

OUT OF THE ARCHIVES

An introduction to cyanotypes

VIVID AND SURPRISINGLY MODERN in appearance, Frank B. Masters' cyanotypes (see p. 44-71) were an exciting discovery for us at the Center. Upon seeing the article, I knew immediately that I wanted to give cyanotypes the "OTA treatment" much like I did for glass plate negatives. We also realized we should have a few examples of the process in our collections. Thanks to eBay, our latter wish was promptly realized; the cyanotypes illustrating this article are the first acquisitions in a small collection of historical railroad photography that we are working to assemble. The cyanotype process may be new for some of you—it's not exactly prevalent in contemporary railroad photography. However, if you've ever worked with older architectural or schematic drawings (blueprints), you're familiar with the cyanotype's hallmark deep blue tone—cyanotypes and blueprints are largely one in the same process, just applied to different uses. So whether you're a collector of antique photography or have some old blueprints you'd like to keep safe, read on for some history of the medium as well as preservation tips.

ARTICLE

Adrienne Evans

PHOTOGRAPHS

Collection of the Center

Historical context and development

Sir John Herschel, an English astronomer and chemist, first publicly introduced the cyanotype process via a presentation to the Royal Society of London in 1842. Looking for a simple way to make copies of his notes, Herschel had spent the preceding years experimenting with ways to create and permanently fix photogenically produced images. He made several contributions to the development of photography throughout his inquiries. He achieved success using hyposulphite of soda as a fixer (still used today) as early as 1819. He also discovered the light sensitivity of palladium salts and is credited with coining the terms *positive*, *negative*, *photograph*, and *snapshot*.

Within a year of the introduction of the cyanotype, botanist Anna Atkins, a family friend of Herschel and correspondent of calotype inventor William Henry Fox Talbot, began to employ the cyanotype technique to contact print photograms of algae. She produced *Photographs of British Algae: Cyanotype Impressions* (1843–53) in three volumes. Atkins' book was one of the first to use photographic printing and illustration—both its handwritten text and photograms were cyanotypes. While the production of Atkins' images was "camera-less"—she placed botanical specimens on cyanotype coated paper that she exposed to sunlight—many consider her the first woman photographer.

Aside from Atkins' work, photographers (with a few notable exceptions like Henry Le Secq) seldomly used the cyanotype process in the years following its introduction. In the 1870s, the cyanotype process gained traction with engineers and architects as a method for reproducing schematics and architectural drawings (a.k.a. blueprints, which remained the primary way of copying plans until the 1950s). The first pre-sensitized blueprint paper was made commercially available in France by Marion and Company in 1872. Photographers eventually got hip to the cyanotype, using it as a cheap proofing paper in the 1880s—Eadweard Muybridge used cyanotypes to make working proofs of his famous human and animal locomotion series. In addition, Pictorialist photographers including Edward Steichen and Fred Holland Day created works that incorporated the process around the turn of the century. Because it is straightforward and uses relatively inexpensive materials, the cyanotype became an accessible means for amateurs to create multiple copies of their negatives. Popular usage of the process increased with the introduction of early hand cameras and commercial cyanotype photographic papers such as Kodak's Ferro-Prussiate print and postcard paper.

The cyanotype process fell into disuse around 1920 as black-and-white images became more fashionable. However, cyanotypes enjoyed a revival of sorts in the mid-twentieth century when several photographers began producing them along with other types of early photographic prints as alternatives to gelatin silver prints on commercially-produced photographic paper. Today, several contemporary photographers and artists incorporate cyanotypes into their work including John Dugdale, Christian Marclay, and Kate Cordsen. Analog photography curriculums continue to include the cyanotype process (that's how I learned about it); cyanotype chemistry and pre-sensitized papers (often marketed as "sun prints") are available for purchase from B&H and other online retailers.

Identification and Care

Identifying cyanotypes is a relatively straight-forward process—they're blue! (Usually.) The cyanotype's image is formed from the interaction of light-sensitive iron salts and potassium ferrocyanide, which creates ferric ferrocyanide, the inorganic pigment otherwise known as Prussian blue. Depending on the specific chemistry of the emulsion, the texture of the paper or photographic substrate, and the print's level of



deterioration, cyanotypes can vary in their “blueness” from light, blue-gray to rich, deep indigo or navy. In addition, some photographers found the blue color of cyanotypes “unnatural” and decided to tone them for a more palatable color. Toned cyanotypes can appear black, warm black, green, bluish lilac, or violet, but these hues are far less common than blue. In addition, it’s possible to mistake cyanotypes for blue-toned gelatin silver prints, blue carbon prints, and woodburytypes. The cyanotype’s layer structure is the key to accurate identification in most of these cases. Unlike gelatin silver, carbon, and woodburytype prints, the cyanotype emulsion is applied directly to the paper support during the sensitization process with no binder or baryta layer present. Under close inspection, the paper fibers of cyanotype prints are highly visible on a matte surface. They lack the differential gloss evident in carbon prints and woodburytypes or the baryta layer of gelatin silver prints.

Handling and storage practices for cyanotypes are very similar to general guidelines regarding the care of photographic prints in most respects. Wear gloves when handling cyanotypes; the oils in our hands can cause lasting damage to photographic images. Store cyanotypes in a relatively cool and dry environment to prevent curling, mold growth, and other forms of deterioration. Ideal conditions are thirty to forty percent relative humidity and sixty-eight degrees Fahrenheit with minimal fluctuations. Avoid basements, garages or attics and definitely do not store them on the floor (floods and leaks)! Oversized prints should be stored flat and smaller prints can be stored vertically, but they need enough support to prevent slumping.

Regarding storage enclosures, there has been some discourse in the preservation community about the most appropriate material for cyanotypes. For the past several years, the common wisdom has been to avoid storing cyanotypes in buffered enclosures.

A cyanotype Real Photo Postcard labeled “Smiley Canyon near Fort Robinson in Nebraska.” We believe this is the Chicago & North Western branch line to Lander, Wyoming. Date unknown, photographer unknown

For those unfamiliar with the term, “buffered” refers to archival boxes and boards that contain additive calcium carbonate to raise the pH level of the storage material to the alkaline side of the scale. This alkaline environment is meant to neutralize highly acidic historic papers and protect them from acids that can migrate from neighboring boxes and objects. Buffered materials are traditionally thought to irreversibly fade cyanotype images as Prussian blue can be hydrolyzed in alkaline environments. Yet some contend that unless excess moisture is present in the storage environment, buffered enclosures can be safe for cyanotypes. Further, unbuffered enclosures are not as widely commercially available. My take: if you can find unbuffered enclosures, I recommend using them (better safe than sorry), especially in storage spaces without tight environmental controls. In addition, storage containers should be acid-free and pass the Photographic Activity Test.

Controlling the light levels to which cyanotypes are exposed is another important aspect of their long-term preservation. Cyanotypes are notorious for fading in visible light, so exhibiting originals for long periods of time is generally inadvisable. However, light-faded cyanotypes can regain image density if stored in the dark for an extended period of time. While this phenomenon may seem like magic, according to Mike Ware, a British chemist and scholar of alternative photographic processes, it’s all just a matter of science. “[Cyanotypes] are faded by visible light, when the Prussian blue (ferric ferrocyanide) is photochemically reduced to Prussian white (ferrous

ferrocyanide); but this reaction is found to be substantially reversible, because the latter is slowly reoxidized by molecular oxygen.”

Railroad Heritage Visual Archive Updates

The Center’s collections team has grown significantly over the past few months. First, though, we said goodbye to Angel Tang, archives assistant, who began a new gig at the University of Wisconsin’s Steenbock Library as their Data, Science & Engineering Diversity Resident Librarian. Congratulations Angel! In seeking her replacement, we received applications from a large and accomplished pool of candidates, and with enough work to go around at the Center, we made the decision to take on four of them in various intern and contract positions:

- Heather Sonntag, already a well-established visual materials archivist, is processing and digitizing the Ron Hill Collection at our archival storage facility.
- Joining her (on alternate days) is Gil Taylor, a recent graduate of UW’s iSchool, who’s surveying and digitizing the Jim McClellan Collection.
- Finally, we’ve taken on two new interns: Valerie Lines and John Walker. Both are pursuing master’s degrees at UW’s iSchool, and they are processing John Gruber’s slides and negatives, respectively.

We’re looking forward to making a lot of processing headway with our newly-expanded collections team in the coming months. Welcome aboard, everyone!

In addition, the rest of us “usual suspects” are still hard at work on long-term projects. Wesley Sonheim, intern, and Natalie Krecek, archives associate, continue to make great progress on the Jim Shaughnessy Collection. Between them, they have processed approximately thirty boxes of Shaughnessy’s film negatives and digitized some 5,500 images since beginning work on the collection began last spring. They are about to dive into the negatives depicting the Delaware & Hudson—one of Shaughnessy’s favorite subjects. John Kelly, volunteer, is now pitching in on the John Gruber Collection, identifying the locations and subjects of the unlabeled images. Meanwhile, I’ve been coordinating much of our new hires’ work, co-writing grant applications, and continuing the search for a Collection Management System. Stay tuned to our social media channels and email blasts to receive processing updates and new collection announcements. •

Collections processing status and queue at the Center. We receive many inquiries about the processing status of our various collections and what we will be working on next. We plan to publish regular updates here and on our website.

Collection	Processing Status
Jim Shaughnessy	In progress, ~20% complete
John Gruber	In progress, ~10% complete
Ron Hill	In progress, ~40% complete
Jim McClellan	In progress, ~20% complete
David Mainey	In progress, ~40% complete
Karl Zimmermann	Next up, estimated start: 2022
John Ilman	Estimated start: 2022~2023
Stan Kistler	Estimated start: 2022~2023



Left: A cyanotype print of a train arriving at a depot in Elmwood, state unidentified. We believe this could be in Nebraska on the Missouri Pacific or possibly Illinois on the Chicago, Burlington & Quincy. If you know, please get in touch. Photographer unknown



Below: A cyanotype Real Photo Postcard of the Atchison, Topeka & Santa Fe Railway depot at Larned, Kansas, 1907, photographer unknown