

Rehousing Bare Daguerreotype Plates Using Waterjet-cut Aluminum Spacers

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Photograph Conservation

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In 1842, artist, architectural historian, archaeologist, and photographer Joseph-Philibert Girault de Prangey (French, 1804-1892) embarked on a three-year journey throughout the Eastern Mediterranean and produced over one thousand daguerreotypes. These images include the earliest surviving photographs of Greece, Lebanon, Egypt, Syria, and Jerusalem. Girault was a truly unique artist, using whole plates that were larger than the standard nineteenth-century plate dimensions, and making multiple exposures on single plates, including the innovative use of the “long half” plate for panoramas, obelisks and minarets. *Monumental Journey: The Daguerreotypes of Girault de Prangey*, curated by Stephen Pinson, is the first exhibition in the United States devoted to the artist, and the first ever to focus on his trip throughout the Mediterranean. The exhibition, open to the public from January 30 – May 12, 2019, includes over 100 photographs by the artist, shown together with related watercolors, albums, stereoviews, and lithographs.

BACKGROUND

In January 2019, The Metropolitan Museum of Art opened the exhibition *Monumental Journey: The Daguerreotypes of Girault de Prangey*, curated by Stephen Pinson. This exhibition presented an opportunity to revisit the bare-plate daguerreotype housing method used at The Met for the previous twenty years. The Met’s newly acquired plates arrived to the Museum within non-original housings. Each plate was bound with wooden spacers resting on the plate edges, sandwiched between two sheets of window glass, and secured with brown paper tape along all four edges. The plates bound in the 1970s were secured with water-activated paper tape, while those bound later utilized pressure-sensitive brown paper tape. See the instructions for The Met’s revised re-housing method described in detail below.



The Metropolitan Museum of Art, 2016.94; Girault de Prangey
Caryatid, Erechtheion, Athens, 1842; AT, recto and verso

PROCEDURE

Perform the following procedure wearing nitrile gloves and a dust mask to mitigate the risk of contact or moisture reaching the bare plate. Ideally, undertake this treatment in a room with reduced humidity to lower the amount of absolute humidity within the plate package. Record the room temperature and relative humidity conditions during binding in the treatment report.

1. Record the style and materials of the present binding and the condition of the bound daguerreotype before treatment (BT), with both photographic and written documentation.
2. Disbind the package, or remove the existing housing from the plate, retaining binding fragments to keep with the object paperwork.
3. With extreme care, examine the bare plate, and record all possible data regarding hallmarks, tarnishing patterns, evidence of process, and other condition concerns. If possible, inspect the plate under short wave ultra violet illumination.
4. Photograph bare plate for during treatment (DT) record. While not being examined, the plate should be safely housed in a temporary sink mat enclosure for protection.
5. Construct two z-trays from Mylar® polyester sheets – one horizontal and one vertical – to securely hold the plate (see *A* below for instructions).
6. Clean any dust from the prepared Mylar®, and fit daguerreotype plate into z-trays, first into one and then the other (see *C* below for assembly details).
7. When the plate is secure in the z-trays, place into the Aluminum spacer, using the overhanging Mylar® to lift the object (see *B* below for instructions on measuring and ordering the Aluminum spacer).
8. Clean two pieces of 0.079 inch borosilicate glass with Ivory® liquid dish soap and water. Rinse thoroughly with deionized water and dry with a soft cotton cloth. The two pieces of Borofloat® glass are ordered to the exact outer dimensions of the Aluminum spacer (again, see *B* below for measuring instructions for the Aluminum spacer).
9. Change nitrile gloves at this point to avoid transferring any water to your workstation.
10. After puffing away any dust, sandwich the assembled components (daguerreotype plate in its z-trays, fitted into the spacer) between the two pieces of borosilicate glass. (see *C* below for assembly instructions).
11. Align the edges of the glass and spacer and hold the package in place with metal bulldog clips padded with Filmoplast® SH pressure-sensitive tape (the threaded linen surface of the tape allows a little bit of grip). It can be challenging to clip the four sides of the package, due to the overhanging extensions of the Mylar® z-trays. Clamping at the corners worked well until the edges of the package were accessible.
12. Using a fresh scalpel blade, cut off the excess Mylar® overhang, using the edge of the spacer and glass as a guide, moving the blade perpendicular to the plate package.
13. Bind the edges of the package with two layers of Filmoplast® P-90 Plus pressure-sensitive tape (see *D* below for binding instructions).
14. Write the accession number in graphite on the binding tape on the verso.

A. Preparation of the Mylar® z-trays

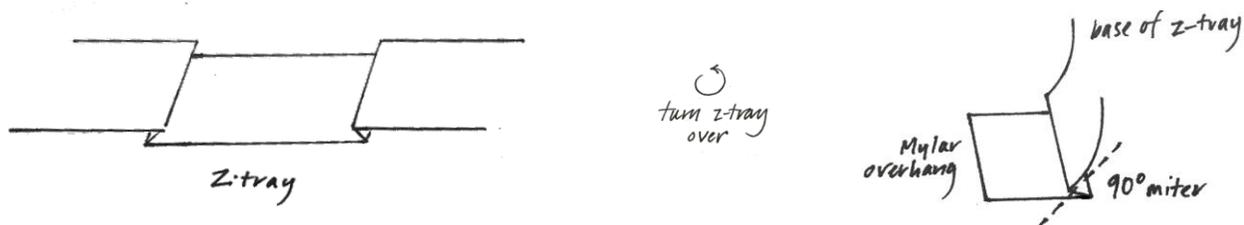
One horizontal and one vertical Mylar® z-tray are constructed to accommodate the plate. These should fit snugly to the plate, but not apply any stress to the object. Use 3-, 4-, or 5-mil Mylar® for this step, depending on the size of the plate and its precise fit within the Aluminum spacer. Gloves should be worn throughout this process to prevent fingerprints on the polyester film. Note that there are a variety of approaches to the construction of the z-trays depending on the individual conservator. Only one variant is presented here. The beauty of this step is that it can be repeated with fresh Mylar® until the z-trays fit precisely.

1. Cut Mylar® to the exact height of the object, and approximately 12-15 cm longer than the object width. If the plate is not perfectly square, a larger sheet can be cut and the final trimming done when all z-folds are complete, ensuring that the plate fits snugly and squarely.
2. Make a valley fold approximately 5 cm from the end. This will allow the depth of the plate to sit in the folded recess.
3. Make a mountain fold approximately 3-4 mm from the first (valley) fold. Burnish with a Teflon folder. This creates the first “z”.
4. Use the plate or careful measurements to mark with a stylus where the “z” should be folded at the opposite end of the Mylar®. Repeat the valley and mountain folds to complete the first of the two z-trays.
5. Cut second piece of Mylar® to the exact width of the object, and approximately 12-15 cm longer than the object height.

Create valley and mountain folds in this sheet of Mylar® in the same manner as the first to create the second z-tray. Burnish the folds with a Teflon folder.

6. At this stage the plate will need to be fitted into the z-trays before moving forward.
7. Mitering some or all corners of the z-tray may allow a better fit inside the plate package. To miter the corner(s), flip the z-tray over and trim off the upper corner of the ‘z’ at 90 degree angle, using a scalpel.
8. Record Mylar® mil and whether corners were mitered in treatment report.

Mitering the z-tray may allow a better fit inside the plate package.



B. Waterjet-cut Aluminum Spacer

A spacer 3mm in width and 3mm in depth was chosen for these plates. (The spacers are custom waterjet-cut, so the dimensions should be determined by the needs of the individual plate; 3mm x 3mm spacers worked well for all of the plates bound for this exhibition). These dimensions provide sufficient width to support the two sheets of glass, and sufficient depth to safely protect the face of the daguerreotype, while minimizing the amount of air space within the bound package. Metal was chosen over plastics and paper products for its excellent long-term stability, its low reactivity, and its aesthetics. ARJ Custom Fabrications provided Aluminum alloy 6061 for the Girault de Prangey spacers. Samples were analyzed with Gas Chromatography-Mass Spectrometry in The Met's Department of Scientific Research, and no byproducts were identified that might negatively affect the daguerreotypes over time. The spacers were cleaned in a fume hood with a cotton swab dampened with HPLC grade acetone, until the swab swiped clean over all faces. The spacer was allowed to air dry before being used in the package.

1. Measure the exact dimensions of the top, bottom, left, and right sides of the daguerreotype plate in millimeters. Take the larger of the top and bottom dimensions (X) and the larger of the left and right dimensions (Y).
2. Add 1mm to each of the X and Y dimensions (effectively adding 0.5mm all around), to accommodate the z-trays. This dimension (A x B) is the size of the inner window of the spacer.
3. Add 2x the width of the spacer to each of the A and B measurements. In our case, because the spacer is 3mm wide, we added 6mm to each of the A and B values, (effectively adding 3mm all around), resulting in the outer spacer dimensions (C x D).
4. Choose the depth of the spacer that accommodates the project (again, ours were 3mm deep).
5. Order the spacer in the selected depth, with an inner window of values A x B mm, centered within the outer dimensions of C x D mm. For Girault de Prangey, the exact dimensions of each plate varied slightly within each format. It was determined that the binding, mount-making, and glass ordering would be made easier if each format had fixed spacer dimensions. Very slight differences in plate sizes were accommodated by varying the custom folds and the Mylar® thickness of the z-trays.
6. Order the two pieces of glass to the exact outer dimensions of the Aluminum spacer.

Example and diagram follow for the 3mm x 3mm Aluminum spacer:

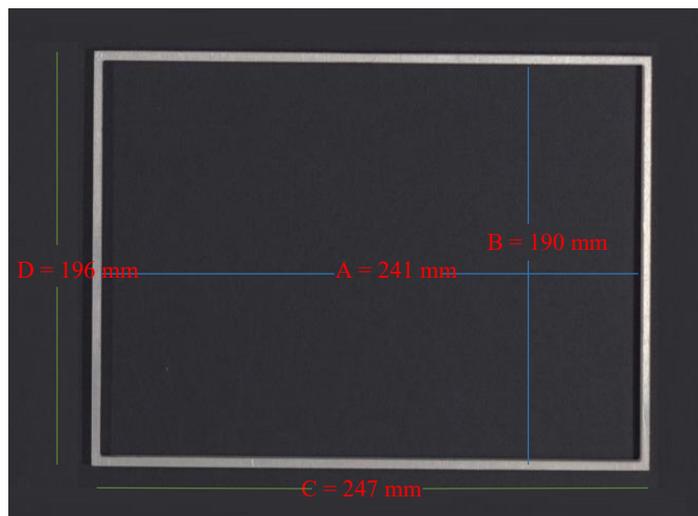
1. Plate dimensions:

top: **240mm**, bottom: 239mm
left: 188mm, right: **189mm**

so, X: 240mm, Y: 189mm

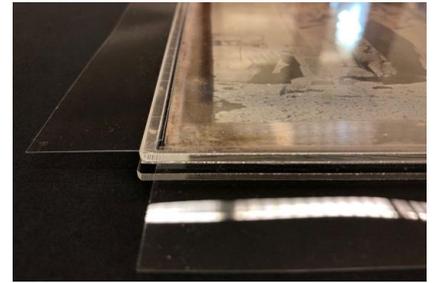
2. A: 241mm, B: 190mm
(A x B) = inner window

3. C: 247mm, D: 196mm
(C x D) = outer dimensions

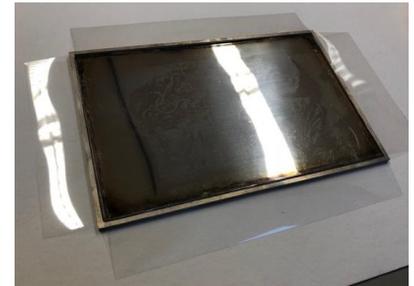


C. Package Assembly

1. Puffer the z-trays to remove any dust.
2. Carefully ease the plate into the z-tray first that is in the orientation of the image. Do so by pulling open the folds slightly to allow the plate to fit. Then, fit the plate and its first z-tray into the second z-tray.
3. Place the cleaned lower piece of Borofloat® glass on the work surface. Place the aluminum spacer on the glass.
4. Lift the z-trays holding the plate into the waiting spacer, being sure that the whole is seated within the spacer's inner edges and flat against the glass below.
5. Place the upper piece of Borofloat® glass onto the package, ensuring the folds of the z-tray fit evenly and safely over the edges of the plate. Clip the package together so it is securely held.
6. Trim the Mylar® z-tray extensions with a scalpel blade held perpendicular to the package, using the glass edge as a guide. Cutting the excess Mylar® at this stage ensures that the polyester film will hold the plate in precisely the correct location inside the bound package.



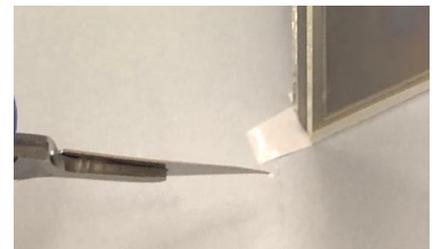
Stratigraphy of the package:
borosilicate glass - spacer with plate
sitting in its z-trays - borosilicate glass,
before trimming Mylar®



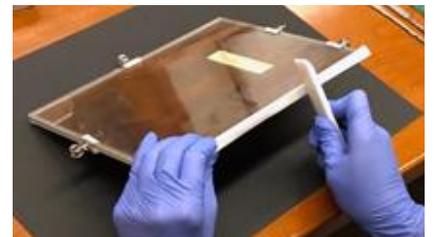
A daguerreotype in its two z-trays,
nested in its Aluminum spacer

D. Binding

1. Cut two pieces of Filmoplast® P-90 Plus pressure-sensitive tape, each approximately 2cm longer than the short edge of the plate package, and two pieces that are approximately 2cm longer than the long edge of the plate package.
2. Trim these four strips to a width of 12mm.
3. Bind the longer edges of the plate package first. With the recto facing up, apply the tape to the face, 2mm from the edge. Burnish lightly with a Teflon folder, and bind around the package edge. Trim the overhanging tape to extend approximately 7mm around the corner (see image to the right), ensuring full coverage of the corner. Then wrap the remainder of tape onto the verso, being sure to adhere the tape well to the depth and faces of the plate package.
4. Bind the shorter sides of the plate next, trimming the tapes at the final corners flush rather than wrapping the tape over the corner. Miter just the upper layer of tape where overlapped at the corners on the recto/face of the package.
5. Apply the second layer of Filmoplast® P-90 Plus pressure-sensitive tape as described above, but with tapes trimmed to 14mm in width. For this second layer, bind the shorter edges of the plate first, followed by the longer edges, with



Cut the edge of the tapes to fold
around the corner



Burnish the tapes with a Teflon folder

the tape edges just covering/hiding the first tape layer. This will ensure the most complete coverage.

6. Miter just the upper layer of tape where overlapped at the corners on both the recto and verso.
7. Write the accession number in graphite on the verso, on the binding tape.



Second binding layer, mitered at the corner

For this group of daguerreotypes, the second layer of Filmoplast® P-90 pressure-sensitive tape was toned with Golden® soft body black acrylic, and then trimmed to 14mm in width - wide enough to just cover the first binding tape layer. The width of the binding tapes is determined by the depth of the package, which depends upon the decisions taken as to the thickness of the Aluminum spacer and the borosilicate glass. The upper layers of tape that overlap on the corners were mitered on the front and the back of the second binding layer. This second layer provided an additional protective layer for the package, and satisfied an aesthetic imperative.

SOURCED MATERIALS

- Water-jet cut aluminum spacers (ARJ Custom Fabrications, Inc., 151 Taylor Street, Trenton, NJ 08638; 609-695-6227) using aluminum alloy 6061 (Yarde Metals, 603 Murray Rd, East Hanover, NJ 07936; 800-444-9494)
- Mylar® polyester sheets, 3-, 4-, or 5-mil thickness (Talas, 330 Morgan Avenue, Brooklyn, NY 11211, www.talasonline.com; 212-219-0770)
- Borofloat® borosilicate glass, 0.079 inch thick (S.I. Howard Glass Co., Inc., 379 SW Cutoff, Worcester, MA 01604, www.howardglass.com; 508-753-8146)
- Filmoplast® P-90 Plus tape (Talas, 330 Morgan Avenue, Brooklyn, NY 11211, www.talasonline.com; 212-219-0770)
- Filmoplast® SH tape (Talas, 330 Morgan Avenue, Brooklyn, NY 11211, www.talasonline.com; 212-219-0770)
- Golden® soft body black acrylic (Dick Blick Art Materials, PO Box 1267, Galesburg, IL 61402, www.dickblick.com; 800-828-4548)
- Nitrile gloves (Fisher Scientific, www.fishersci.com; 800-766-7000)
- HPLC grade Acetone (Fisher Scientific, www.fishersci.com; 800-766-7000)

