
Colour and Luxury

Three Classical Painted
Marble Pyxides from
the Collection of the
National Archaeological
Museum, Athens

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The scientific investigation of an outstanding group of marble vessels from the collection of the National Archaeological Museum of Athens has provided significant evidence regarding the variety of pigments and the development of painting techniques used during the Classical period.¹ The small scale, figurative compositions on the walls and the lids of three exquisite marble pyxides (NAM A 11363, A 11372, A 12904) represent rare evidence of figural painting during the Classical period. Despite the paucity of information on the original context of the NAM pyxides,² their shapes allow us to place them in the last quarter of the 5th century BCE. Marble pyxides, listed under the term '*kylichnis*' in Athenian inventories, served primarily as containers for jewellery or cosmetics and their elaborate shapes were probably inspired by wooden prototypes. The technical mastery displayed and the smooth appearance of their highly-polished surfaces are unrivaled among the sculptural products of their time.³ The largest group of marble vessels known today comes from the purification trench at Rheneia.⁴ In her article on marble vessels from Delos and Rheneia, Ph. Zapheirópoulou discusses their various shapes and degree of elaboration and describes the traces of preserved polychromy on a large number of them.

More recently, J. Gaunt presented a synthetic overview of Classical and Hellenistic marble pyxides, inquiring into their dating, the workshops of their manufacture (most probably Attic) and their function as luxury gifts and dedications in funerary, civil and domestic contexts.⁵ However, the pictorial aspects and the rich polychromy applied on the marble vessels have never been properly investigated from a scientific viewpoint. The three pyxides of the National Archaeological Museum Collection presented in this brief essay offer the best-preserved evidence of high-quality figural painting as well as of the use of an unusual variety of precious pigments for the decoration of such luxury artifacts.

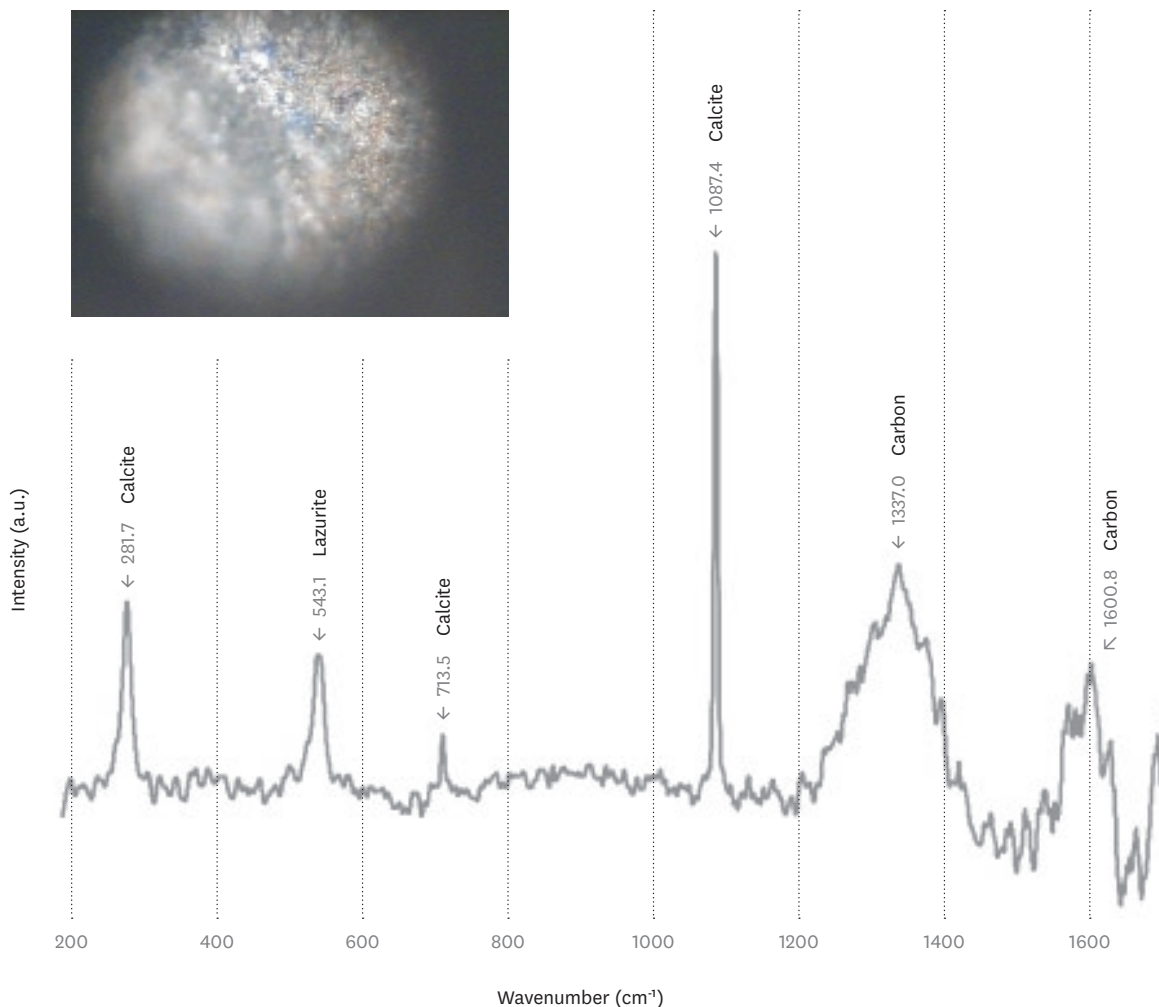


Two Marble Pyxides with Pedestal Foot

The marble pyxides with pedestaled foot A 11363 and A 12904 belong to the most elaborate category of classical marble vessels. On the walls of the pyxis A 11363⁶ (fig. 1) a delicately painted scene depicts two quadrigas and two hoplites. The style of the composition is much more ‘painterly’ than in most white-ground vases of the same period. The artist does not use a line to define shapes, he is rather experimenting with colour to delineate the figures and suggest the impression of volume. Three horses in each quadriga are painted in brick-red and the fourth horse is rendered in a dark blue hue, similar to the colour of the preserved charioteer’s upper garment. The charioteer’s chiton still exhibits a bright yellow hue, although the paint surface is damaged. The skin colour of both the charioteers and the hoplites is orange-red, slightly lighter than that of the horses. Traces of purple colour are visible in the area of the charioteer’s face, on the back of the chariot and on top of the quadrigas. The area originally occupied by the horses’ collars is today white, but traces of gold leaf were reported at the time of the acquisition of the pyxis by the NAM. The knob on the lid is painted in bright red and random traces of red and purple colour are preserved on the lid.

The pyxis was investigated with various non-destructive methods of analysis and multispectral imaging techniques¹ in the attempt to identify the pigments. Raman bands (Kaiser MRM Raman spectrophotometer) were used as fingerprints for the following pigments: carbon (very weak, very wide approx. 1350, 1590 cm^{-1}), hematite (225, 293, 411, 613 cm^{-1}), cinnabar (253, 354 cm^{-1}), goethite (297, 389 cm^{-1}), orpiment (184, 204 cm^{-1}) and lapis lazuli (544 cm^{-1}).⁷ The identification of the purple colour, possibly an organic dye, remains inconclusive. Hematite and cinnabar were mixed to produce the brick-red colour of the horses, while the skin tones are rendered using hematite alone. The knob of the lid was painted with pure cinnabar. The bright yellow of the charioteer’s chiton was identified as orpiment, doubtless used from a desire to evoke the colour of the precious *krokōtos* or *krokobaptos* chiton, dyed with saffron stigmas.⁸ Five spectra yielded a satisfactory single peak at 544 cm^{-1} consistent precisely with lazurite. This find confirms the use of lapis lazuli, the rare semi-precious stone, for the dark blue coloured horses in both quadrigas, and for the charioteer’s upper garment (fig. 2). The behavior in the infrared false-colour images of the

Fig. 1 Classical marble pyxis, NAM A11363.
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blue areas corresponding to the presence of lazurite is consistent with the use of lapis lazuli and rules out other blue pigments used in antiquity, such as azurite, chrysocolla and vivianite. In the false-colour image, blue areas show up as bright red (high reflectance in the infrared range), an observation which is in agreement with the behavior of lapis lazuli in the infrared range.⁹ In addition, the absence of luminescence in the infrared range rules out the use of Egyptian blue, the pigment most commonly used in antiquity.¹⁰ Carbon black was mixed with lapis lazuli to produce a dark blue tone, while an undercoat of goethite, visible in the areas where blue paint is now lost, probably served to produce a warmer, greener hue. The use of lapis lazuli has not been previously

Fig. 2 Raman spectrum of lapis lazuli, calcite and carbon black. Taken during the in situ examination of the pyxis A11363.

recorded in ancient Greek painting and its identification is therefore particularly significant. Lapis lazuli was the *sappheiros* of the Greeks and was considered a precious stone in antiquity. Theophrastus (*De Lapidibus* 23) lists it with other opaque minerals, and by comparing it to the *kyanos* (azurite) implies that it was dark blue in colour, while the statement that *sappheiros* seems to be spotted with gold is especially important for its identification, since what causes this effect of ‘gold sparkles’ or ‘drops of gold’, as Pliny the Elder would describe it later, are simply inclusions of iron pyrites (*NH* 37:119–120). In later sources (Alexander Med., *Therapeutica* II 45.12) lapis lazuli is also described as *golden veined*, while in the medico-magical text known as the *Cyranides* (1.18.10), we are further informed that painters produced their pigment from ‘lazurite the excellent’, which they also called the ‘natural’. The choice of precious lapis lazuli for the decoration of the pyxis, together with cinnabar and orpiment (all three imported pigments), certainly confirms both the aesthetic and market value of the artifact, underscoring on its eminent standing within the hierarchy of the material culture of 5th century Athenian society.

A rooster and a hen (or probably another rooster) are depicted on the two sides of pyxis A12904 (figs. 3–4). The figures are painted using earthen hues of brown, orange and bright red.¹¹ Incisions are visible in the area of the tails to indicate feathers. As in the pyxis A11363, the painter uses colour in a sophisticated way to model the birds and achieve a naturalistic appearance, a practice which seems to derive from the tradition of large-scale panel painting, rather than from a pottery *milieu* where pictorial experimentation was much more limited, as far as colour is concerned. The pigments were identified with a portable XRF (handheld XRF spectrometer by Innov-X Systems) and are composed of iron-based ochres, cinnabar and lead white. Yellow and red-orange ochres were used for the feathers on the body of each bird, while bright cinnabar was chosen for the rooster’s comb and wattles (fig. 5). The constant presence of lead in all the paint layers examined, suggests that lead white was either used in a mixture with the other pigments, or that it served as an undercoat. It is interesting to observe that the use of lead white as a painting material was already assimilated within the techniques of painters of the 5th century BCE and that this tradition was followed systematically afterwards on both painting¹² and sculpture¹³ of the late Classical and Hellenistic periods.

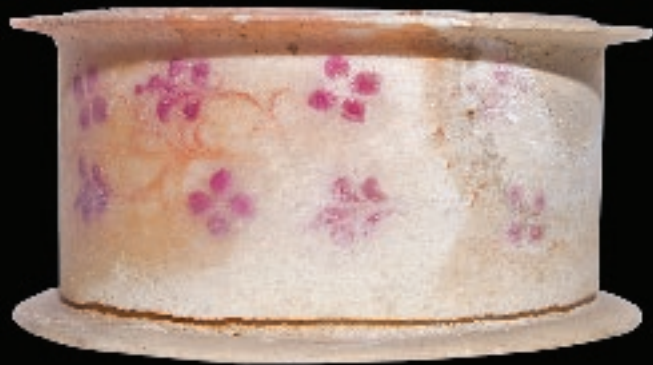


Fig.3 Classical marble pyxis, NAM A12904.
Painted rooster.
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Fig.4 Classical marble pyxis, NAM A12904.
Painted hen or rooster.
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Fig.5 Classical marble pyxis, NAM A12904.
Detail of painted rooster.
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Marble Pyxis

The marble pyxis A 11372, although of a smaller size than the two previous ones, presents an equally high degree of elaboration and an intriguing polychromy (figs. 6–7). All around its straight walls an extremely refined floral composition is painted with purple flowers each with four petals attached to yellow-brown curling stems. The flat surface of its lid is entirely occupied by a scene with two seated figures and perhaps another winged figure behind them. It is difficult to distinguish the exact shape of the figures and iconographic details because of the damage and loss in the paint surface. The predominant surviving colour is purple, applied on both the area of the garments and around the outer ridge. The analytical examination of the purple colour did not allow us to obtain any significant results for its identification. Also in this instance, as in the case of pyxis A 11363, the unidentified pigment might be of organic origin. The absence of luminescence induced by ultraviolet radiation does not necessarily rule out the presence of madder. A non-fluorescent madder was found on the marble basin now in the collections of the Museum in Ascoli Satriano, Italy.¹⁴ The absence of any sign of bromine seems to exclude the use of Tyrian purple. Gold leaf was originally applied to embellish the inner part of the raised band of the lid and is today very scantily preserved (fig. 8). Bright orpiment (which was detected with XRF) was used for the indication of jewellery (bracelets and necklace) and lead white was present in most of the areas examined. The use of precious materials and the association of purple colour and gold leaf are also attested on similar marble vessels coming from rich funerary contexts in Northern Greece.¹⁵ Significant pictorial details were revealed using imaging technique;¹⁶ the infrared-reflected image clearly revealed the sophisticated line drawing of the female figures, traced with a black pigment, possibly a carbon-based black (fig. 9), while the visible-induced luminescence image showed Egyptian blue as glowing white. The blue pigment, now entirely invisible to the naked eye, was used for the wings, the drapery of the left figure and the sandals and headband of the right figure (figs. 10–11). Traces of Egyptian blue were also observed on the walls of the pyxis. The ultraviolet-induced luminescence image offered a more detailed view of the delicate drawing of the floral motifs (fig. 12).

Fig. 6 Classical marble pyxis, NAM A11372. The painted lid with a figural scene. © Ch. Simatos

Fig. 7 Classical marble pyxis, NAM A11372. The painted walls with a floral composition. © J. Stephens



Fig. 8 Classical marble pyxis, NAM A11372. Traces of gold leaf on the lid, detail. © Ch. Simatos

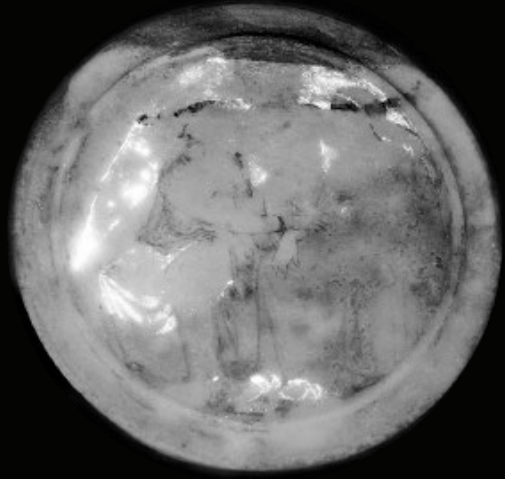
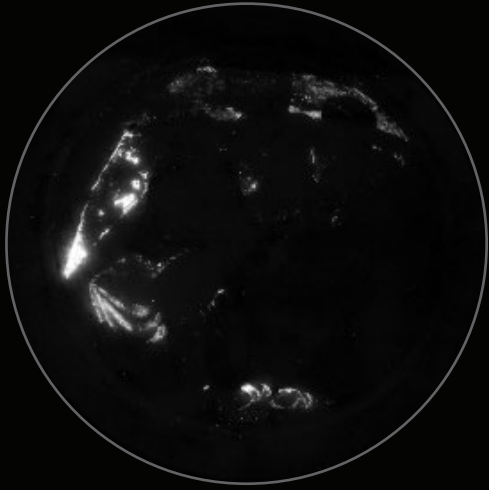


Fig. 9 Classical marble pyxis, NAM A11372. The figural scene of the lid. Infrared reflected image (800–1000 nm), detail. © G. Verri

Fig. 10 Classical marble pyxis, NAM A11372. The figural scene of the lid. Visible induced luminescence image, detail. © G. Verri

Fig. 11 Classical marble pyxis, NAM A11372. The figural scene of the lid. Visible induced luminescence image and Infrared reflected image overlay, detail. © G. Verri

Fig. 12 Classical marble pyxis, NAM A11372. Detail of the floral decoration on the side. Ultraviolet-induced luminescence image. © G. Verri



Some of the pigments identified on the examined pyxides (lapis lazuli, cinnabar, orpiment, gold leaf) certainly represented highly-praised materials and their choice was linked to the overall value of the artefacts, probably from a desire to imitate – through their silken finish and rich polychromy – their luxury counterparts in ivory (as is the case with 4th century BCE marble funerary furniture; see for example the marble throne from the so-called Tomb of Eurydike at Aegae¹⁷). At the same time, the refinement in execution and the advanced knowledge concerning the use of colour with tempera techniques, reflect the activity of experienced and talented painters, mastering their pictorial techniques and the rendering of minute details. The style of those unique micrographic paintings exhibits close affinities – both as regards the style itself and the choice of unusual materials – with the refined figural paintings on luxury marble artefacts produced later in the fourth and third centuries BCE, such as the painted marble sarcophagus from Kition,¹⁸ the throne from the so-called Tomb of Eurydike at Aegae and the so-called Getty Lekanis (*podanipter*) from Ascoli Satriano.¹⁹ The early dating of our pyxides, allows us to appreciate the high level of figural painting from a period from which no panel or wall paintings are preserved and permits us to evaluate better the development of small-scale figural painting on marble, as well as the antecedents of many of the pictorial acquisitions reflected in larger-scale Hellenistic wall paintings.²⁰

- 1 The scientific examination of the vessels included Raman spectroscopy conducted by G. Oikonomou (the Institute of Geology and Mineral Exploration, Athens) with the assistance of D. Smith (Muséum National d'Histoire Naturelle, Paris) and M. Perraki (National Technical University of Athens). X-ray fluorescence was conducted by A. Karydas (Institute of Nuclear Physics 'Demokritos'/ International Atomic Energy Agency, Vienna) with the assistance of V. Kantarelou. Duetto XRF-XRD measurements were conducted by Ph. Sarrazin (InXitu Inc, CA). Multispectral imaging (visible-reflected, infrared-reflected, visible-induced luminescence and ultraviolet-induced luminescence imaging) was performed by G. Verri (Courtauld Institute of Art, London). The results of a preliminary scientific investigation were presented by H. Brecoulaki, 'Precious Colours in ancient Greek Polychromy and Painting: Material Aspects and Symbolic Values' at the conference organized by Ph. Jockey, *Les Arts de la couleur en Grèce ancienne...Et ailleurs*. Colloque international organisé à l'Ecole française d'Athènes, 23-25 avril 2009, Athens (the paper was published at the *Révue Archéologique*, 2014 no 1; see Brecoulaki 2014)
- 2 The pyxides were donated to the NAM by private collectors
- 3 Gaunt 2013
- 4 Zapheiroupolou 1973
- 5 Gaunt 2013
- 6 Zapheiroupolou 1973, 624-625, fig. 32; Gaunt 2013, 391
- 7 Smith et al. 2009
- 8 Grand-Clément 2011, 105-106
- 9 Aldrovandi et al. 2005
- 10 Verri 2009
- 11 Zapheiroupolou 1973, 624-625, fig. 31; Gaunt 2013, 391
- 12 Brecoulaki 2006, 408-411; Kakoulli 2009, 87-92
- 13 Karydas et al. 2011
- 14 Wallert 1995
- 15 Kottaridi 2011, 124, fig. 133
- 16 Verri 2009; 2009a
- 17 Brecoulaki 2006, 53-61, pls 1-10
- 18 Fluorentzos 2011; Goergiou 2009
- 19 Bottini - Settari 2009; Wallert 1995
- 20 Brecoulaki forthcoming