OUT OF THE ARCHIVES

Glass plate negatives: part 1

ARTICLE

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PHOTOGRAPHS

As noted

ALONG WITH SO MANY WORKERS in Wisconsin, the nation, and the world, the Center's staff members have been working from home since mid-March. These new conditions have challenged us in the same ways they have challenged so many of you, and it is difficult for us to process collections materials with limited access to our archival storage space and other facilities. That said, we have found ways to use this time productively, posting new image galleries to the Center's Flickr account and website, while engaging more frequently with our community on social media, and conducting research to advance our policies, technology, and preservation practices. Plus, taking part in the Center's recent online conference, Virtual Conversations, was a heartening experience and a great way to reconnect with so many of you.

I was particularly gratified to see that many of the questions posed during the conference were archives-related. That helped inspire us to host a followup online session, "Archives and Preservation Q&A," which was taking place as this issue went to press and is now available for viewing on our YouTube channel at www.youtube.com/railphotoart, where you can also find all of the presentations from Virtual Conversations. Most importantly, all of us on the collections staff feel fortunate to be healthy and continuing to work, especially when so many others in our field have been furloughed or laid off. We are deeply grateful for your support, which helps make this possible.

Our two graduate interns, Angel Tang and Wesley Sonheim, have continued working on our collections throughout quarantine. Angel, who just finished her master's degree at the University of Wisconsin at Madison, has been posting Wallace Abbey images to our Flickr account while conducting a literature review of various digitization practices. Meanwhile, Wesley has been editing images from Jim Shaughnessy's historic glass plate negatives and researching cold storage preservation. Natalie Krecek, archives associate, has been editing and posting images from the recently-processed Victor Hand Collection. She's also been a huge help with image requests, which have been plentiful over the last few months.

Glass plates in the Shaughnessy Collection

When the Jim Shaughnessy Collection arrived at the Center last fall, it came with some bonus material: 241 historic glass plate negatives that Shaughnessy had collected. Dating from the 1880s to the 1910s, these images are the oldest in the Center's archive. Most of them depict railroad operations and destinations on the Delaware and Hudson; Rutland; and Delaware, Lackawanna & Western railroads, and Shaughnessy used several of them in his books about the histories of the D&H and the Rutland.

During Virtual Conversations, several attendees expressed curiosity about the plates, and I realized they would make a great topic for "Out of the Archives." We decided to split this column into two parts over this and the following issue. I understand that most of our members are not out shooting trains with glass plates—a terrible medium for capturing motion. However, I know many of you like to collect historic images, so in part one, in this issue, I present a little history, and then in part two, coming in the fall issue, I will share some tips for identifying and preserving glass plate negatives.

Historical context and development

Predating plastic-based film, glass plates were the primary physical support for photographic negatives from the mid-nineteenth century to the early twentieth century. While the format may seem primitive when compared to contemporary practices, glass plate photography revolutionized the medium and was the end result of multiple significant breakthroughs made over a 150-year course of experimentation, failure, and discovery.

Rather than reviewing *all* of that history, let's jump in with William Henry Fox Talbot's 1841 calotype, the earliest practical negative-positive photographic process. To produce a calotype, a photographer coated a paper sheet with silver chloride, placed it in a camera, and then exposed it to light. The photographer then developed the paper with gallic acid and fixed it with sodium thiosulphate. Unlike the daguerreotype (the only other practical means of producing a photographic image during this period), the calotype had the advantage of duplicability. The calotype process produced a negative image from which several copies could be contact printed; daguerreotypes could only be copied through re-photography. However, prints produced from calotypes lacked fine detail and clear highlights due to the opacity and grain of the paper. Plus, Talbot guarded his invention with a restrictive patent, preventing innovation as well as wide adoption of the process.

Beginning in the late 1830s, many photographers experimented with glass as a substrate for their

Albany, New York, had a passenger station with platforms on two levels to serve trains on the Delaware & Hudson, below, and the New York Central, above. This winter view from February 17, 1914, looks down on the D&H tracks from the NYC bridge. CPRA, Shaughnessy-G-DH-003

negatives. In 1847, Abel Niepce de Saint-Victor found success with a negative-positive process that utilized albumen (egg whites) to bind light-sensitive silver halides to glass plates. Albumen-on-glass could produce images with much finer detail than paper calotype negatives but required long exposure times, limiting its utility.

Frederick Scott Archer's invention of the wet plate collodion process in 1851 is what really cemented glass as the preeminent photographic support of the period. Wet plate collodion improved upon previous photographic methods' exposure times by twenty-fold, and thanks to the rigidity and transparency of its glass base, it produced finely rendered prints with clear highlights and deep shadows. The wet plate collodion process quickly superseded most other forms of photography; it was the most widely used process for the next thirty years. It also bears mentioning that along with the wet plate negative, the collodion process had various photographic applications such as the tintype (wet collodion on iron), the ambrotype (an underexposed or bleached collodion negative backed by dark fabric or coating), and the lantern slide (a positive transparency meant for projection).

Lake George, New York, was a popular vacation destination for rail travelers in the early twentieth century, and the Delaware & Hudson Railway marketed it heavily. This view, circa 1912, shows an afternoon passenger train with enough business to warrant three locomotives. Photograph by Fred Thatcher. CPRA, Shaughnessy-G-DH-0033

For all the advantages of wet plate photography, there was one catch: the whole process was a huge pain. To shoot just one image, wet plate photographers had to hand-coat a glass plate with an emulsion of collodion and ether, sensitize the plate in a bath of silver nitrate, expose it in camera almost immediately, and then process it—all while the collodion emulsion was still wet! This limitation was manageable in a studio setting, but it was impractical in the field. Those who wished to photograph outdoors had to haul large view cameras as well as unsensitized glass plates, photographic chemicals, and portable darkrooms to their shooting locations.

In 1871, Richard Leach Maddox published an alternative to the cumbersome wet collodion process—the gelatin dry plate negative, which utilized the light sensitivity of silver bromide suspended in a gelatin emulsion coated on a glass plate. By this point, innovators had developed dry collodion methods, but they were never as widely adopted as Maddox's dry plate. His original methodology underwent many improvements in the following years, and by 1879, a young bank clerk and photography enthusiast named George Eastman had patented a machine to mass produce dry plates. However, John Carbutt (who, interestingly enough, served as the Union Pacific's official photographer in 1866 during the construction of the transcontinental railroad) is actually credited as the first commercial producer of dry plates in the United States. But Eastman was close behind him, officially forming George Eastman Dry Plate Company in 1880 (and, in 1892, Eastman Kodak).

Regardless of the manufacturer, the dry plate was a vast improvement on collodion. The dry plate was about sixty times more sensitive to light, arrived from the factory pre-sensitized and ready for the camera, and could be exposed on site and processed later. Widely embraced by the public, the gelatin dry plate enjoyed a heyday of about twenty years and greatly democratized photography for casual practitioners. Its shorter exposure times also led to the first handheld cameras and candid snapshots.

The development of flexible roll film in the late 1880s spelled the beginning of the end for the dry plate (as well as for all glass-based negatives). Manufacturers first targeted amateur photographers with roll film (both paper-based and nitrocellulose), producing it in small formats. Professionals accustomed to the clarity and fine detail of large glass plate negatives initially spurned roll film (the earliest varieties, which were paper based, suffered from the same issues as the calotype) and held onto their glass plates. However, in 1912, manufacturers introduced large-format sheet film, which by the early 1930s had all but replaced glass plates for popular use. Still, glass plates did not completely disappear at this point, as scientists continued to employ them in special applications such as micrography through the early 2000s.

In part two in the next issue, I will share some tips on how to distinguish wet-plate collodions from dry plates, and how best to preserve both formats. We will share more examples from the Shaughnessy Collection then, too, and update you on our latest archival efforts. •