1991. *Venetiaans & Façon de Venise. Glas 1500-1700*. Lochem.

Lhermite-King, Sylvie. 2008. *Cent verres français, 1550-1750: Trésors des collections privés*. Paris: Sylvie Lhermite-King.

Maitte, Corine. 2009. *Les Chemins de verre. Les migrations des verriers d'Altare et de Venise (XVI^e^-XIX^e^ siècles)*. Rennes: Presses Universitaires de Rennes.

Painchart, Benoît and Christine Guyomar. 2017. La verrerie à l'italienne dans le contexte du marché parisien entre 1550 et 1665. Troisième partie. Les verres du musée national de la Renaissance à Écouen. Une approche archivistique. *Éclats de verre* 30: 32-49.

Piot, Eugène. 1863. Exposition des amateurs Anglais au Musée de Kensington. *Le Cabinet de l'amateur* (années 1861 et 1862): 268-312.

Rochebrune, Marie-Laure de. 2004. Venetian and *Façon de Venise* Glass in France in the 16th and 17th Centuries. In *Beyond Venice: Glass in Venetian Style, 1500-1750*, edited by R. W. Price. Corning, New York: Corning Museum of Glass.

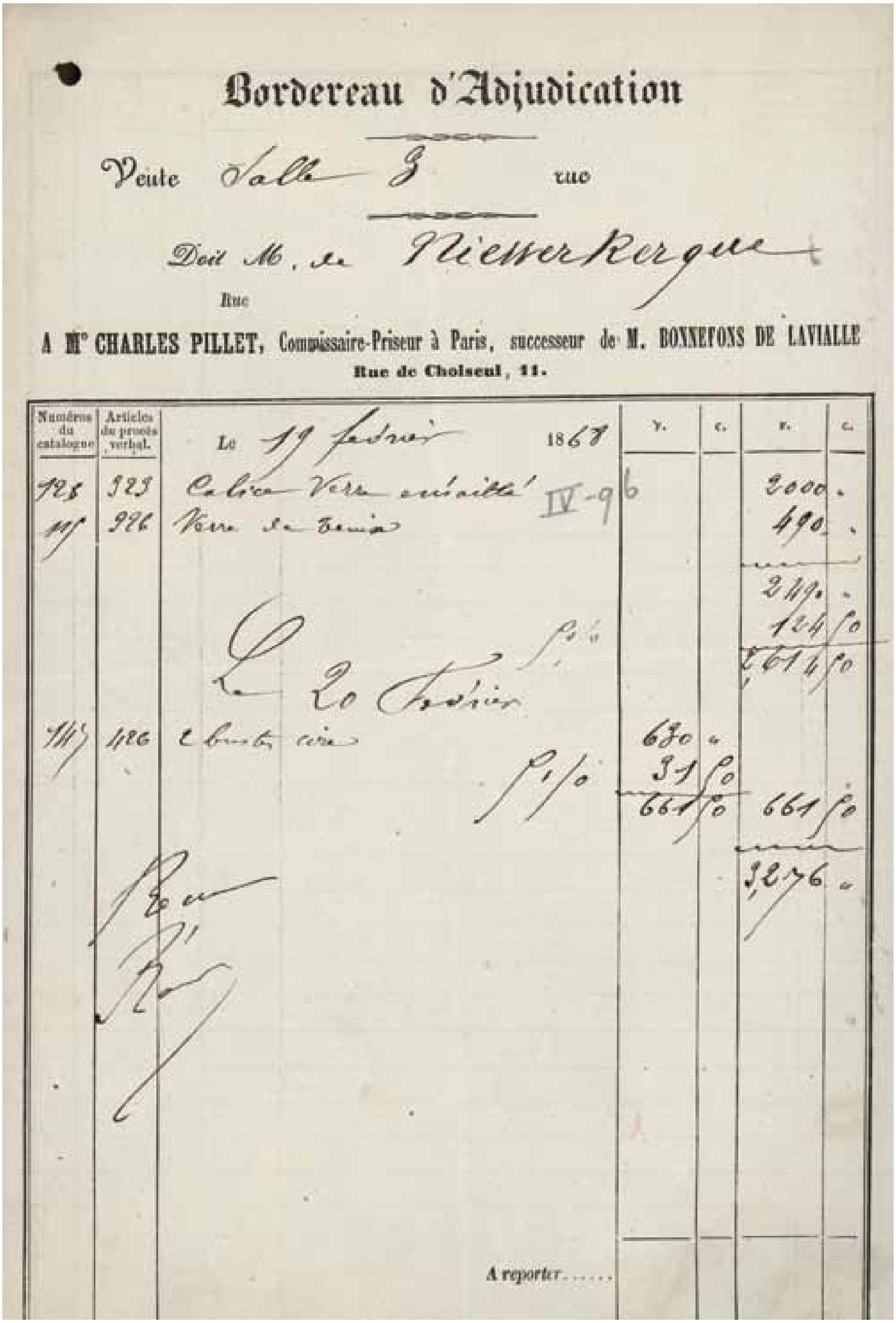
Steppuhn, Peter. 2016. *Mittelalterliche und frühneuzeitliche Glasfunde aus der Altstadt von Lübeck*. Rahden: Verlag Marie Leidorf GmbH (Lübecker Schriften zu Archäologie und Kulturgeschichte, 30).

Weber Soros, Suzanne and Stefanie Walker. 2004. C*astellani and Italian Archaeological Jewelry*. New Haven: Yale University Press.

Willmott, Hugh. 2002. *Early Post-Medieval Vessel Glass in England c.1500–1670*. York: Council for British Archaeology (Council for British Archaeology, Research Report 132).

Fig. 1 - *Goblet with enamelled and gilded decoration*, France, 1526-1575, h.16.2 cm., d. 13.5 cm. London, British Museum, S.824 (© The Trustees of the British Museum).

Fig. 2 - *Goblet (chalice?) with enamelled and gilded decoration*, France, mid-16th century, h. 22.4 cm, d. 14 cm. London, Wallace Collection, C518 (© The Trustees of the Wallace Collection).



Bordereau d'Adjudication

Vente Salle 3 rue

Doit M. de Nieuwerkerque

Rue

A Mᵉ CHARLES PILLET, Commissaire-Priseur à Paris, successeur de M. BONNEFONS DE LAVIALLE

Rue de Choiseul, 11.

Numéros du catalogue	Articles du procès verbal	Le 19 février 1868	f.	c.	f.	c.
	323	Calice Verre émaillé IV-96			2000	
		Verre de Venise			490	
					2490	
					124	50
					2614	50
		20 février				
	1126	Buste cire	630			
			31	50		
			661	50	661	50
					3276	
		A reporter......				

Fig. 3 - *Receipted* Bordereau d'Adjudication *for the comte de Nieuwerkerke's purchases from the Roux of Tours sale*. London, Wallace Collection Archives, HWF/RW/2/2 (© The Trustees of the Wallace Collection).

Fig. 4 - *Beaker known as the 'Clutterbuck-Muncaster' beaker. Gilded and enamelled glass*, France, mid-16th century, h. 16 cm, d. at top and base 9 cm. Pennington Family of Muncaster Castle (© Muncaster Castle).

Fig. 5 - *'Hallebardiers' goblet with enamelled and gilded decoration*, France, circa 1560, h. 17 cm., d. 11 cm. Écouen, musée national de la Renaissance, E.Cl. 8627 (© RMN-Grand Palais, musée de la Renaissance, château d'Écouen / Hervé Lewandowski).

Fig. 6 - *Bottle with enamelled and gilded decoration*, France, 1551-1589, h. 19.5 cm., d. 12 cm. Écouen, musée national de la Renaissance, Ec. 282 (© RMN-Grand Palais, musée de la Renaissance, château d'Écouen / Mathieu Rabeau).

Fig. 7 - *Footed bowl with enamelled and gilded decoration*, France, 1551-1589, h. 15 cm., d. 25.5 cm. Écouen, musée national de la Renaissance, E.Cl. 14438 (© RMN-Grand Palais, musée de la Renaissance, château d'Écouen / Mathieu Rabeau).

Fig. 8 - Philippe-Joseph Brocard, *Plate with enamelled and gilded decoration*, circa 1880, h. 1.7 cm., d. 27.2 cm. Corning, The Corning Museum of Glass, inv. 2008.3.38 (© 2008.3.38, Collection of The Corning Museum of Glass, Corning, NY).

Luca Pesante

GLASS IN ROME IN THE XVI CENTURY

The history of glass of XVI and XVII century in Rome and Lazio is almost unknown. By doing a resaerch on renaissance craftmenship it was easy to come across a large amount of archival documents which were telling a quite surprising phenomenon about glass making and trade in the capital of the Papal State during the second half of XVI century.

Throughout the course of the XVI century most of the roman art (and within this word is always included what we call now handicraft) is made by non-romans. As well as the maiolica-making is managed by potters coming from the most renowned and traditional center of production like Deruta, Urbino, Casteldurante, Montelupo, Faenza, all glass makers are from famous center of production of our peninsula: Piegaro in Umbria, Altare in Liguria and Murano[1].

Since the pontificate of pope Paolo III Farnese new construction sites, cultural patronage, urban planning interventions, transformed the physiognomy of Rome, and the introduction of glass-making is not a marginal aspect of this radical change. The document that appears to be the first concrete act for the installation of glass work in Rome is a *breve* or a *privilege* signed directly by the pope (in case of new inventions or introductions of new techniques, the normal practice was asking the Pope the privilege of being the only one to use that technique or that material in Rome or in the ecclesiastical state). Antonio Serragli merchand of Florence, has found a way to make glass (*artem cristallorum*) like that one of Murano. And for

[1] For an overview on labour in Rome during this century see: Delumeau 1957; Güll 2003; Pesante [forthcoming].

the utility, decorum and ornament of the city the pope granted the privilege:

> *Dilecto nobis in Christo Speciali Viro Domino Antonio Francisco de Serraliis civi et mercatori florentino Ro. Cu. Sequenti salutem in Domino. Cum sicut accipimus tu tuis industria laboribus et vigiliis artem cristallorum fabricandorum, instar eorum qui in Murano oppido fabricantur, in Alma Urbe et Statu ecclesiastico novam adinveneris et illam ad publicam commoditatem et utilitatem nec non decorum et ornamentum Urbis et Status ecclesiatici huiusmodi in ipsa Urbe atque aliis Civitatibus Terris et locis S.R.E. mediate vel immediate subiectis exercere ac novas officinas et furnorum seu fornacium species erigere intendas Nos qui semper specialibus favoribus industrios homines et qui novam aliquam artem in dictam Urbem seu Statum ecclesiasticum introduxerunt...*
> (Roma, in Camera Apostolica, 16 agosto 1559[2]).

Few years later, in may 1575, a contract was signed before a notary in the small ligurian village of Altare: Francesco Serrodi e Francesco delle Pertiche created a company in order to make glass in Rome in a workshop equipped with a kiln nearby via della Scrofa (not faraway from piazza del Popolo). We are informed that they used to produce *rerum vitrialium et cristallorum* then sold to the dozens of glass traders spread all over the city of Rome and the papal State, most of them from Liguria[3].

Three years later a boat loaded with sand, sailed from Liguria and docked in the port of Rome on the Tiber river. The load value is 105 gold scudi[4]. The sand was directed to the glass workshop of Francesco delle Pertiche. Next year, in july, we find other people in the same company: Giovanni Paolo Pignatelli e Nardo Cocchi both from another important and renowned italian center of glass production: Piegaro in Umbria[5]. Actually Nardo will be the true protagonist of glass production in Rome in the following decades (Fig. 1).

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[2] ASV, *Cam. Ap., Div. Cam.*, 189, cc. 167v-169v.
[3] ASR, *CNC*, vol. 1052, c. 103r.
[4] ASR, *CNC*, vol. 1052, c. 441r.
[5] ASR, *NTAS*, vol. 13, c. 184v.

In april 1579 a company made by two brothers from Piegaro, Giovanni Antonio and Noro Pignatelli, *super arte et exercitio bichierarie* in via di Panico, was based on venitian glass trade, and is specified that none of the members can go to Venice to do business on their own for themselves. Next year Giovanni Antonio Pignatelli along with Tarquinio del q. Cristoforo create a company (*smalti de musaico*).

Nardo runs two workshop at the same time: one in Rome, in via della Scrofa (along with Sebastiano Massari from Altare) and one in Bracciano. Notarial deeds inform us of aspects that hardly could be foreseen before. First: only a small part of the glass produced in Rome was intended for the local roman market. In 1583 Giovanni Antonio Seroddi e Francesco delle Pertiche partners in the workshop in via della Scrofa sent a boat loaded with *mercanzie de bicchieri de cristallo*, to Naples. Two decades later, another glass maker Florido Floridi sent fifty barrels filled with his glass to Pizzo di Calabria on a boat owned by Baptista from Genoa[6]. In the same year a group of merchants from Altare and Piegaro bought 822 scudi of glass from Florido Florido in order to ship it to Sicily and Calabria. More or less the same sea routes were sailed for row materials supply. And this is the second unpredictable aspect: since 1581 the father of a glass maker used to send every year from Altare to Rome *terra* of Altare, probably a silica sand extracted nearby Altare, *soda* bought in Genoa (sodium carbonate), and blowpipes, brocken glass, marzacotto, molds for glasses, crucibles, gathering together all these goods in Savona and then shipped on a boat to Rome.

In 1593 Nardo signed a contract by which he bought one salma of *Manganese d'Inverea* (Ivrea, 40 km north of Turin) in Altare that should be shipped to Rome, to the river Tiber in front of his workshop[7].

Two years later, in october 1595, thanks to an extremely interesting notarial deed, we know that Nardo asked a owner of a boat, to go to Trapani, Sicily, «*andare con la detta sua barcha alla volta di Trapano et caricare detta sua barca di rena da fare becchieri in*

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[6] ASR, *TNC*, uff. 6, vol. 45.

[7] ASR, *TNC*, uff. 6, vol. 26, c. 489r.

un luogo detto a Santo Todero […] *quale debba essere rena bona, bella et ben conditionata da poter fare li bicchieri*»[8].

Francesco from Altare died in 1583, since that Nardo Cocchi and Sebastiano Massari took over his workshop and became as *sociis bicchierariis ad Scrofam* the leadears of glass production in Rome, active as well in a second workshop nearby the lake of Bracciano (Oriolo).

In 1592 Nardo Cocchi gets a very significant commission for making sealed glass for the entire ecclesiastical State (that is glass used to retail sale of wine and oil in taverns and other public places): «*negotium sive appaltum fabricandi et destribuendi mensuras vitri ab oleo et a vino ac pro omni alio liquore necessarias et opportunas hospitibus et alii personis qui minute vendunt predicta, tam in Urbe quam in toto statu ecclesiastico*»[9].

One of the most important commitment of a glass maker working in Rome is the constant and active collaboration with painters in the realization of mosaics all over the city.

And the same year Nardo and Sebastiano are involved in a company with the great bolognese painter Paolo Rossetti to make the mosaics in the Caetani chapel in Santa Pudenziana:

> *Il detto Paolo promette componere e fare tutto il musaico che andarà tutto in detta cappella secondo l'accordo fatto con il detto Ill. mo Sig. Cardinale, e metterci la sua opera et industria et altre opere che bisognassero per comporre il detto mosaico, a tutte sue spese. Il detto m. Nardo promette per servitio di detto musaico dare et consignare al detto s. Paolo per l'opera tutti li smalti et marmi che seranno di bisogno et necessario per detto musaico et tagliati et accapati secondo sarrà ordinato da detto m. Paulo […]*[10].

A month later a new company exclusively for the production of enamel tiles for mosaic is created between Nardo, Bastiano and the venitian Girolamo Magagnato. This company *societas smaltorum* is expected to last for 10 years, and it is stated that in event they were

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[8] ASR, *TNC*, uff. 6, vol. 30, c. 284r.

[9] ASR, *TNC*, uff. 6, vol. 25.

[10] ASR, *TNC*, uff. 19, vol. 28, c. 411.

to make the mosaics of the St. Peter dome all of the three partners must work equally in this commision[11].

Nardo dies in june 1604, immediately after his death the inventory of his workshop is drawn up. Few days later the venitian glassmaker Pietro Pomodoro bought his workshop, carrying on the important task of mosaic tiles production.

In 1605 Pietro Pomodoro venitian and Giovanni Antonio Zappi from Altare made the mosaic glass tiles (smalti) for the Fabbrica di San Pietro

> *per fare la fascia sotto il cornicione della Cappella grande, dove sta scritto Tu es Petrus, et altre parole* and these *smalti* must be *d'oro e turchini boni, perfetti, e fini, risplendenti e vaghi, buoni, belli, perfetti et di quella bontà longhezza e perfettione che sonno quelli della Gregoriana anzi megliori, et che l'oro sarrà fino et bello acceso, che non parrà svanito, et di pezza grossa com'adoperano li spadari, et ne darrà mostra inanzi, et detti smalti sarrano tagliati più minuti e proportionati all'opera*[12].

REFERENCES

Manuscript sources

Archivio Segreto Vaticano (=ASV), *Camera Apostolica, Diversa Cameralia (=Cam. Ap., Div. Cam.).*

Archivio di Stato di Roma (=ASR), *Archivio del collegio dei notai capitolini (=CNC).*

ASR*, Archivio dei Trenta Notai Capitolini (=TNC).*

ASR, *Archivio del tribunale di Acque e Strade (=NTAS).*

Printed sources

Delumeau, Jean. 1957. *Vie économique et sociale de Rome dans la seconde moitié du XVI^e siècle.* Paris: de Boccard.

Güll, Paolo. 2003. *Industrie du quotidien: Production, importations et consommation de la céramique à Rome entre XIV^e et XVI^e siècle.* Rome: École Française de Rome.

Pesante, Luca. [forthcoming]. *Il lavoro della ceramica a Roma dal 1600 al 1613.*

[11] ASR, *TNC*, uff. 6, vol. 25.

[12] ASR, *TNC*, uff. 38, vol. 5, c. 232r.

Fig. 1 – Giovanni Battisti Piranesi, *View of the* Porto di Ripetta (engraving), nearby to where Nardo Cocchi's atelier was located.

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Marco Verità, Elena Tesser, Fabrizio Antonelli

THE BARGELLO VENETIAN GILDED, ENAMELLED BLUE GOBLET

A PORTABLE XRF ARCHAEOMETRIC INVESTIGATION

1. *Introduction*

Extraordinary enamelled and gilded glass objects were made in Murano since the second half of the 15th century and during the 16th century. Since the 16th-century items in imitation of the Venetian style were made also in other European glass centers (*à la façon de Venise*). Due to their beauty and appreciation, copies and fakes of these vessels were also made in the following centuries up today. In most cases, it is quite a hard task to ascertain their authenticity by visual inspection and stylistic comparison.

In this framework, the study of the provenance and authenticity of Venetian enamelled glass objects represents a most significant area of research into the art and technology of Renaissance glassmaking. Several studies attested that scientific analyses of the glass and enamels compositions can be a useful tool to identify the origin of pieces of uncertain attribution in the museum collections[1]. The quantitative chemical composition of the glass body and enamels compared with a database of analytical data collected on well dated and known provenance samples can help to recognize genuine Venetian pieces and identify later copies and fakes[2].

Due to their importance and fragility many glass artworks cannot be neither sampled or moved away from the museums. Under such constraints, the application of a non invasive and portable technique

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[1] Biron and Verità 2012.

[2] Janssens *et al.* 2013; Verità and Biron 2017.

such as handled (portable) X-Ray fluorescence spectrometry (pXRF) has a great potential for studying the chemical composition of glass and enamels of these items. pXRF is a punctual technique which allows small areas to be investigated in a short acquisition time (few minutes), giving the possibility to analyse more than one area on each enamel, verify their chemical compositions and detect subsequent retouchings (if any). Nevertheless, it is important to underline that pXRF has some important drawbacks in glass analysis[3]; in particular, it can reliably detect only elements with an atomic number higher than 15 (Phosphorous), which prevents a quantitative analysis of the whole composition of glass and enamels (Na, Mg, Al, Si and P cannot be quantified). A helium flux could be used in order to improve detection of light elements (not applied in our experiment).

The results presented in this study concern the semi-quantitative chemical analysis for elements of atomic number higher than 15 of the glass and enamels of the famous blue goblet preserved in the National Museum of Bargello in Florence (here renamed: Bargello blue goblet) decorated with enamelled scenes representing Triumph of Virtue. This goblet is very important for the history of Renaissance Venetian glass, for it is one of the few items of this kind for which extant documents prove the existence before the 19th century. In fact, a document attests that on 22nd February 1758 the Balì Giovanni Filippo Marucelli donated this goblet to the *Società Colombaria* in Florence. Since 1865 the goblet is preserved and on display at the National Museum of Bargello. Non-invasive and non-destructive pXRF analyses were performed on the goblet in order to: (i) identify the chemical composition of the glass body following appropriate procedures; (ii) study the qualitative and semi-quantitative chemical composition of colourants and opacifiers of the enamels and (iii) verify potentials and limitations of portable X-Ray Fluorescence in this field of application. The results obtained were compared with a database of enamelled Renaissance Venetian glass objects for a first evaluation of provenance and dating, in order to improve its authentication procedure[4].

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[3] Adlington and Freestone 2017.

[4] Verità and Biron [in press]; Verità and Biron 2015.

2. *Experimental*

The pXRF analyses were carried out on site at the Bargello Museum in Florence. The blue cup was analysed using a XGLab, model ELIO spectrometer equipped with a rhodium anode X-ray tube operating at 50 kV, 80 μA and a SDD detector (real time 180s). This setting allows most of the oxides with Z>15 to be analysed in concentrations as low as 0.01%. Twenty-two spectra were acquired on the body glass and enamels by approaching the instrument at the fixed working distance (9 mm) from the surface. The body glass and each enamel were measured in different points. Areas where body glass is possibly flat and enamels are well separated from each other were chosen. The rather small size of the measured spot areas (3 mm in diameter) made it possible to analyse almost all the enamels (black ones excluded) avoiding interferences from surrounding enamels. The quantitative chemical composition was achieved by using fundamental parameter method, reference glass standards NIST-620, NIST-610, Corning B and C and reference glasses made at the Stazione del Vetro, Murano-Venice. XRF spectra fitting as well as quantitative analysis were performed by bAxil (BrightSpet – Belgium) software. The relative errors on concentration of about 5% for major oxides and about 25% for minor and trace elements were estimated.

3. *Results and discussion*

The analysis of the body glass was performed on the cup edge and foot (Fig. 1). The results reported in Tab. 1 reveal a very similar composition of the two parts, indicating that the two parts of the goblet were made by using the same batch and probably the same day. Despite the fact that sodium is not detectable, the potassium (K_2O about 3%), calcium (CaO around 4%) and chlorine (Cl 0.7%) contents indicate that the base glass is likely a soda-lime-silica glass obtained by melting a batch of silica and purified soda plant ash (the amount of calcium is within the range of Venetian *cristallo*

glass composition)[5]. On the other hand, the blue glass is coloured by cobalt (CoO 0.06%) added as a cobalt ore containing also nickel (NiO 0.04%), iron (Fe_2O_3 0.83%) and copper (CuO 0.55%), but not bismuth and arsenic. It is known that cobalt ores contain other minerals in different amounts depending on their provenance area. In particular, chemical data made it possible to ascertain that a cobalt ore containing nichel was in use in Europe during the 15th century until 1520-1530, when it was replaced by an ore containing also bismuth and arsenic[6]. On principle, the absence of bismuth and arsenic does not imply that a 19th century production could be excluded. However, the glass composition and the cobalt ore used, together with a document attesting that the object was made before 1758 strongly support the hypothesis that the Bargello blue goblet was manufactured before 1520-1530.

As far as the enamels composition is concerned, the low and variable thickness (50 to 300 micrometers) of the enamel layers did not permit to obtain reliable quantitative results. In fact, enamel layers cannot be considered as an «infinitely thick» sample at least for high energy XRF lines (e.g. L and K lines of lead and tin respectively). Consequently, some elements are measured not only in the enamel layer, but also in the underlying glass (Fig. 2), thus leading to an underestimation of the elements present in the enamel layer. This problem is particularly evident for elements such as tin and lead. Tab. 2 reports approximate values of the critical penetration depth for L and K lines of major glass and enamels components measured in a body glass containing 7% of PbO, under the analytical conditions used in this study. Therefore, only qualitative information on the enamels composition has been derived from the analyses.

Red enamels were coloured by adding a remarkable amount of iron in the form of small flakes dispersed in a clear glassy phase (Fe_2O_3 8.6%, probably hematite).

Deep blue enamel was coloured with large additions of the same cobalt ore as for the body glass (CoO 1.0%), containing also nickel (NiO 0.5%), iron (Fe_2O_3 3.2%) and copper (CuO 1.8%), but not

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[5] Verità 2013.

[6] Verità and Biron 2017.

bismuth and arsenic. Instead, the light blue enamel (Fig. 3) was coloured exclusively with copper (CuO 2.2%, CoO not detected). Both deep and light blue enamels were opacified with tin oxide crystals added as comparable amounts of lead-tin calx: PbO 6.3% and SnO_2 4.6% in the deep blue enamel, PbO 7.8% and SnO_2 3.7% in the light blue enamel. As explained for the white enamel (see below), these amounts are underestimated.

The white enamel was coloured and opacified by tin oxide crystals (SnO_2) added as lead-tin calx (SnO_2 4.5%, PbO 9.0%): once melted, lead dissolved in the glass leaving the tin oxide crystals dispersed in the matrix. These lead and tin amounts are clearly underestimated compared with their content in the Venetian white enamels database accurately measured with other techniques (PbO 19 ± 5%; SnO_2 17 ± 3.5%)[7].

The green and the yellow-green enamels (Fig. 3) were probably coloured by lead stannate yellow particles added in similar amounts in both enamels, as suggested by the chemical analysis (green: PbO 38.2% and SnO_2 1.5%; yellow-green: PbO 40.8% and SnO_2 1.3%) whereas, the glassy phase of the yellow enamel is colourless and that of the green enamel is coloured by copper (CuO 1.5%) and iron (Fe_2O_3 0.8%).

Black enamel was mainly used to draw lines made by applying a very thin layer on already enamelled areas. In this case, the results of the analysis are strongly affected by the composition of the underlying enamel layer. The black areas are characterized by the presence of cobalt (CoO 1.2%), iron (Fe_2O_3 4.3%) and copper (CuO 1.7%) and no bismuth and arsenic indicating that the black colour was obtained by applying a deep blue enamel. Some colours made by the application of translucent very thin layers of coloured enamels on a white enamel have also been investigated (Fig. 3). Flesh tones were obtained by applying a translucent thin layer of iron particles (red enamel) and the grey ones by applying a thin black enamel layer rich in cobalt, copper and iron on the white enamel.

Finally, the metal leaves of the gilding were analysed: beside gold also other elements were detected, indicating possible interferences

[7] Verità and Biron [in press].

from the underlying and surrounding areas. Nevertheless, an attempt to calculate the gold leaf composition was made by modelling XRF spectra acquired on the gilding as a layered system through the multilayer function of the PyMCA software. Results point out that the gilding spectra are compatible with an about 1μm thick gold leaf containing traces of silver and copper (for the latter, an interference from the copper of the underlying blue glass is possible).

4. *Conclusions*

The application of the non-invasive, non-destructive pXRF analytical technique to the famous gilded and enamelled Bargello blue goblet decorated with Triumph of Virtue provided some useful information on the composition of both body glass and enamels. Despite the fact that a quantitative analysis of the whole composition is not achievable with this technique, results reveal that the glass used to make the cup and the foot is the same, likely a soda-lime silica glass, probably with a Venetian *cristallo* composition. The blue colour was obtained by adding a cobalt ore containing nickel but no bismuth and arsenic. Since it has been proved that the object was manufactured before 1758, the cobalt ore composition suggests that the goblet dates before 1520-1530. Moreover, the analysis of the enamels allowed most colourants and opacifiers to be identified which appear to be compatible with those used in the Renaissance Venetian glassmaking technology. None of the materials that have been identified is incompatible with a genuine Venetian Renaissance production although none of them can definitively prove this hypothesis. It must be firmly underlined that portable X-Ray fluorescence cannot be considered a reliable technique to ascertain the authenticity of enamelled Venetian Renaissance glasses. In fact, in most cases differences in glass composition between genuine Venetian glasses and those made *à la façon de Venise* and later copies can be so subtle that a quantitative determination of all the elements present in the glass composition is needed to distinguish the different provenance. Furthermore, the analysis of the enamels is strongly affected by their thickness that does not allow a quantitative chemical analysis to be performed.

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REFERENCES

Adlington, Laura W. and Jan Freestone. 2017. Using handheld pXRF to study medieval stained glass: A methodology using trace elements. *Materials Research Society*. Advances Vol. 2 (33-34):1785-1800.

Biron, Isabelle and Marco Verità. 2012. Analytical investigation on Renaissance Venetian enamelled glasses from the Louvre collections. *Journal of Archaeological Science* 39: 2706-2713.

Janssens, Koen, Simone Cagno, Ine De Raedt and Patrick Degryse. 2013. Transfer of glass manufacturing technology in the sixteenth and seventeenth centuries from southern to northern Europe. In *Modern Methods for Analysing Archaeological and Historical Glass*, edited by K. Janssens. Chichester (West Sussex): John Wiley & Sons Ltd: 537-562.

Verità, Marco. 2013. Venetian soda glass. In *Modern Methods for Analysing Archaeological and Historical Glass*, edited by K. Janssens., Chichester (West Sussex): John Wiley & Sons Ltd: 515-533.

Verità, Marco, and Isabelle Biron. 2015. Enamels on Venetian Renaissance Glass. An analytical and technical Approach. *Glass technology: European Journal of Glass Science and Technology* 56, 6: 177-190.

Verità, Marco and Isabelle Biron. 2017. Renaissance Venetian enamelled glass. Genuine, *façon de Venise* and fake or copy artefacts. In *Annales du 20e Congrès de l'Association Internationale pour l'Histoire du Verre*, edited by S. Wolf and A. de Pury-Gysel (Friburg/Romont,7-11 septembre 2015). Rahden/Westf.: VML Verlag Marie Leidorf: 444-452.

Verità, Marco and Isabelle Biron [in press]. Analytical investigation of genuine Renaissance Venetian enamelled glass (accepted for publication in the 2021 issue of the *Journal of Glass Studies*).

Tab. 1 - Composition of the body glass and enamels in wt% of the oxides. Searched for and not detected: As, Bi, Zn, Sb, Cr; nm: not measured. For SiO_2 a semiquantitative estimation is reported.

Analysed area	SIO_2	K_2O	CaO	Cl	TIO_2	Fe_2O_3	
Glass							
cup	*72*	3.2	4.2	0.78	0.05	0.80	
foot	*70*	3.0	4.0	0.62	0.05	0.75	
Enamels							
red	*36*	1.5	2.4	nm	0.03	8.6	
light blue	*47*	1.7	2.0	nm	0.03	0.4	
black on light blue	*41*	1.9	1.5	nm	0.04	4.3	
deep blue	*47*	2.1	1.2	nm	0.03	3.2	
white	*49*	1.3	1.7	nm	0.03	0.7	
green	*28*	0.8	0.8	nm	0.05	0.8	
yellow-green	*26*	0.3	0.3	nm	0.03	0.1	

Tab. 2 - Extimated critical penetration depth (order of magnitude) of L and K lines for the main elements of glass and enamels composition.

Glass body (PbO 7%)	**Critical penetration depth (µm)**
K Ka	30
Ca Ka	35
Fe Ka	135
Cu Ka	210
Pb La	420
Sn Ka	2500

MnO	CuO	CoO	NiO	PbO	SnO_2	SrO	*tot*
0.23	0.55	0.06	0.04	1.20	0.65	0.03	83.8
0.23	0.50	0.06	0.03	1.00	0.52	0.02	80.8
0.2	0.5	nd	nd	3.8	2.5	0.05	55.6
0.1	2.2	nd	nd	7.8	3.7	0.03	65.0
0.2	1.7	1.5	0.8	5.0	3.7	0.04	61.7
0.2	1.8	1.0	0.5	6.3	4.6	0.04	68.0
0.1	0.4	nd	nd	9.0	4.5	0.04	66.8
nd	1.5	nd	nd	38.0	1.5	nd	71.5
nd	0.2	nd	nd	41.0	1.3	nd	69.2

Fig. 1 - *Spot areas (red) where the body glass composition (a. glass cup, b. glass foot) has been investigated.*

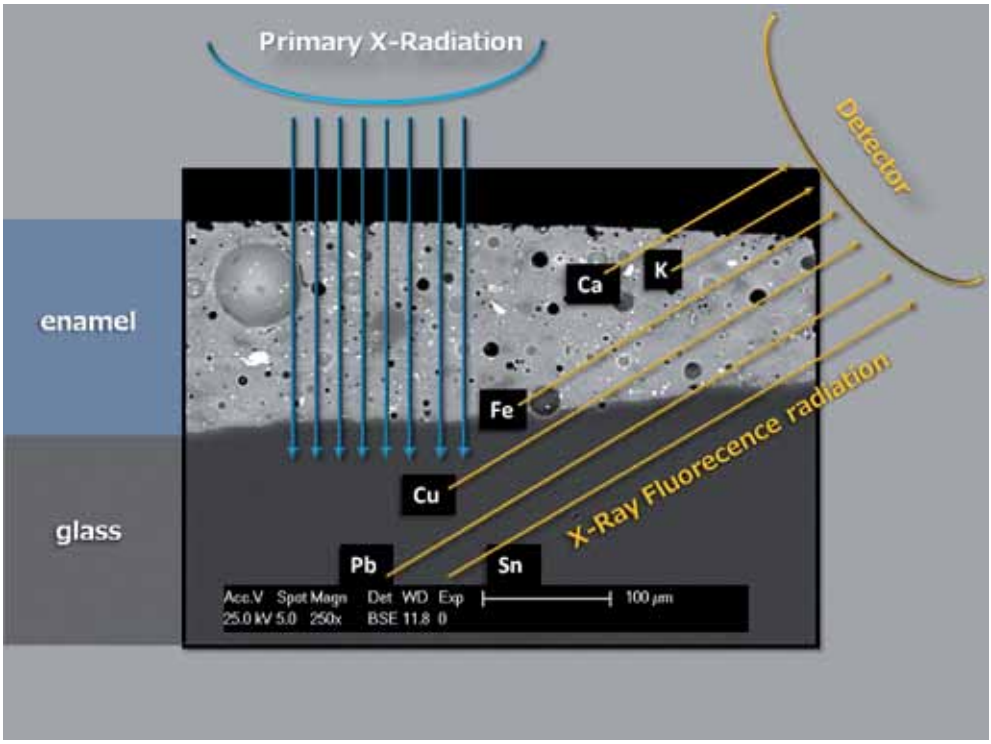

Fig. 2 - *SEM-BSE micrograph of the cross section of an enamel on glass substrate*. The scheme highlights different depths from which XRF radiation is produced by some elements.

Fig. 3 - *Light blue (a.), deep blue (b.), green (c.) and yellow-green (d.) enamels*. Red dashed circles indicate areas investigated by pXRF. The red arrows indicate thin layer of grey and red enamels applied for reproducing flesh tones.

Mari Yanagishita and Andrea Cagnini

A SPECIAL CASE OF SELECTIVE DEGRADATION:
THE BLUE ENAMELS OF THE RELIQUARY OF SAINT ERINA, IN THE COLLECTION OF THE MUSEUM OF CAPPELLE MEDICEE, FLORENCE

1. *Introduction*

The reliquary of Saint Erina in the collection of the Museum of Cappelle Medicee, Florence, is a rock crystal vase of Fatimid art, 10th century, decorated in the third quarter of the 15th century with a very rare Venetian silver setting (a dragon with a snake) enamelled with *en ronde-bosse* blue and green enamels (Fig. 1). On the occasion of the restoration of the reliquary it was possible to note a selective degradation of the enamels. The blue enamels show extended gaps and the surviving fragmentary parts are characterized by advanced crizzling and loss of transparency, while the green enamels appear in excellent conditions (Fig. 2). Some green salts are also present on the artworks. Scientific analyses were performed in order to ascertain the state of degradation of the blue enamels, their chemical composition and to hypothesize the reasons for the difference in the state of preservation of the two enamels.

2. *Historical aspects of the reliquary*

The reliquary of Saint Erina was originally a profane object and was part of the Treasure of the Medici family, located in the Medici Palace until the expulsion of the family from Florence in 1494. Three generations of illustrious members of the Medici family, Cosimo the Elder, Piero the Gouty and Lorenzo the Magnificent collected antique hardstone vases purchased mainly from Venetian merchants, probably coming from Constantinople. With the expulsion of the Medici family from Florence, the most important objects of the Treasure

were transferred in 1495 to Rome, to save them from dispersion and passed into the hands of Cardinal Giovanni de' Medici, the future Pope Leone X. Later Clemente VII, the second Pope belonging to Medici family, donated some relics, purchased by Leone X, to the family church of San Lorenzo in Florence by putting them in the same precious hardstone vases. Thus the profane vases, that had been part of the old Medicean Treasure, returned to Florence, in the form of reliquaries[1].

According to Steingraber, the creation of the setting of the reliquary of Saint Erina has to be attributed to the same Venetian goldsmith's atelier of the second half of the fifteenth century that made the polylobate base of the reliquary of San Isidoro, now in the collection in the Museum of the Treasure of San Marco in Venice. In fact, it is possible to note some similar aspects about manufacturing[2].

3. *Scientific aspects*

The scientific investigations to understand the nature of the weathering of blue enamel were performed by the Scientific Laboratory of the Opificio delle Pietre Dure in Florence. Two sampled micro-fragments observed under a stereomicroscope, were opaque with undefined color. One of the fragments was embedded in resin and polished. The cross section, observed with an optical microscope, shows a central core of translucent deep blue glass surrounded by a semi-opaque white-green layer crossed by many cracks. In the SEM micrograph[3], two materials can be distinguished more clearly: the central light grey part is related to unweathered enamel, while deep grey areas crossed by black lines correspond to the brittle dark material and are cracked weathered enamel layers (Fig. 3).

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[1] Heikamp and Grote 1974, vol. 2: cat. no. 22.

[2] Steingaber 1971: cat. no. 180.

[3] The sample was observed using an optical microscope Zeiss Axioplan and was analysed using a Stereo-scan 440® LEICA CAMBRIDGE scanning electron microscope. Elemental analysis was performed using an AZTEC Oxford EDS probe (Potential: 25kV, Beam current: 0.2 nA, I probe: 1nA, Live time: 400s) using standard glasses for concentration assessment

The chemical composition of the unweathered enamel is characterised by low concentration of stabilizers (Al_2O_3 0.5%; CaO 2.5%) and a very high amount of alkalis (Na_2O+ K_2O about 27%). The blue colour is connected with the presence of cobalt (Tab. 1).

The composition of translucent enamels applied on silver or gold is a compromise between several parameters necessary to fire the enamels and to assure they adhesion to the metal. In fact the composition gives to the enamel specific characteristics: low softening point, high fluidity, high expansion coefficient and deep colour. The enamel should be fired without affecting the metal below, it should reach a proper homogeneous thickness and it should follow the expansion of metal during the firing of enamels. Moreover, the high transparency and the bright surface allows to appreciate the working of the metallic surface giving to the artwork beautiful aesthetical features. This is a typical composition of transparent enamel on silver of that period[4].

Regarding the weathered layer of the enamel, remarkable changes concerns the sharp decrease of the concentration of fluxers (sodium and potassium) while the other elements do not show significant changes. This composition is typical of a leached glass layer. In the condensed water layer that often is present on the enamel surface, an exchange of alkaline ions from the glass and protons from the water occurs, leading to a depletion of alkali from the enamel that reacts with water forming hydroxides, increasing solution pH and glass alteration. The leached-hydrated glass layer has a different volume with respect to unweathered glass, giving mechanical stresses and cracking the glass structure. Cracks are preferential ways for further degradation.

Why blue enamel is heavily weathered while green enamel is in good state of preservation? Even if no fragments were sampled from the green enamel, it is possible to make a hypothesis based on the analysis of blue and green enamels applied on silver from the St. John altar of the Baptistery of Florence. The different state of preservation of the two enamels can be related to their different composition: blue enamels contain few stabilizing ions (low concentrations of calcium, magnesium, and cobalt) while green enamels contain low amounts of calcium and

[4] Verità *et al.* 2013.

magnesium, but large amounts of colorants (copper and iron) that act as stabilizers (Tab. 1).

The green salts were also sampled from the reliquary to ascertain their nature. They were analysed by FTIR[5] spectroscopy and SEM. The elemental composition is compatible with the presence of formates (mainly copper and/or sodium or mixed) formed by the reaction of formic acid with elements from the alloy and enamels.

4. *Conservation treatment*

After cleaning the gilded silver surfaces (edge of the lid and the base) with micro-abrasive powders (very fine calcium carbonate) dissolved in deionized water and ethanol, the conservation treatment on enamel was carried out by firstly consolidate blue enamels in a precarious state using a vinyl butyral polymer (Mowital B 60HH) in different concentrations (5% - 9%) in pure Ethanol. The following step was the cleaning of green enamels by swabbings with two different solvents mixtures (deionized water: acetone: ethanol 1:1:1 and acetone:ethanol 1:1). The last step was the cleaning of the weathered blue enamels covered with a brown wet substance that was carried out by light swabbings of the surfaces, through Japanese paper, with the same mixtures used for the cleaning of green enamels. The brown material was not investigated and so its nature is not clear. The protectant applied in previous interventions on the silver of the gaps of the blue enamels was not removed due to the extreme fragility of the adjacent enamels. The cleaned gilded silver surface was coated with a nitrocellulose resin to protect it from further oxidation.

5. *The conservative state of the reliquary over time*

The state of preservation of enamels is the result of several parameters, mainly: enamels composition, previous treatments and

[5] Infrared spectroscopic analysis were performed using a FTIR THERMO "IS50"™ spectrometer (software "OMNIC"™ v. 9.0).

storing conditions. Comparing the images of the *reliquary* taken in 1933 and 1972 we can observe, indeed, a significant increase of the enamel gaps on the base in a very limited time.

It is surprising that the preservation state of the blue enamel has deteriorated so dramatically in the past 50 years after maintaining acceptable conditions for hundreds of years. This observation highlights the critical role of the preservation parameters (humidity *in primis*) and inappropriate treatments (aggressive washing, impregnation with polymers, etc.) of enamels, whose chemical composition is intrinsically weak (more than 27% alkali, minimal concentration of stabilizers like alumina and calcium oxide).

6. *Conclusions*

In conclusion, it is well known that a key aspect that determines the state of preservation of transparent enamels on metal is their low-durable chemical composition. However, considering the rather good state of preservation of the blue enamel in 1933 (after 400 year of exposition to the environment) and the rapid decay in the following 50 years, the role played by inappropriate treatments and/or the conservation in an extremely aggressive environment is evident.

We would like to underline the importance of creating suitable environmental conditions for their preservation. Great care has to be taken to the microclimatic parameters inside the showcases in order to avoid further damage to the enamels. It is well known, for instance, that the presence of wooden materials in the showcases should be avoided as they are a source of formic and acetic acids[6]. In fact, in the presence of sodium (glass) and copper (in glass but also present in the silver alloys), the acidic gases can cause corrosion and production of various salts, as was found on the reliquary of Saint Erina. It could be very useful also to schedule regular monitoring in order to promptly remove alkaline salts so as not to increase the pH on the enamel surface. Of course, such intervention must be carried out by trained conservators, otherwise the enamels could suffer further damages.

[6] Eggert 2008.

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The authors deeply acknowledge Dr. Monica Bietti, Director of conservative treatment on the reliquary of Saint Erina, formerly responsible of Museum of the Cappelle Medicee, Florence, Dr. Marco Verità for his scientific supervision and Alessandra Santagostino Barbone, who collaborated to scientific analysis.

REFERENCES

Verità Marco, Andrea Cagnini, Monica Galeotti, N. Cavalca and Simone Porcinai. 2013. Compositional analysis of 14th-15th century enamels from the altar of San Giovanni in Florence: an integrated study by portable X-ray fluorescence and electron probe microanalysis. *Archaeometry* 55, 6: 1048-1066.

Eggert, Gerhard. 2008. Chalconantroonite and socoformacite: joint copper glass corrosion. In *2nd ICOM-CC Experts' Meeting on Enamel on Metal Conservation* (Rome Villa Medici, 10-11 March), publications online, Abstracts p. 19-20.

Heikamp, Detlef and Andreas Grote. 1974. *Il Tesoro di Lorenzo il Magnifico, I vasi*. Vol. 2. Firenze: Sansoni Editore.

Steingaber, Erich. 1971. Il Tesoro di San Marco. In *Opere occidentali dei secoli XV e XVI* , edited by H.R. Hahnloser. Firenze: Sansoni Editore.

Tab. 1 - Compositions of blue unweathered enamel from St. Erina Reliquiary and an unweathered green enamel (from the St. John Altar Florence) of the same period (in table are reported the most significant elements).

	Na_2O	**MgO**	**Al_2O_3**	**SiO_2**	**Cl**	**K_2O**	**CaO**	**Fe_2O_3**	**CoO**	**CuO**	**NiO**
Blue Unweathered	9.5	0.3	0.5	63.9	0.2	17.3	2.5	2.6	1.1	1.1	0.2
Green Unweathered (from St. John Altar)	7.9	1.2	0.4	61.5	0.4	12.7	2.0	7.7	ND	5.5	ND

Fig. 1 - *The reliquary of Saint Erina*, 10th century, decorated in the third quarter of the 15th century. Florence, Museum of Cappelle Medicee, inv. no.1945 no. 3.

Fig. 2 - *Detail of the reliquary of Saint Erina* (Fig. 1), showing extended gaps of the blue enamels, that are characterized by advanced crizzling and loss of transparency, and green enamels that appear in excellent conditions.

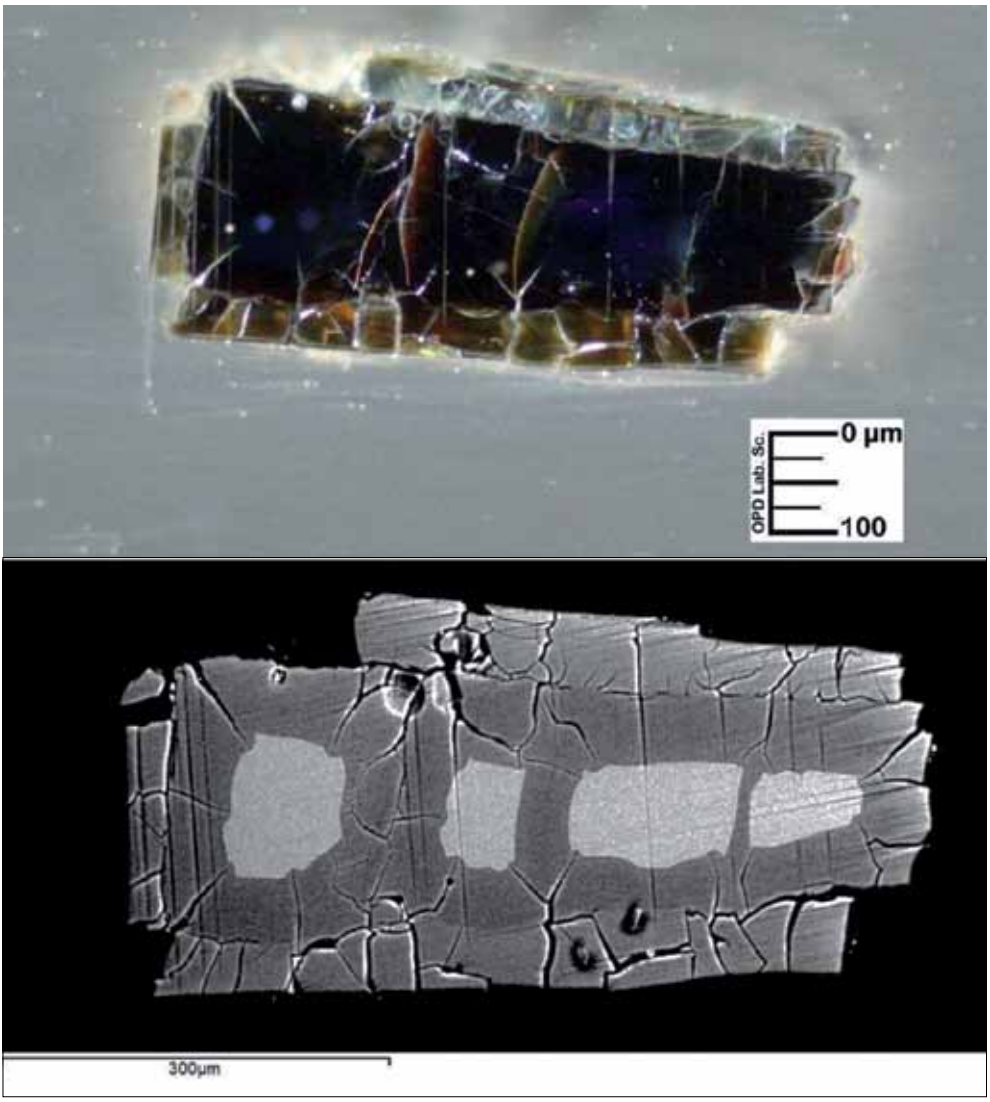

Fig. 3 - *OM (above) and SEM (below) images of the cross section of a blue enamel fragment.*

Clara Menganna

GLASS IN UMBRIA IN THE 16th CENTURY

Any scientific historical research must be based on documents of various type, to whom we can attribute the value of witness of the past even before the research itself transforms the documents into a source of information through analysis and comparisons. The medieval town of Piegaro was a castle whose inhabitants were mainly committed to the glass production activity; this was made possible also thanks to the proximity to the Nestore river and to the Trasimeno lake, from which the glassmakers could extract sand, as well as to the presence of oak and chestnut forests nearby its territory, providing the wood needed for the operation of the furnaces. The aim of this research is therefore to attempt a reconstruction of the work of glassmakers as well as their mobility during the sixteenth century.

In 1891, in his book *Il Duomo di Orvieto e i suoi restauri*, Luigi Fumi published several documents of the fourteenth and fifteenth centuries; these highlighted the recurring relations between the Piegaro glassmakers and the workers engaged in the construction of the cathedral, however, the documentation that has so far emerged from the archives regarding this period is fragmentary and incomplete. In the Piegaro land registry, two glass workshop are documented between 1485 and 1489, one owned by the brothers Pietro and Antonio Scomerri, the other by Giovanni *Harrici Bartoli*, both located within the castle. Giovanni di Arrico di Bartolo owned sixteen lots of land, the third part of a mill shared with Nicola di Pietro alias *Cocho*, as well as a glass kiln, valued respectively at 1,360, 150 and 100 lire. So far, the research has not revealed other documents related to the activity of Giovanni di Arrico di Bartolo. The registry concerning the two Scommeri brothers is more modest: it includes five plots of land estimated at 300 lire, a shop for the sale of glass estimated at 50 lire,

where they also lived, and the furnace, equally valued 50 lire[1]. In a document dated 19th April 1513, we find Pietro Scommeri owing the sum of 73 florins and 12 soldi to the Perugian merchant Antonio di Francesco di Eugenio and partners, the price of 3,492 pounds of *Baruti* ash, furthermore the notary specifies that Pietro exercises a glassware activity, a trade that will be continued by Meonno, Pietro's son[2]. On 12th July 1559, Meonno buys a house with a *casalino* in partnership with Antonio di Giovanni Pignattelli[3]. A few months earlier, on 14th March 1559, he had sold a piece of land to Angelo di Francesco di Giovanni Pignattelli for the price of 24 scudi, paid in kind with a corresponding quantity of glass[4].

Over the first twenty years of the sixteenth century the archives provide us other names of glassmakers involved in trades, mainly in the purchase of raw materials needed for the production of their glassware. In the months of March and April of 1516 Alessandro Perusini is involved in the purchase of two batches of ash, the first quantified in 2.859 pounds for a value of 57 florins and 18 *soldi*; the contract drawn up between the merchant Antonio di Francesco from Perugia and the glassmaker asked that the payment for the ash must take place in three tranches: a first part by Easter Monday, a second in August and the last part by All Saints[5]. The next batch of ash is delivered the following month. On 16th April, Perusini buys from the same merchant other 4,390 pounds of ash, specifying that it must be *Baruti* ash, paying 71 florins and 96 soldi. The latter load is bought in Ancona; the place and the name *Baruti* suggests that the glassmakers of Piegaro, as well as the merchants from Perugia, were supplied directly by ships coming from the capital of Lebanon, since *Baruti* is the ancient name of today's Beirut[6].

Other names of glassmakers operating in Piegaro appear in the documents, such as Prospero di Felice who in 1515, having to answer a petition presented by Ascanio di Giovanni di Piegaro,

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[1] Riganelli 2006: XIX-XX.
[2] ASPg, *Notarile*, Protocolli, 557, c. 79r-v.
[3] ASCP, *Notarile*, Protocolli, 193, c. 114r.
[4] ASCP, *Notarile*, Protocolli, 193, cc. 108r-190r.
[5] ASPg, *Notarile*, Bastardelli, 1097, cc. 135r-136v.
[6] ASPg, *Notarile*, Protocolli, 557, cc. 788r-789r.

also living in the castle, reports that he lived in Naples for eight years, together with the same Ascanio, working as *tizzatoio* (the one stoking the fire) at a glass furnace[7]. In 1542 the master glassmakers Fiore di Cecco di Fiore, Marco di Nicola di Francesco, Sante di Renzo Pazzaglia and Michelangelo di Brancaccio, all from Piegaro, are partners in a glass furnace and appoint the glassmaker Giovanni di Francesco Pignattelli to represent them in disputes, the latter being the forebearer of a glassmakers dynasty, whose members are documented throughout the sixteenth century[8]. In 1558 Pascuccio di Giovanni di Pascuccio is the owner of a glass workshop[9]. In 1575 Tommaso di Rano was the owner of another glass workshop; Giovanni di Giusto di Michelangelo owes him 74 florins and 38 *baiocchi*. The sum is due to Tommaso di Rano for glass bought in his shop, however, the quantity is not specified in the contract[10]. Egidio di Giovanni di Sante, known as *Della Libera*, is the owner of a furnace; on 12th September 1574, Girolamo di Leonardo agreed to stay in his service for three years starting from 1st October. Egidio commits to serve and manage the glass furnace for an annual salary of 24 florins[11]. And still, on 9th March 1577 Rocco di Alessandro, known as *Il Papa*, arranged with Ruggero di Giovanni di Bernardino del Piegaro to teach Giovanni Battista, Ruggero's son, the glass-making art under the following agreed conditions: Giovanni Battista will work without pay, in turn, Ruggero will sell the glass produced by Rocco for a value of five hundred florins over the following two years. The agreement between the two also provides that Rocco will supply Ruggero with assorted glass at the price of half a florin for the *decima comprese le solite vetture come si è solito fare*[12]. Giovanni Battista di Ruggero must have had a good teacher in Rocco, since we find him a few years later, exactly on 28th January 1589, claiming a credit of 70 *scudi* with a certain Francesco di Cristiano, probably a merchant, the price of worked glass sold to him. The debt payment

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[7] ASPg, *Notarile*, Protocolli, 808, c. 612r.
[8] ASPg, *Notarile*, Protocolli, 812, c. 341r.
[9] ASCP, *Notarile*, Protocolli, 193, c. 91v.
[10] ASCP, *Notarile*, Protocolli, 195, c. 305v.
[11] ASCP, *Notarile*, Protocolli, 195, cc. 269v-270r.
[12] ASCP, *Notarile*, Protocolli, 195, cc. 351v-352r.

is thus resolved: Francesco will have to pay forty *scudi* by the end of the following June, the residual sum being owed by Saint Mary's day in August[13]. On the same day, Giovanni Battista presented to the notary another private deed, in which he claimed to have also sold to Francesco di Cristiano a donkey for the price of 10 and a half *scudi*, to be paid the following July[14]. The following day the notary recorded a further contract from which it emerges that Giovanni Battista sold Domenico di Girolamo more glass worth 38 *scudi* and 96 *baiocchi*[15].

On 14th February 1589, Tommaso di Francesco, also a master glassmaker from Piegaro, ordered 4,000 pounds of soda ash in order to make jugs and glasses from the merchant Patrizio di Giovanni; it has to be a specific kind of soda – *delicante de bariglia bona e perfetta* – for 14 *scudi* every thousand at the Ripa di Roma weight, and agrees with the merchant that the soda is to be sent to Piegaro by the month of February, having advanced 50 *scudi* to the merchant[16] .

The contracts we have found mainly refer to the purchase of raw materials, such as ash and soda for glass; another component that is often purchased is the *scarscia*, a marsh grass that grows spontaneously along the shores of Lake Trasimeno, used to wrap flasks, carboys and containers for wine and oil. It is believed that the technique of straw-wrapping glass containers was introduced to Piegaro in recent times, but two documents inform us that this practice was already in use in the sixteenth century. On 2nd November 1575, the glassmaker Tommaso di Rano owes 30 *scudi* and 65 *baiocchi* to Bernardino di Nello Pignattelli, a debt he contracted for having bought wood for the furnace, soda and *scarscia*[17]. In the Piegaro statute dated 1517-18, in article 82, it is considered a crime to soak the *scarscia* in public washhouses, this

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[13] ASPg, *Giudiziario*, Presentazione di scritti, 2, c. 28v., no. 276.

[14] ASPg, *Giudiziario*, Presentazione di scritti, 2, c. 28v., no. 277.

[15] ASPg, *Giudiziario*, Presentazione di scritti, 2, c. 28v., no. 278.

[16] ASPg, *Giudiziario*, Presentazione di scritti, 2, c. 44r., no. 469. *Barilla* is a plant grown in the territories of Valencia and Alicante (Spain). The soda obtained after a long process is used for the manufacture of glass-crystal, white soap and for dyeing cotton, see: *Dizionario delle scienze naturali* 1832. Vol. 3: 320.

[17] ASCP, *Notarile*, Protocolli, 195, c. 305r.

indicates that the straw-wrapping of flasks and carboys was already practiced at the time[18].

Another interesting and not well studied aspect is the female presence in the production cycle. A document dated 20th May 1589 reveals that two young women, Battistina and Innocenza, daughters of Silverio di Giulio, are sent to the workshop *a l'arte di lavorare vetrio* with master glassmaker Mercurio di Pietro di Antonio. The girls' father undertakes to pay the master 26 florins a year, in addition to supplying them with four pairs of shoes[19].

In the last quarter of the sixteenth century an important innovation is reported by the priors of the city of Perugia, the eventuality of producing *cristallo* in the Perugia area. The Priors elected for July, August, and September of the year 1577 leave in fact a memo for the priors who will take over their task, in which they inform that Leonardo di Matteo, owner of a shop for the sale of glass in Perugia, the glassmaker Nardo Cocchi from Piegaro and two investors, the noble Perugian Camillo della Penna and the notary Nicolò Marsiliani, are interested in setting up locally a furnace to produce crystal *in the Venetian manner*. They also state they have obtained authorisation from the pope *il Breve* (with the support of the glassmaker Giovanni Paolo Pignattelli from Piegaro, but residing in Rome in those years), to produce it in exclusivity for the duration of ten years.

> *Sappiamo anco le Signorie Vostre che Nardo, vetraro perugino con alcuni altri dal Piegaio si sono convenuti con noi d'introdurre in questa città l'arte del cristallo, havendo già trovato nel nostro contado la terra, overo luocolo atto a questo, per farne la fornace qua dentro, con certe prerogative che se gli concedono, et con obligo di dare le tazze et bicchieri dilla maniera che si vedono dipinti in un quadro nella nostra Cancelleria a certi prezzi convenuti, come di tutto appare per mano di ser Simone Franceschini nostro notario. Però le Signorie Vostre favoriranno questo negotio per esser cosa bella, et nuova in questa città, et quando cominceranno a dar fuoco alla fornace faranno osservare il privilegio concessoli, che per X anni non si possa vendre altro cristallo che quel di Venetia*[20].

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[18] Riganelli 2006: XIX-XX.

[19] ASPg, *Giudiziario*, Presentazione di scritti, 2, c. 115r., no. 1663.

[20] ASPg, Archivio Storico del Comune di Perugia, *Ricordanze*, 3, cc. 46v-47r.

> (Your Lordships should also know that Nardo, a Perugian glassmaker, together with some others from Piegaro, have agreed with us to introduce the art of crystal into this city. They have already found in our countryside the land, or a site suitable for this, to build the furnace, with certain prerogatives that were granted to them, and with the obligation to produce cups and glasses in the manner of those seen in a painting in our Chancery and at determined prices, as declared by our notary Ser Simone Franceschini. Your Lordships will support this trade which is a beautiful and new thing in our city, and when they activate the furnace you will ensure that the exclusive concession granted to them is observed, and that for ten years no other crystal can be sold other than that in the Venetian style)

The initiative must have been successful, since on November 4th 1587 the priors of Perugia bought from a Piegaro master *quattro lampade lunghe con il bottone de cristallo*[21].

The skill and art of the Piegaro masters are appreciated and recognized throughout the Umbrian territory; in Orvieto, these glassmakers' skill had spread since the Middle Ages into the following centuries, since on 27th May 1587 a prestigious commission was granted to Giovanni di Ercolano Pignattelli. The chamberlain of the Santa Maria di Orvieto factory instructs him to produce all the quantity of enamels that will be needed for the large facade of the cathedral church of S. Maria di Orvieto and *of that perfection and color and type as directed* by the painter Cesare Nebbia. Giovanni Pignattelli will produce 6673 pounds of enamels for the building, for a total cost of nine hundred *scudi*[22].

It is clear that the production of glass and crystal in Piegaro maintained a good quality level in the following centuries, since the historian Pompeo Pellini wrote that in the mid-seventeenth century the three Umbrian centers, Piegaro, Marsciano and Deruta, (the latter two centers famous for the production of glazed terracotta and maiolica) worked consistently *di vetro et di terra, con tanto ingegno et abondanza che servono quasi all'uso et necessità di tutta la Toscana,*

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[21] ASPg, Archivio Storico del Comune di Perugia, *Cappella dei Priori*, 9, c. 44r.

[22] Fumi 2013 [1891]: 157.

dell'Umbria e della Marcha[23] (glass and earth, with such ingenuity and abundance that they almost satisfy the whole demand of Tuscany, Umbria and the Marche).

In the last two decades of the XVI[th] century glassmakers from Piegaro will be in Rome playing the role of leaders in the reorganization of the glass production along with men coming from Altare in Liguria. These artisans will be decisive in the gretaest artistic work in the late XVI[th] century.

REFERENCES

Manuscript sources

Archivio di Stato di Perugia (=ASPg), *Notarile*, Protocolli.

Archivio di Stato di Perugia (=ASPg), *Notarile*, Bastardelli.

Archivio di Stato di Perugia (=ASPg), *Giudiziazio*, Presentazione di scritti.

Archivio di Stato di Perugia (=ASPg), Archivio Storico del Comune di Perugia, *Ricordanze*.

Archivio di Stato di Perugia (=ASPg), Archivio Storico del Comune di Perugia, *Cappella dei Priori*.

Archivio Storico del Comune di Panicale (=ASCP), *Notarile*, Protocolli.

Printed sources

Dizionario delle scienze naturali nel quale si tratta metodicamente dei differenti esseri della natura considerati o in loro stessi secondo lo stato attuale delle nostre cognizioni o relativamente all'utilità che ne può risultare per la medicina, l'agricoltura, il commercio e le arti. 1832. Vol. 3. Florence: Vincenzo Batelli e F.

Fumi, Luigi. 2013. *Il duomo di Orvieto e i suoi restauri. Monografie storiche condotte sopra i documenti* (1891). Reprint by L. Riccietti. Florence: Nabu Press.

Pellini, Pompeo. 1988. *Dell'Historia di Perugia*. Vol. 1 (Venezia 1664). Photomechanical reprint. Sala Bolognese: Arnaldo Forni.

Riganelli, Giovanni. 2006. *Statuto di Piegaro del 1517-1518*. Perugia: Deputazione di Storia Patria per l'Umbria.

[23] Pellini 1988 [1664]: 18.

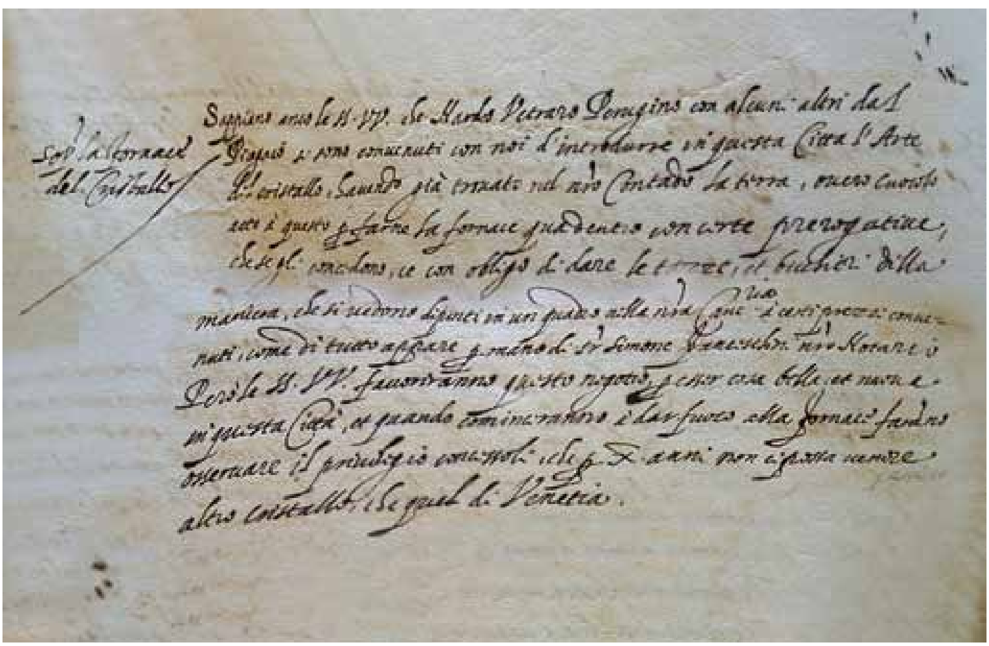

Fig. 1 - *Cocchi Misciattelli furnace, current Piegaro glass Museum.*
Fig. 2 - *Memory of the priors of the town of Perugia which announces the construction of a furnace to produce crystal in Piegaro*, 1577. ASPg, Archivio Storico del Comune di Perugia, *Ricordanze*, 3, c. 46v.

Maria Stella Florio

ANTONIO SALVIATI AND HENRY LAYARD'S ASSOCIATION IN THE MURANO REVIVAL
THE LEGAL CONTEXT

If the reasons for the sudden ending of the famous association between Antonio Salviati and Henry Layard may remain unclear, when viewed from the legal perspective it is nonetheless obvious that since the beginning there was plenty of scope in their arrangements for the tensions that would develop later. The legal context in fact makes clear that Salviati was in no position to oppose, for instance, the changing at some point of the Company's name from 'Salviati & Co.' to 'The Venice and Murano Glass and Mosaic Co.' – now the source of uncertainty in the dating and attribution of some of the artworks produced during their association – nor could he ultimately avoid being driven out of the business he had founded.

Yet Salviati's firm was itself the stuff of myth, immediately successful from its start in 1859 despite the difficult economic conditions in Venice under Austrian rule. Lorenzo Radi's mosaic tiles, such as were needed for St Mark's restorations, quickly triumphed internationally as did his chalcedony vases, often mounted by Salviati in gilt copper or better still silver as in some specimen "of great beauty"[1](Figg. 1-3). And equally admired was Salviati's blown glass when he opened a shop in London in the summer of 1866, quite a momentous time for Venice, fraught with the danger of imminent war. Still Salviati managed to go on working both in Venice and in England, where he had won the commissions for the mosaic decorations of the Albert Memorial Chapel at Windsor and the Albert Memorial itself, and was then waiting in Venice for the

[1] Migliaccio 2006: 43, «*due esemplari di grande bellezza*». My transl.

cartoons of the artist, John Clayton. Diplomatic negotiations having progressed, however, in the autumn Layard was in Venice to witness the actual handover of the city to Italy and to visit Salviati, finding that he was still waiting for Clayton's cartoons for Windsor, so that «Salviati had had the extra workmen he had employed standing idle, and that he was having to pay a penalty for every week which had passed since the final date of the contract, 11 July 1864», as Layard himself wrote to the artist[2]. And then, as we know, before the year was over the firm of Antonio Salviati became Salviati and Co[3].

The Company was established in London by Memorandum and Articles of Association on 21 December 1866 and registered on the following 2 January. The members were Austen Henry Layard, Lachlan Mackintosh Rate, William Richard Drake and four other Englishmen – Robert Amadeus Heath, Charles Somers, William Edward Quentell and William Fite – making up the minimum number of seven individuals required to establish a limited liability company. The registered address was at 431 Oxford Street, Salviati's shop. The object was the purchase of Salviati's entire business. No expiry date was set[4]. This had been preceded by an agreement made on 18 December 1866 for «the employment in the service of the Company of Dr. Salviati and Signor Giulio Salviati, and [...] their remuneration», and a similar agreement was also made at the same time with Eugenio Jesurum, Salviati's associate. Both documents are referred to in the Articles of Association in the very general terms just related but neither is in the Archives' files, and presumably they never were, being arguably in the nature of a gentlemen's agreement. So we do not know exactly what the sale of his business and his being retained there as an employee entailed for Salviati. This can only be gathered from other sources. Thus for instance the Articles of Association mention the 'possibility' of his receiving four of the Company's thirty-two shares «in part payment for the purchase»[5]. Indeed, Salviati was originally issued with four

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[2] Sladen 2000: 298, citing RA Add H2, 1855.

[3] TNA, *Board of Trade*, BT 31/1316 /3405.

[4] *Ibid.*, 3245/1, Memorandum of Association of Salviati and Company (Limited).

[5] *Ibid.*, 3245/2, Articles of Association of Salviati and Company (Limited), Art. 7.

shares which, however, were transferred to another member on 10 January 1868[6].

This said, it is apparent that to all intents and purposes Salviati and Co. was an English company, subject to English law. As a foreign company wanting to operate in Italy it therefore needed the Italian Government's acknowledgment. This was not so much an authorization as an endorsement. The procedure only aimed to ascertain that the foreign company applying had been duly incorporated in its own country according to the rules in force there, which rules would continue to govern it. Thus, Salviati and Co. was simply required to submit the Memorandum and Articles of Association and to have a registered office in Italy and a legal representative, who was to be the distinguished Mattia Montecchi, accredited on 28 October 1867. It was also required that any subsequent changes to the Articles of Association thus endorsed also be notified in order to be formally acknowledged in their turn. Salviati and Co. was therefore acknowledged by royal decree (22 September 1867), published in the official journal (26 October 1867) and coming into force fifteen days later on 10 November 1867. That very day, Salviati & Co. entered into a fifteen-year contract with the *Fabbriceria di San Marco* not only to supply mosaic tesserae to the Basilica but also to execute all the mosaic restorations needed in St Mark's. The following day the Company was entered on the relevant public registers and so it took off.

Less than one year later, however, by an Extraordinary Meeting of the members in London a Special Resolution to change the name to 'The Venice and Murano Glass and Mosaic Co. Ltd.' was passed (27 August 1868) and confirmed (17 September 1868)[7]. Also the Company's registered office was changed and moved to 30 St James's Street. The Resolution was then sanctioned by the Board of Trade (21 October 1868) and finally entered on the register of Joint Stock Companies on 28 October 1868[8]. The change of the Company's name

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[6] *Ibid.*, 3245/5, Summary of Capital and Shares of Salviati and Company (Limited) made up to the tenth day of September 1868.

[7] *Ibid.*, 3245/6, Special Resolution of Salviati and Company (Limited), reg. 25 Sept. 1868.

[8] *Ibid.*, 3245/8, Fresh Certificate of Incorporation granted to the Company under the new name, reg. 28 Oct. 1868.

must therefore be dated to the time when it took place in England in 1868 according to the laws of that country.

With this in mind, it is important to realize that the change of the Company's name was a change of the Memorandum and Articles of Association previously endorsed in Italy and so, as mentioned earlier, it had to be submitted to be acknowledged in its turn and be entered on the relevant public registers. But this was not done, for a long time. To be sure, there were no consequences in terms of fines or other penalties for this omission and the new name could be used in Italy as well as in the rest of the world, it being their legal name. And so, for example, it appeared on their letterheads right away, in 1869[9]. The only consequence of the omission, however, was that the use of the new name could not produce legal effects, not having been acknowledged in Italy. What happened therefore was that the name 'Salviati & Co.' remained unchanged on all relevant public registers in Venice and that Mattia Montecchi continued to act in the name of Salviati & Co. as the Company's legal representative on the strength of his original power of attorney. In this capacity, for instance, on 29 April 1870 he gave a special power of attorney to Carlo Piastra, one of the Venice operatives, to conduct business for 'Salviati & Co.' in his absence[10]. All this continued until Montecchi suddenly died in London on 28 February 1871. At that point action had to be taken, and later in the year Giovanni Castellani was appointed in Montecchi's stead by a power of attorney that specifically instructed him «to have the new name of the Company rectified and approved» (17 October 1871)[11]. The process was achieved when the new name was entered on the register of the Tribunale di Commercio di Venezia on 11 October 1872[12], and after that on those of the Camera di Commercio (15 November[13]), and of the Portofranco Authority (21 December[14]). The year 1872, however, is only the date when the new name was acknowledged in Italy, four years after the change had come into effect, to which end it must be remembered that

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[9] Bova 2008: 153, citing AMV, b. 36.

[10] ASVe, *Archivio Notarile II serie*, Notaio Angelo Pasini, b. 2365, Rep. 3612.

[11] *Ibid*., b. 2367, Rep. 4051. My transl.

[12] ASVe, *Commissione di sorveglianza alle fabbriche ed arti privilegiate nel recinto del portofranco di Venezia*, b. 75, fasc. 25, 51/241.

[13] CCVe, *Registro ditte*, fasc. n. 2479, 'Salviati. Cessata'.

[14] ASVe, *Commissione di sorveglianza*, 51/287.

a Special Resolution of the Company's shareholders had been sufficient. In other words, there was no dissolution of 'Salviati & Co.' in 1872 and no concomitant establishment of a new company by the name of 'The Venice and Murano Glass and Mosaic Co. Ltd'. This was always the same English company under the same English management, and no matter what they called it, it was always under the artistic direction of Antonio Salviati from its beginning in 1866 until their separation.

This is the outline of the change of the Company's name from a legal point of view. But it also dovetails perfectly with the account of a contemporary, Bolaffio[15]. He recalled that a few months after the establishment of Salviati & Co. (and so in 1868), the Company's title was changed and Salviati's name removed in breach of their understanding («*contro i patti espressi*»). If this is true, then it would have been in the gentlemen's agreement mentioned earlier, and it would also explain, or be one of the reasons why, Salviati agreed to sell his business. «All Venice protested», Bolaffio writes, and Salviati's name reappeared «*sulle insegne*» – on shop-signs, catalogues, letterheads, etc. – but not «in the books» – that is, it was not entered on any register. And in fact, both on the register of Joint Stock Companies in London and on that of the Tribunale di Commercio di Venezia, the Company's name was simply 'The Venice and Murano Glass and Mosaic Co. Ltd', while in actual practice we find it followed by the name 'Salviati & Co', which of course was not part of the title and had no legal import whatsoever. It may have been the effect of the protest or for marketing or other reasons. As it is, this only adds to the confusion of the Company's change of name during the association and until they separated in 1877. Then Salviati regained the right to trade under his own name and conversely the Company ceased to use the tag 'Salviati & Co' after its name, though it naturally kept the date of establishment, 1866.

Acknowledgement

I wish to thank Federica Muscolin of the Biblioteca d'arte del Civico Museo Revoltella, Trieste, for the images following.

[15] Bova 2011:17, citing Bolaffio [1881]: 186. My transl.

REFERENCES

Manuscript sources

London, The National Archives (=TNA), *Board of Trade*, 31/1316 /3405.

Venezia, Archivio di Stato (=ASVe), *Archivio Notarile II serie*, Notaio Angelo Pasini, b. 2365**,** Rep. 3612; b. 2367, Rep. 4051; *Commissione di sorveglianza alle fabbriche ed arti privilegiate nel recinto del portofranco di Venezia*, b. 75.

Venezia, Camera di Commercio (=CCVe), *Registro ditte*, fasc. n. 2479, 'Salviati. Cessata'.

Printed sources

Bolaffio, Luigi Filippo. [1881]. Antonio Salviati e la sua industria. In *Milano Esposizione Italiana*. Milano: 185-187.

Bova, Aldo. 2008. Antonio Salviati e la rinascita del vetro muranese tra il 1859 e il 1877. In *Vetri Artistici: Antonio Salviati 1866-1878, Museo del Vetro di Murano*, edited by A. Bova, P. Migliaccio and V. Rusca. Vol. II. Venezia: Marsilio: 133-156.

Bova, Aldo. 2011. La separazione tra Antonio Salviati e la Compagnia Venezia Murano, e l'esposizione internazionale di Parigi del 1878. In *Vetri artistici. Antonio Salviati e la Compagnia Venezia Murano. Museo del vetro di Murano,* edited by A. Bova, P. Migliaccio, V. Rusca. Vol. IV. Venezia: Marsilio: 17-23.

Migliaccio, Puccio. 2006. Il vetro muranese nella prima metà dell'Ottocento: le caratteristiche tecniche e stilistiche e i problemi di attribuzione e datazione. In *Vetri Artistici del primo Ottocento, Museo del Vetro di Murano*, edited by A. Bova, A. Dorigato, P. Migliaccio and V. Rusca. Venezia: Marsilio: 39-45.

Sladen, Teresa. 2000. The Mosaics. In *The Albert Memorial*, edited by C. Brooks. New Haven and London: Yale University Press: 287-307.

Addendum

Since preparing this paper I was made aware that the two chalcedony glass vases have previously been published in Tonini, Cristina. 2019. El vidrio veneciano en las exposiciones internacionales y nacionales. In *Actas del II Encuentro Internacional «Artes Decorativas: Coleccionismo y Exposiciones en Europa (1851-1929)»*. Madrid: Museo Cerralbo: 141-170, fig. 3.

YouTube: https://goo.gl/kS8gci

III Encuentro: https://es. calameo.com/read/000075335da51d1ea3282

Fig. 1 - Lorenzo Radi, Antonio Salviati, *Two chalcedony glass vases*, 1861-1866. Trieste, Museo Revoltella, inv. nos. 1598, 1599 (Photo Marino Ierman).

Fig. 2 – *Silver filigree mount*, detail of Fig. 1.

Fig. 3 – *Transparency*, detail of Fig. 1.

Mauro Stocco

IMITATION OF THE RENAISSANCE ENAMELLED GLASSES IN THE SECOND HALF OF THE NINETEENTH CENTURY

SOME EXAMPLES FROM THE MUSEO DEL VETRO OF MURANO

The nineteenth-century glass collection of the Museo del Vetro of Murano is one of the most interesting and numerically relevant among the holdings of the museum and one of the largest in the world. It is strictly connected to the history of the institution itself.

The Museo Vetrario (the original name of the Museo del Vetro) was founded in 1861, thanks to the intuition of two important protagonists of the local history, Antonio Colleoni (1810-1885) and Abate Vincenzo Zanetti (1824-1883). The former was the mayor of the island, while the latter was a passionate scholar of history and glass art lover. They succeeded in establishing a small archive-museum in Palazzo Giustinian in order to collect documents, glasses and other varied materials concerning the history of Murano. The glass collection, which initially included only a few pieces, was gradually enriched thanks to many donations from individuals and glassworks[1]. The museum and the archives were first housed only in the central room of the first floor, but, in a few years, the area of the museum would have expanded to occupy almost all the rooms of the palace[2]. Vincenzo Zanetti was the first director of the *Archivio e Raccolta*. According to his intentions, the aim of the Museo Civico Vetrario was not only to

[1] Palazzo Giustinian was originally a patrician palace in typical Flamboyant Gothic style. After having been the residence of the bishops of Torcello since the second half of the seventeenth century and then property of the Venice Patriarchate, in 1840 it became the town hall of the Murano Municipality. Barovier Mentasti 1978: 10-11; Tagliapietra 1984: 92.

[2] Zanetti 1866: 120; Dorigato 2006: 7-8.

collect and exhibit the glass masterpieces of the past centuries, but also and above all to create the perfect place where masters, artists and technicians could study old artworks to take inspiration from them and to recover the ancient traditional techniques, after the deep crisis that had affected the glass production of Murano in the first half of the century[3]. In 1862 a drawing school for glassmakers was also founded, settled in the museum and strictly connected to it, thus further contributing to the rebirth of artistic glass production in the island[4].

The reintroduction of the technique of enameling in Murano in the second half of the nineteenth century originated from this specific artistic and cultural context, where the Museo Vetrario certainly played an important role. Indeed, many pieces of the Renaissance period, including examples of enamelled glasses, were displayed inside the museum since the years immediately following its foundation, as it is reported in the catalogues of the collection published in those years[5]. The number of Renaissance enamelled glasses gradually increased more and more thanks to new donations and acquisitions. In the 1888 catalogue written by Giuseppe Marino Urbani de Gheltof, director of the museum from 1883 to 1892, they are listed together with their provenance and the year of acquisition[6]. The Museo Vetrario was therefore the most easily accessible place where to study the old pieces, including the enamelled ones. Other famous Italian and foreign glass collections, as well as publications and catalogues kept in the library of the Museo Vetrario, were an important source of inspiration[7].

Reconstructing the history of the revival of the technique of enameling in the second half of the nineteenth century is possible thanks to written documents, books, essays and the articles published

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[3] Barovier Mentasti 1978: 11.

[4] For the drawing school see Bertolini 1984. The glassblowers looked upon with interest all the styles and techniques of the objects in the collection, from the archaeological masterpieces to the beautiful examples of virtuosity and manual skill of the Baroque period, obviously not omitting the Renaissance glasses.

[5] Zanetti 1866: 127; Zanetti 1873: 24; Zanetti 1881: 56-57.

[6] Urbani De Gheltof 1888: 21-24.

[7] Barovier Mentasti 1982: 202, 208.

in the magazine *La Voce di Murano*, especially those of Vincenzo Zanetti[8]. Other important elements to take into consideration are the World's fairs, where the most important Murano glassworks presented all the latest innovations and the best of their production, and the glass expositions at the Museo Vetrario.

The first Murano Glass Exposition (*Prima Esposizione Vetraria Muranese*) took place in 1864, with the purpose of checking the real condition of Venetian glassmaking but probably also to increase the collection of the museum[9]. On that important occasion, Giovanni Albertini and Antonio Tosi exhibited some gilded and enamelled glasses, which were considered to be the first stage in the recovery of this technique. Zanetti stated that «*le suddette prove se pel disegno non erano molto felici, presentavano dei buoni elementi a sperare qualche cosa di meglio*» (If these attempts were not really well-done regarding the drawing, in any case they presented good elements to hope for something better)[10]. Actually, some attempts were previously made by Gaetano Negrisiolo, a Venetian artist specialized in ceramic painting[11]. In 1846 he was awarded a silver medal by the Reale Istituto Veneto di Scienze, Lettere ed Arti for his pieces decorated with «*pittura a fuoco sul vetro*» (fire painting on glass)[12].

In 1867 at the Universal Exhibition in Paris, even if the Venetian glassworks obtained a really great success, there was no trace of gilded and enamelled objects between all the kinds of traditional blown glasses. It was Antonio Salviati's initiative that made it possible to fill this gap. That year in Paris he met the ceramic painter Giuseppe Devers and convinced him to come to Venice and teach the techniques of enameling and gilding on glass to the masters and decorators of the Salviati & C. Among his pupils, there were the aforementioned Antonio Tosi, the young Venetian painter Leopoldo Bearzotti and Lorenzo Bernardi[13].

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[8] The articles and essays published in the magazine *La Voce di Murano*, founded in 1867 by Vincenzo Zanetti, are a very useful source of information to reconstruct the progress of glass technology and the different stages of the recovery of ancient techniques in the second half of the nineteenth century.

[9] Dorigato 2008: 17.

[10] Zanetti 1867: 82; Zanetti 1868: 122.

[11] Zanetti 1867: 82.

[12] *Atti delle Adunanze dell' I.R. Istituto Veneto di Scienze Lettere ed Arti* 1843: 169.

[13] Cecchetti *et al.* 1874: 76-77; *La Voce di Murano* 5 aprile 1869: 34.

Three enamelled dishes in the collection of the Museo del Vetro can be dated from the period immediately after Devers' arrival in Venice. One of them (inv. Classe VI no. 3643), realized with the *incalmo* technique and with the portrait of the Venetian patriot Daniele Manin (1804-1857) painted in enamel colours, has recently been discussed by Rosa Barovier Mentasti and Cristina Tonini[14]. A beautiful view of the Piazzetta di San Marco with the Santa Maria della Salute Church in the background was depicted on the *lattimo* center of another dish (inv. Classe VI no. 1521), also made with the *incalmo* technique[15] (Fig. 1). In 1868 at the Industrial Exhibition in the Doge's Palace there were «*piatti [...] con ornamenti e disegni di vedute architettoniche di Venezia [...] dorati e dipinti a smalti fusi*» (plates with [...] ornaments and drawings of architectural views of Venice [...] gilded and painted with fused enamels)[16]. *Lattimo* plates painted in red enamel with different views of Venice taken from engravings by Antonio Visentini (1688-1782) and Luca Carlevarijs (1663-1730) were realized in Murano around 1741, probably by the Miotti or Bertolini glassworks, and commissioned for English travellers on the Ground Tour[17]. Another small *incalmo* dish (inv. Classe VI no. 1520) is directly linked to Renaissance iconography: the man depicted in the centre is the same male portrait of the *Coppa Barovier*[18]. The famous cup was exhibited at the Museo Correr until 1932, when it entered the Museo Vetrario together with the other glass pieces of the Correr collection. Taking inspiration from this masterpiece of the fifteenth century was surely a clear indication of Murano glassblowers' desire to revive the glorious past of the island and the ancient production techniques. Three dishes kept in the Corning Museum of Glass are very similar to our pieces. One is enamel decorated in the *lattimo* center with an urn encircled by a snake (inv. no. 75.3.69)[19]. On the underside of the base there is an inscription: «*Egregio dottore*

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[14] Barovier Mentasti and Tonini 2016: 59-60.

[15] Dorigato *et al.* 2010: 159-160, no. 195.

[16] Zanetti 1868: 123.

[17] Barovier Mentasti and Tonini 2013: cat. 61.

[18] Dorigato *et al.*, 2010: 160-161, no. 196.

[19] https://www.cmog.org/artwork/plate-185; *New Glass Review* 2016: 92.

Trombini. G. Devers 1868» and the monogram «*SV*», which probably stands for «Salviati Venezia». Another *incalmo* dish shows a Renaissance-like angel playing the lute (inv. no. 53.3.57)[20]. The monogram «*SV*» appears again on the bottom, accompanied by two additional initials (*SB*?) and the inscription «*Devers dirix*», which probably stands for «direxit». The last is a *lattimo* dish (inv. no. 2010.3.152) painted with the scene of two couples walking, surrounded by four cartouches with typical Venetian symbols[21]. Here again the piece is signed «*SV*» and «*Devers dirix*» on the back. We can therefore reasonably affirm that all these dishes were made by Salviati & C. glassworks and date from the year 1868. Giuseppe Devers was clearly personally involved in their production, having the function of teacher and supervisor.

At the second Murano Glass Exposition (*Seconda Esposizione Vetraria Muranese*) in 1869 Salviati presented the glass mosque lamps that Isma'il Pasha, the khedive and viceroy of Egypt, ordered from the glassworks. Antonio Seguso was the glassblower, while the decorators were Antonio Tosi and Leopoldo Bearzotti, who were responsible at Salviati & C. respectively for the fusing of enamels and painting[22]. One of these beautiful lamps is kept in the Museo del Vetro (inv. Classe VI no. 1777)[23].

Three small dishes of the collection (inv. Classe VI nos. 3654, 3742, 3743), realized by Salviati & Co., are decorated with a traditional motif that can be found in the majority of Renaissance enamelled glasses: bands of small gilt scales and dots in white, green and red enamel[24] Fig. 2). The scales motif was widespread in Renaissance architectural decoration and it became common also in Venice around 1480[25]. It also appeared in the goldsmith's art, as can be seen for example in some reliquaries in the Basilica del Santo in Padua, and in some majolica pieces, already towards the end of the fifteenth century. It is significant that in 1868 Giuseppe Devers gave

[20] https://www.cmog.org/artwork/dish-12.
[21] https://www.cmog.org/artwork/plate-455.
[22] Salvadori 1869: 40-42
[23] Bova *et al.* 2011: 125-126, no. 160.
[24] Bova *et al.* 2011: 41-43, nos. 2, 3 and 4.
[25] Barovier Mentasti and Tonini 2013: cat. 14.

to the museum a beautiful Renaissance tazza decorated with gilded and enamelled scales (inv. Classe VI no. 1086)[26].

The nineteenth-century collection of the Museo del Vetro also includes some pieces that are almost exact copies of well-known Renaissance enamelled glasses held in public collections. A pilgrim flask (inv. Classe VI no. 3662) is the reproduction, with some variations both in shape and decoration, of the couple of bottles in the Museo Civico di Bologna, probably commissioned on the occasion of the wedding of Ippolita Sforza e Alessandro Bentivoglio (1492). It was made by Salviati & Co. glassworks before the Paris Universal Exhibition in 1878[27].

The first imitation of the *Coppa Barovier* was realized by Salviati in 1870 and sent to Paris. The Museo del Vetro holds a later copy (inv. Classe VI no. 3952), probably decorated by Francesco Toso Borella, a leading Muranese decorator in the last two decades of the century (Fig. 3). In 1889 at the Verona Industrial Exposition, he presented a group of enamelled and gilded glasses, including a copy of the *Coppa Barovier*[28]. In 1894 Francesco Toso gave a collection of enamel painted glasses to the Museo Vetrario: «*sono riproduzioni di antiche pitture sul vetro o di soggetti varii pure antichi* [...]» (They are reproductions of ancient paintings on glass or of various ancient subjects)[29]. This copy of the *Coppa Barovier* was probably part of that donation.

These are only some examples of the enamelled nineteenth-century pieces kept in the Museo del Vetro. New studies will allow us to better investigate the revival of this technique.

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[26] *La Voce di Murano* 7 febbraio 1868: 40.

[27] Bova *et al.* 2011: 94-96, no. 104.

[28] Bova *et al.* 2012: 151, no. 166.

[29] *La Voce di Murano* 26 aprile 1894: 17.

REFERENCES

Atti delle Adunanze dell' I.R. Istituto Veneto di Scienze Lettere ed Arti, 1843. Venezia: Naratovich.

Barovier Mentasti, Rosa. 1976. I vetri smaltati veneziani tra '800 e '900. *Rivista della stazione sperimentale del vetro* VI: 257-262.

Barovier Mentasti, Rosa. 1978. *Vetri di Murano dell'800*. Venezia: Alfieri.

Barovier Mentasti, Rosa. 1982. *Il vetro veneziano*. Milano: Electa.

Barovier Mentasti, Rosa and Cristina Tonini. 2013. *Murano, chefs-d'oeuvre de verre de la Renaissance au XXIe siècle*. Paris: Gallimard.

Barovier Mentasti, Rosa and Cristina Tonini. 2016. Some Questions about the Murano Revival. In *Study Days on Venetian Glass. The Birth of the Great Museum: the Glassworks Collections between the Renaissance and the Revival*, edited by R. Barovier Mentasti and C. Tonini. Venezia: Istituto Veneto di Scienze, Lettere ed Arti (*Atti dell'IVSLA* 174/1, 2015-2016, Classe di scienze fisiche, matematiche e naturali).

Bertolini, Graziano. 1984. La scuola di disegno per vetrai. In *Vincenzo Zanetti e la Murano dell'Ottocento*, edited by Associazione per lo studio e lo sviluppo della cultura muranese. Venezia: Comune-Assessorato alla cultura.

Bova, Aldo and Puccio Migliaccio (with the collaboration of Vladimiro Rusca), eds. 2011. *Vetri artistici. Antonio Salviati e la Compagnia Venezia Murano. Museo del Vetro di Murano.* Venezia: Marsilio.

Bova, Aldo and Puccio Migliaccio (with the collaboration of Vladimiro Rusca and Giovanni Sarpellon). 2012. *Vetri artistici. Il recupero dell'antico nel secondo Ottocento. Museo del Vetro di Murano*. Venezia: Marsilio.

Cecchetti, Bartolomeo, Eugenio Sanfermo and Vincenzo Zanetti. 1874. *Monografia della vetraria veneziana e muranese*. Venezia: Stabilimento Antonelli.

Dorigato, Attilia. 2006. *Museo del Vetro*. Venezia: Marsilio.

Dorigato, Attilia. 2008. Il Museo nel decennio successivo alla sua fondazione. In *Vetri artistici. Antonio Salviati 1866-1877. Museo del Vetro di Murano*, edited by A. Dorigato and P. Migliaccio. Vol. I. Venezia: Marsilio.

Dorigato, Attilia and Puccio Migliaccio (with the collaboration of Vladimiro Rusca). 2010. *Vetri artistici. Antonio Salviati 1866-1877. Museo del Vetro di Murano*. Vol. II. Venezia: Marsilio.

Salvadori, Carlo. 1869. *Murano e la sua esposizione. Lettura tenuta a Venezia da Carlo Salvadori.* Milano: Treves.

Tagliapietra, Silvano. 1984. Il Museo Civico Vetrario. In *Vincenzo Zanetti e la*

Murano dell'Ottocento, edited by Associazione per lo studio e lo sviluppo della cultura muranese. Venezia: Comune-Assessorato alla cultura.

Urbani de Gheltof, Giuseppe Marino. 1888. *Catalogo del Museo Civico di Murano*. Venezia: Stabilimento Antonelli.

Zanetti, Vincenzo. 1866. *Guida di Murano e delle celebri sue fornaci vetrarie*. Venezia: Stabilimento Antonelli.

Zanetti, Vincenzo. 1867. Industria Vetraria. *La Voce di Murano* I, no. 16, 29 aprile: 82-83.

Zanetti, Vincenzo. 1868. L'arte vetraria all'esposizione internazionale nel palazzo dei Dogi nell'anno 1868. *La Voce di Murano* II, no. 29, 25 luglio: 122-123.

Zanetti, Vincenzo. 1873. *Il Museo di Murano. Relazione del Direttore Vincenzo Zanetti pubblicata in occasione del concorso del Museo suddetto all'Esposizione Universale di Vienna 1873*. Venezia: Cecchini.

Zanetti, Vincenzo. 1881. *Il Museo Civico-Vetrario di Murano. Monografia del direttore Vincenzo Zanetti*. Venezia: Longo.

Fig. 1 - Salviati & C., Incalmo *dish with an enamelled view of St Mark's Piazzetta*, 1868. Murano, Museo del Vetro, Classe VI no. 1521.
Fig. 2 - Salviati & Co., *Small plate decorated with gilded and enamelled scales*, 1873-1877. Murano, Museo del Vetro, Classe VI no. 3743.

Fig. 3 - Francesco Toso Borella (?), *Reproduction of the Coppa Barovier*, probably 1889. Murano, Museo del Vetro, Classe VI no. 3952.

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