Edward Steichen (American, born Luxembourg, 1879–1973)

Midnight Lake George

1904
Gum bichromate and cyanotype over platinum print
Alfred Stieglitz Collection

AIC accession number: 1949.829

Stieglitz Estate number:

Inscriptions: Signed and inscribed recto, on image, lower left, in green pencil [?]: "STEICHEN / MDCCCCIV"; inscribed verso, on second mount, upper left, in graphite: "Midnight Lake George / by / Steichen"

Dimensions: 39.2 x 50.6 cm (image/paper/first mount/second mount)

Print thickness: N/A

Surface sheen: High gloss (5.4 GU @ 85°)

Paper tone: N/A

Mount: Original

Mount tone: L*83.43, a*6.27, b*23.04

Ultraviolet-induced (UV) visible fluorescence (recto): Surface coating fluoresces green

X-ray fluorescence (XRF) spectrometry:
See below

Fourier transform infrared (FTIR) spectrometry:
See below

TECHNICAL SUMMARY

This photograph is a gum bichromate and cyanotype over platinum print mounted overall to a thick wood-pulp board that has been faced with a dark paper. Gum-platinum printing, a unique technique that involves printing a gum bichromate print over an already developed platinum print, was frequently used by Steichen. This print is a mirror image of another Steichen print in the Art Institute's Stieglitz Collection, also titled *Midnight—Lake George* (1945.830). A letter by Steichen to Alfred Stieglitz seems to indicate that this print was created in three layers: "first printing gray black plat[inum] / 2nd—plain blue print / 3rd greenish gum."[1] Fine cracking and slight delamination at the edge of the print indicate that the print was likely trimmed after it had been fully mounted. The back of the wood-pulp mount has an inscription in graphite, "Midnight Lake George by Steichen," and is highly yellowed. Rough edges on the verso as well as acid burns on the board indicate that this print was once framed. The artist signed the print on the recto in the gum bichromate layer. There is a high glossy coating over the gum layer that fluoresces light green when exposed to UV radiation and that has been identified as an oil-based varnish with FTIR-ATR. The FTIR analysis also confirmed the presence of ferric ferrocyanide, the compound that creates the blue color in cyanotype photographs. The "plain blue print" Steichen describes could therefore be a cyanotype between the platinum and gum layers. Platinum, iron, chromium, lead, and trace amounts of mercury were detected using XRF spectrometry. Common to platinotypes, the residual presence of light-sensitive iron ions could be due to improper washing of the print after processing. However, the residual iron signal could also be due to the iron compounds present in the "blue print" layer. Chromium is used to sensitize the gum bichromate. The presence of lead could have two sources: while lead could have been used during fabrication of the photographic paper itself, it was also often used during the processing of platinum prints to increase uniform development of the print. The presence of mercury could be the result of the artist's use of mercuric chloride during processing but could also have been used as a preservation agent for gum bichromate. Zinc and strontium were detected in the mount; these compounds were most likely included during fabrication of the paper.

[1] Edward Steichen to Alfred Stieglitz, Aug. 11–12, 1904, Alfred Stieglitz/Georgia O'Keeffe Archive, Yale Collection of American Literature, Beinecke Rare Book and Manuscript Library, Yale University, box 46, folder 1090.

X-RAY FLUORESCENCE (XRF) SPECTROMETRY

XRF spectral readings were taken from the recto of the work and from the mount when available. The elements listed below have been positively identified in the work; elements in bold have been attributed to the processing of the print.

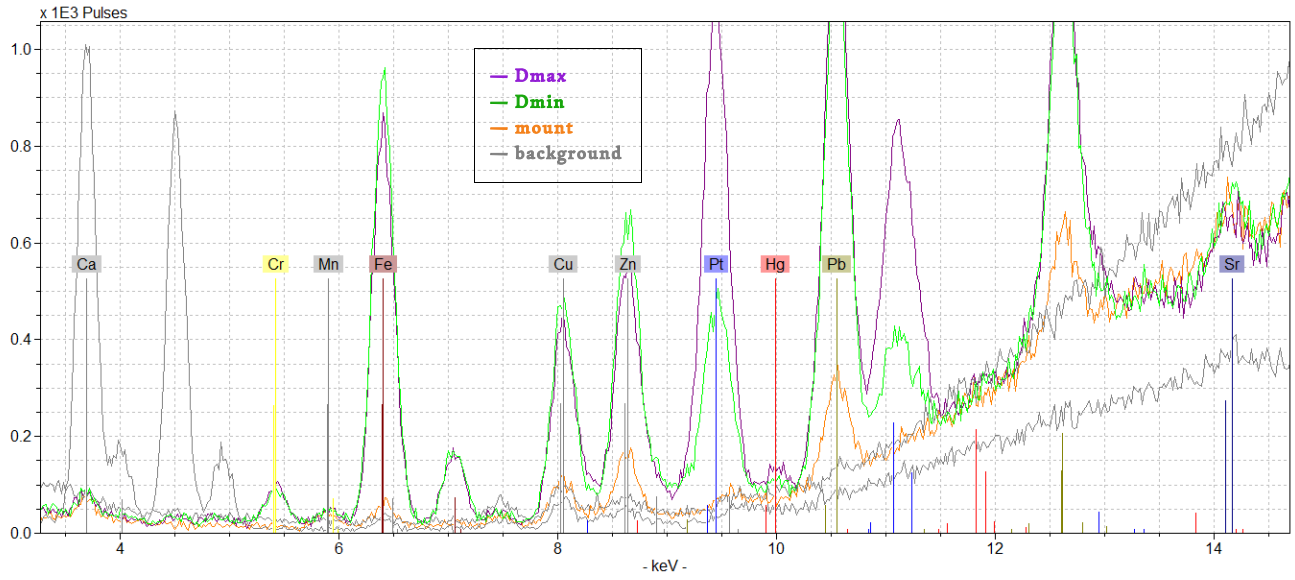
Print: **Cr**, **Fe**, **Pt**, Hg, Pb

Mount: Ca, Mn, Fe, Cu, Zn, Sr, Pb

The graph below shows XRF spectra for three distinct measurement areas on the print: the darkest, maximum-density image area (Dmax, purple); the lightest, minimum-density image area (Dmin, green); and the mount, when available (orange). The background spectrum (gray) represents the characteristic contribution of the instrument itself as measured on a Teflon reference and is included in order to discount irrelevant elements from the print's signature. Elements were identified based on the presence of their characteristic peaks. Analysis was performed with a Bruker/Keymaster Tracer III-V+ energy-dispersive handheld XRF analyzer, equipped with changeable Ti and Al filters and a Rh transmission target. Measurements were taken for 120 or 180 LT at 40 kV and 10 µA. The spectrum below illustrates the significant peaks for this print in the energy range from 3 to 15 keV.

Figure 1. (right)
Locations of XRF measurements

Figure 2. (below)
XRF spectra from the Dmax, Dmin, mount, and background signal produced by the analyzer.



FOURIER TRANSFORM INFRARED (FTIR) SPECTROSCOPY

Analysis was conducted using Reflectance FTIR spectroscopy. Analysis identified a drying oil, likely added with a small amount of natural resin, such as dammar. The characteristic band for Prussian blue is also evident in the spectrum; weak bands for cellulose (the paper substrate) or a gum are visible.

Analysis was performed using a Bruker Alpha small footprint portable FTIR spectrometer, with reflectance mode sampling module for contactless analysis of artworks and integrated video camera. The spectral range available is 375-7,500cm^{-1} with a measurement spot 6 mm in diameter, and working distance of approx. 15mm in front of the spectrometer. 256 scans were acquired at a resolution of 4 cm^{-1}.

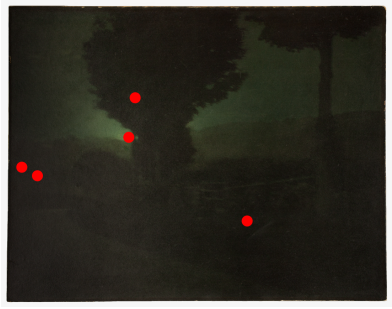


Figure 1. (right)
Location of the spots analyzed with FTIR-ATR

Figure 2. (below)
Reflectance FTIR spectra showing the presence of Prussian blue (PB); a drying oil, and likely a minor quantity of a natural resin such as dammar, weak bands for cellulose (the paper substrate) or a gum, visible especially in the range 1200-1000 cm^{-1}.