THE CONSERVATION PROJECT OF THE

MANILA DAGUERREOTYPES

View on the Mariquina River near Manila (L2007:0328:0005), Hispanic Society of America collection, ca. 1840's

Bottom right: whole plate daguerreotype with reconstructed cover glass viewed under specular light
Top right: inscription on the back of the passe-partout
Top left: whole plate daguerreotype
Bottom left: verso of the plate viewed under normal light and UVC

Caroline Barcella
5th Cycle Andrew W. Mellon Fellow
Advanced Residency Program in Photograph Conservation

George Eastman House
Image Permanence Institute

2009

Contents

Figures

Acknowledgments

The completion of the Conservation Project of the Manila Daguerreotypes would have not been possible without the advice and support of many people.

I would like to thank:

The Andrew W. Mellon Foundation for founding the Advanced Residency Program (ARP) in Photograph Conservation in which this project was conducted.

Grant Romer, *co-director of the ARP and supervisor of the project,* whose commitment to daguerreotype preservation allowed this project to see light. His expertise was instrumental in its completion.

Patrick Lenaghan, *curator of the Hispanic Society of America (HSA)* and Noemí Espinosa, *assistant curator at the HSA*, who shared their passions and concerns about the Manila Daguerreotypes.

Karina Beeman, *4th Cycle ARP Mellon Fellow,* who was first in charge of the project and who made decisive choices about treatment procedures early on.

The *5th cycle ARP Mellon Fellows* Mari Miki, Valentina Branchini, Alejandra Mendoza, and Ania Michas, as well as the graduate from the Selznick program, Inés Toharia Terán, for their contribution to the documentation and treatment of the 18 daguerreotypes.

Gregory Dale Smith, *assistant professor of Conservation Science at Buffalo Sate College* and Roger Easton, *professor in Optical Sciences at Chester F. Carlson Center for Imaging Science (RIT)* who conducted scientific analyses and examination of the passe-partouts.

Robert Frese, *Sign artist and Gilder from Chicagold Sign Co.*, and Mark Osterman, *ARP Process Historian*, for their help and advice in reproducing gold lines on glass.

Ralph Wiegandt, *ARP assistant director for Conservation Education*, for his careful reviewing of this report.

Stacey VanderBurgh, *ARP program manager* for videotaping the demonstration of the gold lines reconstruction on glass.

Patrick Ravines, *senior research project manager*, who assisted us in producing high resolution scans of the daguerreotype plates.

Additionally, Alan Chidgey-Bekhuis, James Bellucci, Joanie Eppinga, Todd Gustavson, Rosina Herrera, Juliana Muniz, Pierre-Emmanuelle Nyeborg, Marinus Ortelee, Joe Struble, and Christopher Wahren were all helpful.

I would especially like to thank Mari Miki and Ryan Boatright for their help and support during the project, as well as Taina Meller for her encouragement.

Introduction

In April 2007, an exceptional group of eighteen daguerreotypes were discovered in the collections of the Hispanic Society of America in New York City. The group included thirteen whole plates and five half-plates, presenting remarkable views of Manila city and its surroundings. They most likely constitute the first photographic records of the Philippine Islands. Discovered in partially opened or incomplete housings, these fragile objects were extremely vulnerable to irreversible damage.

To preserve this important heritage, the Photograph Conservation Department at George Eastman House offered to undertake the stabilization of the group. The conservation project lasted eighteen months and involved the work of six Mellon Fellows from the Advanced Residency Program in Photograph Conservation (ARP), as well the contribution of conservation scientists from various institutions.

Several notable achievements of the project were the establishment of a documentation protocol adapted to French daguerreotypes housings, development of a stabilization system of the plates in their original housings, and techniques to reproduce the format of some original painted and decorated cover glasses. These three aspects benefited from the creation of didactic tools (guidelines, detailed instructions, and videotaping) for dissemination to the field for similar challenges of documenting and treating French daguerreotypes.

This report introduces the Manila Daguerreotypes and their historical context, and describes how the detailed examination of individual objects revealed additional information regarding the material history of the group. It will discuss the didactic tools developed during the project. The final section will synthesize the conservation interventions performed to document, stabilize and ensure the long-term preservation of the Manila Daguerreotypes.

I- INTRODUCTION TO THE MANILA DAGUERREOTYPES

1. Technical background

1.1. Daguerreotypes

Daguerreotypy was the first photographic process to flourish in Western Europe and North America from 1839 to the late 1850s. The image of fine particulates of silver, mercury, and often gold is formed on the surface of a silvered copper plate.[1]

Figure 1: Basic structure of a daguerreotype plate (not in scale)

The daguerreian images are extremely sensitive to surface contact and air pollution. Surface contact will cause a permanent loss in the image, and pollutants will tarnish the silver layer. To prevent this type of damage, the plates were protected inside tight housings from the day they were made. There are two predominant types of housings: the American and British style, and the French style. The plates of the Manila Daguerreotypes are housed in French style housings, also called passe-partouts *(PMCC, 1998)*.

1.2. Passe-partouts

The basic structure of a passe-partout consists of a cover glass, a window mat, and a backing board bound together with paper sealing tape. The plate is inserted from the back of the housing through an access door, and commonly secured inside with strips of paper and adhesive. The door is then closed and secured with pins on the edges. To finish the presentation and ensure a good closing system, a backing paper is usually pasted over the entire back (Figure 2 & 3),

The aesthetic of the housing can be used to date a daguerreotype plate when it can be determined that there hasn't been any change to the original passe-partout. At the beginning of the era, the mat was created with paper. In the early 1840s, reverse painted cover glass appeared – in this case the reverse painting on glass served as the "window mat"– and dominated the aesthetic until the late 1840s. After this date, an additional element was added: a thick window mat with a radius bevel, placed beneath the reverse painted cover glass *(J-D Du Vernay, Nov. 1852, p. 187.)*[2]

[1] The average image particle size for a mercury developed daguerreotype plate is between 0.1 and 50 micrometers (10^{-3} millimeter). The thickness of the copper plate varies from 0.5 to 1 millimeter and the polished silver layer is between 1/50 and 1/30 of the thickness of the copper plate. Many sources explain the image formation and physical properties of daguerreotype plates. Refer to the *PMCC* (1998) for simplified explanations or S. Barger and W. White (1991) for a more in depth study.

[2] Timeline based on literature research, discussions with Grant Romer, and the study of the Georges Eastman House French daguerreotypes collection.

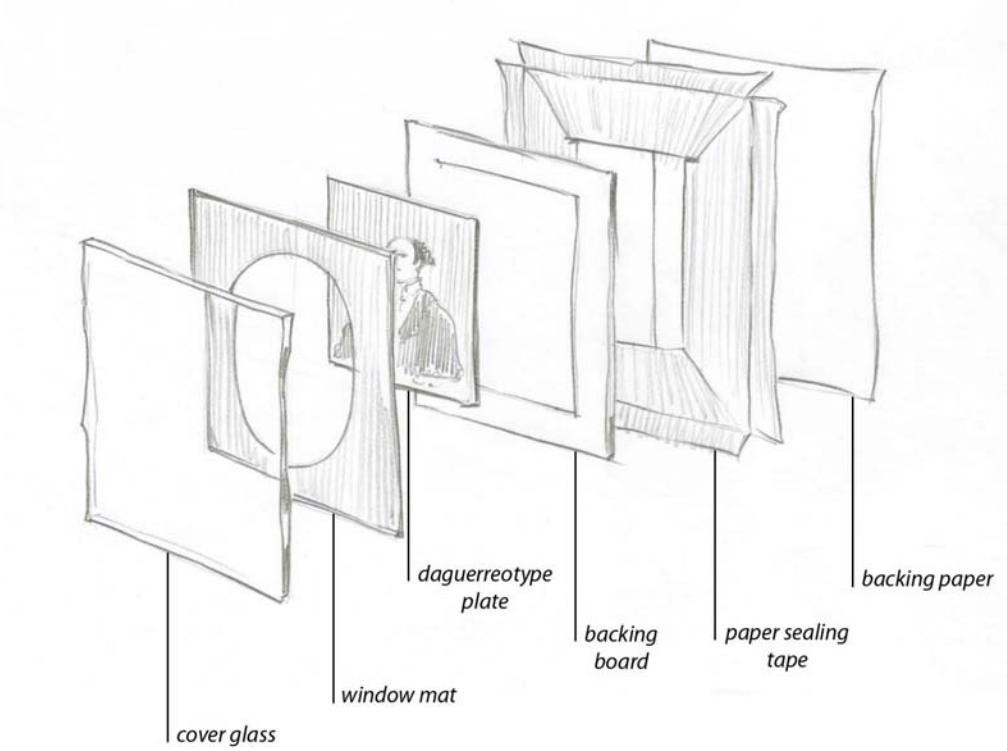


Figure 2: Basic structure of a daguerreotype plate in passe-partout (illustration: Mark Osterman)

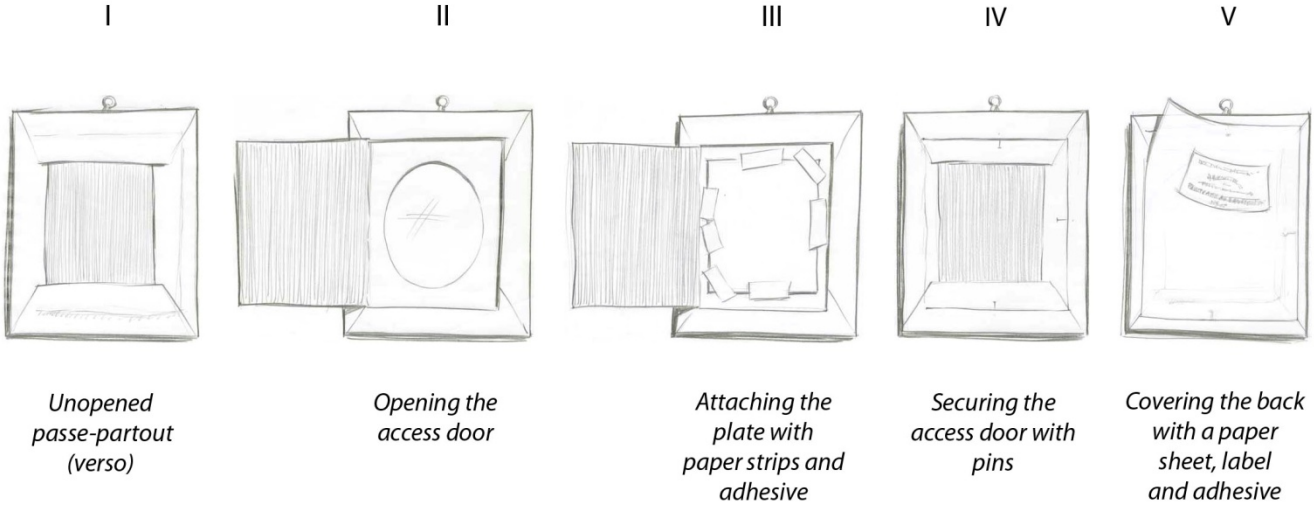


Figure 3: Inserting a daguerreotype plate in a passe-partout (illustration: Mark Osterman)

2. Discovery

The Manila Daguerreotypes were discovered in April 2007 during a conservation survey of the Hispanic Society of America's photographic collections conducted by the ARP Mellon Fellows Luisa Casella and Rosina Herrera.[3] The daguerreotypes were kept in a cabinet located in a stairway at the 7th floor of the building. They were stored vertically in a cardboard box. Many of the plates had shifted inside their housing, or had become separated from their broken or incomplete housing. To secure the plates and their housings, they were placed in temporary protective enclosures and then stored lying flat in cardboard boxes. In November 2007, Grant Romer, co-director of the Advanced Residency Program (ARP), and the 4th Cycle ARP Mellon Fellows Karina Beeman and Rosina Herrera, went to the Hispanic Society of America to pack the objects for transportation to the George Eastman House.[4]

Daguerreotypes in their storage box

Examination of the objects (Noemí Espinosa, Rosina Herrera)


Storage cabinet

Figure 4: Discovery

3. Provenance

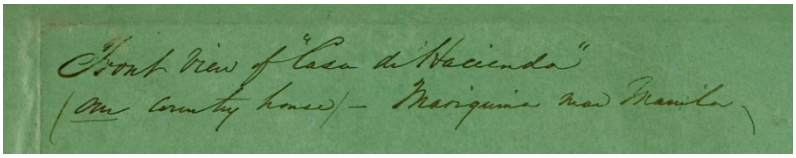
The daguerreotypes were part of a gift from Charles Massa that was delivered to Hispanic Society of America during the summer of 1929. The donation also included a group of nine ambrotypes of Manila that were found next to the daguerreotypes, several photographic albums, and a historical handbook for travelers in the Philippines. Little is known about the donor, except that he was a civil engineer born in New York, was living in New York City at the time of the donation, and that he had undertaken business related to design. We don't know how the daguerreotypes came into his possession *(N. Espinosa, 2007)*.

No documentation about the previous history of the group exists. However, it's possible to date the daguerreotypes, based on the photographic process and the style of the housings, as being from the early 1840s to the early 1850s. The objects by themselves shed further light on the context of their creation through inscriptions written in English on the back of the housings.

[3] A report extract mentioning the discovery of the daguerreotypes and the temporary enclosures fabricated to secure the objects is provided in Appendix 1.
[4] The design and fabrication of the temporary housing for transportation of the bare plates are described in "Travel Housing for Bare Plate Daguerreotype" by Ralph Wiegandt, Rosina Herrera and Karina Beeman *(R. Wiegandt et al., 2009)*.

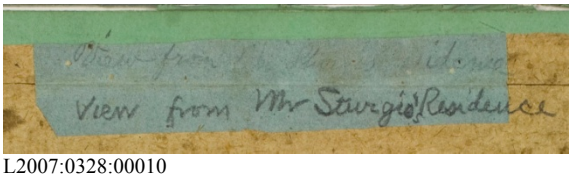
Three of them hold the following inscriptions, respectively:

- *Front view of "Casa de Hacienda" our country home. Mariquina near Manila*
- *Great [Bridge] from Mr. [Dyce's]*
- *View from Sturgis' Residence. Bridge of Misic*



L2007:0328:0018

L2007:0328:0007



L2007:0328:00010

Figure 5: Inscriptions bringing information on the context of creation

These inscriptions reveal that the owners were English speakers, had held a secondary residence in Mariquina near Manila, and were related to the "Sturgises" and "Mr. [Dyce's]." The possibility that the Sturgises were the actual owners has been raised as the name of "[Mess] H.P Sturg[is]" also appears on the box containing the ambrotypes of Manila from the Massa collection. Based on these elements, further research on the Sturgis family was undertaken by Noemí Espinosa, assistant curator at the HSA.

Figure 6: Wooden box engraved "[Mess] H.P. Strugis"

The Sturgises were among the American settlers who arrived in the Philippines prior to its becoming an American colony in 1898. The Russell & Sturgis Company of Manila was created in 1828 by Henry Parkman Sturgis and his cousin George Robert. Russell Sturgis, brother of Henry, joined the Company in 1834. The firm was active until 1875 and was considered the greatest hemp and sugar-cane company in the country. Confirmation that the Sturgises owned a country home in Mariquina was found in the diary of Louis Manigault, a person who was traveling in the

island in June of 1850: *"About eight miles from Manila is a Pueblo called Mariquina -- Here 3 of the commercial houses in Manila -- Russell & Sturgis -- Messrs Kerr* [*sic*] *& Co. -- and Messrs Stewarts & Co -- have a country house where the cool evening can be spent…"*. In her report, Noemí Espinosa also mentioned that "Mr. Dyce's" may refer to an English businessman leading a trader insurance company established in Manila in 1850.[5]

Therefore, it seems that the Manila Daguerreotypes are connected to the wealthy society of American and English settlers established in Manila in the middle of the 19th century.

4. Description

First a general description of the Manila daguerreotypes will be given. A comparative study based on detailed examinations of individual objects will follow, providing context to allow for a better understanding of the group overall. A table gathering the key characteristics of each object is provided in Figure 11.

4.1. General

Each daguerreotype is a photographic object composed of several elements. For the purposes of clarity, the plate, the housings, and the inscriptions are described separately.

Plates
The Manila daguerreotypes group consists of 18 pieces, including 13 whole plates (ca. 16 x 21 cm) and 5 half plates (ca. 12 x 16 cm), which are the two largest formats used to create daguerreian images *(J. Buerger, 1989, p. 197)*. The views show streets and monuments of Manila, landscapes and villages of the surroundings region, and one residence taken from the front and side. The aesthetic quality of the images is remarkable (Figures 7-9).

Inscriptions
The exact location of the views is indicated on the back of the housings in handwritten inscriptions. Three areas are represented: Manila proper; the close-in neighborhood Mariquina, 8 miles north of Manila; and provinces along the Laguna lake, east of Manila. The inscriptions appear to be in multiple hands (Figure 10).

Housing
A first examination of the entire group revealed both similarities and differences in the housing aesthetic. Most of the housings for whole plates are reverse painted glass with an octagonal window opening; two have a missing cover glass; two have a black paper mat with an unusual red tape; and one consists of a painted glass with a rounded window opening and a beveled mat. Among those with the half-plate format, two replicate the design of the whole plate formats, two show slight variations compared to this design, and one has a paper mat (Figure 12).

[5] Martin, Dyce and Co., agents of China Trader Insurance Company Limited. For more information on the Sturgis family and the locations shown on the daguerreotypes, see Noemí Espinosa's report provided in the Conservation Documentation of the Manila Daguerreotypes *(C. Barcella et al., 2009)*.

Figure 7: ***Plazuela de S Gabriel Manila Philippines***
Whole plate daguerreotype and its housing (plate: 16,4 x 21,6 cm – housing: 22,6 x 27,3 cm), L2007:0328:0015

Figure 8: ***Mariquina River near the "Casa de Hacienda"***
Whole plate daguerreotype and its housing (plate: 16,2 x 21,5 cm – housing: 22,7 x 27,3 cm), L2007:0328:0013









Figure 9 (2 pages): Overview of the daguerreotype plates. The position of the images follows the order of the accession numbers (L2007:0328:0001-18)

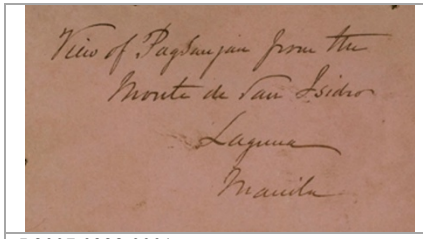
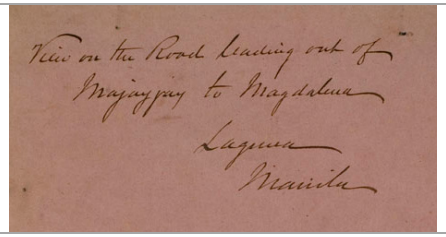
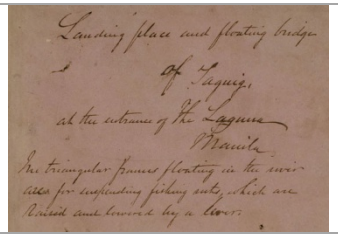
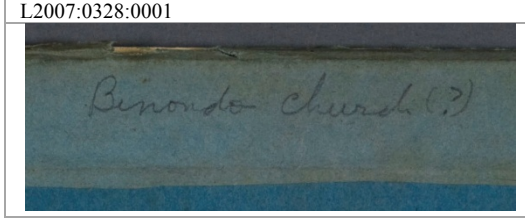
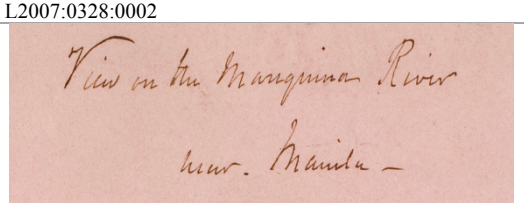
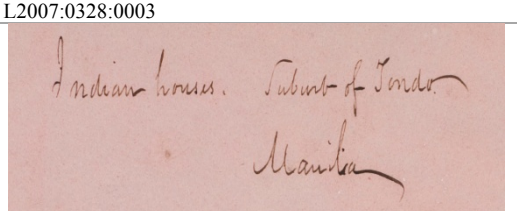
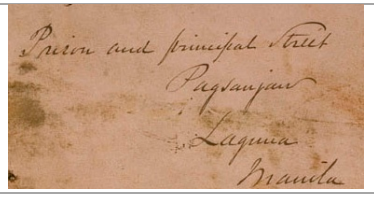
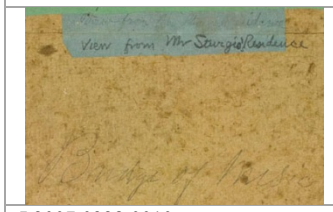
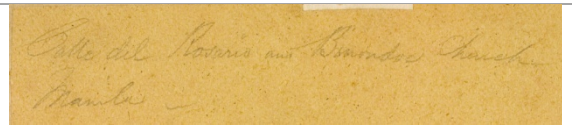
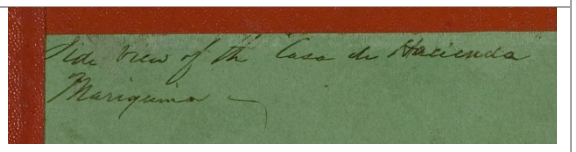
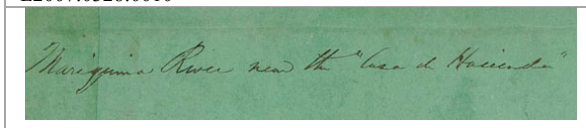
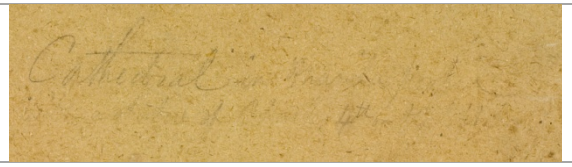
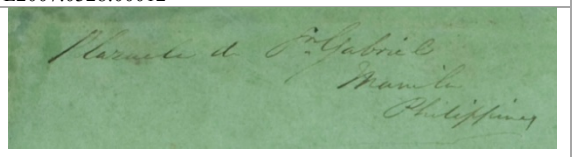
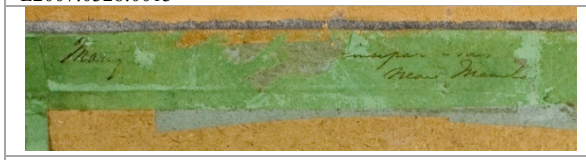
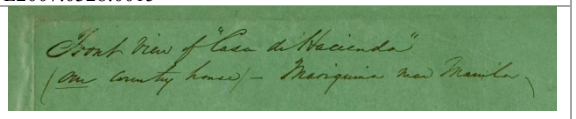
		
L2007:0328:0001	L2007:0328:0002	L2007:0328:0003
		
L2007:0328:0004	L2007:0328:0005	L2007:0328:0006
		
L2007:0328:0007	L2007:0328:0008	L2007:0328:0009
		
L2007:0328:0010	L2007:0328:0011	L2007:0328:00012
		
L2007:0328:0013	L2007:0328:0014	L2007:0328:0015
		
L2007:0328:0016	L2007:0328:0017	L2007:0328:00018

Figure 10: Inscriptions written on the back of the passe-partouts

GEH Acc #	HSA Acc #	initial title/correction (in red)	plate size	plate dimensions (cm)	housing dimensions (max) in cm after treatment	housing dimensions (max) in inches after treatment	plate hallmarks	corners bent down	crimps on the edges from holder	securing system of the plate	type of the mat/ shape of opening window	color of the mat	color of the tape/ backing paper	interior facing paper	handwriting groups *	other	yellow fluorecence under UVC
L2007:0328: 0001	174988	View of PagSanjuan from the Monte San Isidro/ Laguna/ Manila	half	11.9 x 16.2	17.4 x 21.1 x 0.8	6 27/32 x 8 5/16 x 0. 5/16	"30", hexamerous figure	TLC, TRC	no	dots of wax	reverse painting on glass/ octagonal	white	green/no	pink	1+	"27/ July" handwriten, embossed at the back of the plate"CG" in pencil, top left	recto: many spots (tarnish spot in visible light), edges
L2007:0328: 0002	174989	View from the road leading out of Majay[p]jay to Magdalena/ Laguna/ Manila	half	12 x 16.1	17,1 x 21.2 x 0.8	6 11/16 x 8 5/16 x 0.5/16	"30", "garantie", "(vase?) double"	slightly, BRC, BLC	BC	dots of wax	reverse painting on glass/ octagonal	light pink	blue/pink	yellow	1+	"CG" in pencil, top left. broad gold and black lines on cover glass. Board covered underneath the backing paper	recto: slight, edges and spots verso: strong, OV
L2007:0328: 0003	174990	Landing place and floating bridge of Ta[q]guig, at the entrance of the Laguna, Manila. The triangular cranes frames floating in the river are for suspending fishing nets, wich are raised and lowered by the lever	half	12.1 x 16.1	17 x 21.2 x 0.8	6 11/16 x 8 5/16 x 0.5/16	"30", hexamerous figure	no	no	dots of wax	reverse painting on glass/ oval	light pink	blue/pink (also blue paper sheet under tape)	blue	1+	"CG" in pencil, top left. oval window opening	no data
L2007:0328: 0004	174991	Binondo Church (?)	half	16.2 x 12	18 x 22,4 x 0.9	7 1/16 x 8 13/16 x 0.11/32	"B" (verso)	no	no	strips of adhered paper	paper mat	light pink	blue/blue	no	2	unreadable pencil inscription. visible inscription in pencil with a question mark (later addition)	recto: edges OV, and many spots in bottom (brown tarnish in visible light - verso: slight, all edges
L2007:0328: 0005	174992	View of on [the] Mariquina River near Manila	whole	16.2 x 21.5	22.5 x 27.2 x 0.7	8 7/8 x 10 11/16 x 0.9/32	"30", hexamerous figure	slightly, all corners	4: CR, CL, B&TR corners	dots of wax	missing		pink/ pink	green	3	the missing cover glass was painted, with an octagonal opening window	verso: moderate, OV
L2007:0328: 0006	174993	Indian Houses. Suburb of Tondo. Manila. (original no title)	whole	16.2 x 21.5	22.6 x 27.4 x 0.8	8 29/32 x 10 25/32 x 0.5/16	"30", hexamerous figure	yes	4: CR, CL, B&TR corners	dots of wax	reverse painting on glass/ octagonal	white	pink/ pink	green	3b		verso: slight, B
L2007:0328: 0007	174994	Great [Bridges] from Mrs. [Dyce's]? (original no title)	whole	16.3 x 21.6	22.5 x 27.2 x 0.7	8 7/8 x 10 23/32 x 0.9/32	"30", hexamerous figures (2)	no	no	dots of wax	missing		green/ no	pink	5	the missing cover glass was painted, with an octagonal window opening. plate tarnished from cracks in former glass	verso: slight, B
L2007:0328: 0008	174995	Cabildo Government House? (original no title)	whole	16.2 x 21.5	22.6 x 27.2 x 0.7	8 7/8 x 10 23/32 x 0.9/32	"30", hexamerous figure	no	no	dots of wax	reverse painting on glass/ octagonal	light pink	pink/ no	green	5		verso: moderate-strong, OV
L2007:0328: 0009	174996	[Prison]? and principal Street/ PagSanJuan/ Laguna/ Manila	half	12 x 16.2	17,5 x 21.1 x 0.7	6 7/8 x 8 5/6 x 0.9/32	"30", "DAGUERREOTYPE"	no	no	dots of wax	reverse painting on glass/ octagonal	white	yellow/pink	pink	1+	the housing might belong to the missing plate."CG" in pencil, top left	recto: few spots (tarnish spot in visible light)
L2007:0328: 0010	174997	View from Sturgis' Residence/ Bridge of [Misic]	whole	16.2 x 21.5	22.7 x 27.2 x 0.7	8 15/16 x 10 23/32 x 0.9/32	"30", hexamerous figure	no	no	dots of wax	reverse painting on glass/ octagonal	white	green/no	green	5 & 2	original title repeated in pencil (later addtion)	verso: slight, edges
L2007:0328: 0011	174998	Calle del Rosario y and Binondo Church/ Manila	whole	16.3 x 21.5	21.7 x 27.2 x 0.9	8 19/32 x 10 23/32 x 0.11/32	"30", hexamerous figure	no	no	strips of adhered paper/ drop of wax	reverse painting on glass/ rounded rectangle	black	green/no	green	6	later housing. Plate tarnished from glass crack	verso: strong, OV
L2007:0328: 0012	174999	Side view of the Casa de Hacienda/ Mariquina	whole	16 x 21.1	22.7 x 27.3 x 0.8	8 15/16 x 10 3/4 x 0.11/32	"30", hexamerous figure	all	4: CR, CL, B&TR corners	strips of adhered paper/ drop of wax	paper/ rounded rectangle	black	green/no	red (originaly green)	4	later glass, mat and tape. Plate tarnished from glass crack	recto: few spots (tarnish spot in visible light). verso: slight, OV-B
L2007:0328: 0013	175000	Mariquina River near the "Casa de Hacienda"	whole	16.2 x 21.5	22.5 x 27.3 x 0.8	8 7/8 x 10 3/4 x 0.5/16	"30", hexamerous figures (2)	slightly BRC, BLC, TRC	4: CR, CL, B&TL corners	dots of wax/ strips of adhered paper	reverse painting on glass/ octagonal	white	green/ green	green	4	3 layers of lining paper	verso: slight, OV
L2007:0328: 0014	175001	Cathedral in Manila [proper] with a statue of Charles 4th on the left [hand] ...Taken on April 4th	whole	16.3 x 21.6	22,6 x 27.2 x 0.9	8 29/32 x 10 23/32 x 0.11/32	"30", hexamerous figure	no	no	dots of wax (only one)	reverse painting on glass/ octagonal	light pink	green/no	green	5	title partially invisible in visible light. IR examination revealed the entire inscription. Bent plate	verso: slight-moderate OV-B
L2007:0328: 0015	175002	Plazuela de [San] Gabriel/ Manila/ Philippines	whole	16.4 x 21.6	22.6 x 27.3 x 0.7	8 29/32 x 10 3/4 x 0.9/32	"30", hexamerous figure	slightly, all corners	4: CR, CL, B&TL corners	dots of wax	reverse painting on glass/ octagonal	black	green/green	green	4		recto: slight, rigt edge veso: moderate, OV
L2007:0328: 0016	175003	Mari[quina]....[principal].... /near Manila	whole	16.2 x 21.5	22.3 x 27.2 x 1	8 25/32 x 10 23/32 0.3/8	"30", hexamerous figure	slightly, all corners	4: CR, CL, B&TL corners	dots of wax/ strips of adhered paper	paper/ rounded rectangle	black	green/ no	green	4	later glass, mat and tape. The board was flipped. inscription discovered in the inside	recto: few spots (tarnish spot in visible light) - verso: moderate, OV-B
L2007:0328: 0017	175004	San Fernando from [Gasthills] look-out	whole	16.2 x 21.5	22.5 x 27.2 x 0.7	8 7/8 x 10 23/32 x 0.9/32	"30", hexamerous figure	no	no	dots of wax	reverse painting on glass/ octagonal	light pink	pink/ pink	no	5	broken cover glass	verso: moderate, edges
L2007:0328: 0018	175005	Front view of "Casa de Hacienda"/ (our country home - in Mariquina near Manila)	whole	16.2 x 21	22.5 x 27.2 x 0.7	8 7/8 x 10 23/32 x 0.9/32	"30", hexamerous figure	slightly, all corners	4: CR, CL, B&TL corners	dots of wax/ strips of adhered paper	reverse painting on glass/ octagonal	black	green/ green	green	4		verso: moderate-strong eges

* See the grouping of the Manila Daguerreotypes available in Appendix 2, as well as Figure 10.

Figure 11: Table of the characteristics of the Manila Daguerreotypes

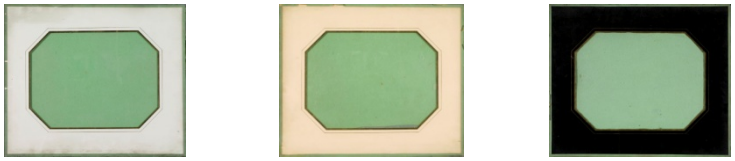
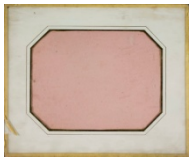
Format	Amount	Type of passe-partout
Whole plates	8	
	2	
	2	
	1	
Half-plates	2	
	2	
	1	

Figure 12: Types of passe-partouts

Conclusion

This first description raises questions about the history of the pieces: How are the variations in the handwriting and the housing design to be interpreted? Were the daguerreotypes associated with and part of a single group at the time of their creation? Did more than one photographer make the daguerreotypes?

The examination of the physical characteristics of each object and their comparative study revealed some possible answers to these questions. Observations made when examining the inscriptions, the housings, and the plates themselves are successively presented for the comparative study.

4.2. Comparative study

4.2.1. Inscriptions

Comparing the inscriptions, we observe that they are from at least five different hands, and that they are often associated with a specific location (Figures 10, 11):

- large handwriting in ink located in the center refers to the views of the "Laguna" area (#1, 2, 3, 9).
- small handwriting in ink located in the center refers to the views of suburbs of Manila (#5, 6).
- small handwriting in ink located on the top left refers to the views of "Mariquina" (#12, 13, 16, 18), but also refers to one view of Manila (#15).
- inscriptions in pencil, possibly from two different hands, refer to the views of Manila district (#7, 8, 10, 11, 14, 17).
- small handwriting in pencil seems to be a later addition. Indeed, it repeats a barely readable previous pencil inscription (#10) and proposes a location for a plate with an unreadable inscription, with a question mark (#4).

One of the daguerreotypes of the "Laguna" area also shows two letters in pencil partially covered by the backing paper. As the treatment of the daguerreotypes involved the removal of backing papers, the full letters "CG" appeared. The same initials were found under the backing papers of the three other daguerreotypes of the "Laguna" area.

Additionally, one daguerreotype from the Laguna group holds the handwritten inscription "27 July" engraved in the copper plate, on the back.

L2007:0328:0009 L2007:0328:0001

Figure 13: Inscriptions "CG" and "27 July"

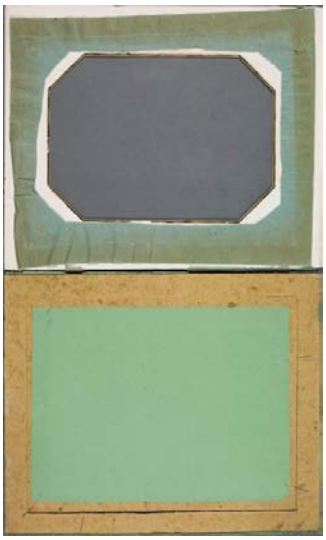
These observations suggest that several people were involved in the making of the daguerreotypes, operating in four different locations. Four of the half plate daguerreotypes that correspond to the views of the "Laguna" were probably housed by a person whose initials were CG.

4.2.2. Housings

Examining and comparing the characteristics of the housings allowed researchers to determine whether certain daguerreotypes belonged to a distinctive group from the day they were made. The housings of the Manila Daguerreotypes can be grouped in three main categories: ones with complete original housings, ones with incomplete housings, and housings with elements added later.

**The complete original housings (13)*

Twelve housings are original and present similar characteristics. Ten have a white, pink, or black reverse painted glass with an octagonal window opening circled by gold lines following the same design. Two painted cover glasses for the half-plates have slight variations: one has lines with a different design, and the other has a cover glass with an oval window opening (Figure 12). As daguerreotypes often have variations in their housing design, the strong aesthetic similarities of twelve of these thirteen objects suggest that they were part of a single group from their creation. This hypothesis is strengthened by the fact that all of the housings contain a blue paper mat to which the plate was attached using dots of wax (chapter I paragraph 1.2). This securing system is unusual, as plates are historically adhered with strips of paper. This circumstance confirms the hypothesis, based on their similarities, that these twelve daguerreotypes are a distinctive subset.



Detail showing a small amount of wax attached to the blue interlayer paper window mat

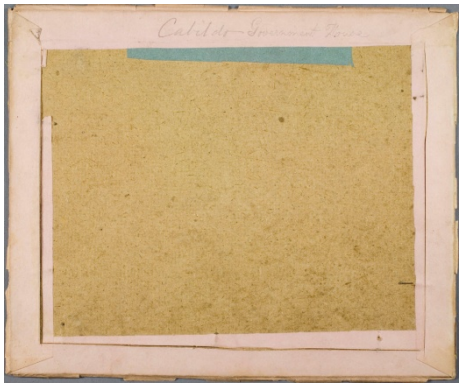
Inside of the passe-partout (L2007:0328:0010)

Verso of the plate and details showing dots of wax in the corners (L2007:0328:0010)

Figure 14: Securing system of the daguerreotype plates housed in original painted glass passe-partouts

If the similarities within this group are determinant, some variations are found on the verso. Comparing the backs, we notice that six boards are uncovered, whereas the other boards are covered with a lining paper. We observe that all of the uncovered boards hold an inscription in pencil, matching with the views taken in Manila district. It is possible or probable that the daguerreotypes of Manila proper were housed by a different person than the one who housed the other ones of this subset.

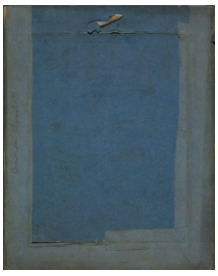
L2007:0328:028:0015



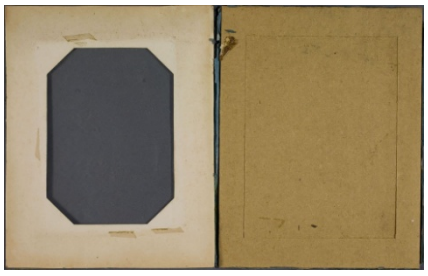
L2007:0328:0008

Figure 15: Example of passe-partout with and without backing paper

Among this subset of original and complete housings, one daguerreotype shows unique characteristics: it is the only one that shows the image in vertical view and has a paper mat on the front and a blue backing paper on the back. The plate was secured using strips of adhesive paper, yet shows no trace of wax on the back. These observations suggest that this daguerreotype may not have belonged to this group originally.



Recto and verso of the passe-partout



Inside of the passe-partout

Verso of the plate

Figure 16: Views of the daguerreotype *Binondo Church* (L2007:0328:0004)

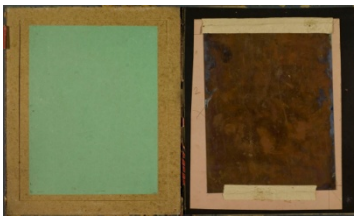
**The incomplete housings (2)*

Two housings have missing cover glass. Both consist of a board and an interleaving paper mat with similar characteristics compared with the original complete housings. One was found with a sheet of paper mentioning "Broken glass removed [RWA] 8-21-29," indicating that the cover glass was discarded when it arrived at the HSA. Residues of wax were found on the paper mats and on the backs of plates, revealing that the plates were secured using the same system that was previously mentioned (Figures 11, 14).

This suggests that these two daguerreotypes belong to the same subset as the twelve daguerreotypes with original painted glass housings. At one point, their cover glass was lost or discarded.

**The housing with later elements (3)*

Two housings consist of a cover glass over a paper mat bound with a red tape to the board. Inside, the plates were secured with strips of adhesive paper. The tape and the paper mat appear to be from a later period when compared with the original housings. However, the boards are similar. Therefore, it seems that the cover glass and the paper mat are later additions. Confirmation of this hypothesis is found by examining the plates themselves. One shows tarnish lines that indicate the presence of cracks in a previous cover glass, and both show tarnish lines following the shape of an octagonal window opening, when the present mat opening is rounded at the corners. Furthermore, the plates show residues of wax on the back, indicating that they were originally secured in the same way as the plates kept in their original painted glass housings.



Opened passe-parout with plate

Daguerreotype, recto and verso

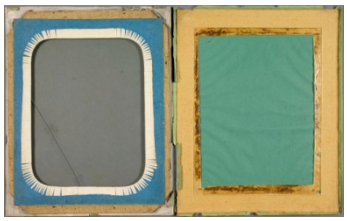
Plate viewed under specular light*, recto

* The view under specular light shows tarnish lines following the shape of the breaks in a former cover glass

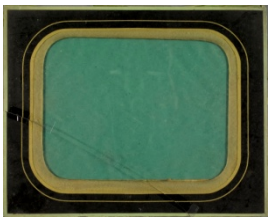
Figure 17: Views of the daguerreotype *Side view of the Casa de Hacienda. Mariquina* (L2007:0328:0012)

These observations suggest that these plates were created at the same time as the ones in original reverse painted glass housings. At one point, the front cover glass and paper mat replaced the original housing format, and were attached to the original board.

One housing consists of a reverse painted glass with a rounded corner window opening and an additional thick mat with a golden bevel. This design is from a later period as compared with the other housings with painted glass (chapter I paragraph 1.2). The plate was attached on the inside with strips of adhesive paper. However, the plate shows residues of wax on the back, and tarnish lines following the shape of an octagonal window opening on the front. These elements indicate that it was previously housed in another passe-partout. It is probable that this plate was created at the same time as the ones housed in the twelve original painted glass housings, and originally placed in a similar passe-partout.

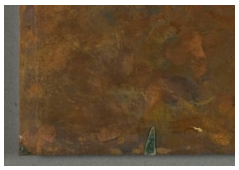


Opened passe-parout



Recto of the passe-partout

Plate under specular light, recto



Verso of the plate, detail of the bottom left edge

Figure 18: Views of the daguerreotype *Calle del Rosario and Binondo Church Manila* (L2007:0328:0011)

4.2.3. Plates

Examination of the plates of the Manila Daguerreotypes revealed evidence of the manufacturer, and variations in the working practices of the photographer(s).

**Hallmark*

Hallmarks press-stamped on the edges of the daguerreotype plates often mentioned the ratio of silver to copper and the logo of the plate maker. All of the Manila Daguerreotypes except for the plate #4 are stamped with the number "30," indicating that 1/30th of the plate is covered with silver. Fifteen plates have the same logo (a hexamerous figure that evokes a six-pointed star), indicating that they come from the same plate maker. Although we don't know who was the plate maker, the same hallmarks were documented on one of the daguerreotypes displayed at the exhibition "Paris et le daguerreotype." It refers to a plate by Alphonse Eugene Jules Itier, dated from 1842 *(A. Cartier-Bresson, 1989, p. 69)*. Therefore, it is most probable that the plates came from France, which is consistent with the style of the original housings. Three plates among the half-plates show various symbols or inscriptions. One is stamped "GARANTIE" and "DOUBLE," also indications of French origin.

hallmark: 5 x 3 mm

hallmark: 3 x 3 mm

L2007:0328:0017

hallmark: 2 x 18 mm

L2007:0328:0009

hallmark: 3 x 3 mm

hallmark on the left: 1.5 x 6 mm

L2007:0328:0002

hallmark: 3 x 2 mm

L2007:0328:0004

Figure 19: Hallmarks

**Edges*

To create a daguerreotype image, the photographer polishes the plate, sensitizes it, exposes it in the camera, and processes the image by developing, fixing, gilding, and washing. During the operations of polishing and gilding, the tools used by the photographer to hold the plate can distort the edges and corners.

The Manila Daguerreotypes' plates can be separated into three distinct groups according the idiosyncrasies of the edges:[6]

- 7 whole plates are crimped similarly along the edges, with corners slightly bent down.
- 9 plates don't show any edge or corner distortion.
- 2 half plates show either no crimp or a crimp of a different kind compared to the whole plates.

[6] To associate the plates with their characteristics, please refer to Figure 11.

Plate with crimped edges, overview and detail of the center right edge (L20007:0328:0018)

Plate with flat edges, overview and detail of the center right edge (L20007:0328:0008)

Figure 20: Edges

These observations indicate that two or three different people, using individual polishing systems, may have contributed to the making of the plates. It is interesting to notice that the whole plates without distortion correspond to the views of Manila (except for the plate # 15), are associated with housings that don't have any backing paper, and hold a pencil inscription (see chapter I paragraph 4.2)

**Yellow fluorescence*

Daguerreotype plates examined with short-wave UVC illumination (250-300nm) may show yellow-green fluorescing areas that are not detectible or differentiated in the visible light spectrum (400-700nm). Studies of this phenomenon concluded that the fluorescent material could be a residual copper cyanide compound, possibly arising from original processing steps: electroplating, fixing, or gilding, or from later brightening or cleaning treatments *(C. Tragni, 2005; L.A. Daffner et al., 1996)*. Although the nature of the component and its sources cannot be precisely identified, examination under UVC may indicate that a plate was processed in a similar or different way compared one with another.

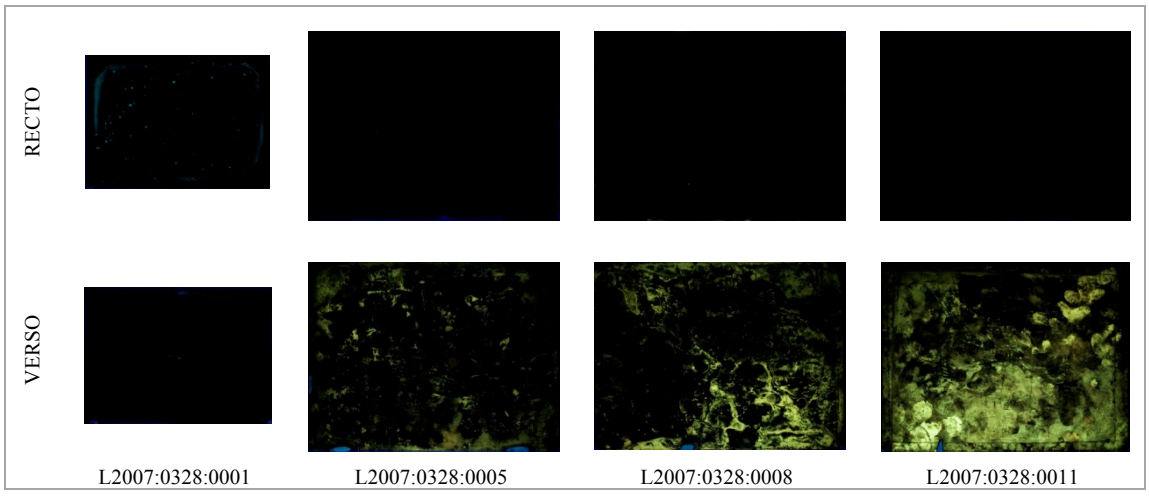


Figure 21: Fluorescence under UVC

The comparative study revealed that all of the whole plates show similar characteristics under UVC: a yellow fluorescence on the back, which covers the entire surface in the more pronounced cases. Even if the fluorescence areas vary in degree, their appearance is similar. Few fluorescent spots or no florescence appear on the recto. By contrast, the UVC fluorescence of the half-plates is quite inconsistent. The plates show fluorescence either on the back or the front, or both, with different characteristics compared with the whole plates (Figure 11). This evidence seems to indicate that the whole plates were processed in the same way, possibly by the same person, whereas the half-plates may have been processed by another photographer, or more than one.

4.2.4. Conclusion

The comparative study allowed the researcher to establish that all of the daguerreotypes except for one seem to have been created in the same context, using plates that probably come from France. Within this main group, at least two photographers seem to have been involved in the making of the plates. Further research is being conducted by Noemí Espinosa on the connection between the Sturgis family and photographers of that time, and may reveal who was the mysterious «CG», and who else may have contributed to the creation of the group.

5. General Condition

A detailed condition report concerning each object is included in the Conservation Documentation of the Manila Daguerreotypes *(C. Barcella et al., 2009).*

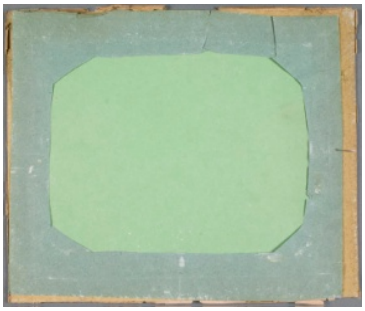
5.1. Plates inside their housing

When the daguerreotypes arrived at the lab, five plates were inside their housing, whereas the others were separated from their original housings prior to transportation. The plates inside their housing were partially loose.

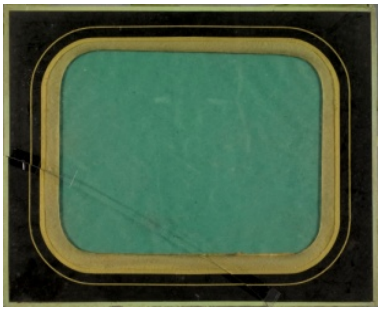
5.2. The housings

Overall, two cover glasses were missing, and two others were broken (Figure 22).
All of the housings were severely soiled, with failed sealing paper tape leading to the complete or partial detachment of the glass and the board. All of the cover glasses had some level of glass deterioration, manifested as crystal formations visible under low power microscope examination. A form of glass deterioration, appearing as interference colors, was found on most cover glasses. The white and pink reverse painting on glass revealed small losses and a powdery surface (Figure 23).
Some blue interleaving paper window mats were folded or torn. All presented residues of white powdery material on the side in contact with the white and pink painted cover glasses, and were stained in areas in contact with the board. Small amounts of wax were found on most of them on the side in contact with the plate (Figure 14). Red powdery residues were noticed in some cases.

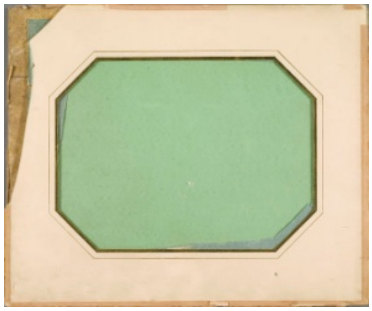
L2007:0328:0005



L2007:0328:0007

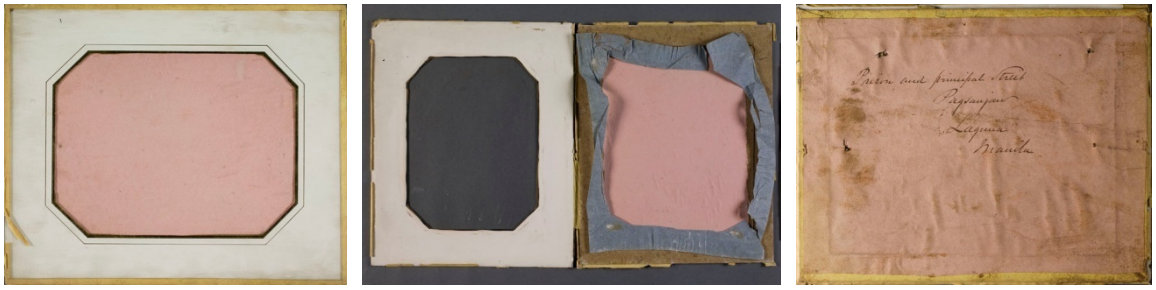


L2007:0328:0011

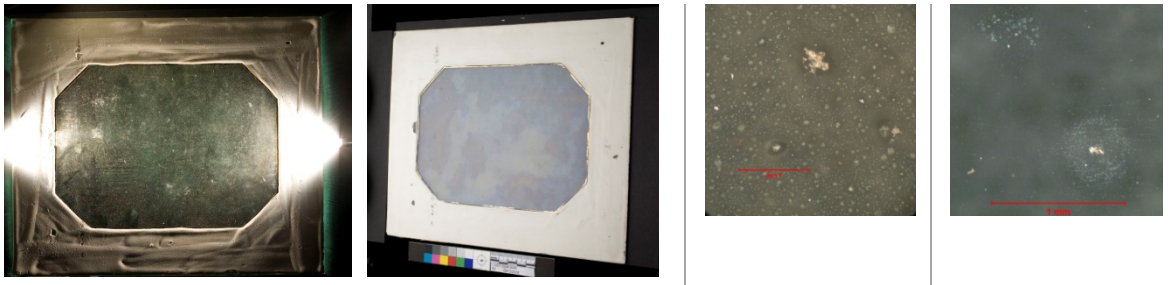


L2007:0328:0017

Figure 22: Housings with missing or broken cover glasses



L2007:0328:0009



L2007:0328:0006 | L2007:0328:0010 | L2007:0328:0011

Figure 23: Deterioration of the housings

5.3. The plates

Surface condition

Accretions of various types were found on all of the plates. Residues of the reverse painting on glass were identified on most plates housed in white or pink reverse painted glass. Fibrous accretions with a mold-like pattern were found on all of the plates, located on the perimeter. We notice that the plate housed in a passe-partout with additional bevel mat shows the most significant fibrous accretions, which also appeared beneath the crack of the cover glass (plate # 11).

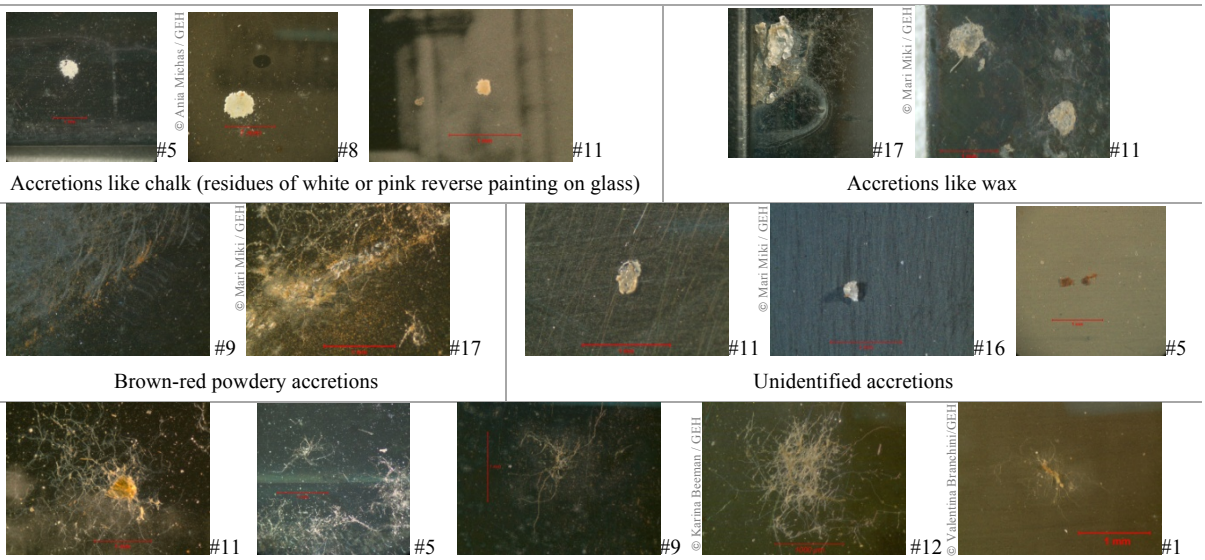


Figure 24: Accretions

Physical deterioration

Two plates showed exfoliation of the silver-plated layer, and one was bent.[7] Contact with the plate surface caused abrasions and significant losses in some of the plates (see Figure 25 below).

Figure 25: Examples of physical deterioration

Chemical deterioration

Plates were in various chemical conditions. Some showed very little tarnish; others presented an overall tarnish film and various tarnish spots. Interference color fronts along the edges and following the shape of the window opening were present in most cases.

Figure 26: Tarnish films (plates viewed under specular light)

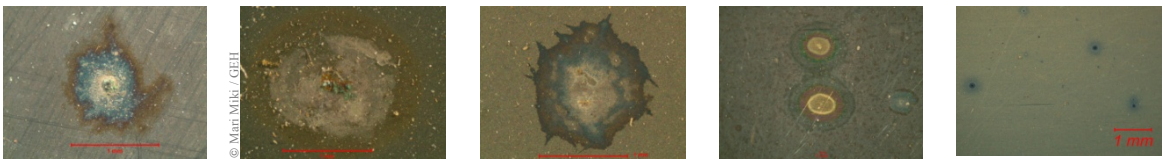


Figure 27: Examples of tarnish spots

[7] Respectively: plates #9 and #15, and plate #14.

6. Diagnostic

Plates inside their housing
Originally, most of the plates were attached inside their housing with dots of wax. Over time, the wax dried and the plates started to shift. Ultimately, the sealing paper failed, leading to the disassembling of the plate and its passe-partout.

The housings
Poor handling induced the breaking of the cover glass. Soil comes from exposure of the objects to a dusty atmosphere for a long period of time without a protective enclosure.
Glass corrosion is a common deterioration found on the internal side of cover glass for daguerreotypes and can be attributed to periods of high humidity inside the housing system *(PPMC, 1998, p. 7; S. Barger and W. White, 1991, pp. 174-181).* The losses in the reverse painting on glass are caused primarily by contact with the point of the pins penetrating through the board (see chapter I paragraph 1.2). Other losses are due to the friable nature of the paint composition.
The blue paper mat was easily physically damaged because it was thin. It was unable to support the weight of the plate. Staining of the areas of the paper that came into contact with the board indicates the boards' chemical instability and poor quality. The white residues are due to the powdery surface of the reverse painting on glass. The origin of the red powdery residue is undetermined. It may come from the "rouge" (iron oxide) used to polish the plate—possibly a contaminant from the space where the plates were prepared, processed, and put in the original housings.

The plates
Accretions are primarily from the powdery surface of the paint or infiltration of dust due to the failure of the protective housings. Fibrous accretions are likely to be mold, as they show the distinctive characteristics of fungi and are located in the areas where the plates were most exposed to humidity (along the edges and under cracks of the glass). The fact that the most mold-like fibrous accretions were found on the plate having greater internal air volume than the others (due to the greater thickness of the beveled mat) tends to confirm this hypothesis.
Direct contact with the plate surface is the major source of mechanical damage, caused by poor handling and/or failure of the protective housing.
Tarnishing of the plates is due to their exposure to air pollutants and humidity, and the degree of tarnish is usually greater for plates with failed housing systems. Residual products from variations in original processing treatments contributed to chemical deterioration as well.

II- THE CONSERVATION PROJECT

1. Treatment objective and proposal

The objective of the treatment is to stabilize the plates inside their original housings, both physically and chemically, while preserving the original appearance of the objects.

Treatment Proposal Steps:

- Document each daguerreotype through a written report and imaging.
- Disassemble all plate housings to gain access and conduct stabilization steps.
- Remove dust and debris from the plates and mechanically remove significant adhered accretions.
- Consolidate significant area of exfoliation.
- Dry surface clean the board.
- Remove, wash, and line the backing papers.
- Dry and wet clean the cover glasses.
- Consolidate the paint surface.
- Compensate for the losses in the paint.
- Reconstruct the broken and missing cover glasses.
- Reassemble the plates and their original housing.
- Develop an appropriate secondary housing.

2. Achievements and contributors

The conservation project of the Manila Daguerreotypes was challenging from many perspectives due to the composite aspect of the objects and their significant number. The documentation, stabilization, and preventive conservation of the entire group required the expertise and collaboration of numerous persons.
The following list outlines the main achievements with the associated contributors:

Documentation
- Historical research (Noemí Espinosa, Inés Toharia,[8] Caroline Barcella)
- Guidelines for primary documentation (Caroline Barcella, Karina Beeman)
- Infrared examination (Roger Easton, Ralph Wiegandt)
- XRF analyses (Caroline Barcella, Alejandra Mendoza)
- FTIR analyses (Gregory Dale Smith)
- High Resolution scanning of the plates (Patrick Ravines)

Conservation treatments
- Compensation for loss in reverse painting on glass (Karina Beeman, Caroline Barcella, Alejandra Mendoza)
- Consolidation of silver layer exfoliation (Ania Michas)
- Rehousing systems of the plate in its original housing (Karina Beeman, Caroline Barcella)
- Housing system of an untreated, broken, reverse painted cover glass (Mari Miki)
- Recreation of the lines of reverse painted glass (Caroline Barcella)

[8] Research on the history of photography in Manila by Inés Toharia are provided in the Conservation Documentation of the Manila Daguerreotypes (*C. Barcella et al., 2009).*

Preventive conservation
- Secondary housing for transportation (Rosina Herrera, Karina Beeman, Ralph Wiegandt)
- Secondary housing for permanent storage (Caroline Barcella)

3. Didactic tools created for documentation and treatments

The significant number of objects to be treated required the participation of a team of conservators[9] to complete the documentation and the stabilization of the group. To ensure consistency of the records and treatment procedures, didactic tools were created to give guidance through three critical steps of the conservation treatments:

- The primary documentation
- Securing system of the plates inside their original housing
- The reconstruction of the reverse painted cover glasses and the decorative gold lines

3.1. Guidelines for documentation

Guidelines for documentation were created to facilitate and coordinate the work of the conservation team, and to leave a comprehensive and consistent documentation record. The guidelines consist of two parts: directions for the photo documentation of the objects, and the templates for examination and treatment reports. The guidelines are provided in Appendix 3.

3.1.1. Photo documentation

3.1.1.1. Views, lighting

Given the multiple elements that compose a daguerreotype and its housing, a minimum of twenty image views were needed to ensure proper documentation of the object and its condition before, during, and after treatment.

Images full frame
The plates were documented on the recto and on the verso under normal, UVA, and UVC light. Specular lighting was used to document silver tarnish. The housings were documented in normal light on the recto, on the verso, and in an opened position with the blue paper mat face down on the cover glass and then face up on the board. Cockling of the backing paper and soiled glass were documented using raking light. Specular light was used to document interference colors of the glass (see example in Appendix 4).

Image details
The hallmarks were systematically documented in the copy room using a macro lens.
Stereo microscopy was used to document examples of accretions and tarnish spots on the plate, as well as glass deterioration on the cover glass (see example in Appendix 4).

[9] ARP Mellon Fellows Mari Miki, Valentina Branchini, Alejandra Mendoza, and Ania Michas, and graduate Selznick student Inés Toharia, joined the project initiated by Karina Beeman and the author, under the supervision of Grant Romer.

3.1.1.2. File naming

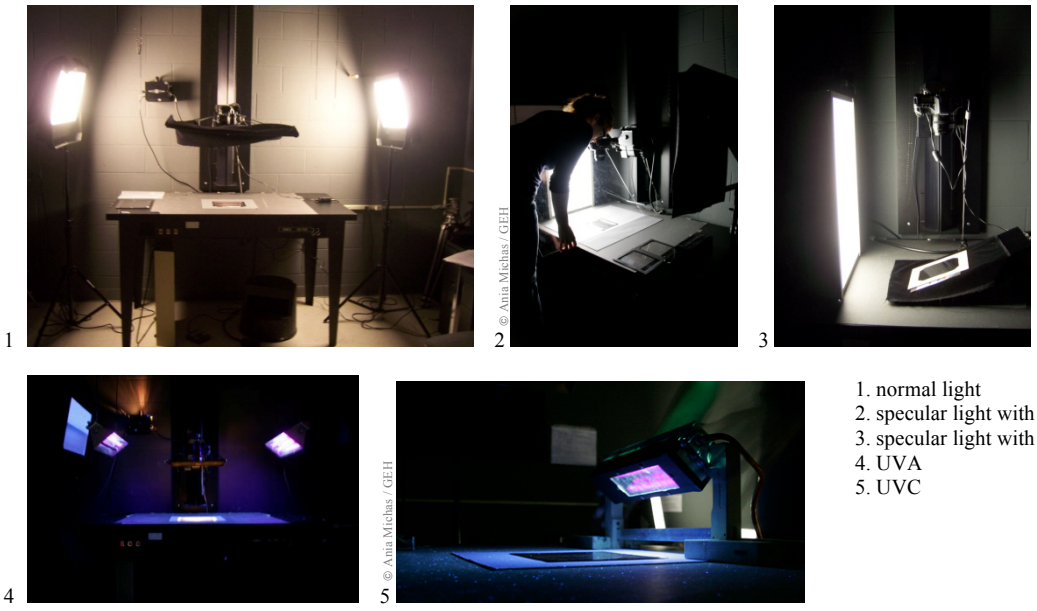
The files were named based on the naming protocol of the GEH conservation laboratory. Each name includes the accession number, the stage of the treatment (before, during and after), the lighting system (normal, specular, raking, UV), and the side (recto/verso) of the object. The specific component imaged (plate, passe-partout or glass) was added to the file name, as well as the descriptor of views " opened" that refer to the view of the inside of the passe-partout.
The file name of the view under microscope (MIC) includes terms for the location, the form of deterioration, and the magnification.

AccessionNo_	BT_	NOR_	PLATE_	R
	DT_	SPE	PP	V
	AT_	RAK	GLASS	OPENED
		UVA		
		UVC		
		MIC		description, magnification, location

Figure 28: File naming

3.1.1.3. Lighting setup

The guidelines specify, for each lighting system, the light source, the position of the object, white balance details, and the exposure. A standard exposure was adopted following the directions of the *AIC Guide to Conservation Documentation (F. Frey et al., 2008)*. The Photographic Reference Plates 2008 for Conservation Documentation was used as a color checker *(D. Kushel et al., 2008)*. Images of the installation of the lighting systems are provided in the guidelines.



1. normal light
2. specular light with plexiglass at 45º
3. specular light with object at 45º
4. UVA
5. UVC

Figure 29: Lighting setup

3.1.1.4. Image management

Format

The image formats were established following the directions of the *AIC Guide to Conservation Documentation (F. Frey et al., 2008)*. Image capture was done in CR2 format, and then replaced by DNG files. Tiff files were created and processed if needed (color balance, cropping). Jpeg files were created to insert visual references in the examination report.

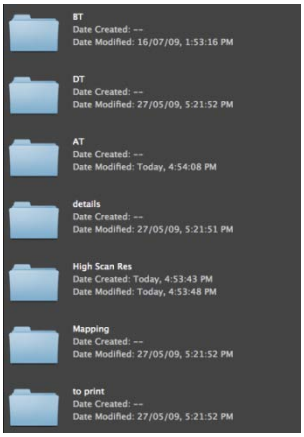
Printing

Contact sheets were created that include the file name as a caption. The size of the images was selected based on a desire to ensure usable records on hardcopy, while taking into consideration the extensive number of images produced during the project. Recto of the plate and passe-partout appear in full page, views under UV in quarter page, details in 1/6 page, and all of the other views in 1/2 page. The contact sheets were printed on Enhanced Epson Matte Paper with the Epson 4880 inkjet printer (see example in Appendix 4).

3.1.1.5. Organizing

The organization of the images was standardized to facilitate the consultation.
A main folder named under the accession number of the object comprises the six following sub-folders:

BT (images full frame before treatment)
DT (images full frame during treatment)
AT (images full frame after treatment)
details (hallmarks and views under microscope)
High Res Scan (High Resolution Scan)
Mapping (scan of the Mylar mapping)
to print (contact sheets)



3.1.2. Template for reports

3.1.2.1. Examination report form

The examination report consists of the three standard sections: Identification, Description, and Condition. In the two last sections, the housing and the plate are independently considered. For the Description section, the key characteristics of the Manila Daguerreotypes were collected and included as check boxes in the report. This system has the advantage of efficiently and uniformly guiding the description. It also gives an understanding of the characteristics of the individual object and the variations within the group.

The condition report of the plate is based on the condition categories established for the documentation of the Southworth and Hawes daguerreotypes for the *Young America* exhibition *(T. Meller, 2005)*. The categories have been organized into three types to facilitate the graphic

representation of deterioration. The surface condition, the physical deterioration, and the chemical deterioration were successively mapped on a Mylar sheet with uniform color code and symbols, and inserted as images in the report (see example in Appendix 4).

Physical deterioration

Chemical deterioration

Figure 30: Graphic representation of deterioration (L2007:0328:0007)

3.1.2.2. Treatment report form

The treatment report lists the main steps of the treatment and details the procedures and the materials used. Evaluation and recommendation for conservation are included. The first treatment reports created were used to guide the conservation treatments of the rest of the objects (see examples in Appendix 4).

The template forms are provided in the Manila electronic documentation in the folder "report forms" found in the general folder "TREATMENT." They were formatted as "stationery pads" so the master template file cannot be changed.[10] Instructions to fill out the forms are provided in the Documentation Guidelines.

3.2. Instructions to secure the plates inside their original housing

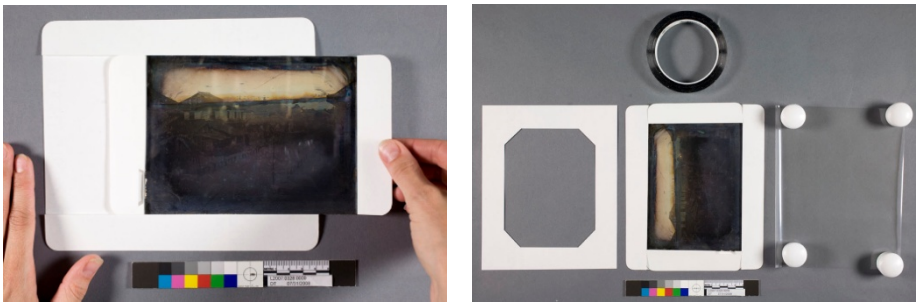
An innovative system to secure the plates inside their housing was developed to meet five criteria:

1. Using chemically inert conservation materials.
2. Securing the plate in the inside and isolating the plate from the board and the exterior atmosphere.
3. Respecting the original appearance of the object, including thickness and profile.
4. Ensuring that the treatment be easily reversible.
5. Ensuring that the treatment be easily reproducible.

[10] To create a stationery pad, go to File > read the information and check the box "Stationery pad" (on a Mac computer). The file can be modified by unchecking the box.

3.2.1. Design and materials

The plate was placed in a paper holder created in nonbuffered paper (Renaissance 3136, ca.150 gsm). The holder consists of two Z trays, so that the plate can be easily inserted in one tray and slide into the other. Paper was chosen to ensure good handling propriety, to be commensurate with the original materials, and to act as a buffer in case of variation of humidity inside the package. The external dimension of the holder corresponds to the dimension of the cover glass. On the top of the holder, an interleaving paper window mat isolates the plate from the painting material of the cover glass. On the back, a transparent barrier film (Escal™ Ceramic Barrier Film) isolates the plate from the original poor quality backing board. The package cover glass/paper mat/plate in holder and barrier film is then bound with the 3M™850 Polyester Silver Tape. This tape was selected for its thinness, good handling property, and relatively good sealing property. The binding was performed in a work space maintained at 35 % RH, and two layers of tape were applied to increase the seal of the package.



L2007:0328:0009

L2007:0328:0005

Figure 31: Materials and procedure to secure the plate inside their original housing

3.2.2. Procedure

A. Fabrication of the holder

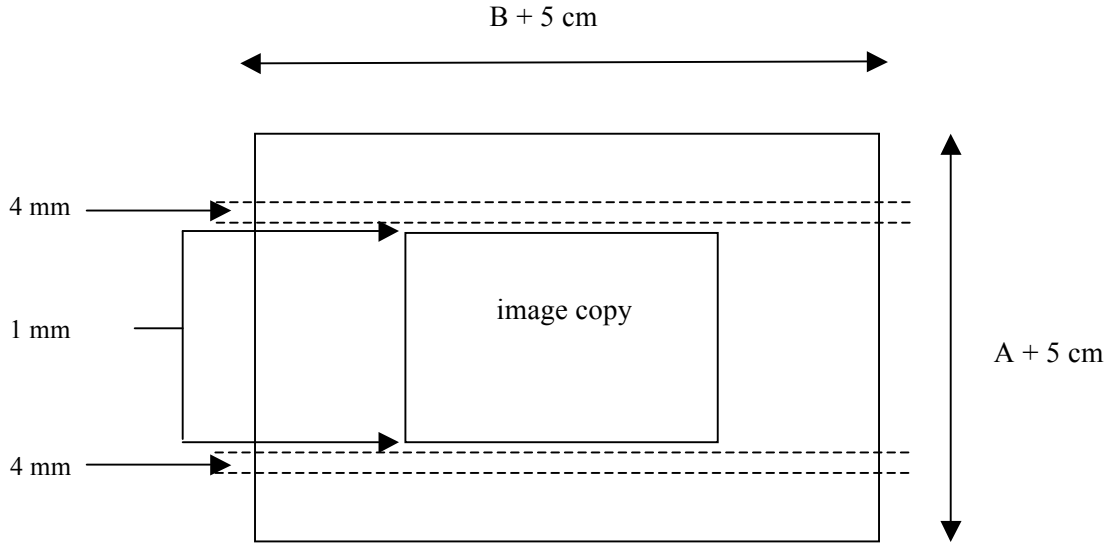
- Prepare a sheet of paper to the dimensions of the cover glass + 5 cm (tray 1). Prepare another sheet of paper that is the height of the plate +1.5 mm and the width of the cover glass + 5 cm (tray 2).
- Create the trays following the instructions in Diagram 1 below.
- Place an image of the plate printed out to its exact dimensions inside the holder, with the original cover glass and mat on the top of it. Adjust the position of the window opening and mark the edges of the cover glass on the holder. Cut the edges of the holder 2 mm on the inside of the marks.

Diagram 1: Fabrication of the holder to secure the plate inside the housing

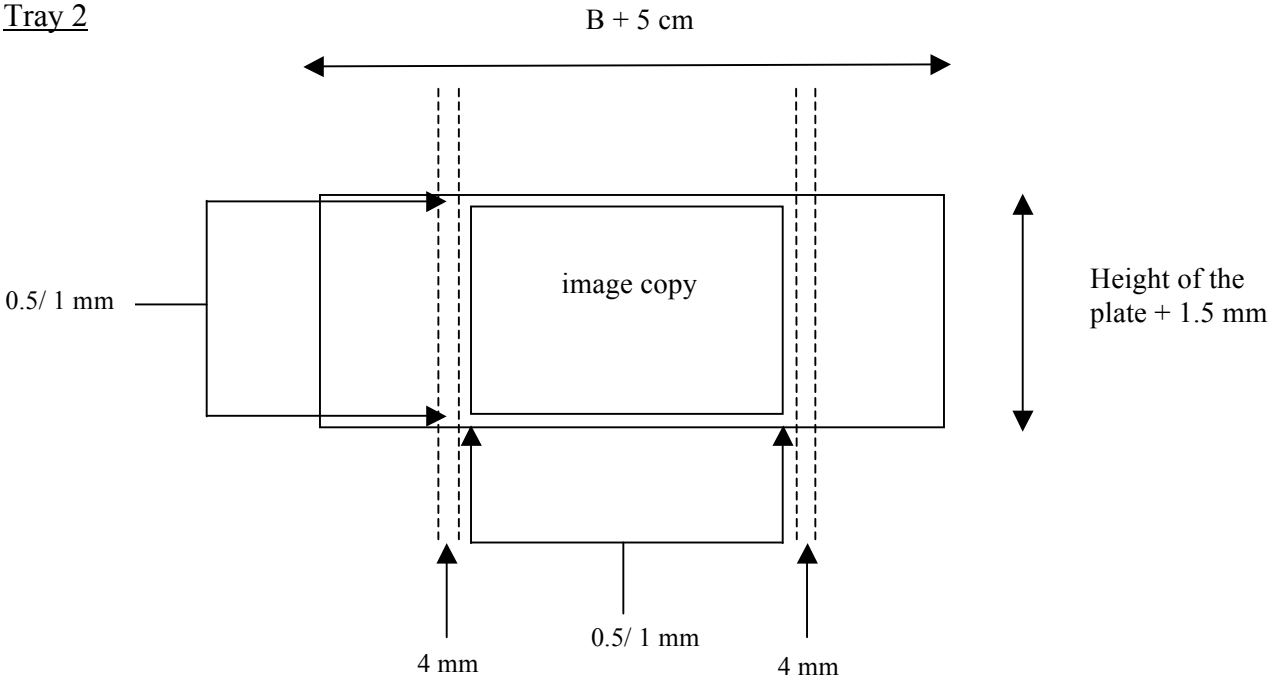
A: height of the cover glass
B: width of the cover glass

---- fold

Tray 1



Tray 2



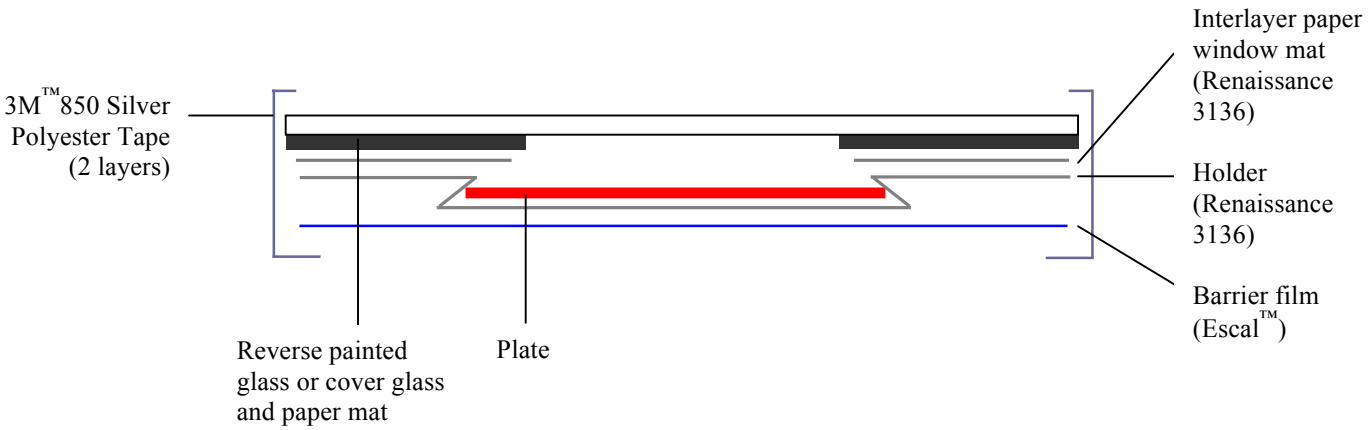
B. Fabrication of the window paper mat and barrier film

- Create a window paper mat slightly smaller than the cover glass (- 5 mm) with an opening window slightly larger than the original (+ 5 mm).
- Cut a piece of barrier film slightly smaller than the cover glass (- 5 mm).

C. Assembling and sealing (see Figure 31)

- Assemble cover glass and interlayer paper mat using small tabs of Filmoplast® P-90 on the edges to avoid shifting. Attach the plate in the holder using small tabs of Filmoplast® P-90 on the edges to avoid shifting. Attach the barrier film on the back with small tabs of 3M™850 Silver Polyethylene Tape on the edges. Ensure that the barrier film is taut, with no wrinkles or bulges. Place clamps on the edges to secure the package.
- Bind the package on the perimeter with one continuous strip of 3M™850 Polyester Silver Tape. Repeat the operation going in the opposite direction.

Diagram 2: Securing system of the plate



NB: An example of the securing system is included in the didactic box of the Manila Project.

L2007:0328:0009

Figure 32: Securing package

3.3. Instructions to reproduce the lines of reverse painted cover glass

Two techniques were developed to reconstruct the broken or missing reverse painted glass of the Manila Daguerreotypes. One features reproducing gold lines by applying gold leaf to glass, and the other involves reproducing gold lines through applying paint to paper.

3.3.1. Reconstruction of reverse painted cover glass with gold lines made of gold leaf

3.3.1.1. Design and materials

The gold lines of the original painted glass of the Manila Daguerreotypes show high reflectivity with a mirroring effect, which is characteristic of gold lines made of gold leaf. The design consists of three gold lines and a thin black line following the shape of an octagonal window opening. One broken painted glass was of this kind, and we knew that the two missing cover glasses were very likely to have been made the same way (see part I paragraph 4.2.2). As the gold lines of the original passe-partouts of the Manila Daguerreotypes strongly affect the aesthetic of the objects, it was decided to reproduce them with the same design and the same material. This endeavor was challenging, as no conservation technique was known. After various experiments, a technique from sign painting on glass was adopted.

L2007:0328:0014

Figure 33: Gold lines of the original passe-partouts

Borosilicate glass was used as cover glass since its stability is estimated to be twice as good as that of soda-lime glass[11]. The background was created in cardboard rather than paint in order to distinguish the reconstructed cover glass from the originals.

3.3.1.2. Materials and procedure

General procedure

A wide strip of gold leaf is first applied on the reverse side of the glass over a water gelatin size on the area where the lines will be applied. When the gelatin is dry, the lines are silkscreened over the gold with a varnish insoluble in water. After drying, the excess gold is brushed away with a

[11] Information based on the comparison of the stability of soda-lime glass and borosilicate used to conduct the Photography Activity Test. Personal communication with Doug Nishimura (Senior Research Scientist, Image Permanence Institute).

slightly dampened cotton swab. At this point, only the gold material located underneath the varnish remains. When looking at the other side, the gold lines follow exactly the shape of the varnish. The plate is then allowed to dry fully ink face up. [12]
As the screen pattern was slightly visible, the borders of the lines were trimmed to achieve sharp edges. As a last step, the gap between the two internal gold lines was filled with a mixture of Aquazol® 500 at 20% in water and black pigment to create the black line. The white or pink background was created by tinting a 2-ply nonbuffered conservation mat board to the color of the original paint.

Step-by-step instruction: Making gold lines made of gold leaf

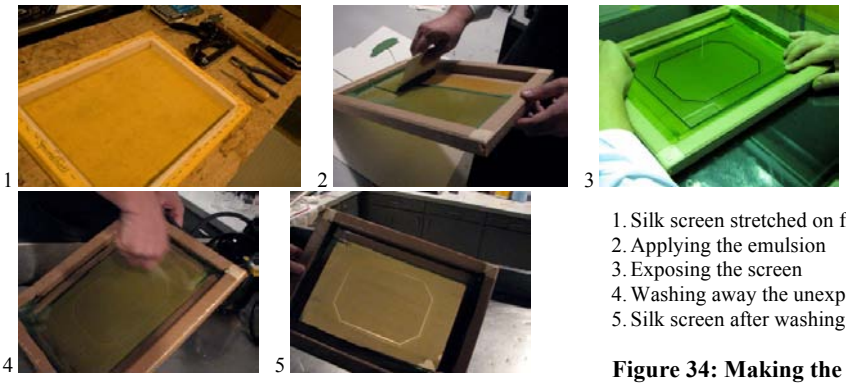
A. Fabrication of the silk screen

Materials:

Transparency with the design of the lines (300 dpi file printed on "hp laser monochrome transparencies" with HP color LazerJet 2600n)
Finest polyester silkscreen (355, ref: 350 MPC40), The Art Store, Rochester, NY
Staple gun
Silk screen frame
Diazo photo emulsion and sensitizer
UV light
Gummed paper tape, 2" width

Procedure:

- Stretch the screen while stapling the edges behind the frame. Maximum tension is required. Proceed from the center to the corners, working alternatively on two opposite sides.
- In a dimly lit area, spread the emulsion on one side using small pieces of boards. Only a thin film covering the screen should remain. Repeat the operation on the other side.
- Let the emulsion dry for a couple of hours in the dark.
- Expose the screen to UV light for one minute under the transparency. To ensure good contact of the transparency with the screen, sandwich the screen and the transparency between two pieces of heavy glass.
- Wash away the unexposed area with a stream of warm water. Check to make sure that the lines are clear. Use a soft brush to remove residues of emulsion, if any.
- Let the screen dry for a couple of hours.
- Cover the edges on both sides with gummed paper tape.



1. Silk screen stretched on frame and material needed
2. Applying the emulsion
3. Exposing the screen
4. Washing away the unexposed areas
5. Silk screen after washing

Figure 34: Making the silkscreen

[12] See complete treatment report of the daguerreotype L2007:0328:0005 in Appendix 4 for more details.

B. Glass gilding

Materials:

Borosilicate glass (Borofloat™), 2 mm, Swift Glass Co., NY
Gelatin capsule for gilding, Rochester Art Supply, NY
Gold Leaf 23K Giusto Manetti, Rochester Art Supply, NY
Gilder's tip (flat brush of squirrel hair design for gilding)
Large soft flat brush (to apply the gelatin)
Chamois

Procedure:

- Clean the glass with a mixture of water/ethanol (1:1).
- Dissolve one capsule of gelatin in 500 ml of water.
- Apply the water size on 10-15 cm of the area to be gilded.
- Pick up the strip of gold leaf with the gilder's tip and lay it on the wet glass. Proceed section by section until the entire area of the design is covered with gold.
- Allow the water size to dry (30 min).
- Lightly wipe off the gold that doesn't adhere to the glass with the chamois.
- Compensate the losses in gold with small pieces of gold leaf over water size.

Figure 35: Glass gilding

C. Silk screening

Materials:

Silk screen hinged to plywood base
Masking tape, 2" width
Rubber squeegee wider than the design
Gilder Specialty Products Back Up Black by Sepp Leaf Products, Rochester Art Supplies
Turpentine
Wiping cloth, lint-free
Plastic gloves

Procedure:

- Set up the equipment in a well-ventilated area.
- Cover the edges of the silkscreen with masking tape.
- Center the gilt glass underneath the silkscreen, gold face up. Maintain it with tabs of tape.
- Lay down the silkscreen against the gilt glass. Ensure that there is a good contact between them.
- Pour some ink on the top end of the silkscreen.

- Spread the ink from the top to the bottom with the squeegee, using a steady pressure and speed.
- Gather the excess of ink with the squeegee and put it back in the paint pot.
- Lift the screen, remove the gilt glass with the varnished lines, and let the varnish dry for 2-3 hours.
- Clean the screen with wiping cloth and turpentine.

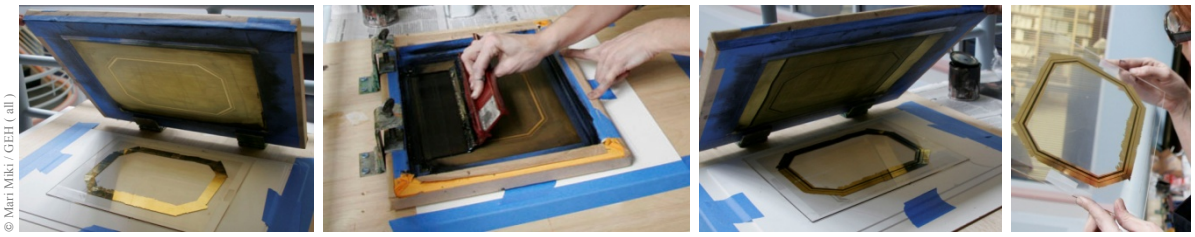


Figure 36: Silk screening

D. Removing the excess of gold and finishing

Materials:

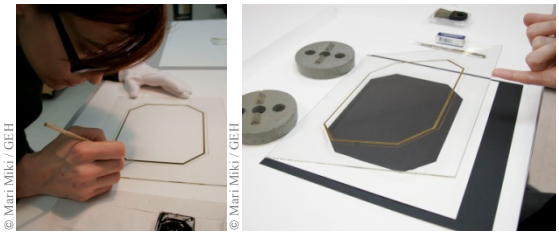
Cotton swab
Calcium carbonate powder
Water
Scalpel
Flat metal ruler

Procedure:

- Put a few drops of water and some calcium carbonate powder on the glass, in the middle area.
- Slightly moisten the cotton swab with the mixture of water and calcium carbonate.
- Lightly wipe off the area covered with gold and varnish. The varnish remains when the uncovered gold is brushed away.
- The edges of the lines can be made sharper and thinner by trimming the borders with a scalpel.

For additional information, the reader can refer to the video of the procedure available in the didactic box of the Manila Project.

Figure 37: Wiping away the excess gold and trimming



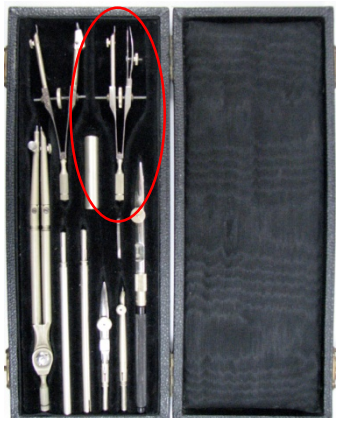
Making the black line and background

L2007:0328:0005

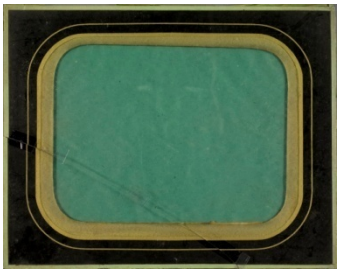
Figure 38: Passe-partout with reconstructed cover glass

3.3.2. Reconstruction of reverse painted glass with gold lines made of brass powder

A painted glass with a rounded rectangle window opening was broken. It showed two decorative lines following the shape of the window opening. The gold lines presented a mat surface, characteristic of gold lines made of paint with brass powder. To reconstruct the mat, paper was used, on the top of which the gold lines were drawn. A ruling pen on compass, found in vintage drafting sets, was used to reproduce the lines in a way to ensure that they will be exactly parallel. The reservoir of the ruling pen was filled with a mixture of Aquazol® 500 at 2% in water and Mica Brass powder. The first line was drawn around a mat board pattern made to the shape of the window opening. To create the second line, the compass was opened to the distance that separates the two lines and the operation was repeated.



Ruling pen on compass



Original broken painted cover glass

Reconstructed cover glass with paper mat
(L2007:0328:0011)

Figure 39: Reconstruction of reverse painted cover glass with gold lines made of brass powder

III. SYNTHESIS OF THE CONSERVATION INTERVENTIONS PERFORMED

This part of the report presents an overview of the interventions performed during the project. Detailed documentation is provided in the Appendices or included in the treatment reports *(C. Barcella et al., 2009)*. The reader is invited to refer to these documents for additional information.

1. Documentation

In addition to the primary documentation described in the Guidelines for Documentation (chapter II paragraph 3.1), FTIR and XRF analyses were conducted to identify various component materials of the housings and the plate, and infrared imaging was used to examine two boards with unreadable inscriptions. Furthermore, the plates were scanned at high resolution in order to capture fine details in the image.

1.1. FTIR

FTIR analyses were performed at Buffalo State College by Gregory Dale Smith (assistant professor of Conservation Science). A sample of adhesive material used to attach the plates was analyzed, as was a sample of white and black painting material from the reverse painted cover glass. The spectra are provided in Appendix 5 along with the correspondence related to the interpretation of the results.

The results established that the material used to attach the plate to the housing was beeswax. The white painted material was identified as calcium carbonate. Although the presence of a binder was expected, thorough analyses couldn't reveal any trace of binder material. The black painted material was identified as asphaltum, which corroborates the results of a previous study on reverse painted cover glass *(Grinde, 2005, p. 36)*.

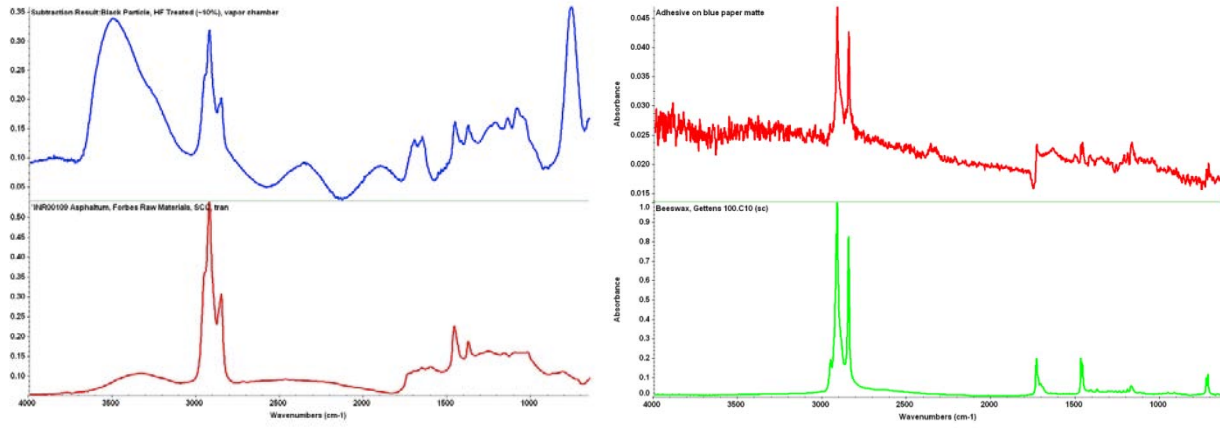
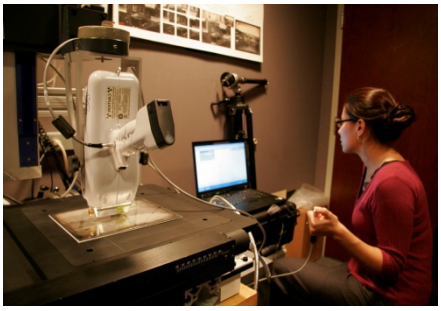


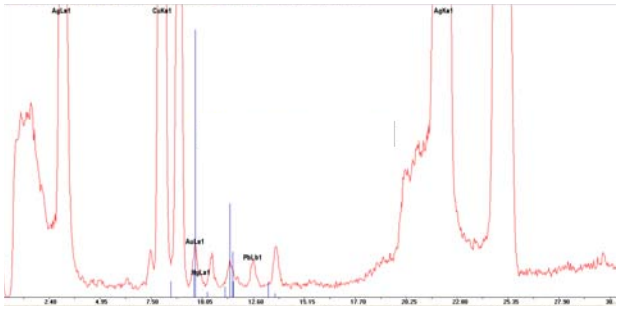
Figure 40: FTIR analyses of adhesive and black paint

1.2. XRF

XRF analyses were performed at the GEH Conservation Laboratory using the hand-held TRACer III-IV Energy Dispersive X-Ray Fluorescence (XRF). The decorative lines of the painted cover glasses and a daguerreotype plate were analyzed. Spectra and interpretation are available in Appendix 6.[13]



Instrument setup



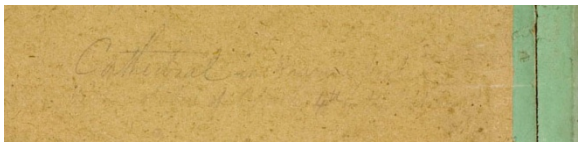
XRF spectrum in Dmax showing the reference peaks of gold (blue lines)

Figure 41: XRF of a daguerreotype plate (L2007:0328:0005)

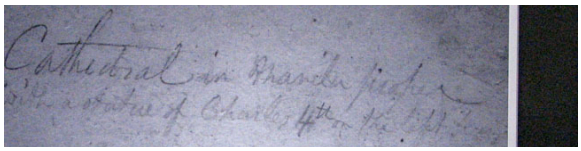
The results indicate that the gold lines with high reflectivity are made of gold, whereas the gold lines with a matte surface contain brass powder. XRF of the recto of the plate shows the presence of gold, confirming that the plate was gilded in the post-imaging process. On the verso, an area that fluoresces under UVC was compared with a nonfluorescent area. As expected, no difference was noticed, as the fluorescent material is likely to be a cyanide compound, undetectable by the instrument *(C. Buzit Tragni, 2005; L.A. Daffner et al., 1996)*.

1.3. Infrared examination

Two boards with unreadable or partially readable pencil inscriptions were brought to the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology (RIT) to be examined under Infrared light by Roger Easton, professor in Optical Sciences.



View of the inscription under normal light



View of the inscription under infrared light

Figure 42: Infra Red examination of a board with unreadable pencil inscription (L2007:0328:0014)

[13] The Appendix includes the XRF reports as well as a poster prepared for the XVIII International Materials Research Congress presenting the work on the Manila Daguerreotypes.

The examination revealed the entire inscription on the board L200703280014: “Cathedral in Manila [proper] with a statue of Charles 4th on the left [hand],” which was previously entitled: “Cathedral in Manila …Taken on April 4th…”.
The unreadable inscription on the board L200703280004 couldn’t be revealed, possibly due to interference from components in the blue paper upon which the inscription was written.

1.4. High resolution scanning of the plate

Most of the plates benefited from a high resolution scanning performed at the GEH conservation laboratory following the procedure developed by Patrick Ravines (Senior Research Project Manager) and Ralph Wiegandt (ARP Assistant Director for Conservation Education).
An Epson 10000 scanner was inverted and mounted about 20 cm above the work surface. The glass of the scanner was removed to reduce interference and allow noncontact precise positioning of the daguerreotype at the imaging plane. The plate was pre-positioned at the imaging plane, supported on an adjustable scissors jack according to a calibration scale, and then focused precisely through the scanner software.
The plates were scanned at 1600 dpi. Color adjustment was made on a duplicated file. Both master file and histogram leveled files were kept in TIFF format, and a Jpeg file format was created for access.
The image files created by this means allow viewing of fine details, which is of particular interest for the Manila Daguerreotypes that show outdoor views that reveal significant historically relevant image detail.

L2007:0328:0017

Detail enlarged from tiff file created with Camera EOS 5D

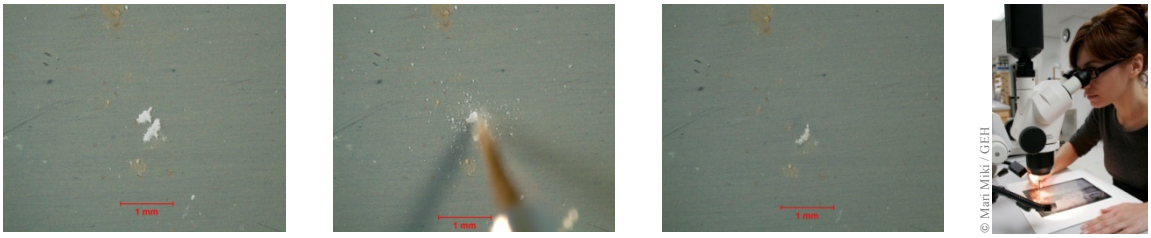
Detail enlarged from tiff file created with Epson 10000 scanner (1600 dpi)

Figure 43: High resolution scanning of the daguerreotype plates

2. Curative Conservation

2.1. The plates

Dry surface cleaning
The plates were dusted with blown air using a rubber bulb to remove loose accretions. The most significant accretions still adhering to the surface were partially or totally removed with the brush Isabey Repique Kolinsky (6229) size 0 under stereomicroscope. Intervention in the highlights of the image was minimal, as the risk of micro abrasion is high. Brush strokes always followed the direction of the polishing lines.



Before drycleaning After drycleaning

Figure 44: Mechanical removal of adhered accretion

Consolidating
The major exfoliations of the plate L2007:0328:0015 were consolidated under the stereo microscope by applying 10% Paraloid B-72 in toluene beneath the raised silver flakes with a brush modified to retain a single hair. Materials and detailed procedure are described by the ARP Mellon Fellow Ania Michas in the associated treatment report.

2.2. The housings

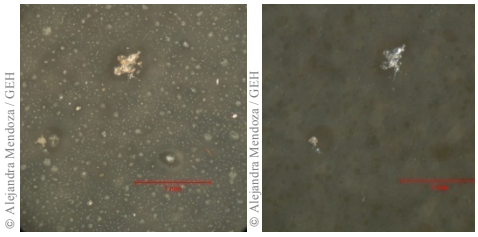
2.2.1. Reverse painted cover glasses

Surface cleaning
The cover glasses were cleaned with a 1:1 distilled water:alcohol solution applied with cotton swabs. This process efficiently removed the soil and the glass deterioration products. Interference colors remained, as well as slight hazing. Attempts to clean the interference colors were made using distilled water, distilled warm water, distilled water mixed with calcium carbonate powder or cerium oxide powder, and slightly acetic solution followed by rinsing. None of these treatments were successful. As confirmed by Stephen Koob (glass conservator at the Corning Museum of Glass), interference colors are irreversible glass deterioration. As the reverse painted cover glasses are fundamental parts of the objects, and since the deterioration does not disturb the viewing of the plate, the decision was made to reuse the original cover glasses. The control of the environment inside the package (provided by the re-made housing, appropriate enclosure, and proper environment in the storage area) will prevent any further degradation.

Removal of the sealing tapes
The original sealing tapes adhering to the front of the cover glasses were removed with the application of blotter strips dampened with water to soften the adhesive and then lifted off with a scalpel blade. The tapes were then washed in cold distilled water and flattened.

Consolidation of the powdery surface of the paint
The powdery surface of the white and pink paint was consolidated by spraying several layers of Lascaux® Fixativ 2070 in spray (2% Paraloid B-72 in xylene/isopropanol); the window opening was masked off. Consolidation was successful and neither color shift nor tide lines were observed.

Painted cover glass before and after treatment (L2007:0328:0006)



Glass detail before and after cleaning
(L2007:0328:0010)

Figure 45: Cleaning and compensation for loss of the painted cover glasses

Compensation for loss in the reverse painting on glass
The losses in the paint were compensated with a mixture of pigments and Aquazol® 500 applied very dry. Several tests were conducted to select a binder. Aquazol® was preferred over Methylcellulose or Paraloid B-72 for its fluidity, transparency, and handling properties. A mixture at 2 % of Aquazol® 500 and pigments produced an infilling material with good cohesion after drying, while remaining softer than the original material. This allows for removing the compensation by gentle mechanical action. Ethanol and water were used as solvents. It appears that water, which has a higher surface tension, prevents diffusion of the solvent into the original paint after the application of the infilling.

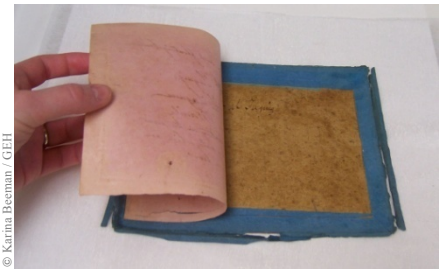
Reconstruction
Two broken reverse painted cover glasses and two missing cover glasses were reconstructed, either with gold lines made of gold leaf on glass with a board serving as background, or with painted gold lines on a paper window mat. The materials and procedures are described in the chapter II paragraph 3.2.

2.2.2. Backing board

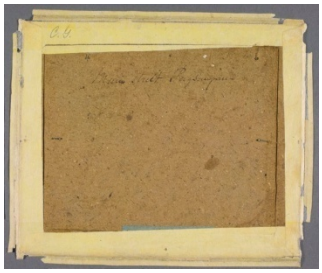
Surface cleaning and treatment of the backing paper
The board was dry cleaned with Staedtler® eraser crumbs followed by a Staedtler® eraser block. The backing papers were detached in order to be cleaned and consolidated, and to attach the new sealing tape beneath, as the original tape was. The backing paper removal was performed using slow humidification through a felted Gore-Tex™ membrane. The detached paper was washed in cold distilled water, and lined with a thin Japanese conservation tissue (7.5 gsm) and diluted wheat starch paste.

Lining

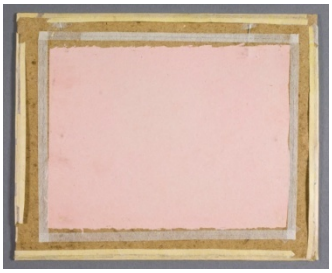
On the external side of the board, the original tape was lined with thin Japanese tissue to preclude direct contact with the new tape. The strips of paper sealing tape removed from the cover glass were infilled on the Japanese tissue. On the internal side, the access door was secured along the edges with strips of Japanese tissue, and the pinpoints were covered as well. The paper tape was folded over in the inside and maintained in place with dots of adhesive. Klucel® G was used as adhesive, so future removal will not require aqueous treatment.



Removing the backing paper
(L2007:0328:0003)



After lining and infilling
(L2007:0328:0009)



Internal side with original paper tape folded over

Figure 46: Treatment of the backing board

2.3. Reassembling of the plate in its original housing

2.3.1. Securing system of the plate

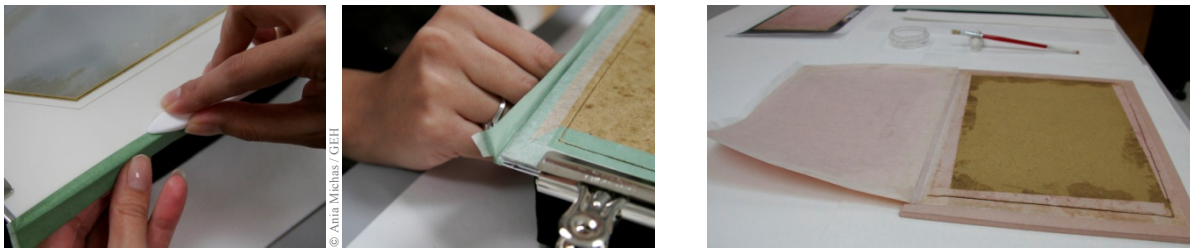
Two methods were used to secure the plate inside the housing. The method used in most cases is described in chapter II paragraph 3.1. Six plates were secured using a second method developed by the ARP Mellon Fellow Karina Beeman.[14] The plate is placed in a polyester Z tray, which is attached to a narrow sink made of board. The sink is attached to a board window mat that serves as a separator between the reverse painted glass and the plate. Further description of this method is given in the report L2007:0328:0003.

2.3.2. Reassembling of the board

The package containing the plate and the cover glass was attached to the board with strips of Filmoplast® P-90 tinted to the color of the original tape. The backing paper was reattached using a floating technique. Four hinges folded over on the inside underneath the paper were pasted to the board with Klucel® G 8% in ethanol. This method allows for easy removal if needed. In most cases, the blue interlayer paper and the residues of original sealing tape were placed inside the package.

The bent plate L2007:0328:0014 was flattened by pressure using two thin hard boards bound to the glass (see the associated treatment report).

[14] L2007:0328:0001, L2007:0328:0002, L2007:0328:0003, L2007:0328:0004, L2007:0328:00012, L2007:0328:0018.



Bounding (L2007:0328:0010) Attaching the backing paper (L2007:0328:0006)

Figure 47: Reassembling of the board

3. Preventive Conservation

Several enclosure systems were developed to temporarily protect the objects and for permanent storage.

3.1. Temporary enclosure systems

Emergency measures
When the objects were discovered, they were stored vertically in a cardboard box. Several of the plates were separated from their housing (see Figure 4). To provide a more secure temporary environment, the objects were protected in individual 4-flap enclosure and stored flat in cardboard boxes. The bare plates had previously been placed in customized paper trays by ARP Mellon Fellows Luisa Casella and Rosina Herrera to preclude contact of the enclosure with the surface.[15]

Housing for transportation and temporary storage of bare plate
Before transportation to the GEH, the plates and their housing were secured in customized temporary housings described by ARP Mellon Fellows Rosina Herrera and Karina Beeman and Ralph Wiegandt. The plates were placed in a housing with sheets of PETG plastic on both sides forming a tray and a lid. The edges consisted of strips of Volara® foam adhered to the tray with double coated tape. Spacers of Volara® were attached similarly to the lid.[16]

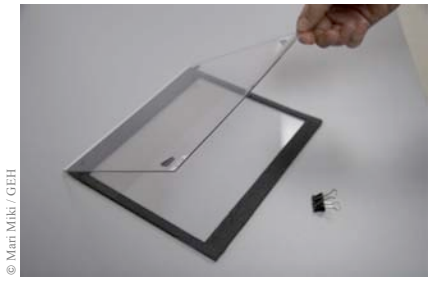


Figure 47: Temporary secondary housing

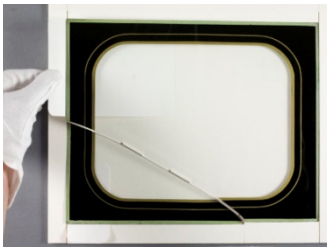
These housings also served as temporary housing for storage of the plates during treatment at GEH. For greater convenience, the tray and the lid were hinged, and a Mylar® strip was placed beneath the plate to facilitate its removal. The transparency of the design allowed us to conduct most of the examination without removing the plate from the housing, keeping handling to a minimum. The plates in their temporary housings were placed in zip-lock bags to maintain a constant humidity level. Climate at the GEH photograph laboratory is maintained at 40% HR (+/- 10% per 24h) and 70 ºF (+/- 5 ºF per 24h).

[15] See Appendix 1.
[16] The design and fabrication of the temporary housing for transportation of the bare plates are described in "Travel Housing for Bare Plate Daguerreotype" by Ralph Wiegandt, Rosina Herrera and Karina Beeman *(R. Wiegandt et al., 2009)*.

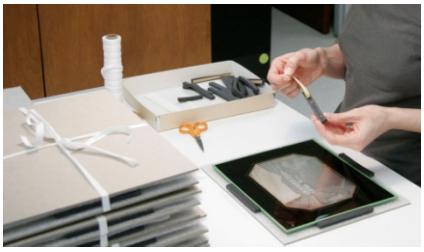
3.2. Housings for broken painted cover glass

Classic housing
The broken painted glass of the daguerreotype L2007:0328:0011 was cleaned on the external face and partially cleaned on the internal face. Examples of fibrous accretions were preserved, so analyses could be performed in the future to determine the nature of these accretions also found on the plates, which are likely to be mold (chapter I paragraph 5.3).
The broken painted glass was secured in a housing made of 4-ply conservation board. Small strips of boards separate the two pieces of glass to prevent direct contact. A lifter strip was placed beneath the pieces to facilitate their removal. Materials used are listed in the associated treatment report.

Transparent housing
The broken painted glass L2007:0328:0017 was purposely not cleaned to retain an example of the original condition of the objects before treatment. It was secured in a transparent housing that allows examination of the entire object from the recto and the verso. The design was developed by ARP Mellon Fellow Mari Miki. Further information can be found in the associated treatment report.


Classic (L2007:0328:0011)


Transparent (L2007:0328:0017)



Making housings for transportation

Figure 48: Secondary housings for broken painted cover glass and transportation

3.3. Housing for transportation

After being treated, the daguerreotypes were secured in individual secondary housings before being transported to the Hispanic Society. The design of the housing was developed to meet the criteria of efficacy, low cost, and fabrication efficiency. Two sheets of nonacidic Bookbinder board served as the top and bottom of the housing. Sheets of 2 mm polyethylene foam were attached to one side of each board using a hot melt glue gun to provide padding on the inside. Strips of Volara® foam adhered with double coated 3M™415 tape served as edges. Each daguerreotype was previously wrapped in photo-tissue, and the package was secured with a cotton string tie. Solid plastic boxes and bubble wrap were used for packing.

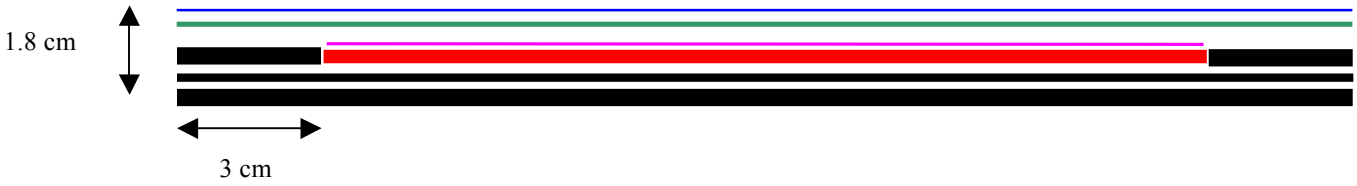
3.4. Permanent secondary housing for the daguerreotypes and storage area

The design of the secondary housing for the daguerreotypes was developed at GEH and fabricated at the HSA by their staff bookbinder. The materials and design were chosen to ensure maximal physical and chemical protection of the object. Each daguerreotype is protected in an individual clamshell box that is six centimeters larger than the object (internal dimension). The box is made of acid-free material and contains a sink made of Volara® foam that retains the daguerreotype.

Notches cut into the Volara® allow for fingers to grip and extract the object. The box includes a sheet of Art-Sorb® and a 4-ply MicroChamber® board to buffer humidity fluctuation and absorb pollutants (see Diagram 3). After consultation with Patrick Lenaghan, curator of the Hispanic Society of America, it was decided to store the boxes in flat cabinet files, located in a controlled climate area.

Diagram 3: Interior structure of the box containing the daguerreotypes

Type 1



Volara® ¼" (6.5mm)
Volara® 1/8" (3mm)
Daguerreotype
Archival paper (120gsm)
MicroChamber® board 4 ply
Art-Sorb®

Type 2 (higher daguerreotypes)

Figure 49: Secondary housing for permanent storage (L2007:0328:0010) and storage cabinet

Conclusion

The rich environment at GEH and collaborative institutions (RIT, Buffalo State College Conservation Department) allowed many individuals with great expertise to contribute to the conservation of the Manila Daguerreotypes, making the completion of the project possible. This report, along with a didactic box and a videotaped demonstration of the reconstruction of decorative lines of the passe-partout, is intended to share and make accessible the various achievements and techniques developed during the course of the project.

The Conservation Project of the Manila Daguerreotypes allowed me to develop my skills in examination and condition reporting, imaging, and problem solving. I learned a lot from dealing with technical and ethical issues related to the reconstruction of some of the original materials, such as reverse painted cover glasses. Also, being in charge of the project constituted a positive learning experience in team coordination.

The numerous illustrations included in this report cannot substitute for the real experience of seeing a daguerreotype, so I invite the reader to visit the Hispanic Society of America and enjoy the magical experience of being transported to Manila and its surroundings, back in the middle of the 19th century, through images formed on silver polished plates protected and enhanced by delicate housings.

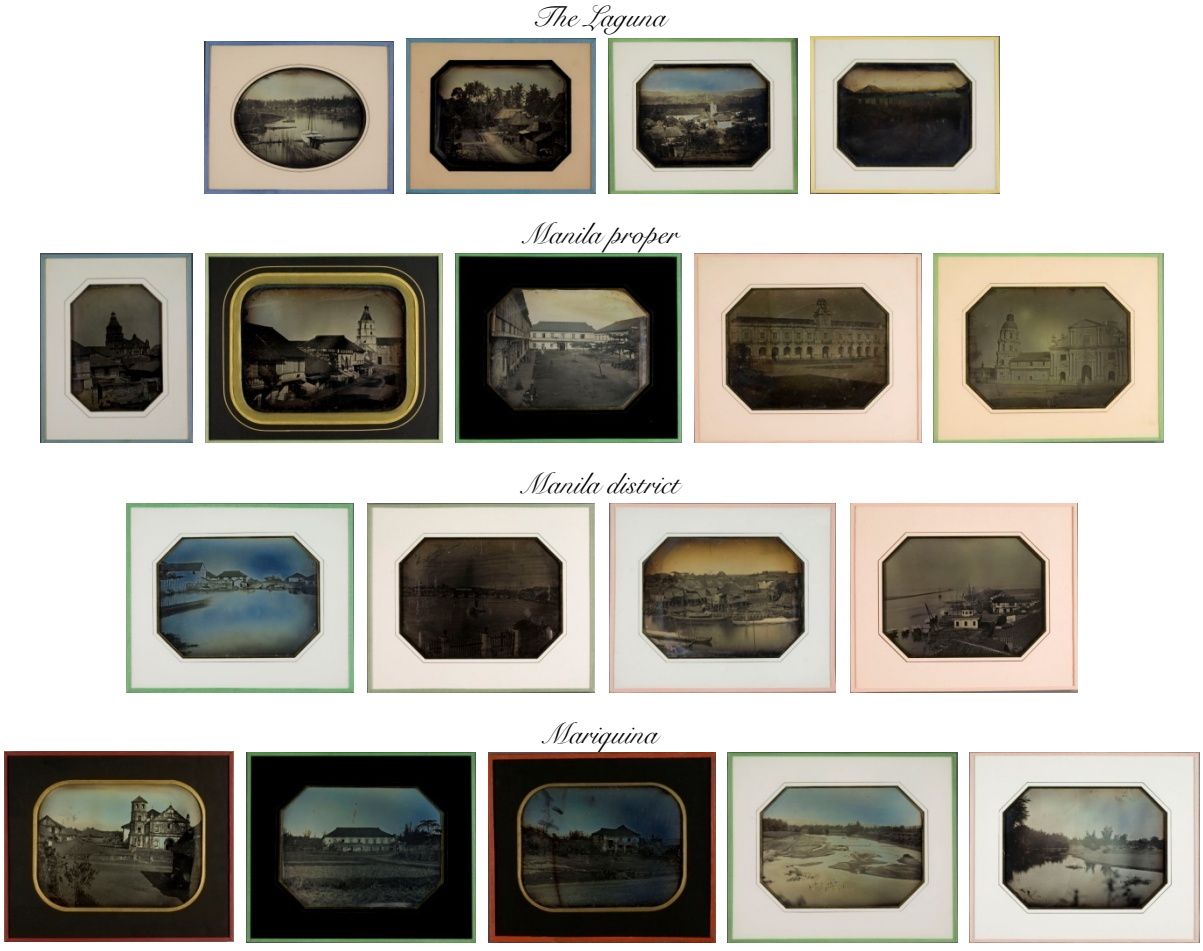


Figure 50: The Manila Daguerreotypes after treatment

References

BARGER Susan, WHITE William, *The daguerreotype: Nineteenth-century technology and modern science*, Smithsonian Institution Press, Washington, 1991.

BUERGER Janet, *French Daguerreotypes*, University of Chicago Press, Chicago, 1989.

CARTIER-BRESSON Anne, "La conservation des daguerréotypes: Un examen de quelques problèmes et leurs solutions historiques," in Paris et le Daguerreotype, musee Carnavalet October 31, 1989 - February 28, 1990, Paris-Musée, Paris, 1989, pp. 60-69

CENTENO Silvia, MELLER Taina, KENNEDY Nora, WYPYSKI Mark, "The daguerreotype surface as a SERS substrate: characterization of image deterioration in plates from the 19th century studio of Southworth & Hawes" in *Journal of Raman spectroscopy 39,* no. 7, 2008, pp. 914-921

COLBOURNE Jane, "A Survey of Methods used in technical examination and analysis of brown inks" in *The Iron Gall Ink Meeting 2000 postprints*, The University of Northumbria, 2000, pp. 37-45.

DAFFNER Lee Ann, KUSHEL Dan, MESSINGER John, "Investigation of a Surface Tarnish Found on 19th Century Daguerreotypes" in *Journal of the American Institute for Conservation 35*, pp. 9-21.

FRESE Robert, "Laying Gold Leaf on Glass", *SignCraft Magazine*, July/August 1995. pp.96-99. http://www.chicagoldsigns.com/images/1995_signcraft_goldleaf.pdf

FREY Franziska et al., WARDA Jeffrey (editor) *The AIC Guide to Digital Photography and Conservation Documentation*, Washington, D.C. : American Institute for Conservation of Historic and Artistic Works, 2008.

PHOTOGRAPHIC MATERIALS GROUP of the American Institute for Conservation of Historic and Artistic Works, "Cased Photographs" in *Photographic materials conservation catalog - Chapter 2,* AIC/ PMG, Washington, D.C., 1998, pp.21-28.

REYNAUD Françoise, "Le Daguerréotype comme object", *in Le daguerreotype français. Un object photographique*, catalogue d'exposition (musée d'Orsay, MET), Réunion des Musées Nationaux, Paris, 2003, pp. 87-101.

RINHART Floyd and Marion. "A tabulation of Hallmarks found on extant daguerreotypes, in The American Daguerreotype, Athens, Georgia, 1981, Appendix 1 pp. 423-425.

DU VERNAY J-D, "Statistique de la photographie", in *La Lumière 2ème année*, 18 septembre – 11 décembre 1852.

WIEGANDT Ralph, MELLER Taina, "Advances in Daguerreotype Conservation: The Conservation Program for the Exhibition Young America: The Daguerreotypes of Southworth and Hawes", *Topics in Photographic Preservation*, Vol. 12, 2007, pp. 37-46.

SWAN Alice, FIORI C.E. and HEINRICH K.F.J, "Daguerroeotypes: a study of the plates and the process", Scanning electron microscopy 1, 1979, pp. 411-423.

Online resources:

KUSHEL Dan, CHEN Jiuan-Jiuan, and CASELLA Luisa, *A Photographic Reference Plate for Conservation Documentation*, 2008.
http://206.180.235.133/sg/pmg/images/photoreference_plate_instructions.pdf

MURATA Hanako, *Investigation of historical and modern conservation daguerreotype housings*, 2d Cycle Advanced Residency Program in Photograph Conservation, on line publication, 2003. http://www.arp-geh.org/indexsep.aspx?nodeidp=185

GRINDE Lene, *Conservation of Stereo Daguerreotypes*, 3rd Cycle Advanced Residency Program in Photograph Conservation, on line publication, 2005.
http://www.arp-geh.org/indexsep.aspx?nodeidp=199

Unpublished documents:
Documents consulted at the George Eastman House Conservation library.

BARCELLA Caroline, BEEMAN Karina, MIKI Mari, BRANCHINI Valentina, MENDOZA Alejandra, MICHIA Ania, TOHARIA Inés*, Conservation Documentation of the Manila Daguerreotypes,* 5th Cycle Advanced Residency Program in Photograph Conservation, 2009.

DA SILVA Eric, ROBINSON Mike et al., *Monitoring the photograhic process, degradation and restoration of 21st century daguerreotypes by wavelength-dispersive X-ray fluorescence spectrometry*, 2009.

ESPINOSA Noemí "Archipielago Sturgis," in *Documentation of the Manila Daguerreotypes*, 2008.

HERRERA Rosina and CASELLA Luisa, "Hispanic Society of America: Survey Report," in *Portfolio [2005-2007],* 4th Cycle Advanced Residency Program in Photograph Conservation, unpublished document, 12-14 April 2007.

MELLER Taina, "Advances in Documentation Methods for Daguerreotype" in *Portfolio [2003-2005]*, 3rd Cycle Advanced Residency Program in Photograph Conservation, unpublished document.

MONNIER Jérome, *Les daguerréotypes du Musée de l'Homme, exemples de restauration, possibilités et limites. Mise au point des conditions de nettoyage électrolytique d'éprouvettes "daguerreotypes,"* mémoire de fin d'étude (thesis), Institut National du Patrimoine, Paris, 1993.

WIEGANDT Ralph, HERRERA Rosina, and BEEMAN Karina, "Travel Housing for Bare Plate Daguerreotype," in *Conservation Documentation of the Manila Daguerreotypes*, 4th Cycle ARP, unpublished document, November 2007.

Appendices

Appendix 1:
Extract of the report: *Hispanic Society of America: Survey Report* by Rosina Herrera and Luisa Casella

Appendix 2:
Grouping of the Manila Daguerreotypes

Appendix 3:
Manila Daguerreotypes: Documentation Guidelines

Appendix 4:
Examination report, treatment report and photo documentation of *View of the Mariquina River near Manila (L2007:0328:0005)* and *Prison and principal street PagSanJan Laguna Manila (L2007:0328:0009)*

Appendix 5:
FTIR Analyses – results, spectra and correspondence

Appendix 6:
XRF Analyses – reports, poster prepared for the XVIII International Materials Research Congress by Alejandra Mendoza and Caroline Barcella

Appendix 7:
Materials and products used for treatments – list, suppliers and datasheets

Appendix 1

Extract of the report: *Hispanic Society of America: Survey Report* by Rosina Herrera and Luisa Casella, 4th Cycle Advanced Residency Program in Photograph Conservation, unpublished document, 12-14 April 2007, p. 6 - 7

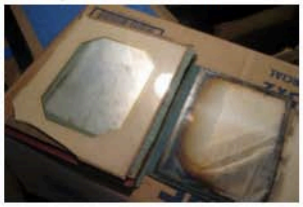
Box where the daguerreotypes were found. The cabinet was in the corridor of the 7th floor

5.2.1 | Daguerreotypes

A group of daguerreotypes was found in a cabinet on the 7th floor. Their existence was unknown prior to the survey and they are not included in the catalog.

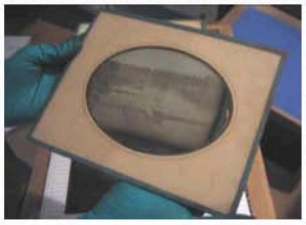
The quality of the images is extraordinary. These are unique examples and probably the first surviving images of Manila.

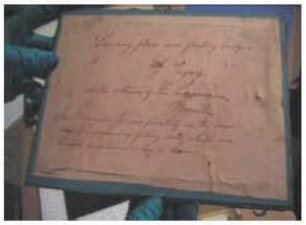
Fourteen of them are whole plate format which makes them the more valuable and rare. The original housing is glass passé partout. Cover glass is broken in only one example. Four examples show glass deterioration.



[3] All prints are hinge mounted except the large format photographs (like the ones by Anne Christian).

Five examples are bare plates (no original housing) and four passé partouts have no plate and likely correspond to the bare plates.



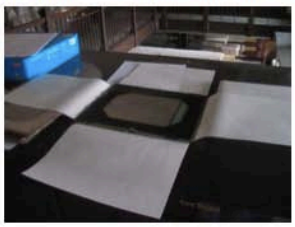


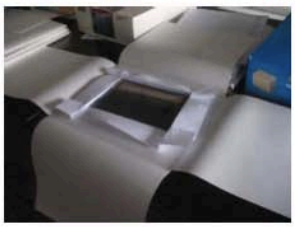
The inscription on the back of some of the housings indicates the location where they were taken ("Laguna, Manila").

Considering their recent storage, the condition of these fragile objects is remarkable. From the group of bare plates, only one is highly tarnished while the rest surprisingly have very little tarnish and mechanical damages on the surface.

In order to provide higher stability, a temporary housing was realized with materials provided by the HSA: regular sheets of paper, four flaps good quality envelops and cardboard boxes.

The daguerreotypes with passé partout were put directly inside the enclosures (image below, left). The bare plates daguerreotypes were first put in a Z tray to avoid direct contact of the paper against the surface (image below, right).





The now protected daguerreotypes were put inside regular boxes. The outside of the box was properly marked with caution signs.

Appendix 2

Grouping of the Manila Daguerreotypes

Grouping of the *Manila Daguerreotypes*

By size:

Full plates: 13 in total
5 – 6 – 7 – 8 – 10 – 11 – 12 – 13 – 14 – 15 – 16 – 17 – 18

½ plates: 5 in total
1 – 2 – 3 – 4 – 9 + 1 extra passe-partout

According to the relation plate/passe-partout:

Plates inside their passe-partout when arrived at the lab: 5 in total
1 – 2 – 3 – 12 – 16

Plates outside their passe-partout when arrived at the lab: 13 in total

- with no doubt on the match: 8

4 – 10 – 11(broken reverse-painted glass) 13 – 14 – 15 – 17 (missing part reverse-painted glass) – 18

- with a passe-partout associated when the plates were catalogued based on logic and proximity: 5

5 (only backing board) – 6 – 7 (only backing board) – 8 – 9

According to the type of mat:

Paper mat: 3 in total

- Octagonal
  - White: # 4
- Double elliptical
  - Black, broad golden line: # 12 – 16 (later tape and evidence of break of the original glass)

Reverse-painted glass: 13 in total
Without bevel:

- Octagonal
  - White: # 1 – 6 – 9 – 10 – 13
  - Pink: # 2 – 8 – 14 – 17
  - Black: # 15 – 18
- Oval :
  - White: # 3

With bevel:

- Double elliptical
  - Black: 11

Missing: 3
9bis (backing board similar to # 4), 7 (backing board similar to # 10), 5 (backing board similar to # 17)

According to the backing board:

Half plate:
Group 1: # 1, 2, 3, 9
- pink backing paper
- extended ink inscription from the same hand in the center
- C G initial

Group 2: # 4, extra backing board
- blue backing paper
- no inscription
- hanging ribbon

Full plate
Group 3: # 5, 6
- pink backing paper
- pink tape
- short ink inscription from the same hand? in the center

Group 4: 13, 15, 16, 18
- green backing paper
- green tape
- ink inscription from the same hand on the left top edge

Groupe 5:
A: # 8, 17
- no backing paper
- pink tape
- blue strip on the top
- pencil inscription on the tape, top edge

B: # 7, 10, 14
- no backing paper
- green tape
- blue strip on the top
- pencil inscription on the tape, top edge

Group 6: later passe-partouts

 # 12: backing board similar to group 4B
- original backing board
- later glass, later mat, later tape (=#16)

 # 16: backing board similar to group 4B without baking paper (found after opening)
- original backing board (flipped)
- no baking paper, green tape, ink inscription on the top edge
- later glass, later mat, later tape (=#12)
- hanging rings

#11: Later housing
- later cover glass, mat and backing board
- green tape, strips of light pink adhered paper, no baking paper
- pencil inscription on the board

According to the handwriting/ locations

Group 1: #1, 2, 3, 9
- large handwriting in ink located in the center
- initial "CG" in pencil underneath the baking paper
- title repeated in ink on the board, underneath the backing paper, with the same handwriting
- views of the "Laguna" area

Group 2: #10, 4
- small handwriting in pencil along an edge
- repeats a barely readable previous pencil inscription (#10) and proposes a location for a plate with an unreadable inscription, with a question mark (#4)
- seems to be a later addition

Group 3: #5, 6
- small handwriting in ink located in the center
- views of suburbs of Manila

Group 4: #12, 13, 16, 18, 15
- small handwriting in ink located on the top left
- views of "Mariquina"
- one view of Manila (#15)

Group 5: #7, 8, 10, 11, 14, 17
- inscriptions in pencil, possibly from two different hands, located in the top edge on the paper tape
- views of Manila district

Group 6: #11
- inscription in pencil
- later passe-partout

Appendix 3

Manila Daguerreotypes: Documentation Guidelines

I- PHOTO DOCUMENTATION

Views and naming

➢ Before treatment

Case1: Plate inside its passe-partout

VIEWS	NAMING
1- plate in the passe-partout, normal light, recto	L20070328000X_BT_NOR_R
2- plate in the passe-partout, normal light, verso	L20070328000X_BT_NOR_V
3- plate in the passe-partout, raking light, verso	L20070328000X_BT_RAK_V

Case 2: Plate outside its passe-partout

VIEWS	NAMING
Plate	
1- plate, normal light, recto	L20070328000X_BT_PLATE_NOR_R
2- plate, normal light, verso	L20070328000X_BT_PLATE_NOR_V
3- plate, specular light, recto	L20070328000X_BT_PLATE_SPE_R
4- plate, UVA, recto	L20070328000X_BT_PLATE_UVA_R
5- plate UVA, verso	L20070328000X_BT_PLATE_UVA_V
6- plate, UVC, recto	L20070328000X_BT_PLATE_UVC_R
7- plate UVC, recto	L20070328000X_BT_PLATE_UVC_V
Housing	
8- empty passe-partout, normal light, recto	L20070328000X_BT_PP_NOR_R
9- empty passe-partout, normal light, verso	L20070328000X_BT_PP_NOR_V
10- empty passe-partout, raking light, verso	L20070328000X_BT_PP_RAK_V
11- empty opened passe-partout, normal light	L20070328000X_BT_PP_NOR_OPENED_1
11b- empty opened passe-partout, normal light, interlayer paper flipped (if interlayer paper)	L20070328000X_BT_PP_NOR_OPENED_2
11c- cover glass, raking light with optical fiber, verso (if any hazing or glass characteristics only visible under this lighting)	L20070328000X_BT_GLASS_RAKof_V
11d- cover glass, axial light with optical fiber, verso (if dull area)	L20070328000X_BT_GLASS_AXIof_V
11e- cover glass, specular light w/out plexiglass, verso (if interference colors)	L20070328000X_BT_GLASS_SPE_V
Details	
12- plate detail (hallmark), macro lens, normal light, recto or/and verso	L20070328000X_BT_PLATE_NOR_hallmark_Location*_R/V
12b- plate detail (hallmark), macro lens, specular light, recto or/and verso (if needed)	L20070328:000X_BT_PLATE_SPE_hallmark_Location*_R/V
12c- plate, detail (exfoliation), macro lens/, raking light (if any)	L20070328000X_BT_PLATE_RAK_exfoliation_Location*
13- plate detail (accretion, fibrous accretion, adhesive residue), stereo microscope, recto or/and verso	L20070328000X_BT_PLATE_MIC*_description (x--)*_Location*_R/V
14- glass, detail (crystal), stereo microscope	L20070328000X_BT_GLASS_MIC*_cristal (x--)*_Location**
14b- glass detail (significant area of deterioration), axial light with optical fiber, macro lens, recto or/and verso (if any)	L20070328000X_BT_GLASS_AXIof_description (x--)_Location*_R/V

* Use the location code inserted in the examination report.
** Record position of detail area precisely. Registered on a Mylar overlay for precise relocation after cleaning.
* The views under the microscope should include a calibration mark. Please, use one millimeter scale.
* The specified magnification corresponds to the magnification of the binocular lens (10x) multiplies by the magnification of the objective.

➢ During treatment

Case 1: Plate inside its passe-partout

VIEWS	NAMING
1- opened passe-partout with the plate inside, normal light	L20070328000X_DT_PP_PLATE_NOR
2- 14: same views than Before treatment Case 2	
15- 19: same as During treatment Case 2	

Case 2: Plate outside its passe-partout

VIEWS	NAMING
Housing	
1a- passe-partout without backing paper, normal light (if backing paper)	L20070328000X_DT_PP_NOR_V
1b- cover glass, specular light without plexiglass, verso (if interference color)	L20070328000X_DT_GLASS_SPE_V
Details	
1c- plate, accretion before treatment	L20070328000X_DT_PLATE_MIC_description BT(x--)*_Location
1d- plate accretion after dry cleaning	
1c- glass, detail (crystal), stereo microscope1c- glass, detail (crystal), stereo microscope	L20070328000X_DT_PLATE_MIC_description AT(x--)*_Location
1d- glass detail (significant area of deterioration), axial light with optical fiber, macro lens, R/V (if any)	L20070328000X_DT_GLASS_AXIof_description (x--)_Location*

* Use the location code inserted in the examination report.
* The views under microscope should include a calibration mark. Please, use one millimeter scale.
* The specified magnification correspond to the magnification of the binocular lens (x10) multiplies by the magnification of the objective.

➢ After treatment

VIEWS	NAMING
1- plate in the passe-partout, normal light, recto	L20070328000X_AT_NOR_R
2- plate in the passe-partout, normal light, verso	L20070328000X_AT_NOR_V

NB: All of the views numbered with a, b, c,… are optional.

Settings

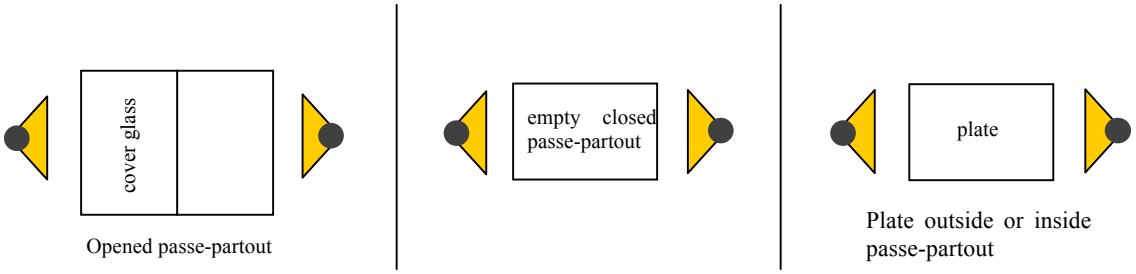
General settings:

- **The views are made in RAW format with the camera Canon EOS 5D**
- **The camera frame is oriented in the same direction as the object (vertical or horizontal)**
- **The object is placed on a mat board covered with a neutral grey background**
- **The scale is placed at the bottom of the image, at a distance of approximatively 1/2 centimeter from the object**
- **A margin of 1 cm is left on the top of the object and of 1/2 cm on the bottom of the scale**
- **The image is recorded on the screen in the right orientation**

Normal light:

Lighting source: Fluorescent daylight diffuse light panels DIGILITE 600 by Interfit

- Object:
  - empty closed passe-partout: horizontal position
  - opened passe-partout: vertical position, the cover glass oriented to the left
  - plate: the light must be parallel to the polishing lines (horizontal across the image)
- Light position: see picture 1
- White balance: manual
- Exposure: 200 in lightest grey (ca. f/8 – 0.3 sec)

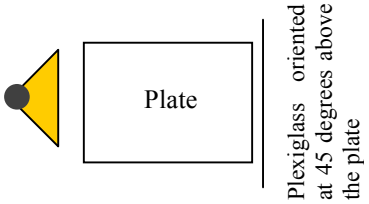


Specular light

Lighting source: Luxor light table used as a lamp

WITH PLEXIGLASS

- Object: horizontal position
- Light position: see picture 2, 2bis (Macro)
- White Balance: manual
- Exposure: 200 in lightest grey (ca. f/8 – 1/4 sec)



WITHOUT PLEXIGLASS

- Object: horizontal position
- Light position: see picture 3
- White Balance: manual
- Exposure: 200 in lightest grey (ca. f/16) for the plate and 150 in lightest grey (ca. f/16) for the gold lines

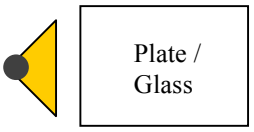
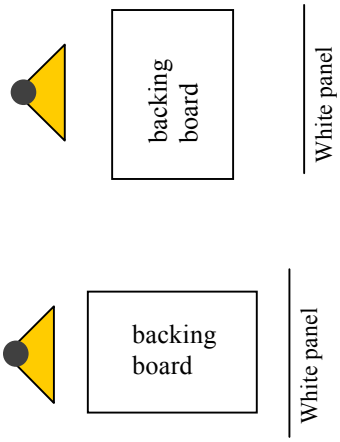


Plate laying on a board oriented at 45 degrees (board covered w/ black velvet and lifted on the right)

Raking light (baking board, verso):

Lighting source: Fluorescent daylight diffuse light panels DIGILITE 600 by Interfit

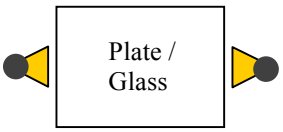
- Object: horizontal or vertical position (top oriented to the left side when the image is horizontal), depending on the main direction of the relief or planar distortions
- Light position: left light on, levelled to the lower height. A white panel is placed in front of the right light (off). See picture 4
- White balance: Manual
- Exposure: 190 in lightest grey (ca. f/8 – 1/5 sec)



Raking light with optical fiber (cover glass, verso)

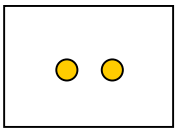
Lighting source: "Chiu Technical corporation. Lumina. ACE®" 3 Amp, 150 Watts

- Object: horizontal position
- Light: close to the right and left edge, laying on the background. Maximum illumination. See picture 5
- White balance: manual
- Exposure: ca. f/8 – 1/5 sec



Axial light with optical fibber (cover glass, verso)

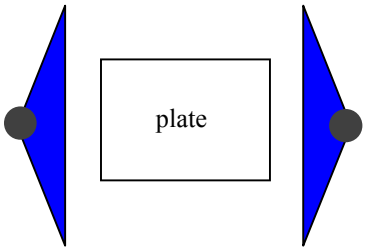
Lighting source: "Chiu Technical corporation. Lumina. ACE®" 3 Amp, 150 Watts



- Object: horizontal position
- Light: optical fibbers are place on each side of the lens, at the same height. Maximum illumination. See picture 6
- White balance: manual
- Exposure: 180 in lightest grey (ca. f/8 – 1/20 sec)

UVA:

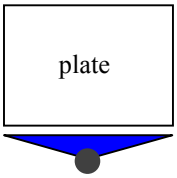
Lighting source: "Silvania Blacklight Blue" 15 Watts



- Object : horizontal position
- White balance: Shaded
- Light: hang to the ceiling. See picture 7
- Exposure: ca. f/8 – 5 sec

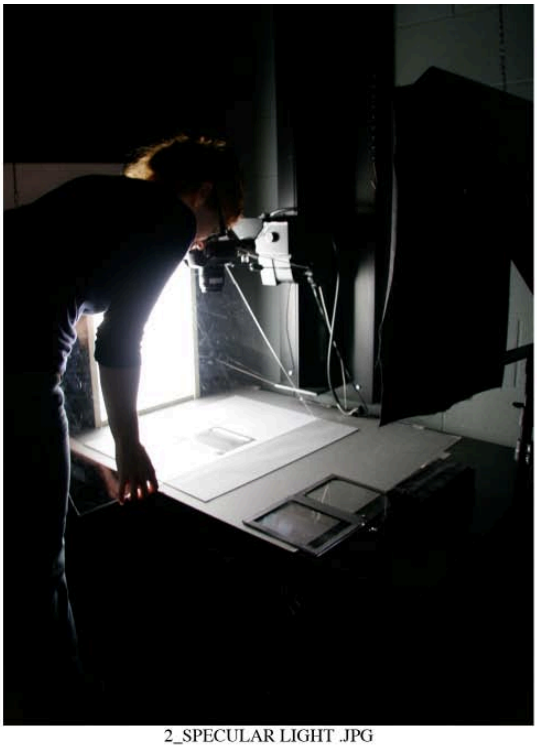
UVC:

Lighting source: GEH UVC lamp, fabrication D. Kushel 5/04

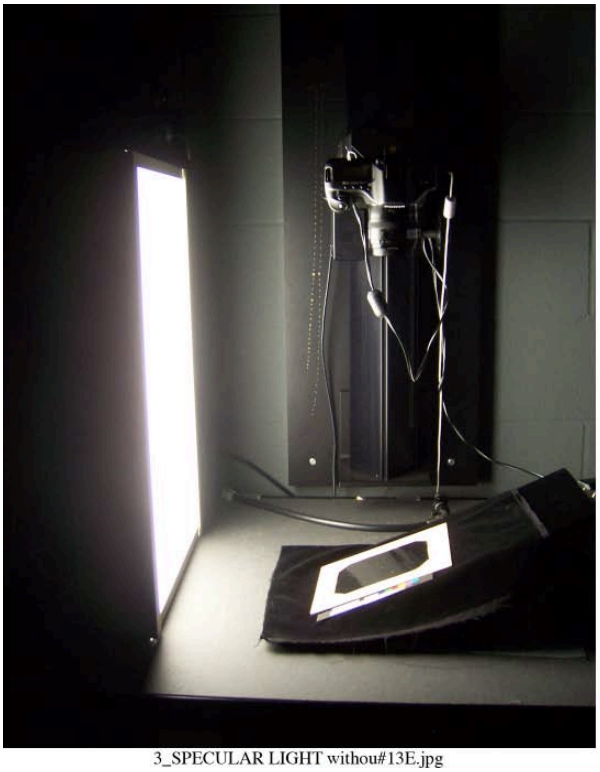


- Object : horizontal position
- White balance: Shaded
- Light: as close as possible from the lower edge. See picture 8
- Exposure: ca. f/8 – 10 sec

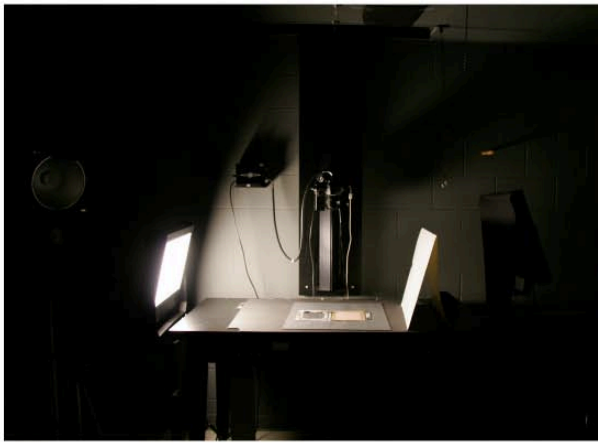
1_NORMAL LIGHT.jpg



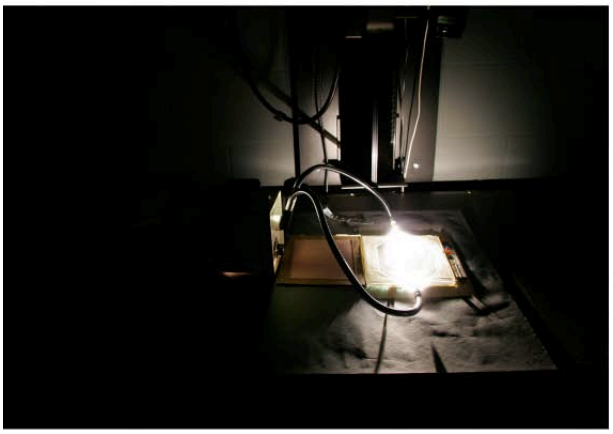
2_SPECULAR LIGHT .JPG



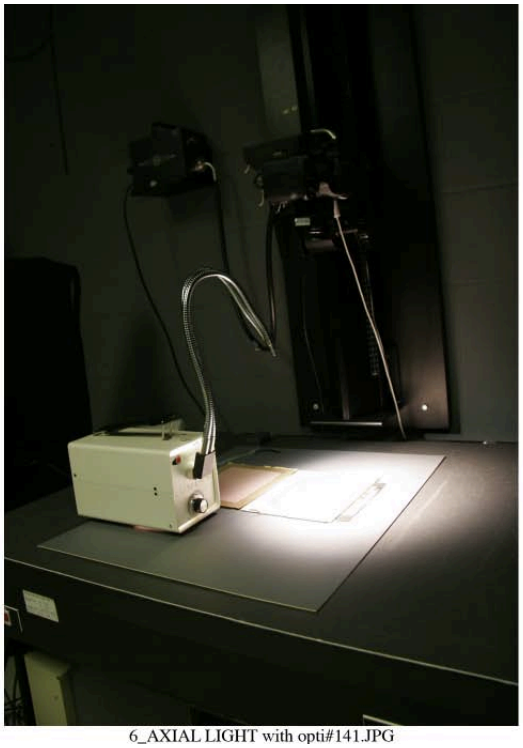
3_SPECULAR LIGHT withou#13E.jpg



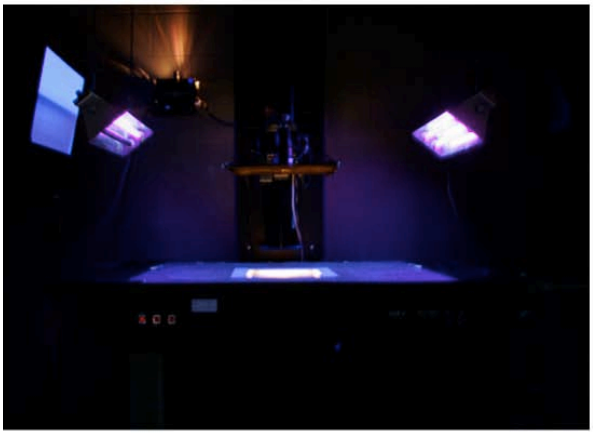
4_RAKING LIGHT.JPG



5_RAKING LIGHT with opt#140.JPG



6_AXIAL LIGHT with opti#141.JPG



7_UVA.JPG

8_UVC.JPG

Images management

➢ Files format

• Convert the CR2 files in DNG (in Bridge, select all > open in camera RAW > select all > save images as Digital negative (.dng). Delete the CR2 files

• Create TIFF files: open the image in camera RAW, save as Tiff (.tif). Place the DNG files in a folder named DNG

• To insert in the report, convert images needed in JPEG (.jpg) (240 dpi, 4 inches, level 8)

➢ Printing

Paper & printer:

• Report: Permalife block paper & Color LaserJet 2600n

• Images: Enhanced matte paper & Epson Stylus Photo 2200 or Epson Stylus Pro 4880. When selected, use the same printer to print all of the images of a designated item.

Images print out:

• Formating:

- Create contact sheet: Select image(s) > Tool > Photoshop > Contact Sheet II
- Set up: * Resolution = 300 ppi

  * Caption = Arial, 8 to 10 pt (adjust in order to print out the entire file name. NB: the computer of the copyroom allows to print long file names, as opposite to my computer (Mac, CS3). If you want to use your computer and encounter the same problem, create a contact sheet in In Design)
- Save as ContactSheet-X(number referring to the printing order).pds in a folder named *to print.*

• Size of the images:

- *Full page*: recto of the plate (normal light) and recto of the passe-partout
- *Half page*: the ones which are not in the other categories
- *¼ pages*: UV
- *1/6 page*: details

NB: This is a basis which can be modified according to each case

• Order: follow the order of the table "views and naming"

Inkjet printers setting:

• Epson 2200: Print > page set up > Select in Quality type: Best photo + in Type: Enhanced Matte paper > OK

• Epson 4880 (place the paper face down): Page set up > Select in Media type : Matte paper - Enhanced matte paper + in Print quality : Max quality > OK

II- EXAMINATION REPORT

- The form is located in Manila > TREATMENT > report forms > forms > exam_report form model (This is a "stationery pad" - recognizable by its yellow color - so the master template file cannot be changed.)
- When you completed the examination record, record the file as examination report X (number of the plate).

EXAMINATION RECORD

IDENTIFICATION

Artist:	Unknown	**HSA No.:**	
Title/subject:		**GEH No.:**	L2007:0328:000
Date:	Ca. 1840's-1850's	**Owner:**	Hispanic Society of America
Country of origin:	Philippine Islands	**Provenance:**	Gift of Charles Massa (1929)
Process:	Daguerreotype	**Format:**	plate

Recto of the plate, before treatment	*Recto of the passe-partout, before treatment*	*Verso of the passe-partout, before treatment*

DESCRIPTION

Housing	**Passe-partout:** ☐ complete ☐ incomplete ☐ separated from the plate ☐ contains the plate **Dimensions (h x w):** cm **Inscriptions:**
Mat:	☐ Paper mat / ☐ Reverse-painted glass Color : Window shape: ☐ oval ☐ octagonal ☐ rounded rectangle With: ☐ golden bevel ☐ lines ☐ opaque coating on the back ☐ Interlayer blue paper underneath
Glass:	Thickness: mm
Binding tape:	☐ original tape Color: ☐ retaping (No:) Color:
Backing:	**Strawboard** with access door ☐ pins (No:) ☐ hanging ribbon/ring Exterior facing paper: ☐ sheet Color: ☐ strips Color: Interior facing paper: ☐ sheet Color: ☐ none

Plate	**Dimensions (h x w):** cm Recto: gold-toned Verso: copper **Corners:** ☐ unclipped ☐ bent **Edge:** ☐ crimped **Securing system:** ☐ drops of wax ☐ adhered paper **Hallmark/ Inscription:** *

- Insert the picture (300 dpi, 3 inches, Jpeg level 8) in the related case. Make the lines of the table invisible
- To check the box, double click on the box and select "checked"
- Color the unchecked options in the lightest grey
- Add comments in font size 8 underneath the checkbox part
- Maintain the examination report within one page. If needed, reduce the font size of the comments (7), or the image size

* See image

CONDITION

Previous Treatment:

Housing	**General condition :** ☐ **excellent** ☐ **good** ☐ **fair** ☐ **poor**
Mat:	☐ dust ☐ dirt ☐ stains ☐ losses ☐ other:
Cover glass:	☐missing ☐ crack ☐ loss ☐ other: *Outer face*: ☐ dust ☐ dirt ☐ scratches ☐ other: *Inner face*: ☐ interference colors ☐ surface haze ☐ weeping glass ☐ crystal visible under magnification ☐ other:
Binding tape:	☐ dust ☐ dirt ☐ abrasion ☐ tear ☐ loss ☐ disfunctioning ☐ other:
Backing:	☐ dirt ☐ stain ☐ abrasion ☐ tear ☐ loss ☐ other:

• Locate the alterations within parentheses using the location code next page

Plate	**General condition:** ☐ **excellent** ☐ **good** ☐ **fair** ☐ **poor**

For the exact location of the deteriorations, see the schemes next page

Surface condition:

1. accretion
2. fibrous accretion
3. residue
4. other

Physical deterioration:

5. abrasion
6. blisters
7. dent
8. exfoliation
9. loss
10. pitting
11. planar distortion
12. scratch
13. other

Chemical deterioration:

14. corrosion stain
15. fingerprint
16. tarnish – brown/yellow
17. tarnish – grey/black
18. tarnish – interference color
19. tarnish – whitish cloudy film

Other:

20. tide line:
21. other

21a:
21b:

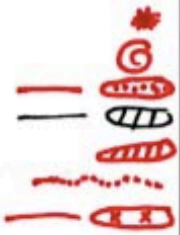
Verso of the plate:

22. accretion
23. stain
24. other

• Indicate any particulate observation. When a image detail exists, add a *
• See next page for the correspondence deterioration/ symbol of the Mylar Mapping (the file is located in Guidelines > documentation > Mylar Map Guide.pdf)

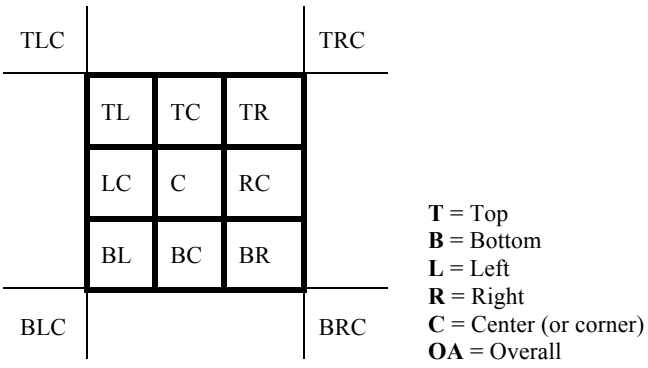
* See image detail

SYMBOLS FOR MYLAR DETERIORATION MAPS

Image Plate	General condition : ☐ excellent ☐ good ☐ fair ☐ poor
	*Surface condition:* ■ 1. accretion 2. fibrous accretion 3. residue 4. other
	*Physical deterioration:* ■ 5. abrasion 6. blisters 7. dent 8. exfoliation 9. loss 10. pitting 11. planar distortion 12. scratch 13. other
	*Chemical deterioration:* ■ 14. corrosion stain 15. fingerprint 16. tarnish – brown/yellow 17. tarnish – grey/black 18. tarnish – interference color 19. tide line 20. whitish cloudy film 21. other 21a. faded spot 21b. shape of the mat 21c. ...
	Verso of the plate: 22. adhesive 23. accretion 24. old seal 25. stain 26. other

- Please create separate Mylar maps for each group of deterioration and several maps for chemical deterioration to avoid confusion of the symbols (*Chemical deterioration 1, Chemical deterioration 2 etc.*)
- Scan Mylar maps and save them as JPEG images; suggested naming of the image files:
  Surface condition - # of the plate_SC
  Physical deterioration - # of the plate_PD
  Chemical deterioration - # of the plate_CD1, # of the plate_CD2, ...
- Insert these images in your examination report

Document created by Karina Beeman

Surface condition	*Physical deterioration*
Chemical deterioration 1/2	*Chemical deterioration 2/2*
	

• Scan the Mylar sheets (300 dpi, 4 inches width, Jpeg level 8)
• Insert the pictures in the related cases (a third case for chemical deterioration can be created if needed)
• Make invisible the lines of the table (select all > border > “no line”)

III- TREATMENT PROPOSAL AND REPORT

- The form is located in Manila > TREATMENT > report form > form > treatment report form (This is a "stationery pad," so the master template file cannot be changed.)

TREATMENT PROPOSAL

• Document the object before, during and after treatment (see the guidelines of the photo documentation in appendix)

Housing:

• Requires opening the package and removing the plate: ☐ yes ☐ no/already out of the housing
• Repair element of the backing (paper, board):
• Treatment of the cover glass: ☐ cleaning, ☐ replacement, ☐ treatment of the reverse painting on glass
• Recreate missing elements:
• Stabilize the plate inside the housing
• Reassemble the package

Plate:

• Remove accretions
• Consolidate exfoliation

Custom secondary housing:

• Make new housing

• To check the box, double click on the box and select "checked"
• Colour the unchecked options in the lightest gray

TREATMENT REPORT

Steps of treatment	Description
Documentation and storage	• The plate and the housing were examined and documented. • As the designated passe-partout holds an inscription matching with the view of the plate, it was decided with the HSA to reassemble them together. Note that there is no technical evidence confirming the passe-partout originally belongs to the plate. The "Manila Daguerreotypes" ensemble includes a backing board without any plate that may have been the original housing as well (we ignore what was the subject of the missing plate). • The bare plate was kept in the protective housing used for transportation, and enclosed in a polyethylene zip bag in order to avoid fluctuation of RH. Climate at the GEH photograph laboratory was maintained at 40% RH (+/- 10% per 24h) and 70 ºF (+/- 5 ºF per 24h)
Treatment of the external lining paper *Cleaning:* *Removing:* *Washing:* *Lining:*	• The backing board and the cover glass were separated by cutting the sections of the tape still functioning with a blade inserted in between both elements. • The lining paper covered the original tape. It had to be removed in order to be cleaned and consolidated, to uncover the pencil inscription partially visible on the tape, and to allow the re-binding of the package to remain as it was. • After dry cleaning with Staedtler eraser in crumbs followed by Staedtler eraser block, the lining paper was humidified through Gore-tex (24 hours) then removed. The written inscription (probably in Iron gall ink) is resistant to water; therefore humidification was avoided. • When the lining paper was removed, another inscription (same ink and same hand) was discovered on the backing board: "Main Street Pagsanjan". On the binding tape, the full initial: "CG", written in pencil, could be read. • The detached paper was washed in cold distilled water, and lined with conservation Japanese tissue (close to 9 gsm) and diluted wheat starch paste. • Both the lined paper and backing board were left in a book press for 3 weeks to dry and flatten.

Treatment of the painted glass *Cleaning:* *Consolidating:* *Infilling:*	• The glass was cleaned with a 1:1 water/alcohol solution and cotton swabs. Attempts to clean the interference colors were made using water, warm water, water mixed with calcium carbonate powder, cerium oxide powder, and slightly acetic solution followed by rinsing. None of these treatments were efficient. As confirmed by Stephen Koob (glass conservator at the Corning Museum of Glass), the interference colors are irreversible glass deterioration. As the painted glass is otherwise in good condition, and the location of the deterioration does not disturb the reading of the plate, decision was made to reuse it. The control of the environment inside the package (provided by the re-made housing, appropriate enclosure and proper environment in the storage area) will prevent any further degradation. • The original tape adhering to the glass was removed with the application of blotter strips dampened with water and a blade, then washed in cold water and flattened. • The powdery surface of the white paint was consolidated spraying 3 layers of Lascaux Fixativ 2070 in spray (2% of B72 in xylene/ isopropanol) while a mask was covering the opening window. Consolidation was efficient and neither color shift nor tide lines were observed. • The losses of the painting were infilled with mixture of pigments (Kaolin China Clay yellowish and Slat Grey extra light by Kremer, ca 4:1) in 2% Aquazol 500 diluted in ethanol. The infilling can be easily removed by gently digging in it, as it is softer than the original material. Although a thick mixture was used, limiting the amount of solvent carried out, ethanol tends to slightly diffuse into the original material, and eventually creates faint tide lines. This treatment should then only be used when the losses are strongly disturbing. Further investigations on consolidation and infilling of reversed painted glass would be needed.
Treatment of the backing board	• Japanese tissue Tengucho 7.5 gsm was applied on the original tape with Klucel G 8% in ethanol in order to avoid direct contact with the new tape. Pieces of tape removed from the cover glass were then infilled at their original location. On the internal face of the board, strips of Tengucho 11 gsm were pasted around the access door to secure it. This securing system was needed since the external lining paper, which first assured this function, will not be re-lined on the board.
Fixing the plate inside the package	• The plate was dusted with blown air using a rubber bulb in order to remove loose accretions. • The plate was placed in 2 paper trays (Renaissance) sliding in each other. This custom-made holder maintains the plate in place while preserving the original thickness of the package. Choice of paper used was made as it is commensurate with the original material, has good handling properties, and will act as a buffer in case of humidity variation inside the package.
Assembling the housing	• An interlayer of Renaissance paper was added between the chalk and the plate, and a sheet of Escal barrier film was placed underneath the plate holder. Cover glass, interlayer paper, plate in holder and Escal were bound together with one strip of 3M 850 Polyester Silver Film Tape. This system constitutes a semi-sealed package isolating the plate from the backing board and from humidity and pollutants in the atmosphere. The binding was performed in a dry atmosphere (35% HR). • The original tape on the backing board was folded over on the inside, and then the board was assembled with the plate package using 4 strips of Filmoplast P90 previously tinted to the color of the original with watercolors (Cadmium Lemon, Cobalt Blue, Burnt Sienna, and Raw Sienna). A window was opened in the Filmoplast in order to see the inscription in pencil on the original tape. • The blue interlayer paper and the residues of original tape were placed inside the package, in between the Escal and the backing board. • The lining paper was reattached to the board using a floating technique. 4 hinges folded over on the inside underneath the paper were pasted to the board with Klucel G in ethanol at 8%. If needed, removal can be easily done to access the covered inscriptions.

Materials used in the treatment (as appeared in the report):

- Staedtler Mars eraser crumbs
- Staedtler Mars plastic eraser
- Lascaux Acrylic Fixative 2070 (2% B72 in xylene/ isopropanol)
- Wheat starch paste
- Aquazol® 500
- Kremer powder pigments
- Light Impressions Renaissance paper 3136 (non-buffered, 150 gsm)
- Escal™ Ceramic Barrier Film (polypropylene/ ceramic/ polyethylene)
- 3M™ 850 Polyester Silver Film Tape
- Filmoplast® P 90 Tape
- Artists' Water Colour Winsor and Newton
- Klucel® G

EVALUATION

The plate is physically and chemically secured in its original housing. All the elements of the housing were stabilized and reused when reassembling the package, except the failed binding tape and blue interlayer paper (both are enclosed inside the package). The reassembled package respects the thickness and appearance of the original.
The plate, originally fixed to a thin blue paper by dots of wax (the failure of which caused shifting) is now held in a paper double tray. As humidity and pollutants contained in the air cause chemical degradation of the daguerreotype, the plate was isolated from the exterior atmosphere inside a semi-sealed package. The backing board was then attached using a paper tape tinted in the same color than the original.

CONSERVATION RECOMMENDATIONS

In order to assure a long term preservation of the daguerreotype plates and their original housings, they should be kept in a controlled environment (40%, HR +/-5% per 24 h, stable temperature) and handled with care.
Lighting for exhibition should not exceed 50 Lux (minimal lighting needed for comfortable human vision), and be free of UV radiations.

• Adapt the treatment proposal and treatment report to each object (text in grey)

Appendix 4

Examination report, treatment report and photo documentation of *View of the Mariquina River near Manila* (L2007:0328:0005) and *Prison and principal street PagSanJan Laguna Manila* (L2007:0328:0009)

ADVANCED RESIDENCY PROGRAM IN PHOTOGRAPH CONSERVATION

George Eastman House
International Museum of Photography and Film
900 East Avenue
Rochester, NY 14607
tel: 585-271-3361
fax: 585-271-4405

Conservator: Caroline Barcella ***Date:*** 09/11/2008

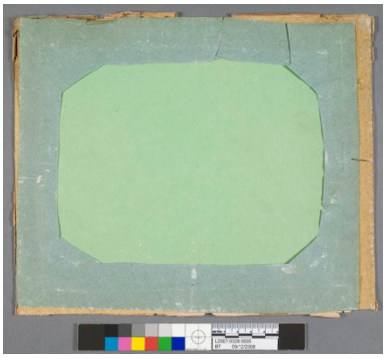
Authorization for treatment: Patrick Lenaghan

EXAMINATION RECORD

IDENTIFICATION

Artist:	Unknown	**HSA No.:**	174992
Title/subject:	"View on [the] Mariquina River near Manila"	**GEH No.:**	L2007:0328:0005
Date:	Ca. 1840's-1850's	**Owner:**	Hispanic Society of America
Country of origin:	Philippine Islands	**Provenance:**	Gift of Charles G. Massa (1929)
Process:	Daguerreotype	**Format:**	Whole plate

Recto of the plate, before treatment



Recto of the passe-partout, before treatment

Verso of the passe-partout, before treatment

DESCRIPTION

Housing	**Passe-partout:** ☐ complete ☒ incomplete ☒ separated from the plate ☐ contains the plate **Dimensions (h x w):** 22,1 (max) x 27 (max) cm (board) **Inscriptions**: handwritten in ink: **"**View on [the] Mariquina River near Manila", on the upper center of the baking paper. *NB:* The plate and the housing were found separated and reassembled at the HSA based on logic and proximity.
Mat:	☐ Paper mat / ☐ Reverse-painted glass Color : Window shape: ☐ oval ☐ octagonal ☐ rounded rectangle With: ☐ golden bevel ☐ lines ☐ opaque coating on the back ☒ Interlayer blue paper *NB:* The mat is missing. Based on the powdery residues present on the interlayer blue paper and the tarnish lines on the plate, it seems to have been a reverse painting on glass, white or pink, with an octagonal window opening.
Glass:	Thickness: mm *NB*: the cover glass is missing.
Binding tape:	☒ original tape Color: pink ☐ retaping (No:) Color:
Backing:	**Strawboard** with access door ☒ pins (No: 3, CR, CL, BC) ☐ hanging ribbon Exterior facing paper: ☒ sheet Color: pink ☐ strips Color: Interior facing paper: ☒ sheet Color: green ☐ none

Plate	**Dimensions (h x w):** 16.2 x 21.5 cm Recto: gold-toned Verso: copper **Corners:** ☒ unclipped ☒ bent down (slightly, all corners) **Edge:** ☒ crimped, 4 marks (12 x 2 mm: center of R and L edges, 8 x 2 mm: T and B on the right edge) **Securing system:** ☒ drops of wax ☐ adhered paper **Hallmark/ Inscription**: 30 partly cut on L (3 x 5 mm, TLC) and hexamerous figure partly cut on L and B (can be seen as a 6 points star or a 6 petals flower, 3 x 3 mm, BLC). Both are press-stamped*.

* see image detail

CONDITION

Previous Treatment: none

Housing	**General condition:** ☐ excellent ☐ good ☐ fair ☒ **poor**
Mat:	☐ dust ☐ dirt ☐ stains ☐ losses ☒ other: missing The interlayer blue paper is attached to the board on BLC. The corner is inserted in between the board and the paper tape. The paper shows few tears measuring less than 1 cm (in TL, and around the opening window) and 2 folds in the TC and TR. 2 pinholes have been created on R and B by pins going through the board. On the recto, white powdery deposit appears on the perimeter, some traces follow the shape of a hexagonal window opening. This reveals the former presence of a reverse painting on glass white or pink. On the verso, the perimeter (in contact with the board) is stained, and a small amount of wax adheres in CL. Its location matches with the wax (complementary piece) attached to the back of the plate.
Cover glass:	☒missing ☐ crack ☐ loss ☐ other: *Outer face*: ☐ dust ☐ dirt ☐ scratches ☐ other: *Inner face*: ☐ interference colors ☐ surface haze ☐ weeping glass ☐ crystal visible under magnification ☐ other
Binding tape:	☒ dust ☒ dirt ☒ abrasion ☒ tear ☒ loss ☒ failed (all edges)
Backing:	☒ dirt (OA) ☒ stain (concentrated on the raised areas, on the recto) ☒ abrasion ☒ tear (created by the head of the pins) ☒ loss (created by the head of the pins) ☒ other: on the verso, white powdery deposit on the perimeter due to contact with the former reverse painting on glass.

Plate	**General condition:** ☐ excellent ☐ good ☒ **fair** ☐ poor

For the exact location of the deteriorations, see the schemes next page

Surface condition:

1. accretion: many of various affiliations, mostly visible under microscope. White chalky accretions visible in BC *. Brown accretions in TL surrounded by a lighter area*. The examination under microscope show overall white tiny deposits (some brown)*, and few transparent loose crystals* (possibly debris of glass).

Only examples of each kind are represented on the mapping.

2. fibrous accretion : located on the perimeter, mainly in the R and L edge and in the corners. White in color, appear as individual with a « mold-like » pattern (1 mm width in average) or as larger web (BR, BL)*. Some are surrounded by tarnish (TL).
3. residue
4. other

Physical deterioration:

5. abrasion: moderate. 2 distinct abraded and scratched areas in the C and R top, possibly due to surface contact with the mat.
6. blisters
7. dent
8. exfoliation
9. loss: abrasion and scratches caused small losses in the image.
10. pitting: small and sharp losses mostly visible in the CR.
11. planar distortion: small relief in BC (appears as a dark shadow on the image under specular illumination).
12. scratch: 2 distinct scratched areas appear in TC and TR. Small scratches are also visible along the top, lower and left edge.
13. other

Chemical deterioration:

14. corrosion stain: tarnish spots concentrated in the TL. They show a light nucleus surrounded by blue/green tarnish*.
15. fingerprint
16. tarnish – brown/yellow: slight yellow film located on the left side (inside a significant tide line). Deep bright yellow tarnish inside a smaller tide line on TL. Dark brown tarnish bands follow the former window opening. Tow main patterns are visible, due to shifting of the plate in the housing.
17. tarnish – grey/black:
18. tarnish – interference colors: around the edges. Wider band along the left and bottom edges. From the outside to the inside, colors appear in the following order: blue, red/ purple, yellow, green, blue and purple.
19. tarnish – whitish cloudy film: following the shape of the window opening in BR.

    Other: bluish cloudy film appear in TL, following the shape of a tarnish line and the highlights*.
20. tide line: covers the left side of the plate. The area affected appears slightly stained in normal light, the image shoes a "reticulation" pattern, and some specific spots have developed. Defect in processing (fixing, washing, toning) or later accident involving liquid spreading may be at the origin of the tide line and associated defects.

Small tide lines appear on the R and B edges.

21. other

    21a: discolored spots showing a brown nucleus/accretion*. Various size (1 to 3 mm diameter). Appear mainly in the tide line area.

    21b-21c: very small black spot (0.3 mm diameter in average), randomly distributed. Some appear nucleated with a grey/blue halo*, some evenly black*.

    21d: bright line along the perimeter, framing the image, with a whitish/bluish tonality.

* see image detail

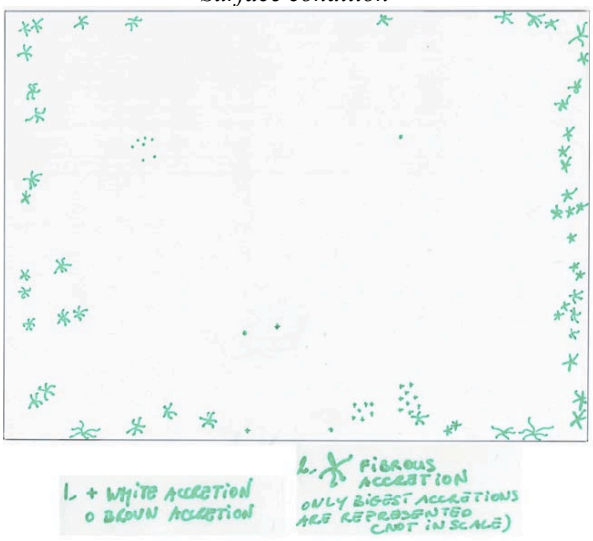
21e: unidentified lines on the upper part. May be process related or due to tarnish.

Verso of the plate:

22. accretion: small amount of wax on L and R bottom edge, and CL edge (ca. 0.5 cm x 1.5 cm). They were used to attach the plate to the blue interlayer paper mat. The piece of wax on BR edge detached from the plate. It is complete, versus the 2 others (broken at the edge). They fluoresce blue/green under UVA and UVC.

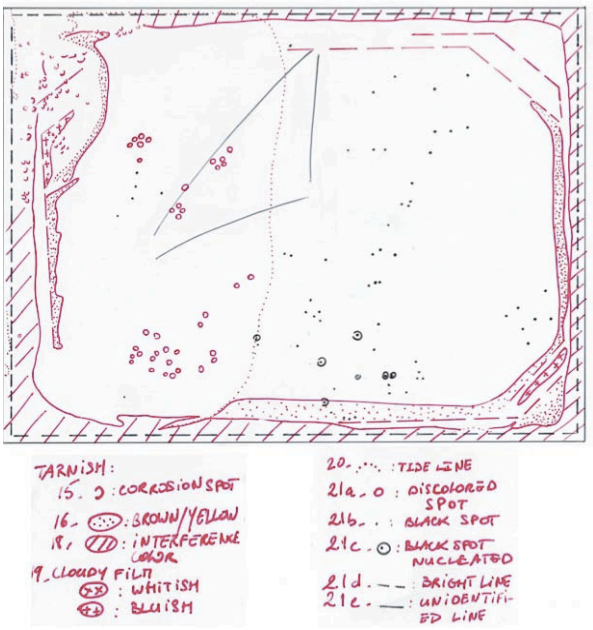
23. stain: overall staining showing interference colors (blue, purple, yellow and green). A strong yellow fluorescence under UVC (invisible under UVA) seems to match with the stains showing a slight yellow reflectance in visible light. The yellow fluorescence under short-waves illumination could indicate the presence of cyanide compound (Tragni, 2005; Daffner, Kushel and Messiner, 1996)

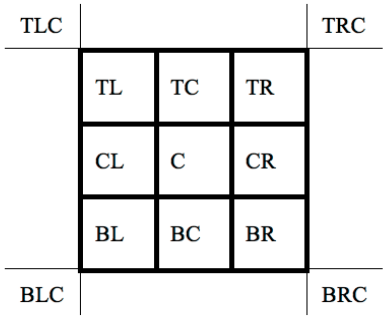
Surface condition



Physical deterioration

Physical deterioration





T = Top
B = Bottom
L = Left
R = Right
C = Center (or cor
OA = Overall

TREATMENT PROPOSAL

• Document the object before, during and after treatment (see the guidelines of the photo documentation in appendix)

Housing:

• Requires opening the package and removing the plate: ☐ yes ☒ no/already out of the housing
• Repair element of the backing: remove and consolidate the external lining paper
• Treatment of the cover glass: ☐ cleaning, ☐ replacement, ☐ treatment of the reverse painting on glass
• Recreate missing elements: gilded glass, mat, binding tape
• Stabilize the plate inside the housing
• Reassemble the package

Plate:

• Remove accretions
• Consolidate exfoliation

Custom secondary housing:

• Make new housing

TREATMENT REPORT

Steps of treatment	Description
Documentation and storage	• The plate and the housing were examined and documented. • The bare plate was kept in the protective housing used for transportation, and enclosed in a polyethylene zip bag in order to avoid fluctuation of RH. Climate at the GEH photograph laboratory was maintained at 40% RH (+/- 10% per 24h) and 70 ºF (+/- 5 ºF per 24h).
Treatment of the external lining paper *Cleaning:* *Removing:* *Washing:* *Lining:*	• The lining paper covers the original tape. It had to be removed in order to be cleaned and consolidated, and to allow the rebinding of the package as it was. • After dry cleaning with Staedtler eraser crumbs followed by a Staedtler eraser block, the lining paper was humidified through Gore-tex (24 hours) and then removed. The written inscription (probably in Iron gall ink) is resistant to water; therefore humidification was avoided. • The detached paper was washed in cold distilled water, and lined with conservation Japanese tissue (7.5 gsm) and diluted wheat starch paste. • Both the lined paper and backing board were left in a book press for 3 weeks to dry and flatten.
Treatment of the backing board	• Japanese tissue Tengucho 7.5 gsm was applied on the original tape with Klucel G 8% in ethanol in order to avoid direct contact with the new tape. On the internal face of the board, strips of Japanese tissue Tengucho 11 gsm were pasted around the access door to secure it. Indeed, the lining paper, which first assured this function, will not be re-lined on the board.
Treatment of the plate	• The plate was dusted with blown air using a rubber bulb, in order to remove loose accretions. • The most significant accretions still adhering to the surface were brushed away using a fine, soft brush (Isabey Repique Kolinsky (6229) size 0). Removal was done under a stereomicroscope, insuring that the image surface was not scratched. This soft cleaning allowed the partial removal of the adhered accretions*.
Reconstruction of the cover glass/mat *Design and materials used:* *Golden lines:*	• The examination of the plate and its backing board indicates that the missing cover glass was a reverse painting on glass (white or pink), probably with a hexagonal window opening. As all of the reverse painting on glass of the Manila daguerreotypes (full plates) present the same design (hexagonal window opening surrounding by 3 lines), the missing glass was very likely to be the same. Therefore, the missing painted glass was reconstructed after the design of the originals. Gold leaf was used to recreate the gold lines in order to achieve the high reflectivity present in the originals (this effect, called "mirroring," is typical from gold lines made of gold leaf; the other way to produce gold lines is to use brass powder mixed with an adhesive; this last technique gives a dull effect, as it can be seen on plate 11). Being uncertain if the original paint was white or pink, a white color (the more neutral) was chosen. Cardboard was used as opposed to painting to create the mat, in order to distinguish the reconstructed cover glass from the originals. Borosilicate glass was used as cover glass since its stability is estimated to be twice as good as soda-lime glass. • The technique used to gild the glass comes from the sign painting craft. Gold leaf was applied on glass using a water size method: a very diluted gelatin size (ca. 0.1%) was brushed on a clean glass, on the top of which the gold leaf was laid. After the gelatin dried (30 min), the design of the lines was silk-screened on the top of the gold using a silk-screen ink made for glass gilding (Back Up Black ink). The ink was allowed to dry (2-3 hours), and then excess gold was brushed away with damp cotton swabs mixed with calcium carbonate powder. At this point, the gold precisely follows the design of the ink. As the edges of the lines showed a fine pattern from the silkscreen,

* see image detail

Black line: *Background:*	the borders of the lines were slightly trimmed to achieve good sharp edges, using a scalpel. The plate was then allowed to dry ink face up for 4 weeks, and was then placed in a oven at 60º C for 3 consecutive nights to allow a total evaporation of the solvents contained in the ink. • The black line was drawn by filling the gap between the 2 inner golden lines with Aquazol® 500 in water 20% mixed with Lamp Black pigment. • The background was achieved using a 2-ply non-buffered rag board tinted with Winsor and Newton watercolor to the tint of the original white reverse paintings on glass.
Securing the plate inside the package	• The plate was placed in 2 paper trays (Light Impression Rennaissance) sliding in each other. This custom-made holder maintains the plate in place while preserving the original thickness of the package. Choice of paper used was made as it's commensurate the original material, has good handling properties, and will act as a buffer in case of humidity variation inside the package.
Assembling the housing	• A sheet of Escal barrier film was placed underneath the plate holder. Gilded cover glass, mat board, plate in holder and Escal were assembled and maintained in place with tabs of Filmoplast P90, then bound together with two continuous strips of 3M 850 Polyester Silver Film Tape (clockwise and counter-clockwise). This system constitutes a semi-sealed package isolating the plate from the backing board and from humidity and pollutants in the atmosphere. The binding was performed in a dry atmosphere (35% HR). • The original tape on the backing board was folded over on the inside, and then the board was assembled with the plate package using 4 strips of Filmoplast P90 tinted to the color of the original with watercolors (Alizarin Crimson, Cadmium Lemon, Cobalt Blue, Burnt Sienna, Raw Sienna, and Lamp Black). A window was opened in the tape in order to see the inscription in pencil on the original tape. • The blue interlayer paper and the residues of original tape were placed inside the package, in between the Escal and the backing board. • The lining paper was reattached to the board using a floating technique. 4 hinges folded over on the inside underneath the paper were pasted to the board with Klucel G in ethanol at 8%. If needed, removal can be easily done to access the covered inscriptions. • As Filmoplast P90 tended to lift on the back, consolidations were made using Aquazol 500 in ethanol 2%.

Materials used in the treatment (as appeared in the report):

- Staedtler Mars eraser crumbs
- Staedtler Mars plastic eraser
- Lascaux Acrylic Fixative 2070 (2% B72 in xylene/ isopropanol)
- Hiromi Japanese papers: Tengucho handmade 11 gsm, Tengucho machine made 7.5 gsm
- Jin Shofu Wheat starch paste (Hiromi)
- Aquazol® 500
- Kremer powder pigments
- Light Impressions Renaissance paper 3136 (non-buffered, 150 gsm)
- Escal™ Ceramic Barrier Film (polypropylene/ ceramic/ polyethylene)
- 3M 850 Polyester Silver Film Tape
- Filmoplast® P 90 Tape
- Artists' Water Colour Winsor and Newton
- Klucel® G

Material used for the reconstruction of the glass, gold lines and mat:

- Borofloat glass (borosilicate), 2mm, Swift Glass Co., NY
- Gelatin capsule, Rochester Art Supply, NY
- Gold Leaf 23K Giusto Manetti, Rochester Art Supply, NY
- Kremer powder pigments
- Aquazol® 500
- Gilder Specialty Products Back Up Black, Sepp Leaf Products
- 100% rag photo board, non-buffered, 2-Ply Vellum, by Parsons Paper Co.
- Artists' Water Colour Winsor and Newton

EVALUATION

The plate is physically and chemically secured in its original housing. All the elements of the housing were stabilized and reused when reassembling the package, except the failed binding tape and blue interlayer paper (both are enclosed inside the package). The missing cover glass has been identified as a reverse painting on glass, and reconstructed based on the design of the other painted glass of the *Manila Daguerreotypes.*

The plate, originally fixed to a thin blue paper by dots of wax (the failure of which caused shifting) is now held in a paper double tray. As humidity and pollutants contained in the air cause chemical degradation of the daguerreotype, the plate was isolated from the exterior atmosphere inside a semi-sealed package. The backing board was then attached using a paper tape tinted in the same color as the original.

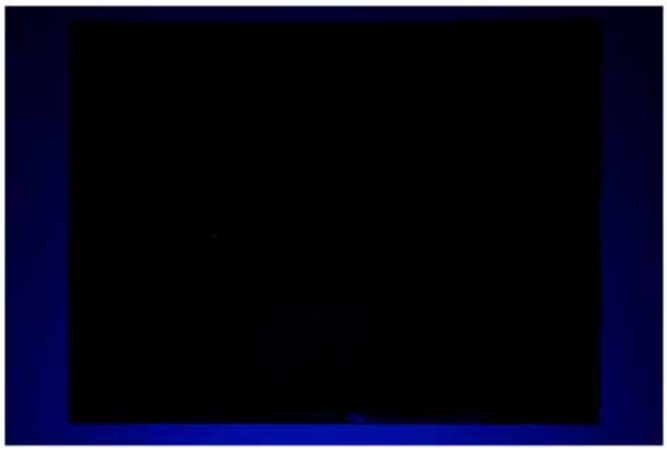
L20070328005_BT_PLATE_NOR_R.tif

L200703280005_BT_PLATE_SPE_R.tif

L200703280005_BT_NOR_PLATE_Vplate up side down.tif

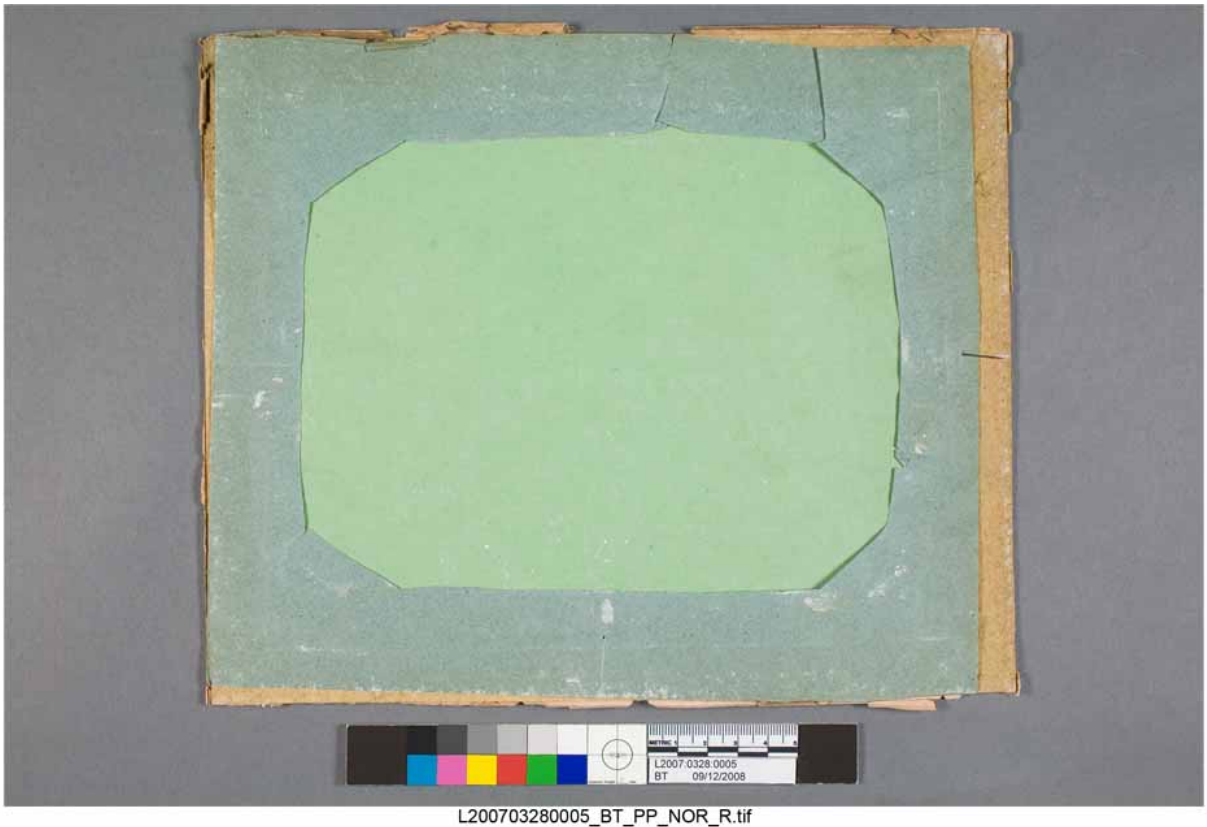
L200703280005_BT_PLATE_UVA_R.tif

L200703280005_BT_PLATE_UVA_V.tif



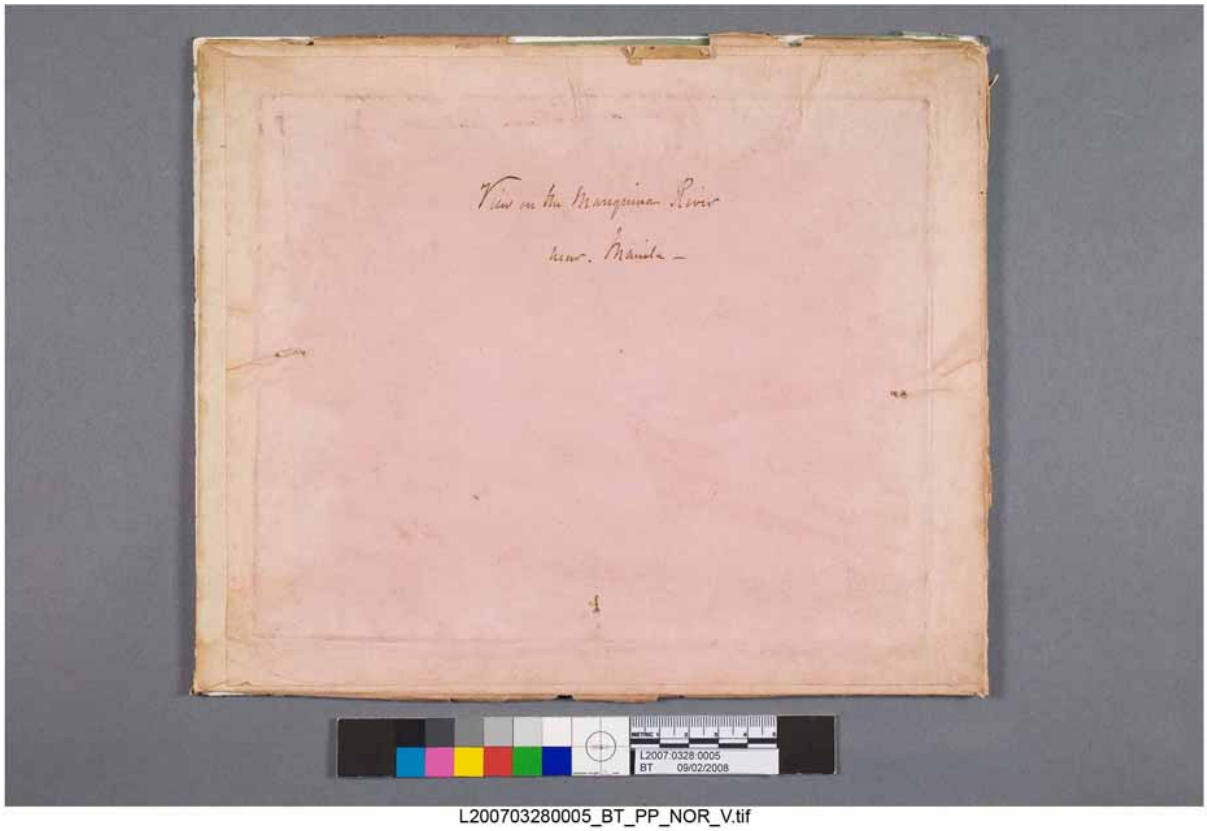
L200703280005_BT_PLATE_UVC_R.tif

L200703280005_BT_PLATE_UVC_V.tif

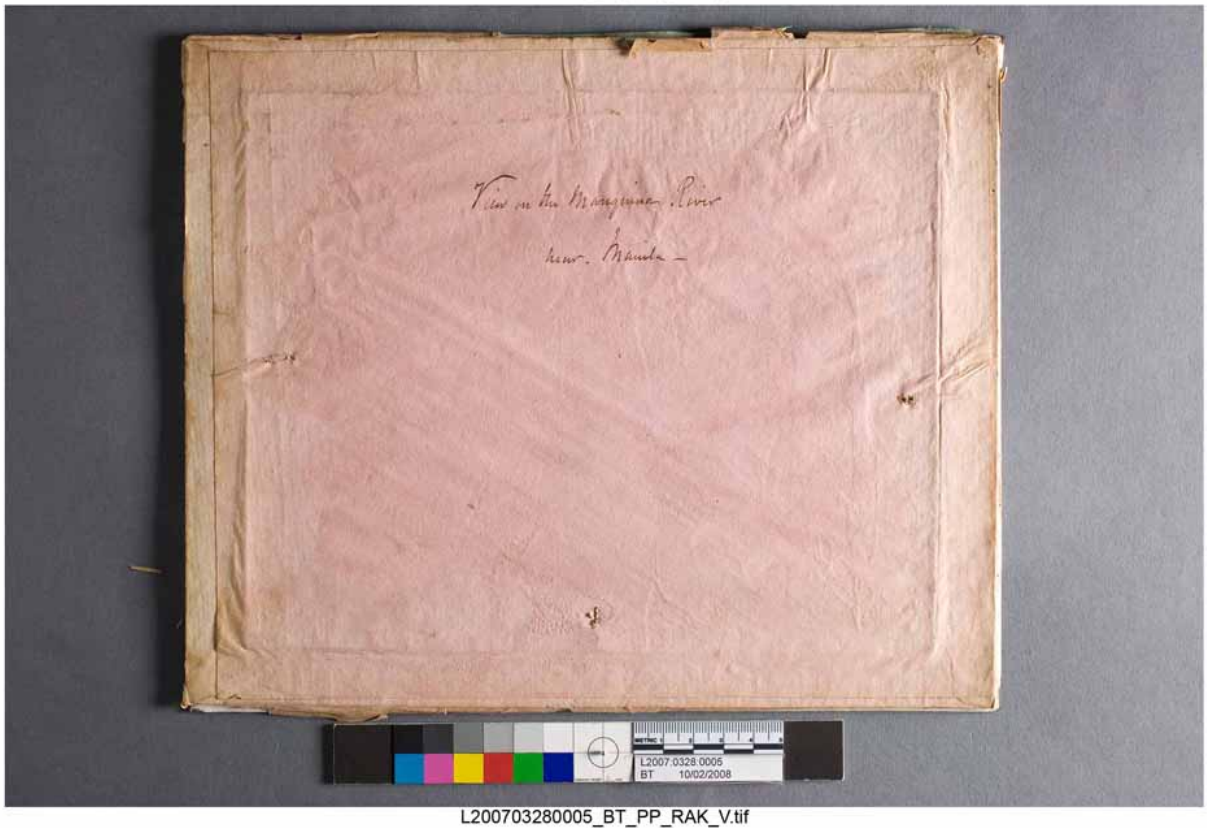


L200703280005_BT_PP_NOR_R.tif

L200703280005_BT_PP_NOR_OPENED.tif



L200703280005_BT_PP_NOR_V.tif



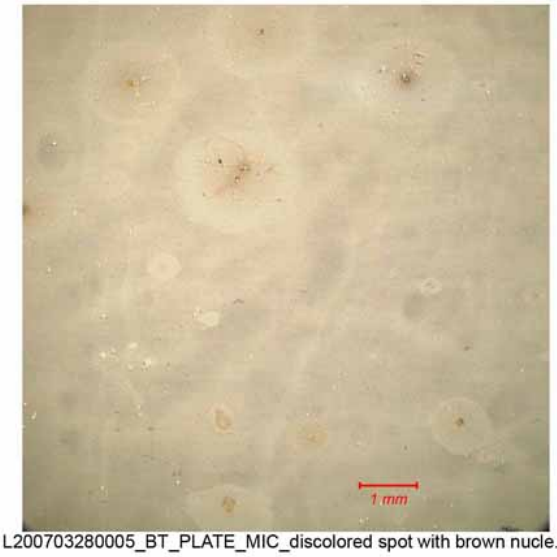
L200703280005_BT_PP_RAK_V.tif

L200703280005_BT_PLATE_NOR_halllmark_BLC.tif

L200703280005_BT_PLATE_NOR_hallmark_TLC.tif

L200703280005_BT_PLATE_MIC_white accretion(x32)_BC.tif

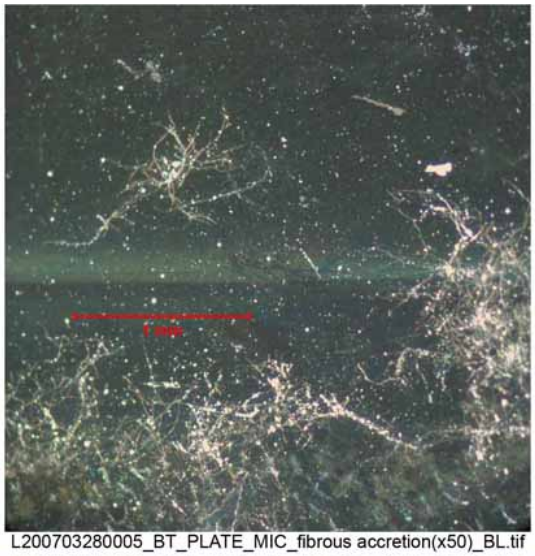
L200703280005_BT_PLATE_MIC_brown accretions(x50)_LC.tif



L200703280005_BT_PLATE_MIC_discolored spot with brown nucle...

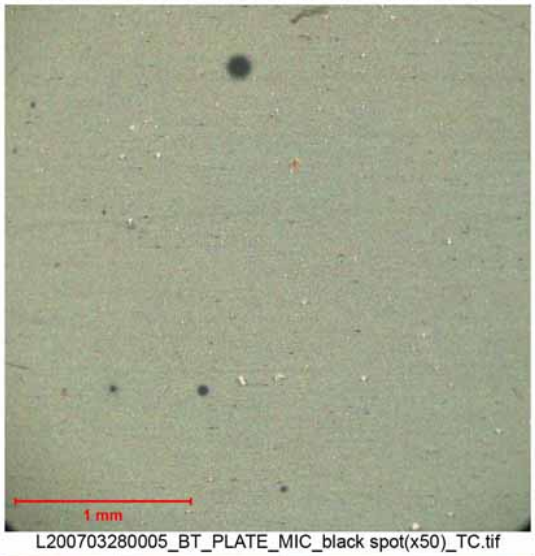
L200703280005_BT_PLATE_MIC_transparent loose accretions like ...

L200703280005_BT_PLATE_MIC_fibrous accretion(x12.5)_BL.tif

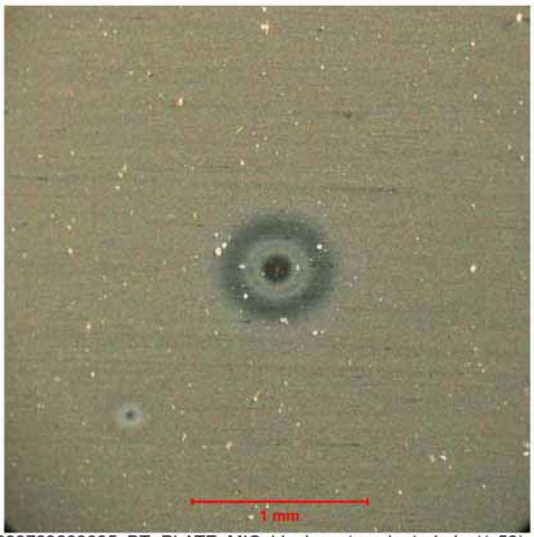


L200703280005_BT_PLATE_MIC_fibrous accretion(x50)_BL.tif

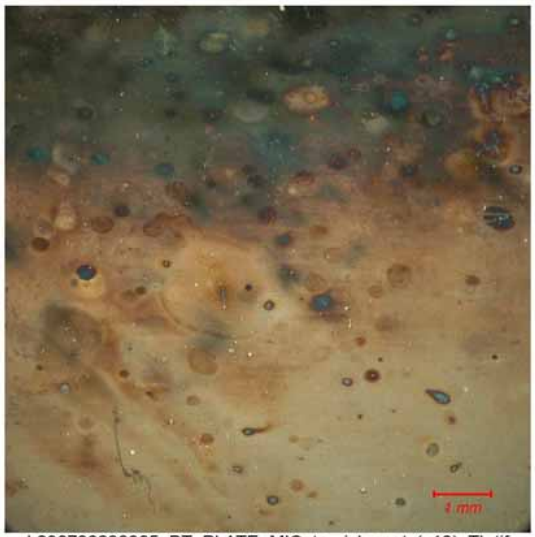
L200703280005_BT_PLATE_MIC_black spot_accretions_pitting(x5...



L200703280005_BT_PLATE_MIC_black spot(x50)_TC.tif



L200703280005_BT_PLATE_MIC_black spot nucleated_dust(x50)_...

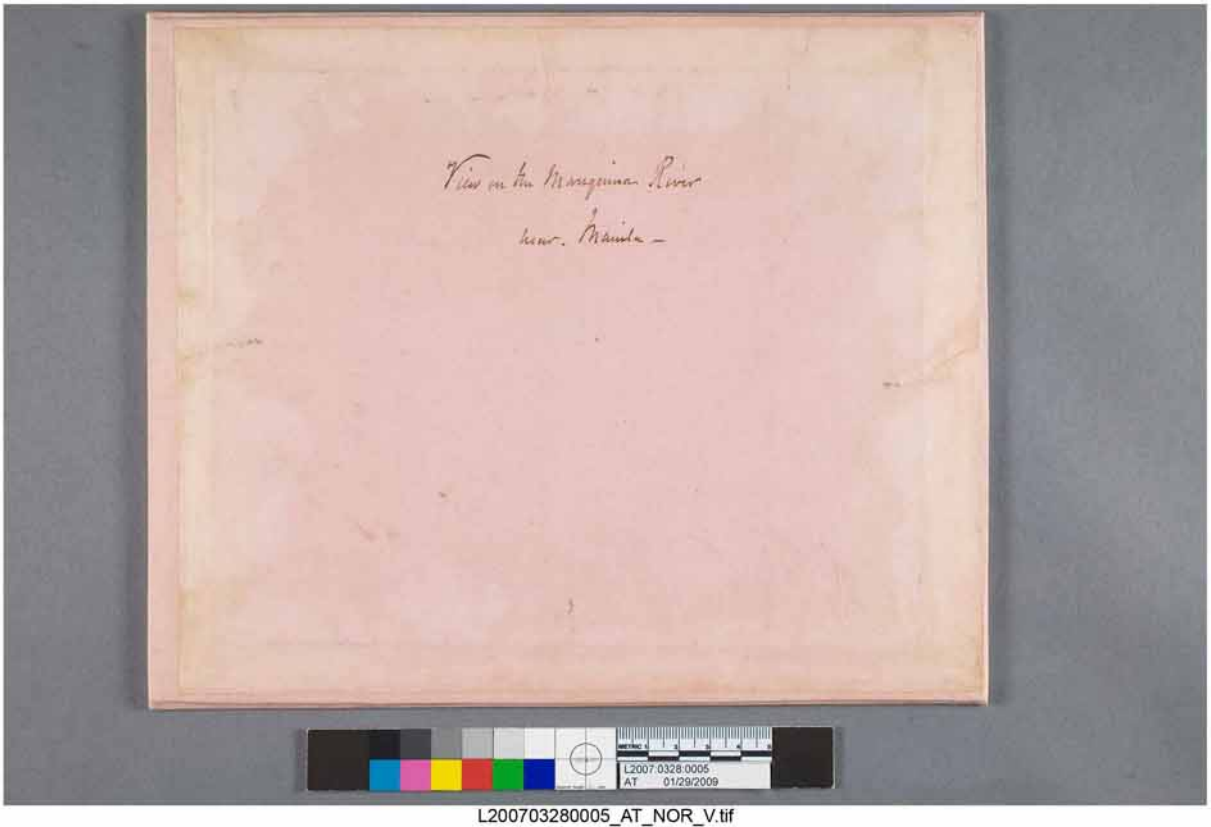


L200703280005_BT_PLATE_MIC_tarnish spots(x16)_TL.tif

L200703280005_DT_PP_NOR_V.tif

L200703280005_AT_SPE_R.tif

L200703280005_AT_NOR_R.tif



L200703280005_AT_NOR_V.tif

ADVANCED RESIDENCY PROGRAM IN PHOTOGRAPH CONSERVATION

George Eastman House
International Museum of Photography and Film
900 East Avenue
Rochester, NY 14607
tel: 585-271-3361
fax: 585-271-4405

Conservator: Caroline Barcella ***Date:*** 03/18/2008

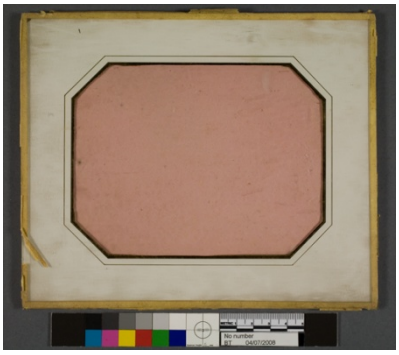
Authorization for treatment: Patrick Lenaghan

EXAMINATION RECORD

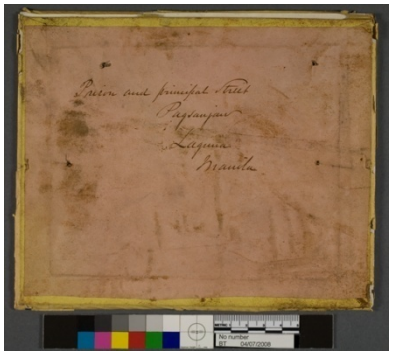
IDENTIFICATION

Artist:	Unknown	**HSA No.:**	174996
Title/subject:	"[Prison] and principal Street PagSanJan Laguna Manila"	**GEH No.:**	L2007:0328:0009
Date:	Ca. 1840's-1850's	**Owner:**	Hispanic Society of America
Country of origin:	Philippine Islands	**Provenance:**	Gift of Charles Massa (1929)
Process:	Daguerreotype	**Format:**	½ plate

Recto of the plate, before treatment



Recto of the passe-partout, before treatment



Verso of the passe-partout, before treatment

DESCRIPTION

Housing

Passe-partout: ☒ complete ☐ incomplete ☒ separated from the plate ☐ contains the plate
Dimensions (h x w): 17,5 x 21.1 cm
Inscriptions:
- handwritten in ink on the baking paper: "[Prison] and principal Street PagSanJan Laguna Manila"(TC).
- letters in pencil, partly hidden under the backing paper, written on the tape (TL). Appeared as the initial "CG" after removal of the baking paper.

NB: The plate and the housing were found separated and reassembled at the HSA based on logic and proximity.

Mat:

☐ Paper mat / ☒ Reverse-painted glass Color : white
Window shape: ☐ oval ☒ octagonal ☐ rounded rectangle
With: ☐ golden bevel ☒ lines ☐ opaque coating on the back ☒ Interlayer blue paper underneath
NB: The white material on the verso of the glass has a thickness of 1-1.5 millimeters. It has been identified as calcium carbonate (chalk, see analyses in appendix).
There are 3 lines following the shape of the window opening: 1 broad golden line on the inside (2.5 mm) divided by a thin black line, followed by an outermost golden line 0.4 mm beyond. The materials were applied on glass in the following order: golden lines, black lines, and chalk. The golden material was identified as gold (see analyses in appendix).

Glass:

Thickness: 2 mm

Binding tape:

☒ original tape Color: yellow ☐ retaping (No:) Color:

Backing:

Strawboard with access door ☒ pins (No: 4) ☐ hanging ribbon
Exterior facing paper: ☒ sheet Color: pink ☐ strips Color:
Interior facing paper: ☒ sheet Color: pink ☐ none

Plate

Dimensions: 12 x 16,2 cm Recto: gold-toned Verso: copper
Corners: ☒ unclipped ☐ bent **Edge:** ☐ crimped
System of mounting: ☒ drop of wax ☐ adhered paper
Hallmark/ Inscription: press- stamped: [30] (top half cut off,1 x 3 mm, BL) and DAGUERREOTYPE (2 x 18 mm, BL)*

* see image detail

CONDITION

Previous Treatment: none

Housing	**General condition :** ☐ excellent ☐ good ☒ **fair** ☐ poor
Mat:	☒ dust (verso) ☐ dirt ☒ stains (verso) ☒ losses (TLC, TL) ☐ other: *NB:* The loss in TL seems to have been caused by a pin sticking up from the backing board. The inner gold line of the mat presents irregular edges. The paint seen through the glass appears lighter in some areas (mostly around the edges). The interlayer blue paper is torn in two pieces, cockled, and shows many folds. Residues of wax are attached to the surface. The location matches with the residues found on the back of the plate. White powdery deposits appear on the face in contact with the chalk, and unidentified red/brown powder appears on the opposite face.
Cover glass:	☐ missing ☐ crack ☐ loss ☐ other: *Outer face*: ☒ dust ☒ dirt ☐ scratches ☐ other: *Inner face*: ☒ interference colors (perimeter, especially pronounced on BL) ☒ surface haze (L edge, R edge) ☐ weeping glass ☐ crystal visible under magnification ☒ other: white powdery accretion visible OA could be residues from the chalk, or crystal formation from glass deterioration*
Binding tape:	☐ dust ☒ dirt ☒ abrasion ☒ tear (OA) ☐ loss ☒ failed (T, L, R edges) ☐ other:
Backing:	☒ dirt ☒ stain ☒ abrasion ☐ tear ☐ loss ☐ other: *NB:* The inner lining paper shows two stains reflecting approximately the wax dots on the blue paper

Plate	**General condition:** ☐ excellent ☐ good ☐ fair ☒ **poor**

For the exact location of the deterioration, see the schemes next page

Surface condition:

1. accretion : few, mostly located on the center part, white in color *.
2. fibrous accretion : concentrated on the perimeter. Only visible under microscope, showing a “mold-like” appearance. White in color *.
3. residue : possibly wax residues, as appear on the back of the plate *.
4. other

Physical deterioration:

5. abrasion: numerous, randomly distributed. Caused by surface contact. Fingerprints also generated abrasion of the surface.
6. blisters
7. dent
8. exfoliation: small, on the perimeter of the losses due to previous exfoliation *.
9. loss: some due to exfoliations on the left and lower edge, and numerous due to surface contact *.
10. pitting
11. planar distortion
12. scratch: numerous with various shapes and directions. A flat object, possibly the passe-partout, seems to have scratched the right and left edges by moving laterally (wave-shape scratches).
13. other

Chemical deterioration:

14. corrosion stain: numerous in the center part. Appear as red or brown in the center, often nucleated *
15. fingerprint: numerous on the perimeter. They abraded the surface, and generated tarnish.
16. tarnish – brown/yellow
17. tarnish – grey/black
18. tarnish – interference color
19. tarnish – whitish cloudy film

    Other: tarnish – blue
    tarnish– purple
    bluish cloudy

The plate is highly tarnished below a horizontal line located on the upper part. This clear delimitation could indicate that the plate fell off its passe-partout, leaving the lower part exposed to air. However it has to be noticed that the binding tape failed on the top of the passe-partout, which seems to be original. The origin of the tarnish shape is then unclear.

20. tide line: along the right and left edge, due to processing treatments.
21. other (tarnish)

    21a: faded spot: 3 spots with sharp edge showing a light yellow color nucleus, and surrounded by color rings (purple/green/black)*. They fluoresce yellow under UVC.

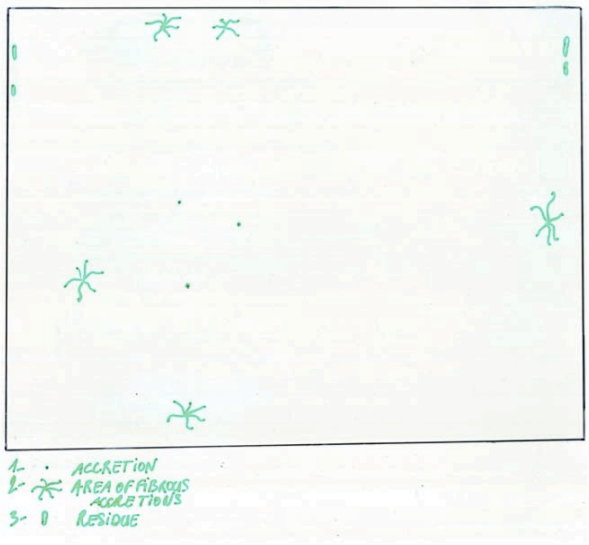
    21b: shape of a mat: octagonal, corresponds to the opening window of the passe-partout. Both don’t match however, which could be explained by the shifting of the plate, or by the fact that the plate was originally kept in another passe- partout.

Verso of the plate:

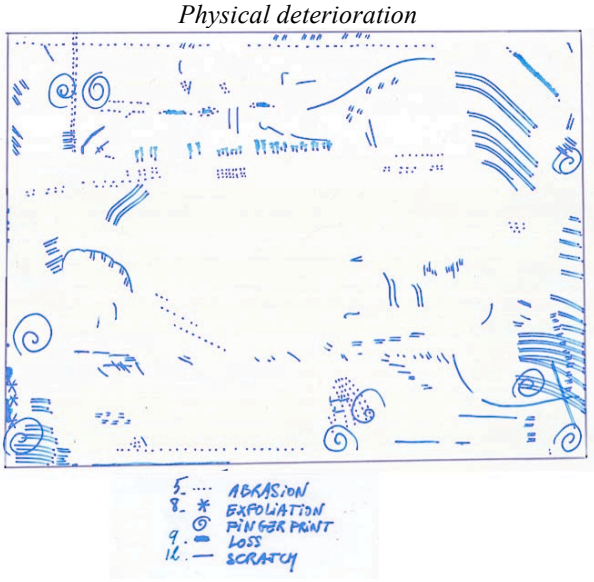
22. accretion: small amount of wax adhere in the lower right and left corner, upper left corner and top right edge. They match in location with the residues present on the blue interlayer paper. They fluoresce blue/green under UVA and UVC.
23. stain 24. Other: note that the verso does not fluoresce yellow under UVC, unlike the other plates of the *Manila Daguerreotypes*.

* see image detail

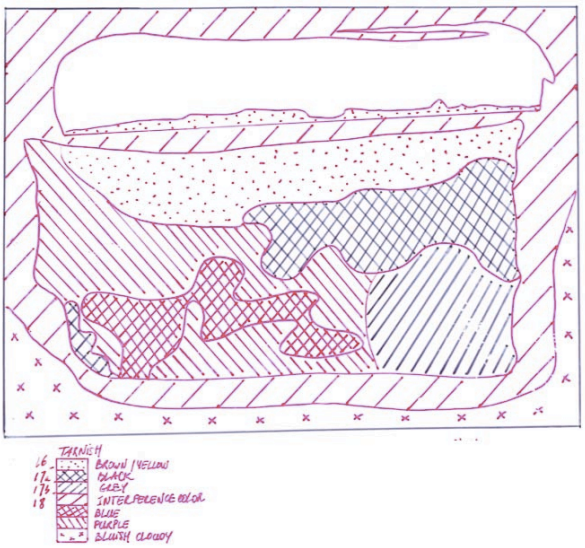
Surface condition



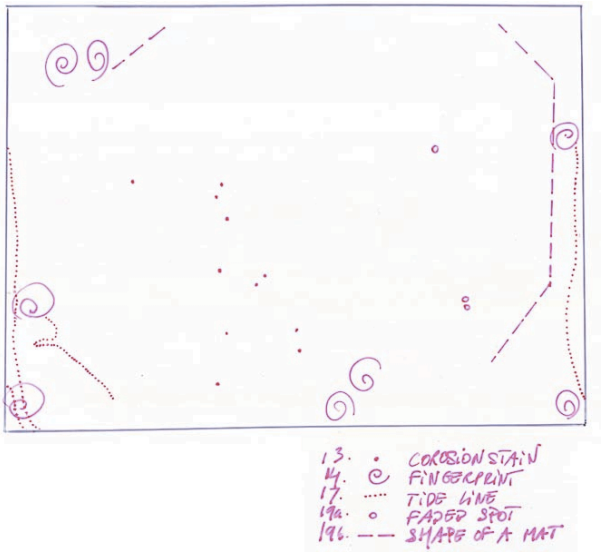
Physical deterioration



Chemical deterioration ½



Chemical deterioration 2/2



TL	TC	TR
CL	C	CR
BL	BC	BR

TLC — TRC

BLC — BRC

T = Top
B = Bottom
L = Left
R = Right
C = Center (or corner)
OA = Overall

TREATMENT PROPOSAL

• Document the object before, during and after treatment (see the guidelines of the photo documentation in appendix)

Housing:

• Requires opening the package and removing the plate: ☐ yes ☒ no/already out of the housing
• Repair element of the backing (paper, board): remove and consolidate the external lining paper
• Treatment of the cover glass: ☒ cleaning, ☐ replacement, ☒ treatment of the reverse painting on glass (consolidation and infilling)
• Recreate missing elements: binding tape
• Stabilize the plate inside the housing
• Reassemble the package

Plate:

• Remove accretions
• Consolidate exfoliation

Custom secondary housing:

• Make new housing

TREATMENT REPORT

Steps of treatment	Description
Documentation and storage	• The plate and the housing were examined and documented. • As the designated passe-partout holds an inscription matching with the view of the plate, it was decided with the HSA to reassemble them together. Note that there is no technical evidence confirming that the passe-partout originally belongs to the plate. The "Manila Daguerreotypes" ensemble includes a backing board without any plate that may have been the original housing as well (We ignore what was the subject of the missing plate). • The bare plate was kept in the protective housing used for transportation, and enclosed in a polyethylene zip bag in order to avoid fluctuation of RH. Climate at the GEH photograph laboratory was maintained at 40% RH (+/- 10% per 24h) and 70 ºF (+/- 5 ºF per 24h)
Treatment of the external lining paper *Cleaning:* *Removing:* *Washing:* *Lining:*	• The backing board and the cover glass were separated by cutting the sections of the tape still functioning with a blade inserted in between both elements. • The lining paper covered the original tape. It had to be removed in order to be cleaned and consolidated, to uncover the pencil inscription partially visible on the tape, and to allow the re-binding of the package to remain as it was. • After dry cleaning with Staedtler eraser in crumbs followed by Staedtler eraser block, the lining paper was humidified through Gore-tex (24 hours) and then removed. The written inscription (probably in Iron gall ink) is resistant to water; therefore humidification was avoided. • When the lining paper was removed, another inscription (same ink and same hand) was discovered on the backing board: "Main Street Pagsanjan". On the binding tape, the full initials: "CG", written in pencil, could be read. • The detached paper was washed in cold distilled water, and lined with conservation Japanese tissue (close to 9 gsm) and diluted wheat starch paste. • Both the lined paper and backing board were left in a book press for 3 weeks to dry and flatten.
Treatment of the painted glass *Cleaning:* *Consolidating:* *Infilling:*	• The glass was cleaned with a 1:1 water/alcohol solution and cotton swabs. Attempts to clean the interference colors were made using water, warm water, water mixed with calcium carbonate powder, cerium oxide powder, and slightly acetic solution followed by rinsing. None of these treatments were efficient. As confirmed by Stephen Koob (glass conservator at the Corning Museum of Glass), the interference colors are irreversible glass deterioration. As the painted glass is otherwise in good condition, and the location of the deterioration does not disturb the reading of the plate, decision was made to reuse it. The control of the environment inside the package (provided by the re-made housing, appropriate enclosure and proper environment in the storage area) will prevent any further degradation. • The original tape adhering to the glass was removed with the application of blotter strips dampened with water and a blade, then washed in cold water and flattened. • The powdery surface of the white paint was consolidated spraying 3 layers of Lascaux Fixativ 2070 in spray (2% of B72 in xylene/ isopropanol) while a mask was covering the opening window. Consolidation was efficient and neither color shift or tide lines were observed. • The losses of the painting were infilled with mixture of pigments (Kaolin China Clay yellowish and Slat Grey extra light by Kremer, ca 4:1) in 2% Aquazol 500 diluted in ethanol. The infilling can be easily removed by gently digging in it, as it is softer than the original material. Although a thick mixture was used, limiting the amount of solvent carried out, ethanol tends to slightly diffuse into the original material, and eventually creates faint tide lines. This treatment should then only be

	used when the losses are strongly disturbing. Further investigations on consolidation and infilling of reversed painted glass would be needed.
Treatment of the backing board	• Japanese tissue Tengucho 7.5 gsm was applied on the original tape with Klucel G 8% in ethanol in order to avoid direct contact with the new tape. Pieces of tape removed from the cover glass were then infilled at their original location. On the internal face of the board, strips of Tengucho 11 gsm were pasted around the access door to secure it. This securing system was needed since the external lining paper, which first assured this function, will not be re-lined on the board.
Fixing the plate inside the package	• The plate was dusted with blown air using a rubber bulb, in order to remove loose accretions. • The plate was placed in 2 paper trays (Rennaissance) sliding in each other. This custom-made holder maintains the plate in place while preserving the original thickness of the package. Choice of paper used was made as it is commensurate the original material, has good handling properties, and will act as a buffer in case of humidity variation inside the package.
Assembling the housing	• An interlayer of Renaissance paper was added between the chalk and the plate, and a sheet of Escal barrier film was placed underneath the plate holder. Cover glass, interlayer paper, plate in holder and Escal were bound together with one strip of 3M 850 Polyester Silver Film Tape. This system constitutes a semi-sealed package isolating the plate from the backing board and from humidity and pollutants in the atmosphere. The binding was performed in a dry atmosphere (35% HR). • The original tape on the backing board was folded over on the inside, then the board was assembled with the plate package using 4 strips of Filmoplast P90 previously tinted to the color of the original with watercolors (Cadmium Lemon, Cobalt Blue, Burnt Sienna and Raw Sienna). A window was opened in the Filmoplast in order to see the inscription in pencil on the original tape. • The blue interlayer paper and the residues of original tape were placed inside the package, in between the Escal and the backing board. • The lining paper was reattached to the board using a floating technique. 4 hinges folded over on the inside underneath the paper were pasted to the board with Klucel G in ethanol at 8%. If needed, removal can be easily done to access the covered inscriptions.

Materials used in the treatment (as appeared in the report):

- Staedtler Mars eraser crumbs
- Staedtler Mars plastic eraser
- Lascaux Acrylic Fixative 2070 (2% B72 in xylene/ isopropanol)
- Wheat starch paste
- Aquazol® 500
- Kremer powder pigments
- Light Impressions Renaissance paper 3136 (non-buffered, 150 gsm)
- Escal™ Ceramic Barrier Film (polypropylene/ ceramic/ polyethylene)
- 3M™ 850 Polyester Silver Film Tape
- Filmoplast® P 90 Tape
- Artists' Water Colour Winsor and Newton
- Klucel® G

EVALUATION

The plate is physically and chemically secured in its original housing. All the elements of the housing were stabilized and reused when reassembling the package, except the failed binding tape and blue interlayer paper (both are enclosed inside the package). The reassembled package respects the thickness and appearance of the original.
The plate, originally fixed to a thin blue paper by dots of wax (the failure of which caused shifting) is now held in a paper double tray. As humidity and pollutants contained in the air cause chemical degradation of the daguerreotype, the plate was isolated from the exterior atmosphere inside a semi-sealed package. The backing board was then attached using a paper tape tinted in the same color than the original.

CONSERVATION RECOMMENDATIONS

In order to assure a long term preservation of the daguerreotype plates and their original housings, they should be kept in a controlled environment (40%, HR +/-5% per 24 h, stable temperature) and handled with care.
Lighting for exhibition should not exceed 50 Lux (minimal lighting needed for comfortable human vision), and be free of UV radiations.

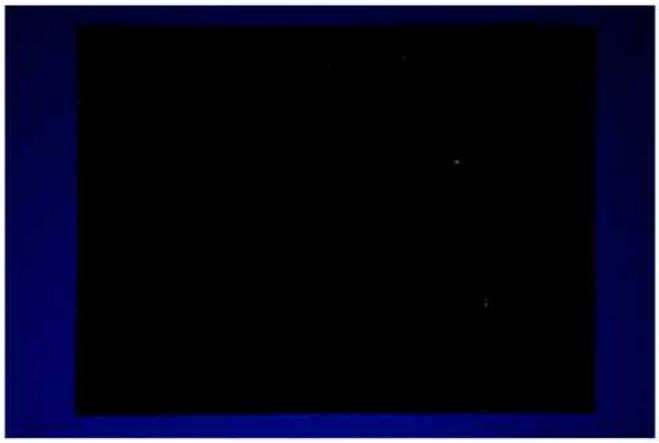
L200703280009_BT_PLATE_NOR_R.tif

L200703280009_BT_PLATE_SPE_R.tif

L200703280009_BT_PLATE_NOR_V.tif

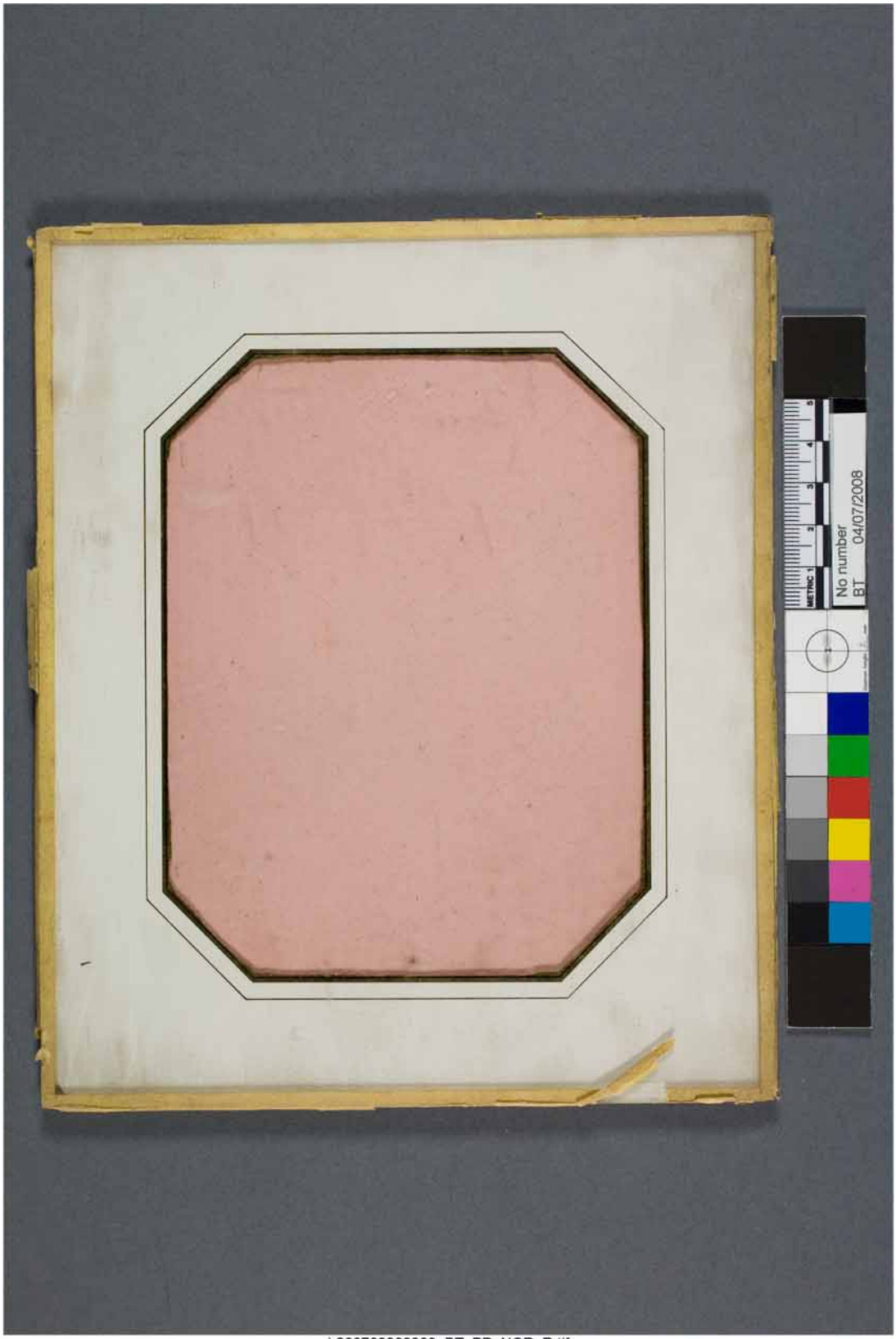
L200703280009_BT_PLATE_UVA_R.tif

L200703280009_BT_PLATE_UVA_V.tif

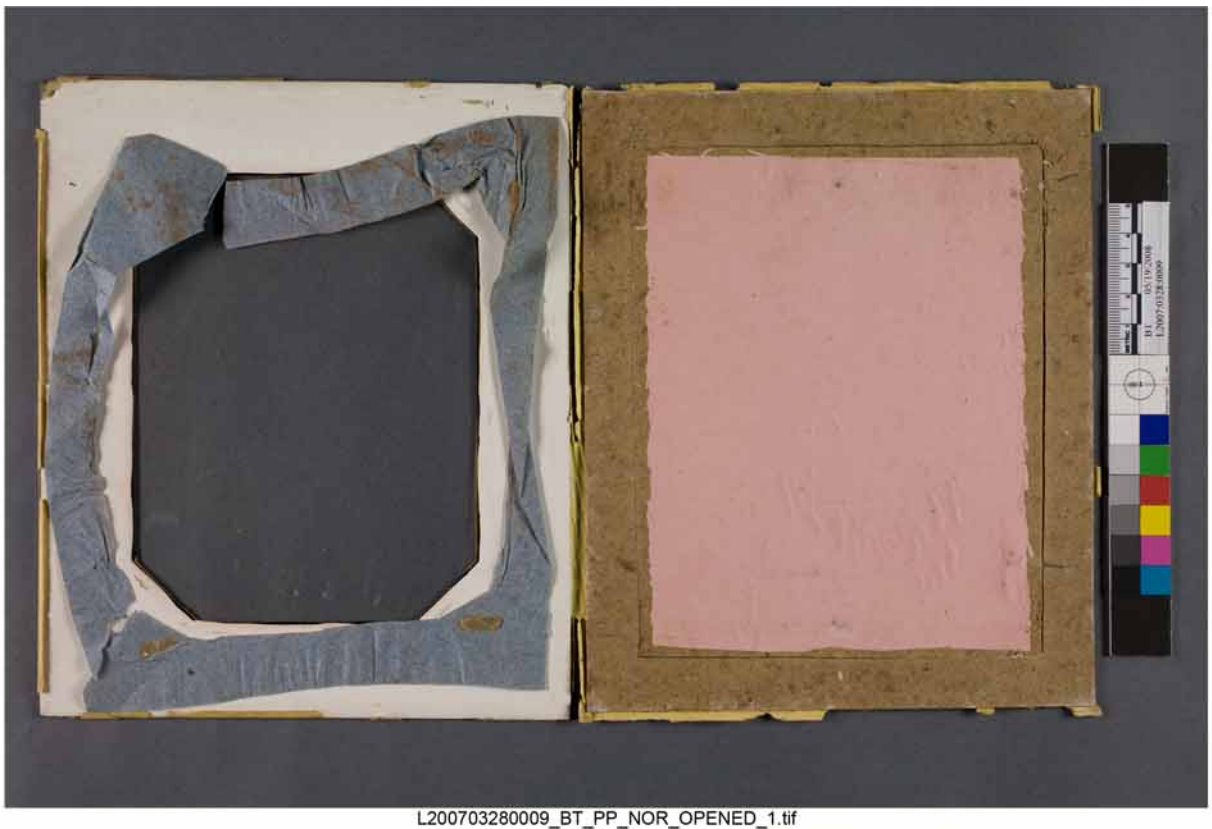


L200703280009_BT_PLATE_UVC_R.tif

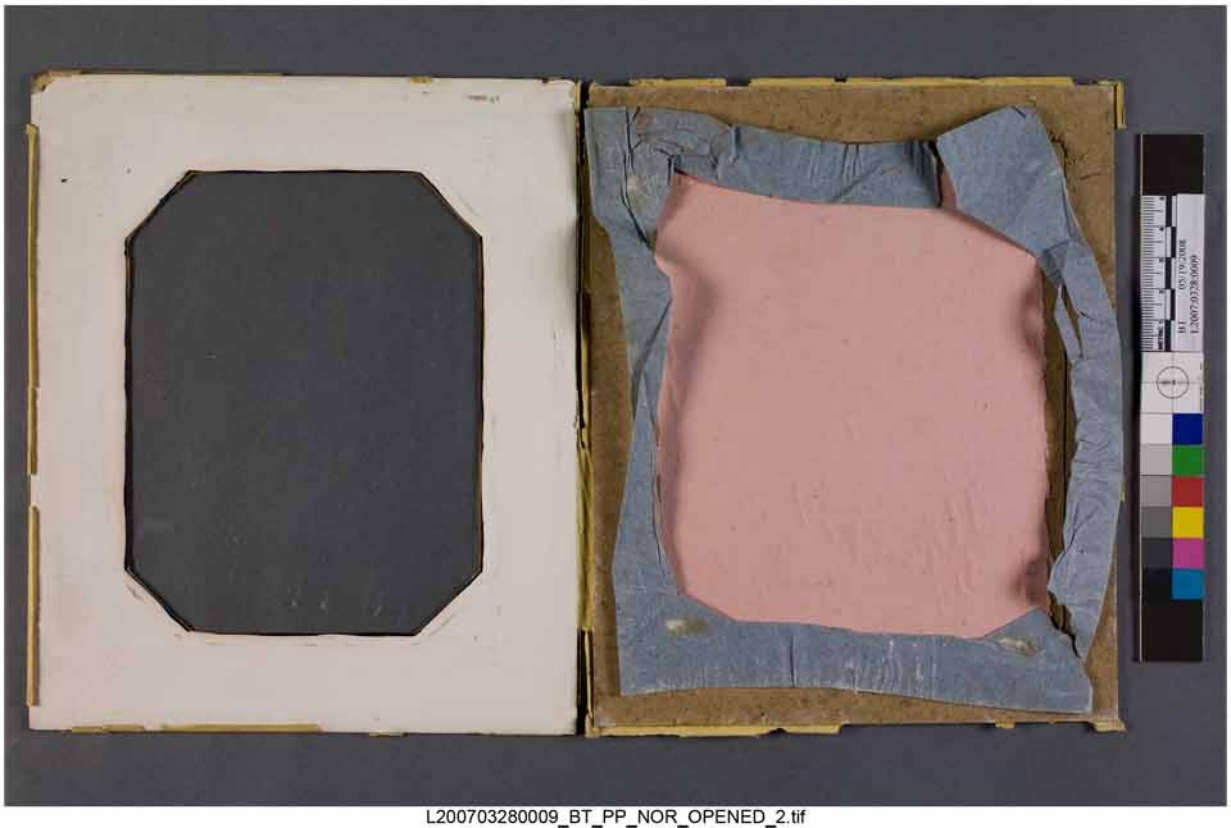
L200703280009_BT_PLATE_UVC_V.tif



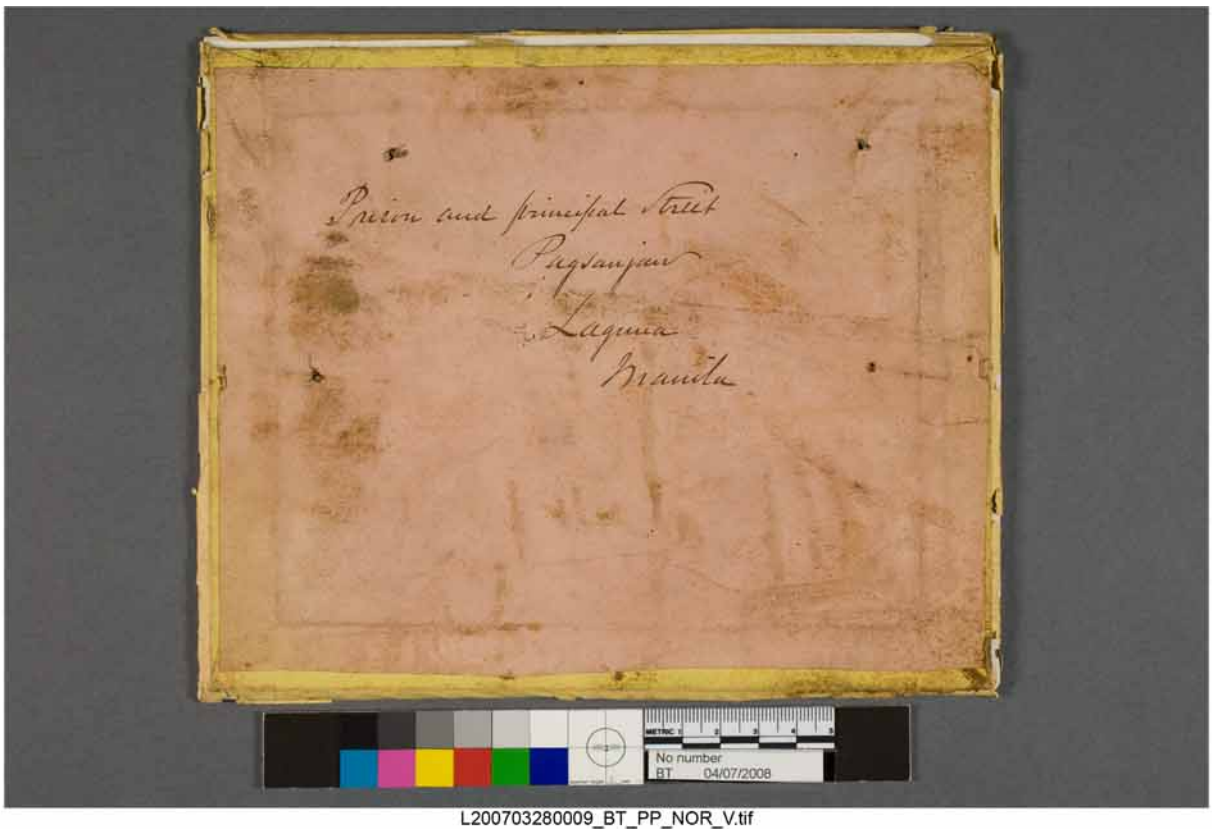
L200703280009_BT_PP_NOR_R.tif



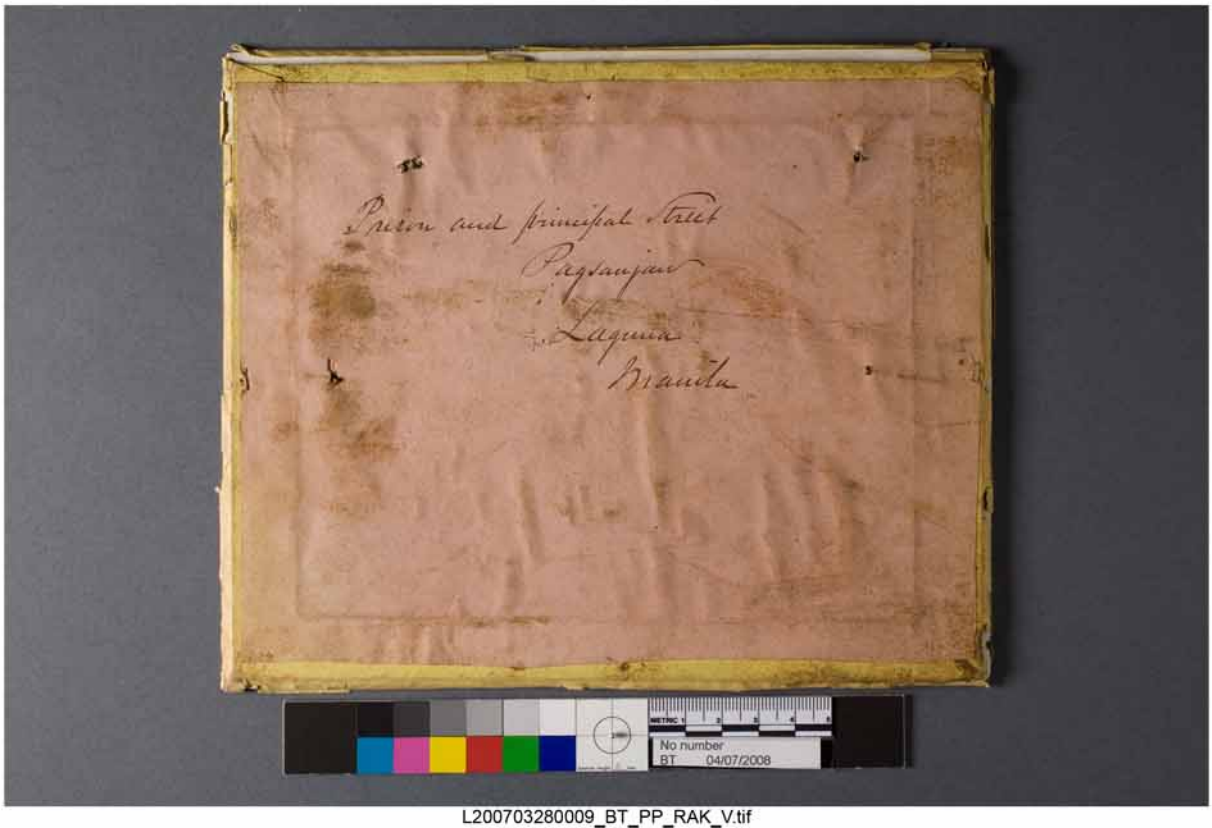
L200703280009_BT_PP_NOR_OPENED_1.tif



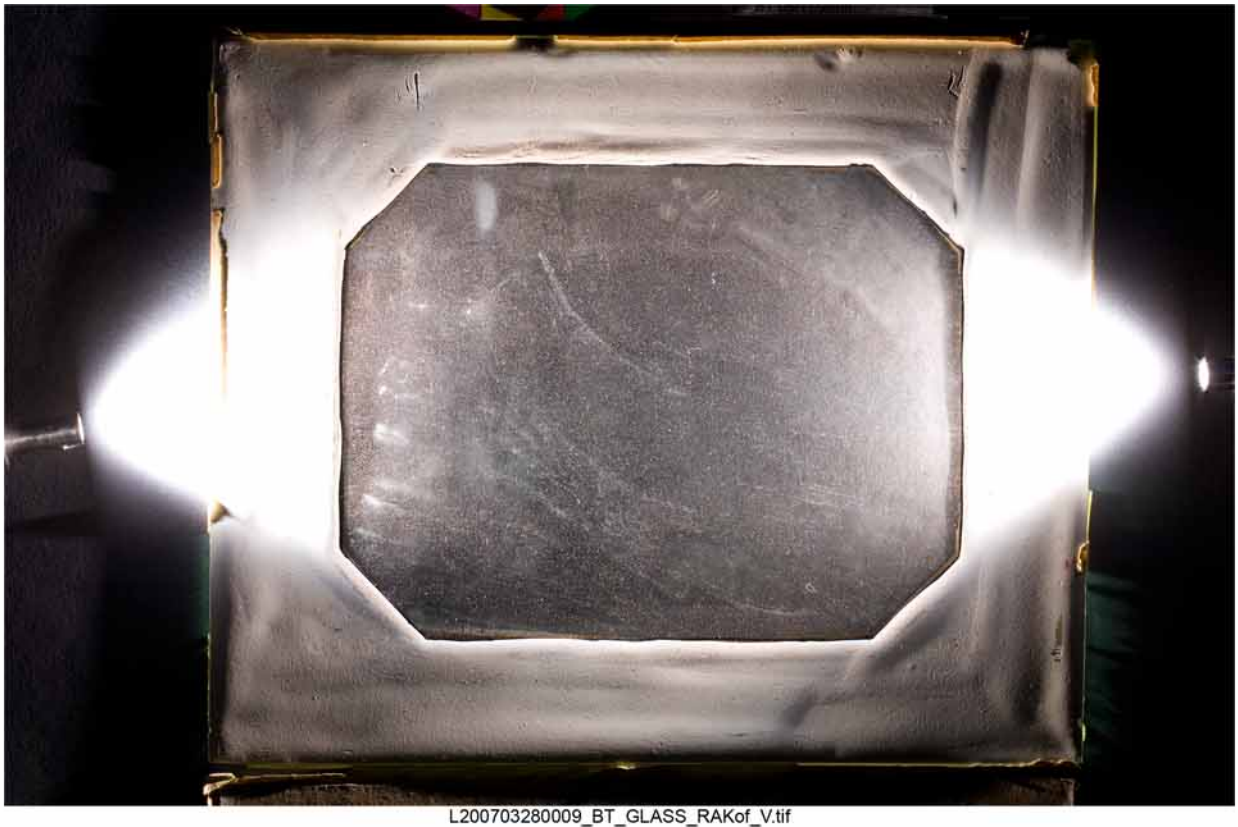
L200703280009_BT_PP_NOR_OPENED_2.tif



L200703280009_BT_PP_NOR_V.tif



L200703280009_BT_PP_RAK_V.tif

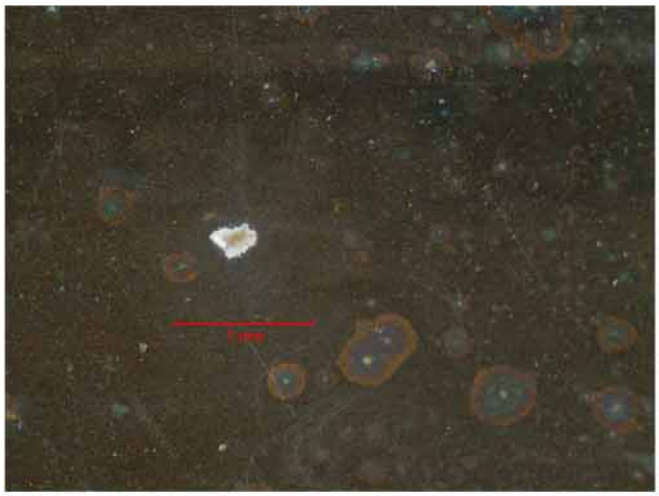


L200703280009_BT_GLASS_RAKof_V.tif

L200703280009_BT_GLASS_SPE_V.tif

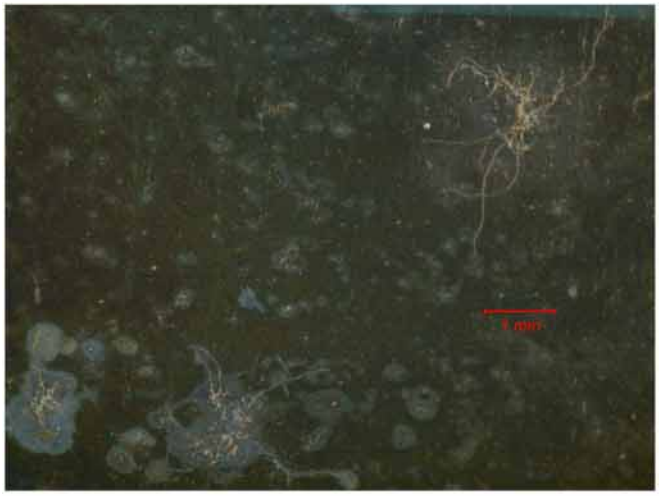
L200703280009_BT_PLATE_RAK_exfoliation & hallmark_BLC.tif

L200703280009_BT_PLATE_SPE_hallmark_BLC.tif

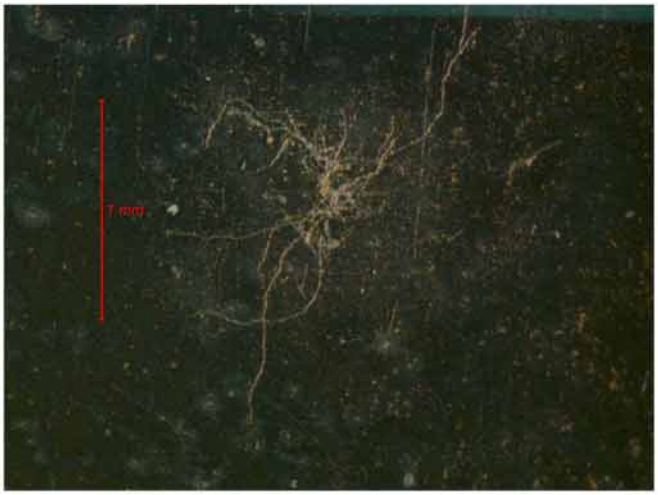


L200703280009_BT_PLATE_MIC_white accretion and tarnish spot...

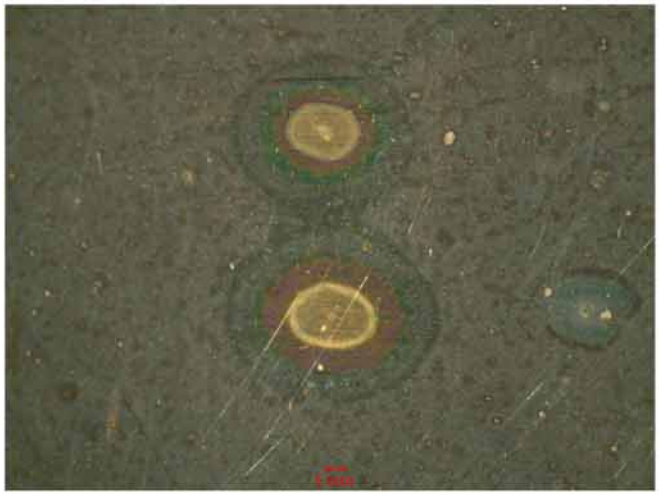
L200703280009_BT_PLATE_MIC_adhesive residue (x10)_TR.jpg



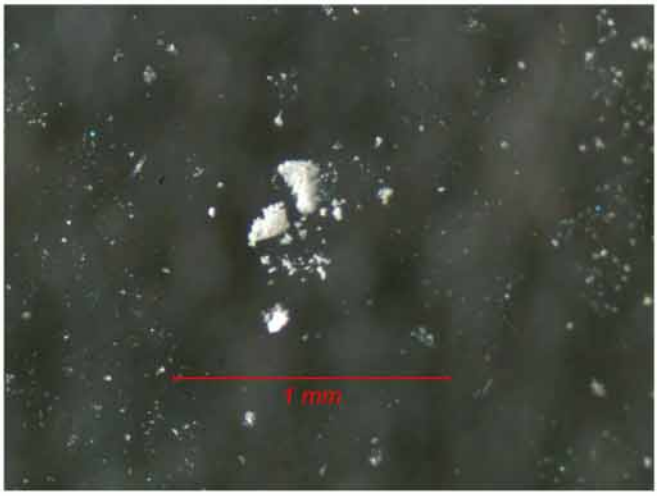
L200703280009_BT_PLATE_MIC_fibrous accretion (x25)_TL.jpg



L200703280009_BT_PLATE_MIC_fibrous accretion (x40)_TL.jpg



L200703280009_BT_PLATE_MIC_faded spot (x6.5)_BR.tif

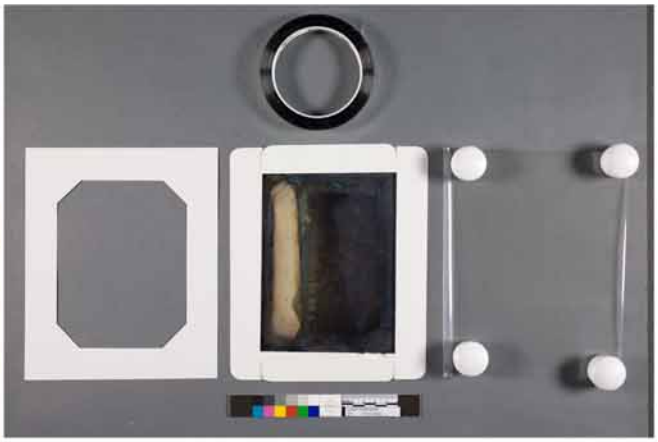


L200703280009_BT_GLASS_MIC_white accretion (x50)_C.tif

L200703280009_DT_BOARD_NOR_V.tif

L200703280009_DT_CLEANED GLASS_SPE_V.tif

L200703280009_DT_PLATE IN HOLDER_NOR.tif



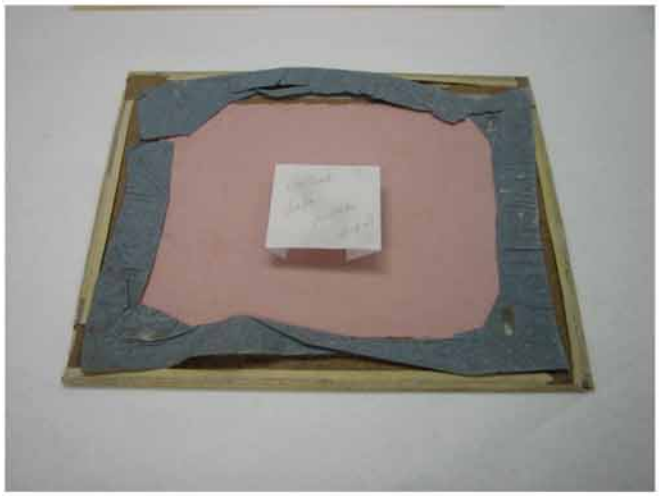
L200703280009_DT_MATERIALS_NOR.tif

L200703280009_DT_SEALED PLATE_NOR_R.tif

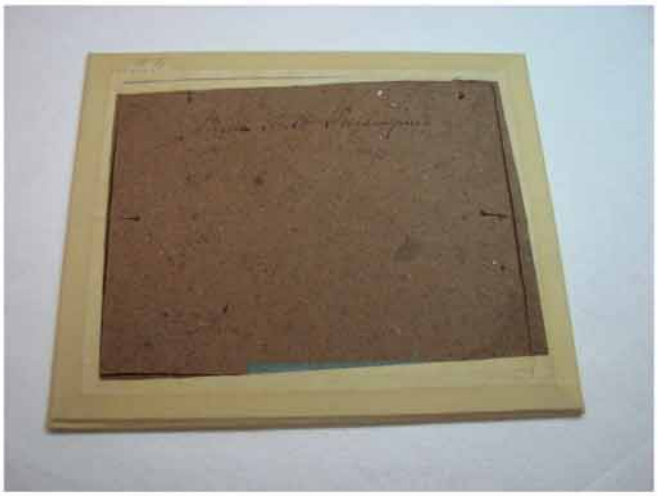
L200703280009_DT_SEALED PLATE_NOR_V.tif

L200703280009_DT_TREATED BOARD_NOR_V.tif

L200703280009_DT_TREATED BOARD_NOR_R.tif

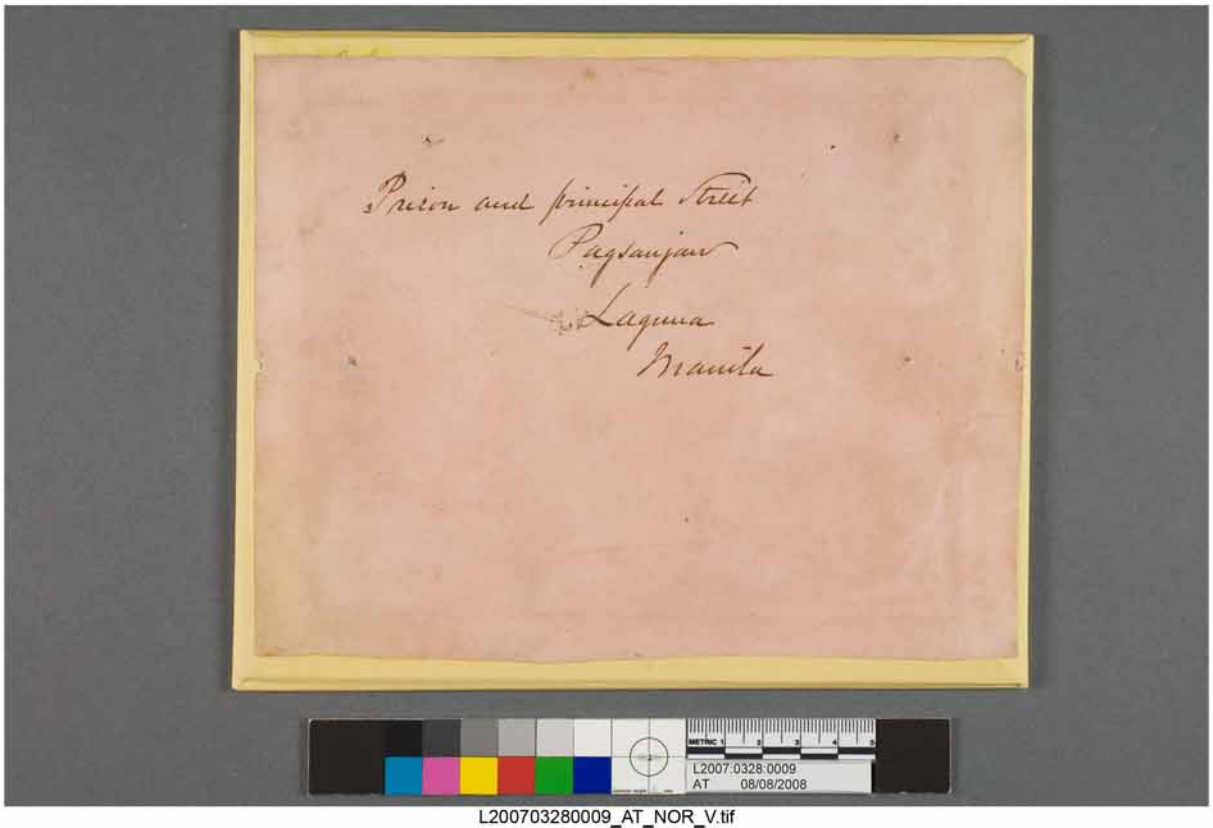


L200703280009_DT_BOARD AND INSERTED ORIGINAL MATE...



L200703280009_DT_BOUNDED PP_NOR_ V.jpg

L200703280009_AT_NOR_R.tif



L200703280009_AT_NOR_V.tif

Appendix 5

FTIR Analyses – results, spectra and correspondence

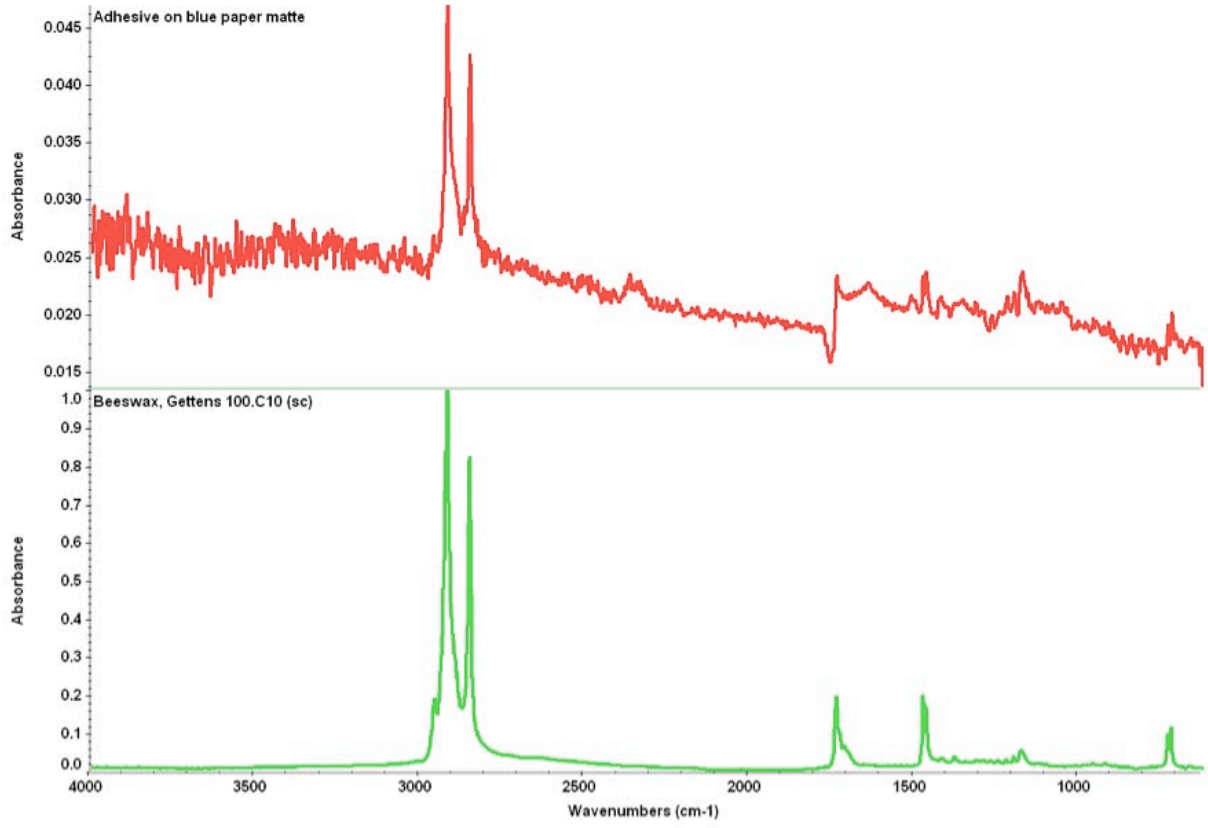
FTIR analyses of various components of Manila's passe-partouts

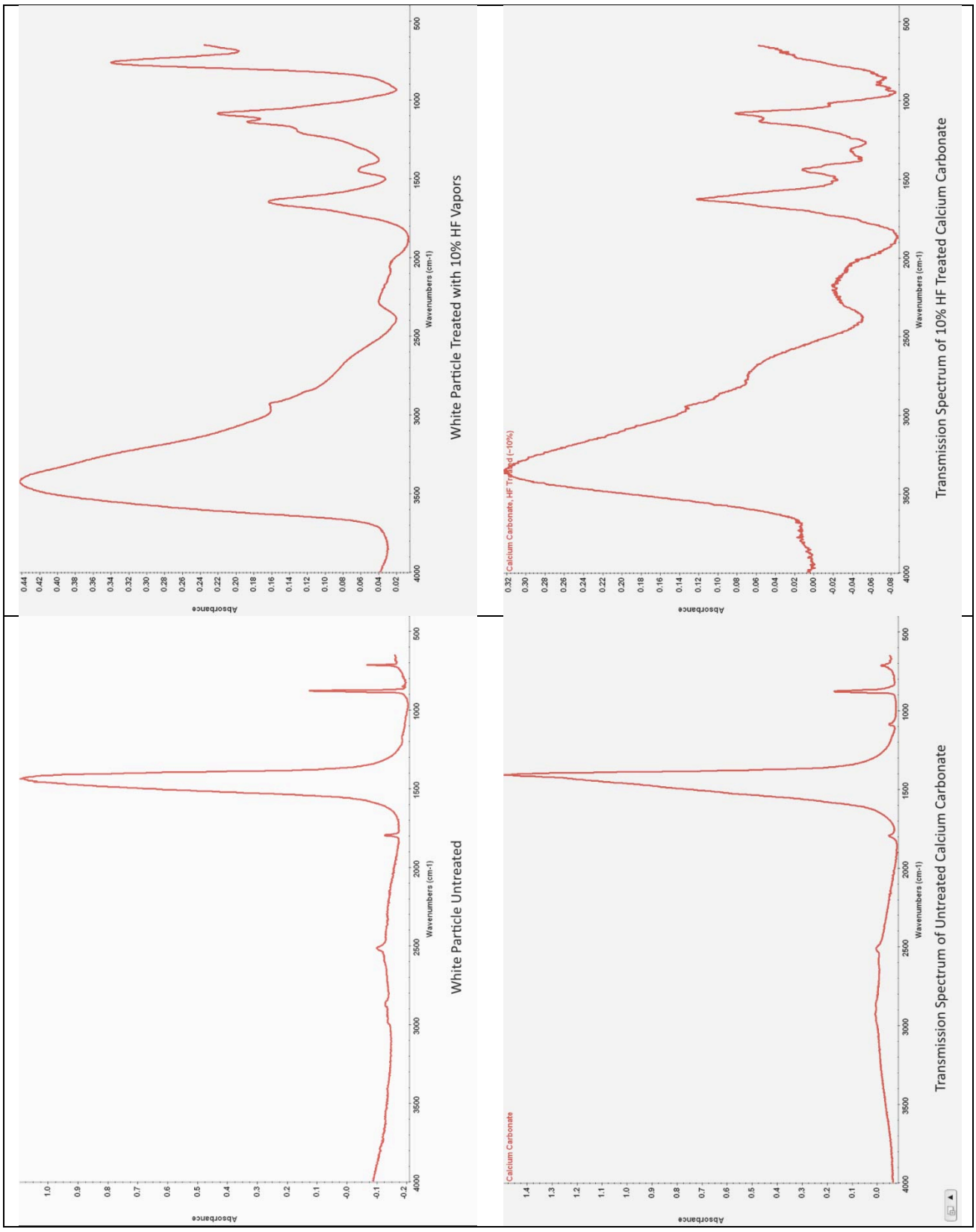
Analyses performed by Gregory Dale Smith at Buffalo State College in June 2008

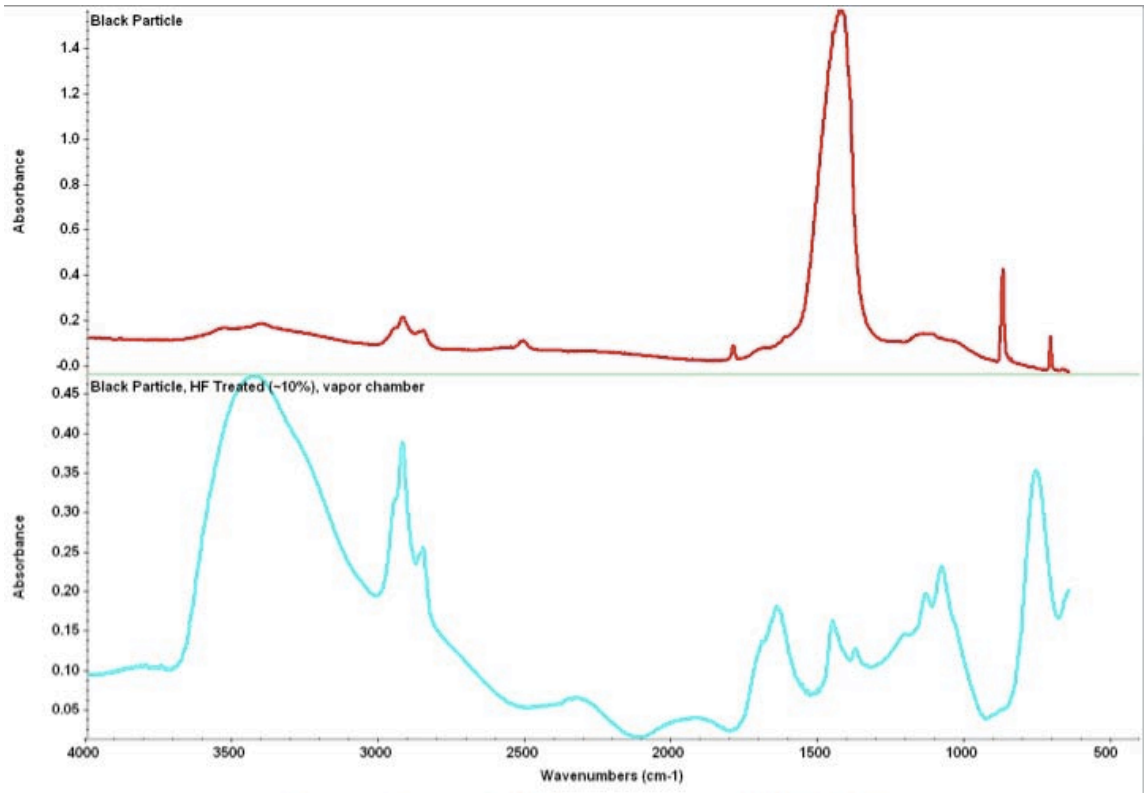
1- Adhesive like wax attaching the plate to the blue paper (L2007:0328:0009) > **Beeswax**

2- White material on the internal side of the cover glass (L2007:0328:0009) > **Chalk**
Extensive analyses have been conducted to establish the presence of a binder. No biding material has been found. If any binder had been used, it is in minuscule quantity.

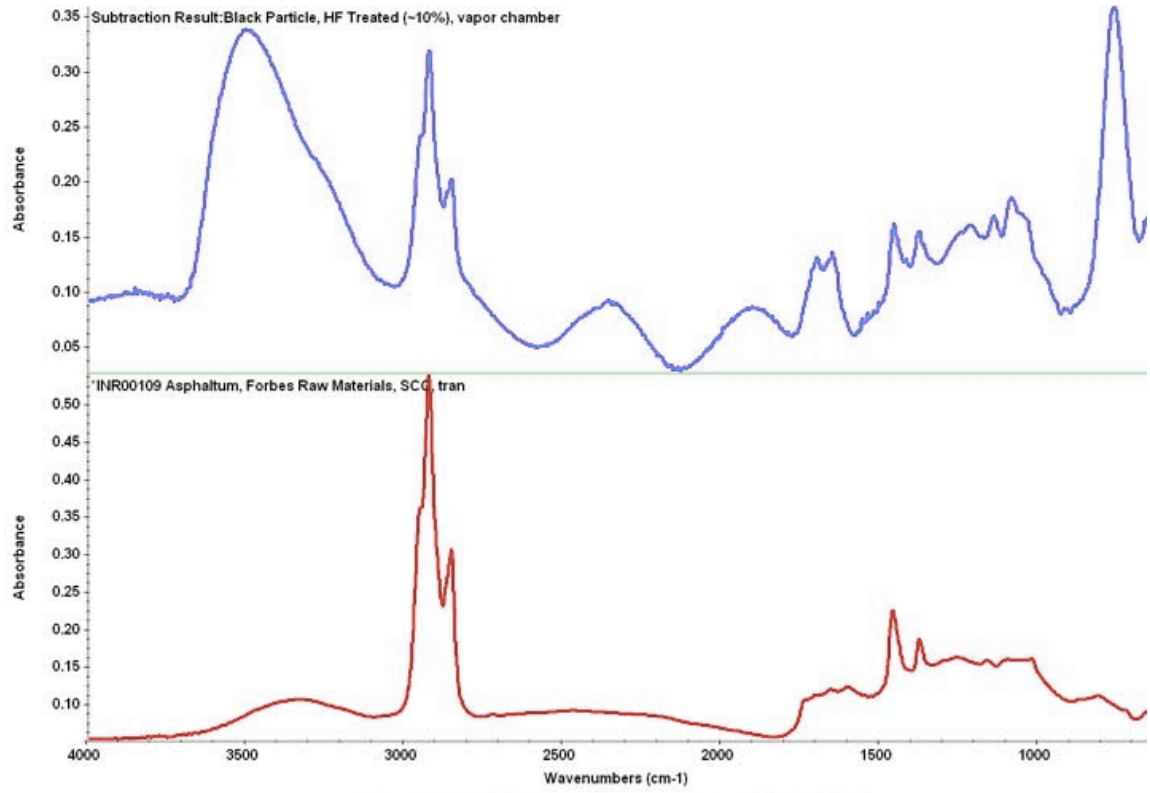
3- Black painting on the internal side of the cover glass (L2007:0328:0015) > **Asphalt**




White Particle Treated with 10% HF Vapors
White Particle Untreated
Transmission Spectrum of 10% HF Treated Calcium Carbonate
Transmission Spectrum of Untreated Calcium Carbonate
Absorbance
Wavenumbers (cm-1)
Calcium Carbonate



Black Particle Before and After Treatment with 10% HF Vapor



Comparison of Subtraction Spectrum and Asphaltum

FTIR analyses
Correspondence with Greg Smith

Le 23 juin 08 à 08:22, Smith, Gregory D. a écrit :

Caroline,

Just wanted to let you know that we are working on your sample. We have tried a couple of methods to get the best possible analysis of any binding medium in the chalky material, and also to analyze selectively the black paint. We have a few more samples to run, but should have an answer for you this week.

Thanks,
Greg

Le 4 sept. 08 à 07:03, Smith, Gregory D. a écrit :

Caroline,

I have attached a set of powerpoint slides from Lisa, who was the undergraduate helping me with the analysis of those daguerreotype gesso materials you brought. Her analysis of the white material was totally unsuccessful in identifying a binding medium by FTIR. We tried direct measurements, solvent extractions, and even hydrofluoric acid treatments. We may not be seeing anything other than chalk by these methods simply because there is not enough material present, the gesso being very underbound.

The black particles were more successful. We treated one sample with HF acid vapors to eliminate the carbonates (chalk) and the resulting spectrum had the residual chalk spectrum subtracted. We then searched the subtraction spectrum through our database of spectra and came up with a convincing hit for asphaltum, which all makes sense.

I am sorry that we weren't more successful with the white sample in identifying how it is held together. There could be other ways of approaching the question, say using GC-MS on an extracted sample, but that would require finding a lab with GC-MS to assist in the analysis.

Thanks,
Greg

From: Caroline Barcella [mailto:cbarcella@geh.org]
Sent: Fri 9/12/2008 4:56 PM
To: Smith, Gregory D.

Greg,

Thanks a lot for these spectra and explanations.
Just a few questions to be sure I understand correctly the spectra:
- The spectrum "White particle, HF Treated (-10%)" shows residues of chalk only, is that it? (I ask the question because the spectrum looks quite different than the one of the chalk.)

- Comparing the spectrum of the" treated black particle" with the reference spectrum of asphaltum, I can see the first one had significant peaks (ca. 3500 and 900) that does not appear on the second one. Is that residue of chalk also, or the asphaltum can it be mixed with something else?

Thanks a lot,
Caroline

Caroline,

The spectra recorded from the samples that have been acid treated may have new bands that correlate to the acid-treated component, namely CaCO3. The same peaks present themselves when we take a pure sample of CaCO3 and treat it with HF, so we know that they cannot be due to any residual binder. In instances where we know the chalk has been mixed with a binder, for instance in gouache watercolors or in grounds from paintings, those peaks are normally trivial in comparison to the much larger peaks of the binder, even if those peaks from the binder where not visible prior to treating the chalk-containing spectrum. This is why we say that for your samples there must be very little or no binder present - I just can't imagine that we wouldn't see something there.

I hope that helps clarify the spectra. As a side note, this acid treatment has worked very well for a number of other projects, so I am fairly confident in saying that your sample must be abnormally low in binder material!

Best,
Greg

Gregory Dale Smith, Ph.D.
Andrew W. Mellon Assistant Professor of Conservation Science
Art Conservation Department
Rockwell Hall #230
1300 Elmwood Avenue
Buffalo NY 14222
716-878-4646 (phone)
716-878-5039 (fax)
smithgd@buffalostate.edu
http://www.buffalostate.edu/depts/artconservation/

Appendix 6

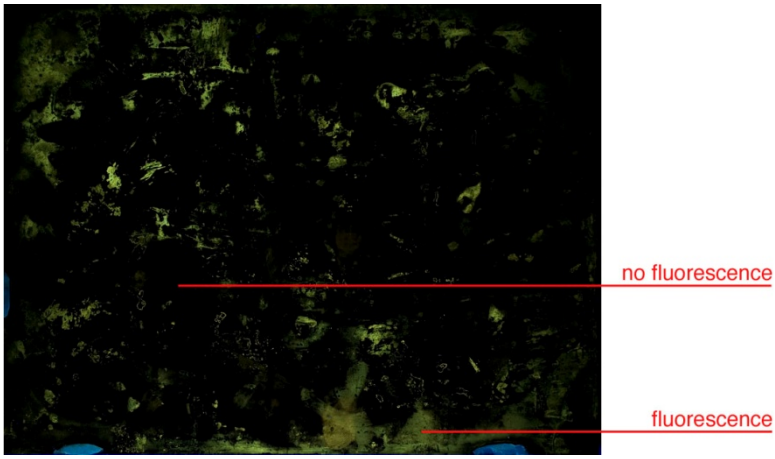
XRF Analyses – reports, poster prepared for the XVIII International Materials Research Congress by Alejandra Mendoza and Caroline Barcella

XRF analyses of the Manila Daguerreotypes – Plate

ID number, collection		L2007:0328:0005 (GEH No.), Hispanic Society of America (GRF: 174992)
Title, author		*View on the Mariquina River near Manila*
Date		Ca. 1840's - 1850's
Photographic process		Daguerreotype
Description	recto	Silver image in good condition, a tide line covers the left part, no fluorescence under UVA and UVC
	verso	The copper plate shows stains overall with slight interference colors. Under UVC a yellow florescence appears, following more or less the stains visible in normal light.

XRF settings	40 kV, 8 µA, 6mil Cu_1mil Ti_12mil Al filter, no vacuum, 300s
Objective	1- Identify the elements present in the image and in the support, discuss their origin 2- Confirm that the plate is gilded 3- Observe if the material which fluoresces yellow on the verso is identifiable via XRF
Expected results	Image: Silver (Ag), Mercury (Hg), Gold (Au) Support: Copper (Cu)
Instrument operator: Data analysis: Date:	Caroline Barcella and Alejandra Mendoza Caroline Barcella and Alejandra Mendoza November 2008

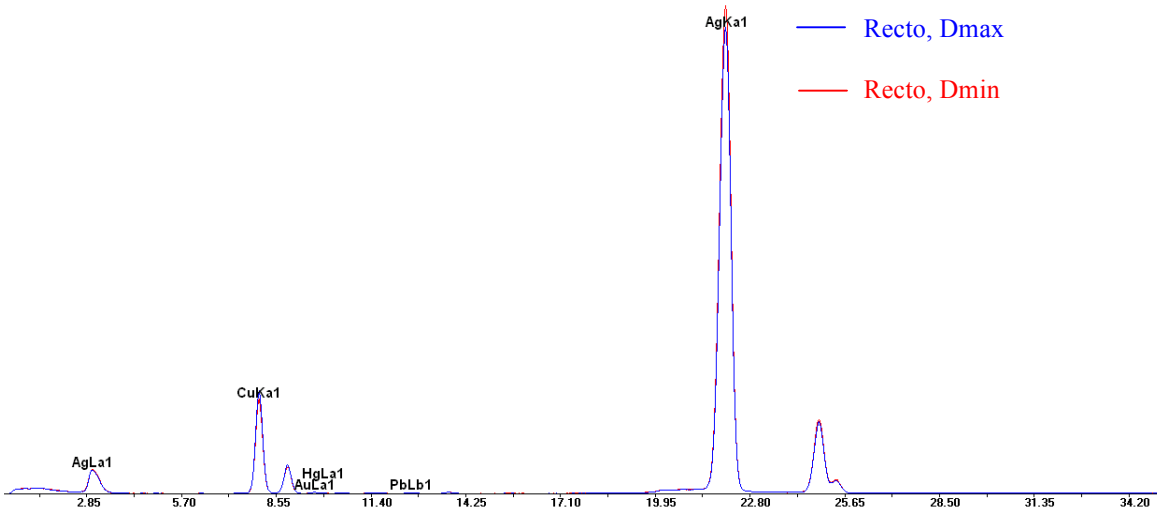
Recto, normal light



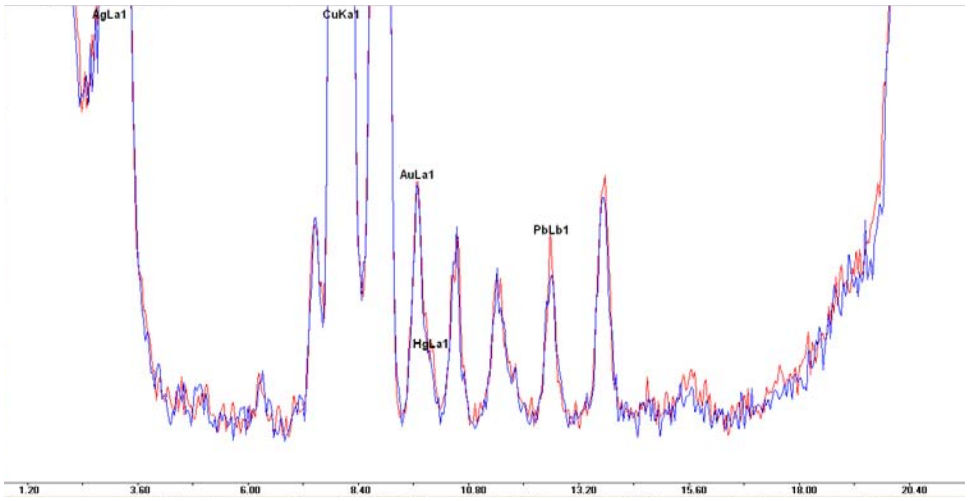
Verso, UVC light

Examination area: 3.5 x 4.5 mm

RECTO – Shadow (Dmax)/ Highlights (Dmin)



Detail:

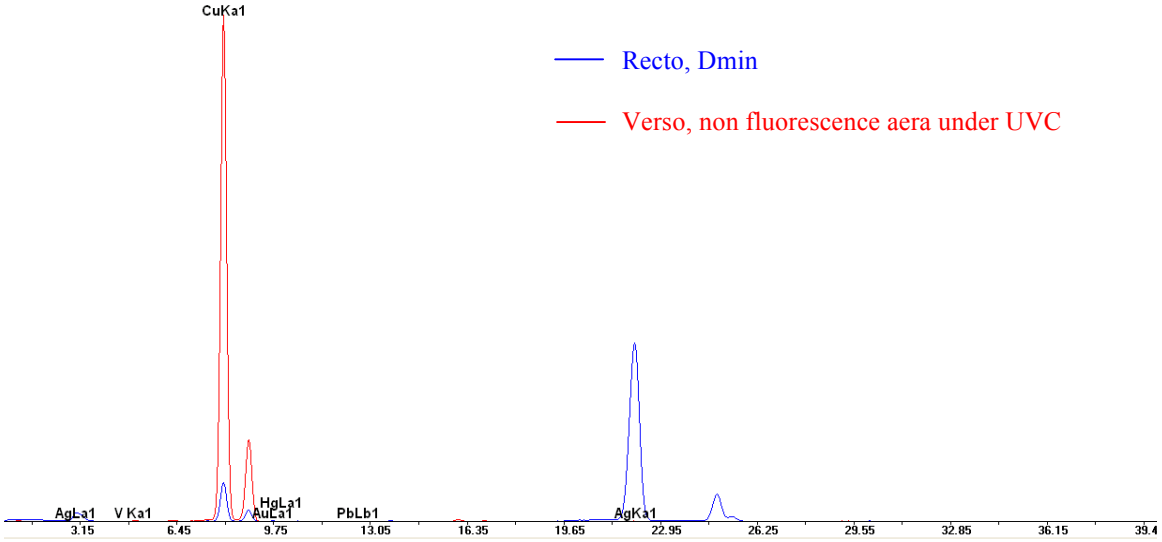


The spectra in the highlights (Dmin) and dark area (Dmax) are similar. Copper and silver are clearly visible and constitute the plate support. Gold, mercury and lead are present in small quantity. Mercury and gold are part of the image material. They come from the processing treatments -- mercury vapors being used as developer and gold being used for gilding. The origin of lead is uncertain. It may come from the plate as impurity of the copper.

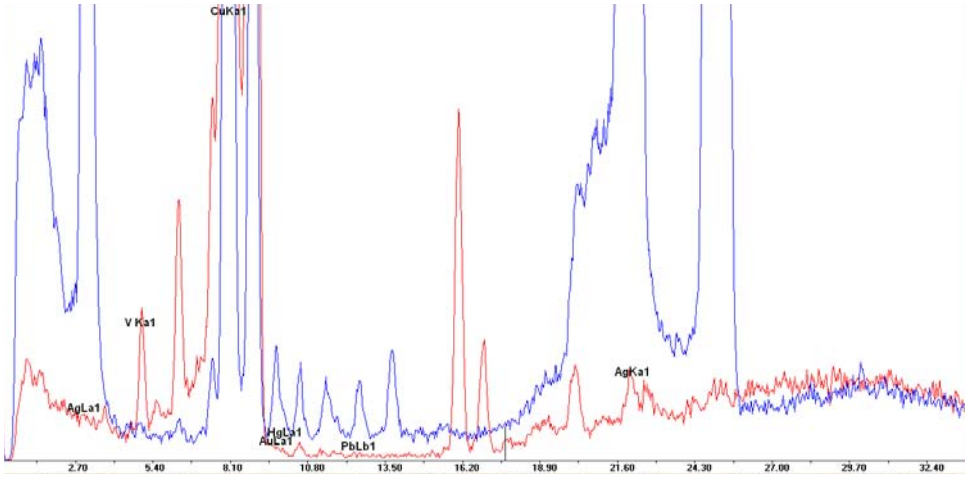
The analysis confirms the plate is gilded.

NB: The peak at 14 kV hasn't been identified

RECTO/ VERSO



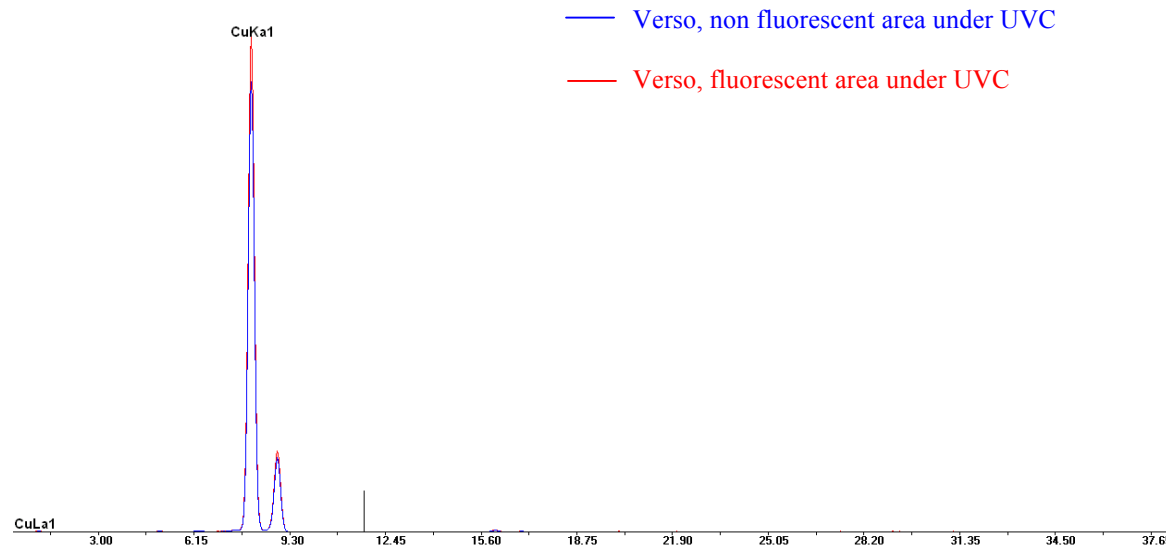
Detail:



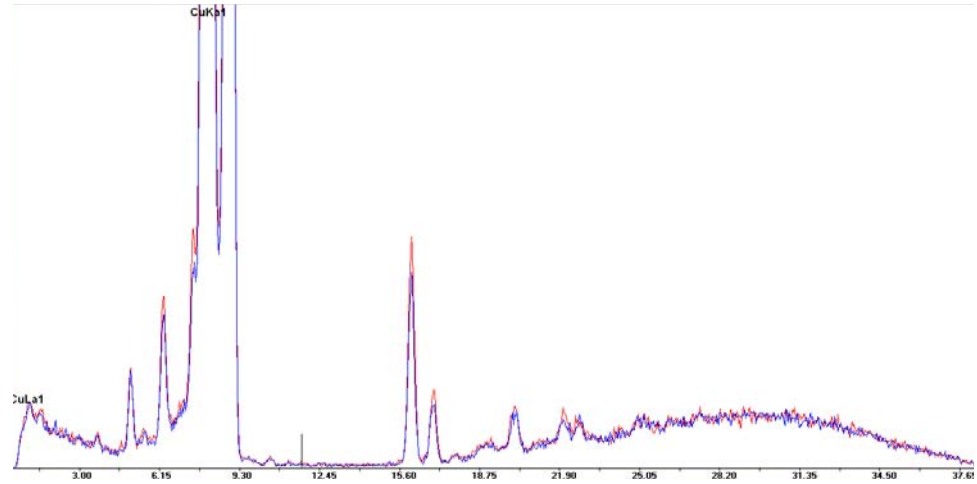
Copper is clearly visible in the spectrum of the verso and constitutes the main component of the plate support. Silver is also present as part of the plate. Silver appears in smaller amount from the verso compared to the recto since the copper layer partially obscures it. Valadium seems to be present in small quantity in the plate. Lead found in the spectrum of the recto doesn't appear on the verso. This could indicate either than lead is part of the image material, or that a particle of lead was included in the copper plate in the examination area on the recto.

NB: 1- The peaks at 16 & 17 kV are artefacts of the analysis, they duplicate the copper peaks.
2- The peak at 7kV hasn't been identified.

VERSO - non fluorescent/ fluorecent area



Detail



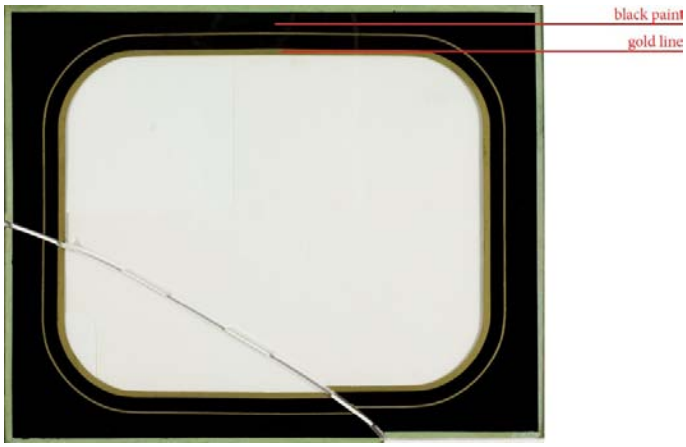
The spectra in florescent and non fluorescent area are similar. This shows that the XRF cannot detect the element(s) that fluoresce under UVC. Previous studies demonstrated that yellow fluorescence on daguerreotypes are likely to be due to the presence of cyanide compounds[17]. As cyanide cannot be detected by the apparatus (cyanide is composed of carbon and nitrogen which are part of the low weight elements non detectable by the apparatus), the results were expected.

17 Buzit Tragni Claire, *The use of ultraviolet-induced Fluorecence for Examination of Photographs*, 2005, pp.43-56, www.arp-geh.org/FileUpload_demo/Tragni2005UVReport.pdf. Daffner Lee Ann, Kushel Dan, Messinger John, "Investigation of a Surface Tarnish Found on 19th Century Daguerreotypes", *Journal of the American Institute for Conservation 35*, 1996:09-21, pp. 9-21.

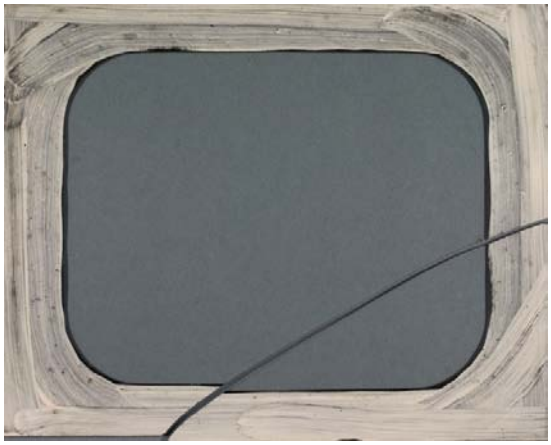
XRF analyses of the Manila Daguerreotypes – Matte gold lines

ID number, collection		L2007:0328:0011 (GEH No.), Hispanic Society of America (GRF: 174998)
Title, author		Calle de Rosario and Binondo Church - Manila
Date		Ca. 1840's - 1850's
Process		Reverse painting on glass, front element of a French housing for daguerreotype
Description	recto	The cover glass is painted on the verso with black paint to create a window mat. The edge of the window opening is circled with a thick gold line, followed by a outermost thin gold line. Both have a matte surface.
	verso	A thin layer of pink mat paint covers the black paint. The gold paint is not visible, as it is covered by the black paint.

XRF settings	40 kV, 1.90µA, 12milAl_1milTi filter, no vaccum, 120s
Objective	1- Identify the elements present in the gold lines
Expected results	Golden line: Copper (Cu), Zinc (Zn)?, Tin (Sn)? Pink paint on the verso: Calcium (Ca) Black paint: / Glass: As, ?
Instrument operator: Data analysis: Date:	Caroline Barcella and Alejandra Mendoza Caroline Barcella and Alejandra Mendoza November 2008



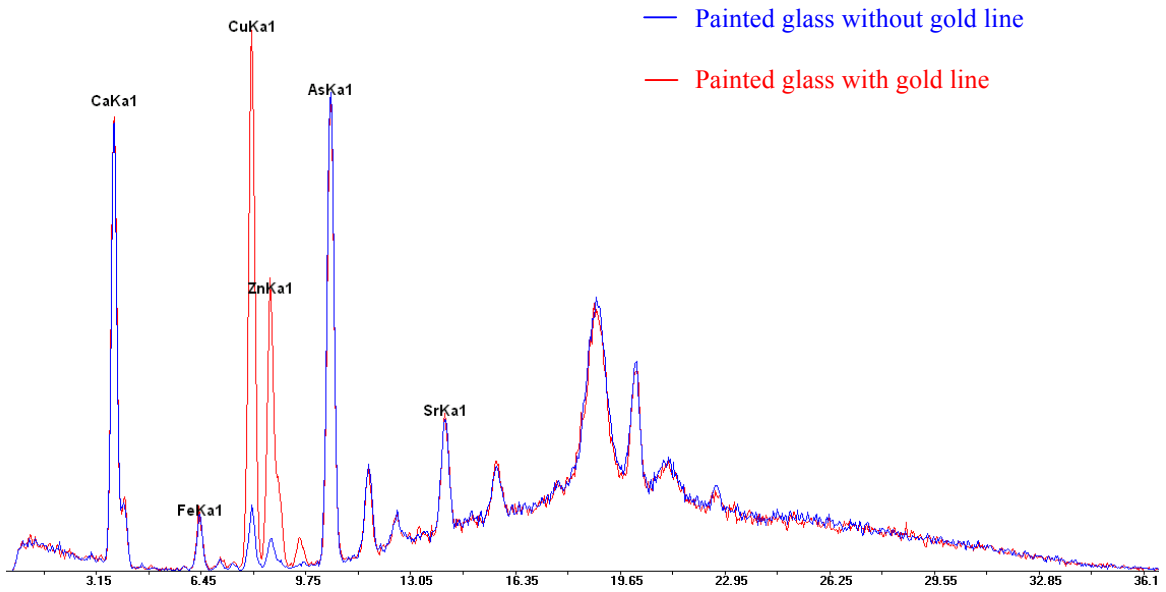
Recto, normal light



Verso, normal light

Examination area: 3.5 x 4.5 mm

VERSO - with gold line/ without gold line



The spectrum of the painted glass with gold lines shows clearly the presence of copper (Cu) and zinc (Zn) that do not appear in the spectrum of the painted glass without gold lines. This indicates that the gold lines are made of copper and zinc (brass powder).

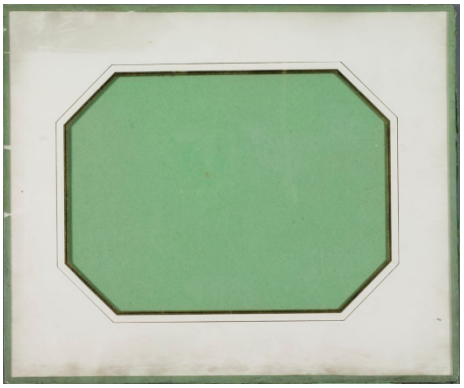
Calcium is clearly visible, coming from the matte paint covering the black paint (FTIR analyses identified the paint as clacium carbonate).

Iron (Fe), Arsenic (As) and Strontium (Sr) are likely to be part of the glass.

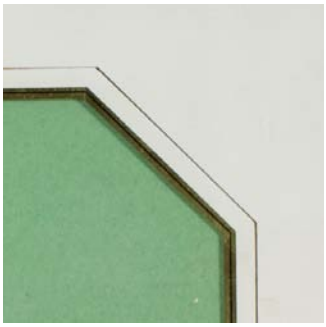
XRF analyses of the Manila Daguerreotypes – High reflectivity gold lines

ID number, collection		L2007:0328:0010 (GEH No.), Hispanic Society of America (GRF: 174997)
Title, author		View of Sturgis' residence. Bridge of [Misic]
Date		Ca. 1840's - 1850's
Process		Reverse painting on glass, front element of a French housing for daguerreotype
Description	recto	The cover glass is painted on the verso with white paint to create a window mat. The edge of the window opening is circled with a thick gold line (ca. 2.5 mm) divided by a thin black line. A outermost thin gold line is also present. The gold lines have a high reflectivity with a mirroring effect.
	verso	The inner gold line is partially covered by the black painting that create the thin black line, and by the white paint that creates the background.

XRF settings	40 kV, 1.1µA, 12milAl_1milTi _1milCu_filter, no vaccum, 180s
Objective	1- Identify the elements present in the gold lines
Expected results	Golden line: Au? White paint on the verso: Calcium (Ca) Black paint: / Glass: As, ?
Instrument operator: Data analysis: Date:	Caroline Barcella and Alejandra Mendoza Caroline Barcella and Alejandra Mendoza November 2008



Recto, normal light



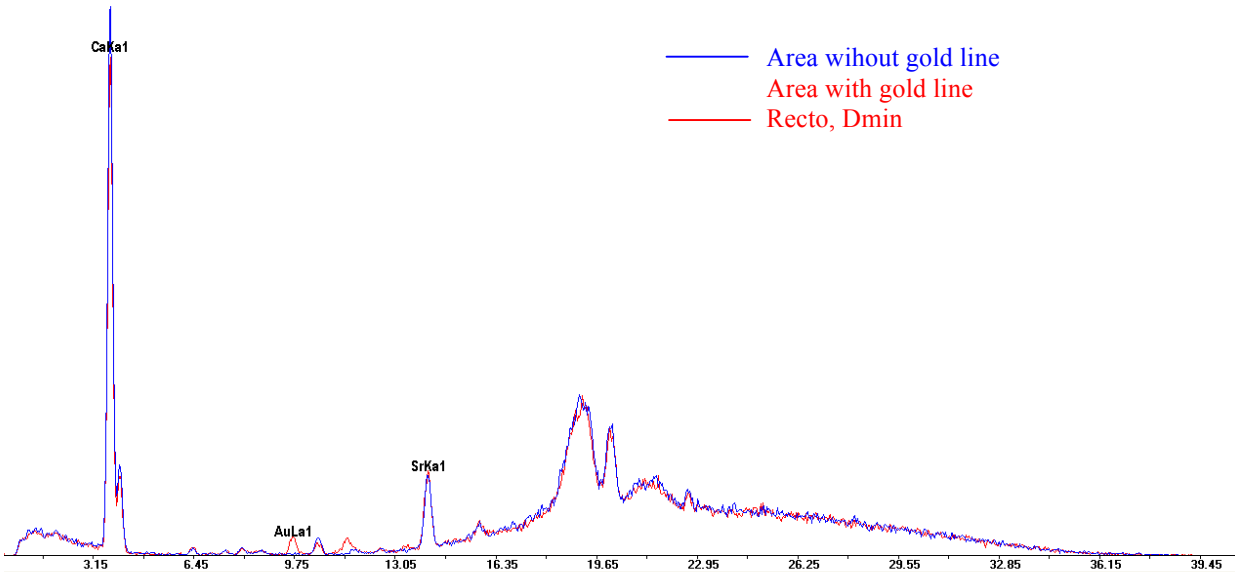
detail

Verso, specular light

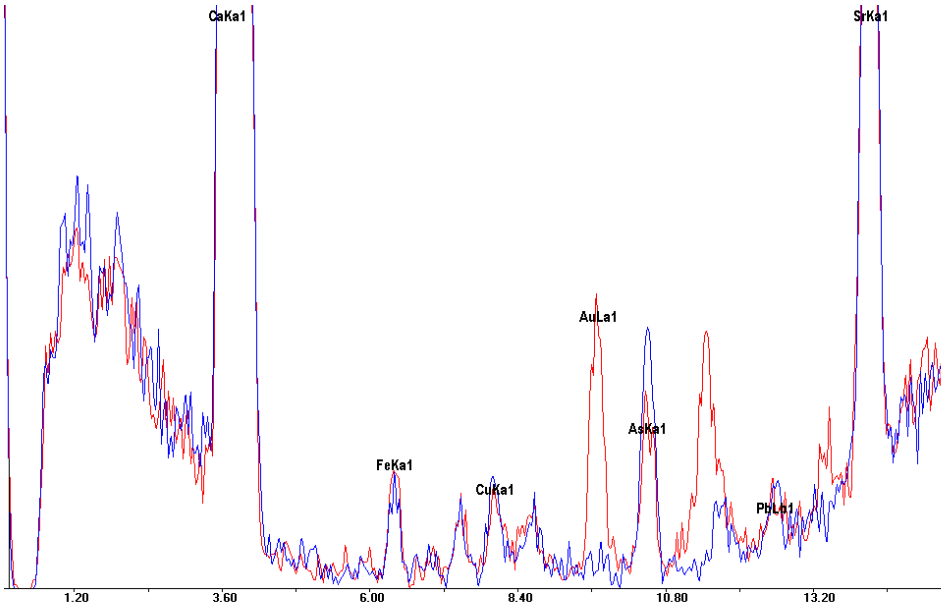
detail

Examination area: 3 x 4 mm

Painted glass with/without gold lines



Detail:



The spectrum of the painted glass with gold lines shows clearly the presence of gold (Au) that does not appear in the spectrum of the painted glass without gold lines. This indicates that the gold lines are made of gold.

Calcium is clearly visible, coming from the matte paint covering the black paint (FTIR analyses identified the paint as clacium carbonate).

Iron (Fe), Arsenic (As), Lead (Pb) and Strontium (Sr) are likely to be part of the glass.

XRF Analysis of photographs at George Eastman House

The acquisition of a hand-held TRACeR III-V Energy Dispersive X-Ray Fluorescence (XRF) instrument during the last cycle of the Advanced Residency Program in Photograph Conservation (2007-2009) at George Eastman House (GEH) has produced important results in elemental analysis of photographs from the museum collection, promoting their scientific analytical characterization, which has allowed the authors to contribute information to the existing knowledge and data bases of XRF analysis of photographic materials in the Conservation field.

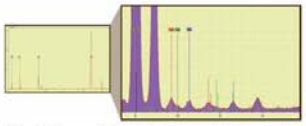
Manila daguerreotypes

In April 2007, an exceptional group of 18 daguerreotypes was discovered in the collections of the Hispanic Society of America in New York City. They constitute the earliest known photographic records of the Philippine Islands. The documentation and the stabilization of this important heritage were conducted at the George Eastman House conservation laboratory.

Why XRF? The purpose was to identify component elements of the daguerreotype plates and the decorative lines of the passe-partout housing systems.

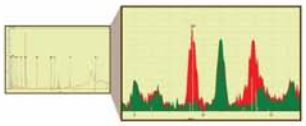
Constraint: Minimize the handling of the plate and ensure that the instrument, which needs to be within 1mm of the plate, does not contact its vulnerable surface.

Instrument setup: the handheld XRF was mounted in an inverted position on an auto-adjust stereomicroscope stand, outfitted with a failsafe stop to prevent surface contact. The vertical travel of the instrument was operated through the microscope software.



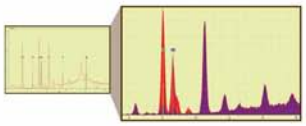
The spectrum shows the presence of copper and silver from the plate support, and small quantities of gold and mercury from the image material. This confirms that the plate was gilded.

View on the Mariquina River near Manila, daguerreotype, whole plate, ca. 1840-1850



The spectrum of the decorative lines shows the presence of gold, confirming that these highly reflective lines are made of gold leaf.

View on the Mariquina River near Manila, daguerreotype in passe-partout, ca. 1840-1850



The spectrum of the matte golden lines shows the presence of copper and zinc, indicating that these lines are made by applying brass powder paint.

Calle del Rosario and Binondo Church - Manila, daguerreotype in passe-partout, ca. 1840-1850

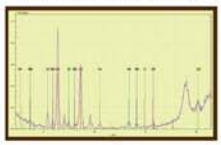
XRF settings for the plate: 40kV, 83μA, Cu(6 mil)/Ti(1 mil)/Al(12 mil) filter, no vacuum, 300s
XRF settings for the lines: 40kV, 1.1 μA, Cu(6 mil)/Ti(1 mil)/Al(12 mil) filter, no vacuum, 180s
40kV, 1.9 μA, Ti(2 mil)/Al(12 mil) filter, no vacuum, 180s

Fine art photographs

We conducted XRF analysis of fourteen fine art photographic prints from the George Eastman House collection, which were exhibited at The Association of International Photography Art Dealers Show, in New York, March 26-29, 2009.

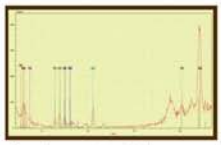
Why XRF? The objective was to corroborate the photographic processes and the elements present in the different strata of the prints.

Principal Robert Haldane,
Hill and Adamson, salted paper print, ca. 1843



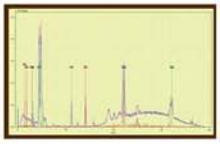
Silver constitutes the image material of the print. Small amounts of iron and calcium are present in the paper and board (primary and secondary supports). Cobalt and arsenic are present in the primary support since smalt was used in the production of XIX Century paper as a whitening agent.

Principal Robert Haldane,
Negative by Hill and Adamson, later print by Jesse Bertram, Carbon print ca. 1920 (negative ca. 1843)



The pigment and gelatin mixture that constitutes the image contains iron, manganese, copper and chromium. Chromium is present in the image material, from the potassium bichromate solution used to sensitize the gelatin in the carbon print process.
Iron and arsenic are present in the primary paper support. Small quantities of rubidium, strontium, yttrium, and zirconium are present in the secondary support. These elements are typically found in dirt or sand, indicating that this was possibly used as a filler in the fabrication of the board. Zinc, iron and small quantities of arsenic and copper are also present in this board.

Silo and Canal Petaluma, Normal,
Ansel Adams, gelatin silver print, April 19, 1962



The image material is composed of silver and selenium. As expected from Adams practice, selenium was used as a toning agent. Barium and strontium are present in the baryta layer of the paper support.

XRF settings for all the prints: 40kV, 83μA, Cu(6 mil)/Ti(1 mil)/Al(12 mil) filter, no vacuum, 300s

Alejandra Mendoza,[1] Caroline Barcella,[2] Bruce Kaiser,[3]
[1,2]Andrew W. Mellon Fellow, Advanced Residency Program in Photograph Conservation, George Eastman House, Rochester, NY
[3]Chief Scientist Bruker AXS

XVIII International Materials Research Congress
LASMAC & Archeological & Arts Issues in Materials Science
Cancún, México. August 16th - 20th 2009.

Appendix 7

Materials and products used for treatments – list, suppliers and datasheets

List (as appears in the treatment report)

- Staedtler® Mars eraser crumbs (supplier: William Minter)
- Staedtler® Mars plastic eraser
- Lascaux® Acrylic Fixative 2070 (2% B72 in xylene/ isopropanol) (supplier: Talas)
- Hiromi® Japanese papers: Tengucho handmade 11 gsm, Tengucho machine made 7.5 gsm (supplier: Hiromi)
- Jin Shofu Wheat starch paste (supplier: Hiromi)
- Aquazol® 500 (supplier: Talas)
- Kremer® powder pigments (supplier: Kremer)
- Light Impressions® Renaissance paper 3136 (supplier: Light Impression)
- Escal™ Ceramic Barrier Film (supplier: Keepsafe)
- 3M™ 850 Polyester Silver Film Tape (supplier: Uline)
- Filmoplast® P-90 Tape (supplier: Talas)
- Artists' Water Colour Winsor and Newton
- Klucel® G (supplier: Talas)

Reconstruction of the painted cover glasses

- Borosilicate glass (supplier: Swift Glass Co)
- Gelatin capsule (supplier: Rochester Art Supply)
- Gold Leaf 23K Giusto Manetti (supplier: Rochester Art Supplies)
- Kremer powder pigments (supplier: Kremer)
- Mica Powder Micro Brass M9262M (supplier: Talas)
- Gilder Specialty Products Back Up Black (by Sepp Leaf Products; supplier: Rochester Art Supplies)
- 100% rag photo board, non-buffered, 2-Ply Vellum (by Parsons Paper Co).
- Artists' Water Colour Winsor and Newton

Secondary housings

- Volara® Polyethylene Foam in black (supplier: University Products)
- 3M™415 double-sided tape (supplier: Talas)
- Art-Sorb® Sheet form (supplier: Talas)
- MicroChamber® Alphamount 4 ply board (supplier: Conservation by design limited)
- PETG (supplier: Curbell Plastic)

Suppliers:

CONSERVATION BY DESIGN LIMITED
Works 5 Singer Way
Woburn Road Industrial Estate'
Kempston Bedford MK42 7AW
01234 846300
fax: 01234 852334
info@conservation-by-design.co.uk
www.conservation-by-design.co.uk

HIROMI PAPER
2525 Michigan Ave Unit G-9
Santa Monica, CA 90404
310 998 0098
866 479 2744
fax : 310 998 0028
www.hiromipaper.com

CURBELL PLASTICS, INC.
100 Aviation Avenue
Rochester, NY 14624
585 426 1690
800 722 2140
Fax: 585 426 1125
www.curbellplastics.com

KEEPSAFE MICROCLIMATE SYSTEMS
9 Oneida Avenue,
Toronto, ON
Canada
416 703 4696
800 683 4696 ext 701
info@keepsafe.ca
www.keepsafe.ca

KREMER PIGMENT
Hauptstr. 41 – 47 DE
88317 Aichstetten
Germany
0049 75 65 911 20
Fax 0049 75 65 16 06
info@kremer-pigmente.de
www.kremer-pigmente.de

LIGHT IMPRESSIONS
PO Box 2100
Santa Fe Springs, CA 90670
800 828 6216
www.lightimpressionsdirect.com

ROCHESTER ART SUPPLIES
150 West Main Street
Rochester, NY 14614
800 836 8940
Fax: 585 546 5028
info@fineartstore.com
www.fineartstore.com

SWIFT GLASS CO.
131 West 22nd Street
New York, NY 14903
607 733 7166
fax: 607 732 5829
quality@swiftglass.com
www.swiftglass.com

TALAS
330 Morgan Ave
Brooklyn, NY 11211
212 219 0770
Fax: 212 219 0735
info@talasonline.com
www.talas-nyc.com

THE ART STORE
3333 W Henrietta Rd
Rochester, NY 14623
585 427 9290
www.wholesaleart.net

ULINE
Shipping Supply Specialist
1 800 958 5463
www.uline.com

UNIVERSITY PRODUCT
517 Main Street
Holyoke, MA 01040
800 628 1912
413 532 3372
fax: 413 532 9281
info@universityproducts.com
www.archivalsuppliers.com

WILLIAM MINTER
Bookbinding & Conservation
Woodbury, PA 16695
845 793 4020
fax: 814 793 4045
wminter@pennswoods.net

STAEDTLER®

Chemical product data sheet

address STAEDTLER Mars GmbH & Co. KG
Moosaeckerstr. 3
90427 Nuernberg

phone +49 911 93 65 - 888
fax +49 911 93 65 - 769
internet www.staedtler.de
e-mail service@staedtler.de

Article description
STAEDTLER® Mars® plastic 526 50 - Mars® plastic combi 526 508
STAEDTLER® Mars® plastic eraser holder528 50
STAEDTLER® rasoplast 526 B20/30/40 - rasoplast combi 526 BT30
STAEDTLER® Noris Club® triangular eraser 526 002

Constituents		
Erasers:	Elastomer:	Polyvinyl chloride
	Filler:	Chalk
		rasoplast combi 526 BT30, blue part: pumice
	Colour pigments:	Pigments containing toxic heavy metals are not used
	Special softening agent:	No hazardous substance under German law (ChemG 94)
		The softening agent used is not classified as a hazardous substance according to valid European regulations.
	More constituents:	Mars plastic combi 526 508: dissolving substance
Packaging:	Sleeve: paper, packaged with cellophane	

Toxicology	
	Not harmful if used in the proper manner. Staedtler products are subject to comprehensive quality inspections.

Conformity	
	Not necessary

Usage notes		
Ability to/quality:	Excellent erasing properties for graphite on paper and matt drafting film	
	Mars plastic 526 50:	Premium quality
	Mars plastic combi 526 508:	blue part of eraser for India ink
	rasoplast 526 B20/30/40:	Comfort quality
	rasoplast combi 526 BT30:	blue part of eraser for writing ink
	Noris Club eraser 526 002:	ergonomic triangular design, minimal crumbling
Ageing:	Do not age, therefore practically unlimited storage time	
	Exception: Mars plastic combi 526 508: blue part	

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

PARALOID (TM) B-72 100% Resin

Revision date: 09/26/2003

Supplier Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399 United States of America

For non-emergency information contact: 215-592-3000

Emergency telephone number
Spill Emergency 215-592-3000
Health Emergency 215-592-3000
Chemtrec 800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Acrylic polymer(s)	Not Hazardous	99.0 - 100.0%
Individual residual monomers	Not Required	<=0.1%
Toluene	108-88-3	<=0.8%

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance
Form Granular solid
Colour clear
Odour Acrylic odor

Hazard Summary
CAUTION!
INHALATION OF DUST CAN CAUSE THE FOLLOWING:
IRRITATION OF NOSE, THROAT, AND LUNGS
HEADACHE
NAUSEA
MAY CAUSE EYE/SKIN IRRITATION.

Potential Health Effects
Primary Routes of Entry: Inhalation
Eye contact
Skin contact

Eyes: Monomer vapors from heated product can cause the following:
slight irritation

Skin: Prolonged or repeated skin contact can cause the following:
slight irritation

Inhalation: Inhalation of dust can cause the following:
irritation of nose, throat, and lungs
Inhalation of monomer vapor from heated product can cause the following:
May cause nose, throat, and lung irritation.
headache
nausea

Toluene	ACGIH	Not classifiable as a human carcinogen.
Toluene	US CA65CRT	Developmental toxin.
Toluene	IARC	Classification not possible from current data.
Toluene	IARC	Inadequate data.
Toluene	IARC	Evidence suggests lack of carcinogenicity.

4. FIRST AID MEASURES

Inhalation: Move to fresh air.

Skin contact: Wash with water and soap as a precaution. If skin irritation persists, call a physician.

Eye contact: Flush eyes with water as a precaution. If eye irritation persists, consult a specialist.

Ingestion: Drink 1 or 2 glasses of water. Consult a physician if necessary. Never give anything by mouth to an unconscious person.

5. FIRE-FIGHTING MEASURES

Flash point	not applicable
Ignition temperature	393.0 °C (739.40 °F) estimated
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Suitable extinguishing media:	Use the following extinguishing media when fighting fires involving this material: carbon dioxide (CO_2) dry chemical water spray

Specific hazards during fire fighting: Material as sold is combustible; burns vigorously with intense heat.

Special protective equipment for fire-fighters: Wear self-contained breathing apparatus and protective suit.

Further information: Water mist may be used to cool closed containers.
Remain upwind.
Avoid breathing smoke.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Appropriate protective equipment must be worn when handling a spill of this material. See SECTION 8, Exposure Controls/Personal Protection, for recommendations.
If exposed to material during clean-up operations, see SECTION 4, First Aid Measures, for actions to follow.

Environmental precautions
CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Methods for cleaning up
Floor may be slippery; use care to avoid falling.
Eliminate all ignition sources.
Ventilate the area.
Transfer spilled material to suitable containers for recovery or disposal.

7. HANDLING AND STORAGE

Handling
Store in a cool, dry, well ventilated place. Avoid contact with eyes, skin and clothing. Wash thoroughly after hand
Keep container tightly closed. Do not breathe vapours/dust. Static charges can accumulate: use bonding and gr
between transfer equipment and receiving containers and for anyother operations capable of generating static e

Storage
Storage conditions: Material can burn; limit indoor storage to approved areas equipped with automatic sprinkle
Ground all metal containers during storage and handling.
Storage temperature: -18.00 - 49.00 °C/-0.40 - 120.20 °F
Further information:
Monomer vapors can be evolved when material is heated during processing operations. See SECTION 8, for ty
ventilation required.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limit(s)

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value
Toluene	Rohm and Haas	TWA	50 ppm
	Rohm and Haas	STEL	75 ppm
	Rohm and Haas	Absorbed via skin	
	ACGIH	TWA	50 ppm
	ACGIH	SKIN_DES	
	OSHA/Z2	TWA	200 ppm
	OSHA/Z2	Ceiling	300 ppm
	OSHA/Z2	MAX. CONC	500 ppm
	Z1A	TWA	375 mg/m3 100 ppm
	Z1A	STEL	560 mg/m3 150 ppm

Eye protection: Use safety glasses with side shields (ANSI Z87.1or approved equivalent). Eye protection worn compatible with respiratory protection system employed.
Hand protection: Cotton or canvas gloves.

Respiratory protection: A respiratory protection program meeting OSHA 1910.134 and ANSI Z88.2 requiremer equivalent must be followed whenever workplace conditions warrant a respirator's use. None required under nc operating conditions. When dusty conditions are encountered, wear a properly fitted NIOSH approved (or equiv half-mask, air-purifying respirator. Air-purifying respirators should be equipped with NIOSH approved (or equiva organic vapor cartridges and N95 filters. If oil mist is present, use R95 or P95 filters.

Protective measures: Facilities storing or utilizing this material should be equipped with an eyewash facility.

Engineering measures: Use local exhaust ventilation with a minimum capture velocity of 150 ft/min. (0.7 at the point of dust or mist evolution. Refer to the current edition of "Industrial Ventilation: A Manual of Recomm Practice" published by the American Conference of Governmental Industrial Hygienists for information on the de installation, use, and maintenance of exhaust systems.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Granular solid
Colour	clear
Odour	Acrylic odor
pH	not applicable
Boiling point/range	not applicable
Melting point/range	no data available
Flash point	not applicable
Ignition temperature	393 °C (739.40 °F) estimated
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Vapour pressure	not applicable
Relative vapour density	not applicable
Water solubility	practically insoluble
Density	0.66 g/cm3Bulk density
Viscosity, dynamic	not applicable
Evaporation rate	not applicable
Percent volatility	1 % maximum

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Hazardous reactions	None known. This material is considered stable. However, avoid temperatures above 260C/500F. Thermal decomposition is dependent on time and temperature.
Materials to avoid	There are no known materials which are incompatible with this product.
Hazardous decomposition products polymerization	Thermal decomposition may yield acrylic monomers., Product will not undergo polymerization.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	LD50rat > 5,000 mg/kg Toxicity data for a compositionally similar material.
Acute dermal toxicity	LD50rabbit > 3,000 mg/kg Toxicity data for a compositionally similar material.
Skin irritation	rabbitslight irritation Toxicity data for a compositionally similar material.
Eye irritation	rabbitslight irritation Toxicity data for a compositionally similar material.

Further information
No data are available for this material. The information shown is based on profiles of compositionally similar ma
Component: **Toluene**
Acute inhalation toxicity LC50rat 4 h15.07 mg/l

12. ECOLOGICAL INFORMATION

There is no data available for this product.
Toluene
Ecotoxicity effects

Toxicity to fish	LC50Rainbow trout96 h 24 ppm
Toxicity to fish	LC50Fathead minnow (Pimephales promelas)96 h 26 ppm
Toxicity to fish	LC50Bluegill sunfish96 h 13 ppm
Toxicity to algae	EC50Algae96 h >433 ppm
Toxicity to aquatic invertebrates	EC50Daphnia magna48 h 11.5 ppm

13. DISPOSAL CONSIDERATIONS

Environmental precautions: CAUTION: Keep spills and cleaning runoff out of municipal sewers and o bodies of water.

Disposal
Waste Classification: When a decision is made to discard this material as supplied, it does not meet RCRA's characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40 CFR 261.33. The toxicity ch (TC), however, has not been evaluated by the Toxicity Characteristic Leaching Procedure (TCLP).
For disposal, incinerate this material at a facility that complies with local, state, and federal regulations.

http://talasonline.com/photos/msds/b72.pdf

**** MATERIAL SAFETY DATA SHEET ****

AQUAZOL® 5/50/200/500

Section 1 - Chemical Product and Company Identification

Product Name:
AQUAZOL® 5/50/200/500

Chemical Family:
Polyoxazoline

Chemical Name:
Poly (2-ethyl-2-oxazoline)

Formula:
$-(C_5H_9NO)-$

Manufacturer's Name:
Polymer Chemistry Innovations, Inc.
(aka "PCI)

Manufacturer's Address:
4231 S. Fremont Ave.
Tucson, AZ 85714

Manufacturer's Telephone Number:
(520) 746-8446

CHEMTREC Telephone Number:
(800) 424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	%
25805-17-8	*Poly (2-ethyl-2-oxazoline)	99.9 %
10431-98-8	2-ethyl-2-oxazoline	<0.1 %

Reviewed in accordance with section 311 & 312 of SARA Title III and found not to be in any hazard class.

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Chemical, Not otherwise specified.
Protect from moisture. Keep container tightly closed.

POTENTIAL HEALTH EFFECTS

Eye No adverse health effects known or expected.
Skin No adverse health effects known or expected.
Ingestion No adverse health effects known or expected.
Inhalation No adverse health effects known or expected
Chronic Not available.

http://talasonline.com/photos/msds/aquazal5-50-msds.pdf

Renaissance Paper, 16 x 20 - 100/pkg

Item #3136

Renaissance Paper™ is perfect for photos, document interleaving, xerography, envelope-making and lining. The papers are made of acid and lignin-free 80lb. text weight with 25% cotton fiber, less than .0008% reducible sulfur content, and a smooth white surface. We watermark each sheet to identify the presence or absence of the buffering agent. All papers pass P.A.T.

100 per package

www.lightimpressionsdirect.com

Escal Film

Escal film is a heavy weight transparent barrier film with excellent resistance to oxygen permeation. It has been designed especially for use with oxygen absorbers for the storage and treatment of museum and cultural artefacts.

The outer layer of Escal is polypropylene. The inner barrier layer is a vacuum-deposited ceramic on a PVA substrate. This glass-like barrier material offers nearly the same barrier capacity as aluminum foil based films. Oxygen permeability is 0.05cc/m2/24hrs, water vapour transmission is 0.01gm/m2/24hrs. As in most sealable barrier films, the inner layer is polyethylene.

http://www.keepsafe.ca/ESCAL.htm

3M
Polyester Film Tape
850

Technical Data **June, 2007**

Product Description

3M™ Polyester Film Tape 850 can generally be used for splicing and applications where chemical resistance and/or clean removal is necessary. The silver backing is a transparent polyester with a thin layer of aluminum and the gold is a pigmented polyester with a thin layer of aluminum.

Product Construction

Backing	Adhesive	Color	Standard Roll Length
Polyester	Acrylic (transparent or pigmented)	Transparent, Red, Black, White, Silver, Gold	72 yds. (66 m)

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

		ASTM Test Method
Adhesion to Steel:	30 oz./in. width (33 N/100 mm)	D-3330
Silver and Gold:	42 oz./in. width (46 N/100 mm)	D-3330
Tensile Strength at Break:	28 lbs./in. width (491 N/100 mm)	D-3759
Elongation at Break:	120%	D-3759
Backing Thickness:	0.9 mil (0.02 mm)	D-3652
Total Tape Thickness:	1.9 mils (0.05 mm)	D-3652
Water Vapor Transmission Rate:	1.6 gms. H_2O/100 sq. in./24 hrs. (24.8 g/m^2/24 hrs.)	D-3833
Silver and Gold:	0.9 gms. H_2O/100 sq. in./24 hrs. (7.75 g/m^2/24 hrs.)	D-3833

Features

- Prolonged exposure to sunlight or hot caustics will cause backing to become brittle and lose tensile strength.
- Thin, high strength polyester film helps reduce failures due to breakage while meeting low caliper requirements.
- Chemical and solvent resistance to help reduce rejects produced from chemical and solvent attack.
- Abrasion resistant to help protect surface from abrasions and rough handling.

Application Ideas

Transparent, Red, Black, White:

- Splicing and web defect marking.
- Sealing, labeling and protecting.
- Positive film striping (3M™ Polyester Film Tape 850 - transparent).
- Decorative edging.
- Tape hinge.

Silver and Gold:

- Post splicing movie film.
- Deflect flagging where reflective sensing is required.
- Decorative striping and die cutting.
- Decorative edging.

Storage

Store under normal conditions of 60° to 80°F (16° to 27°C) and 40 to 50% R.H. in the original carton.

Shelf Life

To obtain best performance, use this product within 18 months from date of manufacture.

Product Use

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Warranty and Limited Remedy

Unless stated otherwise in 3M's product literature, packaging inserts or product packaging for individual products, 3M warrants that each 3M product meets the applicable specifications at the time 3M ships the product. Individual products may have additional or different warranties as stated on product literature, package inserts or product packages. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's application. If the 3M product is defective within the warranty period, your exclusive remedy and 3M's and seller's sole obligation will be, at 3M's option, to replace the product or refund the purchase price.

Limitation of Liability

Except where prohibited by law, 3M and seller will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

ISO 9001:2000

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 standards.

3M

Industrial Business
Industrial Adhesives and Tapes Division
3M Center, Building 21-1W-10, 900 Bush Avenue
St. Paul, MN 55144-1000
800-362-3550 • 877-369-2923 (fax)
www.3M.com/industrial

Recycled Paper
40% pre-consumer
10% post-consumer

NESCHEN

filmoplast P 90®

Technical Information

General information

- selfadhesive, wood-free, white and relatively tear-resistant special purpose paper
- coated on one side with a solvent-free, age-resistant and permanently elastic acrylate adhesive

Areas of application

- Restoration, protection and joining of documents and papers
- Repositioning of pages
- repairs to torn edges
- affixing to the mount

Processing & Handling

- for initiatitive as well as professional Tips on the Application please refer to the current Neschen catalogue „Products for libraries, archives and picture framers" and on our homepage www.neschen.de

Advantages / Special Features

- Certified anti-aging-properties! Tested (by the Papiertechnische Stiftung ("Foundation for Paper Technology"), Munich, (PBA-No. 21.495/2)
- slightly alkaline in a range without negative effect on documents, but with sufficient buffering-capacity at the same time, preventing from possible acid damage
- the 40 g/sqm special purpose paper is ideally tuned to the best compromise between stability and durability on the one hand and smoothness and transparancy on the other hand
- easy and secure handling due to masking of the adhesive by siliconised paper
- Tuning and dynamics of the adhesive forces development allows immediate correction during application, on the other hand it ensures sufficient adhesive forces after their evolution
- disposable via normal or paper waste
- further information or references will be given on demand
- also available in the practical dispenser box
- lifespan–group 6-70 according DIN 6738, which means a lifespan of min. 100 years

NESCHEN

filmoplast P 90®

Technical Information

Technical Data

Carrier:

Film type:	white special purpose paper		
Thickness [µm]:	76 ± 8		approx. 3 mil
Weight [g/m²]:	40 ± 2		
Breaking Force [N/15mm]:	lengthwise: 41 ± 5		DIN 53455, 50mm/min
Elongation at Tear [%]:	lengthwise: 2,0 ± 0,7		DIN 53455, 50mm/min
Tear Resistance [N/mm²]:	lengthwise: 33 ± 4		DIN 53455, 50mm/min

Adhesive:

Adhesive Type:	Polyacrylate Dispersion		
PH-value:	approx. 8,5		
Weight [g/m²]:	22 ± 2,5		
Adhesive Strength[N/25 mm]:	10 min: > 4,3	24h: paper break	AFERA 4001

Backing:

Type:	white paper, siliconised on one side		
Thickness [µm]:	54 ± 6		approx. 2 mil
Weight [g/m²]:	65 ± 6		
Removal Force [mN/cm]:	15 ± 10		speed 300 mm/min

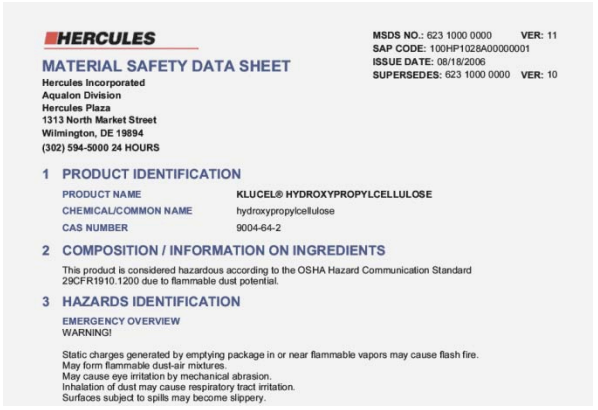
Others:

Handling/Storage Conditions:	18° to 25°C / 60° to 80° F; 40-65% relative humidity		
Shelf Life [Years]:	4		
Temperature Stability:	-20 - +50°C	-4 - +120°F	affixed to aluminium
pH-Evolution in the Product: [referring to PTS-Method]	fresh product: pH 8,5		aged product: pH 7,8
Humid Climate Stability:	the defined purpose of this product excludes its application in extremly humid surroundings		

All tests were performed in aacordanc with 23/50-2, DIN 50014.

Version: 04/2006
Copyright Neschen AG, 2006
www.neschen.de

http://talasonline.com/photos/adhesives/filmoplast_p90.pdf.



HERCULES

MSDS NO.: 623 1000 0000 VER: 11
SAP CODE: 100HP1028A00000001
ISSUE DATE: 08/18/2006
SUPERSEDES: 623 1000 0000 VER: 10

MATERIAL SAFETY DATA SHEET

Hercules Incorporated
Aqualon Division
Hercules Plaza
1313 North Market Street
Wilmington, DE 19894
(302) 594-5000 24 HOURS

1 PRODUCT IDENTIFICATION

PRODUCT NAME	KLUCEL® HYDROXYPROPYLCELLULOSE
CHEMICAL/COMMON NAME	hydroxypropylcellulose
CAS NUMBER	9004-64-2

2 COMPOSITION / INFORMATION ON INGREDIENTS

This product is considered hazardous according to the OSHA Hazard Communication Standard 29CFR1910.1200 due to flammable dust potential.

3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
WARNING!

Static charges generated by emptying package in or near flammable vapors may cause flash fire.
May form flammable dust-air mixtures.
May cause eye irritation by mechanical abrasion.
Inhalation of dust may cause respiratory tract irritation.
Surfaces subject to spills may become slippery.

POTENTIAL HEALTH EFFECTS
May cause skin irritation by mechanical abrasion.

Refer to Section 5 for Hazardous Combustion Products, and Section 10 for Hazardous Decomposition/Hazardous Polymerization Products.

4 FIRST AID MEASURES

SKIN
Wash with soap and water. Get medical attention if irritation develops or persists.

EYE
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists.

INHALATION
Remove to fresh air. Get medical attention if nasal, throat or lung irritation develops.

INGESTION
No adverse health effects are expected from accidental ingestion of small amounts of this product. For ingestion of large amounts: Do NOT induce vomiting. Get immediate medical attention.

5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
Water spray, dry chemical, foam, carbon dioxide or clean extinguishing agents may be used on fires involving this product.

FIRE FIGHTING PROCEDURES
Wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear when fighting fires involving this product.

CONDITIONS TO AVOID
None known.

HAZARDOUS COMBUSTION PRODUCTS
Combustion products include: carbon monoxide , carbon dioxide and smoke

AUTOIGNITION TEMPERATURE 752 ° F

6 ACCIDENTAL RELEASE MEASURES

Ventilate area. Avoid dust formation. Clean up spills immediately. If product is not contaminated, scoop into clean containers for use. If product is contaminated, scoop into containers, and dispose appropriately. In case of accidental spill or release, refer to Section 8, Personal Protective Equipment and General Hygiene Practices.

7 HANDLING & STORAGE

GENERAL MEASURES
Ground all equipment.
Blanket vessel with inert gas when emptying bags where flammable vapors may be present.
Ground operator and pour material slowly into conductive, grounded chute.
For large bags (1000 lbs or greater) a ground cable MUST be attached to the bag ground connection.
Store in a cool, dry, well-ventilated area at approximately 20° C (68° F).
Keep container closed when not in use.

MATERIALS OR CONDITIONS TO AVOID
Avoid conditions that generate dust; product may form flammable dust-air mixtures.
Avoid emptying package in or near flammable vapors; static charges may cause flash fire.
Keep away from heat, flame, sparks and other ignition sources.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

WORK PRACTICES & ENGINEERING CONTROLS
Eyewash fountains and safety showers should be easily accessible.
Provide adequate ventilation.
If upper respiratory tract irritation occurs, use an approved dust/mist respirator to minimize exposure.
Keep floors clean and dry. Clean up spills immediately.

GENERAL HYGIENIC PRACTICES
Avoid contact with eyes, skin, and clothing.
Avoid breathing dust.
Handle in areas with adequate ventilation.
Avoid contamination of food, beverages, or smoking materials.
Wash thoroughly after handling, and before eating, drinking or smoking.
Remove contaminated clothing promptly and clean thoroughly before reuse.

RECOMMENDED EXPOSURE LIMITS
No exposure limit has been established. This product may irritate the upper respiratory tract if used under conditions that create dust or mist particulates.

PERSONAL PROTECTIVE EQUIPMENT
Safety glasses
Impervious gloves
Appropriate protective clothing
Wear approved dust/mist respirator if user operations create dust/mist that causes irritation.

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE
Eliminate ignition sources and prevent build-up of static electrical charges.
Completely isolate and thoroughly clean all equipment, piping, or vessels before beginning maintenance or repairs.
Keep area clean.

9 PHYSICAL & CHEMICAL PROPERTIES

PHYSICAL STATE:	granular solid
COLOR:	white to off-white
ODOR:	slight
Specific Gravity	heavier than water
Vapor Pressure	negligible at 68° F
Solubility In Water	insoluble at temperatures above 113° F
pH Value	5 - 8.5 (in water solution)
Softening Point	212 - 302 ° F

10 STABILITY & REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS
None known.

HAZARDOUS POLYMERIZATION
Not anticipated under normal or recommended handling and storage conditions.

GENERAL STABILITY CONSIDERATIONS
Stable under recommended handling and storage conditions.

INCOMPATIBLE MATERIALS
None known

11 TOXICOLOGICAL INFORMATION

CARCINOGENICITY INFORMATION
PRODUCT/SIMILAR PRODUCT - Not listed as a carcinogen by NTP. Not regulated as a carcinogen by OSHA. Not evaluated by IARC.

REPORTED HUMAN EFFECTS
PRODUCT/SIMILAR PRODUCT - Not a skin irritant or skin sensitizer in repeated insult patch tests when tested as a 10% aqueous paste. Due to the physical nature of this material, may cause eye, skin and respiratory irritation.

REPORTED ANIMAL EFFECTS
PRODUCT/SIMILAR PRODUCT - Acute oral LD50 (rat): > 10 g/kg. Minimal rabbit eye irritant. No effects were observed from oral administration of up to 5% in the diet of rats for 90 days. Metabolism studies indicate that the product is not absorbed by the gastrointestinal tract.

12 ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
PRODUCT/SIMILAR PRODUCT - The 96-hour TL50 under static conditions to Rainbow trout and Bluegill fish was > 100 ppm.

BIODEGRADABILITY
This product is biodegradable.

13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL
Landfilling in a permitted solid or hazardous waste facility is recommended. Handling, transportation, and disposal of material should be conducted in a manner to prevent a nuisance dust hazard. Fully containerize the material before handling, and protect from exposure to the outdoors. Ensure there are no restrictions on disposing of bulk or semi-bulk quantities of waste material. Disposal should be in accordance with all Federal, State and local regulations.

http://talasonline.com/photos/msds/klucel_g.pdf

BOROFLOAT® 33
Borosilicate Glass

Special Properties

- High temperature load capacity:
  - up to 450°C permanent load
  - up to 500°C temporarily (< 10h)
- Low thermal coefficient of expansion
- Thermal coefficient matches silicon (anodic bonding)
- High thermal shock resistance
- Clear practically colorless appearance
- Low fluorescence
- High UV-Transmission
- High chemical resistance against acids, bases and organic substances
- Low alkali content in the glass composition
- Low specific weight

Typical Applications

- Substrates for dielectric coatings
- Lighting applications
- Optical filter coating substrates
- Wafer substrates
- Biotechnology
- Photovoltaics
- Environmental Technology
- Harsh Environments
- Neutron absorbers
- Measurement and Sensor-Technology

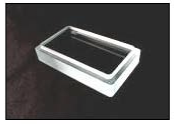


Fig.: CNC-manufactured, temperature resistant window made of BOROFLOAT glass. Parts like this optical window for a micro reactor are economically made of borosilicate glass.

BOROFLOAT® glass has an excellent optical quality. Resulting from a special micro-float manufacturing process, BOROFLOAT offers a good flatness and surface quality. BOROFLOAT is very resistant against water, neutral, saline and acidic solutions as well as to iodine, chlorine, bromine and organic substances even over long periods of time and at temperatures higher than 100°C. BOROFLOAT exceeds the chemical resistance of most metals and many other materials. The borosilicate glass is an ideal substrate for dielectric coatings and has shown to be a good choice for many different technical glass applications, particularly at high operating temperatures. BOROFLOAT® 33 is a registered trademark of SCHOTT.

Specifications of BOROFLOAT®

Optical Properties

- Optical Transmission spectrum of Borofloat
- UV-Transmission:
  - Borofloat 0,7mm thick
  - Borofloat 3,3mm thick
- Abbe Constant v_e: 65,41
- Dispersion $n_F - n_C$: 71,4 x 10^{-4}
- Stress Optical coefficient K: 4,0 x 10^{-6} mm^2 N^{-1}

Index of Refraction of Borofloat

Title	Wavelength (nm)	Refractive Index
n_g	435,8	1,48015
$n_{F'}$	479,9	1,47676
n_e	546,1	1,47311
n_d	587,6	1,47140
n_D	589,3	1,47133
$n_{C'}$	643,8	1,46953
n_C	656,3	1,46916

Mechanical Properties

- Density: 2,2 g/cm^3 (25°C)
- Young's modulus E: 64 kN/mm^2 (acc. to DIN 13 316)
- Poisson's ratio μ: 0,2 (acc. to. DIN 13 316)
- Shear modulus σ: 25 Mpa (acc. to. DIN 52 292 T 1)
- Knoop hardness $HK_{0,1/20}$: 480 (acc. to. ISO 9385)

Chemical Properties

- Hydrolytic Resistance:
  - Class HGB 1 (acc. to. ISO 719 / DIN 12 111)
  - Class HGA 1 (acc. to. ISO 720)
- Acid Resistance:
  - Class 1 (acc. to. ISO 1776 / DIN 12 116)
- Alkali Resistance:
  - Class A2 (acc. to. ISO 695 / DIN 52 322)

Chemical Durability of Borofloat

Solution	Reaction time/ Temperature	Weight loss (mg/cm2)
5 Vol.% HCl	24h at 95°C	<0,01
0,02 n H_2SO_4	24h at 95°C	<0,01
H_20	24h at 95°C	<0,01
5% NaOH	6h at 95°C	1,1
0,02 n NaOH	6h at 95°C	0,16
0,02 n Na_2CO_3	6h at 95°C	0,16
10% HF	20min at 23°C	1,1
10% NH_4F x HF	20min at 23°C	0,14

Electrical Properties

- Dielectric Constant ϵ_r: 4,6 (1 Mhz ; 25°C)
- Loss Tangent (tan δ): 37 x 10^{-4} (1 Mhz ; 25°C)
- Logarithm of the electrical Volume Resistivity lgρ:
  - 8,0 Ω x cm (250°C)
  - 6,5 Ω x cm (350°C)

Standard Thicknesses

Thickness	Tolerance	Thickness	Tolerance
0,70mm	±0,1	7,5mm	±0,3
1,10mm	±0,1	8,0mm	±0,3
1,75mm	±0,2	9,0mm	±0,3
2,00mm	±0,2	13,0mm	±0,3
2,25mm	±0,2	15,0mm	±0,3
2,75mm	±0,2	16,0mm	±0,5
3,30mm	±0,2	17,0mm	±0,5
5,00mm	±0,2	18,0mm	±0,5
5,50mm	±0,2	19,0mm	±0,5
6,50mm	±0,2	21,0mm	±0,7

All given details and specifications are mean reference values and are not guaranteed. In addition, please consider our "Notes on technical specifications"

http://www.pgo-online.com/intl/katalog/borofloat.html

BASF

The Chemical Company

Material Safety Data Sheet

MSDS Code: 9262M

Mearlin® Micro Brass

Revision date: 10/17/06 **Date Printed:** 07/03/07

NFPA Classification:		HMIS Classification:	
Health:	0	Health:	0
Flammability:	0	Flammability:	0
Instability:	0	Physical Hazard:	0
Special Hazards:		Personal Protection:	E

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical Name: Chemical Mixture

Product Use: Colorant.

Supplier: BASF Corporation
100 Campus Drive
Florham Park, NJ 07932

For Chemical Emergency Call:
BASF Hotline: 1-800-832-HELP
CHEMTREC (24 hours):
1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands)
1-703-527-3887 (Outside Above Area)

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient CAS Number	Weight in Percent (%)	Notes
Mica 12001-26-2	24.0 - 45.0	None.
Titanium Dioxide (Rutile) 1317-80-2	53.0 - 70.0	None.
Iron Oxide - Fe2O3 1309-37-1	2.0 - 6.0	None.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Color: Gold
Form: Powder
Odor: Odorless

Flash Point, °C: Not Applicable

Most Important Hazards: Prolonged or repeated exposure may cause lung damage.

Potential Health Effects:

Inhalation: May cause irritation of the respiratory tract. Prolonged or repeated exposure causes lung damage.

Ingestion: No adverse health effects are expected from swallowing.

Skin Contact: May cause skin irritation.

Eye Contact: Dust may cause irritation and inflammation.

Carcinogenicity:

Ingredient CAS Number	Weight in Percent (%)	NTP (Y/N)	IARC (See Notes)	OSHA (Y/N)	ACGIH (See Notes)
Mica 12001-26-2	24.0 - 45.0	N	N	N	N
Titanium Dioxide (Rutile) 1317-80-2	53.0 - 70.0	N	N3	N	N
Iron Oxide - Fe2O3 1309-37-1	2.0 - 6.0	N	N	N	A4

Notes:
IARC: Y1=Carcinogenic to humans; Y2A=Probably carcinogenic to humans; Y2B=Possibly carcinogenic to humans; N3=Not classifiable as to its carcinogenicity; N=Not studied or probably not carcinogenic.
ACGIH: A1=Confirmed human carcinogen; A2=Suspected human carcinogen; A3=Confirmed animal carcinogen; A4=Not classifiable as a human carcinogen; A5=Not suspected as a human carcinogen; N=Not studied.

Chronic Health Hazards: Prolonged or repeated exposure to dust may cause pulmonary problems.

Aggravated Medical Conditions: Pulmonary disorders. Allergies.

4. FIRST AID MEASURES

Inhalation: Move person to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

Ingestion: If large quantities are ingested, seek medical advice. Not a hazard under normal use conditions.

Skin Contact: Wash with soap and water. Get medical attention if irritation persists.

Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

5. FIRE FIGHTING MEASURES

Flash Point, °C: Not Applicable
Autoignition Temperature, °C: Not Applicable
Lower Explosive Limit, %: Not Applicable
Upper Explosive Limit, %: Not Applicable

Extinguishing Media: None - does not burn. Use extinguishing media appropriate for surrounding fire.

Fire Fighting Procedures: Positive pressure, self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Not a fire or explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures: Scoop up or vacuum into a container for reclamation or disposal.

7. HANDLING AND STORAGE

- Store in cool dry place.
- Material may be slippery when wet.
- Avoid breathing dust.
- Wash thoroughly after handling.
- Avoid contact with eyes.
- Use only with adequate ventilation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredient CAS Number	Weight in Percent (%)	OSHA PEL	ACGIH TLV
Mica 12001-26-2	24.0 - 45.0	20 mppcf	3 mg/m³ (Respirable fraction)
Titanium Dioxide (Rutile) 1317-80-2	53.0 - 70.0	10 mg/m³ (Total dust) 5 mg/m³ (Respirable dust)	10 mg/m³ (Total dust)
Iron Oxide - Fe2O3 1309-37-1	2.0 - 6.0	10 mg/m³ (as Fe, total particulate)	5 mg/m³ (Respirable fraction)

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 2006 standards. Unless otherwise noted, all OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, June 30, 1993.

Personal Protective Equipment: Safety glasses with side shields.

Respiratory Protection: Use a NIOSH/MSHA approved respirator as necessary to protect from: dust. If respiratory protection is used, follow all requirements for respiratory programs set forth in OSHA regulations (29 CFR 1910.134).

Ventilation: General ventilation. Local exhaust ventilation is recommended to control exposures to within applicable limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Powder
Color: Gold
Odor: Odorless

Melting Point, °C: Decomposes
Density: 3.4Kg/L
Bulk Density: 30.2g/100 cc
Specific Gravity: 3.4
Solubility (in water): Insoluble
pH: 7.0-11.0 (4% H2O)

10. STABILITY AND REACTIVITY

Stability Data: Stable

Conditions/Hazards to Avoid: None known.

Incompatibility (Materials to Avoid): None known.

Hazardous Decomposition Products: None known.

Polymerization: Will not occur.

Polymerization - Avoid: None known.

11. TOXICOLOGICAL INFORMATION

Information on Product:
No data available.

Information on Components:

Ingredient CAS Number	Weight in Percent (%)	Acute Toxicity - Oral	Acute Toxicity - Inhalation	Acute Toxicity - Dermal	Acute Toxicity - Other
Mica 12001-26-2	24.0 - 45.0	Not Available	Not Available	Not Available	Not Available
Titanium Dioxide (Rutile) 1317-80-2	53.0 - 70.0	Not Available	Not Available	Not Available	Not Available
Iron Oxide - Fe2O3 1309-37-1	2.0 - 6.0	Not Available	Not Available	Not Available	Not Available

12. ECOLOGICAL INFORMATION

Information on Product:
Environmental Fate: No data available.
Ecotoxicological Information: No data available.

13. DISPOSAL CONSIDERATIONS

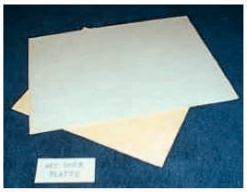
US EPA Waste Number: Not Regulated

Long life for art

You are here: Products > Art Sorb

ART SORB

SHEET TYPE:



Size: 500 x 500 x 1,8 mm. Dry weight about 160 g/sheet (100 grams of ART SORB per sheet). They are composed of non-woven ART SORB particles bound in a PE/PP non-woven.

ART SORB sheets are ideal in small volumes such as framing systems and for vertical applications like on back walls of display cases. Due to their large active surface sheets are often used to buffer rapid changes in relative humidity. They can be cut to appropriate size with scissors or a cutter knife. ART SORB sheets are available pre-conditioned at 50% RH only, but they adapt rapidly to other climatic situations when exposed in a room with a given relative humidity.

Please be aware that these sheets give off fine dusts of ART SORB during handling. This dust contains corrosive LiCl and should not get into contact with art works, specially metals. Be sure not to transfer this dust on your artwork through your hands or gloves. In case these dusts are a problem, the ART SORB should be sealed into permeable but dustproof materials like TYVEK.

TECHNICAL DATA:

Chemical Composition:

ART SORB consists of 90% silica gel (SiO_2) and lithium chloride (LiCl). ART SORB does not off-gas and will even take in a small amount of organic volatiles. Acid contaminants however degrade ART SORB with time as they do with any silica gel.

High moisture capacity (EMC = equilibrium moisture capacity):

Equilibrium Moisture Content is the actual amount of water adsorbed by the silica gel when its vapour pressure is at equilibrium with a given relative humidity (RH). A high EMC indicates a large capability to buffer changes in RH. ART SORB has a unique high adsorption / desorption capability throughout the entire range of RHs (see Table 1).

High M-Value:

The M-value represents the amount of water in grams that is gained or lost by one kilogram of gel when the RH changes by 1%. A high M-value means a greater capacity to buffer RH changes. ART SORB outperforms ordinary silica gels, actually increasing its M-value (see Table 1).

Table 1: EMC/RH amd M-Values of Respective Silica Gels*

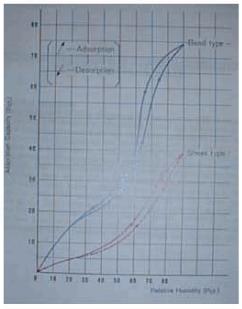
	regular density silica gel		medium density silica gel		ART SORB	
% RH	EMC	M	EMC	M	EMC	M
0	0	7.0	0	2.0	0	6.5
10	7.0	7.0	2.0	1.0	6.5	5.0
20	14.0	6.5	3.0	1.0	11.5	4.5
30	20.5	4.5	4.0	1.0	16.0	6.0
40	25.0	3.5	5.0	1.5	22.0	4.0
50	28.5	2.0	6.5	1.5	26.0	9.0
60	30.5	1.5	8.0	1.5	35.0	19.0
70	32.0	1.0	11.0	6.0	54.0	13.0
80	33.0	1.0	17.0	15.5	67.0	7.0
90	34.0	1.0	32.5	61.0	74.0	6.0
100	35.0		93.5		80.0	

*Data supplied by manufacturer or taken from S. Weintraub: "Studies on the behaviour of RH within an Exhibition Case", ICOM Committee for Conservation, Triennal Meeting, Ottawa, 1981, p. 81/18/4-1ff. ART SORB values change slightly from lot to lot.

Minimal Hysteresis Problems

Hysteresis is the phenomenon whereby a silica gel's EMC/RH adsorption curve lies below its desorption curve (which drastically restricts a silica gel's buffering ability). ART SORB has high slopes of both adsorption and desorption throughout the RH range, so it is not significantly affected by hysteresis. (see Figure 2), Hysteresis affects "regular density" silica gels to such an extent that their average M-Values along the adsorption / desorption curve (the values that represent the true buffering ability of a sorbent) are greatly reduced.

Figure 2: ART SORB Ad-Desorption Curve (at 25°C):



Immune to Temperature Change:

Many moisture sensitive materials are affected by temperature, causing M-Value and response time to vary adversely to temperature changes. ART SORB's EMC/RH curve is largely independent of temperature changes. Of course, ART SORB has to be at the same temperature as the air in the showcase.

Economical:

Due to its extraordinarily high M-Value, especially between 40 % and 75% RH (the range which is most important for the conservation of most art objects) ART SORB has a large moisture reservoir to buffer changes in RH. Therefore ART SORB is much more economical in use than other buffering agents.

Adsorption of contaminants:

Like other silica gels, ART SORB is capable of adsorbing small quantities of organic volatiles. However, these compounds are not fixed irreversibly but can be released again when ART SORB is adsorbing additional moisture. Thus, contaminants might be transfered from one showcase to another. For this reason, ART SORB can not be rented or taken back.

Life span:

Life span of ART SORB is not without limits. Like all silica gels, ART SORB is slowly losing its adsorption capacity. Presence of gazeous pollutants like acetic acid accellerate the degradation process. Our own experience is that the conditioning of an ART SORB cassette RH 50% typically rises by 1 - 2 % RH / year - at the same weight of the cassette. So the life span of ART SORB can be considered ± 10 years. You can continue to use ART SORB much longer, but adsorption caracteristics will be considerably lower.

Precautions: see our page: "How to use ART SORB for the Preservation of Art". Further Informations see Material Safety Data Sheet..

http://www.cwaller.de/english.htm?eartsorb.htm~information

3M
Splicing Tapes
415 • 465 • 469 • 9420 • 9497 • 9499

Technical Data **June, 2003**

Product Description 3M™ Splicing Tapes utilize an acrylic pressure sensitive adhesive system that offers a balance of initial adhesion and good holding power.

Construction

Products	3M™ Splicing Tape 415	3M™ Splicing Tape 465	3M™ Splicing Tape 469	3M™ Splicing Tape 9420	3M™ Splicing Tape 9499	3M™ Splicing Tape 9497
Adhesive Type:*	400	400	330	400	430	430
Adhesive Carrier:	Polyester Film	None	Tissue	Polyester Film	None	None
Release Liner:	Tan Paper	Tan Paper	White Silicone Coated Paper	Tan Paper	Tan Paper	Tan Paper
Approximate Thickness: Release Liner	0.004 in. (0.10 mm)	0.004 in. (0.10 mm)	0.005 in. (0.13 mm)	0.004 in. (0.10 mm)	0.003 in. (0.08 mm)	0.003 in. (0.08 mm)
Tape Only	0.004 in. (0.10 mm)	0.002 in. (0.05 mm)	0.0055 in. (0.14 mm)	0.004 in. (0.10 mm)	0.002 in. (0.05 mm)	0.002 in. (0.05 mm)
Tape Color:	Double Coated Film Clear	Adhesive Transfer Clear	Double Coated Film Light Red	Double Coated Film Red	Adhesive Transfer Clear	Adhesive Transfer Light Red
Liner:	Tan 60#, Densified Kraft	Tan 60#, Densified Kraft	72# Densified Kraft	Tan 60#, Densified Kraft	Tan 60#, Densified Kraft	Tan 60#, Densified Kraft

*3M™ Adhesive 430 is a firm acrylic pressure sensitive adhesive which features both high initial adhesion and good high temperature holding power.

3M™ Adhesive 400 is a medium-firm acrylic pressure-sensitive adhesive system. It features an excellent balance of good initial adhesion (quick stick) and good shear holding power.

PETG

PETG, glycol-modified polyethylene terephthalate, is a copolyester that is a clear amorphous thermoplastic. **PETG** sheet has high stiffness, hardness, and toughness as well as good impact strength.

Unstressed **PETG** exhibits good resistance to dilute aqueous solutions of mineral acids, bases, salts, and soaps. **PETG** also has good resistance to aliphatic hydrocarbons, alcohols, and a variety of oils. Halogenated hydrocarbons, low molecular weight ketones, and aromatic hydrocarbons dissolve or swell this plastic.

PETG does not contain a UV inhibitor and it is not suggested for use in applications involving continuous long-term outdoor exposure.

www.polymerplastics.com/transparents_petg.shtml

VOLARA® foam

Fine Cell Crosslinked Polyethylene Foam , By Voltek

Volara® is a flexible closed-cell polyethylene foam which is crosslinked by means of a unique electron irradiation process. It is manufactured as a continuous smooth sheet with small cells, and is available in a variety of types to suit varied design property requirements.

Volara ® has many benificial characteristics including high temperature resistance and low water absorbtion, low moisture vapor transmission and good buoyancy. Volara ® also has excellent thermal insulation and chemical resistance properties. The AFR and MF grades of Volara are fire-retardant, while the A and EO grades meet FDA regulations regarding food contact applications. Volara is nontoxic and contains no CFC, HCFC, or hydrocarbon blowing agents. It is available in continuous rolls and laminated sheets.

www.reillyfoam.com/volara.htm