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Topics in Photographic Preservation, Volume 15.
Pages: 4-14
Compiler: Jessica Keister

Topics in Photographic Preservation is published biannually by the Photographic Materials Group (PMG) of the American Institute for Conservation of Historic & Artistic Works (AIC). A membership benefit of the Photographic Materials Group, *Topics in Photographic Preservation* is primarily comprised of papers presented at PMG meetings and is intended to inform and educate conservation-related disciplines.

Panoramic View of Mexico City by Photographer Claude Désiré Charnay

Maria Estibaliz Guzman-Solano and Diana Lorena Diaz–Cañas

Presented at the PMG session of the 2012 AIC Annual Meeting in Albuquerque, New Mexico.

ABSTRACT

Désiré Charnay, a well-known travel photographer and archaeologist, left an important legacy in Mexico—photographic documentation of different cities and archaeological sites from his first trip to Mexico between 1857 and 1861. His work includes many examples of historic photographic techniques such as salted paper prints and albumen prints. One of his most beautiful and impressive works is a panoramic view of downtown Mexico City, circa 1858. This highly detailed image is composed of five photographs contact-printed from five collodion glass plate negatives. The photograph was a gift to Manuel Orozco y Berra, one of Charnay's closest friends in Mexico. In 2009, the post-graduate course in the conservation of photographs at the National School for Conservation in Mexico City began studying this photograph. Extensive research was carried out over the course of three years. Teachers and students have been collaborating with scientists, historians, art historians, photographers, curators, and conservators from different countries in order to identify the photographic techniques and to propose and execute a suitable course of treatment for this masterpiece.

INTRODUCTION

This text presents the results of the conservation research of a magnificent photographic work entitled "Panoramic View of Mexico City", prepared by the French photographer Claude-Joseph Désiré Charnay, on his first trip to Mexico between 1857 and 1860. This photograph, which today belongs to Orozco y Berra Map Library in Mexico City, was analyzed and restored at the National School of Conservation (ENCRyM). Not only professors of the Postgraduate Course in Photograph Conservation and three generations of students (2009-2011) participated in this project, but also scientists, historians, photographers and curators from various Mexican institutions like the National University of Mexico, the Bank of Mexico and of the National Institute of Anthropology and History (INAH).

DESCRIPTION AND VALUE

The "Panoramic View of Mexico City" consists of five fiber-based prints, in a rectangular and horizontal format, showing the urban architecture and landscapes of downtown Mexico City at the mid-nineteenth century. The dimensions of the complete work are 199 x 29.9 cm, and the maximum dimensions of the individual prints are 41 x 29.9cm. Although there are some prints or photographs of the same topic from around 1860, this "panoramic view" is the only one that shows Mexico City in the second half of the 19th century. It is a view of the city that can no longer be seen after to 150 years of building and growth.

As a photographic product of a particular time it has a great scientific and technological value for conservators, especially because it is one of only two known copies in the world, done by a well-known photographer of the nineteenth century. Charnay gave this panoramic to his friend, the geographer Orozco y Berra. Orozco y Berra held the “panoramic view” in his private collection, and ensuring that it has been protected and stored within the files of the Map Library that bears his name. The other print is located at the National Library of France and is part of the *Album Fotográfico Mexicano*, which was given to Emperor Napoleon III as a special edition.

Fig 1. *Panoramic view of Mexico City*. Orozco y Berra Map Library.
Courtesy ENCRyM-INAH 2009.

ANALYSIS OF COMPOSITION MATERIALS AND PHOTOGRAPHIC PROCESSES

In 2009 the "Panoramic View of Mexico City” came to the National School of Conservation (ENCRyM), and through visual examination with the naked eye, magnifiers, special illumination, and other analytical techniques, we achieved a better technological understanding of the photograph.

The panoramic view consists of five POP photographs printed on linen paper from five collodion negatives on glass.

Looking in detail at the shadows and lights, vanishing points and perspective of the five images, it is possible to recognize a great "false panorama" of a master photographer. Charnay had a full knowledge of each frame, so the five prints would fit perfectly, creating a continuous panorama (i.e. the camera was turned five times in succession, passing time between shots, but without moving the location of the tripod).

Considering the conditions of the shot (from the roof of a church), the difficulty and technical challenges that existed in capturing and processing large 14” collodion negatives on glass, we recognize the great technological value of the negatives of this panorama.

Four of the original negatives are now stored in the Musée Du Quay Branly in France. The fifth negative is lost. These negatives were very important for our research, because they helped us to understand the original size of the prints and the author's precise cutting of the five papers, perfect for achieving a continuous panorama.

Taking into consideration the time needed to make this “panoramic view”, the yellow-brown hue due to significant fading of the image (as compared to the intensity of the original retouching), the paper fibers clearly visible and a slight sheen on the surface, we recognized two possible

photographic techniques: it could be either a salted paper print with a coating or a slightly albumenized print. It was important to answer this question for a deeper understanding of Charnay's work at a transitional time between two photographic techniques.

This material analysis would also determine modifications made after its creation, and better understand the effects and causes of damage, and define the most suitable materials and methods for conservation and mounting.

It was the first time that the National School of Conservation required such detailed analytical techniques to identify particular binders in photography. As a first step, we generated agreements with several Mexican institutions and laboratories with the needed equipment.

In summary, we used the following instrumental techniques:

a) Raman Spectroscopy (RAMAN) and Fourier Transform Infrared Spectroscopy (ATR-FTIR) to locate, in the respective spectral absorption, characteristic bands of the functional groups of proteins such as albumin or functional groups characteristics of other coating materials used in the nineteenth century.

b) Scanning electron microscope (SEM) to recognize the surface morphology, cross-section and identify more precise constituent elements by using the energy dispersive spectroscopy X-ray (EDS).

Raman

The first use of Raman spectroscopy was not the most appropriate for our purposes because it didn´t have the resolution needed. Therefore, we used the Raman Spectrometer Station from the Bank of Mexico laboratory. First, we analyzed different samples so we could identify patterns of powder spectra of albumin, salted paper prints and vintage albumen and reproductions, in both good and bad condition.

When we analyzed the “panoramic view”, we were surprised because the spectra showed no absorption bands corresponding to the amide functional group of the albumin protein. After many readings, we figured out that using the Raman was not good enough to recognize the presence of albumin binder in very thin layers, particularly in aged prints. Also it did not provide information on other possible coating materials.

ATR-FTIR

Subsequently we used the ATR-FTIR Spectrometer, to analyze various vintage and contemporary samples. It was possible to detect in the "panoramic view´s" spectrum, the absence of the characteristic amino groups of albumin. Therefore, the idea of an albumen coating or a light albumin binder was discarded for the “panoramic view”.

This characteristic weak link of the carbonyl functional group is present in esters, which is typical of waxes or oils.

Oil was discarded, because it does not crystallize and shouldn't show its respective absorption band. Also the possibility of paraffin was discarded because this synthetic product with long hydrocarbon chains, do not have aliphatic esters such as those shown in the spectra.

Double small absorption regions confirmed the presence of wax. Two extra peaks absorption bands are characteristic of beeswax as you can compare the spectrum in the U.R.O.G. website database.

It is concluded that the coating on the "panoramic view" is beeswax, typically applied to salted paper in the nineteenth century, for better conservation as protection from oxidizing pollutants and to improve the saturation of contrasts.

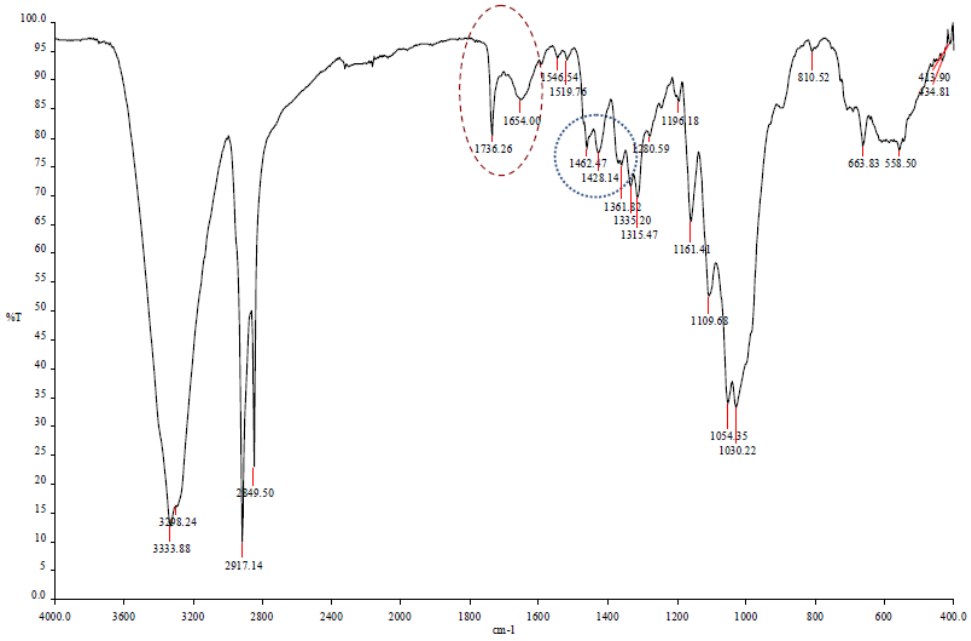

Fig. 1. *This ATR-FTIR spectrum shows esters at 1736 cm-1, absorption at 720 cm-1, 1462 cm-1, and between 1750 - 1730 cm-1, confirming the presence of beeswax*.

SEM

Finally, samples were analyzed in the Scanning Electron Microscope (SEM), which confirmed the presence of a wax coating. The difficulty of the energy dispersive X-rays (EDS) to penetrate between the fibers indicated the presence of an organic material on a non-greasy surface. Therefore the samples were washed with chloroform and acetone obtaining less flattened and cleaner fiber surfaces. EDS detected silver –from the image– and silica, calcium and chloride –dust materials–. The qualitative results of these elements were low.

There are two hypotheses about the absence of gold: either the rays do not read a coating sample covered with an organic material or it was difficult to detect so little amount of gold in micro samples. We are inclined toward the second hypothesis, because the "panoramic view" had purple retouches, characteristics of a gold toned salted paper.

CONDITION AND TREATMENT

The severity of the damage, such as distortions, cracks, brittleness, stains, and punctures were the result of improper mounting after its creation. Handling and storage conditions diminished the physical state of the photograph.

The five prints of the panorama were not originally mounted on cardboard secondary supports. There is evidence that at some point, the five images were butted with adhesive tapes. The edges had brown residues of an oxidized adhesive, probably rubber-based.

Possibly in the middle of the twentieth century someone made a second attempt to mount the five prints. The prints were adhered onto a cotton canvas, using a mixture of starch and animal glue, leaving a space between the photographs. This mixture is covering the images along the edges.

With this mounting, the photograph was folded so it could be stored vertically, hanging from shelves. This setup is typical for the maps in the Orozco y Berra Map Library, where the "panoramic view" belongs.

Most of the physical damage was due to inadequate handling and storage systems. Among other alterations, the most important were: tears, abrasion and delamination along the right and left edges of each photograph due to continuous friction of surfaces where the fabric used to be folded. There were also dark adhesive tapes residues. Apparently the carriers of the tapes were removed and this caused some breakage and delamination of the paper support.

There were also some accretions of the adhesive used for the lining in the fabric. On the verso, were evident some yellowish stains on the cotton support due to varnish residues and small wood splinters.

The adhesion of the five prints over a cotton fabric with an open weave produced planar distortion in the primary paper support of the photographs, due to the differential rates of moisture absorption between materials, but also because the textile's texture was transferred to the thin photographic paper.

On the recto, graphite inscriptions were noted at top right. These correspond to the dimensions of the prints, probably used to assist the placement of the photographs on the fabric support.

The mounting favored the horizontal alignment of each print so, in order to straighten the image and correct the lens distortion, spaces of one or two millimeters were left between each picture.

These spaces interrupted the appreciation of the complete image by giving an illusion of losses along the edges. Probably after printing this version of the Panorama, Charnay decided to cut the overlaps between images following each horizon independently, and not the horizon formed by the final image.

Due to the deterioration inflicted by the mounting, and in favor of the aesthetic appreciation of the Panorama, it was imperative to remove the fabric and provide a new mounting that avoided folding. After testing, it was decided that mechanical removal was the best option.

Once unmounted, the residues of starch and bone glue on the verso were reduced by mechanical means in order to avoid excessive wetting that could worsen planar distortion of the prints.

The next step was surface cleaning with soft brushes in order to eliminate superficial grime. The erasing of graphite inscriptions was completed under the microscope, to target only the graphite and avoid disruption of the beeswax coating.

After mechanical cleaning, the residues of starch and bone glue on the recto were removed with methylcellulose gels. The solubility of beeswax was an important issue to consider in order to remove the adhesive tape residues and the stains produced by it. Due to its functional groups, beeswax is easily soluble in non-polar solvents and alcohol, so a mixture of water-acetone (4:1 v/v) was used and applied on the suction table in order to avoid tidelines.

With this cleaning it was possible to detect the presence of optical brighteners in different materials commonly used in the conservation of photographs such as cotton, non-woven polyester support and blotters. The optical brighteners were affected by the water and migrated to the paper support. This allowed us to identify different materials, which contained brighteners and avoid its use in the following conservation processes.

After cleaning with solvents, some fibers were left from the non-woven polyester support over the print, so those were removed mechanically under microscope. Then, planar distortion was corrected by humidifying with Gore-Tex and drying under blotters, non-woven polyester support and weight. Tears were aligned under microscope and mended with Japanese paper and Methylcellulose. Filling was also made with fibers of Japanese paper and Methylcellulose.

At this point, Agustín Estrada assisted the digitization of the five prints, with high–resolution images, in order to ease the cataloging process and further consultation of the photograph.

Once the five prints were stabilized, different proposals were discussed in order to choose the most adequate mounting. From the beginning, a complete adhesion of the verso to a new board or any kind of lining was discarded because it would have been very invasive for the prints and would have hidden the back of the paper. Also it would have required wet treatments and from the beginning and due to the fragility of the paper, water was a substance to avoid.

According to the storage conditions and the policies of the Map Library, the mount should maintain the extended panorama and should respect the continuity of the image to produce a full panoramic view.

The following reasons allowed us to eliminate the spaces between each photograph:

a) If images were added trying to align the papers and not the horizon of the images, the images wouldn't have matched.

b) Recovering the planar distortion allowed the image to be seen complete and there weren't any losses along the edges. Assembling the prints by the edges produced a curved image due to the lens distortion.

c) From the comparison between this mounting with the Panorama at the *Bibliothèque Nationale de France*, it is clear that both prints were put together following the horizon, but cropped differently. The print in France was cropped so that the panorama could be kept straight, hiding the lens distortion; but the one in Mexico was cropped to eliminate the characteristic 'defects' from the collodion glass plate negative.

After evaluating both proposals, a decision was taken to assemble the five images dropping the previously existing spaces, but without overlap. Therefore, it produced the aforementioned curvature in the resulting paper geometry, but the horizon alignment was kept between images. To join the images, strips of Japanese paper adhered with methylcellulose were used as reinforcement at of the points of assembly on the verso.

In this way, a continuous panorama was obtained, to which a false margin was applied to the borders of the verso using Japanese paper adhesive with 8% Klucel.

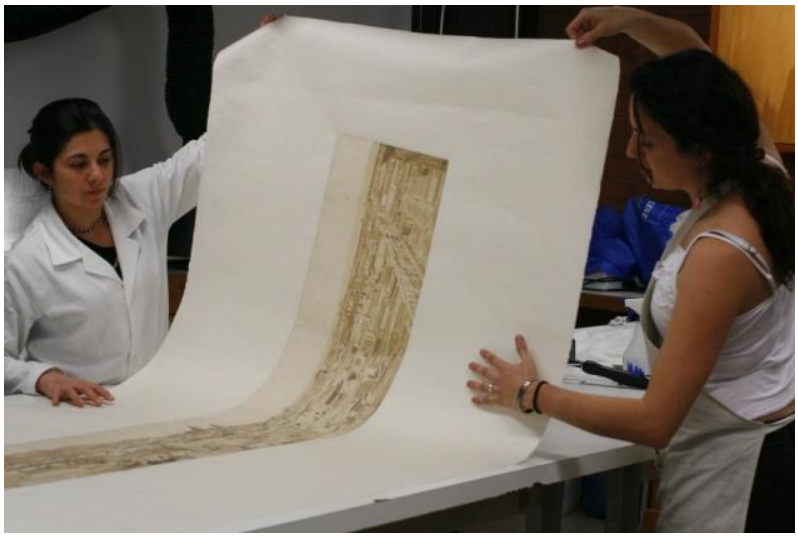

Fig 2. False margin mounting technique.
Courtesy ENCRyM-INAH 2012.

Finally, a specific mounting and storage system was done by attaching the top and bottom edges of the false margin to an 8-ply acid free board. However, the panorama (with the five prints joined together), couldn't withstand the tension and started generating new creases from stress between the junction with the false margin and among prints. Thus, the false margin was removed.

Fig 3. Detail of the new creases and distortions.
Courtesy ENCRyM-INAH, 2013.

After removing the false margin, the planar distortions were corrected by humidifying with Gore-Tex and drying under blotters, non-woven polyester support and weight. Subsequently it was placed inside a polyester film sleeve, in order to hold it in place within the mounting system. Later this sleeve was attached to a 4ply cardboard. On the verso of the acid free cardboard, a dibond backing was used to give better support to the mounting system, and instead of glass, acrylic was used in order to protect the recto. The system was sealed along the edges with aluminum tape and a frame was added to support the mounting system, to ease the handling and avoid any planar distortion.

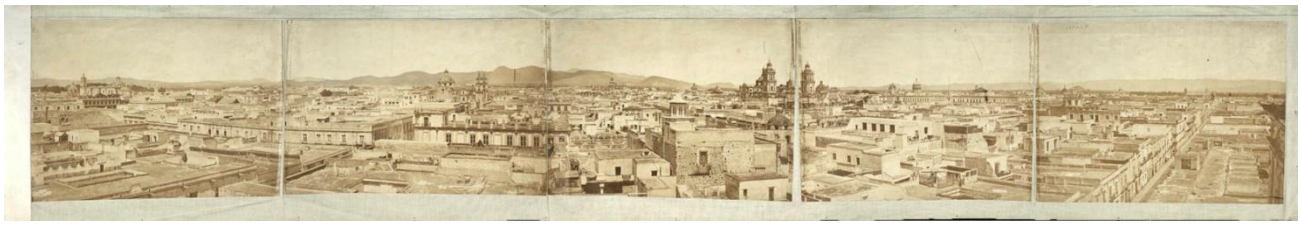

Fig 4. *Panoramic view of Mexico City*. Before treatment. Orozco y Berra Map Library.
Courtesy ENCRyM-INAH 2009.

Fig 5. *Panoramic view of Mexico City*. After treatment. Orozco y Berra Map Library.
Courtesy ENCRyM-INAH, 2013.

CONCLUSIONS

This conservation project covered several objectives:

- Analytical techniques such as Raman and ATR–FTIR are valuable tools for the comprehension of photographs. In addition, interdisciplinary work with specialists from different fields is essential to better understand the results that a scientific tool can provide and to compliment that information with historical data.

- Complementing analytical techniques with visual and microscopic examination is vital to understanding the material state of photographs, their deterioration process and to propose adequate conservation treatments and the best mounting and storage options.

- Treatments allowed the recovery of the aesthetic values of the photograph and stabilize its physical characteristics. It eases the different functions of the photograph in the Archive.

- Collaboration between professors and three classes from 2009 to 2011 enriched different discussions and helped to achieve adequate treatments for the photograph.

- This project provided valuable information about the materials used by Désiré Charnay during his first journey to Mexico.

- This project allowed us to start new research focused on the characterization of Charnay's photographs during his first journey to Mexico.

ACKNOWLEDGEMENTS

Escuela Nacional de Conservación, Restauración y Museografia - Manuel del Castillo Negrete. Especialidad en Conservación y Restauración de Fotografías (ECRF). Professors: Fernanda Valverde, Natalia Barberá, Liliana Dávila, Javier Hinojosa and Agustín Estrada.

Students from the cycles 2008-09, 2009-10, 2010-11 (ECRF). Mercedes Aguado, Maricarmen Alcalá, Diana Diaz, Soledad del Rio, Carina Cruz, Sofia Arévalo, Maia Garay, Gisela Villanueva, Gabriel Aguilar.

And the following: Mapoteca Orozco y Berra (owner of the panorama print); 2012 FAIC Latin American and Caribbean Scholarships (American Institute of Conservation, Getty Foundation); Q. Javier Vázquez, T.Q.I. Luz Esperanza López Mendes, Lic. Raquel Sánchez, Carlos Rodríguez Rodríguez (ENCRyM); Q. Ernestina Cervera, Q. Marisela Gutiérrez Franco, Dr. María del Carmen Valverde Valdés (UNAM); M. en B. Yuri Castro Riquel, Bernabé Rico (Perkin Elmer de México S. A.) PERKIN ELMER DE MÉXICO S. A.; Lic. Carlos Vidali Rebolledo (MOyB); Guillermo Tovar y de Teresa (historian); Dana Hemmenway (Library of Congress)

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Papers presented in *Topics in Photographic Preservation, Volume Fifteen* have not undergone a formal process of peer review.