Skills and Strategies for Working with Photograph Collections

Sandra A. Varry, MFA, MLIS, CA, DAS
University Archivist, Florida State University
Athanasius Kirchner, 1646
Table Camera Obscura, 1769
Niecephore Niepce
View from his window at La Gras, c. 1827
Heliograph
27. LOUIS JACQUES MANDÉ DAGUERRE. Still Life, 1837. Daguerreotype.
Société Française de Photographie, Paris.
William Henry Fox Talbot
The Open Door, 1843
Salted Paper
219. *Daguerre-Giroux Camera.* Giroux’s camera of 1839, based on Daguerre’s patent, was the first camera to be sold in any numbers to the public. The lens was fitted with a pivoted cover plate (A), which acted as a shutter. A plaque (B) bore Daguerre’s signature and Giroux’s seal.
Sixth plate daguerrotype, ca. 1852
32. UNKNOWN PHOTOGRAPHER. *Jabez Hogg Making a Portrait in Richard Beard's Studio, 1843.*
Carte de visite camera
Disderi
Carte-de-visite 8 frame
1860-65
Julia Margaret Cameron, 1868
Portrait of Darwin
Disderi Cabinet Card, c 1870
Napoleon Sarony, 1880 - 1900
The Terminal, 1893
Alfred Stieglitz
Photogravure
563. Sanderson Camera. Frederick Sanderson used two slotted stays on either side of the lens panel in his 1895 camera. This allowed a considerable degree of vertical, horizontal, and swing movement to be applied to the lens panel.
Dorthea Lang
Migrant Mother, 1936
An artist's conception of a conventional model of Land's camera. Opacity of negative and printing paper prevents light from interfering with developing process.
Color

William Eggleston, ca. 1970
Preparation

- Original order
- Respect des fonds
- Do no harm
- Process
- Investigation
- Experimentation
Preparation

- Workspace
- Preservation
- Safety
- Handling
- Research
- Background
Safety

https://www.youtube.com/watch?v=pQiWYnv19Q0
Identification

- Negative or positive image?
- Metal, paper, glass, or plastic?
- black and white?
- other monochrome?
- color image?
- process?
Important photographic processes of the nineteenth and twentieth centuries with their approximate periods of use

<table>
<thead>
<tr>
<th>Year</th>
<th>Process</th>
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<tbody>
<tr>
<td>1839</td>
<td>Daguerreotype</td>
</tr>
<tr>
<td>1850</td>
<td>Calotype</td>
</tr>
<tr>
<td>1860</td>
<td>Salted paper</td>
</tr>
<tr>
<td>1870</td>
<td>Albumen paper</td>
</tr>
<tr>
<td>1880</td>
<td>Photogenic drawing</td>
</tr>
<tr>
<td>1890</td>
<td>Salted paper print</td>
</tr>
<tr>
<td>1900</td>
<td>Albumen print</td>
</tr>
<tr>
<td>1910</td>
<td>Printing-out paper (POP) print</td>
</tr>
<tr>
<td>1920</td>
<td>Gelatin silver developing-out paper print</td>
</tr>
<tr>
<td>1930</td>
<td>Cyanotype</td>
</tr>
<tr>
<td>1940</td>
<td>Platinum or palladium print</td>
</tr>
<tr>
<td>1950</td>
<td>Carbon print</td>
</tr>
<tr>
<td>1960</td>
<td>Gum bichromate print</td>
</tr>
<tr>
<td>1970</td>
<td>Woodburytype</td>
</tr>
<tr>
<td>1980</td>
<td>Collootype</td>
</tr>
<tr>
<td>1990</td>
<td>Color pigment print</td>
</tr>
<tr>
<td>2000</td>
<td>Dye transfer print</td>
</tr>
<tr>
<td>2010</td>
<td>Ilfochrome Classic (Cibachrome) print</td>
</tr>
</tbody>
</table>

**Positives**

- **Monochrome on metal**
  - Heliograph (Nicéphore Niépce)
  - Daguerreotype
  - Tintype
- **Color on metal**
  - Direct heliochrome
  - Hillotype
- **Monochrome on glass**
  - Ambrotype
  - Monochrome transparency
- **Color on glass**
  - Lippmann photograph
  - Three-color Lumière transparency
  - Autochrome
- **Monochrome on plastic**
  - Monochrome transparency
- **Color on plastic**
  - Color transparency
- **Monochrome on fabric**
  - Pannotype
- **Monochrome on paper**
  - Photogenic drawing
  - Salted paper print
  - Albumen print
  - Printing-out paper (POP) print
  - Gelatin silver developing-out paper print
  - Cyanotype
  - Platinum or palladium print
  - Carbon print
  - Gum bichromate print
  - Woodburytype
  - Collootype
- **Color on paper**
  - Color pigment print
  - Dye transfer print
  - Ilfochrome Classic (Cibachrome) print
  - Chromogenic process print

**Negatives**

- **Monochrome on paper**
  - Paper negative
- **Monochrome on glass**
  - Albumen negative
  - Collodion negative
  - Gelatin silver bromide negative
- **Monochrome on plastic**
  - Gelatin silver bromide negative
- **Color on plastic**
  - Chromogenic process negative
Figure 6
(a) A glass plate negative, (b) a print made around the time of the negative, and (c) a modern print from the negative.
The photograph

In the nineteenth and twentieth centuries, a photograph was understood to be a visible and permanent image on some type of support that had been produced by the action of visible or invisible radiation on a photosensitive surface.

Today the emergence of digital imaging has caused some confusion in terminology since the digital output prints from a printer attached to a computer are often called photographs. While these may well be comparable to true photographs in terms of resolution and rendition, they are the product of a fundamentally different technology. The term “digital photograph” is both vague and incorrect. It should be avoided since it could mean any number of very different things: a digital image file, a gelatin silver print derived from a digital image file, an ink-jet print, a laser print, and so on.

A photograph has a laminar structure. The underlying support is the thickest layer; it may be made of metal, paper, glass, synthetic polymer (plastic), fabric, and so on. The support is covered with a transparent layer—a binder of gelatin, albumen, or collodion—which holds the image-forming materials, such as metallic particles, pigments, dyes, and so on. In this book we will use the terms “image material,” “binder,” and “support” in the strict sense of the words: “image material” for the substance that absorbs or scatters incident light; “binder” for the substance that holds the image material on the support; and “support” for the material that underlies and carries the binder and image material.

Figure 3
The structure of a photograph.

Figure 4
Gum bichromate print, Robert Demachy, *Primavera*, ca. 1900.
The daguerreotype 1839–1860

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats

<table>
<thead>
<tr>
<th>American standard plate sizes (in.)</th>
<th>European standard plate sizes (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full plate 6½ x 8½</td>
<td>Full plate 16.2 x 21.6</td>
</tr>
<tr>
<td>Half plate 4¼ x 5½</td>
<td>Half plate 10.8 x 16.2</td>
</tr>
<tr>
<td>Quarter plate 3¼ x 4¼</td>
<td>Third plate 7.2 x 16.2</td>
</tr>
<tr>
<td>Sixth plate 2¼ x 3¼</td>
<td>Quarter plate 8.1 x 10.8</td>
</tr>
<tr>
<td>Ninth plate 2 x 2½</td>
<td>Sixth plate 7.2 x 8.1</td>
</tr>
<tr>
<td>Sixteenth plate 1½ x 1½</td>
<td>Eighth plate 5.4 x 8.1</td>
</tr>
<tr>
<td>Gem type 1 x 1</td>
<td>Ninth plate 5.4 x 7.2</td>
</tr>
</tbody>
</table>

Structure

silver-mercury amalgam

polished silver
copper

Recommendations for conservation of daguerreotypes

- Never touch the plate surface
- The plate should always be sealed in a package, under glass, to protect it from abrasion and from exposure to air and pollutants

Sensitivity

<table>
<thead>
<tr>
<th>Light</th>
<th>Abrasion</th>
<th>Pollutants</th>
<th>Humidity</th>
<th>Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>sensitive</td>
<td>very sensitive</td>
<td>very sensitive</td>
<td>average</td>
<td>average</td>
</tr>
</tbody>
</table>
Figure 30
Tintype, photographer unknown,
Portrait of a Man, ca. 1900.
The tintype 1853–1930
Synonyms: ferrotype, melainotype, melanograph

Occurrence in collections
- Very rare
- Rare
- Common
- Very common

Common sizes and formats
- 8 x 10 in.
- 5 x 7 in.
- 2½ x 4 in. (“bon ton”: eight on an 8 x 10 plate)
- 2½ x 3½ in. (“bon ton” or carte-de-visite: four on a 5 x 7 plate)
- 2 x 2½ in. (sixteen on an 8 x 10 plate)
- 1½ x 2½ in. (eight on a 5 x 7 plate)
- 1½ x 1½ in. and various smaller formats, often called “gems”

Structure

Recommendations for conservation of tintypes
- Keep in storage envelopes, protected from humidity and light
- Add a piece of cardboard inside the storage envelope to prevent deformation

Sensitivity
- Light: sensitive
- Abrasion: average
- Pollutants: average
- Humidity: very sensitive
- Flood: very sensitive

Overall view
Magnified view
Fabrication and use

A thin sheet of iron (about 0.15 mm thick) is coated with a dark brown or black lacquer, which can be shellac or linseed oil mixed with a pigment. The lacquered plate is usually purchased by the photographer as a manufactured product. The photographer coats the plate with collodion containing bromide and/or iodide and immerses it in a silver nitrate sensitizer bath before the collodion solvents evaporate. The plate is then immediately exposed in the camera; it is developed with a solution of ferrous sulfate and nitric acid and then fixed in a sodium thiosulfate or potassium cyanide bath. After washing and drying, the image is usually given a coat of protective varnish. In the twentieth century, gelatin bromide emulsions were introduced for making tintypes; these required that the image be whitened using mercuric chloride. Black cardboard may have been used instead of the lacquered iron plate. Variants of the process continued to be used into the 1930s.
Figure 39
Ambrotype, photographer unknown, ca. 1860. Half of the ambrotype plate is placed on a black background and appears as a positive; the other half is seen by transmitted light and appears as a negative.
The ambrotype 1852–1870

Synonym: collodion positive

Occurrence in collections: very rare | rare | common | very common |

Common sizes and formats:
- Variable; similar to daguerreotype plate sizes to fit cases designed for daguerreotypes

Structure:
- Glass, silver, collodion, varnish, black paper, velvet, or lacquer

Recommendations for conservation of ambrotypes:
- Enclosure in a sealed package

Sensitivity:
- Light: sensitive
- Abrasion: sensitive
- Pollutants: sensitive
- Humidity: sensitive
- Flood: very sensitive

Overall view: [Image of ambrotype]
Magnified view: [Image of eye detail]
Figure 94
Press and molds for producing a convex surface on a mounted print, engraving, ca. 1900.

Figure 95
Carte-de-visite-format albumen print with a convex surface. R. Gallas, Portrait of a Man in Military Uniform, ca. 1880. Verso and recto.
Figure 97
Carte-de-visite photograph albums, ca. 1860.
Table 1 – Typical mount formats for albumen prints

<table>
<thead>
<tr>
<th>Mount Name</th>
<th>Mount Size (inches)</th>
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<tbody>
<tr>
<td>Carte-de-visite</td>
<td>4½ x 2½</td>
</tr>
<tr>
<td>Victoria</td>
<td>5 x 3½</td>
</tr>
<tr>
<td>Cabinet</td>
<td>6½ x 4½</td>
</tr>
<tr>
<td>Promenade</td>
<td>7 x 4</td>
</tr>
<tr>
<td>Panel</td>
<td>8¼ x 4</td>
</tr>
<tr>
<td>Boudoir</td>
<td>8½ x 5½</td>
</tr>
<tr>
<td>Imperial</td>
<td>9½ x 6½</td>
</tr>
<tr>
<td>Stereo</td>
<td>3 x 7</td>
</tr>
</tbody>
</table>

Table 1a – Mount formats available in the United States around 1860

<table>
<thead>
<tr>
<th>Mount Name</th>
<th>Image Size (mm)</th>
<th>Mount Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mignon*</td>
<td>53 x 37</td>
<td>67 x 45</td>
</tr>
<tr>
<td>Koli bri</td>
<td>61 x 33</td>
<td>80 x 40</td>
</tr>
<tr>
<td>Frida</td>
<td>63 x 40</td>
<td>80 x 51</td>
</tr>
<tr>
<td>Visit</td>
<td>89 x 58</td>
<td>110 x 69</td>
</tr>
<tr>
<td>Sezession</td>
<td>98 x 46</td>
<td>115 x 55</td>
</tr>
<tr>
<td>Elisabeth</td>
<td>100 x 70</td>
<td>125 x 82</td>
</tr>
<tr>
<td>Melanie</td>
<td>97 x 79</td>
<td>120 x 90</td>
</tr>
<tr>
<td>Malvern</td>
<td>138 x 70</td>
<td>165 x 82</td>
</tr>
<tr>
<td>Chique</td>
<td>131 x 45</td>
<td>150 x 55</td>
</tr>
<tr>
<td>Alfons</td>
<td>146 x 46</td>
<td>165 x 55</td>
</tr>
<tr>
<td>Kabinett</td>
<td>140 x 100</td>
<td>165 x 110</td>
</tr>
<tr>
<td>Helene</td>
<td>150 x 117</td>
<td>180 x 130</td>
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<tr>
<td>Promenade</td>
<td>177 x 98</td>
<td>205 x 110</td>
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<tr>
<td>Boudoir</td>
<td>186 x 119</td>
<td>205 x 132</td>
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<tr>
<td>Salon</td>
<td>214 x 157</td>
<td>250 x 175</td>
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<tr>
<td>Valerie</td>
<td>240 x 194</td>
<td>280 x 210</td>
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<tr>
<td>Isabella</td>
<td>290 x 230</td>
<td>330 x 250</td>
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<tr>
<td>Imperial</td>
<td>294 x 173</td>
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<tr>
<td>Adele</td>
<td>87 x 57</td>
<td>100 x 70</td>
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<tr>
<td>Admiral</td>
<td>117 x 87</td>
<td>130 x 100</td>
</tr>
<tr>
<td>Album</td>
<td>150 x 110</td>
<td>165 x 125</td>
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<tr>
<td>Rudolf</td>
<td>177 x 127</td>
<td>190 x 140</td>
</tr>
<tr>
<td>Franz</td>
<td>235 x 175</td>
<td>250 x 190</td>
</tr>
<tr>
<td>Madrid</td>
<td>58 x 58</td>
<td>70 x 70</td>
</tr>
<tr>
<td>London</td>
<td>87 x 87</td>
<td>100 x 100</td>
</tr>
<tr>
<td>Wien</td>
<td>94 x 94</td>
<td>108 x 108</td>
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</table>

* Mount names and sizes vary from one supplier to another; bold indicates the most common formats.
Figure 50
Stereograph transparencies, ca. 1920.

Figure 51
Lantern slides, ca. 1920.
Monochrome transparencies on glass: lantern slides and stereograph slides 1850–1950

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
• lantern slide
cm: 8.5 x 8.5; 8.5 x 10
in.: 3 ¼ x 3 ¼; 3 ½ x 3 ½; 3 ¾ x 4
• stereograph slide
cm: 4.5 x 10.7; 6 x 13; 7 x 13; 7 x 15; 8.5 x 17
in.: 3 ½ x 7

Structure
gelatin, collodion, or albumen

Recommendations for conservation of monochrome transparencies on glass
• Avoid extremes of humidity in the storage environment

Sensitivity

<table>
<thead>
<tr>
<th></th>
<th>Light</th>
<th>Abrasion</th>
<th>Pollutants</th>
<th>Humidity</th>
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<td>average</td>
<td>sensitive</td>
<td>average</td>
<td>sensitive</td>
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</table>
Figure 150
Collootype, photographer unknown, Musicians, print by Obernetter, ca. 1890.
The collotype 1868–1940
Synonyms: albertype, collograph, heliotype, photo-collograph, phototype, Lichtdruck, phototype

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
• Variable, from postcards to large-format prints

Structure

Recommendations for conservation of collotypes
• The support paper may be sensitive to extended display under intense light sources

Sensitivity

<table>
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<th>Pollutants</th>
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<td>average</td>
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</table>

Overall view
Magnified view
What is a chromogenic process transparency?
A chromogenic process transparency is a positive photographic image on a film support that is composed of three superimposed layers of gelatin, each containing a dye image, either yellow, magenta, or cyan. The photosensitive material is a silver halide (chloride, bromide, or iodide) included in the gelatin layers, and the dyes are formed (hence, the term ‘chromogenic’) only at the time of the development of the silver image. The support is either cellulose acetate or polyester. Color transparency film is available in rolls, with image sizes ranging from 24 × 36 mm to 6 × 7 cm, and is intended for projection or as sheet film.

Figure 70
Faded chromogenic process transparencies, photographers unknown. Beach and Gardens, ca. 1950.
Chromogenic process transparencies 1935 to present

Occurrence in collections  very rare | rare | common | very common |

Common sizes and formats
- 135-format roll film (mm): image sizes 18 × 24; 24 × 36; 24 × 65
- 120-format roll film (cm): 4.5 × 6; 6 × 6; 6 × 7; 6 × 9
- 220-format roll film: same as 120-format, but in a longer strip, allowing twice as many images
- sheet film: cm: 6 × 9; 9 × 12; 12 × 18; 18 × 24
  in.: 4 × 5; 8 × 10

Structure
- gelatin and yellow dye
- gelatin and magenta dye
- gelatin and cyan dye
- cellulose triacetate or polyester

Recommendations for conservation of chromogenic process transparencies
- Protect from all light exposure
- Keep in a cool and dry environment
- Cold storage if possible

Sensitivity
- Light: sensitive
- Abrasion: average
- Pollutants: average
- Humidity: sensitive
- Flood: sensitive
Yosemite ca. 1899

Oliver Lippincott
The POP print 1860–1940
Synonyms: aristotype, celloidin, citrate paper

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
- Image sizes are similar to gelatin silver negative plate formats

Structure
- gelatin or collodion
- baryta (gelatin and barium sulfate)
- paper
- silver

Recommendations for conservation of POP prints
- Collodion POP prints are vulnerable to mechanical damage (scratches and abrasions)
- Store in protective envelopes

Sensitivity
- Light average
- Abrasion average
- Pollutants average
- Humidity average
- Flood average

Overall view | Magnified view | Transmission electron microscope view
Figure 121
Gelatin silver bromide print, photographer unknown, Soldier, ca. 1915.
The gelatin silver developing-out print 1880 to present

Synonyms: gelatin silver bromide print, DOP print

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
- American (in.): 3½ x 5; 5 x 8; 8 x 10; 11 x 14; 16 x 20; 20 x 24; 24 x 30
- European (cm): 9 x 12; 13 x 18; 18 x 24; 24 x 39; 30 x 40; 40 x 50; 50 x 60

Structure

baryta (gelatin and barium sulfate)

silver

gelatin

paper

Recommendations for conservation of gelatin silver developing-out prints
- Avoid excessive heat and humidity
- Store in protective envelopes

Sensitivity

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<th>Abrasion</th>
<th>Pollutants</th>
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<th>Flood</th>
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</table>

Overall view

Magnified view

Transmission electron microscope view
Figure 124
Cyanotype, photographer unknown, Group Portrait at a Bridge, ca. 1890.
The cyanotype 1842 to mid-twentieth century
Synonyms: blueprint, ferro-prussiate print

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
• Image sizes correspond to those of the negatives used to print them

Structure

blue pigment particles

paper

Recommendations for conservation of cyanotypes
• Store in protective envelopes, preferably good-quality paper with no alkaline buffer
• Protect from prolonged exposure to intense light

Sensitivity

<table>
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<tr>
<th>Light</th>
<th>Abrasion</th>
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</table>

Overall view

Magnified view
Image tone and deterioration patterns can help distinguish the following three single-layer print processes:

- **Salted paper**
  - Image tone: brown to violet
  - Appearance and texture: matte
  - Deterioration: fading, yellowing

- **Cyanotype**
  - Image tone: blue
  - Appearance and texture: matte
  - Deterioration: generally good; possible paper support deterioration

- **Platinum or palladium print**
  - Image tone: neutral gray
  - Appearance and texture: matte
  - Deterioration: no fading; possible "ghost" image on adjacent sheets
Image tone and deterioration patterns can help distinguish the following three two-layer print processes:

- **Image tone**: brown to violet
- **Appearance and texture**: glazed
- **Deterioration**: fading; yellowing in highlights; minute cracks

- **Image tone**: chocolate brown
- **Appearance and texture**: glazed or high gloss
- **Deterioration**: no fading; no yellowing; generally good condition; pigment particle clusters visible under magnification

- **Image tone**: variable
- **Appearance and texture**: matte
- **Deterioration**: no fading; no yellowing
Print processes with two layers
The photographic image is located in a binder layer that adheres to the surface of the paper support. Under magnification, the surface shows a transparent layer through which the fibers of the paper support can be seen.
Image tone and deterioration patterns can help distinguish printing-out process prints from developed-out prints:

- **Image tone**: purple to violet
- **Appearance and texture**: smooth surface; may be matte, glazed, or high gloss
- **Deterioration**: yellowing

- **Image tone**: warm tones or neutral gray (gold toned, platinum toned)
- **Appearance and texture**: smooth surface; may be matte, glazed, or high gloss
- **Deterioration**: may show minute cracks, scratches, and abrasions; silver image is often in better condition than gelatin POP

- **Image tone**: neutral gray (may be toned to sepia, in which case no chemical deterioration is visible)
- **Appearance and texture**: smooth surface; may be matte, glazed, or high gloss
- **Deterioration**: silver mirroring
CODE NOTCHES FOR SHEET FILMS

PORTRA 160NC
PORTRA 160VC
PORTRA 400NC
PORTRA 100T
Gelatin silver negatives on glass 1878–1940

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
- American (in.): $2\frac{1}{2} \times 2\frac{1}{2}$; $2\frac{1}{2} \times 4$; $4 \times 5$; $5 \times 7$; $8 \times 10$; $11 \times 14$; $14 \times 17$; $16 \times 20$; $18 \times 22$; $20 \times 24$
- European (cm): $4.5 \times 6$ (sixteenth plate); $6.5 \times 9$ (eighth plate); $9 \times 12$ (quarter plate); $13 \times 18$ (half plate); $18 \times 24$ (full plate); and other formats, such as $8 \times 17$; $21 \times 27$; $24 \times 30$; $30 \times 40$

Structure

Recommendations for conservation of gelatin glass plate negatives
- Store in protective envelopes placed in custom-size boxes
- Position vertically for storage or, if horizontally, in small stacks

Sensitivity

<table>
<thead>
<tr>
<th></th>
<th>Light</th>
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<td>average</td>
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</tr>
</tbody>
</table>
What is a gelatin silver negative on film?
A gelatin silver negative on film is a negative on a plastic film support—either cellulose nitrate, cellulose acetate, or polyester—with a layer of gelatin holding silver particles that form the image. The sensitized film is manufactured in standard camera formats, either as multiple-image rolls or as single-image sheets.

Table 3—Chronology of plastic film supports for roll and sheet film

<table>
<thead>
<tr>
<th>Approximate Period of Use</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1888–1951</td>
<td>cellulose nitrate</td>
</tr>
<tr>
<td>late 1920s to present</td>
<td>cellulose acetates</td>
</tr>
<tr>
<td>1955 to present</td>
<td>polyester</td>
</tr>
</tbody>
</table>
Sandy Skogland, Revenge of the Goldfish, 1981
The chromogenic process print 1942 to present

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
- American (in.): 3½ × 5; 4 × 6; 5 × 7; 8 × 10; 11 × 14; 16 × 20; 20 × 24; 20 × 30; 24 × 30
- European (cm): 9 × 13; 10 × 15; 13 × 18; 18 × 24; 20 × 30; 30 × 45

Structure
- gelatin with cyan dye
- gelatin with magenta dye
- gelatin with yellow dye
- polyethylene with titanium dioxide
- paper
- polyethylene

Recommendations for conservation of chromogenic process prints
- Keep in a cool and dry environment
- Cold storage is recommended

Sensitivity
- Light: sensitive
- Abrasion: average
- Pollutants: average
- Humidity: sensitive
- Flood: average

Photomicrograph of a section
The Cibachrome or Ilfochrome Classic print 1963 to present

Occurrence in collections | very rare | rare | common | very common |

Common sizes and formats
• Variable, depending on the degree of enlargement

Structure
- gelatin with yellow azo dye
- gelatin with magenta azo dye
- gelatin with cyan azo dye
- polyester with microbubbles or RC paper

Recommendations for conservation of Cibachrome or Ilfochrome Classic prints
• Avoid wetting
• Avoid humid storage environments
• High-gloss prints on polyester support are vulnerable to scratching and abrasion

Sensitivity

<table>
<thead>
<tr>
<th>Light</th>
<th>Abrasion</th>
<th>Pollutants</th>
<th>Humidity</th>
<th>Flood</th>
</tr>
</thead>
<tbody>
<tr>
<td>average</td>
<td>average</td>
<td>sensitive</td>
<td>average</td>
<td>sensitive</td>
</tr>
</tbody>
</table>

Photomicrograph of a section
Preservation

• Basic Handling
  - Gloves, transporting larger images, always using two hands,

• Storage options
  - Plastic vs. Paper
    - Types of enclosure and their best uses: sleeving, envelopes, archival board.
  - Making your own
    - Furniture and boxes

• Ideal vs. Budget and Space
• Physical organization of images within a collection.
Ten Simple Dos and Don’ts

Don’t touch or rub

Wear gloves to handle objects

Don’t write with a pen

Use a graphite pencil to write

Don’t glue

Use photo corners

Don’t expose to strong light

Store in appropriate envelopes and boxes

Don’t wet

Keep in cool and dry conditions
Deterioration of plastic film supports

Toward the end of the nineteenth century, the heavy and fragile glass plates used for negatives were replaced with plastic film. Transparent materials produced by treating cellulose with acids—such as cellulose nitrate and cellulose acetate—are used as supports for photographic and motion picture film. Some films remain in good condition today, but many have shown signs of the inherent instability that produces deformation, creases, and breakage, as well as the release of sticky materials and acidic—even toxic—gases (see Gelatin silver negatives on film). These hydrolysis reactions, leading to the eventual loss of the photographic image, are accelerated by increasing temperature and humidity. All film collections—of both historical and contemporary images—are threatened, including those containing roll film, sheet film, negatives, or transparencies, as long as these are made with cellulose nitrate or cellulose acetate. Only cold storage can significantly slow down the deterioration of cellulose film base.

Table 5—Life expectancy of cellulose triacetate film base as a function of storage temperature

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Life Expectancy of Film at 50% RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C</td>
<td>45 years</td>
</tr>
<tr>
<td>15°C</td>
<td>80 years</td>
</tr>
<tr>
<td>10°C</td>
<td>160 years</td>
</tr>
<tr>
<td>0°C</td>
<td>625 years</td>
</tr>
<tr>
<td>-10°C</td>
<td>2,740 years</td>
</tr>
<tr>
<td>-20°C</td>
<td>10,000 years</td>
</tr>
</tbody>
</table>

Figure 208
Cellulose nitrate sheet film negative in a deteriorated state, photographer unknown, ca. 1950
Storage furniture

Wood storage cabinets—whether they are made of solid wood, plywood, or an engineered wood product—should be avoided if possible. They all emit varying degrees of volatile organic compounds (VOCs) that may damage photographs. Metal shelving and cabinets are the preferred option. Plated steel, anodized aluminum, and steel coated with a heat-cured finish or with cured epoxy paint are all good materials for metal storage furniture. Cured epoxy finishes are particularly resistant and emit no solvents. Most metal office furniture currently available is finished with heat-cured finishes that meet the requirements for conservation of photographs.

If wood storage units are the only choice, photographs should be carefully enclosed in envelopes and boxes before being placed in drawers or on shelves and should never be in direct contact with a wood surface.

Figure 222
(a) Storage vault for graphic and photographic collections;
(b) drawer fitted for storage of daguerreotypes.
<table>
<thead>
<tr>
<th>Type of Image</th>
<th>Support</th>
<th>Process</th>
<th>Maximum Temperature</th>
<th>Relative Humidity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>glass plate</td>
<td>• albumen</td>
<td>18°C</td>
<td>30–40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• collodion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• gelatin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>black-and-white</td>
<td>paper</td>
<td>18°C</td>
<td>30–50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• gelatin silver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• pigment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cellulose triacetate</td>
<td>gelatin silver</td>
<td>7°C</td>
<td>20–30%</td>
<td></td>
</tr>
<tr>
<td>polyester</td>
<td>gelatin silver</td>
<td>5°C</td>
<td>20–40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2°C</td>
<td>20–50%</td>
<td></td>
</tr>
<tr>
<td>color</td>
<td>paper</td>
<td>18°C</td>
<td>30–50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cibachrome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• dye transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Polaroid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• pigment (Fresson, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC paper</td>
<td>chromogenic</td>
<td>2°C</td>
<td>30–40%</td>
<td></td>
</tr>
<tr>
<td>cellulose triacetate</td>
<td>chromogenic</td>
<td>-3°C</td>
<td>30–50%</td>
<td></td>
</tr>
<tr>
<td>polyester, polyester</td>
<td>chromogenic</td>
<td>2°C</td>
<td>20–30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3°C</td>
<td>20–40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-10°C</td>
<td>20–50%</td>
<td></td>
</tr>
</tbody>
</table>

*The relative humidity must be at a stable set point between these values, not fluctuating within them.*
### Table 4—Identification of plastics used as supports for film negatives

<table>
<thead>
<tr>
<th>Identifying Characteristic</th>
<th>Type of Plastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>date of manufacture</td>
<td></td>
</tr>
<tr>
<td>before late 1920s</td>
<td>cellulose nitrate</td>
</tr>
<tr>
<td>before 1952</td>
<td>cellulose nitrate or cellulose acetate</td>
</tr>
<tr>
<td>1952–1955</td>
<td>cellulose acetate</td>
</tr>
<tr>
<td>after 1955</td>
<td>cellulose acetate or polyester</td>
</tr>
<tr>
<td>type of deterioration</td>
<td></td>
</tr>
<tr>
<td>deformation, support yellowed, image severely oxidized</td>
<td>cellulose nitrate</td>
</tr>
<tr>
<td>folds in the image layer, vinegar odor</td>
<td>cellulose acetate</td>
</tr>
<tr>
<td>markings</td>
<td></td>
</tr>
<tr>
<td>safety film</td>
<td>cellulose acetate</td>
</tr>
<tr>
<td>nitrate</td>
<td>cellulose nitrate</td>
</tr>
<tr>
<td>notch codes</td>
<td></td>
</tr>
<tr>
<td>number, form, position of notches</td>
<td>according to manufacturer's code legend</td>
</tr>
<tr>
<td>chemical test</td>
<td></td>
</tr>
<tr>
<td>diphenylamine test: Using a micropipette, place a drop of 0.5% diphenylamine solution in concentrated sulfuric acid on a glass slide (caution: this material is dangerous and should be handled only by qualified technicians using appropriate equipment). Using a pair of tweezers, place a small piece of the film support—less than a square millimeter taken from the nonimage border—onto the drop. If cellulose nitrate is present, an intense blue color will appear in the liquid over the course of a few seconds.</td>
<td>positive test result indicates cellulose nitrate</td>
</tr>
</tbody>
</table>

Figure 204
Diphenylamine test. (a) The intense blue color indicates the presence of cellulose nitrate; (b) no color reaction indicates that the sample is not cellulose nitrate.
Table 10—Paper and polyester: advantages and disadvantages

<table>
<thead>
<tr>
<th>Material</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>paper</td>
<td>• humidity-buffering effect</td>
<td>• opaque</td>
</tr>
<tr>
<td></td>
<td>• allows ventilation of any damaging gases</td>
<td>• can tear</td>
</tr>
<tr>
<td></td>
<td>generated by the object</td>
<td>• permeable to external pollutants</td>
</tr>
<tr>
<td></td>
<td>• neutralizes some pollutants</td>
<td></td>
</tr>
<tr>
<td>polyester (PET)</td>
<td>• transparent</td>
<td>• electrostatic</td>
</tr>
<tr>
<td></td>
<td>• strong, resists tearing</td>
<td>• may stick to gelatin if wetted</td>
</tr>
<tr>
<td></td>
<td>• inert and stable</td>
<td>• seals objects in along with any gases they</td>
</tr>
<tr>
<td></td>
<td>• protects from external pollutants</td>
<td>generate</td>
</tr>
</tbody>
</table>

Table 11—Names and acronyms of plastics used in conservation

<table>
<thead>
<tr>
<th>Acronyms</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>acrylonitrile butadiene styrene</td>
</tr>
<tr>
<td>PE</td>
<td>polyethylene</td>
</tr>
<tr>
<td>PEN or PENP</td>
<td>polyethylene naphthalate</td>
</tr>
<tr>
<td>PET or PETP</td>
<td>polyethylene terephthalate (often called polyester)</td>
</tr>
<tr>
<td>PMMA</td>
<td>polymethylmethacrylate (acrylic glazing)</td>
</tr>
<tr>
<td>PP</td>
<td>polypropylene</td>
</tr>
<tr>
<td>PS</td>
<td>polystyrene</td>
</tr>
<tr>
<td>PTFE</td>
<td>polytetrafluoroethylene (Teflon®)</td>
</tr>
<tr>
<td>Type of Image</td>
<td>Support</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>black-and-white</td>
<td>glass plate</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>paper</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>cellulose triacetate</td>
<td></td>
</tr>
<tr>
<td>polyester</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>paper</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>color</td>
<td>paper</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>cellulose triacetate</td>
<td></td>
</tr>
<tr>
<td>polyester, polyester</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The relative humidity must be at a stable set point between these values, not fluctuating within them.
Conservation

• Basic cleaning of prints and negatives.
  – Dusting, film and print cleaners, etc.

• Mold & Insects
  – Isolation, determination, treatment

• Scrapbooks & Albums
  – Preserving original order, interleaving, photo corners

• Adhesives

• Water damage
  – Tray washing, separation of silver versus color process materials, pigment based prints, archival digital prints.

• When it’s time to see a conservator
  – Wet and then dried together, emulsions on glass, etc.
Arrangement

- Using original order or imposing order
  - pros and cons
  - weeding
- Unique identifying numbers
  - try not to have multiple numbers for the same item, either through digitization, software assignment, or other reference numbers.
    - develop your own code if necessary versus a system or device generated number. Especially helpful when there is a print and negative of the same image.
- Use the same arrangement for digital images
- Plan for expansion if necessary.
Description

• Description versus interpretation
  - Main subject(s) i.e. person, events, activities, and objects.
  - Geographical locations if known.
  - Date or span of dates, circa, etc.

• Keeping a consistent format for both physical and digital collections.

• Metadata - viewing it/creating it
  Thesaurus for Graphic Materials
  http://www.loc.gov/pictures/collection/tgm/
Exhibiting Alabama State Archive

Wright State
Digital “photography”

- Same process
- Different recording device
Devices
## File Formats

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JPEG/JPG</strong> (Joint Photographers’ Expert Group)</td>
<td>Most popular lossy image format. Allows users to specify what level of compression they desire.</td>
</tr>
<tr>
<td><strong>PNG</strong> (Portable Network Graphics)</td>
<td>Best of lossless image formats. Widely supported across web. Allows you to include an alpha channel within file.</td>
</tr>
<tr>
<td><strong>BMP</strong> (BitMap)</td>
<td>Would avoid if possible. They offer little to no compression which results in unnecessarily large files.</td>
</tr>
<tr>
<td><strong>TIFF/TIF</strong> (Tagged Image File Format)</td>
<td>Offers both compressed and uncompressed versions. Compressed are similar to PNG and uncompressed is similar to BMP.</td>
</tr>
<tr>
<td><strong>PDF</strong> (Portable Document Format)</td>
<td>Most widely used document format. Great vector image format. Created by Adobe.</td>
</tr>
<tr>
<td><strong>EPS</strong> (Encapsulated PostScript)</td>
<td>Most common vector image format. Standard format for print industry.</td>
</tr>
<tr>
<td><strong>GIF</strong> (Graphics Interchange Format)</td>
<td>Lossless format that supports both animated and static images. Great for webpage banner ads.</td>
</tr>
</tbody>
</table>
Digital storage

- Online,
- external drives,
- CD/DVD,
- flash memory
DAM: digital asset management

- Workflow
- Labeling
- Metadata
Digital environments

http://www.adobe.com/products/bridge.html

https://www.gimp.org/
Online exhibition

http://guides.library.illinois.edu/c.php?g=347666&p=2344

https://www.floridamemory.com/photographiccollection/
Helpful Websites:

*Caring for Your Photographic Collections*
https://www.archives.gov/research/alic/reference/photography.html#care

*Northeast Document Conservation Center – Storage Enclosures for Photographic Materials*
http://www.nedcc.org/resources/leaflets/4Storage_and_Handling/11StorageEnclosures.php

*Care, Handling, and Storage of Motion Picture Film*
http://www.loc.gov/preserv/care/film.html

*Personal Archiving*
http://www.digitalpreservation.gov/you/