Gold-glasses: From their origin to Late Antiquity in the Mediterranean

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Abstract

The chapter introduces the preliminary stage of a wide-ranging research into gold-glasses, the aim of which is to investigate different techniques combining gold and glass in Greek and Roman times. The objects considered start from the fourth century BCE and include the various productions of Late Antiquity. The most relevant objects found in the Mediterranean and the adjacent areas will be examined, combining the close study of the glass artefacts and their typological and stylistic classification, with research on their distribution and chronological patterns.

The high value and rarity of these glasses enable not only the analysis of the technological details of such complex techniques, which are still not fully understood, but also the investigation of the socio-economical dynamics, related to the diffusion of these luxury items.

The objective of the research is to find an eventual common thread, connecting productions so far considered separately, but probably resulting from a process of transmission of products, trends, techniques and possibly migration of artisans in the Mediterranean, during the early centuries of the first millennium CE.

Introduction

The research is progressing through several stages. The current PhD project on gold-band glass (from late Hellenistic to early Roman luxury glass production: a systematic analysis on gold-band glass), conducted at the University of Cologne (Professor Ortisi), in conjunction with the University of Padua (Professor Bonetto), represents the next step after
my master’s thesis in Classical Archaeology at the University of Padua. The study focused on Hellenistic sandwich gold-glass vessels (late third to early second centuries BCE), but revealed a great variety of gold-glass techniques, before and after this particular limited production (Cesarin 2012). The investigation on gold-glass begins with the earliest objects that used glass to cover a gold-foil or gold-leaf decoration (finger-rings, inlays and shallow lidded bowls, dating from the fourth to third centuries BCE) and includes different products, spread around the Mediterranean basin in the following centuries. The distinction between foil and leaf is based on the thickness of the gold, respectively >10 µm and <10 µm (Darque-Ceretti et al. 2011, 541), but concerning glass with gilded decoration, this distinction is mostly very vague in the literature.

Although gold-glasses have attracted remarkable interest in scholarly literature, essentially because of the rarity and luxury of the objects, the current state of the art lacks an up-to-date and global approach. Generally, most of the publications offer a mere iconographic analysis, especially concerning the Late Antique fondi d’oro, bases of vessels decorated with sandwiched gold-leaf decoration (the Italian name is used in the text to avoid misunderstandings with the other gold-glass groups). Furthermore, these groups are mostly examined separately. Only a few authors have considered collectively different gold-glass techniques: either as a prelude to the most famous Hellenistic sandwich gold-glass (Barag 1990, 19–25), or as different gilding techniques in Roman times (Whitehouse 1996, 4–12); Goldstein skipped from Hellenistic sandwich gold-glass to Islamic gold-glass vessels (Goldstein 1989, 115–9).

Some products have not been analysed properly as a class and would benefit from inclusion in a catalogue. The principal issues needing clarification concern technological aspects, the location of the workshops and the chronology of each single group. A technological connection can be distinguished between gold-glass objects up to Late Antiquity and will be further investigated. Particular attention will be dedicated to the process of transmission of products, trends, techniques and possibly migration of artisans from the eastern Mediterranean to Italy and the western provinces, likely to have occurred between the middle of the first century BCE and the first century CE.

Object of the study

This chapter considers several gold-glass techniques, dating from the fourth century BCE to the fifth centuries CE, offering an overview of the technological development that occurred during this millennium.
Unfortunately, chronology has been often misunderstood by scholars, because of the longevity of some items, in some cases buried decades or even centuries after they were made, and also because of the lack of knowledge of each single gold-glass technique.

From a preliminary analysis, it is possible to divide the objects into two main groups, separating them on the basis of a simple technological division:

• Sandwich techniques, with the gold-foil or gold-leaf covered by a glass layer, allowing a practical use of the object and ensuring a better preservation of the decoration. These gold-glasses are generally documented in jewellery (rings, beads and gems), furniture or architectural decorations (inlays and plaques), lavish table services (sandwich gold-glass bowls; mosaic glass plates and bowls with gold-glass tesserae; gold-band glass bowls; *fondi d’oro*; vessels with gilded-thread inscription, sandwiched on the base; Nuppengläser (decorated with gold-leaf roundels, etc.) and cosmetic containers (gold-band glass alabastra, pyxides, unguentaria).

• Techniques employing superficial gilding (sometimes combined with cold-paint decoration): the objects, both vessels and plaques, were not covered by a glass layer. Some of them were probably purposely created as funerary goods or ritual objects (Schlangenfadengläser gilded plates, bowls, ewers, etc.), since the practical use would have increased the chances of damage and the loss of the decoration.

An intermediate point between these groups is represented by the shallow lidded bowls identified as exaleiptra (Stern 1999, 34–5). The decoration is superficial, yet partially protected through the superimposition of the two parts. The decoration occurs on the inner surface of the bowl, and on the lower surface of the outsplayed rim of the lid.

Each class must be considered as exceptionally rare and the prerogative of an extremely restricted élite. In total, just over 500 objects of gold-glass from Late Antiquity are currently reported to exist (see Howells 2015, 7). Although an accurate count of the objects with superficial gilding is not possible, because the decoration is easily lost, it may be stated that the *fondi d’oro* represent the only extensive gold-glass production.

Late Classical period

The earliest classes considered date to the fourth to third centuries BCE: finger-rings (*Figure 2.1*), inlays and shallow lidded bowls
(exaleiptra). These groups are reasonably recognised as the prelude to the Hellenistic sandwich gold-glass vessels.

Scholars suggested that the first use in Greece of colourless glass to cover the gold occurred in Olympia, thanks to the genius of the master Phidias (Schiering 1991, 14–16; Stern 1999, 39; 2002, 354). Pottery moulds and colourless glass inlays were recovered in a dump connected to the master’s workshop. Larger moulds in the shape of sections of the garments were employed for sagging large sections of glass (Letsch et al. 1983, 96–105). Some even earlier inlays using glass covers were created in the ninth to eighth centuries BCE (Barag 1990, 19–25), but I will not concentrate on these products, since the connection between them and

Figure 2.1  Glass ring with gold-leaf, representing a winged figure, probably a Nike. Corning (New York), Corning Museum of Glass, 71.1.15. Fragmentary, glass hoop broken off. Finger-rings, with inlays and exaleiptra, represent the earlier products with colourless glass covering a gold decoration (fourth–third century bce). They could be interpreted as the prelude to the more elaborated sandwich gold-glass technique of Hellenistic times.
Source: © Corning Museum of Glass
the Greek tradition, starting with Phidias a few centuries later, is hardly verifiable.

A similar use of colourless glass is attested at the Macedonian court and evidenced by the findings in royal Macedonian tombs. Funerary couches, thrones and other precious grave goods (i.e. the shield found in the tomb of Philip II) were adorned with ivory, gold and glass (Andronikos 1984, 34–5, 122–37; Ignatiadou 2001, 4–7; Kottaridou 2011, 70–90).

Iconography connects Macedonian inlays with the gold-glass rings (winged figures, gods, goddesses or mythological figures, hippocamps and sea monsters, kalathiskos dancers). Both groups were presumably produced in northern Greece or Macedonia starting from the early fourth century BCE (Ignatiadou 2001, 7). A precise chronology is difficult, since in very few cases the archaeological contexts are known. Gold-glass rings and gems may be divided into three types:

- Rings completely cast in colourless glass, both the main part, consisting of hoop and bezel, and the upper cover. The cut and embossed gold-foil is sandwiched between them. The parts are assembled by partial fusion (e.g. British Museum; Metropolitan Museum; Corning Museum of Glass; for all objects locations see Appendix A). Such rings probably represent the latest of the three groups.
- Gems composed of two layers (the upper one always in colourless glass), sandwiching the cut and embossed gold-foil. The gem is mounted in a metal setting and hoop (e.g. Musée du Louvre; Hermitage; furthermore, some gems that were probably mounted in rings are held in private collections).
- Gems composed of three layers (the two external covers in colourless glass), sandwiching a cut and embossed gold-foil on both sides. The gem is mounted on a metal setting and is pierced, allowing it to rotate on a pivot connected to the hoop (e.g. Hermitage – Homolion, hoop missing; Antikensammlung, Berlin – hoop and setting casket missing; J. P. Getty Museum; Museo Archeologico di Taranto).

Recently, Ignatiadou hypothesised a slightly earlier production for the gold-glass gems than the Macedonian inlays, based on the use of gold-silver alloy in the latter (Ignatiadou 2002, 306, 327), except for the inlays recovered from the tomb of Philip II, which are made of pure gold (Ignatiadou 2017).

A similar provenance and a slightly later chronology may be supposed for the exaleiptra, shallow lidded bowls (diameter 12–19 cm),
which served for mixing and dispensing scented oils and salves. Ceramic exaleiptra already existed in previous centuries, although the profile is not strictly similar to the glass exaleiptra. Stern suggested this definition essentially based on their function (Stern 1999, 33–5; 2002, 355). This shape is not common in glass (11 specimens counted by Stern 1999, 46–9) and seems to be enduring. A very few specimens yielded traces of gold-leaf decoration, mostly combined with cold painting (e.g. Archaeological Museum of Thessaloniki; Museo Archeologico di Taranto; Hermitage; Musée du Louvre). The specimen from Pydna was found in a tomb dated 290 BCE (Ignatiadou 2000, 35–8), providing probably the first example of the use of gold-leaf on glass.

Hellenistic period

The use of thinner gold-leaves is attested in different products of the Hellenistic age.

Sandwich gold-glass represents an extremely rare production, commonly attributed to Alexandria (Harden 1968, 21–47), included in the so-called Canosa Group (Grose 1989, 185–8). Less famous are other contemporary classes (late third to second centuries BCE), also belonging to the Canosa Group, such as mosaic glass bowls or plates containing gold-glass tesserae, and some rare plates with gilded and eventually painted decoration. The latter, related to the exaleiptra because of the decoration, remain unfortunately poorly examined (Rostovcev 1963, 151–79).

Sandwich gold-glass vessels (Figure 2.2) have been found in southern Italy, Rhodes, Anatolia, Syria-Palestine, Egypt, Mesopotamia, Black Sea and the Caucasus. So far, 22 specimens are known (20 are reported in Cesarin 2012, two further are not described). The technique consists of the assembly of two vessels of transparent colourless glass, between which cut gold-leaf triangles and stripes, assembled to form different motifs, are sandwiched. In order to fit together, the inner and outer bowls had to be fashioned to an exact and predetermined shape and size, refined through grinding and polishing. The gold decoration was applied to the outer wall of the inner bowl, maybe using an adhesive. The two layers were partially fused together.

The bowls take hemispherical, parabolic or shallow forms (a unique example is the skyphos in the Metropolitan Museum) and are decorated using different arrangements, which employ geometrical and/or vegetal motifs; rarely figurative scenes are represented. It was possible to recognise several shapes and types, with different rim morphologies. The
A comparative analysis of morphology and decoration revealed a correlation among shapes, technical details and subdivision of the decorated surface.

The hemispherical bowls show either an outsplayed or a straight rim. The hemispherical type with outsplayed rim has an undecorated band below the rim, since the outer bowl is shorter and does not cover the decoration up to the lip. They are decorated with a calyx of alternating acanthus and nymphaea leaves, enclosing imbrication and floral filler details. This complex decoration is delimited by a horizontal double band of waves just below the undecorated part (e.g. two twin bowls in the British Museum; another two twin bowls in the Musée d’Arts et d’Histoire in Geneva; a small fragment with the same decoration was found in Olbia, Black Sea, probably belonging to the same shape).

Hemispherical bowls with a straight rim show decoration on several registers up to the lip (e.g. Museum of Art and Archaeology of Columbia; World of Glass, St Helens; Museo Archeologico Nazionale di Taranto).

**Figure 2.2** Sandwich gold-glass bowl from Canosa (Apulia). London, British Museum, GR 1871,0518.2. Within the end of the third and the second century BCE different types of bowls in the sandwich gold-glass technique were produced. The gold-leaf was applied onto the exterior surface of the inner bowl, then covered with the external bowl. The two vessels were cast separately, ground in order to fit perfectly, assembled and fixed through partial fusion.

Source: © Trustees of the British Museum
The same organisation of the decorated space is recognisable on the parabolic bowls (e.g. Corning Museum of Glass; Hermitage).

Only two specimens of the 22 known so far, both shallow bowls, stand out because of the decorative design with a figurative scene (Cesarin 2016): an entire bowl found in Tresilico (Museo Archeologico Nazionale di Reggio Calabria) and a fragment coming from Egypt (Pushkin State Museum of Fine Arts, Moscow).

The recognition of the workshops’ location on an archaeological basis remains difficult. Nevertheless, the presence of very few highly specialised workshops in the eastern Mediterranean (Alexandria, Aegean, Syria-Palestine) seems the most probable (Cesarin 2012).

A new experimental study conducted by a Japanese team (Fujii and Namiki 2017) reproduced the hemispheric bowl in the British Museum with Kirikane, Japanese decorative technique, which applies lines, diamonds and triangles cut in metal leaf. The aim of the work is to shed light on sandwich gold-glass techniques, considering not only the cutting and application of the gold-leaf (a probable forerunner of Kirikane), but also on the fusing process of the glass layers.

Another notable Hellenistic production was mosaic glass with sections of preformed canes and tesserae (Figure 2.3). The canes were generally composed of translucent dark-coloured glass (mostly blue) and opaque white or yellow, creating a star or spiral pattern. The tesserae were usually in solid or layered monochrome colours; very few vessels show gold-glass tesserae.

Characteristic are plates (diameter c. 30 cm) with outplayed sides and rims, flat or slightly convex bottoms, bands of cut-grooves (e.g. Corning Museum of Glass; British Museum); parabolic bowls (e.g. Metropolitan Museum, British Museum); and hemispherical bowls (e.g. Metropolitan Museum, Toledo Museum of Art). A unique example is the amphoriskos of the Corning Museum of Glass (Harden 1968, 25–7; Oliver 1968, 49–51; Goldstein 1979, 176, pl. 21, 23.460).

The plate shape was contemporarily produced in monochrome glass. In very few specimens some traces of gold-leaf decoration have survived (e.g. British Museum).

Late Hellenistic and early Roman period

The late Hellenistic period yielded gold-band glass (Oliver 1967, 13–33), a new class combining coloured glass and gold-leaf.

Gold-band glass objects were fashioned using different working methods, structured in a sequence of phases. First, variously coloured
glass bands were created (often layering translucent coloured glass with opaque white or yellow glass). A strip of gold-leaf was sandwiched between two colourless glass layers. Then, after being placed side by side, the bands were reheated and manipulated in different ways, in order to create small vessels or jewellery.

According to the chronology and the distribution pattern, gold-band glass objects belong to two main groups:

- Late Hellenistic alabastra (Figure 2.4) and bowls, with few beads and gems, probably dating between the second and the first centuries BCE, distributed across the eastern Mediterranean, with a western limit in southern and central Italy.
- Roman unguentaria, pyxides and bowls, the chronology of which may be restricted to a limited period, between 50 BCE and 50 CE, found mostly in Italy and the western provinces.
During the Hellenistic period four different types of alabastra are known. They are differentiated based on profile, technological details and pattern (e.g. British Museum; Victoria and Albert Museum; Metropolitan Museum; Corning Museum of Glass; Antikensammlung, Berlin; Musée du Louvre). Very few bowls are known (e.g. Museo Archeologico Nazionale delle Marche) and beads and gems are also very rare (e.g. Miho Museum; Rijksmuseum Leiden).

The Romans produced: carinated (Figure 2.5) and globular unguentaria (e.g. Hermitage; British Museum; Metropolitan Museum; Corning Museum of Glass; Römisch-Germanisches Museum of Cologne; Musée du Louvre; Museo Civico Archeologico di Bologna), pyxides (e.g. Hermitage;
Figure 2.5  Gold-band glass unguentarium. Corning (New York), Corning Museum of Glass, 59.1.87. Roman gold-band glass vessels (unguentaria, pyxides and bowls) have been found mostly in Italy and western Provinces, and date probably between 50 BCE and 50 CE. Although the Roman group seems to be inspired by the Hellenistic one, new shapes with new colours, new arrangements and new patterns can be observed. The working methods also changed and improved.
Source: © Corning Museum of Glass

British Museum; Metropolitan Museum; Corning Museum of Glass; Antikensammlung, Berlin; Musée du Louvre; Museo Archeologico Nazionale di Aquileia; Museo Archeologico Nazionale di Napoli) and shallow, hemispherical and carinated bowls (e.g. Museo Archeologico Nazionale di Aquileia; Römisch-Germanisches Museum of Cologne).

Although the Roman group seems to be inspired by the Hellenistic one, new shapes with new colours, arrangements and patterns can be
observed. The working methods also changed and improved, but they are, for both periods, still not clearly explained and require further investigation (Cummings 1980, 40–1; Lierke 2009, 42, 45, 49). A preliminary analysis suggests that both the Hellenistic and the Roman gold-band glass includes a major group of cosmetic and perfume containers and a secondary group of bowls and jewellery (more than 250 objects are catalogued so far).

Contemporary with the Roman gold-band glass but, at the current state of knowledge, restricted to the city of Pompeii are rare examples of gilded plaques decorating walls of private houses, for example, the famous Domus degli Amorini Dorati (Sogliano 1908, 34–6; Seiler 1992, 50, fig. 312–15; Beretta and Di Pasquale 2004, 219, no. 1.57).

Late Roman period

The second century and the beginning of the third century CE provide only sporadic evidence, mostly poorly preserved, and not clearly understood. Some gold-glasses, both vessels and plaques with superficial gilding, are known, for example, in France (Foy and Nenna 2001, 92, 219) and in Egypt (Cooney 1976, 69–71).

From the beginning of the third century CE, we may observe a great variation of techniques, shapes and styles, leading to the prolific production of the so-called fondi d’oro (Figure 2.6).

The two main decorative innovations of the third century CE are the use of gilded threads and the application of coloured glass blobs in order to cover gold-leaf roundels (Nuppengläser, known also as medallions when the single blob survived). Both represent developments of long-standing decorative techniques. Both threads and blobs appear in different areas of the Roman empire, but seem to be combined with the gold-leaf decoration only in the Rhineland (Schlangenfadengläser in the East: von Saldern 2004, 327–31; western Schlangenfadengläser: von Saldern 2004, 331–7; eastern origin of the Nuppengläser: von Saldern 2004, 347–9). Gilded threads were used both superficially (Schlangenfadengläser) and sandwiched between the bottom of the vessel and the base with its foot-ring, creating an inscription (Figure 2.7).

Schlangenfadengläser commonly employed colourless, red and blue threads. In very few cases these were combined with some colourless threads covered by gold-leaf, shaped mostly into spirals and leaves (the most famous is the Masterpiece, Römisch-Germanisches Museum
of Cologne: Harden 1987, 124–6). The same kinds of threads were fashioned in various decorative motives on Schlangenfadengläser and as inscriptions and frames on the vessels with an inscription on the bottom. While the first group seems to be peculiar to the Rhineland and adjacent areas, and worked in this region (Harden 1987, 104, 107–8), the second group is widely spread throughout the western provinces. Both classes are very restricted.

About 20 specimens, belonging to the second group, are known (Alarcão 1968, 71–9; Filippini 1996, 113–28; Howells 2015, 29–30, 3). We cannot state their shapes for certain, since usually only the base has survived, although we may hypothesise that they were fashioned according to the trend of the period: free-blowing. The inscriptions, often surrounded by a cartouche, represent salutations of antique convivial tradition (e.g.

Figure 2.6  *Fondo d’oro*. Corning (New York), Corning Museum of Glass, 66.1.37. Base of a vessel decorated with gold-leaf representing shepherd and flock. The figures are surrounded by the inscription DICNITAS AMICORUM PIE ZESES VIVAS.

*Fondi d’oro* were mostly obtained from bases of bowls or dishes and inserted as signacula near the graves in the Catacombs of Rome.

Source: © Corning Museum of Glass
ANNI BONI, VITA TIBI, A ME BIBE). Both cartouche and inscription are made of glass threads, gilded, variously coloured (white, blue, red) or colourless (e.g. Musée de la Société Anonyme Belge des Mines, Aljustrel; British Museum; Museo Archeologico Nazionale di Aquileia; Römisch-Germanisches Museum of Cologne; Corning Museum of Glass; Aquincumi Muzeum Budapest; Musée du Petit Palais, Paris; Pokrajinski Muzej, Ptuj).

Another group widely recorded in the western regions, the so-called Nuppengläser, provides some examples with gilded decoration. This category, named after the glass blobs (in German Nuppen) applied to the walls of the vessel, has a long tradition and many varieties (Harden 1987, 101–3; von Saldern 2004, 347–51). Some vessels were characterised by gold-leaf roundels, applied externally onto the vessel, and covered by blue or green blobs. The common shapes are difficult to recognise, since mostly only single blobs are preserved (Whitehouse 1996). The only vessel known so far, although fragmentary, was found in Cologne (St Severin bowl: Figure 2.8). Six fragments from this bowl are kept in the British Museum. The open vessels decorated with blobs were blown and likely utilised for drinking and eating or serving, the decoration is in fact
visible from the inside. Since the iconographies are very similar to the *fondi d’oro*, it is possible that the manufacturing centers were the same.

Vessels with superficial gilding are relatively rare, mostly poorly preserved. Some unique specimens show gold-leaf decoration combined with engraving or painting. The chronology and workshops are difficult to identify, since the products are very different in shape and style (von Saldern 2004, 352–61). Whitehouse hypothesised three production areas, active between the third and the fourth centuries CE, in the Roman empire: the eastern Mediterranean, Italy and the Rhineland. A notable concentration of glass objects with gilded decoration is recorded in Cologne (Fremersdorf 1967). Whitehouse suggested an earlier chronology (first to second centuries CE) for the blue glass ewer with gilded decoration held in the Corning Museum of Glass, generally dated third to fourth centuries CE (Figure 2.9). He also considered two of the best preserved specimens, the Daphne Ewer and the bottle representing the myth of Apollo and Marsyas, eastern Mediterranean products, dated to the third to fourth centuries CE,
while considering the Rhineland as the most probable area of origin for the Disch Cantharus (Whitehouse 1996, 4–12).

A limited and very skilful production is characterised by a brushed technique employing powdered gold-leaf enriched with painting in order to represent portraits (Howells 2015, 28–9, 2). These were sandwiched in gold-glass medallions with a blue base. Although often considered
together with the *fondi d’oro*, they seem to be from an earlier period. They are dated to the late second to third centuries CE and were probably produced in Italy by Alexandrian workers, according to the Greek dialect of some inscriptions (Whitehouse 1996, 10). This group also stands out from the other gold-glass objects based on chemical composition (Meek 2013, 126).

As mentioned above, the *fondi d’oro* are the most numerous gold-glass class (the well-known catalogue by Morey counts several hundreds, although lacking many specimens). They were the first gold-glasses ever discovered, thanks to the numerous explorations of the Roman catacombs from the seventeenth century onwards. They were mostly found set in plaster as *signacula* of the *loculi* in the catacombs, which is still the most prolific find spot. Although some early studies revealed the real nature of these objects, as bases of vessels (Vopel 1899, 80), they were commonly thought to be medallions produced for the purpose of decorating the graves (Haevernick 1962, 58–9). The technique is simpler than that of the small group of medallions and the decoration varies from mythological, Christian or Jewish representations to portraits, landscapes or depictions of animals.

Numerous publications on the *fondi d’oro* are essentially catalogues, which sometimes also include other contemporary, or slightly earlier, gold-glass objects (Morey 1959; Zanchi Roppo 1969; Faedo 1978, 1025–70; Pillinger 1984). Until recently, the *fondi d’oro* were merely studied from an iconographical perspective (von Saldern 2004, 363–74). The first in-depth analysis of the technological process, supported by experimental replicas, was published by Howells (Howells 2013, 112–20; 2015). Recent chemical characterisation on a selection of gold-glasses preserved in the British Museum revealed the existence of three compositional groups, partially coincident with grouping based on technical and decorative details (Meek 2013).

**Methodology for further work**

Although many studies on gold-glass techniques exist, they are mostly outdated publications, rarely providing safe hypotheses on the technological processes, the location of workshops, or the chronology. To date, catalogues are incomplete (e.g. Oliver 1967 on gold-band glass; Morey 1959 on *fondi d’oro* and other Roman gold-glass objects) and most of the techniques have not been convincingly explained. A comprehensive analysis, combining different approaches, could significantly improve
the understanding of gold-glass, moving beyond the mere typological study and developing the high scientific potential of this research theme.

The wide-ranging literature collected so far and the direct observation of 165 objects, preserved in many European museums (e.g. British Museum; Victoria and Albert Museum; Fishbourne Roman Palace; Antikensammlung, Berlin; Landesmuseum Württemberg, Stuttgart; Römisch-Germanisches Museum, Cologne; Musée du Louvre; Rijksmuseum Leiden; Gemeentemuseum den Haag; Museo Archeologico Nazionale delle Marche; Museo Civico Archeologico di Bologna; Museo Archeologico Nazionale di Aquileia; Museo Archeologico Nazionale di Napoli; Museo Archeologico Nazionale di Altino) has allowed the understanding of the complexity of the topic and enabled the identification of several open questions that require an appropriate investigation. Because of the extent and the complexity of the subject, it was decided to focus sequentially on the various classes.

Beside the analytical macroscopic examination, taking measurements and photographs, some of the objects were also examined by optical microscope.

The first aim of this research is the creation of a catalogue, organised by production methods and periods, to obtain a clear and reliable classification of the shapes and the technical details. The comparative analysis of decorative motifs and technological details, together with the research on distribution of the finds, will be fundamental in supplying more data for the chronology and hopefully will allow us to hypothesise about the location of the workshops.

**Preliminary results**

From a preliminary analysis, we can state that several different areas were involved in the production of gold-glasses, including both the eastern Mediterranean regions, Italy, and the western provinces.

The earliest classes (finger-rings, inlays and exaleiptra) appear to be produced in Macedonia and northern Greece, between the fourth and the third centuries BCE. A wider area could be suggested for the Hellenistic productions belonging to the Canosa Group (sandwich gold-glass, mosaic plates and bowls with gold-glass tesserae, plates with gilded and painted decoration) and, slightly later, for the Hellenistic group of gold-band glass. The distribution patterns of these classes, the chronological delimitation of which will be better defined, are similar, and extended eastwards from central and southern Italy. This allows us to hypothesise about diverse
workshops, in an area comprising the Aegean, the Syrian-Palestinian coast and Egypt.

In the early Imperial age, Roman gold-band glasses were probably produced in Rome and Venetia, according to both distribution patterns, a comparison with other mosaic techniques and the small amount of evidence of glass-working. This production acquires great significance for the hypothesis of a migration of artisans from the eastern Mediterranean to Italy, between the end of the first century BCE and the early first century CE.

Contemporary with these are rare examples of gilded plaques from Pompeian houses. The extraordinary preservation of the architecture and furniture of the Campanian sites does not allow us to consider these plaques a peculiarity of Campania for this early period.

The second and the third centuries CE provide scarce and scattered evidence, generally consisting of glass with superficial gilding, the poor state of conservation of which does not enable us to locate the workshops and to state a precise chronology.

The various and numerous products (i.e. *fondi d’oro*, Schlangenfadengläser, Nuppengläser, vessels with superficial gilding, etc.) spread from the eastern Mediterranean to the western provinces, from the third to the fifth centuries CE and were probably made in different workshops, either located in the eastern Mediterranean, Rome or the Rhineland.

At the current state of knowledge, all of these regions lack archaeological indicators of glass-working specifically related to gold-glass production, beside the third century BCE context, documented at Rhodes (Triantafyllidis 2002, 30–2).

**Conclusion**

The main aim of this project is to investigate three principal issues: the location of the workshops, the chronology and the working process of each production.

The accurate collection of data, organised in a reasoned, exhaustive and updated catalogue, will yield an improved typological classification, and will allow a systematic mapping. This step will be crucial for advancing reliable hypotheses on the questions above mentioned.

Moreover, the particular lavishness and rarity of these glasses enable us to investigate the socio-economical dynamics related to the diffusion of these luxury items, which were doubtless manufactured in a small number of specialised workshops, and their meaning as status symbols,
intended for an extremely restricted élite. This consideration leads to a completely different approach, if compared to glassware in everyday use, which was mostly created locally, extremely standardised in the whole Roman empire, and distributed on a small regional scale.

The newly assembled data will provide a significant contribution in the validation or rejection of the current hypothesis of connection and continuity among the gold-glass productions (Figure 2.10), offering a new perspective on contacts and circulation of products, ideas and artisans throughout the Mediterranean, during the early centuries of the first millennium CE.

Appendix A

The following list provides the location of a selection of representative objects mentioned above:

- Rings: British Museum, no. 1872,0604.291; Metropolitan Museum, no. 17.194.2537; Corning Museum of Glass, no. 71.1.15; Musée du Louvre, no. Bj 1279; Hermitage, no. 2495/70, no. Πλ4; Volos,
Archaeological Museum, no. M 58; Berlin Antikensammlung, no. 1966.8; J. P. Getty Museum, no. 88.AN.106; Museo Archeologico di Taranto, no. 12.292.


- **Sandwich gold-glass**: Metropolitan Museum, no. 23.160.76; British Museum, no. 1871,0518.1, no. 1871,0518.2, no. 1885,0101.296; Musée d’Arts et d’Histoire in Geneva, no. MF 3634; Museum of Art and Archaeology of Columbia, no. 77.198; Museo Archeologico Nazionale di Taranto, no. 40.058, no. 40.059; Corning Museum of Glass, no. 71.1.5; Hermitage, no. Kz 5323/5636, no. Ol.1903.222; Museo Archeologico Nazionale di Reggio Calabria, no. 6171; Pushkin State Museum of Fine Arts, Moscow, no. 116.1.

- **Mosaic plates and bowls with gold-glass tesserae**: Corning Museum of Glass, no. 66.1.35; British Museum, no. 1871,0518.3, no. 1871,0518.4, no. 1868,0501.86; Metropolitan Museum, no. 17.194.281, no. 17.194.266.

- **Gold-band glass**: Metropolitan Museum, no. 17.194.284, no. 17.194.285, no. 17.194.286, no. 15.130.11, no. 91.1.2053, no. 30.115.16, no. 81.10.328, no. 29.100.88, no. 17.194.259, no. 06.1035.2; British Museum, no. 1868,0501.75, no. 1868,0501.76, 1895,0602.1, no. 1856,1226.1132, no. 1871,0518.3; Victoria and Albert Museum, no. 1868–1023; Corning Museum of Glass, no. 76.1.46, no. 55.1.9, no. 76.1.24, no. 76.1.25, no. 55.1.3, no. 59.1.87; Berlin, Antikensammlung, no. 451x, no. 1961.5; Musée du Louvre, no. MNE 94, no. MNE 93, no. S 2383, S 2288; Rijskmuseum Leiden, no. 511/a–b, no. R.O.II,161, no. B 1952/10.17; Hermitage, no. П1883.6, no. Е698, no. Е1044; Ljubljana, Narodni muzej Slovenije, NMS R 2095.

- **fondi d’oro**: Metropolitan Museum, no. 18.145.1a–b, no. 28.57.24, no. 16.174.1, no. 18.145.2, no. 11.91.4, no. 16.174.2; Corning Museum of Glass, no. 54.1.83; British Museum, no. 1898,0719.1, no. 1898,0719.1, no. 1863,0727.12, no. 1870,0606.12, no. 1863,0727.6, no. 1893,0426.183, no. 1859,0618.2, no. 1859,0618.1, no. 1863,0727.10; Bonn, Rheinisches Landesmuseum, no. 17293.

- **Brushed Medallions**: Metropolitan Museum, no. 26.258, no. 17.190.109a; Corning Museum of Glass, no. 90.1.3.

- **Vessels with gilded inscription**: British Museum, OA.858; Corning Museum of Glass, no. 66.1.31, no. 66.1.147; Paris, Musée du
Petit Palais, no. A.DUT.244, no. A.DUT.254; Aquileia, Museo Archeologico, no. 12897; Cologne, Römisch-Germanisches Museum, no. 40.551.

- Nuppengläser: British Museum, no. 1881,0624.1, no. 1854,0722.17, no. 1863,0727.17, no. OA.4308, no. OA.857, no. OA.4309; Metropolitan Museum, no. 18.145.8.
- Vessels with superficial gilded decoration: Corning Museum of Glass, no. 70.1.3, no. 66.1.267, no. 55.1.86, no. 78.1.1; Marseille, Musée d’Histoire, no. 99.2.34; Bonn, Rheinisches Landesmuseum, no. LXVIII.

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