

Preserving and Digitizing Andrew J. Russell's Collodion Glass Plate Negatives

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Andrew Joseph Russell (1829 – 1902)

Andrew J. Russell photographed the construction of the transcontinental railroad, traveling by wagon in 1868 and 1869 to capture images with a portable darkroom in the field.

The Andrew J. Russell Collection Digitizing, Cataloging, and Relhousing Project occurred at the Oakland Museum of California from July 2012 to September 2015. The scope of the project covered all photographic material by Andrew J. Russell, the majority of which are collodion glass plate negatives.

Project goals:

1. Re-house the collection for long-term preservation
2. Digitize the collection to produce versatile high resolution images
3. Review and clean up catalog information in the OMCA collection database
4. Develop a curriculum guide and provide public access to all digitized images online

The information presented here focuses on re-housing and digitization of Andrew J. Russell's collodion glass plate negatives



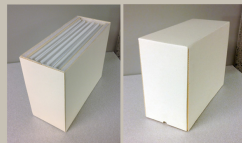
The Russell collection contains 645 wet plate collodion negatives on glass supports

- 198 glass plate negatives are large format "Imperial" size at 10" x 13" (25.4 cm x 33.02 cm)
- 447 stereograph glass plate negatives come in two sizes, 4" x 8" or 5" x 8" (10.2 cm x 20.3 cm or 12.7 cm x 20.3 cm)

At the start of the project, densely packed filing cabinets held glass plate negatives in hanging file folders. The location of accession numbers on storage envelopes and tight packing made it difficult to find and remove a single negative without putting pressure on neighboring glass plates. The negatives were also subject to risk of damage from the back and forth movement of the drawer and fluctuations in environmental RH.



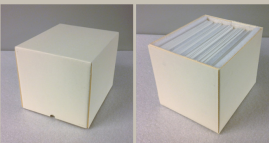
Negatives were re-located to an offsite HVAC controlled storage room set at 65° to 70° F and 45% RH. When analyzing environmental data, the barrier created by new storage boxes alone cut fluctuations in RH by half.



Imperial storage box



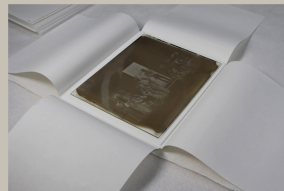
Interior view



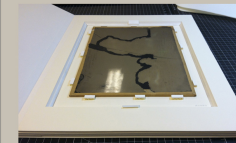
Stereograph storage box

Glass plates are most stable when stored vertically on the longest edge. After an inventory of the filing cabinets, Registrars transferred negatives in stable condition to vertical storage in custom boxes lined with Ethafoam.

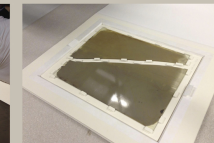
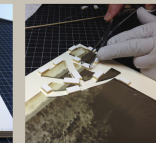
Weight determined the number of negatives per box. For safe handling and storage, imperial size boxes hold 10 negatives and stereograph size boxes hold 25 negatives. Within the box, negatives are distributed evenly and padded with pieces of 1/4" (0.635 cm) Ethafoam. Pieces of archival board placed parallel to the negatives on the interior sides of the box increase stability, and when taken out, allow space to position hands for removing glass plates from the box.



Four-fold envelopes enclose negatives with a piece of 4-ply board for handling support. The envelope has the accession number written at the top left corner on the front and back so the negative is easy to identify whether the envelope is open for viewing or closed for storage.

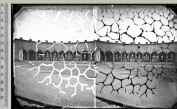


Preparators place each negative in a removable tray, emulsion side up, and register it with spacers. For broken glass plates, individual pieces are placed on the tray in their original orientation and secured. The tray fits within a folder designed so the negative is held securely without any pressure on the glass. Folders are stacked in Solander boxes for storage.



85 glass plate negatives with condition issues such as cracked or broken glass and unstable emulsion require flat storage mounts. Flat storage mounts had been created for broken glass plate negatives years earlier, and for this project the design of the mounts improved in the following ways:

- A reduction in the size and weight of mount materials and storage boxes to increase safe movement and handling
- Development of a tray that allows the plate to be easily removed from the mount for examination
- An increase in stability by using rigid board for supporting glass plates and broken pieces
- Improvement upon the use of secure spacers holding broken pieces in place



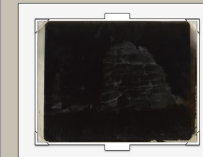
During the original processing of this negative, the emulsion temporarily detached from the glass plate forming a network of small ridges. A honeycomb pattern emerged as the ridges of emulsion flaked off the glass. A past attempt to salvage the image by painting over the damaged emulsion is visible on half of the plate.

It was important to digitize collodion glass plate negatives with both a transmissive and a reflective image. A transmissive image shows how the negative would look as a printed photograph. The reflective image captures a snapshot of the negative's condition as well as the photographer's chemical and physical process.

This cracked negative has an old repair where a second glass plate was added for support and secured with paper tape around the edges. Since collodion is only sensitive to blue light, atmosphere and clouds read as the same tone except for sunrise or sunset. The sky area on half of the plate was masked with black paint to remove a characteristic gray sky.



Andrew J. Russell's iconic photograph
East and West Shaking Hands at Laying Last Rail
May 10, 1869



Glass plate on scan mount



Processed image, 900 ppi



Detail at 1:1 zoom

Registrars used an Epson Expression 10000XL flatbed scanner to image glass plate negatives. After researching equipment and methods of imaging, the project team chose the Epson scanner for its ability to produce high resolution images while being significantly less expensive than alternatives.

Custom scan mounts made with clear acrylic hold glass plates in a stable position at the corners and raise them 1/16" above the scanner platen for optimal focus. Twenty-six broken negatives could not be used with the scan mounts and were taken to a local photographer with a copy stand and digital scan back equipment for imaging.

Goals for Digitization

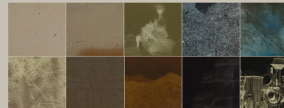
1. Capture as much high quality data as possible to limit the need for physical handling of the negatives in the future
2. Create versatile digital assets ready to be used for online access, education, historical research, rights and reproductions, exhibition prints, and gallery graphics

File Types

- Master file: Tiff scanned in 48 bit color with embedded metadata
- Processed file: Tiff presented in black and white, cropped and edited for clarity
- Access file: Jpeg resized and compressed for database and web use, derivative of processed file



Each master scan includes a ruler for scale and a transmission step wedge for gauging exhibition prints. The majority of negatives are scanned with the emulsion side facing the scanner, which produces the sharpest image.



Color range across negatives

While master files retain color information, the processed version is presented in black and white per curatorial direction. Depending on the chemicals used, the color of collodion negatives in the collection range between beige, blue, red, brown, or black. Instead of converting the images to grayscale, the channel mixer was used in Photoshop to create a monotone image with slightly more weight on the green, red, or blue channel depending on the color of the emulsion. This method provides more control over tone and detail in the final image.



Processed image
Pony Engine, circa 1868

This presentation and additional project files are available at: <http://tinyurl.com/gpaedcj>

Additional Resources

- Andrew J. Russell catalog on OMCA Collections: <http://collections.museumca.org>
- Andrew J. Russell and the Building of the Transcontinental Railroad Curriculum (Grades 8 and 11): <http://tinyurl.com/m2s4nb8>

Andrew J. Russell Core Project Team:

John Burke, Director, Collections & Information Access Center
Erica Jackson, Assistant Registrar
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Peng-Peng Wang, Paper Conservator
Amy Billstrom, Associate Director Learning Initiatives
Drew Johnson, Curator of Photography & Visual Culture
Gawain Weaver, Photo Conservation Consultant
Glenn Williamson, Historical Consultant

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