

The narrative of Vilhelm Hammershøi revised: Investigating the artist’s use of cobalt blue, chromium-based green and cadmium yellow.

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Introduction

The Vilhelm Hammershøi Digital Archive (ViHDA), an ongoing project at the National Gallery of Denmark (SMK), is investigating the characteristics and development of the working methods of the Danish painter Vilhelm Hammershøi (1864–1916). An in-depth visual, technical and scientific documentation has been carried out of, at this point, more than 90 paintings by the artist. Despite Hammershøi’s internationally growing reputation, very little is known about his techniques or materials. The current research will provide significant insights into the distinctive artistic qualities of the painter, which will ultimately become available in an open-access digital archive. Although known generally for his use of greyish and toned-down shades, the comprehensive examination of Hammershøi’s practice has uncovered his application of a wide variety of pigments, including an extensive use of cobalt blue, chromium-based green and cadmium yellow.

Methods

Multiband imaging and X-ray fluorescence spectroscopy

Multiband imaging (MBI) involves capturing a painting’s image across multiple wavelength regions within the electromagnetic spectrum, including ultraviolet (UV), visible (VIS), and infrared (IR). Some pigments or other painting materials are known to emit light after having been illuminated with UV or IR radiation. In conjunction, scanning X-ray fluorescence spectroscopy (MA-XRF) is used to map the distribution of chemical elements within both the paint layers and the underlying ground layer. The combination of these processes is instrumental in determining pigment use in the individual paintings (Figure 1).



Figure 1. The painter Elisabeth Wandel (1890). Oil on canvas. 56 cm x 48 cm

Results and discussion

Ida Hammershøi with a Teacup and Near Fortunen

A distinctive feature of Hammershøi’s paintings, revealed by the investigation, is their rich and versatile palette, including an extensive use of pigments containing chromium (Cr), cobalt (Co) and cadmium (Cd). This is exemplified by two paintings, the portrait *Ida Hammershøi, The Artist’s Wife, with a Teacup* (likely a study for a finished painting at the AROS Art Museum) and the landscape *Near Fortunen*. Non-destructive methodologies, such as multiband imaging (especially infrared false colour—IRFC) and MA-XRF spectroscopy, uncovered the unexpected presence of these pigments. Notably, a chromium-based green pigment plays a role in the underpaint modelling of the figure in the portrait—clearly visible in the unfinished hands—while its interaction with cobalt blue emerges as a significant constituent in the finishing layer of the facial flesh paint (Figure 2). In the landscape, the analysis revealed Hammershøi’s substitution of traditional green pigments for a mix of cobalt blue and cadmium yellow (Figure 3).



Figure 2. *Ida Hammershøi, the Artist's Wife, with a Teacup* (1907). Oil on canvas. 91 cm x 73.5 cm. The blue pigment appears in pink in the IRFC.

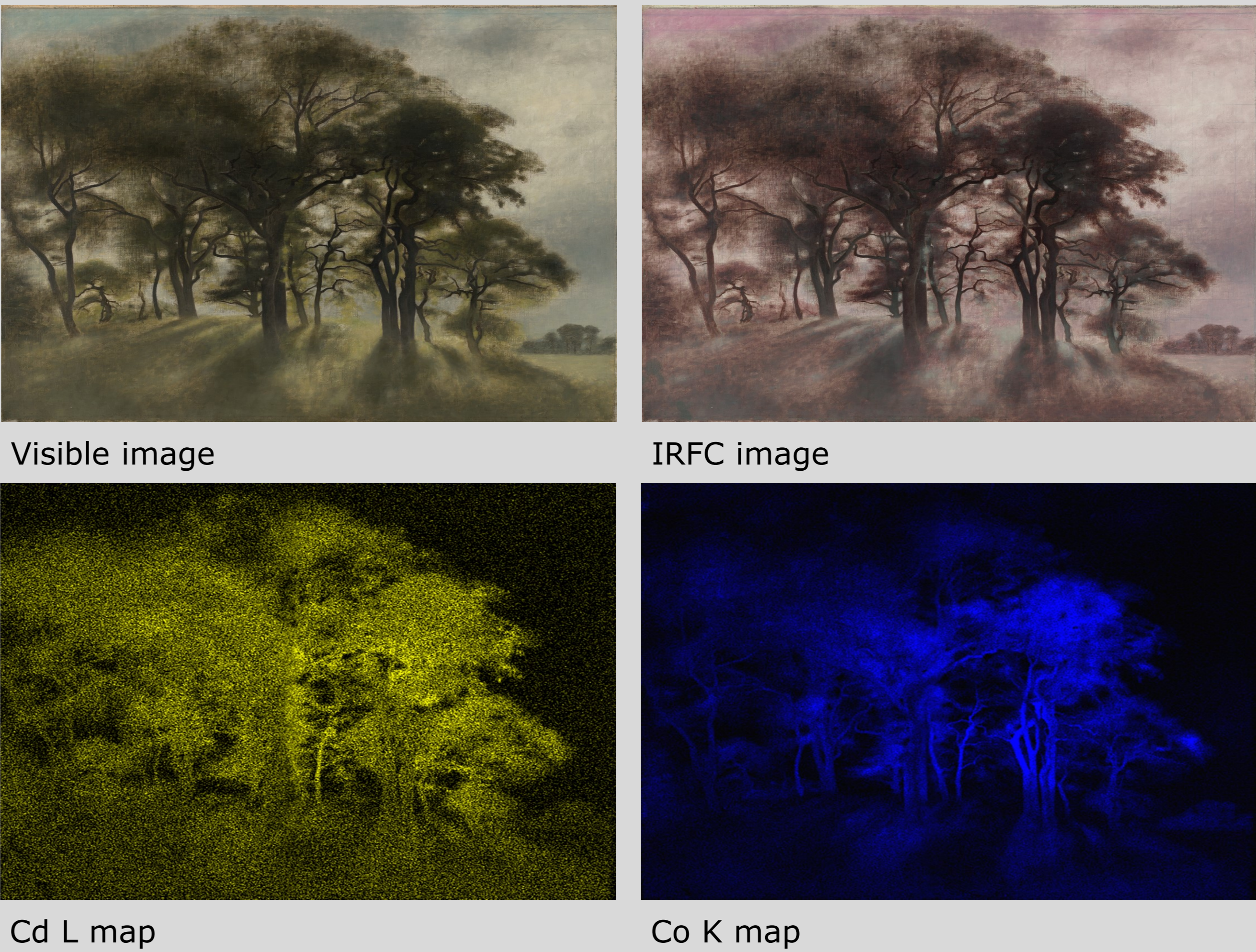


Figure 3. *Near Fortunen, Jægersborg Deer Park, North of Copenhagen* (1901). Oil on canvas. 55 cm x 66.5 cm. The blue pigment appears in pink in the IRFC.

Conclusions

The results of this investigation within the ViHDA project provide new insights into Hammershøi's artistic practice and his specific use of pigments. The examples presented in this poster illustrate his proficiency in manipulating the colours behind the muted tonality and atmosphere of his paintings. This work also underscores the potential of non-destructive methodologies in the study of artworks.

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