The Long and Winding Road: The Preservation of Direct-Positive & Photographic Print Materials

Richard Avedon, The Beatles August 11, 1967, Silver Gelatin Prints (left) and Dye Transfer Prints (right)

Heather Brown, Fellow Winterthur/University of Delaware Program in Art Conservation

Photographic Conservation Resources

Daguerreotypes, Ambrotypes & Tintypes

Daguerreotype

- 1839 – 1865
- Silver-plated copper support
- Gold-Mercury-Silver amalgam image material
- Protective enclosure protects from oxidation and abrasion
- Glass degradation serious challenge

Ambertype

- 1852 – 1880
- Glass support prone to damage
- Dimensionality present
- Silver image in collodion binder
- Typically varnished. Yellowed.
- Black asphaltum layer applied to verso (often). May be cracked.
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Tintype
- 1856 – 1890
- Japanned iron support
- Silver image in collodion binder
- Typically varnished. Hand coloring in cheeks common
- Iron support may rust upon exposure to high RH

Direct Positives popularity timeline
- 1850
- Ambrotype
- 1870
- Tintype
- 1840
- Daguerreotype
- 1920

Photographic Print Materials:
Key Topics to Consider
- Timeline & Identification

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Photographic Print Materials: Key Topics to Consider

- Timeline & Identification
- Deterioration Problems
- Preservation Guidelines and Priorities

Approaches to Identification

- Historical
- Contextual
- Technical

Clues to Identification: Historical/Contextual

- Photographer
- Provenance
- Image content
- Format

Clues to Identification: Historical/Contextual

- Photographer
- Provenance
- Image content
- Format

Clues to Identification: Technical

- Image quality
- Image color
- Non-image color

Clues to Identification: Technical

- Image quality
- Image color
- Non-image color
- Surface characteristics
- Format and presentation
- Deterioration characteristics
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Silver-Based Printing Processes
The Basics
1. Unexposed papers contain light-sensitive silver halides (AgCl, AgBr, AgI)
2. Exposed to light (contact printing if POP – projection printing if DOP)
3. Developed (if DOP)

Timeline of Popularity

Silver-Based Printing Processes
The Basics
1. Unexposed papers contain light-sensitive silver halides (AgCl, AgBr, AgI)
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Silver-Based Printing Processes

The Basics

1. Unexposed papers contain light sensitive silver halides (AgCl, AgBr, AgI)
2. Exposed to light [contact printing if POP – projection printing if DOP]
3. Developed (if DOP)
4. Fixed to remove residual light sensitive salts

Structure of Photographic Print Materials

Binder Layer

Final Image Material

Primary Support

Baryta

Common 19th Century Photographic Print Materials

- Salted Paper
- Albumen
- Silver Gelatin Printing Out
- Collodion Chloride Printing Out

Salted Paper Prints

Image: Photolytic Ag
Support: Cotton rag paper
**Salted Paper**

- 1841 – 1860
- No binder layer
- Photolytic silver image produced by light
- Purplish-brown image color
- Faded silver image
- May be abraded

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**ALBUMEN PHOTOGRAPH**

Anonymous, Hand-colored Albumen Photograph, Private Collection

**ALBUMEN PHOTOGRAPH**

Anonymous, Albumen Photograph, Library of Congress

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Reproduced from the National Museum of Photography, Film and Television collection, by courtesy of the Science and Society Picture Library.

http://www.collodion.org/

Images from the Image Permanence Institute, Graphics Atlas: www.graphicatlas.org

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Portrait Formats: Carte-de-Visites
approx. 2 1/2 x 4 to 4 1/4 in.

Portrait Formats: Cabinet Cards

Albumen Photograph

- 1855 – 1895
- Egg white binder on thin rag	paper support
- Photolytic silver image
produced by light
- Typically gold toned
- Often mounted
- Purplish-brown image color
- Yellowed highlights
- Crazed egg white surface

Albumen Binder

Photolytic Silver / Gold Toned

100% Rag Paper Support
Albumen Photograph
- 1855 – 1865
- Egg white binder on thin rag paper support
- Photolytic silver image produced by light
- Typically gold toned
- Often mounted
- Purplish-brown image color
- Yellowed highlights
- Crazed egg white surface

Silver Gelatin Printing Out Paper
- 1885 – 1940
- Gelatin binder layer
- Paper coated with baryta – glossy surface
- Photolytic silver image may fade or discolor
- Typically gold toned
- Often mounted
- Purplish-brown image color
- Gelatin may flake or abrade

Collodion Chloride Matte

Collodion Chloride Glossy
Silver Gelatin Developed Out Photographs

Silver Gelatin Developed-Out Paper

PERIOD WHEN PROCESS PREDOMINATED

Silver Gelatin Developed-Out Photograph

Early 20th-Century Photographic Processes

Portrait of Charles Greeley Abbot (5th secretary of the Smithsonian); silver gelatin developed-out photographs. One copy was kept in storage while the other was on display in a poor quality housing.
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Silver Gelatin DOP Processing:
- Exposure
- Development
- Stop Bath
- Fixation
- Washing

Evolution of Positive Paper Prints (Photographic)
- 19th century
  - Silver print-out papers
- 20th century
  - Silver develop-out papers

Printing-out paper
- Alfred Stieglitz, Lake George, ca. 1930. The silver-mirroring is emphasized in this photograph by the use of specular lighting. (Courtesy George Eastman House, Acc. No. 1974.0052.0033)

Developing-out paper

Sulfur-Toned DOP (Gelatin)
- Image Permanence Institute Postcard Collection, hand-colored silver gelatin, hand-colored 1921.
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Silver Gelatin
- 1895 – 1960
- Paper support coated with baryta
- Silver image
- Gelatin binder
- Image fading
- Silver mirroring

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Deterioration of Silver Image Material
High humidity and air pollutants can oxidize metallic silver image into invisible silver ions \((Ag^+)\) = Fading

Deterioration of Silver Image Material
Pollutants can reduce the silver ions to metallic silver at the surface of the gelatin = Silver Mirroring

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High humidity and air pollutants can oxidize metallic silver image into invisible silver ions (Ag+) = **Fading**

Pollutants can reduce the silver ions to metallic silver at the surface of the gelatin = **Silver Mirroring**

If the silver ions come into contact with sulfur they can form silver sulfide = **Yellowing**

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**Non-Silver Print Materials**

- **Carbon Print**  
  1865 - 1950
- **Cyanotype**  
  1880 - 1920
- **Platinotype**  
  1880 - 1930

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**Cyanotype**

- 1842 - 1890
- No binder layer
- Based on light sensitivity of iron salts
- Blue pigment image
- May fade in light

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**Platinum Print**

- 1890 - 1920
- No binder layer
- Based on light sensitivity of iron salts
- Platinum image
- Image will not fade
- Paper support may yellow

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**Platinum Print**

- 1890 - 1920
- No binder layer
- Based on light sensitivity of iron salts
- Platinum image
- Image will not fade
- Paper support may yellow
Photograph Process Identification – Review

- Surface sheen
- Image tonality
- 30X magnification
- Mounting style
- Image fading
- Binder layer cracking
- Binder abrasion

Images from the Image Permanence Institute, Graphics Atlas:
www.graphicatlas.org

Photograph Process Identification – Review

- Surface sheen
- Image tonality
- 30X magnification
- Mounting style
- Image fading
- Binder layer cracking
- Binder abrasion

Feeding the Ducks, Gertrude Kasebier
Gum Bichromate Photograph
UD Museums Collection, University of Delaware

Photograph Process Identification – Review

- Surface sheen
- Image tonality
- 30X magnification
- Mounting style
- Image fading
- Binder layer cracking
- Binder abrasion

Self Portrait, Heather Brown
June 2012 workshop at the Center for Alternate Photography in NY

Photograph Process Identification – Review

- Surface sheen
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- 30X magnification
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Self Portrait, Heather Brown
June 2012 workshop at the Center for Alternate Photography in NY
“HOMEWORK”  (1) Identify one type of photographic print in your institution’s collection (or your personal collection). The more historic the photograph the better! Read about the type and process of this type of photograph print using the Graphic Atlas (http://www.graphicsatlas.org/). Based on what you have read, tell us what type of photographic process was used for your print.

(2) Briefly describe the condition of the photographic print you selected:

(3) Briefly describe what you think the preservation needs are of the photographic print you selected.

(4) What is the significance of the photograph you selected?