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The Mid-Republican Temple A at Largo Argentina in Rome: Colour, Form, and Culture

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The Mid-Republican Temple A at Largo Argentina in Rome: Colour, Form, and Culture

Stephan Zink – Jana Hainbach – Jens Pflug – Ina Reiche – Monica Ceci

Abstract

The initial construction phase of Temple A at the area sacra of Largo Argentina dates to the second half of the 3rd cent. B.C., marking it as a rare example of Mid-Republican architecture in Rome. The building's appearance has largely remained elusive, with only a fraction of its columnar elevation surviving as decontextualized architectural members in storage rooms. This paper brings together the results of architectural field research conducted from 2018 to 2022 with scientific colour analysis to offer a preliminary reconstruction of the temple's plan and façade, including a colour reconstruction of a columnar capital. We discovered that the original colouring underwent a fundamental remake during the 2nd cent. B.C. The initial red/blue-on-white scheme, which probably still

followed an Etrusco-Italic tradition of colouring, was replaced with the latest Hellenistic colour fashion of yellow – standing for gold – on white. This modernized colour scheme reduced the emphasis on colour in favour of the architectural form and its intrinsic effects of light and shadow. From a wider cultural perspective, the shift to a yellow-on-white scheme represents a testament to the phenomenon of 'Hellenization' in Late Republican Rome, foreshadowing both the *aurea templa* of the Augustan period and some fundamental elements of Imperial architectural aesthetics.

Keywords: Rome, Largo Argentina, Mid-Republic, temple, polychromy, colour triad, yellow, gold, architectural reconstruction, Hellenism, Italic-Ionic capital

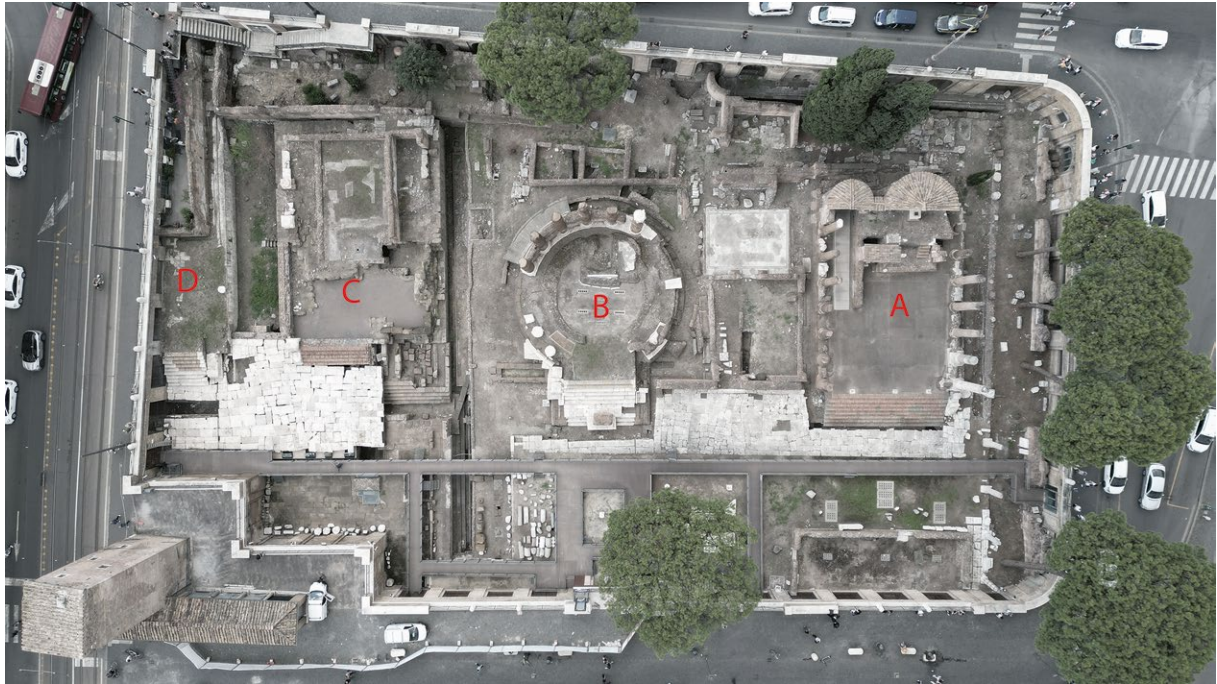
Introduction

Within the urban landscape of modern Rome, the archaeological site known as Area Sacra di Largo Argentina offers a unique window into the city's ancient layers (Fig. 1). It stands as the most significant testimony to Rome's urban development in the Campus Martius region during the Mid- and Late-Republican period (ca. 3rd–1st cent. B.C. at Largo Argentina). Beginning in 1926 and continuing through the 1930s, the archaeologist G. Marchetti Longhi unearthed four ancient Roman temples at the site. Due to the lack of clear identification, they were designated as Temples A, B, C, and D. The earliest of these temples, A and

C, date back to around the mid-3rd cent. B.C. They constitute some of the most important, if not the most important, evidence in Rome for the generally poorly known architecture of the Mid-Republican period.

Between 2018 and 2022, the German Archaeological Institute, in partnership with the Sovrintendenza Capitolina ai Beni Culturali di Roma, conducted detailed on-site studies on the architecture of Temples A and C¹. Despite extensive previous research, this project provided an opportunity to systematically re-document the substantial in situ remains and to conduct the first-ever analytical documentation of

¹ Zink – Pflug 2019; Zink et al. 2020; Zink et al. 2021; Zink et al. 2024



1 Area sacra of Largo Argentina, aerial view with Temples A–D, 2021

the architectural members of these temples². As we have shown in a different context, this research enabled us to refine previous theories about the construction phases, while revealing novel information on architectural designs³.

Among the notable discoveries of the recent project were previously unnoticed traces of colour on the architectural remnants of the earliest, Mid-Republican façade of Temple A. These colour traces offer a rare glimpse into the temple's initial polychromy from around the mid-3rd cent. B.C., as well as into a subsequent renewal of the surface and colour that occurred at some point during the 2nd cent. B.C. Remarkably, this renovation embraced an aesthetic markedly different from the original. Thus, within the ca. 140 years during which the earliest building of Temple A was in use, we can trace the adoption of a new and fundamentally different colour system. This paper examines the changing colour schemes of Temple A and asks what these changes implied for both

the perception and the broader symbolic significance of the architecture. Our conclusions must be considered provisional, as the new discoveries at Largo Argentina represent the first systematically collected evidence of the colour scheme of a Mid-Republican Roman temple.

Against the backdrop of Etrusco-Italic and Greco-Hellenistic architectural polychromy, the changing colour scheme of Temple A appears to be part of a broader cultural phenomenon known as Hellenization⁴. Typically evident in architecture through the adoption of architectural concepts and forms, Hellenization in this case becomes tangible through the introduction of a new colour symbolism likely derived from the Hellenistic monarchies of the Eastern Mediterranean. At Temple A, 'Hellenization through colour' involved replacing the traditional red/blue-on-white scheme with a more reduced yet luxurious yellow/gold-on-white palette. Notably, this new colour scheme also reflects a shift in the interaction be-

² For the first architectural documentation, see Marchetti Longhi 1936, summarized in Coarelli 1981. It is noteworthy that Marchetti Longhi overlooked the importance of the architectural members, possibly explaining their omission from subsequent scholarship that relied on his works as a primary reference. For clarification, we argue that what Marchetti Longhi designated as phases 1 and 2 should be considered a single phase, corresponding to our construction phase 1 of ca. 240 B.C. (for a detailed argument Zink et al. 2020, 391–393).

³ For the report, to which this contribution represents a follow-up, see Zink et al. 2020.

⁴ The scholarly concept of 'Hellenization' is not without its problems, as it runs risk of reducing a highly complex process of cultural transfer and exchange to a one-way street of cultural copying. It is essential to emphasize that this process does not necessarily imply the loss of distinct Roman identities. For further discussion on the concept and its implications in Late Republican architecture, see, for example, La Rocca 2011.

tween colour and form. While Etrusco-Italic colour schemes tended to dominate architectural forms with abundant colouring that was meant to stand out from a distance, the Hellenistic approach favoured more restrained colouring that enhanced three-dimensional details, accentuating the sculptural qualities of the architectural form as well as its effects of light and shadow. Consequently, yellow/gold against a white backdrop (whether stucco or marble) became a new standard of colour symbolism for monumental

exterior façades. Broadly speaking, the yellow/gold-on-white scheme appears to have been part of a significant paradigm shift, initially seen in the Hellenistic kingdoms before appearing in the architectural polychromy of Late Republican Rome⁵. It became fully effective in Rome's *aurea templa*, the golden temples of the Augustan period, and foreshadowed a later trend of Imperial architecture that was centred around complex patterned ornamentation with minimal or no colour additions.

Reconstructing a Temple from Fragments

Temple A stands as one of those ancient structures that require virtual reconstruction from fragmented pieces before we can even begin to make sense of its polychromy. In our previous research, we presented the arguments for reconstructing the temple's ground plan as a prostyle temple of ca. 22.01 × 9.05 m, featuring four frontal columns and two on the side (axial width 2.37 m; lower columnar diameter ca. 0.65 m)⁶. In this study, we offer the corresponding ground plan alongside a preliminary reconstruction of the façade (Fig. 2). The temple's rather conventional plan was complemented by an extraordinary podium, the elevated base on which the building stood. Its monumental stairway was accessed from a slightly raised platform that was located in front of the temple, functioning as a ceremonial area around the temple's altar. The lower part of the podium consisted of four courses of ashlar masonry blocks with rough rusticated surfaces, while the upper part featured a carefully carved base with a smooth surface and intricate mouldings. Standing at nearly four meters height, the entire podium transformed a relatively small temple into an imposing structure that visually dominated both the platform housing the altar and the surroundings (Fig. 2).

The reconstruction of the temple's columnar order and the entablature above it relies on a survey of ca. 150 fragments in grey-green volcanic tufa which are today in the storage rooms at the site. Their tufa type is commonly known among archaeologists as

‘peperino’ but is classified as Lapis Albanus in the more specific geological terminology⁷. This material was common for early to Mid-Republican buildings, and also at Largo Argentina, Lapis Albanus was deployed only for the earliest (Mid-Republican) phases of Temples A and C⁸. Among the extant fragments are a few column bases, many pieces of column shafts, and also fragments of capitals. Additionally, parts of the entablature (dentil frieze, cornice) and exterior cella revetments have survived.

The Lapis Albanus fragments vary in size, ranging from ca. 20 cm to 80 cm, and were unearthed during G. Marchetti Longhi's excavations. In our previous work, we distinguished a larger and a smaller set of an exterior columnar order. Considering that Temple A was from the outset significantly smaller than its neighbour, we attributed the smaller columns to Temple A and the larger ones to Temple C⁹. However, the differences between the columnar orders of the two temples were not limited to size alone but also concerned the jointing technique of the column drums as well as the style of the mouldings. Through a careful architectural documentation of over a dozen strategically chosen fragments, we reconstructed an entire column of the 3rd cent. B.C. phase of Temple A (Fig. 3). Currently, our attention is directed towards the temple's entablature and roof, which the reconstruction presented here only shows in a schematic way (see Fig. 2).

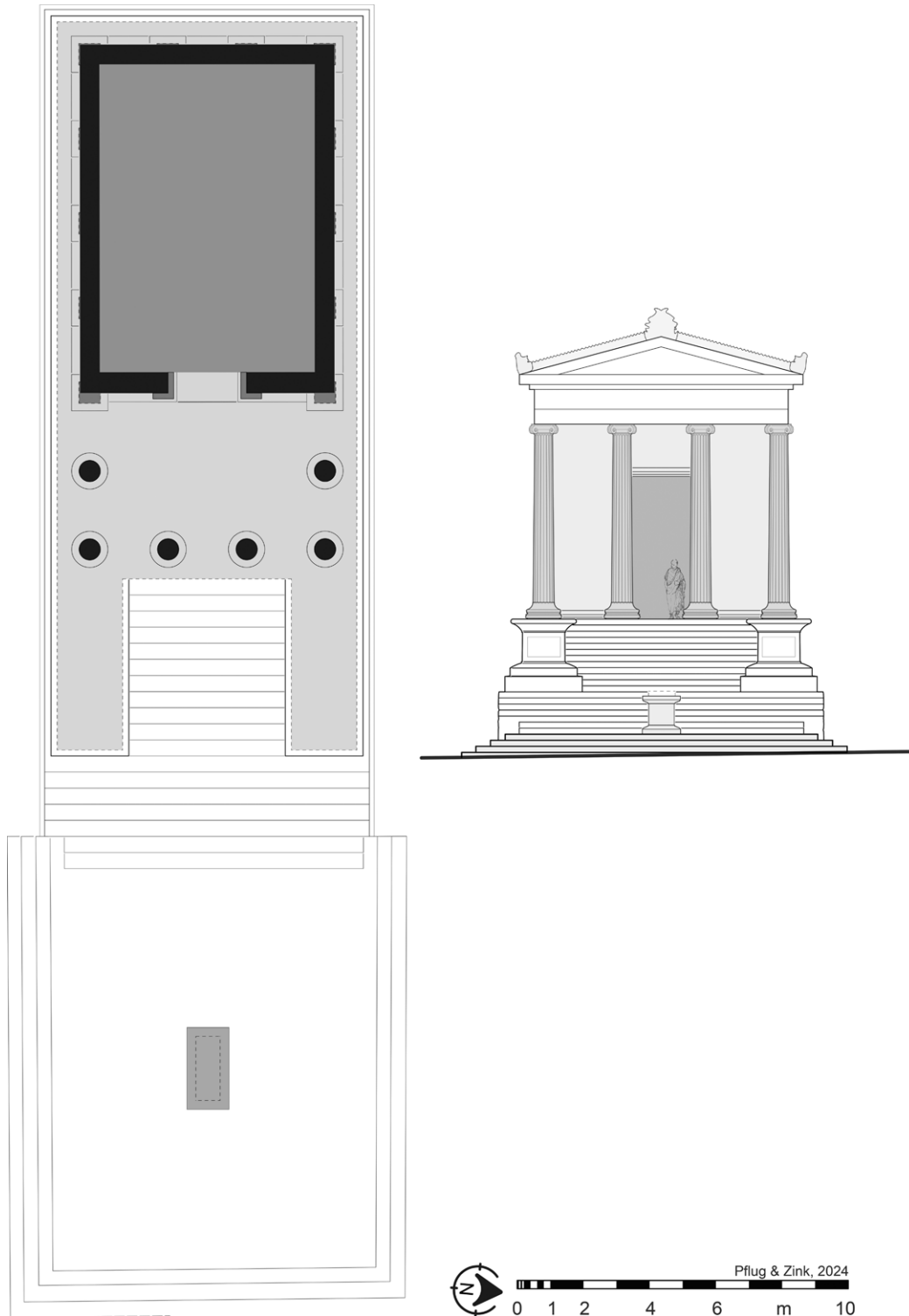
⁵ See also the contribution of L. Haselberger in this volume.

⁶ Zink et al. 2020.

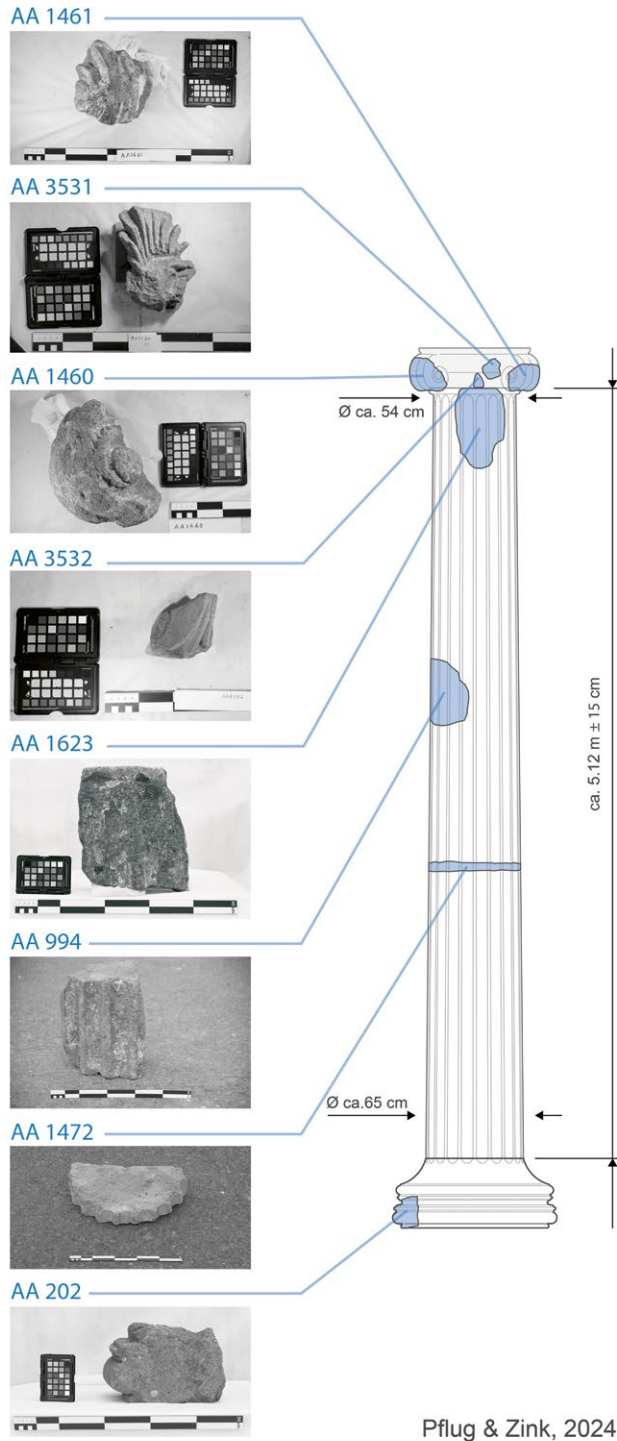
⁷ Our geochemical analysis of the stone and its quarry provenancing (in collaboration with D. Diffendale and F. Marra) is forthcoming in RM 130 (2024).

⁸ Recently Marra et al. 2017; Marra et al. 2018.

⁹ For more detail, see Zink et al. 2020, 395.



2 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Reconstruction of the ground plan and elevation, synthesizing the results of the architectural documentation from 2018–2022. Note the still preliminary and therefore schematic state of the entablature and pediment (scale 1 : 200).



3 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Columnar fragments in Lapis Albanus tufa and reconstruction of a column (scale 1 : 50)

The Italic-Ionic Capitals

Within the current context, we focus in more detail on the reconstruction of a columnar capital. Not only is this a novel piece in the three-dimensional puzzle-work that is Temple A, but the capital fragments also preserve the most extensive remains of the temple's original colouring. The virtual reconstruction of a capital was challenging, as it relies on only a handful of pieces, including the following (Figs. 4. 5)¹⁰:

- five volutes of similar size with pronounced convex spirals of about $1\frac{3}{4}$ turns, as well as large and projecting volute centres;
- three intricately carved palmette fragments, two of which preserve a central medallion that is set into an acanthus leaf; and
- the intermediary leaf of an Ionic cyma with egg and dart pattern.

The volutes, which are two-faced and rather large, in conjunction with the palmettes and the Ionic cyma, suggest that the capitals adhered to the Italic-Ionic type. Unlike the Greek Ionic capitals, which had one-faced volutes that were arranged in parallel pairs at each side of a bolster, the volutes of Italic-Ionic capitals were set at 45 degrees to the main axis and were therefore two-faced. Due to this, they had no specific direction, just like Corinthian capitals¹¹. Each volute features three spirals, one on each side and another one following the outer ridge of the volute. Their form is rather pronounced and extrudes significantly. The lateral spirals spring from the so-called volute eyes (the central half-spheres) and develop over $1\frac{3}{4}$ turns. Once they reach the outer edge of the volute, they begin to protrude even more, while their shape becomes wider at their top with rather sharp edges that take up an almost square profile.

After reviewing the literature on Italic-Ionic capitals, it appears that our fragments align closely to the so-called Type B, as outlined in a typology established by E. Casteels in 1976 and subsequently affirmed, with some additions, in more recent publications¹². The 'Type B' Italic-Ionic capital is character-

¹⁰ Our special thanks go to Thalia Staschok (a student of architecture at the Technical University of Berlin) who greatly advanced the reconstruction of the capital during her internship at the DAI Berlin in 2021 and thus contributed to the following analysis. We would further like to thank Lisa Hock (University of Potsdam) for finishing the 3D model of the capital with great dedication and mastery, even beyond her time as a research assistant at the DAI Berlin.

¹¹ An interpretation of the extant volutes as Corinthian capitals can be excluded on account of both the volutes' size and the other fragments.

¹² Casteels 1976; Villa 1988 further differentiates two subcategories of Type B (BI and BII); see now especially Batino 2006.



4 Largo Argentina, capital fragments in Lapis Albanus tufa from the earliest construction phases of Temples A and C, second half of 3rd cent. B.C.



5 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Reconstruction of an Italic-Ionic capital with extant architectural fragments



6 Italic-Ionic capitals in the courtyard of the Museo Archeologico Nazionale di Tarquinia. The lowermost capital (perhaps 3rd cent. B.C.) represents the closest comparison to the Mid-Republican capitals of Temple A.

ized by an echinus decorated with an egg-and-dart moulding as well as two palmettes in the fields above, between the volutes. The palmettes are either vertically or obliquely arranged and reach all the way from the echinus to the abacus. When looking at the palmettes from Temple A, we can see that, on one side, the leaves fan out more while slightly bending, thus leading to an asymmetrical arrangement (fragment AA 3529 bends towards the right and AA 3531 towards the left). This asymmetry suggests a slightly oblique arrangement of the palmettes.

A particular capital found at the base of a stack of capitals within the courtyard of the archaeological museum of Tarquinia bears striking similarities in composition to those of Temple A (Fig. 6)¹³. It also features convex volutes with a large central eye that is a half-sphere, an Ionic cyma with egg and dart (as echinus), and two palmettes, which were crammed between the abacus and the volutes. Its measurements include a lower diameter of 58 cm, a total height of 28 cm, and a width (volute to volute) of 73 cm¹⁴. Notably, the lower diameter closely matches that of the capital from Temple A, which was ca. 55 cm, as inferred from the preserved fragment of an upper column shaft (Fig. 3)¹⁵.

Some time ago, P. Romanelli linked this and the other Italic-Ionic capitals from Tarquinia with the 4th cent. B.C. Temple III of the 'Ara della Regina', also known as the 'Temple of the Winged Horses' (named after the famous terracotta relief)¹⁶. However, S. Quilici Gigli has contested this attribution by pointing out that these capitals are too small for the columns of Temple III. Instead, they are proposed to come from a later phase of the same structure, believed to date to the mid-3rd cent. B.C. based on findings of architectural terracotta elements¹⁷. This would make our comparison from Tarquinia almost a contemporary of Temple A.

¹³ Overview on comparanda: Batino 2006, 86–89 (cat. 110–113), Tav. XIII, 113; and Batino 2006, 88, cat. 113 for the relevant Tarquinia capital.

¹⁴ Measurements follow Batino 2006, 138 (No. 113); for the lower diameter, see Quilici Gigli 1987, 138 (note 21) who claims to have personally verified it (note that the measurements differ from those in Romanelli 1948, 252).

¹⁵ See, in addition Zink et al. 2020, 393–398.

¹⁶ Romanelli 1948, 251 followed also by Colonna 1985, 73.

¹⁷ Quilici Gigli 1987, 138. Batino 2006, 88 cat. 113 also argues for a 3rd cent. B.C. date (without further explanation). Note that Colonna 1985, 73 provides a misleading reconstruction drawing of Temple III which assumes a lower diameter of 80 cm for the capitals; in any case, this value was disproved by Quilici Gigli's own measurements (see note 14).

Considering aspects such as size, decorative elements, provenance from Latium, and the date of the capital from Tarquinia, it stands out as the most suitable reference point for reconstructing the missing parts of the capital of Temple A. Hence, our virtual reconstruction follows the general proportions of the Tarquinia capital while employing 3D (SfM) models of the extant fragments to determine measurements accurately and position them correctly in coherence with the overall form (Fig. 5).

The Entablature and Roof

For the entablature and the roof, Temple A deployed a mix of stone, wood and terracotta, as was common for the architecture of this time period¹⁸. Almost certainly, the stone columns supported a wooden architrave since it was impossible to use the friable Lapis Albanus to span the clear distance of 1.83 m (at the columnar necks) while carrying the weight of the entablature and the roof (Fig. 2). It is also worth noting that there were no pieces of stone architraves in the material of the storage rooms. Above the wooden architrave would have followed an entablature in stone.

Most likely, this featured a Doric frieze with triglyphs and metopes that was crowned by a dentil frieze, on top of which followed a cornice with mutulae; this is suggested by fragments of a dentil frieze and a cornice with mutulae and guttae. On this set of assumptions, we have here a case of a mixed or hybrid order, as it became quite common during the Hellenistic period¹⁹. Painted terracotta would have been deployed for the revetment of the wooden architrave and for the roof with its decorative elements. In a preliminary study, it was possible to identify about 90 pieces of architectural terracotta, which have a high probability of belonging to the earliest phase of Temple A. Among them are winged male and female figures that decorated the border of the lateral sides of the roof²⁰.

Lapis Albanus, like all volcanic tufa stones, is a porous and rather inhomogeneous building material, which needs a coating for both protection and aesthetic reasons. Therefore, all architectural stone elements of the temple's elevation were once coated with a thin white lime-based stucco layer which would have given the architectural forms a perfectly uniform surface and a homogeneous white base colour. Although the traces of the stucco coating are rather scanty, we were able to detect them on all parts of a column as well as on the entablature.

Colours, Layers, and Painting Techniques

Two of the volute fragments (AA 1460 and AA 1463) retain remnants of coloured stucco that are clearly recognizable even with the naked eye. This observation was the starting point for our project. The applied methods of surface analysis involved several steps. On site, it included a visual examination of surface phenomena, coating stratigraphy, and painting technique on 23 architectural fragments. The eight most promising pieces were chosen for detailed surface mapping (Fig. 7). Along with this, video microscopy (Dino Lite) and macrophotography were carried

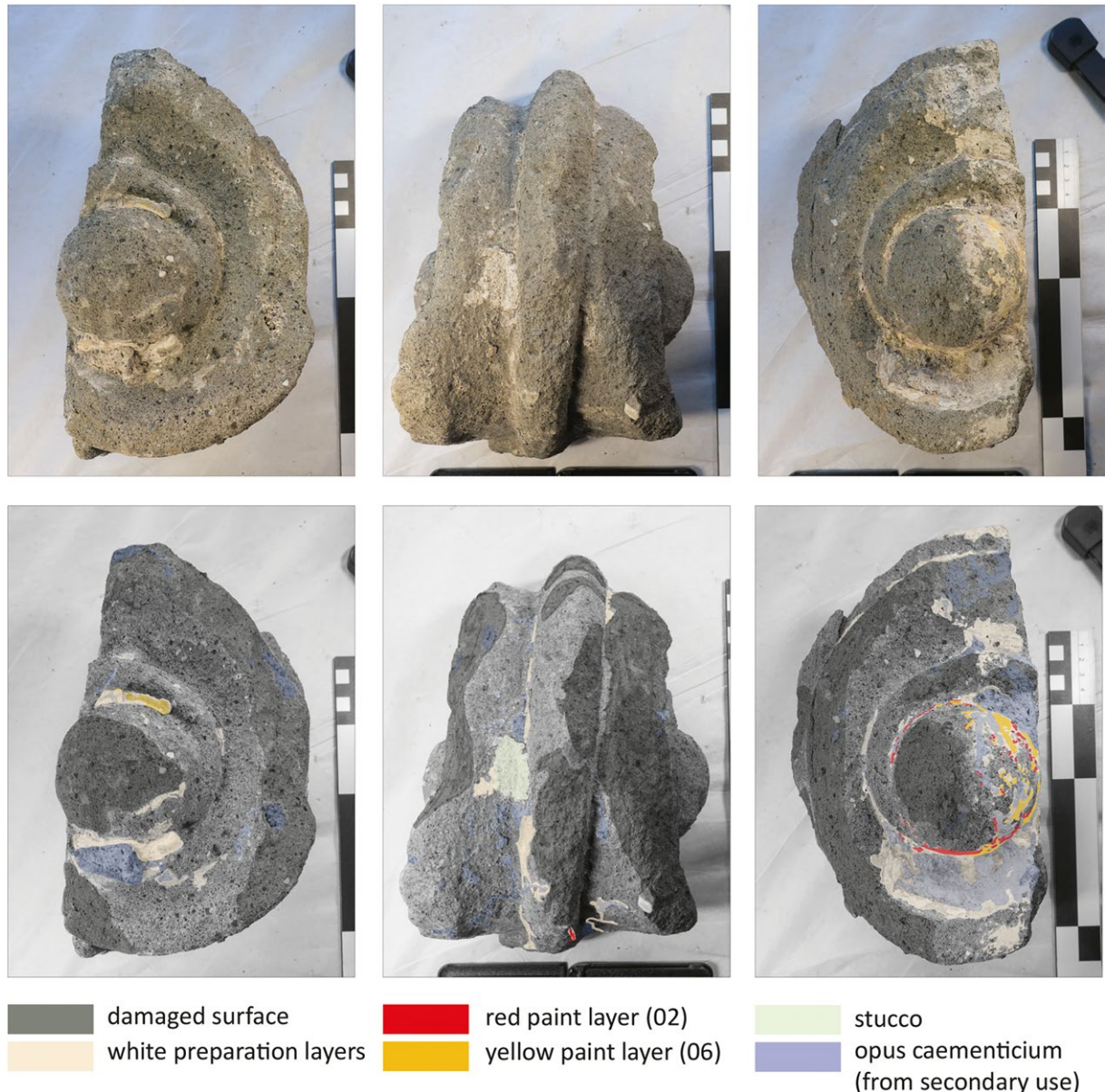
out as well as non-invasive UV-VIS analysis to detect traces of Egyptian blue. These steps informed the subsequent micro-sampling. In total, eight samples were taken, four of which came from three fragments of capital volutes, three from column shaft fragments, and one from a dentil frieze piece that belonged to the entablature. At the Centre de recherche et des restaurations de musée de France in Paris, the samples were prepared as cross sections in order to analyse their stratigraphical sequence and elemental composition using Scanning Electron Microscopy

¹⁸ An illustrative case is the mid-4th cent. B.C. Temple A from Cumae (e.g. Rescigno 2009, 17–19). Davies 2012 has advocated for a complete stone entablature at Largo Argentina's Temple A and identifies the Palatine Temple of Victory (ca. 294 B.C.) as Rome's earliest instance of this, seemingly overlooking the possibility of mixed materials. Notably, the earliest stone architraves in Rome seem to appear only with the use of more compact stones, such as

marble (Round Temple at the Tiber) and travertine (Temple B at Largo Argentina or the Temple of Portunus).

¹⁹ On such orders, see Wilson Jones 2000, 111–113; specifically for the case of central Italy, see Maschek 2012, 19. 49–54 (his «Gruppe 2» with dentil frieze seems relevant here).

²⁰ For Giulia d'Angelo's preliminary study of the terracotta, including her identification of the winged figures, see Zink et al. 2021.



7 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Surface mapping of a volute fragment (AA 1463) from an Italic-Ionic capital in Lapis Albanus tufa

(EDS). Further analysis at ID13 – the Microfocus Beamline of the European Synchrotron Radiation Facility (ESRF)²¹ in Grenoble – used Synchrotron micro-X-ray diffraction (XRD) scanning²².

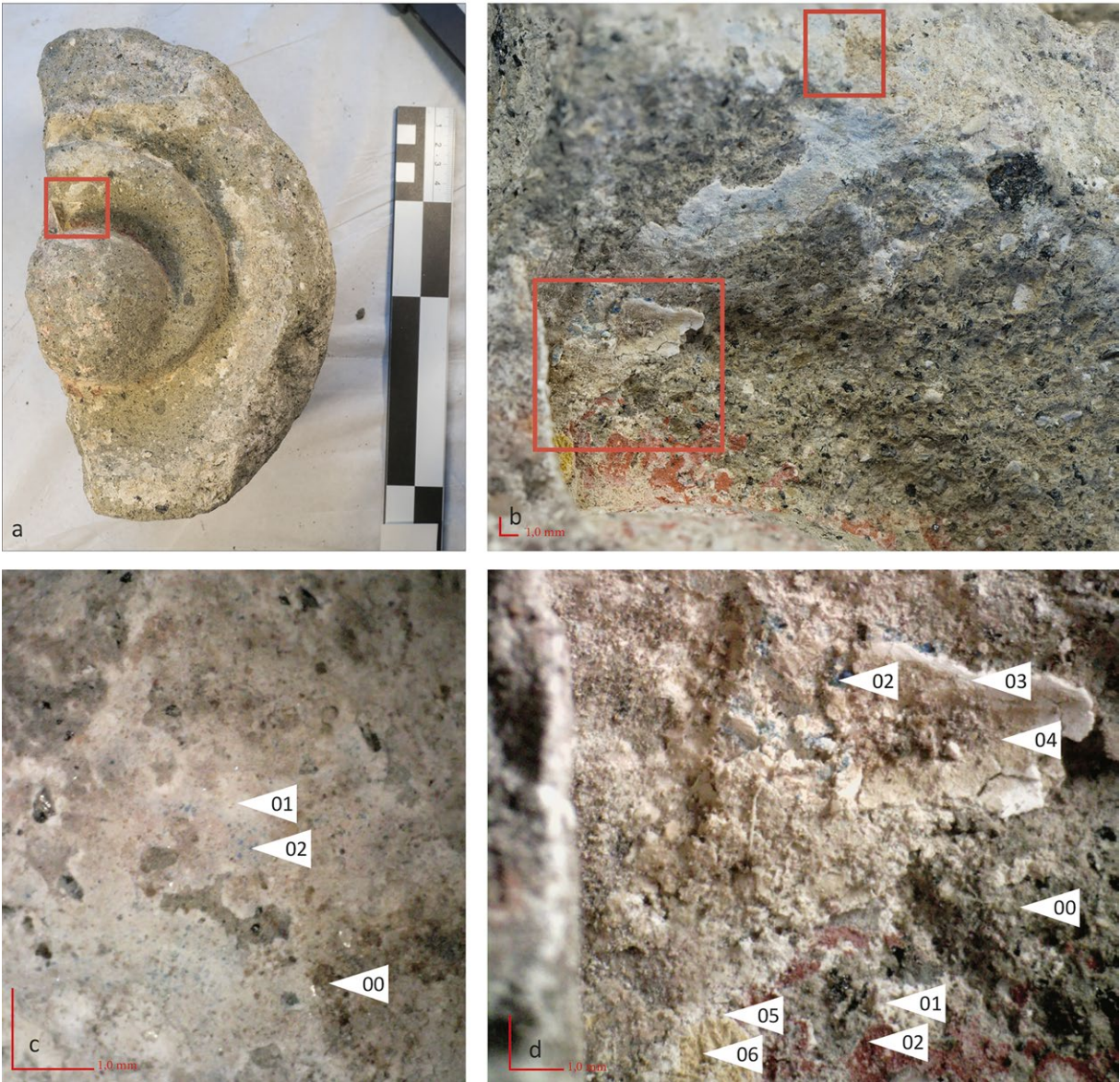
As the surface mapping revealed, the most conspicuous remains of the original stucco/colour coating are preserved on the volutes of the capitals, mostly in the recesses between the spirals but also on the central

volute eyes (Fig. 7). Other architectural members, such as the column shafts and parts of the entablature, also carry traces of stucco coating. On the capital's volutes, however, their state of preservation was so good that, even with the relatively simple field methods, it was possible to determine the principal sequence of stucco and paint coatings. The later analysis of the micro-samples refined these preliminary observations.

²¹ See Cotte et al. 2022.

²² We kindly acknowledge the help of Myriam Eveno in sample preparation and optical microscopy, Eric Laval for SEM-EDS ob-

servations and Clément de Mecquenem for running the synchrotron micro-X-ray diffraction (XRD) scanning in the framework of the block allocation group Historical Materials Access (HG-172).

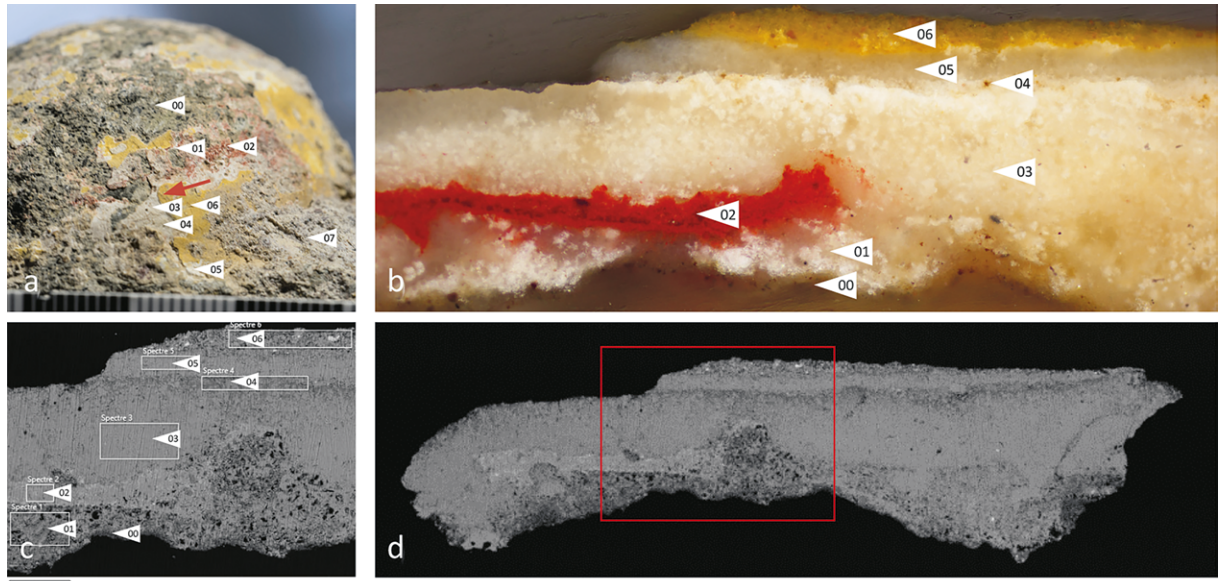


8 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Volute fragment of an Italic-Ionic capital (AA 1460). a) With examined area (red field); b) Macrophotography with areas of microscopy (red); c. d) Video microscopy

The five volute fragments show a consistent stratigraphic sequence (Fig. 8): starting with the Lapis Albanus tufa as the base material (00), followed by a thin white primer (01), which seems to have covered the entire piece. Traces of blue and red paint layers (02) are evident on top of this primer (01). Next follows another off-white primer (05) serving as ground for yellow colour accentuations (06). On some samples, electron microscopy revealed a previously unnoticed layer of white (03) between the two phases of painting and their preparation layers (Fig. 9). On top of this white layer, a very thin surface crust (04) with a chemical composition indicating dirt or dust was

found. This suggests that the surface was exposed to weathering for some time before the final layers (05/06) were applied. In sum, the stratigraphy of the capitals is as follows:

00	Lapis Albanus	
01	white preparation layer	Phase 1 (around second half of 3 rd cent. B.C.)
02	red/blue on white coating	
03	white preparation layer	Phase 2
04	thin dirt crust (time gap)	
05	white preparation layer	Phase 3 (during the 2 nd cent. B.C.)
06	yellow on white coating	



LAYER	DESCRIPTION	SURFACE	DETECTED ELEMENTS	INTERPRETATION
00	carrier, Lapis Albanus			
01	preparation layer, white	thin, 30 to 50 μm	Ca, O, Si	slurry of lime, mainly calcium carbonate CaCO_3 with very coarse grains (sand as a filler)
02	paint layer, red	very thin, 20 to 30 μm	Ca, O, Fe, Si	mainly CaCO_3 \rightarrow lime as a binder, Fe-oxide as pigment (sand as a filler)
03	preparation layer, white	brush style, thick, 100 to 150 μm	Ca, O	slurry of lime, pure CaCO_3 , mainly fine grains
04	layer of dirt, light brown	5 to 10 μm	Ca, O (Al, Si)	dirt
05	preparation layer, white	50 to 100 μm	Ca, O	slurry of lime, pure CaCO_3 , mainly fine grains (sand as a filler)
06	paint layer, yellow	very thin	Ca, O, Fe, Al, Si and S	mainly CaCO_3 \rightarrow lime as a binder, goethite as pigment (sand as a filler)

9 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Volute fragment of an Italic-Ionic capital (AA 1463); micro-sample. a) Location of the sample (red arrow) on the volute eye; b) Thin section microscopy; c, d) Electron microscopy and detail with stratigraphy (1–6) as described in the table



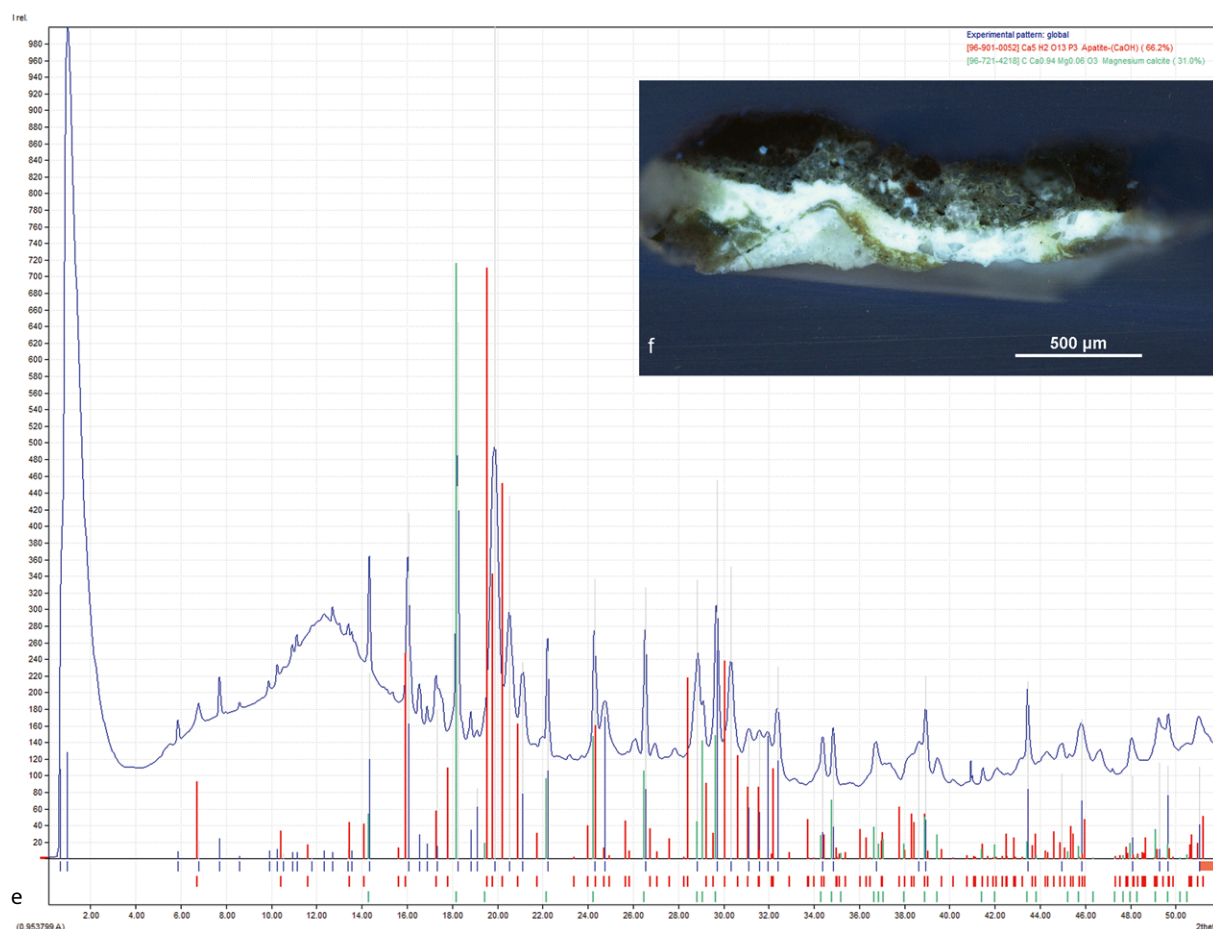
10 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Fragments of column shafts in Lapis Albanus. a. b) Columnar neck fragment (AA 1623) with remains of stucco surface, probably with fire damage, and macrophotography of a detail with location of sample (arrow); c. d) Fragment from the middle of a column shaft (AA 994) and macrophotography of the surface with location of sample (arrow)

The analysis of stratigraphy on the column shafts, conducted through microsampling, appears less definitive but indicates the presence of two main coating phases (Fig. 10). The first sample comes from a flute channel near the columnar neck (AA 1623), where sporadic patches of the extant original surface coating take on an irregular dark yellow/brown/blackish colour, displaying an almost leathery surface that is broken into chips (Fig. 10 a. b). These alterations, likely a result of fire impact, have rendered the samples and their stratigraphy challenging to analyse and interpret. Electron microscopy suggests the presence of two layers containing calcium phosphate, but it is difficult to recognize a clear separation line between them.

Additional samples were obtained from a fragment likely positioned further down the shaft, slightly above the middle of the column (AA 994; Fig. 10

c. d). Once again, the samples pose challenges in interpretation, but one shows a less altered white/yellowish uppermost layer than the others (Fig. 10 e). The lower-level stratigraphy in both samples suggests a white coating of calcium phosphate rich in iron, which may indicate the addition of a white pigment such as bone white. X-ray diffraction analysis also revealed a mix of magnesium containing calcium carbonate and calcium apatite (phosphate) (Fig. 10 f).

Traces of stucco layers were also observed on the dentil frieze and cornice fragments, but these will be presented in the context of a future reconstruction of the entablature. Overall, it appears from our examination that, along with the change of the colour scheme on the capitals from red/blue-on-white (02/01) to yellow-on-white (06/05), the entire façade received a surface makeup. However, only the capitals saw an



10 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Fragments of column shafts in Lapis Albanus. e) X-ray diffraction diagram of sample from AA993; f) Thin section of sample (from AA994)

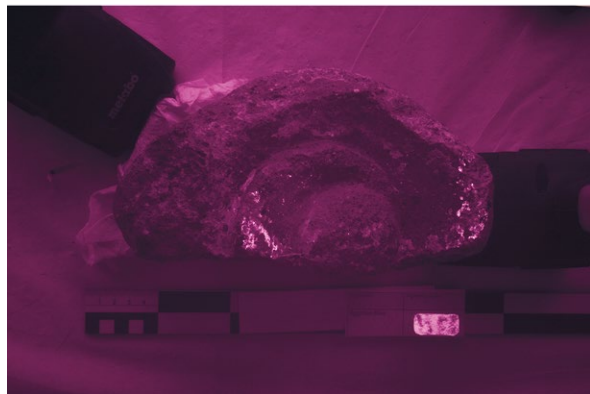
intermediary white layer (03). For all colour coatings, the same surfacing and painting technique was applied: a thin lime slurry, comprising calcium carbonate and sand as aggregate material, served as a preparation layer to homogenize the surface. Subsequently,

the pigments were applied using the secco technique, meaning the painter mixed the pigments with a fine lime slurry (also calcium carbonate) as a binding agent and applied the paint with a brush over the white undercoating.

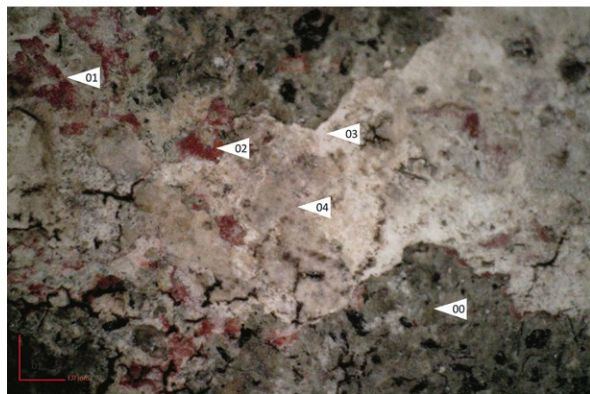
The Red/Blue-On-White Coating (02/01)

As previously mentioned, the red and blue layer (02) rests on top of a white layer (01) and together they form the earliest painting layer. Under the microscope, it is evident that the intense red and the blue pigments sit on the same level (Fig. 8 b. d). Two micro-samples (from AA 1462 and AA 1463) revealed the red pigment as an iron oxide, probably hematite. The blue pigment was identified utilizing VIL-imaging as Egyptian blue (Fig. 11).

Understanding the location of the colour traces in relation to the architectural form is crucial for reconstructing the original colour scheme. Therefore, our initial step involved mapping only the preserved colour evidence onto our 3D model of a capital (Fig. 16 a). Substantial traces of red were found on the so-called volute eye, the centre of the volute in the form of a half sphere, which was fully painted in that colour (as evidenced on AA 1460 and AA 1463, see Fig. 9 a). Notably,



11 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). VIL-Imaging of a volute (AA 1460) from an Italic-Ionic columnar capital



12 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Volute fragment (AA 1463) of a columnar capital with traces of red (02) on the central fillet



13 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Macrophotography of palmette fragments from an Italic-Ionic capital; a) AA 3531 with traces of red (arrow 02); b) AA 3529 with traces of yellow (arrow as one of several examples)

the red paint extends beyond the limit of the half sphere, indicating that the painter traced its outline at the ground with a line of about 5 mm in width (recognizable in Fig. 8 a. b). In contrast, the spiral fillet connecting to the volute eye was entirely painted in blue (identified through VIL-imaging on AA 1460, Fig. 11). Conversely, the fillet running vertically along the frontal ridge of each volute was kept red (evidence on AA 1463; Fig. 12). Therefore, the fillets that decorated the volute displayed an alternating pattern of blue-red-blue against a white background (Fig. 16 a).

The palmette ornaments situated in the space between the volutes comprised three parts: the upper palmette, a central medallion, and an acanthus leaf

encasing a medallion. Minimal colour traces were evident only on one of the extant fragments (AA 33521), with our analysis being restricted to microscopy (Fig. 13 a). Traces of red were found on the ground right next to the medallion, i. e. on the acanthus leaf; another red spot was observed in the depth between the second and the third palmette rib from the left, suggesting that one side of the rib or both were originally painted red (cf. Fig. 16 a).

Given that the red/blue-on-white scheme (02/01) was the earliest colour scheme applied to the façade of the temple, it is reasonable to infer that it was associated with the original construction phase (as previously mentioned, the tufa surfaces required a stucco coating). Consequently, the date of the colour scheme is contingent upon the construction date of the initial temple, which is assumed to be around 240 B.C.²³.

The Yellow-On-White Coating (06/05)

The presence of the yellow-on-white coating is confirmed on four volute fragments of the capitals, with the most extensive traces of yellow pigment found on the volute eyes of fragments AA 1463 and AA 1461. Analysis of samples from these fragments indicated that the yellow pigment was embedded in calcium carbonate and contained a significant amount of iron, suggesting identification as iron oxide or goethite (Figs. 9, 14). Fragment AA 1463 unmistakably proves that the bright yellow colour was applied to the entire volute eye (cf. Fig. 9 a). On the opposite side of the same volute fragment, notable brushstrokes are preserved in the depth between the volute eye and the spiralling fillet. These strokes form a distinct line of ca. 1 cm width, which follows the contours of the volute eye (Fig. 15). The volute eyes of fragments AA 1460, AA 1461, and AA 1462 show traces of yellow at the same location, in the depth along the volute eye. In other words, the yellow colour extended beyond the volute eye onto its ground, forming a ca. 1 cm wide accentuation line around the half sphere (Fig. 16 a). This principle of colour rendering mirrors the technique utilized during the earlier phase 02 when the volute eye was red.

On the palmette/medallion ornament, AA 3529 microscopy revealed traces of yellow in the depth between several of the palmettes' ribs (Fig. 13 b). We lack examination beyond microscopy, but it is relatively certain that this is a paint layer which would have extended over one or both sides of the rib (cf. Fig. 16 a).

The focus regarding the columnar fragments lies primarily on the uppermost layers, which would be

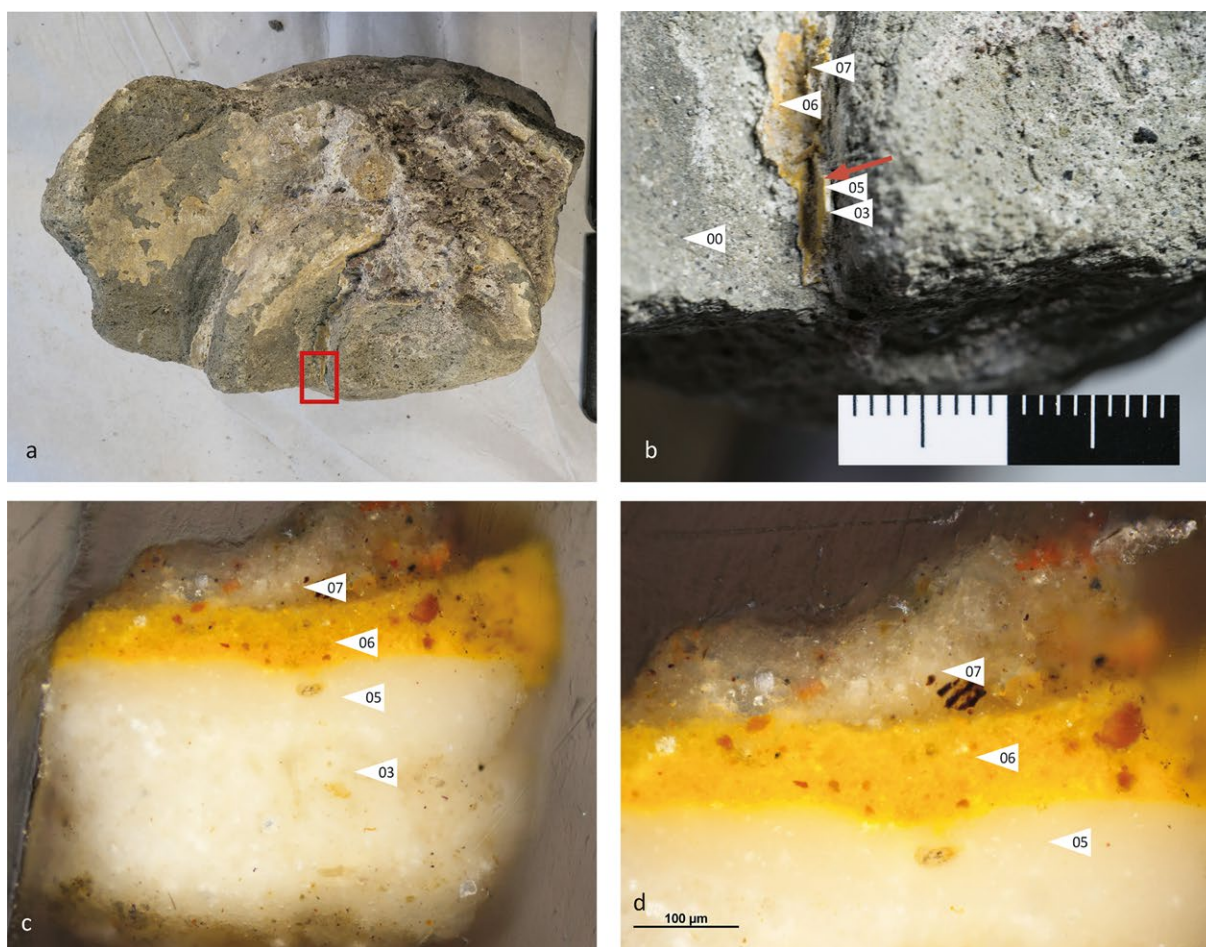
the ones corresponding to the yellow-on-white phase. In the initial sample from a flute channel near the columnar neck (AA 1623), potentially subjected to fire damage, Energy-Dispersive X-ray Spectroscopy (EDS) reveals a deep black uppermost layer (Fig. 10 a, b). It takes on an irregular surface and contains aluminosilicate and calcium phosphate (apatite) with some iron. Below this layer lies a grey stratum with similar elements but significantly higher concentrations of iron and titanium, suggesting a potential iron oxide pigment in a matrix of calcium phosphate (apatite). There is no clearly recognizable border between the layers.

Another sample from the column shaft (AA 994) is more telling in this respect and also seems to have suffered less from fire impact (Fig. 10 e). This sample features a white/yellowish top layer containing calcium phosphate rich in iron, next to aluminosilicate abundant in sodium, magnesium and potassium. This finding first prompted speculation about the presence of a yellow goethite pigment even within the flute channels; however, iron can also occur naturally in aluminosilicates. In any case, subsequent X-ray-diffraction (XRD) analysis excluded the presence of goethite (Fig. 10 f). Therefore, we must assume that the column shafts were kept white.

The yellow-on-white scheme was the final coating applied to the façade of the Mid-Republican Temple A before it was destroyed by a fire. Archaeological excavations from the 1920s and 1930s indicated that the building, already burned down, suffered flooding from the nearby Tiber River²⁴. The characteristic surface alterations observed on the column shaft frag-

²³ This dating implies an identification of Temple A as Gaius Lutatius Catulus' Temple of Iuturna. See Zink et al. 2020, 391 and Zink et al. 2024 with bibliography.

²⁴ See, fundamentally, Ceci 2020; briefly also Zink et al. 2020, 401.



LAYER	DESCRIPTION	SURFACE	DETECTED ELEMENTS	Interpretation
00 - 02	sample did not carry these layers			
03	white preparation layer	brush style, thick 250 µm	Ca, O	slurry of lime, pure CaCO ₃
04	not visible			
05	white preparation layer	200 µm	Ca, O (traces of Si, Al, Na)	slurry of lime, CaCO ₃ with traces of Na-rich aluminosilicate (sand as a filler)
06	paint layer, yellow with brown inclusions	100 µm	Ca, O, Fe (matrix), Fe, O, Pb, Cl, V? (inclusions) and goethite	CaCO ₃ --> lime as a binder, goethite as pigment, presence of a lead rich phase
07	dirt / opus cementicium layer, brown	100–150 µm	Ca, O, traces of Si, Al, Mg, K, Fe and S	CaCO ₃ with traces of an aluminosilicate

14 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Microsample from the volute of an Italic-Ionic capital (AA 1461). a) Location (red square); b) Sampled spot at the eye of the volute (arrow); c-d) Electron microscopy with stratigraphy (1–6) as described in the table

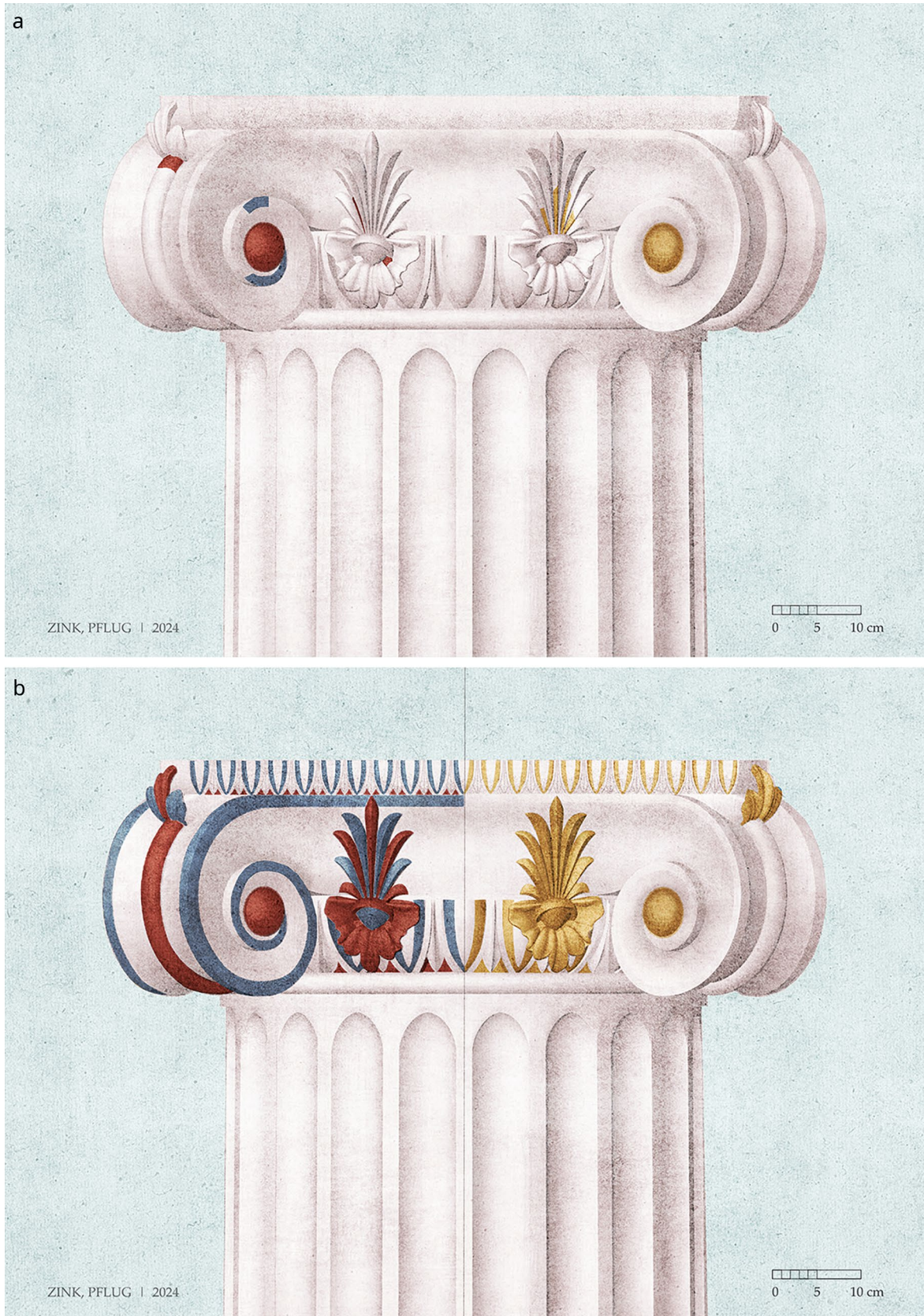


15 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Fragment of a volute (AA 1463) from an Italic-Ionic capital. a) Stucco coating and yellow painting along the volute eye; b) Detail with stratigraphy showing the two main stucco/painting phases; c) Detail with brush strokes

ments appear to align with the fire theory (Fig. 10 a. b). The subsequent complete rebuilding of the temple, which marks phase 2 in our sequence of construction phases, can be dated to the end of the

2nd cent. B.C. or the Late Republican period²⁵. This provides a terminus ante quem for the yellow-on-white coating, which thus must have been applied at some point during the 2nd cent. B.C.

²⁵ For construction phase 2, which is not part of this contribution, see Zink et al. 2020, 399–408.



16 Largo Argentina, Temple A. Italic-Ionic capital with two phases of colouring: above, the earliest, red/blue-on-white colour scheme from construction phase 1 (c. 240 B.C.) and below, the later, yellow-on-white scheme from the 2nd cent. B.C. a) Actual colour evidence; b) Hypothetical reconstruction

Towards a Colour Reconstruction

For both phases, the surviving remains of original colouring provide only a partial picture of the possible appearance of a capital and a column shaft. In the absence of complete information, we would like to present a possible reconstruction for the missing parts (Fig. 16 b). While speculative, we have endeavoured to ground this reconstruction in our knowledge of comparable colour schemes. It is important to acknowledge that the proposed reconstruction is not the only possibility for filling the gaps of knowledge.

For the red/blue-on-white scheme (layers 02/01), we have reliable evidence of the colouring for both the volute eye and fillet. In the case of the palmette/medallion ornament, the red traces on a rib of the palmette suggest that the colour was applied to either one side or the entire rib. We lean towards the latter with the assumption that the palmette featured alternating red and a blue ribs (cf. Figs. 16 a. b). The red traces on the acanthus leaf next to the medallion might indicate a partial colour accentuation of the acanthus leaf with a more coherent colour field around the medallion. In this scenario, the oval centre of the medallion would be rendered in blue to distinguish it from the surrounding area. According to the same logic of separating elements by colour differentiation, the wrapping of the medallion's oval part would be in red. Obviously, red, blue, and white could also have been dispersed differently on this ornamental feature.

The egg and dart pattern of the echinus did not reveal any information about the colour scheme. A typical solution in a red/blue-on-white scheme could be blue ovolos set against a red background with white intermediary leaves, as we suggest in our reconstruction. We also opted to render only the contours of the eggs in colour (compare for this Fig. 19). Similarly, for the abacus, we are left without any information concerning the colour, as this piece is not

preserved. It could have been plane white or more likely featured a painted egg and dart pattern along its moulding. For our reconstruction, we assumed a colour scheme consistent with that of the egg and dart pattern on the echinus (compare, again, Fig. 19). This solution seems favourable as the red backgrounds would provide contrast with the blue fillet of the volute (confirmed) which also functions as a boundary for the abacus. Regarding the acanthus leaf that masks the transition from the central (red) fillet to the abacus, we propose a red central leaf and blue lateral leaves, although an entirely red leaf in accordance with the attached fillet could be equally plausible. The column shafts were entirely white.

Moving on to the yellow-on-white scheme (layers 06/05), the evidence for colour (other than white) is scantier, probably also because less of it was applied (Figs. 16 a. b). Nevertheless, the colouring of the volute eye has been firmly established. In our hypothetical reconstruction, we decided to render the entire palmette in yellow, viewing it as a unified element akin to the volute eye. This decision takes into consideration that the extensive application of yellow on the volute eye appears to be an imitation of gilding or a gilded bronze application. Consistent with this approach, we also decided to render in yellow the acanthus leaf between the middle fillet and the abacus. Similarly, the small fragment associated with the egg and dart pattern of the echinus lacks colour information; hypothetically, we rendered only the contours of the eggs in yellow. This choice serves to create highlights and offers a striking background for the palmette ornament. For the abacus, we propose a painted egg and dart design, featuring yellow eggs with white highlights. During this final colouring phase, the column shafts remained in a pristine white hue.

Colour as a Medium

Our investigation has uncovered a uniform white stucco coating on both the temple's columns and the stone elements of the entablature, while also shedding light on the polychrome accentuations of the Italic-Ionic capitals. However, we should not forget those parts of the façade where colour additions may have existed but where concrete evidence remains absent. For instance, the column bases may have fea-

tured painted accentuations on both the torus and their characteristic triple fillets. Another remarkable detail of the column base is a row of horizontally aligned holes (width 0.6 cm; depth 0.8 cm) in the scotia, the concave channel between the fillets (Fig. 17). Spaced 1.2–1.8 cm apart, these holes could indicate an attached decoration, possibly glass beads in various colours, encased in metal and affixed with spikes in-

serted into the stone. Alternatively, as the holes are not perfectly equidistant, they might have served to secure a continuous metal band, likely gilded²⁶. Further up, above the capitals, the colour schemes remain unknown. As of yet, not a single piece of a revetment plaque of the wooden architrave has been identified among the extant architectural terracotta, and a detailed study of the roof decoration in terracotta and its surfaces is still pending²⁷. Concerning the members of the frieze and cornice, a Doric-Ionic hybrid in Lapis Albanus, the preserved original coatings may be insufficient to determine their original colours.



17 Largo Argentina, Temple A, construction phase 1 (c. 240 B.C.). Fragment of a column base (AA 202, in two pieces) in Lapis Albanus; note the row of holes in the scotia.

Colour and Architectural Form

Considering these gaps, it is impossible to fully re-construct the original colour scheme of the temple's façade. However, the colour remains on the capital fragments alone offer valuable insights into the role of colour on an important sacred building of Mid-Republican Rome. A comparative analysis of the initial and final colour coatings on the capitals of Temple A not only reveals a fundamental change of the colour scheme but also reflects distinct interactions between colour and architectural form. To comprehend these developments, it is essential to look at colour traditions across the Mediterranean.

The triple scheme of red/blue-on-white has been well-established in the Greco-Roman world since the Archaic period onwards and it became a basic colour scheme for monumental façades, especially in sacred contexts²⁸. Therefore, its application in the foundational building of Temple A during the second half of the 3rd cent. B.C. should not surprise us. What is remarkable, however, is the way in which the colours interact with the architectural form in the initial colour scheme of Temple A. Both red and blue fully cover the spirals, boldly highlighting them in a single hue, perhaps with a painted shading, although this detail could not be definitively confirmed in our

study. The visual effect of this approach would have diverged significantly from contemporary Ionic capitals in Attica, Macedonia, or Asia Minor (compare the left side of Fig. 16 b with Figs. 18 and 19). Typically, Greek Ionic capitals featured volutes with much more delicate spirals, also because a hard material like marble or limestone allowed such intricacies to be carved out. Moreover, while the central volute eye was also fully painted, the spirals of the volutes were only accentuated with a thin line, which subtly highlighted their contours. Such accentuation lines or painted shadows were also applied to other ornamental features, with fully coloured surfaces predominantly employed as backgrounds to create contrasts and thus subtly enhance the three-dimensionality of the carved ornaments. In contrast, the earliest red/blue-on-white scheme of Temple A applied the colours in a rather robust manner, treating the three-dimensional decorative elements almost like a two-dimensional canvas rather than emphasizing their sculptural qualities (Fig. 16 b, left side). One could argue that the initial painters of Temple A prioritized the colours over the architectural form.

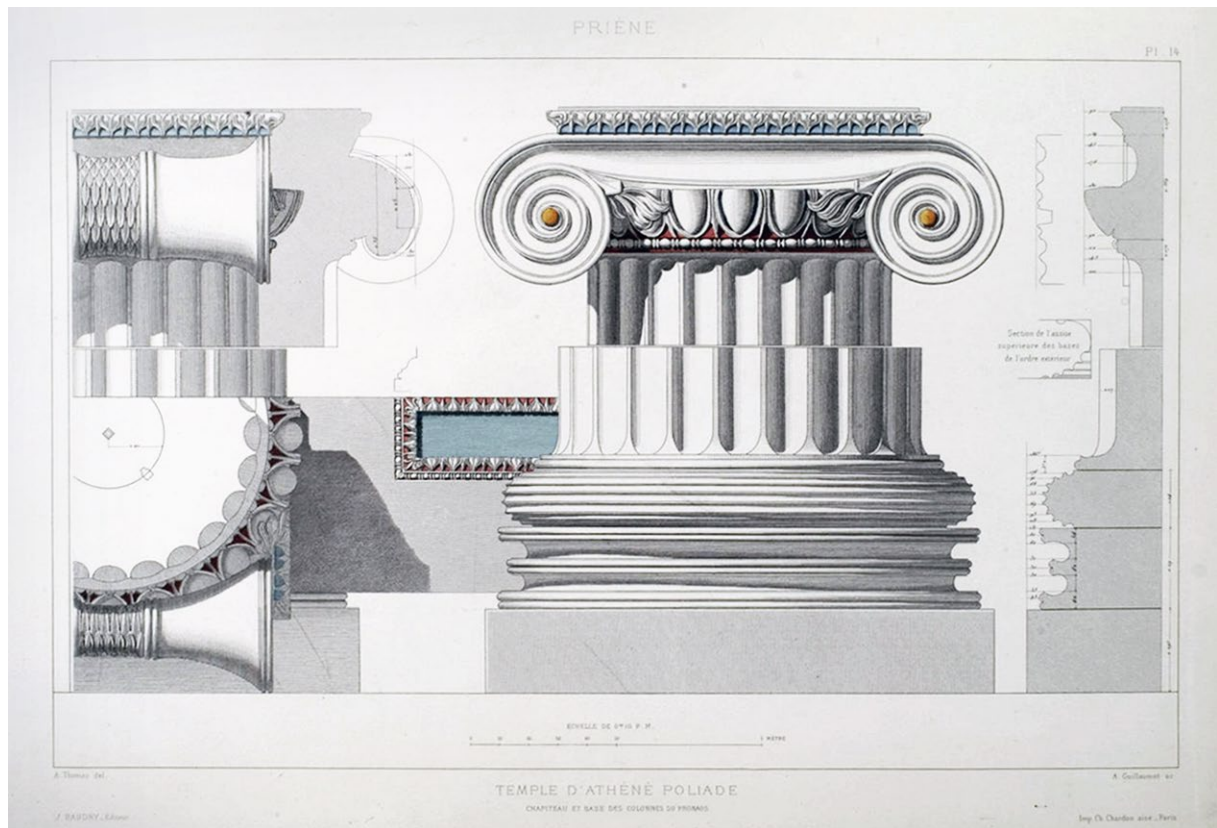
Unfortunately, our understanding of the polychromy in Roman monumental stone architecture from the 3rd cent. B.C. is limited due to scant investigation, making it difficult to evaluate the findings

²⁶ On glass pearls at the columns of the Erechtheion see Stern 1985; further Zink 2019, 8 with fig. 6. (documentation of Donaldson 1836); in other media (painting, mosaics) glass pearls regularly appear in the context of architectural ornaments.

²⁷ See the preliminary report of G. d'Angelo in Zink et al. 2021. Some architectural terracotta from Temples A and C were shown in the exhibition «La Roma de la Repubblica. Il racconto dell'Ar-

cheologia» at the Musei Capitolini in Rome (13.01.2023 – 21.1.2024). In the future, the reconstructions of the different decorative systems presented there should be combined with our analysis of the architecture and polychromy.

²⁸ See the Introduction of this volume and the overviews in Zink 2019, and Zink 2021, 156–160.



18 Priene, Temple of Athena Polias (c. 350 B.C.). Example of Hellenistic carving style with deep under-cuttings for light and shadow effects and reduced colouring

from Largo Argentina in a regional context²⁹. Our most relevant comparisons derive from Etrusco-Italic contexts, such as the tufa-rock-cut and stucco-painted façades of the so-called Tomba Ildebranda (first half of 3rd cent. B.C.) and the Tomba dei Demoni Alati (end of 3rd cent. B.C.) at Sovana, about 150 km north of Rome (Fig. 20). These tomb façades show similarities to the earliest colour coating of Temple A, particularly in highlighting entire elements of the architectural or sculptural decoration in a single colour, often red. Occasionally, the tombs employ colour as a backdrop to bring out an 'unpainted' decorative element. It appears that a primary function of this colour application was to make the tectonic structure more distinguishable from a distance, while also creating a cohesive colour composition across the façade³⁰.

Shifting Colour Trends

It is in the interior of Etrusco-Italic tombs that we find important testimonies of the process of 'Hellenization' in Northern and Central Italy – namely the adoption on Italic soil of artistic practices and concepts that had previously emerged in Greek/Hellenistic contexts. The evidence from the tombs even suggests different speeds in the adoption of Greco-Hellenistic painting repertoires for the interior and exterior surfaces³¹. While the tomb façades continued to employ the bold and robust mode of colour rendering as previously mentioned, the wall paintings inside many Etruscan tombs from the 4th cent. B.C. began to move away from two-dimensional elements, such as the stripe friezes, towards an ornamental repertoire incorporating painterly innovations like

²⁹ For an overview on findings/observations of coloured stucco traces on monumental tufa architecture in Republican Rome, see Mattern 1999, 24–26 who concludes: «Leider ist die Bemalung des Außenstückes in der stadtrömischen Architektur schwer zu erschließen, da Farbspuren nur ausnahmsweise beobachtet worden sind». (Unfortunately, the painting of exterior stucco in the

architecture of Rome is difficult to determine, as traces of paint have only been observed in exceptional cases).

³⁰ On the Sovana tombs, see Barbieri et al. 2013 and, in particular on the intended colour effect, Barbieri 2015.

³¹ For this and the following, see Steingraber 2006, 195. 205–207.



19 Lefkadia, Tomb of the Palmettes (3rd cent. B.C.). Visualization of the extant colour scheme

shadows, dark-light effects (*chiaroscuro*), painted highlights and a much broader colour palette. In Greece, such complex painting can be found on carved stone façades from the Late Classical period



20 Sovana, Tomba Ildebranda (first half of 3rd cent. B.C.). Reconstruction model with polychromy in the Archaeological Museum of Sovana

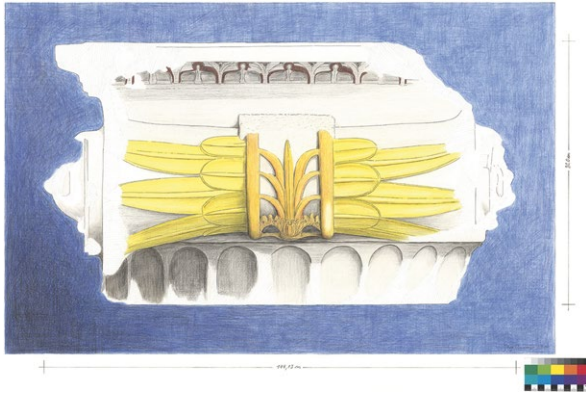
onwards (end of 5th cent. B.C.), and later also in the form of ornaments that were illusionistically painted onto smooth mouldings³². During the 4th cent. B.C., this knowledge must have been disseminated through Magna Graecia to Central Italy where it first appeared inside some tombs³³. The exterior façades underwent ‘Hellenization’ at a slower pace than the interiors. Also at Temple A, there is no indication that the painter of the earliest red/blue-on-white scheme was influenced by the painterly rendering of façades as it was practiced in the Eastern Mediterranean.

Innovations in the style of ornamental carving are also essential to consider. By the late 4th cent. B.C. and particularly during the 3rd cent. B.C., a novel approach to architectural carving emerged, possibly originating in Asia Minor. It employed high relief to create stark light and shadow effects, and this also had a lasting impact on architectural colour rendering (Fig. 18 is a good example). Here, colour was reduced to a mere accentuating tool, enhancing the three-dimensional qualities of the intricate architectural forms³⁴. Temple A’s architectural elements align with this Hellenistic tradition – but not its initial colour scheme, as we have seen. Notably, the Italic-Ionic capitals of Temple A attest very sophisticated and high-quality carving in the best Hellenistic fashion: spatially complex, deeply undercut, and with perfectly sharp contours. Their palmettes are a further testimony of this impressive craftsmanship. Additional-

³² Zink 2019, 11 (with bibliography and examples).

³³ Steingraber – Mainoldi 2006, 205 f.

³⁴ Summitt 2000, 301.



21 Magnesia on the Maeander, Temple of Artemis Leukophryene (2nd cent. B.C.). Capital from the temple's exterior order with colour reconstruction according to the results of a scientific analysis carried out in the Antikensammlung, Staatliche Museen zu Berlin

ly, the column bases and socle profiles of the cella wall also feature deeply undercut mouldings for pronounced light and shadow effects. The triple fillets of the column bases are even strongly reminiscent of models from Ionia (compare Figs. 17 and 18).

In summary, Temple A adopted progressive Hellenistic architectural forms, while its original red/blue-on-white surface coating, though following a long-established Greek colour combination also prevalent in Etruria and Central Italy, applied the colours in a mode that was influenced by Etrusco-Italic painting traditions. It was only the yellow-on-white surface renewal, which, at some point during the 2nd cent. B.C., also brought the temple's colour scheme up to date with the latest Hellenistic fashion. A single colour, a bright yellow hue, was now applied as the only colour differentiator, covering the volute's central eye and possibly the entire palmette/medallion ornaments, probably mimicking the appearance of gilded metal applications (Fig. 16 b, right side). The volutes and their fillets now remained entirely white to allow the architectural form to display its full effect through the interplay of light and shadow.

From a broader perspective, the adoption of the yellow-on-white scheme corresponds to a prevalent colour trend of the 2nd cent. B.C. Hermogenes, the architect of the temple of Artemis at Magnesia on the Meander (Western Turkey), embraced architectural

ornamentation characterized by extreme relief. When colouring the temple's Ionic capitals, Hermogenes diverged from the century-old triple colour scheme of blue-red-on-white, which was occasionally enhanced with the use of yellow. Instead, Hermogenes opted for a simpler yet luxurious palette of white and yellow, likely to imitate gilded bronze (Fig. 21)³⁵. Already earlier, gilded metals appeared in the context of Corinthian capitals, while gold, the material traditionally associated with the divine, along with white, became fashionable in Hellenistic palace architecture. We see a reflection of this trend in Roman wall paintings, which probably followed Alexandrian models³⁶. Hermogenes, who was portrayed by the Roman writer Vitruvius (3, 2, 6; 3, 3, 8–9) as an innovator, may have been among the pioneers who transferred the yellow-on-white scheme to a monumental temple façade. The incorporation of this scheme at Temple A signified the latest Hellenistic colour trend reaching Rome. To contemporary observers, the newly renovated Temple A would have appeared as a modern and groundbreaking structure merely through a face-lift of its colours.

Overall, Temple A now emerges as a prime example for the cultural and aesthetic paradigm shift which happened in Roman architectural polychromy during the 2nd cent. B.C. with the introduction of the innovative yellow-on-white scheme associating yellow with gold. This scheme was not just a merely new colour combination but, due to its mode of application, also a strategy to bring out the three-dimensional qualities of the architectural forms along with a stronger emphasis on the light and shadow effects. It reflects a new understanding of architectural form, and we may indeed see here an early example of some fundamental developments in Roman architecture. During the Augustan period, the yellow/gold and white scheme became a trademark of Roman temple design, and it marked the urban image of Rome so much that it became a literary topos³⁷.

The gradual reduction of architectural colouring was later advanced with the application of the running drill, enabling extensive under-cuttings. This development culminated in Imperial carving styles characterized by intricate ornamental patterns that heavily relied on chiaroscuro contrasts while minimizing the use of colour. The emerging evidence from

³⁵ Zink et al. 2019; see especially the contribution of L. Haselberger in this volume.

³⁶ See Zink 2019, 11 f.; Zink 2021, 172 with references and bibliography.

³⁷ Prop. 4, 1, 5: «*fictilibus crevere deis haec aurea templa*» («these golden temples sprang from gods made of clay»); Ov. Ars. 3, 113:

«*simplicitas rudis ante fuit: nunc aura Roma est*» («raw simplicity was before, now Rome is golden»). The architectural reality of the concept was first formulated in Gros 1976, 41 f.; see more recently Zink 2009, with evidence from the Palatine temple of Apollo.

Temple A, although still a singular example, suggests that this Imperial architectural aesthetic may have originated in the Late Republican period when, also in Rome, a new appreciation for architectural modelling through light and shadow emerged, often accompanied by accentuations of yellow or gold.

In conclusion, our collaborative research project showcases the process of re-contextualizing ancient architectural colouring, emphasizing the necessity of integrating disciplines such as architecture, archaeo-

logy, conservation science, and material science. This interdisciplinary approach is essential for investigating colour as an architectural medium with its unique phenomenology, semantics, and symbology, in addition to its nuanced dialogue with the architectural forms. Temple A provides a striking example of how colour alone could profoundly impact the aesthetic and cultural significance of a building, even without altering its architectural form.

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Fig. 19 Kostis Iliakis (after Rhomiopoulou et al. 2010, colour pl. 8)

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