

CECCO DEL CARAVAGGIO'S MARTYRDOM OF SAINT SEBASTIAN. AN INVESTIGATION INTO CARAVAGGISTI PAINTING TECHNIQUE AND TECHNOLOGY

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Abstract

The object of the analyses was the painting Martyrdom of Saint Sebastian from the Collection of National Museum in Warsaw. Cecco del Caravaggio (active c. 1610 – mid-1620s), now known as Francesco Buoneri, is one of several artists who painted in the style of Michelangelo Merisi da Caravaggio. Giulio Mancini in Considerazioni sulla Pittura, mentions a 'Francesco detto Cecco del Caravaggio' as one of the great master's more noteworthy followers. During analyzing the painting (the analytical light, IR, X- ray, UV, cross- sections, SEM-EDS, XRF, GC-MS, FTIR), it turned out that the artist made corrections to the composition, including the most important, changing theme of the painting. X-ray images show that under the figure of the saint there is an image of Christ at the column. Examinations show that the pigments used by the Cecco were typical 17th century earth-based pigments and similar to Caravaggio palette. A very interesting part about the palette of the Caravaggisti is the use of white: they used calcium carbonate or chalk as an extender to lead white. The research on Cecco del Caravaggio painting technique was conducted as part of an exploratory project: Technique and technology of caravaggisti paintings based on polish museum collections.

Keywords: Materials characterization; Caravaggisti; Cecco del Caravaggio; Francesco Buoneri; Painting techniques; Baroque

Introduction

This research on Cecco del Caravaggio's painting technique was conducted as part of a project: *Technique and technology of Caravaggisti paintings in Polish museum collections*. The aim of the project was to carry out interdisciplinary research into the techniques and painting technology of the follower of Michelangelo Merisi (1571–1610) called Caravaggio. By in-depth examination of Caravaggisti paintings, we can learn about and compare painting workshops in various areas of Europe of artists who were strongly influenced by Caravaggio. Today it is very difficult to determine his legacy as he did not have his own official workshop or any formal pupils. Imitation, interpretation, continuation, and references to his works - all these have entered permanently into the history of art under the name of Caravaggionism. Caravaggio's painting technique is one of the most investigated of all artists. However, in terms of technique and technology, the works of his followers look exceptionally poor. The aim of the article is to compare the workshop of Francesco with Caravaggio's painting technique, finding similarities and differences in the ways of building images [1].

Cecco del Caravaggio (active 1610–20) was a mysterious figure about whose life we

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know little beyond the name of Francesco. It has often been suggested that he was French, Flemish, or Spanish. He was finally identified as Francesco Buoneri by Giani Papi [2]. It is quite possible that as a young man he came to Rome from the province of Bergamo [3]. He is recalled by Giulio Mancini as a member of the very select “schola” of Caravaggio, together with Spadarino, Manfredi and Ribera. He probably lived with Merisi in 1605 at the presbytery of the church of San Nicola dei Prefetti [4] and was probably a friend of Caravaggio and a model in his paintings (his portraits can be found in at least six paintings of Merisi: *Victorious Cupid*, *Young John the Baptist*, *Isaac's Sacrifice*, *David with Goliath's head*). After Caravaggio's escape from Rome (1606), Francesco followed the master to Paliano and then to Naples, where he stayed in 1607 and 1610–11. Traces of his presence can be found in the works of local painters [5]. The only documented source of the artist's paintings are the frescos in Villa Lante in Bagnaia and the easel painting *Resurrection*, commissioned in around 1619–20 by the Guiccardini chapel at the church of Saint Felice in Florence.

Cecco's paintings are characterized by a hyperrealism that originates from Caravaggio's early paintings of 1590–1600 but goes further in a direction in which the master never followed or did not want to follow. Typical of Cecco's style is an obsession with detail and realism [6, 7]. The painting (M.Ob.645MNW) (Fig. 1) comes from the collections of Antoni Strzałecki; it was purchased by The National Museum in Warsaw from Wincenty Szarakiewicz in 1948 [8] and was formerly attributed to Bartolomeo Manfredi and Vallentin de Boulogne. Cecco's authorship was confirmed by the author of his monograph, Giani Papi, in 2001 [2].

The painting is composed on canvas (124×162.5cm) and depicts a scene presenting a completely unknown episode from the life of Saint Sebastian. A soldier is holding an arrow which is protruding from the saint's body. We do not know if the soldier wants to remove the arrow or sadistically twist it into the victim's body. Usually a single figure of Saint Sebastian was shown with a body pierced by arrows or subjected to the healing treatments of Saint Irena. In Cecco's painting the martyr is accompanied by two torturers along with two other witnesses of the incident. Papi believes that it is inappropriate to say that the composition refers to the iconography of Christ. He believes that this was Cecco's new approach to the topic as a result of the expectations of his clients. X-ray research (Fig. 2) has shown, however, that the artist changed the earlier image of *Christ on the Column* to present St. Sebastian. He showed great artistry to create a new iconographic type that was based on another topic [3].



Fig. 1. *Martyrdom of Saint Sebastian*: Visible image

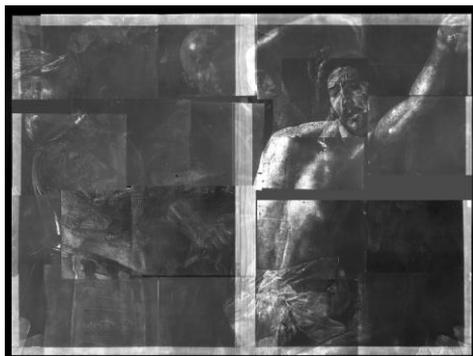


Fig. 2. *Martyrdom of Saint Sebastian*: X-ray Radiograph

Materials and Methods

Technical examination was focused on characterization of the painting materials.

The following non-destructive methods were used in this research [9, 10]:

- Photography in visible light (VIS), and macro-photography. Photographs were taken in diffused light using an Elfo Miqro Pro studio flash at about 5400°K. Macro

photography was performed with a Nikon lens (50mm f/1.8 G AF-S) and a Nikon D800 camera.

- Ultraviolet fluorescence photography and Reflected UV photography was performed using Philips TL-D UV induction lamps equipped with a Wood's filter.
- IR photographs were taken under 1000W halogens with a colour temperature of 3200°K, using a Heliopan IR 1000nm filter. Methods using infrared light allow us to see into the object to observe the underdrawing. The photos were taken with a Nikon D600.
- X-ray photographs were taken using a Baltspot 100kV roentgen apparatus and Fuji Medical X-Ray Super RX film. The recording range was 28kV.
- The samples taken from the painting were embedded in resin and prepared in the form of microstratigraphic cross-sections that were interpreted by visible and UV light microscopy and by SEM–EDS analyses. We used an SMZ1000 stereomicroscope with a Nikon Coolpix 8400 camera in reflected VIS light, starting with the lowest magnification. Further examination of the embedded cross-sections was conducted with an incident UV-light (filter UV2A 330–380nm, 420nm cutting filter). The SEM–EDS instrument was a JEOL JSM-6380LA coupled with an EDS electron microprobe.
- Elemental composition of paint layers was determined by means of XRF (X-Ray Fluorescence Spectroscopy) with a DELTA Handheld XRF.
- FTIR (Fourier transform infrared spectroscopy) was useful in the identification of the general class of binder.
- In order to identify drying oils, waxes and resins, a gas chromatography method combined with mass spectrometry (GC/MS) was used.

Results and Discussions

The painting is on a single piece of plain-weave hemp canvas (thread thickness is 0.500 to 1.125mm). Remnants of the original tacking edge still exist; however, due to the lack of ground on them it can be assumed that the canvas was stretched straight onto the final stretcher with nails. Orange UV fluorescence under the bottom layer of the ground is probably due to the canvas being presized with glue. The artist applied a brown-beige ground with a thickness of approx. 0.154 mm (Fig. 3C, layer 1). The fillers were calcium carbonate and natural iron compounds (SEM–EDS: Si, C, O, Ca, Al, Fe, K, Mg, Na, Cl, P and Pb). The presence of silicon in this layer can be associated with the use of silica, but it is difficult to determine in exactly what form.

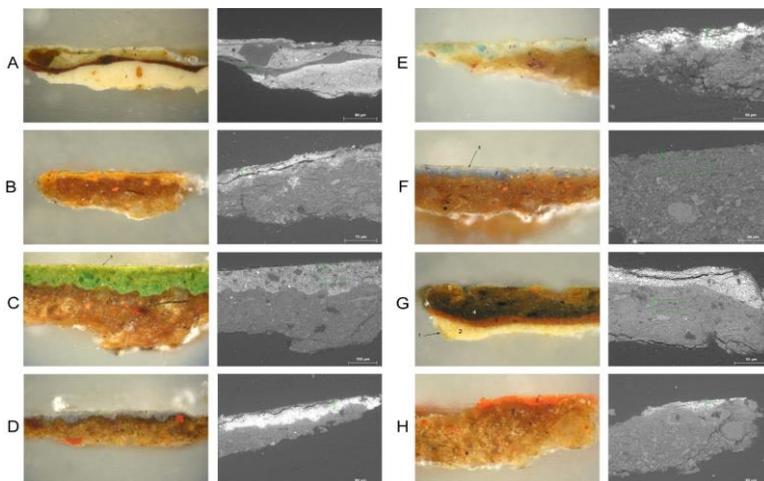


Fig. 3. Cross sections from original areas. Visible and Back Scattered SEM images

The ground was applied with a knife or spatula to keep the weave of the canvas visible. In some areas of the canvas, two ground layers of the same composition are visible, probably added wet-on-wet to level the surface. Darkening of the top layer of the ground and brighter fluorescence in UV is visible in cross-sections, which may suggest the use of isolation. The ground binder is not known, but it can be concluded that emulsion was used, which required additional isolation.

In infrared reflectography (Fig. 4) we can see traces of a drawing made with a brush and dark paint. During the work, the artist made corrections to the composition, including, most importantly, changing the theme of the painting. The body of Saint Sebastian was painted in a different way than the rest of the painting. In many places the texture and the brush work do not match the form of the figure.



Fig. 3. *Martyrdom of Saint Sebastian*: Infrared Reflectography

The change of the composition can be traced on X-rays (Fig. 2), which show that under the figure of the saint there is the figure of Christ at the Column. On the right side, the head of one of the executioners is visible. Unlike the figure of Christ, it was not fully finished. The perizonium from the figure of Christ was partly used as underpainting of the drapery on the hips of Saint Sebastian. The rest of the figure of the Saviour was painted over with a brown paint based on umber, lead white and bone black (Fig. 3A, layer 3). The first composition also included the figure of a young man in the lower right corner of the picture, which was left unchanged. After painting Saint Sebastian, the artist proceeded to the other figures, starting with the young man in a hat, through the bald executioner, ending with the old man, whose eyes were initially directed at the viewer. He then painted a dark background and the tree trunk to which the martyr is tied. Finally, such details as feathers on the hat, arrows and cords were added.

Cecco's use of brushwork in the painting varies across the canvas. Some portions of the painting have broad, smooth strokes, such as the breeches of the armoured soldiers. However, overall Cecco generally uses his characteristically tight hand with his brushwork to achieve the intricate detail of the drapery folds and their varied texture. Cecco not only carefully sketches the outlines of all the figures and adds crisp, delineated shadows; he also shows his skill by realistically rendering the leather glove and the feathers on the hat. In areas of shadow and half-tones the colour of the ground was skilfully used. The greater part of the chiaroscuro modelling was done *alla prima*, only the shadows were made deeper by glazes.

The range of colours and the palette of identified pigments are very simple and are limited mainly to iron and copper pigments (Fig. 3 and Table 1). In most cases, the colour was obtained from a mixture of two or three pigments.

Table 1. Results on the different colour areas analysed

Colour/part	Sample	SEM-EDS	XRF	Pigments
Carnation – Saint Sebastian	A	C, O, Pb, Fe, Ca, Si, P, Al	Pb, K, Fe, Ca, S, P, Cu, Zn, M, traces Sr, Hg, Ba, Se, Zr, Co	Lead White, Yellow Ochre, Green Earth, Charcoal and Ivory black, Organic Red
Carnation-Bald man	B	C, O, Si, Fe, Ca, K, Cl, Pb, Al, Mg, Na, P	—	Yellow Ochre, Lead white, Calcium Carbonate
Green – robe of a bald man	C	C, O, Cu, Ca, Fe, Si, Pb, K, Al, Mg.	Pb, Cu, Fe, Ca, Mg, K, S, Zn, Sr, traces Zr, Mn, Ba, Hg, Co	Verdigris, Yellow Ochre, Lead White, Calcium Carbonate, Green Earth, Umber
Grey – Armor	D	C, Pb, O, Ca, Si, Al	—	Lead white, small amount of Calcium Carbonate, Ivory Black
Blue – sleeve of a man in armour	E	C, O, Si, Cu, Ca, Pb, Mg, Al, P	Pb, Cu, Ca, Fe, K, S, Zn, Sr, traces Ba, Zr, Mn, Hg, Co	Lead white, small amount of Calcium Carbonate, Azurite, Verdigris
Blue – feather from the hat	F	Si, C, O, Al, Na, K, Ca, Mg, S, Cl, Fe	Ca, Mg, K, Fe, Pb, Cu, Sr, S, Zn, Zr, traces Mn, Ba, Si, Co	Ultramarine, Viwianite, Lead white
Background	G	C, O, Si, Fe, Ca, Al, P, K, Mn, Mg, Na, Pb	—	Umber, Lead white, Calcium Carbonate
Red – Turban of old Man	H	C, Si, O, Fe, Al, Ca, Pb, K, P, Cl, Mg, Na	Ca, Fe, Pb, P, K, Mg, Al, Cl, Cu, Sr, Mn, Zn, Zr, traces S, Ti, As, Ba	Red Ochre, Lead White, small amount of Calcium Carbonate, Organic Red (?)
Red – sleeve of a man in armour	I	—	Hg, Ca, Fe, Pb, K, Cu, S, As, Sr, Mg traces Ba, Zr, Mn	Vermilion, Red Ochre, Umber, Organic Red
White – Turban of old Man	J	—	Pb, Ca, Fe, K, S, P, Cu, Zn, Sr, traces Ba, Zr, Hg, Se, V, Si	Lead White
Yellow – tunic of a man in armour; feather from the hat	K	—	Pb, Fe, Ca, K, S, Mn, Cu, Zr, Sr traces Zr, Hg, Co	Ochre

The pale carnation of Saint Sebastian (Fig. 3A) was painted using lead white, calcium carbonate, yellow and red iron oxide, charcoal black and small additions of organic red. Almost pure white was used for the lights. The warm skin of the bald torturer was made with the use of only white and yellow iron oxide (Fig. 3B). Shadows were deepened with a natural umber. The most intense reds in parts of the carnation were obtained through the addition of natural vermilion (Table 1, I). The white perizonium and the turban of the old man were painted with leaded white (Table 1, J). Shadows were obtained by adding charcoal black. The young man's armour was painted with an identical set of pigments: leaded white and charcoal black (Fig. 3D). His yellow tunic was painted with a paint based on ochre, and the highlights are done with the addition of lead white (Table 1, K). Just like the feathers on the hat, the red part of the turban was painted with iron oxide red (Fig. 3H). Vermilion was used for the precisely painted

details on the feathers and red parts on the sleeve of the young man in armour. The sleeve itself was originally blue because it was painted with azurite and lead white (Fig. 3E) and the yellowing of the oil binder changed the colour towards green. The use of verdigris in the shadows also contributed to the colour change on the sleeve. Similarly, the green robe of the bald torturer had a more intense colour because it was made with verdigris in a mixture of white and iron oxide yellow (Fig. 3C). This pigment tends to darken and brown in oil binder [11]. Cecco sparingly uses expensive pigments such as ultramarine, with which only the blue feather on the hat was painted (Fig. 3F). The dark background was made using only natural umber and a small amount of white (Fig. 3G).

The results of the analysis of the binders of the two samples (from background and skin parts) (Table 2) indicate the presence of linseed oil. The data also show that tempera was not used as a binder.

Table 2. GC-MS analysis of the paint layer binder

Sample name / symbol	Identified binder	P/S [12]	Oil content (% w/w)
1. Carnation of Saint Sebastian	Linseed Oil	1.48 ± 0.3	2.0 ± 0.1
2. Background		1.00 ± 0.1	1.7 ± 0.1

Conclusions

The examination of Cecco's work shows that the artist, just like Caravaggio [13], was very concerned about the preparation of the textile support: he prepared new canvases from one piece of textile, tending not to use pieces joined together. Both the pattern and the type of weaving were important to minimize the reflection of light.

One of the most important aspects of the technology used by Caravaggio and his followers was the dark colour of the grounds, which gave a significant tone to particular paintings. Analysis of Caravaggio's works showed that the grounds in his paintings were usually applied in two coats: the bottom layer had a lighter tone and the darker one on the top layer was finely distributed [14]. The basic fillers were yellow ochre, red and brown earth, raw umber mixed in different proportions with lead white, calcium carbonate, quartz, and lamp black [15]. Cecco also preferred grounds thinly applied in two coats. The second layer, in the same colour, was spread *wet-on-wet* to smooth the roughness of the first coat. Ground fillers, similarly to Caravaggio, were based on earth pigments and calcium carbonate.

Caravaggio in his Roman period, instead of sketching with charcoal or brush, used the sharp wooden end of the brush to mark placement lines during preparation of the ground. There are plentiful hypotheses about these incised lines, one of which states that they were probably used to record the pose of a live model [16]. No incision lines were found in Cecco's image. He probably tried to reproduce only the final effect of the Caravaggio paintings using his own methods of drawing on canvas. Under IR radiation, the dark grounds used by Cecco create a low contrast between the graphic lines and the background. Because of the medium and the colour of the underdrawing and grounds, this is hard to see in IR light. The artists probably made a very sketchy type of underdrawing from a life model who posed as each figure in full; he sketched and painted one model after another and painted the background in the final step. In IR reflectography, we can find some evidence that the Cecco made his underdrawings using a brush and probably dark oil paint.

Examinations show that the pigments used by the Cecco were typical 17th century earth-based pigments. A very interesting part of the palette of Cecco, just like the other Caravaggisti, is the use of white: they used calcium carbonate or chalk as an extender to lead white. Such paint allowed the execution of more textural effects that are unaffected by colour. Traces of organic pigments were also found. They were not, however, used as glazes, only in mixtures

with other pigments such as lead white or earth pigments to increase colour. For painting, Cecco chose linseed oil as a binder for the painting layer. It is known that Caravaggio and his followers used linseed and walnut oil [17-19].

Because so little is known about Cecco and his other paintings it is difficult to make conclusions about his entire painting technique. *The Martyrdom of Saint Sebastian* is an integral part of Cecco's oeuvre. It represents and exemplifies the fundamental aspects of his style: use of light, colour, detail, outline, and characteristic figures. This author hopes that this article will be the beginning of research on the painting technique of Francesco Buoneri, also known as Cecco.

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