CIRCUMLITIO

THE POLYCHROMY OF ANTIQUE AND MEDIAEVAL SCULPTURE

Edited by Vinzenz Brinkmann, Oliver Primavesi, Max Hollein

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Foreword

The educated middle-class's ideal of a pure, marble-white Antiquity prevailed unchallenged into the twenty-first century. To this day, Johann Joachim Winckelmann is considered the author of, and indisputable witness to, this point of view. A close reading of his work shows, however, that Winckelmann was – on the contrary – one of the discoverers of polychromy on statues of Classical Antiquity. In particular, his important insight that polychromy is a feature not only of Egyptian or Etruscan, but also of Greek art was first attacked by the Weimar editors of his collected works and later forgotten. Even Johann Wolfgang Goethe, who associated the predilection for colour with "wild tribes" and lack of civilization, was not entirely uninvolved in this act of censorship.

In the early nineteenth century, scholars eagerly took up the topic again when fascinating discoveries of Antique marble figures bearing traces of original paint were made in Athens and Rome – only to lose sight of it again in the twentieth century and marginalize it to this day. The re-introduction of colour to modern and contemporary sculpture by such artists as Jean Dubuffet, Niki de Saint Phalle or Jeff Koons was the expression of great artistic and intellectual liberty. This development, in turn, created an atmosphere in which scholarship could once again address itself with enthusiasm to historical sculptural polychromy.

In 2008, within the framework of the exhibition "Gods in Color" and the accompanying international colloquium "Circumlitio: The Polychromy of Antique and Mediaeval Sculpture", the Liebieghaus Skulpturensammlung devoted to the theme the attention it deserves. It was thus continuing a tradition of research on polychromy already re-established in Frankfurt am Main in 1966 by Volkmar von Graeve and his dissertation on the colouration of the *Alexander Sarcophagus*. Various works in the Liebieghaus collection – for example Antique marble sculptures with traces of paint, Mediaeval objects exhibiting polychromy, and the watercolours of sculptural polychromy executed by Émile Gilliéron in Greece – testify to the farsighted appreciation of polychrome sculpture in the Frankfurt collection.

In conjunction with the exhibition "Gods in Color" curated by Vinzenz Brinkmann – head of the Antiquities Collection at the Liebieghaus and pupil of Volkmar von Graeve – twenty scholars of various nationalities presented their most recent research results on the subject of Antique and Mediaeval sculpture. I am greatly indebted to the Alexander und Jutta Rasor Stiftung, which generously supported the colloquium held in honour of Johann David Passavant.

INTRODUCTION

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Vinzenz Brinkmann

Statues in Colour:
Aesthetics, Research and Perspectives

As the great century for the study of Classical Antiquity and art history, the 1900s possessed an intense and playful interest in the colours of Antique and Mediaeval sculpture. In the turmoil of the twentieth century – and certainly also on account of severe traumatization through genocides and excessive military violence in the midst of a "humane" world –, the culture-upholding citizen turned his back on ornament and colour.[1]

As a consequence of that development, scholars also backed away from a topic which had aroused enthusiasm among the public and academia alike only shortly beforehand. Naturally, the knowledge of Antique and Mediaeval polychromy [FIG. 2] was not lost altogether, and every now and then a new painted archaeological find would come to light. Nevertheless, a persistent interest in the topic, combined with a desire for its visual illustration, was considered inopportune for decades.

The longing for pure three-dimensional form had already accompanied the first great stage of civil and anti-clerical enlightenment in the age of the Early Italian Renaissance.

Leonardo's Treatise

Leonardo da Vinci grew up in a world of coloured sculpture.[2] Costly paints and techniques were employed for the polychromy of religious sculpture, also the works of Desiderio da Settignano or Donatello[3] – even those executed in marble [SEE FIG. 3].[4] As the Middle Ages drew to a close, many a work of polychromy was more expensive than the work and material of the sculptor together. Gold leaf, azurite and cinnabar were traded on international markets at premium prices.[5] What is more, it can safely be assumed that knowledge of Antique sculptural polychromy had not faded entirely over the course of the Middle Ages.[6]

In his treatise on painting, which begins with a comparison of sculpture and painting, da Vinci succeeded in overlooking the most recent developments in the art of his time, and thus forcefully ignoring what had surrounded him in his youth. His concept of sculpture – initially utopian, but soon extremely successful – called for no colour or foreign materials (in the sense of material polychromy) of any kind. When he played painting off against sculpture, he based his line of argumentation exclusively on the fact that sculpture possesses no colour, and thus goes without any means of illusion or psychologization.

"The painter has ten considerations with which he is concerned in finishing his works, namely light, shade, color, body, shape, position, distance, nearness, motion and rest; the sculptor has

only to consider body, shape, position and rest. With light and shade he does not concern himself, because nature produces them for his sculpture. Of color there is none. With distance and closeness he only concerns himself in part, in that he only uses linear perspective but not the perspective of color which varies in hue and distinctness of outline with different distances from the eye. Therefore sculpture has few considerations and consequently is less demanding of talent than painting."[7]

Within the context of a new – enlightened and secular-civil – self-conception, Leonardo was presumably pursuing two aims with this demagogical approach. On the one hand, he was objecting to the religious function assigned sculpture to a particularly strong degree during the Middle Ages. To counter religious dogma and the world of the clergy, which presented its own self-image in churches with three-dimensional sculptures of the saints and church fathers, he was thus proposing a new model. On the other hand, he wanted to assign sculpture a new role in the future. It was to take as its orientation the aesthetic ideal of Antiquity; it would no longer serve the confined intellectual scope of the Christian faith, but rather a historical mon-umentality arising from the intellectualized – i.e. enlightened – myth. In this new function, however, sculpture would have to subordinate itself to painting.

The *Laocoön*

On Wednesday, 14 January 1506, the marble figural group of the Trojan priest Laocoön and his sons[8] was found in an Antique marble-panelled room in Rome. By request of the pope (Julius II), two prominent artists visited the site. Giuliano da Sangallo called out to Michelangelo: "This is the Laocoön mentioned by Pliny."[9] With words of the highest praise, the knowledge-able Roman author Pliny the Elder had described the statuary group in his *Natural History*. "In some cases the glory of the finest works is obscured by the number of the artists, since no one of them can monopolize the credit, nor can the names of more than one be handed down. This is the case with the Laocoön, which stands in the palace of the Imperator Titus, a work to be preferred over all that the arts of painting and sculpture have produced."[10]

Elsewhere, Pliny reports that Praxiteles, whom he actually considers the greatest of all sculptors, had commissioned Nicias – i.e. a prominent painter colleague – with the polychromy of his works. He thus suggests to the reader that Antique sculpture was painted in colour as a matter of course. Praxiteles was active in the second half of the fourth century BC. The date of the *Laocoön Group* is disputed. The majority of scholars, however, have come to accept a temporal attribution to the Late Hellenistic period (between 130 and 20 BC).[11] This is also the period from which numerous finds of well-preserved marble sculpture from the rich island of Delos are known to date.[12] Since this island was already destroyed in the Late Hellenistic period, the

statues stood in their originally intended locations for only a short time. As a result, their polychromy is particularly well preserved. In view of the abundance of paint traces found on them, we are compelled once again to assume that it was the usual procedure to give sculpture a polychrome finish. We must accordingly picture even the famous *Laocoön Group* artfully endowed with colour.

In more recent scholarly literature, the hypothesis has been developed that the Antique be-holder would have had difficulty understanding the group's arrangement. This claim disregards the structure-lending power of colour.[13] The bodies of the serpents will undoubtedly have been painted in such a way as to indicate their scales and, naturally, they will have differed in hue. On the basis of analogous observations, we can confidently assume that the colour of the father's body was darker than that of his sons.[14] What is more, the paint will have been applied in such a way as to enhance the plasticity and fall of the drapery. Horror and the fear of death were "written" on the faces of the victims in the expressions of their painted eyes.

If we translate "opus omnibus et picturae et statuariae artis praeferendum" as "a work to be preferred over all that the arts of painting and sculpture have produced", then we are allowing Pliny to contradict one of his own core statements.[15] For he had actually awarded the *Knidian Aphrodite* the status of most beautiful of all works of sculpture.

The author's original text was passed down over centuries in copy after copy, and mistakes were made in the process. The assumption of such a distortion of the Pliny passage in question shows us a possible way out of the dichotomy. If we replace the genitive "artis" with the abla-tive "arte", Pliny's statement on the *Laocoön Group* would be free of contradiction; "opus omnibus et picturae et statuariae arte praeferendum" would mean: "it is a work to be preferred over everything else, with respect to both the polychromy and the sculptural elaboration". Now the well-versed man would have been emphasizing the sculptural group because, in its manner of merging the work of the sculptor with that of the polychromist, it represents some-thing very special.

According to the scientists of the Vatican Museum laboratories, no traces of pigment remain on the sculptural group. Older photographs, however, exhibit remnants of the polychromy in the eyes of the Apollonian priest. In the sixteenth century, Tommaso Bernabei and Alessandro Allori **[FIG. 4]** visualized the marble group in colour.[16] Were these artists refusing to go along with Leonardo's dictates?

The world of Antiquity and pre-modern times was colourful.

It is thanks not least of all to the colloquium here submitted for publication that the extent and significance of colour and surface design of sculpture has been recognized and investigated.

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4 Alessandro Allori,
The Laocoön Group (with
reconstructed polychromy)
in an imaginary architec-
tural setting, ca. 1570, oil on
canvas, private collection

5 Double statue of Rahotep
and Nofret, detail, 4th
dynasty, limestone, Cairo,
National Archaeological
Museum, inv. 223

6 Statue of Artemis in
a Roman wall painting,
Pompeii, Regio VI, insula
occidentalis 10

There is no question as to the polychromy of Mesopotamian and Egyptian sculpture. In those cultures it was essential that all elements borrowed from nature retain their mimetic character with the aid of colour and additional materials **[FIG. 5]**.

Early Greek artists adopted crafts techniques and aesthetic principles of form and colour composition from the Egyptians of the Third Intermediate Period and the early phase of the so-called Late Period. The fact that our knowledge of the polychromy of Greek sculpture of the early sixth century in constantly increasing would seem to substantiate the assumption that this transfer of knowledge took place in a very direct manner.

The observations and analyses of the polychromy of Egyptian monuments – in a number of cases extremely well preserved – will have to accompany the future investigation of Early Greek polychromy. The painting of the anthropoid mummy sarcophagi do not exhibit any painterly-stylistic devices. The flesh colour was applied meticulously, two-dimensionally and evenly **[FIG. 157]**.

Evidence of Painted Sculpture in Ancient Literature and Imagery

The authors of classical Greece and Rome provide us with an abundance of references to Antique statuary polychromy. Important text passages have been read anew in the past years, resulting in an increase in their value as evidence.

As much a point of dispute as before, however, is the relationship of the Antique descriptions of artworks to reality in the context of *ekphrasis,* whether with regard to the *Eikones* of Philostratus or Callistratus's descriptions of statues. In a new edition, the texts of Callistratus are assigned a highly descriptive character.[17] In virtually stereotypical manner, Callistratus emphasizes the colouration of bronze sculpture when he points out the intense red hue of the skin and other areas of the body.

Image within Image

The picture within the picture is frequently cited as a testimony to the picture's reality. If we interpret Greek vase scenes of the red-figured style as faithful representations, we quickly find ourselves in an irresolvable dilemma. How can an artistic technique which has no natural substances/materials at its disposal (colours, surfaces, light sources) create a direct sensory impression? In these stenographic media, a process of translation has to take place. Or were the gods, heroes and mortals depicted, along with their garments, all really uniformly red? Was fifth-century Athens populated by Indians in flesh-coloured robes? Since this equation is out of the question, we are naturally prevented from interpreting the artwork within the vase scene as a faithful reproduction of the colours and textures of reality. In red-figured vase paint-

ing, marble statues were occasionally depicted in opaque white to which only the light hues of a watery slip were applied. As in the case of the red-grounded gods and heroes, this form of depiction was an artistic translation, and thus one element in a medium-specific system of pictorial codifications!

Polychrome Greek and Roman wall painting usually depicts sculpture in colour. The paintings found in the towns at Mt Vesuvius demonstrate sculptural polychromy in detailed form. A figure of Artemis from house VI insula occidentalis 10 in Pompeii[18] wears a purple chiton with a golden yellow insert, a green cloak around her hips and a golden crown on her head; her skin features an intense shade of ochre-brown **[FIG. 6]**. The cult figures shown in sacro-idyllic landscapes were likewise rendered in colour by the wall painters.

Of particular interest are the exceptions to the rule, i.e. monochrome representations of statues. Numerous traces of paint have survived on the metopes of the Parthenon and the Temple of Zeus in Olympia. Why, then, were the metopes depicted on the façade of the Tomb of Petsas left unpainted? At the root of this contradiction are the expressive means and methods of a pictorial language we are only gradually learning to decipher.[19]

The Analyses and Their Strategies

It would be amiss to draw up standardized specifications for the analysis of the material remnants of polychromy. The choice of analysis methods and strategies is frequently determined by the material itself. The methods of analysis, however, are also always dependent on such factors as the working environment, the permission to take samples – i.e. the potential destruction of the original through the analysis –, and above all the type of research project and its objectives.

The aims, and with them the methods, of the individual projects can differ widely. The investigation of the polychromy of a single object in a museum's own collection, possibly one with a well-equipped scientific laboratory at its disposal, can hardly be compared to the research work of a doctoral student of art history or archaeology compelled to travel from one museum to another in order to record the art-historical, formal and narrative aspects of the polychromy of several hundred sculptures.

Visual Examination

Of eminent significance is the examination of the sculptural surfaces with the eye. The use of a stereo microscope with a magnification range of 10x to 60x permits the inspection of the object, the clarification of initial questions and development of further aims of investigation, and the choice of methods for pursuing them.
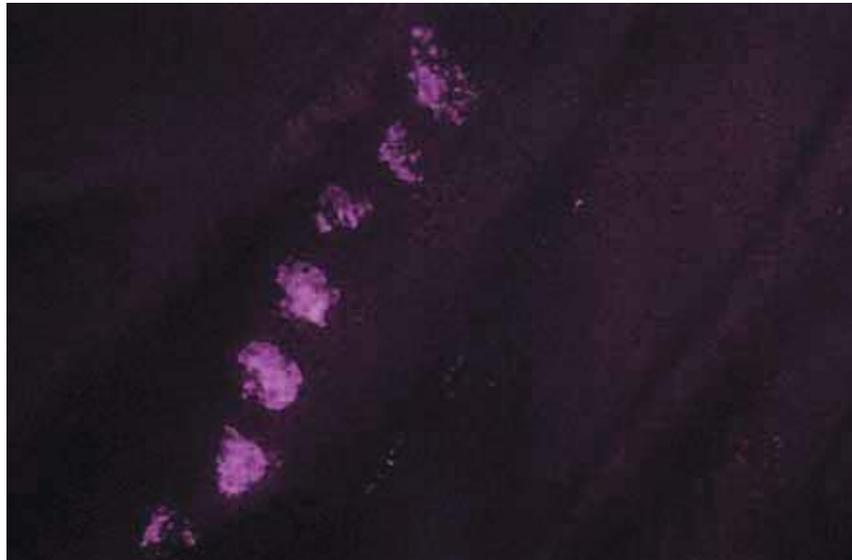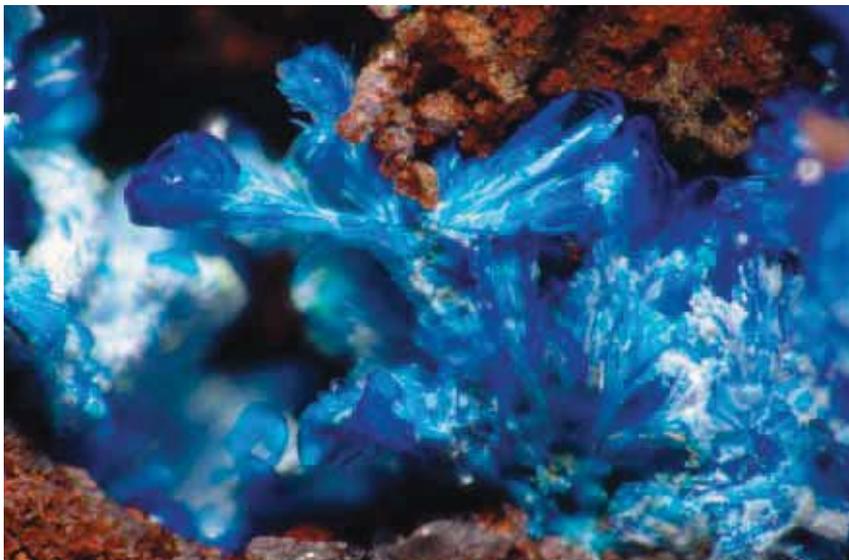
7 Photograph under IR luminescence, ornament on drapery of a Late Hellenistic marble statue of a muse, Frankfurt, Liebieghaus Skulpturensammlung, inv. 160

8 Azurite in the Hilarion Mine, Kamariza, Laurium, width of view: 10 mm

During the examination, it should be possible to control the light. The prerequisite for this is a completely darkened room. Light cast on the surface from an extreme angle allows initial conclusions to be drawn about layer sequences, while also bringing out incisions or decomposition reliefs and thus the polychrome rendering of two-dimensional elements such as ornaments, irises or pupils.

The UV analysis lamp sheds light on traces of former painting particularly on marble surfaces, but also reveals generally fluorescent pigments such as madder lakes.

The Photographic Techniques

The perceptual capacity of the human eye can be supplemented substantially by photographic techniques. Photography under UV fluorescence – with a camera which should be equipped with a strong UV blocking filter (the Schott KV418) – intensifies the contrast and marginal sharpness of the polychromy that comes into view.

The reflection of UV radiation is invisible to the human eye, but not to the camera. For a UV reflectograph, a black glass filter (Schott UG1) should be mounted in front of the lens. Particularly on marble surfaces, very clear structures of the polychromy thus sometimes become visible which are neither perceivable with the naked eye, nor do they become apparent under the microscope.

Giovanni Verri succeeded in optimizing photography under IR luminescence, and thus in permitting photographic evidence of even the slightest traces of Egyptian blue or Han blue and Han purple.[20] Under the light of a strong LED lamp (e.g. ARRI LoCaster), these exposures are made with a digital camera from which the low-pass filter has been removed and on which an IR glass filter (Schott RG830) has been mounted in front of the lens [FIG. 7].

Taking Samples

The removal of samples for the purpose of material analysis represents an intervention into the original substance. Upon removal, the sample loses its relationship to the local context. Layer sequences provide information, but frequently it is difficult to separate the individual layers or assign them to the sequence of the reconstructed application of paint. Reliable analysis results can be obtained with Fourier transformation infrared (FTIR) spectroscopy, XRF analysis and energy-dispersive X-ray spectroscopy on a scanning electron microscope (EDX analysis), as well as simply by viewing through a scanning electron microscope. In the past, however, it has frequently proven impossible to arrive at reliable conclusions with regard to the organic colourants and binding media by these methods.

Non-Invasive Techniques

Non-invasive analysis techniques are becoming ever more important. Here portable systems render projects carried out at several locations invaluable services. Methods permitting great mobility – and thus a large number of individual analyses – lead to unexpectedly high precision. What is more, these are the only methods which allow dense mapping, and thus a detailed topography of the paints on the surface of a sculpture. For a well-differentiated reconstruction, these techniques – carried out in conjunction with conventional analyses – are an essential prerequisite. Whereas non-invasive XRF analysis with a (usually stationary) ArtTax micro represents a first step, the flexible work permitted by the Niton, a manual device manufactured by Thermo Scientific, has proven extremely efficient.

UV-VIS absorption spectroscopy has shown itself to be exceptionally useful in the context of numerous applications. With this method, non-organic as well as organic components, and even their complex ratios to one another in mixtures, can be identified. Whereas the work of taking measurements on the original can be carried out rapidly with this technique, the evaluation of the readings is primarily dependent on the size of the reference library.

Experience has shown that the mobile and non-invasive methods permit the exchange of views between the participating scholars already during the measurement process. This exchange leads to a fine-tuning of the investigation aims which can already be applied while the measurements are still in progress.

In the future, technological developments will permit similar investigation strategies in the area of Raman spectroscopy. The measurement device industry is already now announcing the production of a new generation of robust, easy-to-handle devices which can be used efficiently regardless of the temperature.

Future Objectives

Future investigations and the reconstructions carried out subsequently will concentrate on aspects of detail, i.e. the painterly means used to describe an individual element within its contours. The polychromy of Egyptian sculpture does not derive its effectiveness solely from the even application of paint to the entire surface. In places where surfaces are differentiated in nature through a multitude of individual forms, Egyptian art endeavours to reproduce this detail. On the reliefs in the Chamber of the Seasons at the Sun Temple of Niuserre, for example, the individual scales on the bodies of the fishes are shown. The Egyptian geese, for their part, exhibit well-differentiated and detailed plumage. The polychromy of archaic sculpture evidently carries on the Egyptian workshop traditions quite directly, for which reason we must expect to find similar detail in Early Greek works as well.

The Colours of Antique Bronzes

Important discoveries have been made in the past years with regard to the colouration of bronze sculpture. Most recently, the team around Sophie Descamps[21] at the Louvre succeeded in arriving at significant new observations. Norbert Franken drew up a very helpful systematic overview of metallic inlays in bronzes.[22] The experimental-archaeological endeavours of Gerhard Zimmer are also extremely instructive. His team managed to produce individual elements from alloys of different shades of red and yellow, and assemble them to create a statue.[23]

The Polychromy of Antique Copies of Classical Greek Statuary

Little can be said at present about the polychromy of Hellenistic and Imperial Roman copies of late archaic and classical Greek originals.

On the basis of her new research on the so-called *Hera of Pergamon*, a sculpture now in the Berlin Antikensammlung, Clarissa Blume will soon arrive at the first concrete results on this subject. The polychromy of the striding *Diana of Pompeii* is presently being investigated and reconstructed by Vinzenz Brinkmann, Ulrike Koch-Brinkmann and Heinrich Piening within the context of the Oliver Primavesi Leibniz Prize.[24] It is gradually becoming apparent that the goddess, who wears the archaistic garment of a kore, was here rendered in a contemporary – i.e. Late Hellenistic / Early Imperial – array of colours.

Laurium – A Miracle of Colour

The deposits of natural pigments in the volcanic areas of the mines of Laurium are of unusual luxuriance and overwhelming variety **[FIG. 8]**. These deposits have already undergone study from the geological perspective. In 2009, Heinrich Piening began registering measurements of these pigments in the UV-VIS analysis reference library. Already now, it is obvious that we can reckon with the employment of minerals (for the extraction of pigments) not yet taken into account by modern scholarship.

The Tradition of Reconstructing Polychrome Sculpture

In the nineteenth century, the young discipline of archaeology did not shy away from creating visual aids and bases for scholarly discourse in the form of reconstructions. In this context, questions concerning the polychromy of architecture and sculpture play an important role.[25] In the past few years, progress in the area of digital and contact-free object and material measurement has opened up entirely new perspectives for the reconstruction process. In a project funded primarily by Leibniz Prize winner Primavesi, five Greek marble sculptures whose colouration is especially well preserved are presently being measured, analyzed and reconstructed.[26]

In the context of investigations of the polychromy of Mediaeval sculpture, initial steps are likewise being ventured in this direction. The colour reconstruction of the *Schaftlach Cross* was carried out on a conventional cast. With an elaborate and convincing technique initiated and accompanied by the Germanisches Nationalmuseum in Nuremberg, a figure of St George has been virtually resurrected in its original splendour.[27]

1 See Batchelor 2000.

2 See Brachert / Kobler 1978; most recent literature on the colouration of Mediaeval sculpture: Andreuccetti / Lazzareschi Cervelli 2009.

3 On partial marble polychromy in the work of Desiderio da Settignano: Weeks 1999, pp. 732–38; see Courajod 1887/88, pp. 243–74.

4 On permanent loan to the Liebieghaus Skulpturensammlung from a private collection; Settis 2008, p. 353, fig. 101.

5 See contribution by Nash in this volume, pp. 356–81.

6 See Hermannus's use of the Antique terminology (picture, etc.) in Niemeyer 1963, p. 75,16–26 (Cap. II); on this subject see: Schmitt 2006, pp. 163–205, esp. 164–66.

7 Leonardo da Vinci, "Comparison of Painting and Sculpture" in *Trattato della pittura*, quoted in: Silver / Smith 2010, p. 92.

8 Bibl. on *Laocoön Group*, see Kunze 1996, pp. 139 ff.

9 Sangallo's son recorded this exclamation in a letter. See Schmälzle 2005, p. 16.

10 Pliny, H. N., XXXVI, 37.

11 On this discussion, see Kunze 1996, pp. 139 ff.

12 Brinkmann 2003B, pp. 178 ff; also see Yfantidis 1985 and contribution by Bourgeois and Jockey in this volume, pp. 224–39.

13 See Giuliani 2005, pp. 75 ff. On the possible colouration of the *Laocoön*: Queyrel 2003, pp. 57 ff; see Stewart 2006. In cooperation with the science laboratory of the Vatican Museums, Paolo Liverani investigated the statuary group of the *Laocoön* in the past years. No traces of polychromy were found in the process (verbal message, May 2006).

14 See Brinkmann 1996, pp. 25–29; see contribution by Blume in this volume, pp. 240–57.

15 On argumentation of Andreae 1987. Response: Zwierlein 1989, pp. 433 ff.

16 Fig. 4 was taken from the catalogue Bunnell et al. 1997, no. 139. In this painting, Alessandro Allori depicts the statuary group itself within a Renaissance architectural setting and not one of Antiquity. It is therefore not a case of statuary animation as claimed in the Princeton catalogue (loc. sit., p. 129: "Allessandro Allori painted the group not as a sculpture but as flesh and blood creatures …"). If the painter had truly aimed for such an animation, he would undoubtedly have omitted the statue's base. On Allori in general, see Giovannoni 1991.

17 Bäbler / Nesselrath 2006, pp. 12–15, passim.

18 Museo Archeologico Nazionale, inv. 9301; see Moormann 1988, no. 225, 1; see Aoyagi / Pappalardo 2006, figs. on pp. 109, 178, 192–93, 233.

19 See contribution by Mandel in this volume, pp. 303–23.

20 Accorsi / Verri et. al. 2009, pp. 3392–94.

21 Descamps-Lequime 2005, pp. 5–30. See: Mathis / Descamps et al. 2007, pp. 219–38; Mathis / Delange et al. 2009, pp. 63–72.

22 Franken 2010.

23 Zimmer (forthcoming).

24 Brinkmann / Koch-Brinkmann / Piening 2010.

25 Kader 2009, pp. 234–46.

26 See contribution by Brinkmann / Koch-Brinkmann / Piening in this volume, pp. 188–217.

27 See contribution by von Ulmann in this volume, pp. 382–92.