

Satista Prints and Fading

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When the Platinotype Company's platinum-silver paper, Satista, was introduced in 1914, Willis & Clements advertised that "the prints are absolutely permanent."¹ Although the amount of platinum in the paper was greatly reduced compared with its platinum paper, the Platinotype Company described the new product as closely resembling Platinotype,² and W. H. Smith, the company's representative, told the Croydon Camera Club, "In fact, so closely does the silver simulate 'platinum black,' that in many cases it is impossible to detect visually any difference between a platinotype and a Satista picture."³ A number of influential photographers experimented with Satista as an alternative to platinum, but it never gained the popularity of platinotype. Some of these rare prints demonstrate that the claims of Satista's permanence were exaggerated. Three Satista prints are described below.

Paul Strand (1890–1976) made several of his noteworthy modernist images in Satista in 1916, including *Porch Railings, Twin Lakes, Connecticut* (fig. 1), which was acquired by the Museum of Modern Art (MoMA) in 2001, and *Porch Shadows* (fig. 2), which has been in the collection of the Art Institute of Chicago (AIC) since 1949. When these photographs were first printed they would certainly have appeared quite neutral in hue, but both now exhibit fading and color shifts that have made the presence of retouching prominent, evidence of deterioration that was described by Lisa Barro in 2003.⁴ One of the two Satista prints by Strand is in better condition than the other. While the blackest areas of the AIC print have shifted to warmer tones, they remain darker than those in the MoMA print. The retouching in the AIC print is not as pronounced as that seen in the MoMA print.⁵



Figure 1. Paul Strand, *Porch Railings, Twin Lakes, Connecticut*, 1916. Platinum-silver print, 32.4 × 24.6 cm. The Museum of Modern Art, Thomas Walther Collection, Horace W. Goldsmith Fund through Robert B. Menschel, 1865.2001. © Aperture Foundation Inc., Paul Strand Archive.



Figure 2. Paul Strand, *Porch Shadows*, 1916. Platinum-silver print, 33.1 × 22.9 cm. The Art Institute of Chicago, Alfred Stieglitz Collection, 1949.885, www.artic.edu. © Aperture Foundation Inc., Paul Strand Archive.



Figure 3. Frederick H. Evans, *The Bride*. Platinum-silver print, 14.0 × 22.6 cm. From Frederick H. Evans, *Nine Early Engravings by Edward Calvert: Facsimile Enlargements from the Originals Made on Copper, Wood & Stone MDCCCXXII—MDCCCXXXI* (privately printed, 1915). National Gallery of Art Library, Department of Image Collections, Album P164. The center of the print, which was protected from atmospheric influences more than the edges, remains neutral in hue, while the edges display greater evidence of sulfiding (brown hue) and oxidation (fading).

A platinum-silver print by Frederick Evans from a 1915 portfolio of reproductions of engravings printed in a “permanent process” displays a shift from neutral to warm (fig. 3).⁶ X-ray fluorescence spectrometry (XRF) indicates that this print is platinum-silver, most likely a Satista print.⁷ The high-contrast image of this print changes from black in the central portion to sepia at the perimeter. Barro speculated that the fading and shift toward sepia are due to silver sulfiding, a hypothesis supported by XRF. The image density in the Evans print would have initially been uniformly black throughout, and, as expected, XRF measurements show that the ratios of silver to platinum are consistent from the image at the center to the image at the edges. XRF also reveals an increase in the sulfur content from the blacker image in the center to the more sepia edges. Apparently, air, moisture, and pollutants migrated into the edges of the portfolio and caused this localized deterioration. Other prints in the portfolio show varying degrees of color shift depending on their location within the stack: prints toward the center, where they were protected from atmospheric influences by the mass of other prints in the stack, are more neutral in hue overall. Those near the top and bottom, where they were less shielded from atmospheric conditions, are more sepia.

Unlike the black-*or*-white tones of the engravings reproduced in Satista by Evans, the images in Strand’s Satista prints have continuous tones that gradually move from black to gray to white. The darkest tones of the borders are no longer black but shades of dark brown. The middle tones are more neutral in hue. The retouching medium, which

is also neutral in hue, provides an indication of both the strength and the color of the original image (fig. 4). XRF of MoMA’s print indicates that as the image tone shifts from neutral to more sepia the amount of platinum remains fairly constant, but the quantity of silver increases (fig. 4a).

The shift in image hue can be explained by the way in which the Satista image is formed. During a brief exposure of the sensitized paper, both the silver and platinum images partially print out; subsequent chemical development is required to complete image formation. The platinum image provides the details in the highlights to middle tones. Platinum also is deposited in the darker image areas, but the silver image augments the shadows to provide greater density than would be formed by using a dilute platinum sensitizer alone. Therefore, the amount of silver increases with image density across the entire density range, while platinum increases only to a point before reaching a maximum in the middle tones.

The silver component is susceptible to oxidation in a high-humidity environment.⁸ Oxidized silver, which is both mobile in the presence of water and colorless, accounts for some of the observed fading and will react with sulfur (atmospheric pollution, poor-quality enclosures, etc.) to form a brown silver sulfide or reduce to larger metallic silver particles that are orange in color (see fig. 4).⁹ The light and middle tones retain their neutral hue as they are mostly comprised of the more stable platinum, while the darker, silver-rich image fades and shifts toward sepia.

This phenomenon was demonstrated in 1915 by W. H. Smith of the Platinotype Company when comparing the

permanence of Satista with a silver bromide print. Upon subjecting both to an oxidizing bath of potassium permanganate and sulfuric acid, the bromide print “vanished” while the Satista print experienced “a very slight reduction in the very deepest part of the print” but “remained perfect in every detail.”¹⁰ The neutral lower-density areas, which are comprised primarily of platinum, are therefore more resistant to oxidation and gaseous sulfur than the denser silver image.

These examples illustrate that the silver in Satista prints is vulnerable to oxidation and sulfiding, making it much less stable than the platinum component of the image. Prints in collections may display a wide range of appear-

ances, some of which may be due to deterioration but may also be related to the original image hue of the product, which by 1920 was offered in black and sepia¹¹ and by 1930 in smooth, rough, and vellum surfaces.¹²

While the storage and display history of the MoMA print prior to acquisition is unknown, it is unlikely that it was stored in ideal conditions before coming to MoMA. The AIC print, which remains in relatively good condition, has spent most of the last thirty-five years in a cool, dry environment (60°F and 40% RH).¹³ The superior state of preservation of the AIC print provides strong evidence of the benefits of storage in a temperature- and-humidity controlled environment.

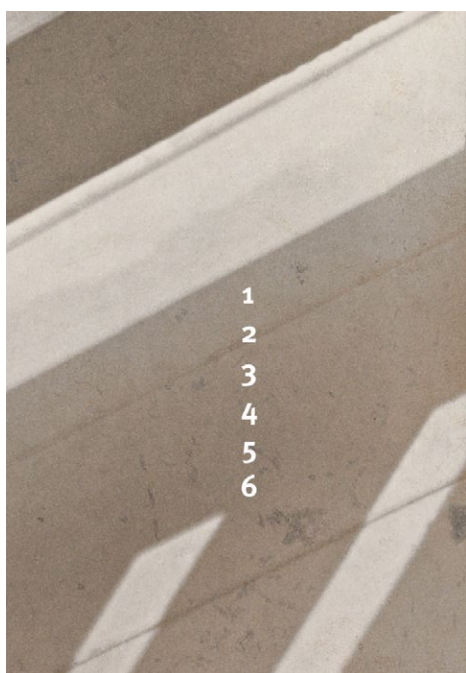
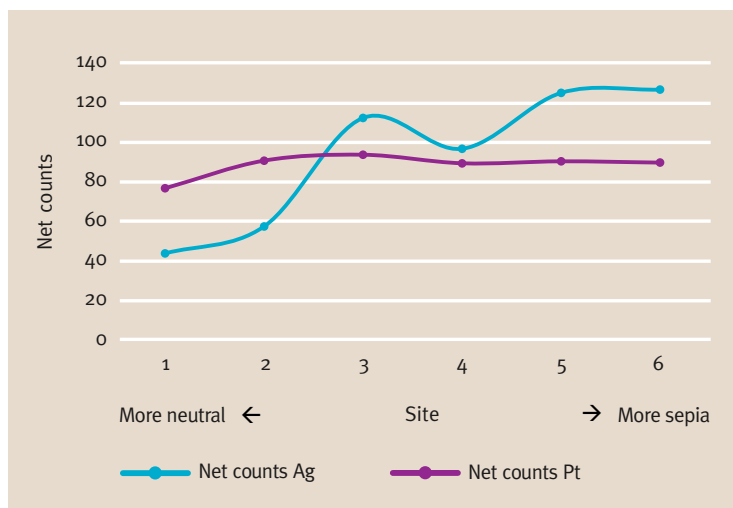


Figure 4. Detail of Paul Strand, *Porch Railings* (fig. 1), showing the locations measured by XRF (sites 1–6) and darker neutral gray retouching.



4a. Graph showing net counts of silver and platinum from sites 1–6.

Note that the net counts of platinum remain fairly constant regardless of image hue. The more sepia regions have higher concentrations of silver (Ag), while the more neutral regions consist predominantly of platinum (Pt). The denser silver image, however, has faded and become more sepia in hue than the regions that consist primarily of platinum. The retouching indicates the original neutral hue and higher density of the image (e.g., below and to the right of site 6).

The Satista process relies on silver to compensate for the lower concentration of platinum in the high densities of the image. The fading of the metallic silver image is due to oxidation. The colorless oxidized silver then reduces to visible metallic silver, often in the presence of sulfur, producing both brown silver sulfide and smaller silver particles, which are orange in hue. The relatively small size of these oxidized and reduced metallic silver particles also helps to explain the lower image density and tonal shift to brown seen in deteriorated areas.

A subtle shift in image hue from warm gray (site 1) to more sepia (site 6) relates to the ratio of platinum to silver. The relative amount of platinum remains about the same throughout and retains its neutral gray tone, while the amount of silver increases as the image becomes denser and more sepia in hue.

Notes

1. Willis & Clements advertisement for platinum-silver paper, *Amateur Photographer's Weekly* 4, no. 83 (February 6, 1914): 131; "Satista Paper" 1914, 221.
2. [Abney] 1915, 284; Smith 1914, 777, 808; [Tennant] 1916, 412–13.
3. Quoted in "Croydon Camera Club" 1916, 386.
4. Barro 2003, 37–54.
5. McCabe 2014, 312–20.
6. Evans 1915. The title page reads, "Permanent Photographs on Drawing Paper by Frederick H. Evans."
7. XRF analysis performed by Matthew L. Clarke, Scientific Research Department, National Gallery of Art, August 2015.
8. Lavédrine 2003, 6.
9. Feldman 1981, 1–9.
10. Our Roving Commissioner 1915, 106–8.
11. Platinotype Company advertisement for "Satista in Four Grades 'Black,' and in 'Sepia' on Smooth Buff Paper," *The British Journal Photographic Almanac and Photographer's Daily Companion, 1917* (London: Henry Greenwood, 1920), 117.
12. For a brief description of Satista and the available grades of paper, see Wheeler 1930, 139–50.
13. The MoMA print was acquired in 2001. The AIC print, which was acquired in 1949, has been stored since 1982 in the photography department's cool room, where conditions are maintained at 60°F (+/-3°) and 40% relative humidity (+/-3%). Daffner 2003, 152.

References

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