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Conservation of *Portrait of a Man in a Dark Costume* by Govaert Flinck in the National Museum in Warsaw

The National Museum in Warsaw's acquired painting by Govaert Flinck, *Portrait of a Man in a Dark Costume*, underwent conservation work carried out by the author of this article in 2005.[1] The conservation made it possible to take samples of the paint layers from different fragments of the composition, so that a series of chemical and physical tests could be conducted in order to obtain a more detailed specification of the technical and technological structure of this work of art. The painting by Govaert Flinck, Rembrandt's student, was interesting material for research, which has confirmed that his painting technique and technology displays great similarities with that of the great master's atelier. It is the author's hope that the results of the examination will provide useful comparative material for researchers of paintings associated with Rembrandt's circle.[2]

State of preservation of the painting before conservation work

The wooden support consisting of three oak panels arranged vertically, measuring 9.5 cm × 69.3 cm × 0.4 cm, was in good condition. The joins of the panels at the back are invisible due to the movable cradle installed later, during conservation works. Before the cradle was applied, the support for the painting was probably thinned to ca. 0.4 cm. Currently, the cradle (also with a thickness of 0.4 cm) constitutes an integral part of the support. The joins of the boards on the face were visible through cracks in the binding media and areas where paint was missing or chipped. The application of too thickly distributed filler, various retouchings and overpaintings are visible along virtually the entire length of the cracks.

The original paint layer varies. It is thin and smooth in areas depicting flesh, hair and sky and thick, impasto and visibly textured with an extensive network of cracks in the trees

1 A comprehensive study of the subject is in preparation.

2 The author wants to acknowledge her gratitude to the following people for their cooperation and advice: Dr. Aleksandra Krupska, Department of Conservation and Restoration of Works of Art, Academy of Fine Arts in Warsaw; Anna Nowicka, Department of Conservation and Restoration of Works of Art, Department of Specialist Research and Documentation Techniques, Academy of Fine Arts in Warsaw; Dr. Irmina Zadrożna, Engineer, Department of Chemistry, Warsaw University of Technology; Marek Wróbel, Studio of Electron Microscope and Microanalysis, Institute of Hydrogeology and Geological Engineering, University of Warsaw; Prof. Antoni Ziemba, Institute of the History of Art, University of Warsaw and The National Museum in Warsaw; Dr. Elżbieta Pilecka-Pietrusińska, Conservation Workshop for Modern Art on Wood Support, The National Museum in Warsaw; Piotr Lisowski, Conservation Workshop for Easel Paintings, The National Museum in Warsaw; Krzysztof Wilczyński, Ligier Studio at the National Museum in Warsaw.

and foliage and the landscape area. The layer of paint depicting the sky is the most damaged area. Patches where the paint has disintegrated, due to the natural movements of the wood, and deformations from various periods resulting from the loosening of the paint are also visible.

In its pre-conservation condition, numerous and extensive retouchings and altered colours, sometimes applied directly in the areas of losses to the ground, or poorly prepared surface of the fillers could be detected. The replacement of the ground – applied over different periods of time – were differentiated in terms of the appearance, texture and type of materials used. Many of the retouchings were matt, others glossy, often having been applied too broadly. The entire work was covered with a layer of darkened and discoloured varnish, which distorted the real tonality of the painting.

Earlier conservation work

The painting has visible remnants and traces of a few earlier attempts at conservation conducted at unknown locations and times. During one of them, the original oak support of the painting was thinned and the movable cradle structure added, consisting of nine wooden slats arranged vertically and fixed to the back of the painting, as well as nine movable ones arranged horizontally. The earlier attempts at conservation were evidenced by the number of places where fillers had been applied extensively, covered with retouchings of different shades and overpaintings. During one of the earlier conservation attempts, many fragments of the composition, especially in the sky area constituting the background for the figure of the man, were subjected to bold intervention, namely repainting. The area covered with paint extended far beyond the areas where the original paint was missing, in an attempt to conceal the numerous areas of damage. The entire face was covered with a thick coat of layers of varnish, probably mastic varnish (visible in ultraviolet light).

Tests conducted

- The painting underwent comprehensive tests both in visible light using binoculars, and a magnifying glass and in the luminescence of ultraviolet (UV) and infrared (IR) light.[3]
- An analysis of the technological layers of the samples was conducted on the basis of:
  - the stratigraphy of cross-sections of paint layers;
  - microscopic photography in direct, and transmitted visible light;
  - microchemical tests identifying the pigments of paint, and ground fillers in individual samples and;[4]
  - scanned images and spectrums using the method of energy-disperse X-ray microanalysis (SEM-EDS)[5] serving to determine the elemental composition.

[3] Photographic documentation, comprising specialist photographs using UV was carried out by Krzysztof Wilczyński from the Ligier Studio at the National Museum in Warsaw, and IR photographs by Piotr Lisowski from the Department of Conservation of Easel Painting of the National Museum in Warsaw.

[4] The identification of the pigments and fillers was undertaken by Anna Nowicka, Department of Conservation and Restoration of Works of Art in the Department of Specialist Research and Documentation Techniques at the Academy of Fine Arts in Warsaw.

[5] The analysis was carried out by Marek Wróbel, Studio of Electron Microscopy and Microanalysis at the Institute of Hydrogeology and Geological Engineering, University of Warsaw.

- For the purposes of identification of the medium used by the artist, an analysis was conducted of the binding media from the samples taken, using two independent spectroscopic techniques, namely gas chromatography coupled with mass spectrometry GC-MS, and for a few samples, Fourier's infrared transformational spectroscopy (FTIR). The infrared spectroscopy served to confirm the results obtained using the GC-MS method.[6]

Research results

- The ground contained the following fillers: chalk, lead white and a hint of iron oxide. The emulsion-binding medium was determined to consist of a water solution of gluten glue and linseed oil. This was in line with the technical and technological procedures used in Rembrandt's atelier, as determined by the Rembrandt Research Project.[7]
- The binding medium used for the paint is an emulsion made of egg yolk with the addition of plant gums with a solution of natural resin, and linseed oil. This type of binding medium, combining egg yolk with linseed oil in an emulsion containing gums, was typical of the technique used by Rembrandt and his atelier, as indicated by Karin Groen's research, interpreted by Ernst van de Wetering.[8] A lack of nut oil, used by Ferdinand Bol for areas of white (linseed oil was used for other colours), confirms the painting's attribution to Flinck rather than Rembrandt's other student, Bol.[9] The addition of resins, resulting from mixing minute amounts of the varnish into the binding medium, was a characteristic method used by the painters in Rembrandt's atelier and circle.[10]
- The pigments used in the making of the painting such as lead white, bone black, lamp black, smalt,[11] iron oxide and lead-tin oxide, green earth, malachite (probably artificial), bitumen brown, and organic red[12] were characteristic of the seventeenth century, and typical of the palette used in the atelier of Rembrandt, Govaert Flinck's master.

6 This analysis was undertaken by Dr. Irmina Zadrożna, Engineer, Department of Chemistry, Warsaw University of Technology.

7 Karin M. Groen, "Grounds in Rembrandt's workshop and in paintings by his contemporaries," in Ernst van de Wetering, Michiel Franken et al., *A Corpus of Rembrandt Paintings*, vol. 4: *The Self-Portraits* (Dordrecht: Springer, 2005), pp. 318–34.

8 Karin M. Groen, "An Investigation of the Use of Binding Medium by Rembrandt. Chemical Analyses and Rheology," *Zeitschrift für Kunsttechnology und Konservierung*, vol. 2, no. 2 (1997); Ernst van de Wetering, *Rembrandt. The Painter at Work* (Amsterdam: Amsterdam University Press, 1997), chap. 9: "The Search for Rembrandt's Binding Medium," pp. 225–43, esp. pp. 236–41.

9 Raymond White, Jo Kirby, "Rembrandt and His Circle. Seventeenth-Century Dutch Paint Media Re-examined," *National Gallery Technical Bulletin*, vol. 15 (1994), pp. 64–78, esp. pp. 66 and 71.

10 Raymond White, Jennifer Pilc, "Analyses of Paint Media," *National Gallery Technical Bulletin*, vol. 16 (1995), pp. 85–95, esp. pp. 88–9; Raymond White, Jennifer Pilc, Jo Kirby, "Analyses of Paint Media," *National Gallery Technical Bulletin*, vol. 19 (1998), pp. 74–95, esp. pp. 77–9, 88–9; Raymond White, Catherine Higgitt, "Rembrandt's Paint Medium," in David Bomford, Christopher Brown, Ashok Roy et al., *Art in the Making. Rembrandt*, exh. cat., The National Gallery, 12 October 1988 – 17 January 1989 (London: The National Gallery, 1988), pp. 48–51, esp. p. 50. See Van de Wetering, *Rembrandt. The Painter...*, op. cit.

11 On the use of smalt in Rembrandt's technique and in his atelier: Ashok Roy, Jo Kirby, "Rembrandt's palette," in Bomford, Brown, Roy et al., *Art in the Making...*, op. cit., pp. 35–47, esp. p. 46; White, Higgitt, "Rembrandt's Paint Medium," op. cit., pp. 48–51, esp. p. 51. See also Van de Wetering, *Rembrandt. The Painter...*, op. cit., p. 235.

12 Roy, Kirby, "Rembrandt's palette," op. cit.; Van de Wetering, *Rembrandt. The Painter...*, op. cit., passim.

Technological construction of the painting

The painting was based on a wooden support, a thin layer of white (cream) ground and two, three (up to four, as in the foliage area) layers of paint, depending on the area of the composition.

The oak panels of the support were covered with two layers of ground. The first layer is rather thin ground, soaked in a dark yellowish white binding medium, probably rubbed into the texture of the grain of the wood in order to smoothen its surface. The second layer of the ground is also rather thin warm light-yellow coloured, and contains chalk, lead white and iron oxide yellows, and plays the role of an imprimatura. It is the *primuersel* (as determined by Karel van Mander, 1604), typical of Dutch panel paintings, that gives the ground a light yellowish tone (unlike canvas paintings in which the top layer of primer was grey, greyish brown or greyish pale brown).[13] On this ground, the artist sketched a dark drawing in a mixture of bone black and lead white, as well as iron oxide compounds. The artist drew freely, and then readjusted the lines in his search for the correct form. By observing the *pentimenti*, we can see the artist's freedom in creating the composition, in his bid to find the correct form for the depiction of the model.

The painter also continued his search in the further stages of his work. In the ground layer he changed his original idea, leaving *pentimenti*, which can currently be detected under infrared light. The final effect was achieved by applying a second layer of paint – the modelling.

The emulsion-binding medium used by Flinck (typical of the technique of Rembrandt's atelier, as indicated above) allowed him to apply the paint layer faster.

The pigments identified in Flinck's painting are lead white, chalk, smalt, malachite, green earth, bone black, lamp black, lead-tin oxide, iron oxide, organic red (cochineal?) and bitumen brown. This modest palette was always characteristic of Rembrandt's atelier in the master's mature period (1630s–1640s),[14] so for example, in the ground layer of the sky area, lead white, and smalt, with the addition of black, was detected. In the modelling layer covering the ground layer, the presence of lead white, smalt, iron oxide and organic red was detected.

The artist approached the landscape part using various techniques: a thin layer for the earth and grass, and impasto modelling for the leaves of the trees and bushes. In the first, or ground layer, lead white, black (bone black, perhaps with the addition of soot), iron oxide were identified. In the second, or modelling layer, lead white and the addition of black, probably soot, were detected, whereas the areas of light contained lead white, iron oxide, and a hint of smalt.

Green earth, lead white and copper compounds were found in the ground layer in the leaves of the bushes and trees. The modelling contains iron oxide, lead white, green earth, organic red and a small amount of smalt and copper compounds. The raised, light areas were modelled using lead-tin oxide with lead white; iron compounds and traces of lead were also identified. They are covered by a layer (a glaze enhancing the local colour) containing copper green (synthetic malachite?), iron compounds, organic oxide and bitumen brown.

In the areas depicting flesh, lead white, iron red and the addition of oxide (probably iron oxide) were identified. The artist achieved the dark, almost monochromatic clothing of the

[13] Groen, "An Investigation...," op. cit. See also Van de Wetering, *Rembrandt. The Painter...*, op. cit., chap. 2: "Painting Materials and Working Methods of the Young Rembrandt. The Ground," pp. 17–23; Ashok Roy, "The ground layer: function and type," in Bomford, Brown, Roy et al., *Art in the Making...*, op. cit., pp. 27–9.

[14] Roy, Kirby, "Rembrandt's palette," op. cit.; Van de Wetering, *Rembrandt. The Painter...*, op. cit., passim.

man using blacks, namely bone black, and lamp black with the addition of iron oxide (probably sienna).

Conservation work

The objective of the conservation work, conducted in accordance with the collectively agreed working programme, was to recover the lost aesthetic qualities of Flinck's work through the removal of highly-yellowed, almost brownish, thick layers of non-original varnish, the altered colours of the retouchings and overpaintings.

After removing dust and surface dirt from the face and the back, work commenced on stabilizing the paint layers, returning their adhesion and cohesion by reattaching loosened and chipped material. The procedure was conducted locally, using thermal assistance and pressure in order to obtain a stronger binding medium. Then, after a careful selection of the appropriate solvents, the non-original, partially decomposed layers of the varnish with altered colours were removed.

The luminescence of the painting was then examined under ultraviolet excitation and the areas of non-original technological layers and remnants of the partially-removed varnish were determined. The extensive overpaintings were removed, which, although not changing the artist's concept, had been applied carelessly, leading to colour changes revealing those areas where the original had been damaged.

Then the fillers were corrected, but only to the extent necessary, and the missing ground was reapplied. Best efforts were used to ensure that the surface of the fillers matched the texture of the original local layer of paint, and they were insulated using retouching varnish.

The aesthetic conservation work was carried out in two phases. The first involved mimicking retouchings, using watercolours, while the second consisted in the finish, using a resin technique. The face of the painting was protected with a final layer of varnish in conjunction with creating a uniform gloss across the entire surface, diminishing any areas of matt or gloss, restoring the painting's homogenous, aesthetic appearance. The varnish is to protect the surface of the painting against any adverse effects of changes in temperature and humidity, mechanical damage, hazardous gas fumes, and UV radiation.