

Colour and Space: Old Questions – New Answers?

Stephan Zink

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Boulanger's painting epitomizes quite well the topics that are at stake when addressing the interfaces of architectural space, sculpture and colour in antiquity. It shows how architecture and its colours functioned as a backdrop for sculpture, and how the two media interacted with each other. We see how colour and texture modified both architectural and sculptural surfaces, influencing the perception of space and form. We also see the impact of light and shadow, and their interaction with different surfaces through reflection. Lastly, we are reminded of the colour effects of other materials such as textiles, metals, glass as well as plants.

At the same time, Boulanger also makes us aware that the questions which this volume addresses are by no means new. The 19th century was the foundational period of polychromy studies and, in fact, its scholarship already touched upon all aspects of colour and space that are discussed in this volume. However, for architects, researchers, philosophers, and writers of

that time, evidence from antiquity served as *exempla* of how things should be executed in their contemporary era². In this sense, Napoleon's Pompeian house in Paris also offered guidance on how to approach construction, sculpture, and colour application.

Today, the analytical possibilities of colour research are completely different and the database of colour findings has also increased³. Does this progression allow us to find new answers to some of the old questions on the interfaces of architecture and sculpture? The 10th Round Table on Polychromy in Ancient Architecture and Sculpture, held in Berlin in November 2020, was an attempt to approach this question. The 18 papers (out of 30 conference contributions) that made it into this volume reflect a broad scope – geographically, chronologically, and thematically – while providing investigative depth that combines various thematic focal points with cutting-edge material analysis and visualization⁴. The volume organizes the papers according to the three themes – «Re-Contextualization and Visualization: Sculpture and Architectural Settings», «Interiors and Exteriors: Colour as a Medium of Architecture», and «Semantics and Symbolisms: Colours and their Meanings» – and it is concluded by the section «News from Museum Research», which reports on the latest colour investigations in various museum collections in Europe and the USA. We should point out that, within the different sections of this volume, the papers are not strictly arranged according to chronology but rather according to their thematic overlaps so as to allow a diachronic tracking of certain colour phenomena. There are also various thematic threads which run across all these papers, threads that have their roots precisely in the old, yet still relevant and highly interesting, questions of the 19th century. It is worthwhile pointing some of them out and thus offer the reader various ways of working through the papers of this volume.

1 Savorra 2006, 25 f. Before demolition, Normand carried out an extensive photographic documentation which remains accessible.

2 See Hassler 2014; Hennemeyer 2017.

3 On methodologies for research on sculptural polychromy see Østergaard 2017 (note, however, that the field is constantly de-

veloping, especially in terms of methods of scientific analysis; updates expected in Østergaard 2024 as well as Liverani 2024; for states of knowledge see Østergaard 2019 (sculpture) and Zink 2019 as well as Zink 2021 (architecture).

4 All papers published in this volume underwent a double-blind peer review process.

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Colour Systems

Already in the 19th century, architect-researchers began to observe that some colour schemes were systematically used during antiquity. For Greek Doric temples, for instance, they identified general principles of colour application, noting that light colours (white/off-white) were typically reserved for the main architectural volumes, while stronger colours were used for ornamentation and decorative elements. In this case, the basic colour scheme consisted of a combination of blue (or black), red, and white. As a general guideline, red was applied to horizontal parts of the entablature, while blue or black was used for the vertical elements (Fig. 2)⁵.

Indeed, this so-called colour triad of red, blue/black, and white remained a fundamental principle throughout antiquity, appearing not only on Doric but also Ionic columnar orders of the Hellenistic period, on grave stelai, and even on Imperial ceilings (Fig. 3). Possibly even the famous statue of Augustus from Prima Porta featured this scheme, as one reconstruction suggests (Fig. 4)⁶; and it was used for the painted backdrop of the colossal statue in the Forum of Augustus, as L. Ungaro elaborates in this volume (Fig. 5). Overall, the triad of the red, blue, and white seems to have served as a universal colour scheme in the Greco-Roman world.

Recent research indicates that during the Hellenistic period, temples and palaces started to adopt an alternative colour scheme incorporating yellow or gold on white background⁷. The shift was accompanied by a new carving style that favoured highly sculptural architectural ornamentation with deep undercuttings, creating dramatic light and shadow effects. Even in cases where the traditional colour triad of red, blue, and white was still utilized, these colours were applied in a more restrained manner, often leaving portions of the ornamentation reserved in white.

These colour systems and their variations are, directly or indirectly, a topic in several papers across this volume. For example, P. Jockey and A. Alfeld studied the blue/black, red and white scheme on the frieze of the Siphnian Treasury at Delphi (525 B.C.) and acutely unfold the astonishing artistic and technical virtuosity of its material manifestation in their contribution. We invite the reader to compare this

evidence with the well-known and now re-investigated sphinx from the Metropolitan Museum which is presented in the research report of S. Hemingway, S. Lepinski, D. H. Abramitis, E. Basso, F. Carò and M. Leona. It represents a contemporary parallel to the Siphnian frieze, also with subtle colour differentiations, including varieties of blue.

The paper by G. Verri, B. Bourgeois, Y. Vandenberghe, V. Jeammet and nine other colleagues investigates the colour purple on Lekythoi and Tanagra-type statuettes. It also exemplifies how, during the 4th and 3rd centuries B.C., colour palettes expanded and vibrant colours increased, leading to what the authors call a revolution of «colour and shine». L. Haselberger looks at colour use in Hellenistic temple architecture in Western Turkey and shows how the new sensitivity for light and shadow in architecture not only transformed the application of the traditional triad of red, blue and white, but also paved the road for Hermogenes' use of yellow/gold on white in his pioneering Magnesian temple. In light of the general phenomenon of colour reduction, Haselberger introduces the term «Polychrome White Temple» for this and other examples of the colour scheme. His new colour reconstruction of a pilaster capital in the Adyton of the Temple of Apollo at Didyma (ca. 170 B.C.) seems to offer a combination of the two colour systems. Further, the paper of S. Zink, J. Hainbach, I. Reiche, J. Pflug and M. Ceci appears to be almost a continuation of this story in the city of Rome, as it shows how the yellow-on-white system was introduced to the *Urbs*. L. Ungaro then demonstrates how such schemes echo in the interiors and on the façades of the Forum of Augustus, albeit with a new main component, the coloured marbles.

The contribution of T. Chapa Brunet, M. Belén Deamos and M. F. Pérez Blasco provides an interesting and rare perspective on the pre-Roman Iberian Peninsula (6th to 1st cent. B.C.) and makes us wonder if and how this area participated in the Greek-Hellenistic colour systems. It is fascinating to see in the paper of S. Pedone and P. Andreuccetti how the basic elements of both colour systems – blue, red, gold, and white – live on in different ways and are expressed in the architecture and sculpture of the Medieval period

5 E. g. Borrmann 1888; Durm 1910, 224–242; see Zink 2019, 29–31 for a brief discussion of the literature.

6 Liverani 2004.

7 Overviews in Zink 2019 and Zink 2021, with further bibliography.



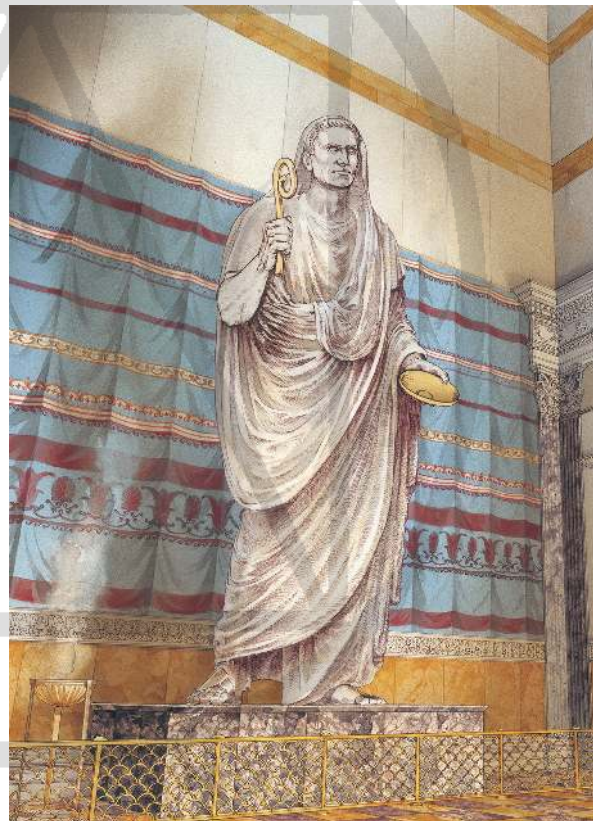
2 Aegina, colour reconstruction of the Late Archaic Temple of Aphaia, c.500 B.C.



3 Rome, Via Latina, Tomb of the Pancratii or «Coloured Tomb», early to mid-2nd cent. A.D.



4 Augustus of Prima Porta according to the colour reconstruction of P. Liverani



5 Rome, Forum of Augustus, 2 B.C., reconstruction of the «Sala del Colosso»

in the Latin West and the Byzantine East. Finally, numerous Alabaster panels produced between 1350 and 1550 in the English Midlands for narrative cycles of altarpieces also highlight these colours but seem to

add green to the palette. The project of M. Mulliez, A. Mounier and M. Schlicht investigated their polychromy and produced highly sophisticated colour reconstructions which are presented here.

Meaning and Context

The choice of a specific colour system and its mere existence prompts inquiry into the meaning of colours. Were these choices merely based on agreed-upon visual and aesthetic conventions, or did certain colour schemes hold specific symbolic meanings? Karl Bötticher broached this topic in 1874 and suggested a distinction between a religious/cultic and a private context of colour use. In the private domain, Bötticher suggested that colours were primarily used to invoke emotional or, as we might say, atmospheric effects. Conversely, within a sacred context, he argued that certain colours carried distinct meaning. For example, the red face of Dionysos and his followers signify ecstasy, Zeus' purple attire identified him as the supreme deity, water-green was linked to Poseidon, white symbolized light and festive purity, and black represented the colour of night and grief⁸.

Recent observations also make us wonder about the religious symbolisms of architectural colouring from a spatial perspective. In 2010, Ursula Mandel highlighted the colour change in the famous ramp of the so-called House of Augustus in Rome, where the colours of walls and ceilings shifted from a polychrome to a monochrome or grisaille tone between the fore room and the actual ramp (Fig. 6)⁹. Given that the ramp led to a sacred cult site¹⁰, it raises the possibility that the colour shift or, more precisely, the disappearance of polychromy, symbolically denoted the transition from the worldly (polychrome) to a sacred realm. Following this interpretation, the monochrome grisaille colour scheme would carry sacred symbolism.

An iconic example of a near-monochrome style is the statue of Mars which is painted on a wall in the House of Venus at Pompeii. Displayed against a garden background and dark sky, the whiteness of the statue effectively accentuates its contours against the dark setting (Fig. 7). Could the statue's whiteness also

convey a sacred connotation that complements its heroic nudity? The same question can be asked for the colossal statue of Augustus in his Forum in Rome, where the white statue was set against a painted curtain (Fig. 5). In this case, however, the problem is that we only have very few fragments of the statue and its complete whiteness remains a conjecture. In any event, these examples provoke thoughts on the interplay between the symbolically assigned colours of statues and their architectural settings. Was a colourful backdrop required to contrast with the whiteness of a divine statue?

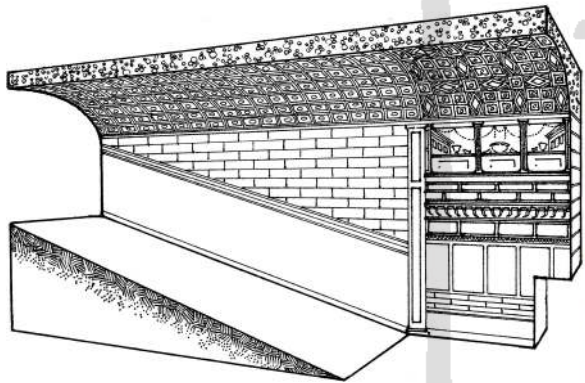
The volume delves into colour semantics and symbolism throughout, with a dedicated section focusing on this theme. One notable paper by G. Verri, B. Bourgeois, Y. Vandenberghe, V. Jeammet and nine other co-authors sheds light on the venerable colour purple, «a symbol of divine splendour, heroic value and aristocratic power» and its dissemination by means of a mass produced item – small terracotta figurines. It is recommended to read this paper together with the research report of B. Bourgeois, Y. Vandenberghe and V. Jeammet on the so-called Pilinia Project, elucidating the technical underpinnings of the purple phenomenon, including a hitherto unknown lime-based painting technique that was specifically used for purple dyes.

Another mass use of colour is investigated by F. Grosser in his paper on the use of faction colours (green, blue, red, and white), meaning the colours which denoted the parties in support of charioteers in the Roman circus. Beyond the space of the circus, faction colours were also charged with a range of different metaphorical meanings and even played a role in funeral art. In Roman Egypt, C. Roberts' study of grave markers reveals different colours for gender and status differentiation, while the abundant use of red seems to be significant to Egyptian funerary

⁸ Bötticher 1874, 54. For more recent and literary approaches to colour symbolism and meaning Bradley 2009; Grand-Clément 2011; Henke 2020.

⁹ Mandel 2010.

¹⁰ Zink 2015 for the discovery of the cult site at the end of the ramp.



6 Rome, Palatine, so-called House of Augustus, around mid 1st cent. B.C.; left: drawing of the ramp and its fore-room; right: detail of the ceiling, which changes from polychrome to grisaille as one begins to move upwards

practices. Red floors and wall paintings also played a key role in the tombs of pre-Roman Iberia, as is pointed out in the paper of T. Chapa Brunet, M. Belén Deamos and M. F. Pérez Blasco.

In the final section on museum research, a captivating exploration by S. Hemingway and colleagues of a late 6th cent. B.C. marble grave stele from the Metropolitan Museum is newly discussed. The brightly coloured sphinx at the top contrasts with the minimally coloured human figures below, except for an object held by the main figure. Could the absence of colour in the human figures signify their transition to the underworld, the domain of the deceased?

A few papers look at sculptural colour symbolism in concrete architectural scenarios. J. Østergaard investigates the colour black in two specific cases: firstly, as an architectural backdrop for the sculpture of the Erechtheion, and secondly in the portrait sculpture that was the focal point of a high Imperial theatre in Campania. Østergaard argues that black stone often came with a material prestige and positive connotations that were independent of the literary (and often negative) uses of the colour black. It is interesting to read this paper along with E. Walter-Karydis' masterly overview on wall decorations of Hellenistic houses, where the painted dark backgrounds were reserved for secondary zones. A colour-centred perspective can also open up a new avenue of semantics as in the paper of G. Verri, K. Raff, C. Granzotto and R. Sabino which offers an in-depth analysis of the colours of an Etruscan architectural terracotta (3rd/2nd cent. B.C.) depicting a giant battling two mythical figures. Their understanding of the clothing through the colours enhances our knowledge of ancient fashion, while also demonstrating that the piece cannot have been an exposed roof terracotta, as has been generally assumed.

Not surprisingly, gold (or yellow as a replacement for gold) is a colour and material highly



7 Pompeii, «House of the Venus in a Shell», wall painting 1st cent. A.D.

charged with symbolic meaning. It is addressed in L. Haselberger's paper on Hermogenes and Hellenistic temple design and also in the paper on Temple A at Largo Argentina. In this contribution, S. Zink, J. Hainbach, I. Reiche, J. Pflug, and M. Ceci suggest that the transition from the blue/red-on-white scheme to the yellow-on-white scheme was part of a cultural transfer known as Hellenization – and, indeed, it foreshadowed the *aurea templa*, the golden temples, which seem to have reflected the urban image of Augustan Rome. S. Pedone and P. Andreucet-

ti's paper then bridges the colour history of gold and blue from Imperial to Christian art and shows how gold, blue, and red became part of a symbology of light, serving as an analogy for the splendour of God. The reconstructions of the medieval alabaster

panels by M. Mulliez, A. Mounier and M. Schlicht then showcases how gilding was prominently applied for backgrounds and for the figures' hair and garment hems, thus becoming an element that almost unites the composition in a spiritual way.

Colour, Form, and Light

A longstanding inquiry of polychromy research centres on the role of colour (or surface) in enhancing the form of an object while influencing light and shadow dynamics. Departing from the Neoclassical tradition that favoured form over colour and cautioned against colourful renderings obstructing the form, architects like Leo von Klenze and Gottfried Semper viewed colour as integral to understanding classical architecture's essence (although differing in their detailed perspectives on polychromy's significance)¹¹. Simultaneously, Peter Brøndsted highlighted how colour not only breaks the monotony of stone but also unites disparate architectural elements, enhancing the overall effect by emphasizing individual parts in relation to the whole¹². Thus understood, colour actually enabled a specific reading of the form. In sculpture, this effect is vividly illustrated in the juxtaposition of one of the colour-reconstructions of V. Brinkmann und U. Koch-Brinkmann with the unpainted version of the same piece (Fig. 8). For architecture, an illustrative example is the capital from the Temple of Artemis at Magnesia on the Maeander. As one of 42 capitals of the temple's exterior façade, its colouring must have served precisely to differentiate and unite at the same time (Fig. 9).

«Light is the soul of colour», Karl Bötticher succinctly wrote in 1874¹³, and in fact colour is nothing without light, be it natural or artificial. This seemingly straightforward statement paves the way for extensive exploration in the realm of colour research, offering ongoing avenues for further investigation. Among the recent advancement that shed new light on the topic is the research exhibition «New Light

from Ancient Pompeii and Rome» which provided valuable insights into the interplay between natural light in different areas of Roman houses and the impact of artificial lamp light on the perception of wall paintings¹⁴. Furthermore, modern 3D light simulations have been employed to analyse how translucent marble roofs in temples have created distinct light conditions since the Archaic period, influencing the presentation of cult statues and the polychromatic interior architecture¹⁵.

During the Hellenistic period, sculptors and architects advanced the use of light and shadow in their designs, evident in innovative columnar arrangements, deep undercarvings, and architectural sculpture seemingly detached from the ground, as seen in the Great Frieze of the Pergamon Altar in Berlin (Fig. 10)¹⁶. This shift towards dramatic light and shadow effects often coincided with a reduction in colour, as exemplified by the 1877 colour reconstruction of the Temple of Athena Polias at Priene (Fig. 11)¹⁷. In the analysis of Temple A at Largo Argentina, S. Zink, J. Hainbach, I. Reiche, J. Pflug, and M. Ceci propose that the evolving colour scheme of the 2nd cent. B.C. might reflect these Hellenistic trends in Rome.

In the Roman Imperial era, ornamentation intensified, and the use of the running drill allowed for intricate undercut forms. By the 3rd cent. A.D., this trend reached a pinnacle where shadow almost became a standalone element in architectural design, known as the «flickering effect» of High Imperial architecture (Fig. 12)¹⁸. While abundant colour rendering in this period may seem unlikely, some scholars suggest the possibility of accentuated renderings, such as high-

11 See Zink 2021, 240 f. in particular; Klenze 1838; Semper 1834.

12 Brøndstedt 1826–1830, 146.

13 Bötticher 1874, 52.

14 Bielfeldt et al. 2022; earlier on light and architecture Heilmeyer – Hoepfner 1990; Schneider – Wulf-Rheidt 2012.

15 See De Lara 2023 for an overview of the evidence as well as a new 3D light simulations of the Parthenon's cella.

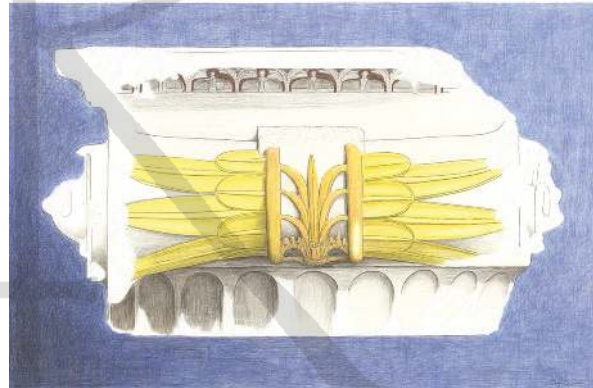
16 Haselberger 2020 analyses this comprehensively.

17 J. B. Summitt has first clearly laid out that the new Hellenistic carving style was often accompanied by an extreme reduction of colour (see Summitt 2000, 281–288. 294. 301).

18 Nolte 1990, 74 f.



8 Statue of a group of Muses from Agnano (perhaps from Delos, 2nd cent. B.C.) and colour reconstruction of V. Brinkmann and U. Koch-Brinkmann



9 Columnar capital from the Temple of Artemis at Magnesia on the Maeander (first half of 2nd cent. B.C.), now in the Antikensammlung Berlin, and colour reconstruction according to surface analysis



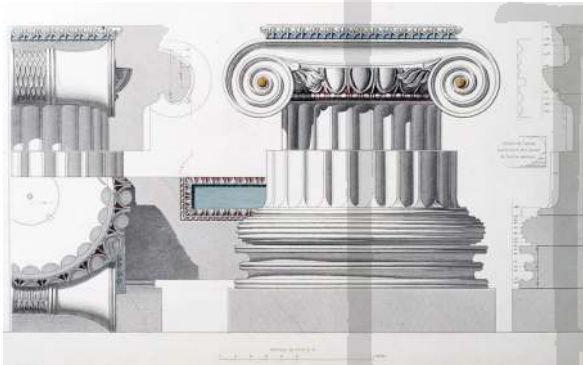
10 Pergamon, Great Altar of Zeus, Okeanos fighting two Giants, first half of 2nd cent. B.C., north risalit, inner side to the stairs

lights with gilding, supported by recent discoveries in Nicomedia, Turkey, from the late 3rd cent. A.D.¹⁹. However, the methodological problem which arises here is

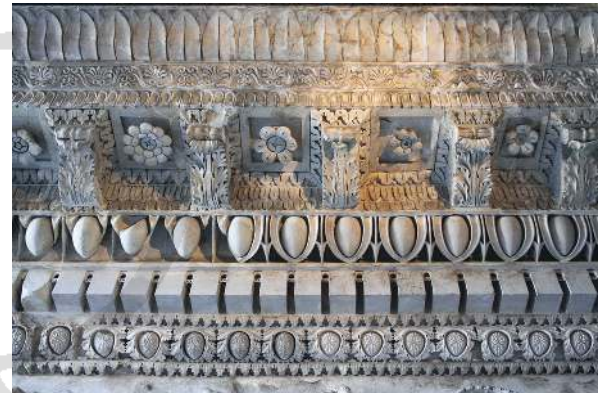
not without irony and valid for all polychromy research: the absence of colour is almost more difficult to prove than the presence of colour.

¹⁹ For the spectacularly painted Tetrarchic reliefs from Nicomedia now comprehensively Ağtürk 2021. Note that the same author has a publication of the corresponding architecture in

preparation; for updates see the project website: <<https://cukurbagarchaeologicalproject.com>> (03.08.2024).



11 Priene, Temple of Athena, 340–150 B.C., colour reconstruction of the exterior columnar order



12 Rome, entablature of the Temple of Vespasian and Titus, dedicated 87 A.D.

Understanding the interplay of colour, form, light, and shadow often revolves around establishing original contexts. Therefore, the volume's first section focuses on re-contextualizations and visualizations of spatial colour scenarios. In analysing the Siphnian Treasury's frieze at Delphi, P. Jockey and M. Alfeld establish the distribution of various colour hues across the different sides of the building, considering their specific light conditions. Examining Iberian sculpture and architecture through funerary contexts, T. Chapa Brunet, M. Belén Deamos, and M. F. Pérez Blasco offer insights into the polychromy of unknown settings, envisioning the vibrant spaces they might have adorned. L. Ungaro reconstructs the sensory experience of materials and space at the Forum of Augustus, showcasing a blend of white and coloured marbles alongside gilded metals. E. Cannà, K. Lapatin, P. Marraffa, F. Sirano, and M. Svoboda focus on re-contextualizing Roman villa sculptures post the eruption of A.D. 79, virtually reconstructing the peplophoros found in the Villa dei Papiri at Herculaneum to illustrate the impact of viewing polychrome statues within their intended environment. Further-

more, S. Bracci, G. Bartolozzi, R. Iannaccone, D. Magrini, P. Liverani, S. Lenzi, and R. Manganelli Del Fà delve into the polychromy of sculptural furniture at the Villa of Poppaea at Oplontis, exploring potential backdrop colours and the sculptures' versatility within the architectural setting.

Various contributions look at how colour, light, and shadow affect the perception of sculptural or architectural form. Examples include the enlightening exploration of the Met Sphinx by the team around S. Hemingway, the study of painting techniques by P. Liverani, the detailed analysis of the Temple of Artemis at Magnesia by L. Haselberger, and the exterior colour transformations of Temple A at Largo Argentina by S. Zink and co-authors. Notably, the recent discoveries from temples at Magnesia, Didyma, and Largo Argentina underscore the significance of white as a colour in shaping contours and enhancing light and shadow effects. The volume's examination of colour application on three-dimensional surfaces concludes with compelling reconstructions of painted medieval alabaster panels by M. Mulliez, A. Mounier, and A. Schlicht.

Imitation and Illusion

As a last point, imitation should not be overlooked, the seeming transformation of a material through the application of surface coating, a recurring theme throughout ancient polychromy. In its more complex phenomenology, not only material was imitated through painting but also form. Such illusionistic colour rendering was capable of even replacing carved architectural decoration. For example, Macedonian

tombs from the end of the 4th cent. B.C. provide us with examples of egg and dart ornaments that are painted in an illusionistic manner, including lighting, instead of being carved out of the stone (Fig. 13). It is generally assumed that the development of these sophisticated illusionistic painting techniques on both sculpture and architecture followed that of panel painting. According to this theory, by the end of the 5th cent.

B.C., painters had learned how to create shading or *chiaroscuro* as well as perspective and the illusionistic effects of depth, and during the Late Classical and Hellenistic periods, these achievements also found their way onto architectural surfaces and became widely distributed across the Mediterranean²⁰.

In Spain, during the 4th cent. B.C., tin was used to imitate silver jewellery on a stone sculpture known as the «Lady of Baza», presented by T. Chapa Brunet, M. Belén Deamos, and M. F. Pérez Blasco. Unsurprisingly, gold was the most commonly imitated material and was mimicked using bright yellow ochre (goethite) or orpiment, with various shades of brown, either to represent gilding or gilded bronze. With the introduction of the yellow-on-white colour scheme in architecture during the Hellenistic period, yellow, as a substitute for gold, gained particular significance. L. Haselberger compiles the evidence from the Ionic temples at Magnesia and Didyma, both featuring instances of gold imitation. The columnar capital of the Magnesian Artemision employs shades of yellow to give architectural ornaments the appearance of gilded bronze, complete with painted shading and subtle material nuances²¹. At Didyma, the ceiling of the temple's staircase showcased rosettes painted to resemble gilded bronze applications. Moving to Rome, the use of yellow accentuations during the 2nd cent. B.C. renovation of Temple A at Largo Argentina aimed to emphasize the form of the Italic Ionic capitals with seemingly gilded highlights, as proposed by S. Zink and colleagues.

Particularly revealing is the evidence presented by E. Canna, K. Lapatin, P. Marraffa, F. Sirano, and M. Svoboda regarding the peplophoros statue from the Villa dei Papiri at Herculaneum (1st cent. A.D.). The statue, carved from white marble, likely Pentelic, leans against a pilaster, also made of white marble but painted to imitate either a veined stone or a precious wood. Additionally, the paint on the white marble plinth was designed to mimic rosso antico or porphyry. These imitations of luxurious materials helped blend the statue seamlessly into its architectural setting, which was adorned with coloured marble revetments. The accompanying 3D reconstruction illustrates this dialogue across space between faux painted and real materials.

In conclusion, the 10th edition of the Polychromy Round Table embarked on an experimental journey by focusing on a central theme, marking a shift from past



13 Vergina, Tomb of the Prince (Tomb III), end of 4th cent. B.C., painted egg and dart moulding above frieze

iterations. The idea had been floating around for some time, and, as organizers and editors, we are grateful for the enthusiastic reception from our colleagues towards this novel approach. Since the inaugural Round Table in 2009, the community of polychromy researchers has significantly expanded, along with the databases and shared knowledge. It was collectively agreed that the time had arrived to delve systematically into broader questions that arise when gathering colour data in the field or from storage areas.

Hosted by the German Archaeological Institute's Division of Building Archaeology, with its focus on the study of ancient building remains, and the Antikensammlung of the Staatliche Museen zu Berlin, renowned for its exceptional architectural collection, the focus of this meeting centred on architecture. However, the Polychromy Round Table has traditionally spotlighted sculpture, reflecting the more advanced state of research on sculptural polychromy both quantitatively and qualitatively compared to that on architecture. Against this backdrop, the theme of «Colour and Space» emerged as a unifying concept encompassing both architecture and sculpture. Architecture revolves around crafting space, while sculpture, as a spatially intricate object, is inherently tied to its spatial environment. Despite being categorized as distinct mediums with differing design and production processes, this volume underscores their interconnectedness in antiquity, illustrating how they were conceptually linked.

²⁰ See Zink 2019, 11 with further bibliography.

²¹ As the investigation of the Antikensammlung Berlin has shown (Zink et al. 2019).

Bibliography

- Ağtürk 2021** T. Ş. Ağtürk, The Painted Tetrarchic Reliefs of Nicomedia: Uncovering the Colourful Life of Diocletian's Forgotten Capital, *Studies in classical archaeology* 12 (Turnhout 2021)
- Bankel 2004** H. Bankel, Farbmodelle des spätarchaischen Aphaia-Tempels von Ägina, in: U. Wurnig – R. Wünsche – V. Brinkmann (eds.), *Bunte Götter. Die Farbigeit antiker Skulptur*, Exhibition catalogue Munich (Munich 2004)
- Bielfeldt et al. 2022** R. Bielfeldt – J. Eber – S. Bosche – F. S. Knauss, *Neues Licht aus Pompeji*, Exhibition catalogue Munich (Oppenheim 2022)
- Blume-Jung et al. 2020** C. Blume-Jung – V. Brinkmann – U. Koch-Brinkmann – B. L. Kress – H. Piening, *Delos. Die Farben der Insel von Artemis und Apoll*, in: V. Brinkmann – U. Koch-Brinkmann (eds.), *Bunte Götter, Golden Edition, Die Farben der Antike*, Exhibition catalogue Liebieghaus Skulpturensammlung Frankfurt am Main (Munich 2020) 82–91
- Borrmann 1888** R. Borrmann, Polychromie (der Bauwerke), in: A. Baumeister (ed.), *Denkmäler des klassischen Altertums zur Erläuterung des Lebens der Griechen und Römer in Religion, Kunst und Sitte* (Munich 1888) 1335–1343
- Brøndsted 1826** P. O. Brøndsted, *Reisen und Untersuchungen in Griechenland: nebst der Darstellung und Erklärung vieler neu entdeckter Denkmäler griechischen Styls, und einer kritischen Übersicht aller Unternehmungen dieser Art, von Pausanias bis auf unsere Zeit 2* (Paris 1826)
- Bötticher 1834** K. Bötticher, *Die Lehre der tektonischen Kunstformen: dorische, ionische und korinthische Bauweise* ²(Berlin 1874)
- Bradley 2009** M. Bradley, *Colour and Meaning in Ancient Rome*, *Cambridge classical studies* (Cambridge 2009)
- Carettoni 1983** G. Carettoni, *Das Haus des Augustus auf dem Palatin, Kulturgeschichte der antiken Welt. Sonderband* (Mainz 1983)
- Durm 1910** J. Durm, *Handbuch der Architektur. Zweiter Theil. Die Baustile, Historische und Technische Entwicklung 1: Die Baukunst der Griechen* ³(Leipzig 1910)
- Grand-Clément 2011** A. Grand-Clément, *La fabrique des couleurs: Histoire du paysage sensible des Grecs anciens: VIII^e – début du V^e s. av. n. è.* (Paris 2011)
- Haselberger 2020** L. Haselberger, *Der Pergamonaltar und der Architekt Hermogenes: Schatten, Raum und Wahrnehmung* (Berlin 2020)
- Hassler 2014** U. Hassler (ed.), *Maltechnik & Farbmittel der Semperzeit* (Munich 2014)
- Heilmeyer – Hoepfner 1990** W.-D. Heilmeyer – W. Hoepfner (eds.), *Licht und Architektur, Schriften des Seminars für Klassische Archäologie der Freien Universität Berlin* (Tübingen 1990)
- Henke 2020** F. Henke, *Die Farbigeit der antiken Skulptur: Die griechischen und lateinischen Schriftquellen zur Polychromie* (Wiesbaden 2020)
- Hennemeyer 2017** A. Hennemeyer, *Antike Architekturpolychromie im 19. Jahrhundert. Mit wissenschaftlicher Methode und künstlerischer Einfühlung vom Fragment zum Gesamtbild*, in: U. Hassler (ed.), *Langfristperspektiven archäologischer Stätten. Wissensgeschichte und forschungsgeleitete Konservierung* (Munich 2017) 275–298
- von Klenze 1838** L. von Klenze, *Aphoristische Bemerkungen gesammelt auf seiner Reise nach Griechenland* (Berlin 1838)
- de Lara 2023** J. de Lara, *3D Physically Based Rendering Applied to the Problem of Translucent Marble Tiles as Means of Illuminating Classical Greek Temples: The Parthenon as Case Study*, *JASc Reports* 51, 2023, 104120; <https://doi.org/10.1016/j.jasrep.2023.104120>
- Liverani 2004** P. Liverani, *L'Augusto di Prima Porta*, in: P. Liverani (ed.), *I colori del bianco. Policromia nella cultura antica* (Rome 2004) 235–242
- Liverani 2024** P. Liverani, *The Study of Colour: Convergence of Methods and Disciplines. Development Perspectives*, in: E. Neri (ed.), *Polychroma. The Meaning of Colours in Roman Sculptures* (Milan 2024) 31–41
- Mandel 2010** U. Mandel, *On the Qualities of the «Color» White in Antiquity*, in: V. Brinkmann – O. Primavesi – M. Hollein (eds.), *Circumlitio. The Polychromy of Antique and Mediaeval Sculpture. Proceedings of the «Johann-David-Passavant-Colloquium Circumlitio. The Polychromy of Antique and Mediaeval Sculpture»*, 10–12 December 2008 (Munich 2010) 303–323
- Nolte 1990** S. Nolte, *Schatteneffekte im Ornament der Kaiserzeit und der Einfluss des Lichtes auf die Ornamentik*, in: W.-D. Heilmeyer – W. Hoepfner (eds.), *Licht und Architektur, Schriften des Seminars für Klassische Archäologie der Freien Universität Berlin* (Tübingen 1990) 72–78

Colour Systems

Already in the 19th century, architect-researchers began to observe that some colour schemes were systematically used during antiquity. For Greek Doric temples, for instance, they identified general principles of colour application, noting that light colours (white/off-white) were typically reserved for the main architectural volumes, while stronger colours were used for ornamentation and decorative elements. In this case, the basic colour scheme consisted of a combination of blue (or black), red, and white. As a general guideline, red was applied to horizontal parts of the entablature, while blue or black was used for the vertical elements (Fig. 2)⁵.

Indeed, this so-called colour triad of red, blue/black, and white remained a fundamental principle throughout antiquity, appearing not only on Doric but also Ionic columnar orders of the Hellenistic period, on grave stelai, and even on Imperial ceilings (Fig. 3). Possibly even the famous statue of Augustus from Prima Porta featured this scheme, as one reconstruction suggests (Fig. 4)⁶; and it was used for the painted backdrop of the colossal statue in the Forum of Augustus, as L. Ungaro elaborates in this volume (Fig. 5). Overall, the triad of the red, blue, and white seems to have served as a universal colour scheme in the Greco-Roman world.

Recent research indicates that during the Hellenistic period, temples and palaces started to adopt an alternative colour scheme incorporating yellow or gold on white background⁷. The shift was accompanied by a new carving style that favoured highly sculptural architectural ornamentation with deep undercuttings, creating dramatic light and shadow effects. Even in cases where the traditional colour triad of red, blue, and white was still utilized, these colours were applied in a more restrained manner, often leaving portions of the ornamentation reserved in white.

These colour systems and their variations are, directly or indirectly, a topic in several papers across this volume. For example, P. Jockey and A. Alfeld studied the blue/black, red and white scheme on the frieze of the Siphnian Treasury at Delphi (525 B.C.) and acutely unfold the astonishing artistic and technical virtuosity of its material manifestation in their contribution. We invite the reader to compare this

evidence with the well-known and now re-investigated sphinx from the Metropolitan Museum which is presented in the research report of S. Hemingway, S. Lepinski, D. H. Abramitis, E. Basso, F. Carò and M. Leona. It represents a contemporary parallel to the Siphnian frieze, also with subtle colour differentiations, including varieties of blue.

The paper by G. Verri, B. Bourgeois, Y. Vandenberghe, V. Jeammet and nine other colleagues investigates the colour purple on Lekythoi and Tanagra-type statuettes. It also exemplifies how, during the 4th and 3rd centuries B.C., colour palettes expanded and vibrant colours increased, leading to what the authors call a revolution of «colour and shine». L. Haselberger looks at colour use in Hellenistic temple architecture in Western Turkey and shows how the new sensitivity for light and shadow in architecture not only transformed the application of the traditional triad of red, blue and white, but also paved the road for Hermogenes' use of yellow/gold on white in his pioneering Magnesian temple. In light of the general phenomenon of colour reduction, Haselberger introduces the term «Polychrome White Temple» for this and other examples of the colour scheme. His new colour reconstruction of a pilaster capital in the Adyton of the Temple of Apollo at Didyma (ca. 170 B.C.) seems to offer a combination of the two colour systems. Further, the paper of S. Zink, J. Hainbach, I. Reiche, J. Pflug and M. Ceci appears to be almost a continuation of this story in the city of Rome, as it shows how the yellow-on-white system was introduced to the *Urbs*. L. Ungaro then demonstrates how such schemes echo in the interiors and on the façades of the Forum of Augustus, albeit with a new main component, the coloured marbles.

The contribution of T. Chapa Brunet, M. Belén Deamos and M. F. Pérez Blasco provides an interesting and rare perspective on the pre-Roman Iberian Peninsula (6th to 1st cent. B.C.) and makes us wonder if and how this area participated in the Greek-Hellenistic colour systems. It is fascinating to see in the paper of S. Pedone and P. Andreuccetti how the basic elements of both colour systems – blue, red, gold, and white – live on in different ways and are expressed in the architecture and sculpture of the Medieval period

⁵ E. g. Borrmann 1888; Durm 1910, 224–242; see Zink 2019, 29–31 for a brief discussion of the literature.

⁶ Liverani 2004.

⁷ Overviews in Zink 2019 and Zink 2021, with further bibliography.



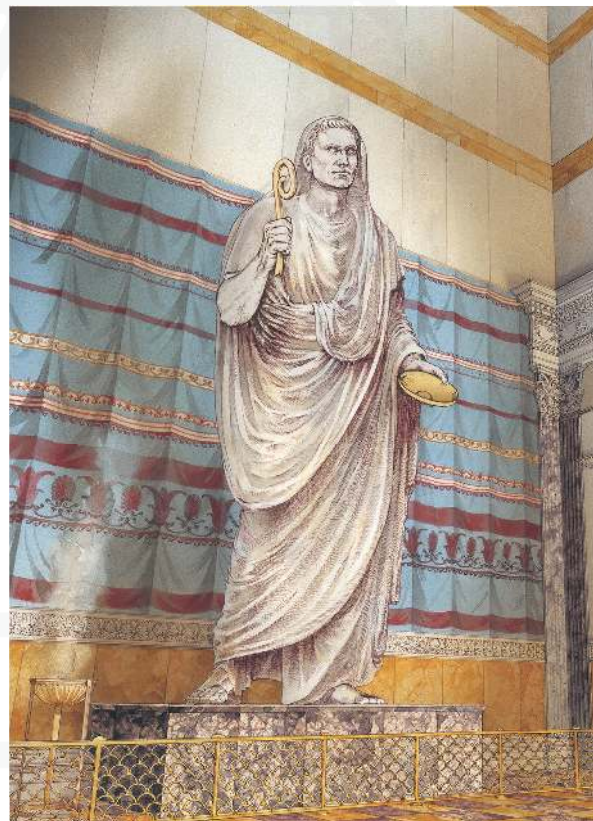
2 Aegina, colour reconstruction of the Late Archaic Temple of Aphaia, c.500 B.C.



4 Augustus of Prima Porta according to the colour reconstruction of P. Liverani



3 Rome, Via Latina, Tomb of the Pancratii or «Coloured Tomb», early to mid-2nd cent. A.D.



5 Rome, Forum of Augustus, 2 B.C., reconstruction of the «Sala del Colosso»

in the Latin West and the Byzantine East. Finally, numerous Alabaster panels produced between 1350 and 1550 in the English Midlands for narrative cycles of altarpieces also highlight these colours but seem to

add green to the palette. The project of M. Mulliez, A. Mounier and M. Schlicht investigated their polychromy and produced highly sophisticated colour reconstructions which are presented here.

Meaning and Context

The choice of a specific colour system and its mere existence prompts inquiry into the meaning of colours. Were these choices merely based on agreed-upon visual and aesthetic conventions, or did certain colour schemes hold specific symbolic meanings? Karl Bötticher broached this topic in 1874 and suggested a distinction between a religious/cultic and a private context of colour use. In the private domain, Bötticher suggested that colours were primarily used to invoke emotional or, as we might say, atmospheric effects. Conversely, within a sacred context, he argued that certain colours carried distinct meaning. For example, the red face of Dionysos and his followers signify ecstasy, Zeus' purple attire identified him as the supreme deity, water-green was linked to Poseidon, white symbolized light and festive purity, and black represented the colour of night and grief⁸.

Recent observations also make us wonder about the religious symbolisms of architectural colouring from a spatial perspective. In 2010, Ursula Mandel highlighted the colour change in the famous ramp of the so-called House of Augustus in Rome, where the colours of walls and ceilings shifted from a polychrome to a monochrome or grisaille tone between the fore room and the actual ramp (Fig. 6)⁹. Given that the ramp led to a sacred cult site¹⁰, it raises the possibility that the colour shift or, more precisely, the disappearance of polychromy, symbolically denoted the transition from the worldly (polychrome) to a sacred realm. Following this interpretation, the monochrome grisaille colour scheme would carry sacred symbolism.

An iconic example of a near-monochrome style is the statue of Mars which is painted on a wall in the House of Venus at Pompeii. Displayed against a garden background and dark sky, the whiteness of the statue effectively accentuates its contours against the dark setting (Fig. 7). Could the statue's whiteness also

convey a sacred connotation that complements its heroic nudity? The same question can be asked for the colossal statue of Augustus in his Forum in Rome, where the white statue was set against a painted curtain (Fig. 5). In this case, however, the problem is that we only have very few fragments of the statue and its complete whiteness remains a conjecture. In any event, these examples provoke thoughts on the interplay between the symbolically assigned colours of statues and their architectural settings. Was a colourful backdrop required to contrast with the whiteness of a divine statue?

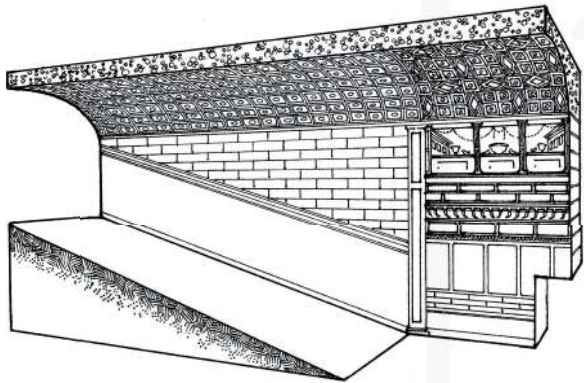
The volume delves into colour semantics and symbolism throughout, with a dedicated section focusing on this theme. One notable paper by G. Verri, B. Bourgeois, Y. Vandenberghe, V. Jeammet and nine other co-authors sheds light on the venerable colour purple, «a symbol of divine splendour, heroic value and aristocratic power» and its dissemination by means of a mass produced item – small terracotta figurines. It is recommended to read this paper together with the research report of B. Bourgeois, Y. Vandenberghe and V. Jeammet on the so-called Pilinia Project, elucidating the technical underpinnings of the purple phenomenon, including a hitherto unknown lime-based painting technique that was specifically used for purple dyes.

Another mass use of colour is investigated by F. Grosser in his paper on the use of faction colours (green, blue, red, and white), meaning the colours which denoted the parties in support of charioteers in the Roman circus. Beyond the space of the circus, faction colours were also charged with a range of different metaphorical meanings and even played a role in funeral art. In Roman Egypt, C. Roberts' study of grave markers reveals different colours for gender and status differentiation, while the abundant use of red seems to be significant to Egyptian funerary

⁸ Bötticher 1874, 54. For more recent and literary approaches to colour symbolism and meaning Bradley 2009; Grand-Clément 2011; Henke 2020.

⁹ Mandel 2010.

¹⁰ Zink 2015 for the discovery of the cult site at the end of the ramp.



6 Rome, Palatine, so-called House of Augustus, around mid 1st cent. B.C.; left: drawing of the ramp and its fore-room; right: detail of the ceiling, which changes from polychrome to grisaille as one begins to move upwards

practices. Red floors and wall paintings also played a key role in the tombs of pre-Roman Iberia, as is pointed out in the paper of T. Chapa Brunet, M. Belén Deamos and M. F. Pérez Blasco.

In the final section on museum research, a captivating exploration by S. Hemingway and colleagues of a late 6th cent. B.C. marble grave stele from the Metropolitan Museum is newly discussed. The brightly coloured sphinx at the top contrasts with the minimally coloured human figures below, except for an object held by the main figure. Could the absence of colour in the human figures signify their transition to the underworld, the domain of the deceased?

A few papers look at sculptural colour symbolism in concrete architectural scenarios. J. Østergaard investigates the colour black in two specific cases: firstly, as an architectural backdrop for the sculpture of the Erechtheion, and secondly in the portrait sculpture that was the focal point of a high Imperial theatre in Campania. Østergaard argues that black stone often came with a material prestige and positive connotations that were independent of the literary (and often negative) uses of the colour black. It is interesting to read this paper along with E. Walter-Karydis' masterly overview on wall decorations of Hellenistic houses, where the painted dark backgrounds were reserved for secondary zones. A colour-centred perspective can also open up a new avenue of semantics as in the paper of G. Verri, K. Raff, C. Granzotto and R. Sabino which offers an in-depth analysis of the colours of an Etruscan architectural terracotta (3rd/2nd cent. B.C.) depicting a giant battling two mythical figures. Their understanding of the clothing through the colours enhances our knowledge of ancient fashion, while also demonstrating that the piece cannot have been an exposed roof terracotta, as has been generally assumed.

Not surprisingly, gold (or yellow as a replacement for gold) is a colour and material highly



7 Pompeii, «House of the Venus in a Shell», wall painting 1st cent. A.D.

charged with symbolic meaning. It is addressed in L. Haselberger's paper on Hermogenes and Hellenistic temple design and also in the paper on Temple A at Largo Argentina. In this contribution, S. Zink, J. Hainbach, I. Reiche, J. Pflug, and M. Ceci suggest that the transition from the blue/red-on-white scheme to the yellow-on-white scheme was part of a cultural transfer known as Hellenization – and, indeed, it foreshadowed the *aurea templa*, the golden temples, which seem to have reflected the urban image of Augustan Rome. S. Pedone and P. Andreucet-

ti's paper then bridges the colour history of gold and blue from Imperial to Christian art and shows how gold, blue, and red became part of a symbology of light, serving as an analogy for the splendour of God. The reconstructions of the medieval alabaster

panels by M. Mulliez, A. Mounier and M. Schlicht then showcases how gilding was prominently applied for backgrounds and for the figures' hair and garment hems, thus becoming an element that almost unites the composition in a spiritual way.

Colour, Form, and Light

A longstanding inquiry of polychromy research centres on the role of colour (or surface) in enhancing the form of an object while influencing light and shadow dynamics. Departing from the Neoclassical tradition that favoured form over colour and cautioned against colourful renderings obstructing the form, architects like Leo von Klenze and Gottfried Semper viewed colour as integral to understanding classical architecture's essence (although differing in their detailed perspectives on polychromy's significance)¹¹. Simultaneously, Peter Brøndsted highlighted how colour not only breaks the monotony of stone but also unites disparate architectural elements, enhancing the overall effect by emphasizing individual parts in relation to the whole¹². Thus understood, colour actually enabled a specific reading of the form. In sculpture, this effect is vividly illustrated in the juxtaposition of one of the colour-reconstructions of V. Brinkmann und U. Koch-Brinkmann with the unpainted version of the same piece (Fig. 8). For architecture, an illustrative example is the capital from the Temple of Artemis at Magnesia on the Maeander. As one of 42 capitals of the temple's exterior façade, its colouring must have served precisely to differentiate and unite at the same time (Fig. 9).

«Light is the soul of colour», Karl Bötticher succinctly wrote in 1874¹³, and in fact colour is nothing without light, be it natural or artificial. This seemingly straightforward statement paves the way for extensive exploration in the realm of colour research, offering ongoing avenues for further investigation. Among the recent advancement that shed new light on the topic is the research exhibition «New Light

from Ancient Pompeii and Rome» which provided valuable insights into the interplay between natural light in different areas of Roman houses and the impact of artificial lamp light on the perception of wall paintings¹⁴. Furthermore, modern 3D light simulations have been employed to analyse how translucent marble roofs in temples have created distinct light conditions since the Archaic period, influencing the presentation of cult statues and the polychromatic interior architecture¹⁵.

During the Hellenistic period, sculptors and architects advanced the use of light and shadow in their designs, evident in innovative columnar arrangements, deep undercarvings, and architectural sculpture seemingly detached from the ground, as seen in the Great Frieze of the Pergamon Altar in Berlin (Fig. 10)¹⁶. This shift towards dramatic light and shadow effects often coincided with a reduction in colour, as exemplified by the 1877 colour reconstruction of the Temple of Athena Polias at Priene (Fig. 11)¹⁷. In the analysis of Temple A at Largo Argentina, S. Zink, J. Hainbach, I. Reiche, J. Pflug, and M. Ceci propose that the evolving colour scheme of the 2nd cent. B.C. might reflect these Hellenistic trends in Rome.

In the Roman Imperial era, ornamentation intensified, and the use of the running drill allowed for intricate undercut forms. By the 3rd cent. A.D., this trend reached a pinnacle where shadow almost became a standalone element in architectural design, known as the «flickering effect» of High Imperial architecture (Fig. 12)¹⁸. While abundant colour rendering in this period may seem unlikely, some scholars suggest the possibility of accentuated renderings, such as high-

¹¹ See Zink 2021, 240 f. in particular; Klenze 1838; Semper 1834.

¹² Brøndstedt 1826–1830, 146.

¹³ Bötticher 1874, 52.

¹⁴ Bielfeldt et al. 2022; earlier on light and architecture Heilmeyer – Hoepfner 1990; Schneider – Wulf-Rheidt 2012.

¹⁵ See De Lara 2023 for an overview of the evidence as well as a new 3D light simulations of the Parthenon's cella.

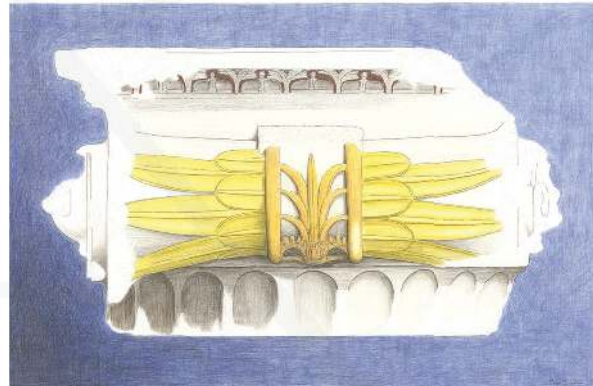
¹⁶ Haselberger 2020 analyses this comprehensively.

¹⁷ J. B. Summitt has first clearly laid out that the new Hellenistic carving style was often accompanied by an extreme reduction of colour (see Summitt 2000, 281–288, 294, 301).

¹⁸ Nolte 1990, 74 f.



8 Statue of a group of Muses from Agnano (perhaps from Delos, 2nd cent. B.C.) and colour reconstruction of V. Brinkmann and U. Koch-Brinkmann



9 Columnar capital from the Temple of Artemis at Magnesia on the Maeander (first half of 2nd cent. B.C.), now in the Antikensammlung Berlin, and colour reconstruction according to surface analysis



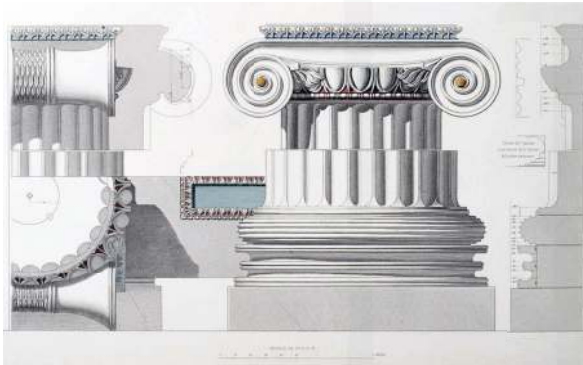
10 Pergamon, Great Altar of Zeus, Okeanos fighting two Giants, first half of 2nd cent. B.C., north risalit, inner side to the stairs

lights with gilding, supported by recent discoveries in Nicomedia, Turkey, from the late 3rd cent. A.D.¹⁹. However, the methodological problem which arises here is

not without irony and valid for all polychromy research: the absence of colour is almost more difficult to prove than the presence of colour.

¹⁹ For the spectacularly painted Tetrarchic reliefs from Nicomedia now comprehensively Ağtürk 2021. Note that the same author has a publication of the corresponding architecture in

preparation; for updates see the project website: <<https://cukurbagarchaeologicalproject.com>> (03.08.2024).



11 Priene, Temple of Athena, 340–150 B.C., colour reconstruction of the exterior columnar order



12 Rome, entablature of the Temple of Vespasian and Titus, dedicated 87 A.D.

Understanding the interplay of colour, form, light, and shadow often revolves around establishing original contexts. Therefore, the volume's first section focuses on re-contextualizations and visualizations of spatial colour scenarios. In analysing the Siphnian Treasury's frieze at Delphi, P. Jockey and M. Alfeld establish the distribution of various colour hues across the different sides of the building, considering their specific light conditions. Examining Iberian sculpture and architecture through funerary contexts, T. Chapa Brunet, M. Belén Deamos, and M. F. Pérez Blasco offer insights into the polychromy of unknown settings, envisioning the vibrant spaces they might have adorned. L. Ungaro reconstructs the sensory experience of materials and space at the Forum of Augustus, showcasing a blend of white and coloured marbles alongside gilded metals. E. Canina, K. Lapatin, P. Marraffa, F. Sirano, and M. Svoboda focus on re-contextualizing Roman villa sculptures post the eruption of A.D. 79, virtually reconstructing the peplophoros found in the Villa dei Papiri at Herculaneum to illustrate the impact of viewing polychrome statues within their intended environment. Further-

more, S. Bracci, G. Bartolozzi, R. Iannaccone, D. Magrini, P. Liverani, S. Lenzi, and R. Manganelli Del Fà delve into the polychromy of sculptural furniture at the Villa of Poppaea at Oplontis, exploring potential backdrop colours and the sculptures' versatility within the architectural setting.

Various contributions look at how colour, light, and shadow affect the perception of sculptural or architectural form. Examples include the enlightening exploration of the Met Sphinx by the team around S. Hemingway, the study of painting techniques by P. Liverani, the detailed analysis of the Temple of Artemis at Magnesia by L. Haselberger, and the exterior colour transformations of Temple A at Largo Argentina by S. Zink and co-authors. Notably, the recent discoveries from temples at Magnesia, Didyma, and Largo Argentina underscore the significance of white as a colour in shaping contours and enhancing light and shadow effects. The volume's examination of colour application on three-dimensional surfaces concludes with compelling reconstructions of painted medieval alabaster panels by M. Mulliez, A. Mounier, and A. Schlicht.

Imitation and Illusion

As a last point, imitation should not be overlooked, the seeming transformation of a material through the application of surface coating, a recurring theme throughout ancient polychromy. In its more complex phenomenology, not only material was imitated through painting but also form. Such illusionistic colour rendering was capable of even replacing carved architectural decoration. For example, Macedonian

tombs from the end of the 4th cent. B.C. provide us with examples of egg and dart ornaments that are painted in an illusionistic manner, including lighting, instead of being carved out of the stone (Fig. 13). It is generally assumed that the development of these sophisticated illusionistic painting techniques on both sculpture and architecture followed that of panel painting. According to this theory, by the end of the 5th cent.

B.C., painters had learned how to create shading or chiaroscuro as well as perspective and the illusionistic effects of depth, and during the Late Classical and Hellenistic periods, these achievements also found their way onto architectural surfaces and became widely distributed across the Mediterranean²⁰.

In Spain, during the 4th cent. B.C., tin was used to imitate silver jewellery on a stone sculpture known as the «Lady of Baza», presented by T. Chapa Brunet, M. Belén Deamos, and M. F. Pérez Blasco. Unsurprisingly, gold was the most commonly imitated material and was mimicked using bright yellow ochre (goethite) or orpiment, with various shades of brown, either to represent gilding or gilded bronze. With the introduction of the yellow-on-white colour scheme in architecture during the Hellenistic period, yellow, as a substitute for gold, gained particular significance. L. Haselberger compiles the evidence from the Ionic temples at Magnesia and Didyma, both featuring instances of gold imitation. The columnar capital of the Magnesian Artemision employs shades of yellow to give architectural ornaments the appearance of gilded bronze, complete with painted shading and subtle material nuances²¹. At Didyma, the ceiling of the temple's staircase showcased rosettes painted to resemble gilded bronze applications. Moving to Rome, the use of yellow accentuations during the 2nd cent. B.C. renovation of Temple A at Largo Argentina aimed to emphasize the form of the Italic Ionic capitals with seemingly gilded highlights, as proposed by S. Zink and colleagues.

Particularly revealing is the evidence presented by E. Canina, K. Lapatina, P. Marraffa, F. Sirano, and M. Svoboda regarding the peplophoros statue from the Villa dei Papiri at Herculaneum (1st cent. A.D.). The statue, carved from white marble, likely Pentelic, leans against a pilaster, also made of white marble but painted to imitate either a veined stone or a precious wood. Additionally, the paint on the white marble plinth was designed to mimic rosso antico or porphyry. These imitations of luxurious materials helped blend the statue seamlessly into its architectural setting, which was adorned with coloured marble revetments. The accompanying 3D reconstruction illustrates this dialogue across space between faux painted and real materials.

In conclusion, the 10th edition of the Polychromy Round Table embarked on an experimental journey by focusing on a central theme, marking a shift from past



13 Vergina, Tomb of the Prince (Tomb III), end of 4th cent. B.C., painted egg and dart moulding above frieze

iterations. The idea had been floating around for some time, and, as organizers and editors, we are grateful for the enthusiastic reception from our colleagues towards this novel approach. Since the inaugural Round Table in 2009, the community of polychromy researchers has significantly expanded, along with the databases and shared knowledge. It was collectively agreed that the time had arrived to delve systematically into broader questions that arise when gathering colour data in the field or from storage areas.

Hosted by the German Archaeological Institute's Division of Building Archaeology, with its focus on the study of ancient building remains, and the Antikensammlung of the Staatliche Museen zu Berlin, renowned for its exceptional architectural collection, the focus of this meeting centred on architecture. However, the Polychromy Round Table has traditionally spotlighted sculpture, reflecting the more advanced state of research on sculptural polychromy both quantitatively and qualitatively compared to that on architecture. Against this backdrop, the theme of «Colour and Space» emerged as a unifying concept encompassing both architecture and sculpture. Architecture revolves around crafting space, while sculpture, as a spatially intricate object, is inherently tied to its spatial environment. Despite being categorized as distinct mediums with differing design and production processes, this volume underscores their interconnectedness in antiquity, illustrating how they were conceptually linked.

²⁰ See Zink 2019, 11 with further bibliography.

²¹ As the investigation of the Antikensammlung Berlin has shown (Zink et al. 2019).

Bibliography

- Ağtürk 2021** T. Ş. Ağtürk, The Painted Tetrarchic Reliefs of Nicomedia: Uncovering the Colourful Life of Diocletian's Forgotten Capital, *Studies in classical archaeology* 12 (Turnhout 2021)
- Bankel 2004** H. Bankel, Farbmodelle des spätarchaischen Aphaia-Tempels von Ägina, in: U. Wurnig – R. Wünsche – V. Brinkmann (eds.), *Bunte Götter. Die Farbigekeit antiker Skulptur*, Exhibition catalogue Munich (Munich 2004)
- Bielfeldt et al. 2022** R. Bielfeldt – J. Eber – S. Bosche – F. S. Knauss, *Neues Licht aus Pompeji*, Exhibition catalogue Munich (Oppenheim 2022)
- Blume-Jung et al. 2020** C. Blume-Jung – V. Brinkmann – U. Koch-Brinkmann – B. L. Kress – H. Piening, *Delos. Die Farben der Insel von Artemis und Apoll*, in: V. Brinkmann – U. Koch-Brinkmann (eds.), *Bunte Götter, Golden Edition, Die Farben der Antike*, Exhibition catalogue Liebieghaus Skulpturensammlung Frankfurt am Main (Munich 2020) 82–91
- Borrmann 1888** R. Borrmann, Polychromie (der Bauwerke), in: A. Baumeister (ed.), *Denkmäler des klassischen Altertums zur Erläuterung des Lebens der Griechen und Römer in Religion, Kunst und Sitte* (Munich 1888) 1335–1343
- Brøndsted 1826** P. O. Brøndsted, *Reisen und Untersuchungen in Griechenland: nebst der Darstellung und Erklärung vieler neu entdeckter Denkmäler griechischen Styls, und einer kritischen Übersicht aller Unternehmungen dieser Art, von Pausanias bis auf unsere Zeit 2* (Paris 1826)
- Bötticher 1834** K. Bötticher, *Die Lehre der tektonischen Kunstformen: dorische, ionische und korinthische Bauweise* ²(Berlin 1874)
- Bradley 2009** M. Bradley, *Colour and Meaning in Ancient Rome*, *Cambridge classical studies* (Cambridge 2009)
- Carettoni 1983** G. Carettoni, *Das Haus des Augustus auf dem Palatin, Kulturgeschichte der antiken Welt. Sonderband* (Mainz 1983)
- Durm 1910** J. Durm, *Handbuch der Architektur. Zweiter Theil. Die Baustile, Historische und Technische Entwicklung 1: Die Baukunst der Griechen* ³(Leipzig 1910)
- Grand-Clément 2011** A. Grand-Clément, *La fabrique des couleurs: Histoire du paysage sensible des Grecs anciens: VIII^e – début du V^e s. av. n. è.* (Paris 2011)
- Haselberger 2020** L. Haselberger, *Der Pergamonaltar und der Architekt Hermogenes: Schatten, Raum und Wahrnehmung* (Berlin 2020)
- Hassler 2014** U. Hassler (ed.), *Maltechnik & Farbmittel der Semperzeit* (Munich 2014)
- Heilmeyer – Hoepfner 1990** W.-D. Heilmeyer – W. Hoepfner (eds.), *Licht und Architektur, Schriften des Seminars für Klassische Archäologie der Freien Universität Berlin* (Tübingen 1990)
- Henke 2020** F. Henke, *Die Farbigekeit der antiken Skulptur: Die griechischen und lateinischen Schriftquellen zur Polychromie* (Wiesbaden 2020)
- Hennemeyer 2017** A. Hennemeyer, *Antike Architekturpolychromie im 19. Jahrhundert. Mit wissenschaftlicher Methode und künstlerischer Einfühlung vom Fragment zum Gesamtbild*, in: U. Hassler (ed.), *Langfristperspektiven archäologischer Stätten. Wissensgeschichte und forschungsgeleitete Konservierung* (Munich 2017) 275–298
- von Klenze 1838** L. von Klenze, *Aphoristische Bemerkungen gesammelt auf seiner Reise nach Griechenland* (Berlin 1838)
- de Lara 2023** J. de Lara, *3D Physically Based Rendering Applied to the Problem of Translucent Marble Tiles as Means of Illuminating Classical Greek Temples: The Parthenon as Case Study*, *JASc Reports* 51, 2023, 104120; <https://doi.org/10.1016/j.jasrep.2023.104120>
- Liverani 2004** P. Liverani, *L'Augusto di Prima Porta*, in: P. Liverani (ed.), *I colori del bianco. Policromia nella cultura antica* (Rome 2004) 235–242
- Liverani 2024** P. Liverani, *The Study of Colour: Convergence of Methods and Disciplines. Development Perspectives*, in: E. Neri (ed.), *Polychroma. The Meaning of Colours in Roman Sculptures* (Milan 2024) 31–41
- Mandel 2010** U. Mandel, *On the Qualities of the «Color» White in Antiquity*, in: V. Brinkmann – O. Primavesi – M. Hollein (eds.), *Circumlitio. The Polychromy of Antique and Mediaeval Sculpture. Proceedings of the «Johann-David-Passavant-Colloquium Circumlitio. The Polychromy of Antique and Mediaeval Sculpture»*, 10–12 December 2008 (Munich 2010) 303–323
- Nolte 1990** S. Nolte, *Schatteneffekte im Ornament der Kaiserzeit und der Einfluss des Lichtes auf die Ornamentik*, in: W.-D. Heilmeyer – W. Hoepfner (eds.), *Licht und Architektur, Schriften des Seminars für Klassische Archäologie der Freien Universität Berlin* (Tübingen 1990) 72–78