Collection Preservation and Access

Photographic Process Identification Webinar #6
Collections

- Environment
- Housing Materials
- Institutional records
- Searchability
- Scholarship
- Publications
- Exhibitions
- Education

Preservation

Intellectual Control

Access
Types of Decay

- Chemical
- Mechanical
- Biological
Causes of Decay

- Light
- Heat (T)
- Relative Humidity (RH)
- Environmental Pollutants
Light

• Display: Low visible light
  – Amount of light depends on sensitivity of objects

  • 50 lux (5 ft candle) for light sensitive objects
  • 100 lux (10 ft candle) for less light sensitive objects

Albumen Print

Silver Gelatin DOP
Environment

- Temperature
- Dew Point
- Relative Humidity
Temperature

- **High T**
  - Accelerates chemical deterioration
    - Rate of decay doubles every 5°C/9°F increase in T

**Why?**

- **Kinetics**
  - Energy of a gas particle is directly proportional to the temperature
Relative Humidity

Relative Humidity is the amount of water vapor in the air expressed as a percentage of the amount needed for saturation at the same temperature.
Water

A deeper look...

- As RH increases or decreases water diffuses into and out of the collection until it reaches equilibrium

What this means...

- Mechanical
  - Objects physically expand and contract

- Chemical
  - Lots of water available for chemical reactions

- Biological
  - Mold city
Dew Point

The temperature at which air containing a specific amount of water becomes saturated. Dew Point determines the temperature and RH combination you can achieve.
Environment

70° F/21° C
50% RH
#1: Ideal Temperature

First, address chemical stability. Keep T low

<table>
<thead>
<tr>
<th>TEMPERATURE SAFE AND RISK ZONES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>68°F/20°C &amp; Higher</strong></td>
</tr>
<tr>
<td>• <strong>High risk</strong> for chemical decay for most materials</td>
</tr>
<tr>
<td>• Increase in biological activity in damp conditions</td>
</tr>
<tr>
<td><strong>55-67°F 12-19°C</strong></td>
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<tr>
<td>• Cool temperatures slow the rate of chemical decay</td>
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<td>• Good for most materials except film and color photographs</td>
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<td><strong>40-54°F 12-19°C</strong></td>
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<td>• Cool temperatures slow the rate of chemical decay</td>
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<tr>
<td><strong>32°F / 0°C Frozen Storage</strong></td>
</tr>
<tr>
<td>• Best for film and color photograph collections</td>
</tr>
<tr>
<td>• Required for degrading acetate and nitrate film</td>
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#2: Ideal Relative Humidity

Second, avoid RH extremes for long periods of time (1-3 months). This can lead to mold and/or mechanical decay.

<table>
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<th>RELATIVE HUMIDITY SAFE AND RISK ZONES</th>
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<tr>
<td><strong>70% RH &amp; Higher</strong></td>
</tr>
<tr>
<td>• High risk for chemical and mechanical decay</td>
</tr>
<tr>
<td>• High risk for mold growth and biological damage</td>
</tr>
<tr>
<td><strong>65-70% RH</strong></td>
</tr>
<tr>
<td>• 70% – High risk for mold growth and corrosion</td>
</tr>
<tr>
<td>• 65% &gt; – Increased risk of chemical decay and mechanical damage</td>
</tr>
<tr>
<td><strong>55-65% RH</strong></td>
</tr>
<tr>
<td>• 60% &gt; – Potential for mechanical damage in vulnerable materials</td>
</tr>
<tr>
<td>• 55% &gt; – Corrosion risk for metals and metal elements</td>
</tr>
<tr>
<td><strong>30-55% RH</strong></td>
</tr>
<tr>
<td>• Generally safe zone for most materials</td>
</tr>
<tr>
<td><strong>30% &amp; Lower</strong></td>
</tr>
<tr>
<td>• Beneficial for chemical decay</td>
</tr>
<tr>
<td>• High risk of shrinkage &amp; brittleness for organic materials</td>
</tr>
<tr>
<td>• Safe for most inorganic materials (metals)</td>
</tr>
</tbody>
</table>
Moisture Equilibration

Slow!

<table>
<thead>
<tr>
<th>Materials</th>
<th>Enclosures</th>
<th>90% Equilibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardcover Book</td>
<td>Book on shelf</td>
<td>One month</td>
</tr>
<tr>
<td>35mm film</td>
<td>Metal can</td>
<td>Six months</td>
</tr>
</tbody>
</table>

Moisture Equilibration at 20°C (68°F)
Environment

Dew Point Calculator: www.dpcalc.org

Constant Dew Point, Change in Temperature
Environment

Dew Point Calculator: www.dpcalc.org

Constant Dew Point, Change in Temperature

Lower Dew Point
Monitoring the Environment

Compare T & %RH and its effect on preservation quality
Preservation Metrics

- **PI**
  - Preservation Index

- **TWPI**
  - Time Weighted Preservation Index

<table>
<thead>
<tr>
<th>TWPI</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWPI &gt; 75</td>
<td>GOOD – slow rate of chemical decay</td>
</tr>
<tr>
<td>TWPI 45 – 75</td>
<td>OK – generally OK but fast decaying organic materials will be at elevated risk</td>
</tr>
<tr>
<td>TWPI &lt; 45</td>
<td>RISK – accelerated rate of chemical decay in organic materials</td>
</tr>
</tbody>
</table>
## Preservation Metrics

- **% EMC**
  - Equilibrium Moisture Content

<table>
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<tr>
<th>Min EMC ≥ 5% AND Max EMC ≤ 12.5% AND %DC ≤ 0.5%</th>
<th>GOOD – minimal risk of mechanical damage; not too dry or too damp, and almost no fluctuation between the two extremes</th>
</tr>
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<tbody>
<tr>
<td>Min EMC ≥ 5% AND Max EMC ≤ 12.5% AND 0.5% &lt; % DC ≤ 1.5%</td>
<td>OK – not too dry or too damp and minimal fluctuation between the two, however sensitive material may be at higher risk</td>
</tr>
<tr>
<td>Min EMC &lt; 5% OR Max EMC &gt; 12.5% OR %DC &gt; 1.5%</td>
<td>RISK – heightened risk of mechanical damage; either too dry, too damp, or too much fluctuation between the two</td>
</tr>
</tbody>
</table>
Preservation Metrics

• Mold Risk Factor

<table>
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<tr>
<th>MRF ≤ 0.5</th>
<th>GOOD – little or no risk of mold growth</th>
</tr>
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<tbody>
<tr>
<td>MRF &gt; 0.5</td>
<td>RISK – An MRF greater than 0.5 indicates that mold spores are half way to germination. An MRF greater than 1.0 indicates that mold spores have germinated, entering a vegetative mold state and visible mold could be actively growing.</td>
</tr>
</tbody>
</table>

NOTE: There is no OK rating for mold growth – either there is the potential for mold germination (RISK) or there isn’t (GOOD).
Monitoring the Environment

Continuous Measuring

• Electronic Dataloggers
Monitoring the Environment

Location

• Inside cases
• Central location in storage or exhibition space
  – Away from doors, air vents, heating/cooling/humidity control equipment
Monitoring the Environment

Electronic data
- Software provides graphs
- Visualize changes over time
- Compare data sets
- Overlay data

eClimateNotebook
### Some Specifics

#### Temperature

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<th>Risk/Conditions</th>
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Good for most materials except film and color photographs |
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| 32°F/0°C Frozen Storage | Best for film and color photograph collections  
Required for degrading acetate and nitrate film |
Chemical instability

Cellulose Acetate Film
Cellulose Nitrate Film

Chromogenic Prints
Chromogenic Film

Inkjet
Color Processes

• Which of these is best preserved in “frozen storage”?

Chromogenic

Silver Dye Bleach

Dye Imbibition
Don’t Freeze!

• Glass Plates
• Internal Dye Diffusion Transfer
Gelatin vs Collodion POP
Preparedness

• Emergency
• Project Planning
• Collection Survey Priorities
Housing Materials

• Words, Words
  – Archival
  – Acid free

Description

This pre-cut mat is a perfect alternative to a party guest book, and a lot more fun. Put your own picture behind it and let attendees at your wedding, birthday, baby shower, retirement, graduation or any celebration write their own comments directly onto the mat.

Details:
• White mat
• Available in assorted sizes
• Double thick
• Image opening has beveled edge
• Black ink pen for signatures included
• Archival and acid free
Housing Materials

ISO 18902 *Imaging materials — Processed imaging materials — Albums, framing and storage materials.*

- Passed P.A.T.
- Alkaline Reserve: 2% by weight calcium carbonate (CaCO₃)
- Kappa Number: 7 or less
- pH Test: pH 7-10
- Bleed Test: no bleed

**Specifications:**

- ArchivalGrade Cardstock Specifications
- Made from fully bleached, high alpha cellulose pulp. It does not contain any post consumer waste recycled pulp. Paper is free of metal particles, waxes, plasticizers, residual bleach, peroxide, sulfur content is less than 0.0008% reducible sulfur.
- The lignin content is measured by the phloroglucinol test with a Kappa number of 5 or less.
- Metallic Impurities, Iron will not exceed 150 ppm and copper shall not exceed 6 ppm. No optical brightening agents are used in the pulp.
- The paper contains a minimum of 3% calcium carbonate (CaCO3) with a pH range 8-9.5
- Alkaline or neutral sizing are used. No alum rosin or rosin sizing are used.
- Color pigment dyes are light-fast and non-bleeding.
- This paper passes the PAT (Photographic Activity Test) ISO 14523 formally ANSI IT9.16
Plastics

• **Good**
  – Polyester (PET)
  – Polypropylene
  – Polyethylene

• **Bad**
  – Polyvinyl Chloride (PVC)
  – Cellulose Acetate
  – Anything greasy to the touch and/or smelly
Paper vs. Plastic

Paper

Pro
• No static
• Write on it

Con
• Opaque
• Abrasive

Plastic

Pro
• Transparent
• Non-abrasive (polyester)

Con
• Static
• Traps pollutants
• Can’t write on it
Resources

• **Storage Environments: The Big Picture**
  – https://www.connectingtocollections.org/storage-environments/

• **Choosing the Datalogger that is Right for You**
  – https://www.connectingtocollections.org/recording-community-webinar-choosing-the-datalogger-that-is-right-for-you/
Resources

- www.filmcare.org
- www.imagepermanenceinstitute.org
Access: Nomenclature

Some processes have MANY different names

What’s in a name?

• Should describe what it is…
  – Technology
  – Materials
Access: Nomenclature

Inkjet Prints
• Archival Digital Print
• Digital Exhibition Print
• Archival Pigment Print
• Digital Pigment Print
• Digital Print
• Archival Pigment Photograph
• Pigment Print

Chromogenic Prints (digitally exposed)
• Lambda Print
• Fujicolor Crystal Archive Print
• Digital Chromogenic Dye Print
• Digital C-Type Print
• LiteJet Exposure on Alu-dibond
• Lambda Digital Print
• Archival Chromogenic Print
• Digital C-Print
• Digital Silver Halide C-Type Print

“That which we call a rose by any other name would smell as sweet”
Access

• Cataloging style guide
  – Standardize list of process names
    • Use technical names rather than industry proprietary names
      – Chromogenic vs. C-print
      – Silver Dye Bleach or Dye Destruction vs. Cibachrome
  – Retrieve information
  – Provide better access and better information to researchers
• How photographs were used, by whom, and when
• How the materials contribute to aesthetics
Intellectual Control

Edward Steichen
Portraits—Evening

Edward Steichen
Mr. and Mrs. Steichen

Edward Steichen
Portraits, Evening

Gum bichromate over silver-platinum print
Metropolitan Museum of Art

Photogravure
National Gallery of Art

Photogravure
Gibson Gallery
Resources

• **Object: Photo**
  – www.moma.org/interactives/objectphoto/#home

• **Graphics Atlas**
  – www.graphicsatlas.org
Survey & Thank You

Thank you!

• National Endowment for the Humanities
  Division of Preservation and Access

• The Andrew W. Mellon Foundation

Survey!

• A brief survey will appear at the end, please give us feedback!
Buffered vs. Non-buffered

Does it matter?