

NOT EVERYTHING IS AS IT SEEMS. IMITATION MARBLES AND SEMI-PRECIOUS STONES IN ROMAN GLASS

1. *Approach*

The generic and non-specific interpretation of the word »murrina« usually refers to ornamental rocks (marbles, alabasters, basalts, granites, diorites, gabbros, lumachelle, different types of breccias, porphyries, serpentinites, etc, in other words, what Romans called »marmora«) and also to semiprecious rocks (agate, onyx, red agate, lapis lazuli, malachite, obsidian, different types of quartz, including rock crystal, amongst others). It also applies to rock-like organic matters such as amber¹, jet, coral, ivory, nacre and pearls. They all have an extensive and well known tradition in various cultures of the Mediterranean region and coexist along with other noble materials such as gold or silver and materials which require a manufacturing process such as ceramic or even glass.

References to murrina, mainly in Latin, are considerable and of varied worth. While some dispel doubts and support some theses resulting from a comparative archaeological analysis with glasses, others seem to be irrelevant, vague or not particularly enlightening². Of all of them, Pliny's references provide the most information and are of greater interest. We should highlight the following aspects from this documental corpus and from archaeological analysis:

1. It is accepted that a discussion may be raised regarding some assessments of the correspondences between glasses and stones. The phenomenon of the manufacture of glass imitating various rocks is, however, unquestionable. Its existence is acknowledged by contemporary and chronologically close literary pieces and accepted by scholars, as revealed by regular reviews of marbled glass and onyxes included in the bibliography.

2. The contexts regarding terms, matter-space-time, functions, value and »imitations« are significant and predominant in ancient literature.

3. The terminology used to refer to stone objects is multiple, with some semantic and phonetic coincidences³.

¹ It is an organic matter which does behave as a rocky substance due to its fossil nature. The yellow glass of the Julio-Claudian period imitates the chromatic range and texture of amber.

² While not purporting to be exhaustive, amongst the references containing these ideas, we should mention: Plin. nat. 33, 2, 5; 36, 12; 36, 197–198; 37, 7–8. Mart. Epigr. 3, 26, 2; 3, 82, 25; Mart. Xen./Epigr. 13, 110; Prop. 4, 5, 26; 4, 8, 37; Paus. 8, 18, 5; Sidon. carm. 11, 21; Lucan. 4, 380; Pol. 6, 1; Varro, De vita pop. rom. 1, 315; Varro, SHA Ver. 5, 3; Heliog. 32, 2–3; Gall. 12, 5; Suet. Aug. 75; Eutr. 8, 13; Iuv. 6, 156; Sen. epist. 119, 3; 123, 7; benef. 7, 9. Petron. 55; 67, 10; Theonas Epist. 6.

³ For Greek »morria« and Latin »murra« a Persian provenance has been put forward: »morik«, »murik« or »muris«. A prototype survives in Iranian: »mura« or »murra«, from which the classical terms might derive. Latin »murra«, »murrha«,

4. *Vasa murrina* mostly belong to a very specific functional group: vessels for drinking wine, probably aromatized with myrrh, amongst other substances. There appears to be a correlation between the name attributed to them and their contents.

5. Sources describe *murrina* separately from other stones. It is, a priori, a specific material. Hence, the general term »*vasa murrina*«, ought to be questioned.

6. The biggest controversy lies in the actual nature of these vessels. Loewenthal and Harden link *murrina* to fluorspar (Fluorite)⁴ based on analysis of classical texts, mainly in Pliny⁵. This identification, traditionally accepted, must not be considered complete. We, however, do not delve into this matter which is beyond the purpose of this paper.

7. There is confusion and a notable lack of definition in the vocabulary used to refer to the various types of glassware imitating stone vessels which do not fall within the group of *murrina*. There is a tendency towards simplification, generalization and an exchange of nomenclatures which applies to current trends regarding marbled glass (imitation marble), mosaic, »*millefiori*« and polychromatic glass. A common and universal language must be pinpointed in order to define, itemize and delimit each object⁶.

8. References to *murrina* and glass are frequently linked. It must not be forgotten that when classical authors describe the former they say that they are imitated by the latter which therefore supports the joint study of both.

9. *Murrina* is associated with other luxury objects (rock crystal, gemstones, gold, silver, etc) and is mentioned in the same contexts although with a preferential value. Pliny⁷ considers *murrina*, along with diamonds, emeralds and gemstones (without specifying) as the most costly products coming from inside the earth. The most treasured products from the surface of the Earth were rock crystal, from the land, and pearls, from the sea.

10. The singularity of these objects and the high price attached to them made them highly desirable and gave rise to a well-known market for forgeries, imitations, copies and all sorts of items inspired by them. This is not only stated by Latin authors but can also be noticed amongst the objects found.

11. *Murrina* vessels have some points in common with glassware: their function (at times mutually complementary), certain physical features, social esteem, oriental provenance, enclaves of highly skilled craftsmanship, the eclosion of mosaic glass, etc. They do not share: sources of raw material, price, porosity (which affects their cleaning, transference of flavours) rigidity as opposed to ductility, thermal insulation (lower in glass), artistic freedom, availability, etc.

12. Pieces made of stone consist mainly of drinking vessels, especially for wine. But the adjective »*murreus*« (from myrrh, yellowish, from *murra* in the wider sense: see n. 3. applies to objects for eating and drinking. However, the term was even used to refer to any object made of stone. The adjective »*murrinus*« (made of *murra*) is more common for vessels and is

»*myrra*«, »*myrrha*«, and the corresponding adjectives »*murreus*«, »*murrheus*«, »*myrreus*«, »*myrrheus*« and »*murrinus*«, »*mur-rhinus*«, »*myrrinus*«, »*myrrhinus*«, at times mixed up with »*murra*«, from Greek »*myrrh*« are closely linked to Greek »*morria*« and its adjectives »*morrinos*«, »*murrinos*«, »*mourrinos*«, »*morinos*«.

⁴ Loewenthal – Harden 1949, 34.

⁵ Plin. nat. 37, 21–22.

⁶ With regards to nomenclatures, see the gradual classification in Ortiz Palomar 2003, on concepts between true and false, in order to determine the type of glass objects we encounter. The intent can be unveiled through the context, purpose and characteristics of the product.

⁷ Plin. nat. 37, 204.

used to refer to calices (goblets), trullae (ladles), vasa (pots), pocula (beakers), capides (bowls with one handle), abacus, escaria vasa (dishes), scyphi (cups with two handles). Other functions can be noted from archaeological finds: vessels for liquids, unguentaria, trays, mortars, cosmetic-medical platelets, revetment panels, personal ornament, etc.

2. *Glass resembling ornamental rocks*

The data provided by the bibliography from the first half of the 20th century must continue to be taken into account for debate in conjunction with fresh studies⁸. This bibliography contrasts with more recent research whose catalographic sections are somehow cautious when dealing with glassware whose decorative patterns are based on the imitation of ornamental rocks⁹. These studies never identify the type of rock, the *raison d'être* of the phenomenon, the period of eclosion, or any other issues regarding stone vessels: type, manufacturing process, chronology, background, functional categories, shared or alternative uses, value, production, meaning, prevalence and their incorporation into royal or ecclesiastical collections. Many aspects go unheeded with regards to glassware such as frequency of the most imitated rocks, technological resources employed or adapted for their manufacture, chromatic formulae – chemical composition –, typology, function, confirmation or correction of data provided by written sources, etc. Descriptions are, therefore, habitually succinct and limited to colours. This vagueness is revealed by the use of generic terms such as marbled glass, unless the rock in question is clearly specified, for instance in the case of the porphyry on an ornamental wall plaque in Corning. The exception could possibly be the recurrent bibliographic identification of glass with agates or onyxes; an easily recognizable group even to non-experts and highly frequent since the Egyptian period.

The most widespread concept is »mosaic glass«. It designates a vast group of glassware items which have in common decorations in a great variety of chromatic forms. Marbled glass has a prevalent position in this group and although the term itself implies a comparative identification with marbles, the ornamental stones which served as models for this type of glass have never been pinpointed. In the Gorga collection, Petrianni differentiates up to twelve different classes, amongst them the »vasellame marmorizzato«. Pieces of other varieties, such as some instances of the millefiori set¹⁰, must necessarily be put down to imitations of fossiliferous limestones.

It is therefore necessary to conduct a comprehensive review of the types described and to make the appropriate corrections and revisions. We propose a classification of »Decorative Chromatic Morphologies«, open to new incorporations of mosaic glass, where two large groups could be differentiated: marbled and millefiori. Here we shall exclusively deal with the first group, which imitates or is inspired of ornamental rocks. These glasses show decorative chromatic morphologies, mainly polychromatic morphologies with preformed elements, although the application of decorations by means of threads or drops can also be used.

⁸ Vickers 1997a.

⁹ Bibliography on this topic is extensive, in chronological order: Kisa 1908, 550; Morin-Jean 1913, 77. 122; Loewental – Harden 1949; Isings 1957, 2 f. 55; Bühler 1973, 18–21 (monograph chapter regarding murrina vessels: »Die murrinischen Gefäße«); Czurda-Ruth 1979, 27. 31 f. 168, ill. 18, 1356 (specific identification: »Achatglas«); Goldstein 1979, 32. 189 f. (n. 507). 191 (n. 513–516). 251 (n. 738. 740. 742) (mentions of marbled glass, with references to agate, onyx and porphyry); Rütli 1988, 26. 156–158, n. 74. 77. 96. 153 (marbled glass); Rütli 1991, 118–142; Grose 1989, 249; Marshall 1990, 35 n. 5 (correct identification of glass imitating agate); Paz Peralta 1998, 494–497.

¹⁰ Petrianni 2003, examples of illustration IV, n. 1–4.

3. *Sample-model and some examples*

Our ultimate objective is to contribute to the development of a classification of glass vessels and wall coverings (mostly manufactured with moulds) with the respective counterpart models in ornamental or semiprecious stones¹¹. The selection criteria are based on the definition of the most characteristic groups, whose number may vary depending on variations in the type of rock and their imitation or interpretation.

Correspondences between a glass object and its model in stone can be total or partial. In the case of total correspondence, the objects must have a common design, colour, shape, size (height, diameter, thickness and even weight), finishing and function. In the case of partial correspondence, there must be a common design in polychromous glass and in monochromatic glass there must be a similarity in colour, including range, tone and saturation (transparent, translucent or opaque), adding visual texture.

We accept, as other authors already have, that the products manufactured using precious or prized materials, available only to the upper classes and with a long tradition in Mediterranean cultures, were imitated, copied or forged using cheaper materials. Their use became, consequently, more popular but not necessarily universal.

Amongst the instances used, there is a prevalence of glass items from the *Conventus Caesarugustanus*, *Provincia Hispania Citerior*, with their »reflections« in rock. For these, we have used our own experience and references from monographs and published catalogues. In cases of illustrative relevance, well documented external finds are used.

Polychromatic glass

– The wall covering glass of the Corning Museum of Glass (fig. 1 a)¹² and fragments of glass panels of the *opus sectile* found in Corinth¹³ unquestionably imitate lapis Porphyrites (Mons Porphyrites-Gebel Dockhan, Egypt).

This rock shows great chromatic uniformity: red background with generally small white inclusions, although at times these inclusions can be of a light pink tone (fig. 1 b). Red porphyry was a rock of imperial ownership and was sporadically exploited up until Claudius' reign, becoming more widespread from Trajan onwards¹⁴. It was common for paving and wall covering, though its use in columns and sculptures was limited to the imperial household. Besides this it was used for vessels such as the well-known instances found in Begram (Afghanistan), dated to the 1st century AD and considered to be gifts, along with other precious objects, from foreign envoys to a prominent person in the city, which indicates their exceptionality. Pensabene pointed out that some of the vessels in this material were the work of post-classical sculptors specializing in work with porphyry, imitating former vessels, due to the long tradition of this rock and also to the ideological connotations attached to its use in Late Antiquity¹⁵.

¹¹ Cisneros Cunchillos et al. 2004. This line of work was introduced at the Conference on »El vidrio romano en la España romana« held in La Granja on 1 and 2 November 2001. This field of investigation, along with interdisciplinary collaboration, is providing remarkable contributions to the knowledge of ancient glass. Methodologically speaking, laboratory work runs parallel to work on conceptual aspects, which results in a unified and reasoned language.

¹² Goldstein 1979, 251 n. 742 ill. 34.

¹³ Ibrahim et al. 1976, 208–212. 265 fig 14. 15.

¹⁴ Pensabene 1998, 347.

¹⁵ Belli Pasqua 1989, 104 f.; Malgouyres 2003, 26–65; Mehendale 2008, 201.

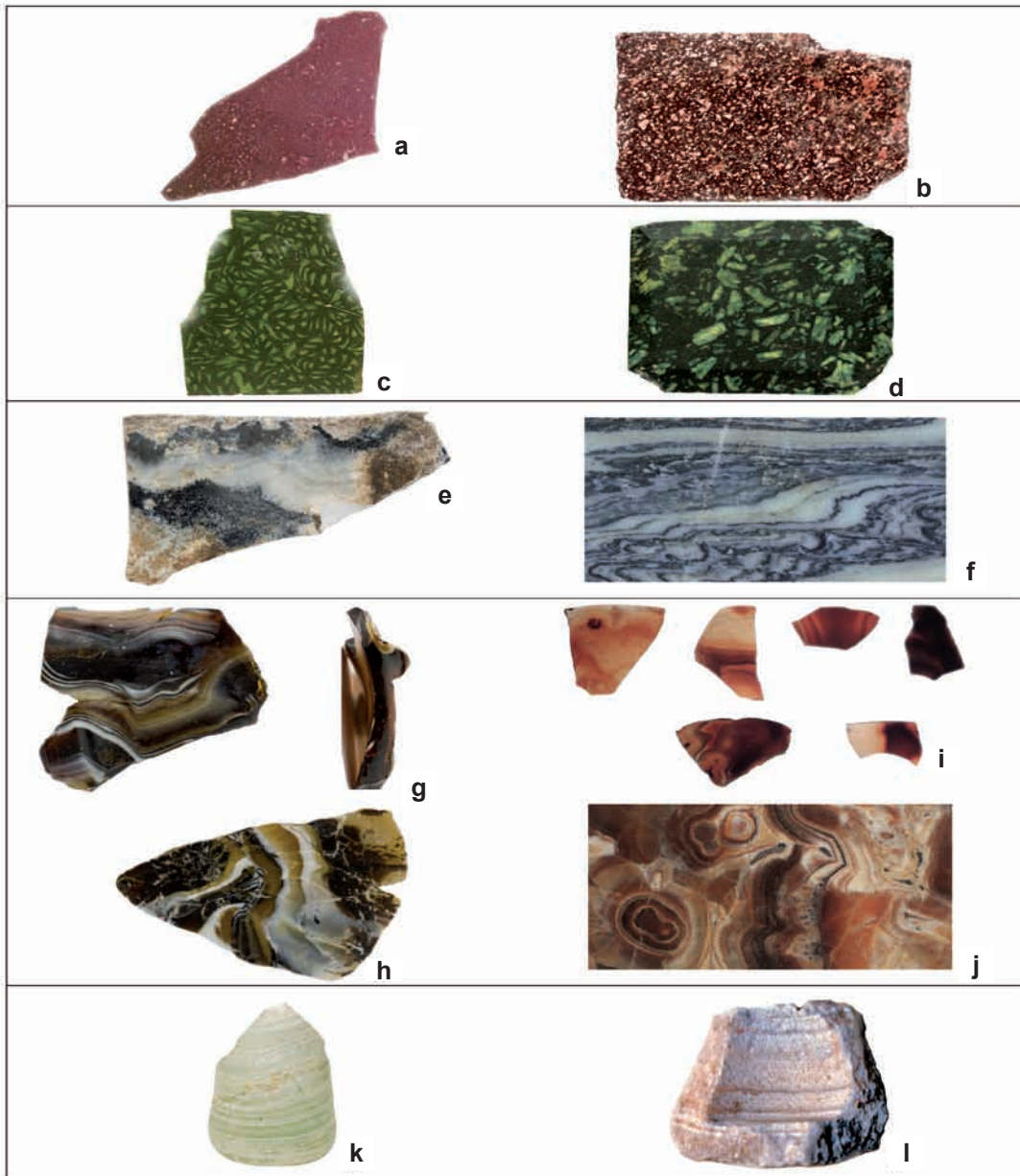


Fig. 1 a Glass, imitating red porphyry. Fragment of wall covering (13,7 x 0,85 cm). The Corning Museum of Glass, b Marble. Fragment of red porphyry (10,6 x 7,6 x 0,67 cm). La Malena (Azuará, Zaragoza). Museum of Zaragoza, inv. 47768, c Glass, imitating green porphyry. Fragment of wall covering (max. 9 x 8 cm). Toledo Museum of Art, d Marble. Green Porphyry. Cotícula (9,4 x 7,6 x 0,74 cm). Colonia Caesar Augusta. Museum of Zaragoza, inv. 50829, e Glass, imitating marmor Carystium. Fragment of wall covering (4,2 x 2,5 x 0,4 cm). Colonia Celsa. Museum of Zaragoza, inv. 48477, f Marmor Carystium, g Glass, imitating agate. Fragment of shallow bowl (2,7 x 2,7 x 0,36 cm), Isings 3a. Colonia Celsa. Museum of Zaragoza, inv. 47621, h Glass, imitating agate. Fragment of deep bowl (4,2 x 3 x 0,39 cm), Isings 3b. Colonia Celsa. Museum of Zaragoza, inv. 47581, i Fragmentary vases from the Tiber. Agate, j Alabaster fiorito, k Glass, imitating alabaster. Fragment of flask, alabastron (max. h. 8 cm), Colonia Caesar Augusta. Museum of Zaragoza, inv. 47785, l Alabaster. Fragment of flask, alabastron (max. h. 4,5 cm). Asturica Augusta (Astorga, León). Museum of León, excavation inventory number AA.LC.20-24.92b.4048.66.

– The wall plaque housed at The Toledo Museum of Art (Ohio)¹⁶ imitates lapis Lacedaemonius (Krokeai, Greece). It has a dark green glass background with multiple embedded canes in light opaque green (fig. 1 c).

The rock can be easily identified *de visu* as porphyry: dark green with rectangular or square crystals of light green colour. It was of imperial ownership, perhaps from the Flavian period. It was possibly introduced in Ostia in the first half of the 1st century B.C. and in Rome at the time of Augustus. It was widely used as wall covering and it had a very limited use for other purposes such as vessels, whose production was already known in the Mycenaean period or *cotricula* to mix *medicamenta* for medical/cosmetic purposes in Caesar Augusta (fig. 1 d). Its dissemination has recently been studied by Lazzarini. He believes it was one of the most widely used rocks in the Roman provinces from Britannia, Gaul, Hispania and Numidia to Ponto, Syria and Palestine¹⁷.

– The fragment of a glass plaque for a wall covering from Celsa imitates *marmor Carystium* (Euboea, Greece). It was found in *insula* II, room 38, on a level from the end of the period of Nero (fig. 1 e). Black opaque glass was used for the background and white opaque pulverized glass was used to design broad waves. The grey shades on the surface are the result of the mixture of the aforementioned colours. The surface is even and bright and the reverse side is coarse and retains traces of lime which give evidence of its adherence to a wall. The size of the plaques varied, the Roman foot being the most frequently used model unit. It is one of the few glass objects for wall covering imitating marble found in Spain. The closest instance with regard to the decoration can be traced to a fragment of plaque kept at The Toledo Museum of Art (Ohio)¹⁸.

Marmor Carystium, whose background colour is white or light green with green straight or wavy streaks which can also have dark almost black tones. Consequently, although the prototype may be highly typical, the rock may have a certain chromatic variation (fig. 1 f). It was of imperial ownership, widespread, particularly in architecture both in plaques and columns and used only exceptionally in sculpture. In this latter use, it was particularly appropriate for certain topics due to its colour, as is the case of the crocodile found in Villa Adriana. This type of marble was used by the Greeks and was one of the first and most valued to be imported by the Romans from the end of Caesar's period until the Byzantine age. It was later reused for numerous purposes, in particular for columns¹⁹.

– Isings Forms 3a and 3b of Celsa imitate agates, although they might also imitate some variety of the *alabastro fiorito*. The fragment of the brim and wall with the base of a rib is dark translucent amber yellow with light amber and white streaks. The total amalgamation produces a chromatic gradient. Some very fine opaque white threads can be noticed which were applied and crushed on the internal and external sides. The surface is very well preserved, polished and smooth to the touch, in line with semiprecious stones. The level it originates from is provisionally dated to circa 15 AD (fig. 1 g. 3 j) The other fragment, bottom and side with a base of four ribs was obtained by melting on a translucent amber yellow base, canes of

¹⁶ Grose 1989, 369 n. 665.

¹⁷ Fant 1993a, 164; Lazzarini 2007, 46–55.

¹⁸ Grose 1989, 368 n. 659.

¹⁹ Lazzarini 2007, 184–188.

opaque white and brown glass to create a wavy pattern. The surface is damaged and cracked. Its level is dated to the period of Nero (fig. 1 h. 3 g).

In terms of comparison, we are inclined towards the semiprecious stone, not only because of the visual similarity but also because there is a higher possibility that these glass beakers may imitate prized agate beakers such as those found in the Tiber (fig. 1 i). These belong in the context of Hellenistic tradition to the period of the Late Republic and Early Empire, when beakers made of semiprecious stones would be used for diplomatic mediation. This could possibly be the case of the court in the Parthian Kingdom. In the ancient world there are several sources for the extraction of agates, mainly India, the Arabian Peninsula and Egypt as well as in Europe. Oriental tradition attributed to them magical powers which were later on incorporated into other cultures. The typology of these beakers is very varied, ranging from cups to *simpulae* and *rhyta*. The chronology could be set by comparing them to ceramic forms²⁰.

The similarity to *alabastro fiorito*, whose provenance is probably Asia Minor, is vaguer, simply based on the visual resemblance to some varieties (yellowish background with yellowish and brown marks of various forms; both background and marks are opaque) (fig. 1 j) and on the fact that it was used in the Roman period for some luxury products as well as for *crustae*. We must not forget the tradition of luxury objects in alabaster from the time of the Pharaonic period: beakers, *pyxides*, *alabastra* or funerary urns²¹.

– A glass ointment jar found in Caesar Augusta clearly imitates alabaster, in line with the long tradition of beakers made from this stone significantly known as *alabastra*, as we just mentioned for the previous group. In comparison with the *alabastron* found in Asturica Augusta (Astorga, León)²², we may note that it is a fragment of the bottom (7 cm diameter) and side, 4.5 cm. high. The glass piece is incomplete, only the base and the receptacle are preserved (Morin-Jean Form 20-21-22)²³. Of translucent green *cinnabar*, it is decorated with white opaque coiled threads. The ornamentation could have been applied to the vessel after blowing (the pontil-mark on the external base is preserved), by turning the piece on an axis and refining or evening it with rotating movements on a *marver*. The threads are not fully fused or embedded but are slightly protruding and it does not have a polished finish (fig. 1 k. 4 h). The glass fully matches the visual texture of the rock, sharing design, shape, size (in particular the thickness of the base, 1.1 cm.), finishing, function and colour (range, tone and saturation – transparent, translucent or opaque). It originates from a level from Trajan's period, in the late 1st century or early 2nd century.

The *alabastron* of Asturica Augusta was found on a *stratum* level of the late 4th century. It is a residual object coming from the waste of the town. The thickness of the base and wall is particularly remarkable: 1.3 cm, in line with the imitation in glass. It is well made and evenly planed. In both cases, glass and stone, the most solid part of the item has been preserved: the base and lower part of the vessel. The piece has earthy tones with white horizontal and parallel streaks (fig. 1 l). This alabaster is a translucent white or pale yellow travertine rock with

²⁰ Belli Pasqua 1989, 104–109.

²¹ Di Leo 1989a, 52; Belli Pasqua 1989, 107–109; Marchei 1992b, fig. 5 f; Aston et al. 2000, 21 f.

²² Housed at the Museum of León.

²³ Morin-Jean 1913, 73–77 fig. 79. Other finds in the Empire: Foy – Nenna 2001, 86 n. 95.

concentric bands and white opaque zones. It was used to make beakers since the pre-dynastic period and for alabastra from the late Egyptian period. In the Roman age it continued to be used for urns, beakers and other vessels as well as for sculptures and architecture: small and medium sized columns and *crustae*²⁴.

– There are three vessels from Celsa, made of orange coloured opaque glass with red streaks (external and/or internal factors alter the chromatic appearance of glass and a uniform green layer frequently forms on red glass²⁵) which we consider similar to some of the chromatic variations of marmor Numidicum (Simitthus-Chemtou, Tunisia). We refer to Isings forms 1²⁶, 18 variant and 22²⁷ (fig. 2 a. 3 e. 4 a. e); they were found in different locations on the site but they appear to be part of a set. Isings form 18/24 (fig. 4 f), kept at the Metropolitan Museum of Art (New York) should be included amongst these vessels. This model of marmor Numidicum was so popular that it was reproduced in the ceramic workshops of Gallic terra sigillata in La Graufesenque with optimal results. It is known as marmorata (fig. 2 b). These vessels were Dragendorff forms 23, 24/25, 27 (Isings 2), 35 and 36, amongst others. Their manufacture is believed to correspond to between Late Claudius and the period of Nero²⁸.

We are inclined to consider that these orange glass beakers imitate this significant stone, although this is one of the least common varieties.

The prevailing background is opaque orange glass with opaque red glass streaks. Under a controlled heat source the appropriate level of ductility could be reached in order to mix them without fusing them. This orange glass has a layer of milky white decomposition redolent of stanniferous veneer, while the alteration of opaque red gives opaque green; these factors might distort an accurate description of the original colours.

According to the stratigraphies of Celsa this set could have been used in Nero's time. Isings 22 was manufactured in terra sigillata, Dragendorff 23, and in metal. The most recurrent colour for this form is translucent emerald green²⁹, though there are also instances in opaque green and blue. These instances from Celsa and those housed at The Toledo Museum of Art³⁰ (marbled, imitating agate) as well as those in the Gorga collection³¹ (one marbled and one millefiori) can be considered as singular vessels because of the imitation in ornamental stones.

A raw glass splinter found in Asturica Augusta (Astorga, León) was possibly used for the extraction of tesserae (fig. 2 c), as attested to in mosaics of the fourth century, such as in the case of the flooring known as Fortunatus (dated to about 360/370) from the Roman villa of the same name located in Fraga (Huesca), housed at the Museum of Zaragoza³².

Marmor Numidicum is a type of breccia of yellow background (hence the name of *«giallo antico»*), with chromatic variations ranging from cream to red, going through orange, and mainly brown, reddish and white stones and streaks (fig. 2 d. e). This rock is linked to the figure of

²⁴ Di Leo 1992; Marchei 1992a, 140 f.; Aston et al. 2000, 21 f.

²⁵ Golstein 1979, 43 f.

²⁶ A similar profile, of a different colour, comes from Magdalensberg, dated to before year 45 AD: Czurda-Ruth 1979, 15–20 n. 8.

²⁷ Paz Peralta 1998, 514 fig. 251, 4; 336, 3.

²⁸ Belmont 1986.

²⁹ Paz Peralta 1998, 514.

³⁰ Grose 1989, 535 f. n. 588.

³¹ Isings 22: Petianni 2003, 68 f. tab. 68.

³² Beltrán Lloris – Paz Peralta 2003, 146 fig. 106.

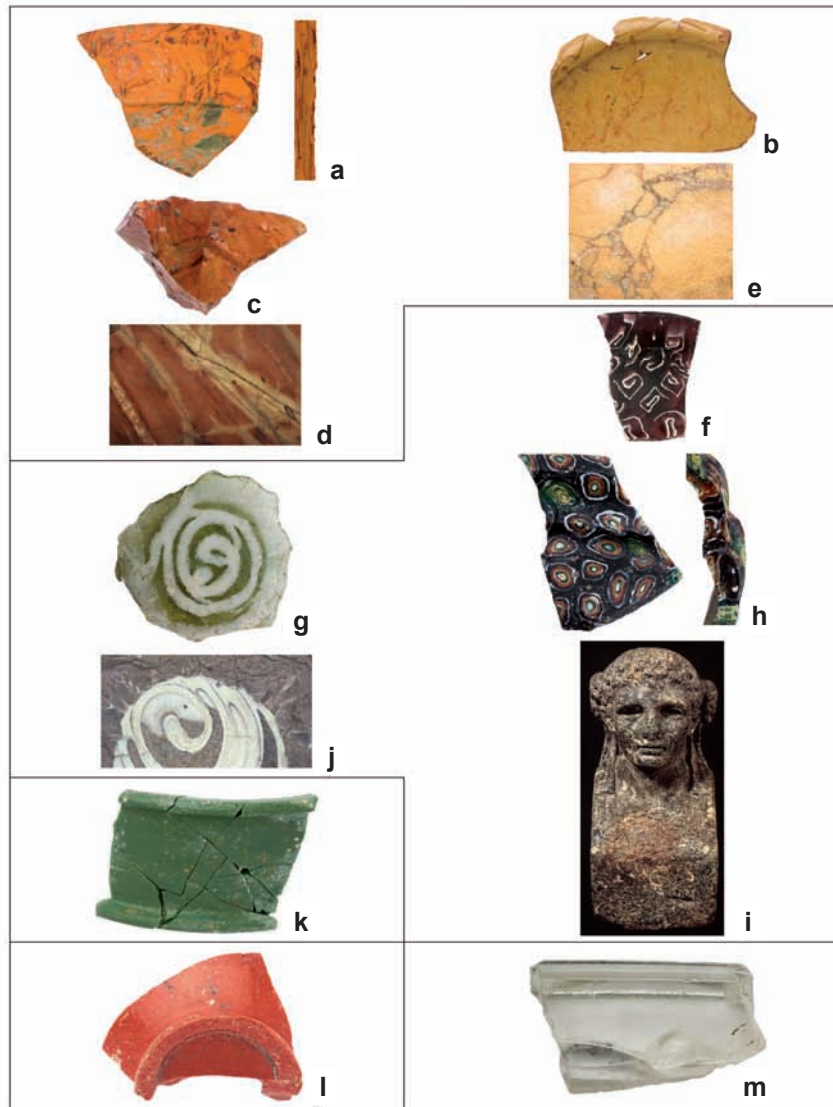
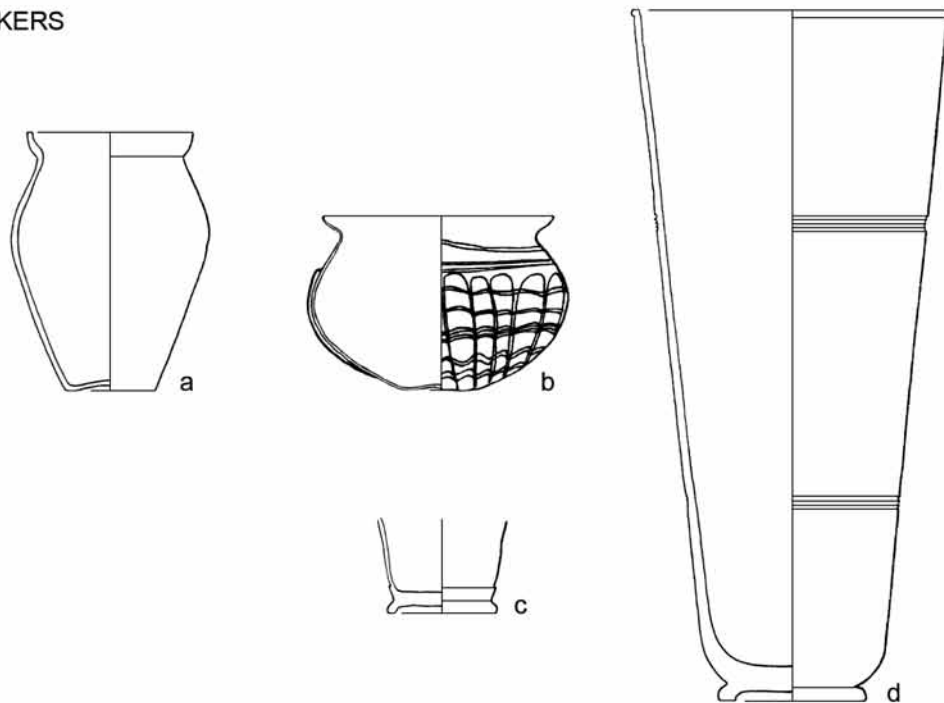


Fig. 2 a Glass, imitating marmor Numidicum (giallo antico). Fragment of deep bowl (4,5 x 5,2 x 0,27 cm), Isings 1. Colonia Celsa. Museum of Zaragoza, inv. 47594, b Pottery. Gallic terra sigillata »marmorata«. Fragment of shallow bowl (13 x 10 cm), Dragendorff 36. Colonia Caesar Augusta. Museum of Zaragoza, inv. 50594, c Glass, imitating marmor Numidicum (giallo antico). Fragment of glass ingot (3 x 2,1 cm and w. 11,924 gr). Asturica Augusta (Astorga, León). Museum of León, excavation inventory number AA.LC.20-24.92.1021.B.44, d Marmor Numidicum, e Marmor Numidicum. Fragment of revetment panel (10.8 x 7.1 x 0.8 cm). Theatre of Caesar Augusta. Museum of Zaragoza, inv. 85.28.23882, f Glass, pattern consisting of opaque white spirals inspired by fossiliferous limestones. Fragment of deep bowl (6,4 x 4,7 x 0,35 cm), Isings 3a. Colonia Celsa. Museum of Zaragoza, inv. 47622, g Glass, opaque white spiral inspired by lumachelle. Fragment of vessel (4,5 x 4,4 x 0,62 cm), Isings 17. Colonia Celsa. Museum of Zaragoza, inv. 45613, photograph by J. Garrido, h Glass, »partridge eye« pattern inspired by fossiliferous limestones. Fragment of plate (4 x 3,3 x 0,31 cm), Isings 5. Colonia Celsa. Museum of Zaragoza, inv. 47574, i Herm of Dyonisos. Lumachella orientale, j Lumachellone antico, k Opaque green glass, imitating basalt. Fragment of dish (2,7 x 3,5 x 0,33 cm), Isings 22. Colonia Caesar Augusta. Museum of Zaragoza, inv. 47625, l Opaque red glass, imitating haematites or marmor Taenarium. Fragment of carinated bowl (3,5 x 2,9 x 0,27 cm), Isings 2. Colonia Celsa. Museum of Zaragoza, inv. 47586, m Transparent colourless glass, imitating rock crystal. Fragment of dish (3 x 1,8 x 0,55 cm). Colonia Celsa. Museum of Zaragoza, inv. 47773.

BEAKERS



DEEP BOWLS



SHALLOW BOWL

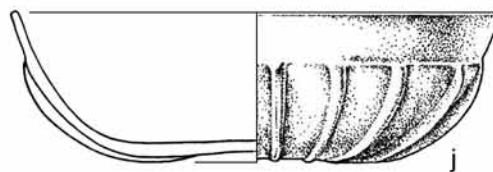


Fig. 3 Guide of vessel forms, classified by functions. a–d Beakers: a Isings 4, b Isings 17, c Isings 34, d Porphyry (glass Isings 34); e–i deep bowls: e Isings 1, f Isings 2, g Isings 3b, h Isings 20, i Isings 22; j shallow bowl: Isings 3a.

Caesar because the ownership of the quarries of this rock was transferred from the Numidian kingdom to the Roman people after Caesar's victories in the year 46 B.C. and the inclusion of the city of Simitthus in the province of Africa. The use of this rock was linked to him after his death because the monolith erected in the Forum in his honour with the inscription *Pater Patriae* was made of this material. According to Suetonius³³, sacrifices to Caesar, amongst other customs, were offered at its base³⁴. It has also been suggested that these quarries became the property of Agrippa, since his name also appeared in them³⁵. Their ownership was transferred to the Empire later on. It was used in Rome from the middle of the 2nd century B.C. and certainly from the 1st century B.C. in private locations. Its most widespread use took place between Augustus and the Severans. It was used in architecture, mainly for wall covering, flooring, small capitals or columns and in sculpture for herms, trapezophores, images of barbarian prisoners and lions and, more rarely, for basins, amongst other uses³⁶.

– Some of the vessels from Celsa housed at the Museum of Zaragoza are characterized by a repeated pattern of spiral or ›occhio di pavone‹ or partridge eye decoration which, in our opinion, reproduces fossiliferous limestones (*lumachelle*) also known technically as ›occhi di pavone‹. The sliced single helicoidal segments used in the manufacture of these vessels were embedded in the glass; white or yellow opaque open glass coils on a violet, blue, green and yellow generally translucent background, although it can also be opaque. The number of turns of the coils varies, with a prevalence of single coils, which can be very close together or slightly separated. In the first case, the visual resemblance of fossiliferous limestone is more realistic. These are widespread throughout the Empire in the periods of Tiberius and Nero. Museums such as The Corning Museum of Glass³⁷ keep complete vessels in their collections, frequent in archaeological finds³⁸. They appear in Isings 1, 2 and 3. In Celsa, they are documented in forms 1 (dark opaque glass), 2 (cobalt blue)³⁹ and 3a (translucent violet) (fig. 2 f. 3 j). They are dated to the period of Nero. The ribbed beaker Isings 17 also has a different spiral. It is made of blown glass, with white, blue and green threads of opaque glass applied on the external wall of the vessel prior to the final blowing. These threads go from the upper to the lower zone forming waves or zigzags and end at the base where they coil up in a curl redolent of the *lumachella* formations, as can be noticed in an instance from Celsa (period of Nero) of transparent cinnabar green (fig. 2 g. 3 b).

The ›occhio di pavone‹ or partridge eye patterns are also present. These are shapes consisting of full concentric circles of various sizes, complexity and colour combinations, as can be seen in a plate Isings 5 from Celsa and in the item of the same shape and very similar decoration kept at The Toledo Museum of Art⁴⁰ (fig. 2 h. 4 d).

³³ Suet. Iul. 85.

³⁴ Fant 1988, 149; Fant 1993a, 147.

³⁵ Pensabene 1998, 337.

³⁶ Cioffarelli 1989, 74; Pensabene – Bruno 1998, 13.

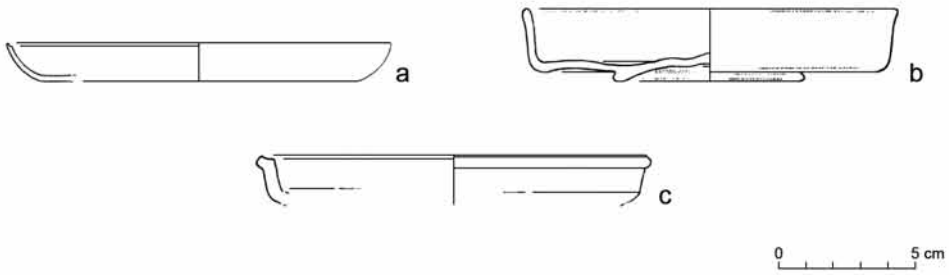
³⁷ Goldstein 1979, 188 n. 501 f. ill. 27 n. 502.

³⁸ The list is long, and we can cite the finds of Magdalensberg, dated to before 45 AD (Czurda-Ruth 1979, ill. 18 n. 64. 76), and Vitudurum (Rütti 1988, for instance, 158 n. 151 ill. 4, 151).

³⁹ Paz Peralta 1998, 501 f. fig. 246, 9; 328, 6.

⁴⁰ Grose 1989, specific example, 226. 309 f. n. 442.

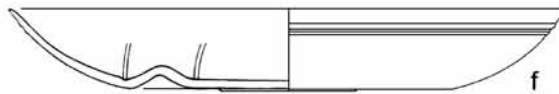
DISHES



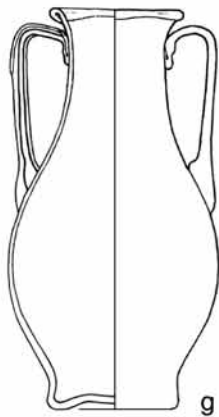
DISHES / LARGE DISHES



LARGE DISH



AMPHORISK



GLASS ALABASTRON

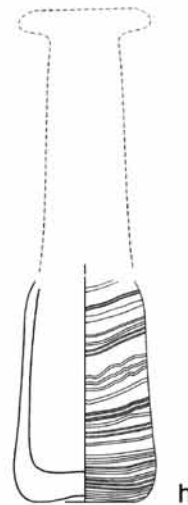


Fig. 4 Guide of vessel forms, classified by functions. a–c dishes: a Isings 18, b Isings 47, c Similis Conspectus 2.1.1 and 2.1.2; d, e dishes/large dishes: d Isings 5, e Isings 22; f large dish: Isings 18/24; g Amphorisk: Isings 15; h glass alabastron.

An appropriate knowledge of rocks is essential to prevent glass objects used separately from being classified as separate categories of ornamental rocks.

Despite the fact that this decoration is included by researchers amongst millefiori glass, we propose that it be included in the group of marbled glass. It has a significant prevalence and a very wide range of patterns.

The use of fossiliferous limestones has been well known since ancient times, when they were mostly used in areas near quarries, until the Romans imported and commercialized them⁴¹. The names given to them are very varied, depending on their predominant colour, which can be that of the background or of the fossils. Their places of provenance are, to a large extent, uncertain. We can thus differentiate between ›lumachella nera‹, of a black background or ›occhio di pavone bianco‹, because the predominant colour is provided by white fossils. They were mainly used for architecture, both in private and public buildings throughout the empire. Due to their colour, they were also used for decorative objects in houses and villas, such as herms or trapezophores. The chronology of their use in Roman times is still uncertain but it appears that during the Augustus period at least, ›lumachella orientale‹ (fig. 2 i) was used. In the zone of Pompeii ante quem 79 AD, ›lumachellone antico‹ (fig. 2 j) and ›lumachella di Sibilio‹⁴² were also used.

We cannot see here a specific imitation but rather a generic model of rock, whose main colour can be very varied. It contains fossils or shells, which allows for numerous interpretations of elongated or rounded elements both closed or open, depending on the artisan's creative freedom. The process is similar to that of the imitation of ›mottled marble‹ in wall paintings, where not very widespread rocks, only known in certain geographical areas, such as limestones, volcanic rocks or granites, are freely depicted⁴³.

Monochrome glassware

This is not a uniform group. While green does not pose major association problems, red can be debatable based on textual information and white can only be seen as part of this imitation process. There are also other colours and saturation levels (transparent, translucent and opaque) with correspondences with other rocks and organic matter (amber, coral, ivory and jet) which we shall not consider in this paper.

– Opaque green vessels Isings 5 and 22 (fig. 2 ki 3 i), found in Caesar Augusta, could imitate basalt, also known to Romans as basaniten. They are dated to levels of years circa 60 (Isings 5)⁴⁴ and circa 100 (Isings 22).

Basalt is a very hard green rock. It used to be mined in Wadi Hammamat (Egypt), whose quarries may have been owned by the empire from the times of Augustus. This is not definite, though, given the lack of inscriptions found there or in the extracted blocks. The Egyptians worked with this rock from the pre-dynastic period and used it for beakers, amongst other purposes. Romans used it only exceptionally for sculpture and almost exclusively for imperial portraits or portraits of persons from the imperial family: Gaius Caesar, Agrippina or Trajan,

⁴¹ Gnoli 1988, 201.

⁴² Di Leo 1989b, 82.

⁴³ Guiral Pelegrín et al. 1986, 277.

⁴⁴ Paz Peralta 1991a, 302.

due to the idea of perpetuity attached to hard durable materials. It was most widely used, however, for ornamental objects and for architecture in the 1st century AD and up until the period of Adrian, mainly⁴⁵.

– Red opaque glass is mentioned by Pliny: ... *et totum rubens vitrum atque non translucens, haematinum appellatum*⁴⁶. It is linked to haematites and there are vessels and applicator sticks for kohl made of this rock in the Middle and Second Intermediate period of Egypt. This powdered mineral was used to cure eye diseases in the Roman period⁴⁷. We, however, believe that the imitation of marmor Taenarium may not be discarded due to its widespread use in the Roman age, the symbolic relationship between its red colour and wine and the tradition of its use in beakers from the Minoan times⁴⁸.

There are vessels from Celsa of Isings forms 1, 2 (widely used) and 5 (fig. 2 l. 3 f). Magdalensberg, dated to before the year 45 AD, yielding an Isings 34 beaker (fig. 3 c)⁴⁹. The saturation of the red colour in the original vessels is dense and its final texture has a shine and polish which enhance the look of the smooth stone. The chromatic spectrum ranges from blood red to intense brown red. Vitreous decomposition produces greenish tones. The actual colour of the glass can be misinterpreted if there is no breakage or if mechanical cleaning is not carried out.

Marmor Taenarium is a medium red rock of crystalline texture. It may have white and black streaks. It was used in the Minoan age for numerous types of vessels (beakers, jugs, rhyta, amongst others). In the Mycenaean period it was used in carved slabs on the façade of the Treasury of Atreus, mid 13th century B.C., and of the Tomb of Clytemnestra. Its use became generalized in Rome from the Late Republic, end of the 2nd and early 1st century B.C. and reached its peak in the times of Adrian. It also had a relevant presence in the Middle Ages, Renaissance and Baroque period, partly due to its reutilization. Its use was conspicuous in architecture, sculpture and objects such as beakers⁵⁰. In sculpture, it was particularly suitable for depicting characters from the Dionysiac cycle, because of the symbolic equivalence between the colour red and wine⁵¹.

– White glass could be used to imitate white marble. In Celsa it was used in items Isings 1, 15, 17 (with blue applied threads), 20 and 47⁵². These vessels from Celsa are dated to the period of Nero. In Magdalensberg⁵³ there are opaque white glass objects which can be dated to before the year 45 AD in forms 2, 4 and in gaming pieces.

We perceive this particular case, which may be obvious to some for chromatic reasons, within the context of glass imitations of raw materials of high significance and social and political prestige, due to the importance white marble had in the imperial period. We must not forget either that in the Greek age marble used in that part of the Mediterranean was essentially white.

⁴⁵ Di Leo 1989c; Aston et al. 2000, 23 f.; Ambrogi 2005, 125.

⁴⁶ Plin. nat. 36, 198.

⁴⁷ Plin. nat. 36, 144–148.

⁴⁸ Aston et al. 2000, 38.

⁴⁹ Czurda-Ruth 1979, 99 f. n. 790–792 ill. 5. 21 n. 790 imitates in colour and shape of background (shallow with long stem) one in red porphyry found in Begram (fig. 3, 4): Hamelin 1953, 128 ill. 14 b n. 95.

⁵⁰ Lazzarini 2007, 71–76.

⁵¹ Pensabene – Bruno 1998, 6.

⁵² Paz Peralta 1998.

⁵³ Czurda-Ruth, 1979, 67. 94 f.; Paz Peralta 1998, 502.

Nonetheless, while its significance and meaning in planning policies and imperial propaganda from Augustus up until the Antonines has been the subject of study⁵⁴, this is not the case for sculptures or other uses. Other coloured ornamental rocks have been studied, for instance, in the case of the ideological component of the use of marmora Phrygium and Numidicum in some instances of public sculptures⁵⁵, or the religious ingredient linked to the use of some coloured rocks, such as black rocks⁵⁶, as well as the already mentioned green and red stones.

– Some finds from Celsa imitate rock crystal: a fragment of the rim of a dish⁵⁷ (fig. 2 m. 4 c) and a fragment of a wall, which could have been part of an enclosed form, probably a jug. This dish from Celsa is dated to the period of Nero. This glass can be identified with the one Pliny describes: »the most prized glass is colourless and transparent, it resembles rock crystal«⁵⁸.

Rock crystal was an expensive raw material which represented the high standard of living for the upper classes. Pliny considered it the most valuable product from the surface of the earth and perhaps its lower consideration with respect to murrina could be due to the fact that the latter came from within the earth, in his opinion. The sources of extraction were possibly in India and in the Alps and the rare occurrence in archaeological records reflects the fact that very few objects were manufactured using this material⁵⁹.

4. Discussion

The use of stone vessels in Egypt, the Near East and in the Minoan and Mycenaean period is unquestionable. There seems to be a prevalence of objects for funerary purposes, but there are also objects for daily use. In Mycenae there is evidence of standardized production at the main centres of power⁶⁰. This tradition could have continued up until the Hellenistic period, with onyx vessels for Dionysian ceremonies conducted in Alexandria by Ptolemy II Philadelphus or in the Treasure of Mithridates VI, King of Pontos, with two thousand vessels from the same rock⁶¹.

It was not until the end of the Republic that ornamental rocks became widespread in the Roman world, and they did so despite the opposition of the austere defenders of traditional values. This phenomenon can be explained because of the conquest of Greece, which put Romans in direct contact with the Hellenic civilization, where marble had been widely used up until the Hellenistic period, and the extraction mines were transferred to the conquerors or became part of their sphere of influence⁶². Another event might also be added: the conquest of Egypt in 31 B.C. After this, Augustus controlled the province, which was ruled under his command and he became the owner of large quarries of porphyry, granite or diorite, mined by the pharaohs and the Ptolomies, and heir of the exploitation system⁶³.

⁵⁴ Pensabene 1998, 363.

⁵⁵ Schneider 1986, 148–152.

⁵⁶ Fornaseri et al. 1995.

⁵⁷ Ettliger et al. 2002, 54 f. ill. 2, *similis italic terra sigillata rim forms Conspectus 2.1.1 and 2.1.2*. Analyses conducted in 1993 by Dr. Constanza Fernández Nieto (Department of Crystallography of the University of Zaragoza) confirm that it is colourless glass; it must therefore be ruled out as rock crystal.

⁵⁸ Plin. nat. 36, 198.

⁵⁹ Vickers 1997a, 263 f.; Vickers 1997b, 4–8.

⁶⁰ Sakellarakis 1976, 175–186.

⁶¹ Alcouffe 1984, 73.

⁶² Pensabene 1998, 334; Fant 1993a, 147.

⁶³ Fant 1988, 149; Fant 1993b, 72.

Whereas in the 2nd century B.C. its use is limited to imperators who sought to produce public architecture of a triumphal style, demand grew in the 1st century B.C. and it was used for private purposes by people who had become wealthy⁶⁴. In this context we must interpret the information reported by Pliny on the figures linked to its use during this century, such as Lucius Crassus⁶⁵, Marcus Lepidus and Lucius Licinius Lucullus⁶⁶, Marcus Scaurus⁶⁷ or Mamurra⁶⁸.

Marble not only conveyed the idea of Rome as the political centre of the Mediterranean and as a rival in terms of splendour of the Hellenistic cities⁶⁹, but its use was a display of luxury and of belonging to the elite. It became a sign of social and political prestige and, consequently, of wealth. In cities, it represented importance and economic success.

The policy of established exploitations, either local or provincial, and in many cases indeterminate, contributed to the imitation of the models from the urbs, the access of provincial ruling classes to the policy of transformation and improvement of the cities started by Augustus, and the use of marble⁷⁰, an expensive product whose final price depended on factors beyond the mere raw material, transport and work carried out on it. Hence the generalized use of crustae in architecture, to the point, as Gros clearly states, that the construction of a temple with blocks of marble was perceived by contemporaries as something singular, as in the case of the temple of Apollo Palatinus and of Jupiter Tonans⁷¹.

With regards to glass, its oldest use was as a substitute for precious or semiprecious stones in Mesopotamia in the late 3rd millennium B.C.⁷². The main endeavours and achievements were focused on obtaining colours and technological skills to that end; this was to be the germ of the *raison d'être* of the phenomenon of imitations and/or forgeries in glass of ornamental and (semi-) precious stones. The production of inlays for ornamental plaques was notable in the Egyptian period. This tradition was maintained in Roman architecture (floor and wall mosaics, columns and ceilings) from the second half of the 1st century B.C. onwards⁷³. The coexistence of stone and glass reached its peak in architecture by the combination of pieces made of both materials in mosaics (floors and walls) and in decorative panels, both figurative and geometrical, produced from the 1st century. The finest instances can be found in the 4th century AD.⁷⁴

The oldest testimonies of ingots of blue glass are dated to the 3rd millennium in Mesopotamia. They were used in jewellery and inlays, imitating more expensive, and not always available, hard semiprecious stones⁷⁵.

⁶⁴ Gros 1976, 71 f.

⁶⁵ Plin. nat. 36, 7.

⁶⁶ Plin. nat. 36, 49.

⁶⁷ Plin. nat. 36, 4–55.

⁶⁸ Plin. nat. 36, 48.

⁶⁹ Lazzarini et al. 1988, 402.

⁷⁰ Pensabene 1992, 43–49.

⁷¹ Gros 1976, 73, quotes the text in Virgil (Verg. Aen. 6, 69), regarding the temple of Apollo Palatinus: *solido marmore templum* and in Pliny (Plin. nat. 36, 50), regarding the temple of Jupiter Tonans *solidis laevis*.

⁷² Forbes 1966, V, 122; Grose 1989, 45, with bibliography; Sternini 1995, 11–22.

⁷³ Grose 1989, 356–358.

⁷⁴ Particularly outstanding are the wall plaques in *opus sectile* from the Basilica de Giunio Basso (Rome), first half of the 4th century, on this topic and the problems posed by the *opera sectilia* from this Basilica, see: Becatti 1969, 181–215 ill. 44–46. 81–83; Guidobaldi – Guidobaldi 1983, 41–43.

⁷⁵ Sternini 1995, 11.

Glass vessels can be found from circa 1450 B.C. They mainly consist of enclosed forms, made using the core-forming technique which already used ornamental rocks as models. The result was smooth glassware, alabastra with festoons and zigzags (applied threads) as well as mosaic glass. The first instances of tableware in mosaic glass, very rare, are attributed to ancient Mesopotamia⁷⁶, between the middle of the 15th century to the 13th century B.C. This group might constitute an initial stage with specific models of marbled glass. Other vessels were manufactured in Egypt, the oldest dating to the period of Amenophis III (towards 1390–1353 B.C.).⁷⁷

The immediate precedent for mosaic glass in tableware for the Roman-Italian group can be found in productions from the 3rd to the early 2nd century B.C. (Hellenistic Canosa Group), and between 80–50 B.C. (Antikythera Group)⁷⁸. The last chronology is in agreement with the find of a glass mosaic dish in the San Ferreol shipwreck (Cartagena, Murcia), of a controversial dating to the middle of the 1st century B.C.⁷⁹

In the West, research confirms its widespread use from the end of the 1st century B.C. onwards, although some stratigraphic dating ought to be reviewed. This may be the case of Magdalensberg (Austria)⁸⁰, chronologies supported by ancient digs, with levels prior to the change of Era and dating which differ from other stratigraphies.

Chronological details have been obtained in Hispania. The stratigraphies from the Augustus period in Baetulo (Badalona, Barcelona), Valencia, Caesar Augusta, Celsa and Conimbriga (Condeixa-a-Velha, Portugal) did not yield tableware in mosaic glass or blown glass⁸¹.

The camp of Haltern is, in our opinion, one of the testimonies dated with a high level of certainty which yields the oldest stratigraphy, despite the fact that when exactly it was abandoned is controversial but it is supposed to have taken place between the Augustus/Tiberius (years 9/11–16). The Isings forms 1, 2 and 3 are documented in mosaic glass⁸². The date matches the stratigraphies of Caesar Augusta, Celsa and Pompei⁸³.

The Colonia Celsa (Velilla de Ebro, Zaragoza)⁸⁴ is an ideal site for research because it yields a wide range of items of monochromatic and mosaic glass. It also provides high stratigraphic reliability. It was founded in the year 44 B.C. by Lepidus and abandoned around the year 68 A.D. Glass tableware is not verified until 15–20 AD, as confirmed by other stratigraphies in Spain⁸⁵.

The production and widespread use of tableware in marbled glass in the Western empire takes place between the end of the Augustus age and the beginning of the Tiberius age (circa 10–16), reaching its peak in the period of Nero (54–68). A rapid decline followed with

⁷⁶ Grose 1989, 47; Sternini 1995, 14, fig. 8; Slitini 2005, 34.

⁷⁷ Slitini 2005, 35.

⁷⁸ Oliver 1968, 48–55; Maccabruni 2005, 413, with bibliography.

⁷⁹ Paz Peralta 2001, 128, with bibliography and comments.

⁸⁰ Paz Peralta 2001, 122, with bibliography. In the total finds, there are only two vessels of ›mosaic glass‹ dated to about 10 B.C.

⁸¹ Paz Peralta 2001, 122–128, with bibliography and comments for the aforementioned sites and others of an earlier chronology, Pompeii (40–10 B.C.) and Rome, in Livia House (early Augustus) and in Regia House, Roman Forum (37/36 B.C.). In the latter the find of a fragment of panel in marbled glass is particularly outstanding.

⁸² Isings 1957, 15–18.

⁸³ Scatozza Hörich 1987, 86 ill. 1 fig. 8.

⁸⁴ Beltrán Lloris et al. 1984.

⁸⁵ Paz Peralta 1998, 534 f.; Paz Peralta 2001.

the Flavian dynasty, from Vespasian (69–79), as confirmed by the rare finds in Pompeii and Herculaneum, both destroyed by the eruption of Mount Vesuvius in the year 79⁸⁶.

We consider the imitations of marble and other ornamental rocks within the context of the economic and social esteem of these materials which equates them to other prized raw materials. The goal is clear: to copy objects made of expensive raw materials and manufacture them using cheaper materials to reach a larger market.

This is unquestionable in the case of imitations of the most prized marbles in wall paintings⁸⁷. It is also undisputed, according to scholars, in the case of imitations of stones in glass⁸⁸. Imitations, as Braemer points out, always correspond to a well defined rock which, in the case of paintings, can be noticed on the boards inspiring the painter, even when the final product was a mere interpretation of the model⁸⁹. We can thus see standards in patterns and colour which make the matching of models and imitations easier. There also exist cases of a certain creative and interpretive freedom, as we pointed out, for so-called ›mottled marble‹ in painting. This notion can also apply to glassware and we have used it with regards to fossiliferous limestones and their imitations in glass. In the case of the latter, the skill and extra allure attained by craftsmanship could have been a form of competing against more limited colour and combination patterns of stones. It also met new marketing demands.

Nonetheless, with regards to mosaic glass, technology at the service of inspiration, imitation or forgery seems to be a minor question. Attention is focused on glass made using shaping moulds. Glass workers, however, used different techniques, at times combinations of several, to represent the models of stones: inlays, preformed canes fusing, pulverizing, drawing and setting by surface fusing, applied threads and marvering, blowing and combing with polychromatic patterns and glyptics with double glass. Carving contributed to enhance the closeness to similar lapidary pieces. Other objects resembling the mineral world used chromatic variations which can be seen in Roman mottled glassware, glass with ›barbotine‹ or colour segments, mostly white, in contrast with blue, green, or purple marble-inspired backgrounds. Decorations made using moulds such as rods or ribs are outstanding because they resemble stone-carved items. The Gorga collection, with a total of 37,953 fragments (monochromatic, dichromatic and mosaic), shows that the most commonly manufactured vessel in marbled glass was Isings 3 (5,185 fragments), followed quite far behind by the Gorga type 3 (146 fragments)⁹⁰. The early models of Isings 3 are found in metal vessels, the so-called ›Zungenphialen‹ of Assyrian origin, 9th–8th century B.C.⁹¹, in Hallstattic types (tomb 502 of Hallstatt) or in metal vessels from Hallstatt C⁹². There are also some instances in ornamental stones, such as the beaker from the Ptolemaic period housed at the Museu Calouste Gulbenkian (Lisbon)⁹³.

The Alexandrian and Eastern Mediterranean tradition in the use of hard stones from the Egyptian age was a decisive factor in the development, eclosion and refinement of the

⁸⁶ Grose 1989, 262.

⁸⁷ Lazzarini – Cancelliere 1999, 97.

⁸⁸ Bacchelli et al. 2000, 86; Loewenthal – Harden 1949, 32.

⁸⁹ Braemer 2004, 109.

⁹⁰ Petrianni 2003, 38.

⁹¹ Welker 1974, 21; Stern 1977, 30 n. 12.

⁹² Harden 1969, 59, ill. 7 E; Jehl – Bonnet 1968, 295–300; Alarcão 1976, 158 f.

⁹³ Assam 1991, 99 n. 34.

murrina phenomenon. Pliny locates the most important production in the regions of the Levant. This area was also crucial and prolific in the procurement, technological innovation and decorative development of glass manufacture. The geographic junction and the parallel development of both arts may have propitiated contacts, exchanges, competition, copying or mutual learning between both industries. The exchange of technology and of decorative patterns confirmed in different types of craftsmanship (especially goldsmithing, silversmithing, pottery and glassworks) also applies to marble work. Close similarities can be noticed in processes which are confirmed by vitreous objects and ornamental stones. We refer not only to polishing, smoothing or blank forming, but also to the sections and traces left on both materials by the tools and the techniques used. The spread of glass imitations follows the migratory movement of artisans towards the west, where they settled initially and especially in Rome, Campania and the north of Italy.

This convergence of crafts is reflected, for instance, in the wavy festoons in horizontal and parallel bands typical of alabaster of unguentaria mostly made of alabaster, where a range of layers are visible for which the correct cutting of the stone was crucial. These are the archetypes for popular festoons, with multiple colour combinations, typical of Egyptian and Phoenician-Punic glass alabaster, redone on Roman drinking vessels. An instance can be seen in the decoration of applied threads in Isings 17 beaker. This is possibly the origin of one of the oldest glass decoration patterns.

From the point of view of the replacement and exchange of properties between stones and glass, the latter is highly relevant because this material is considered to be very close to stone given the provenance of its components and the manufacturing process used. Even with regards to the magical qualities attributed to carved stones these qualities could also be transferred to glass imitations, which adopted the same characteristics.

Another factor is the suitability of producing complementary tableware made of different materials depending on the specific functions. Such combinations convey interesting information regarding palatability, culinary and diet habits. We must remember that murrina were not only related to food and drink. Perfume, cosmetics and medicamenta in general were also closely linked to stone surfaces.

The economic, social and ideological connotations of murrina in the private sphere are revealed by the treatment they were given. They were kept even after they had broken and remained valuable even when reused⁹⁴. Tableware was a good indicator of the wealth and social standing of the owner. The material it was made of reflected his economic level. Due to this, in Greek and Roman periods objects made of prized or precious materials, which could only be afforded by the upper classes, were imitated using cheaper materials of great visual similarity. As a result, the models became widespread: gold objects were made of bronze, silver objects made of pewter, rock crystal and hard rocks were imitated in silver and glass⁹⁵, or gold, silver and bronze objects were made of ceramic, the most renowned instance being Greek ceramics with black and red figures imitating silver and gold tableware⁹⁶. In the early stages of the Empire, this role must have been played by glass,

⁹⁴ Vickers 1997b, 4.

⁹⁵ Vickers 1997b, 8.

⁹⁶ Vickers 1994, 296–299.

especially once technology had been developed and vessels were made imitating eastern Mediterranean tableware. Some other forms are similar to silver tableware and Aretinian ceramic from the end of the 1st century B.C. and early 1st century AD.⁹⁷ Some scholars have highlighted the influence metal vessels had on stone vessels as regards the thickness of their walls and decorative motifs⁹⁸.

Finally, we ought to reflect on one last question: the scarcity of evidence from the Roman period of stone vessels or glass revetment pannels covering. The answer to this is obviously not the same for both cases. The shortage of stone vessels could be due to the fact that few were manufactured, and although their use may not have been widespread, they were more commonly used than murrina and therefore few may have been preserved and some instances, such as those from Begram, can be put down to royal or imperial gifts within totally exceptional contexts of high prestige. Nonetheless, we must also consider the existence of unclassified or incorrectly classified fragments yielded mainly by older digs; this has been confirmed, for instance, in the study of Roman labra whose references were very limited up until Ambrogio's publication, towards the middle of the first decade of this century. We could include in this last case the glass plaques for wall covering as a phenomenon of the generalization of marble crustae. This, however, must not be linked to the erroneous notion that they may have been affordable for everyone. The existence of these glass imitations is a good reflection of this and of the fact that they could have been more widespread than we may think. We might also add a final reason; the small amount of fragments of small stone vessels may have resulted in the lack of acknowledgment or even disregard for these as remains of manufactured products in terms of archaeological recuperation.

Social esteem, natural beauty, intrinsic cost and artistic value caused some of these objects to be reused as gems. They even became heirlooms, kept and treasured in private hands. The final destination of many of these items has traditionally been royal or ecclesiastical collections. These arguments might perhaps contribute to understanding the lack of knowledge in this respect and their absence in museographic exhibits.

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Provenance of figures: Fig. 1: a after Goldstein 1979, 251 n. 742; b Museum of Zaragoza inv. 47768, photo (J. Garrido); c after Grose 1989, 369 n. 665; d Museum of Zaragoza inv. 50829, photo (J. Garrido); e Museum of Zaragoza inv. 48477, photo (J. Garrido); f after Marchei 1992c, 202, 56 b; g Museum of Zaragoza inv. 47621, photo (J. Garrido); h Museum of Zaragoza inv. 47581, photo (J. Garrido); i after Belli Pasqua 1989, 108, 28–33; j after Marchei 1992b, 144, 5 f; k Museum of Zaragoza inv. 47785, photo (J. Garrido); l Museum of León, excavation inventory number AA.LC.20-24.92b.4048.66, photo (María Teresa Amaré). – Fig. 2: a Museum of Zaragoza inv. 47594, photo (J. Garrido); b Museum of Zaragoza inv. 50594, photo (Garrido); c Museum of León, excavation inventory number AA.LC.20-24.92.1021.B.44, photo (María Teresa Amaré); d after Rakob 1993, colour plate C, e; e Museum of Zaragoza inv. 85.28.23882, photo (J. Garrido); f Museum of Zaragoza inv. 47622, photo (J. Garrido); g Museum of Zaragoza inv. 45613, photo (J. Garrido); h Museum of Zaragoza inv. 47574, photo (J. Garrido); i after Di Leo 1989b, 83, 12; j after Sironi 1992, 246, 93 a; k Museum of Zaragoza inv. 47625, photo (J. Garrido); l Museum of Zaragoza inv. 47586, photo (J. Garrido); m Museum of Zaragoza inv. 47773, photo (J. Garrido). – Fig. 3: a–c after Czurda-Ruth 1979; d after Hamelin 1953; e–j after Grose 1989. – Fig. 4: a after Paz Peralta 1991b; b after Biaggio Simona 1991; c drawn by authors; d, e after Grose 1989; f after Paz Peralta 1991b; g after Biaggio Simona 1991; h drawn by authors.

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ZUSAMMENFASSUNG – RESUMEN – SUMMARY

Der Beitrag enthält Analyse, Diskussion und Zusammenfassung über dasjenige Glas, das während der Julisch-Claudischen Dynastie Halbedel- und Schmucksteine nachahmte. Insofern

betrifft dieser die Forschungsfelder Stein und Glas. Überwiegend werden Gefäße und Mauerabdeckungen besprochen, ferner auch persönlicher Schmuck. Die Obergruppe aus sogenanntem ›marbled glass‹ (›marmoriertem Glas‹) wird mit Hinblick auf den jeweils nachgeahmten Stein unterteilt. Die Gattung wird diskutiert und bestimmt. Diese findet ihre besondere Ausprägung in Stein. Besonders hervorzuheben ist dabei der bisher nicht beobachtete Einfluß von fossilem Kalkstein in den als ›ojos de pavo, perdiz‹ bekannten Spiralen. Außerdem wird auf den frühesten Dekor in Glas verwiesen, der ebenfalls bis in römische Zeit fortbesteht, nämlich die Girlanden auf ägyptischen Unguentarien, die einer Alabastersorte ähneln. Zudem werden in interdisziplinärer Weise archäologische Funde und literarische Texte untersucht. Davon unabhängig wird zur Chronologie Stellung genommen, wobei die Stratigraphien von Celsa y Caesar Augusta eine herausragende Rolle spielen (Provinz Hispania Citerior).

Schlagworte: Murrinische Gefäße – marmoriertes Glas – Marmor – Schmucksteine – Colonia Celsa – Colonia Caesar Augusta – Julisch-Claudische Zeit – Altertum Quellen.

Se plantea una síntesis, discusión y análisis recíproco de vidrios que ›imitan‹ rocas ornamentales o semipreciosas, durante la dinastía Julio-Claudia, desde ambos campos de la investigación, principalmente en lo referido a recipientes y revestimientos murales, extendiéndose también al adorno personal. Se desglosa e identifica el genérico grupo de ›marbled glass‹ con sus específicos en piedra, registrando el inédito influjo de calizas fosilíferas en las espirales, ›ojos de pavo, perdiz‹, en vidrio, así como el origen del primer diseño decorativo en vidrio, con perduración romana: los festones en unguentarios egipcios imitando a un tipo de alabastro. Asimismo aportamos un examen entrecruzado de hallazgos arqueológicos con textos literarios y una contribución cronológica derivada del estudio conjunto, destacando para ello las estratigrafías de Celsa y Caesar Augusta (Provincia Hispania Citerior).

Palabras Clave: Vasa murrina – vidrio marmolado – marmor – rocas ornamentales – Colonia Celsa – Colonia Caesar Augusta – periodo julio-claudio – fuentes clásicas.

A synthesis, discussion and reciprocal analysis are presented regarding Roman glass ›imitating‹ ornamental or semiprecious stones in the Julio-Claudian dynasty. Particular attention is paid to vessels and wall coverings as well as personal ornaments. The generic group of ›marbled glass‹, with specific forms in stone, is itemized and identified. The peculiar influence of fossiliferous limestones in coils, ›partridge eye‹ and ›occhi di pavone‹ patterns in glass is registered as well as the provenance of the first decorative pattern on glass with continuity in Rome: festoons in Egyptian unguentaria imitating a type of alabaster. We also contribute a cross-examination of archaeological finds and literary texts as well as a chronological report resulting from the overall analysis, paying particular attention to the stratigraphies of Celsa and Caesar Augusta (Provincia Hispania Citerior).

Key Words: Vasa murrina (Murrhine vessels) – marbled glass – marble– ornamental rocks – Colonia Celsa – Colonia Caesar Augusta – Julio-Claudian period – classical sources.