Collection Preservation and Access

Image Permanence Institute
2017-2018

Photographic Process Identification Webinar #6

NATIONAL ENDOWMENT FOR THE HUMANITIES

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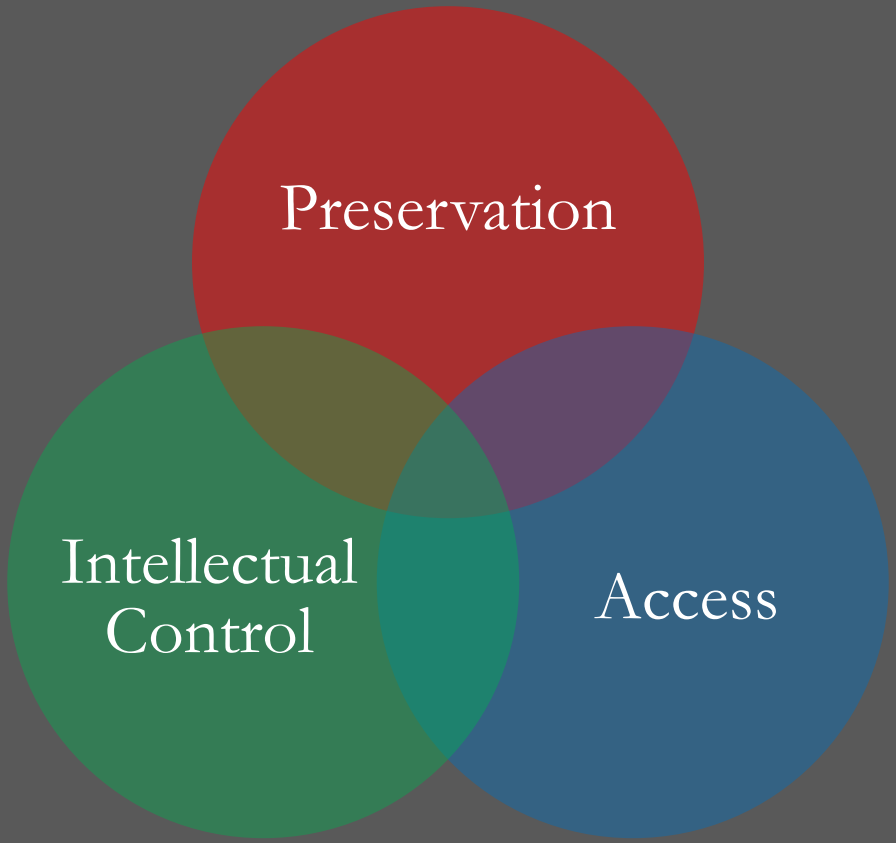
Collections

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



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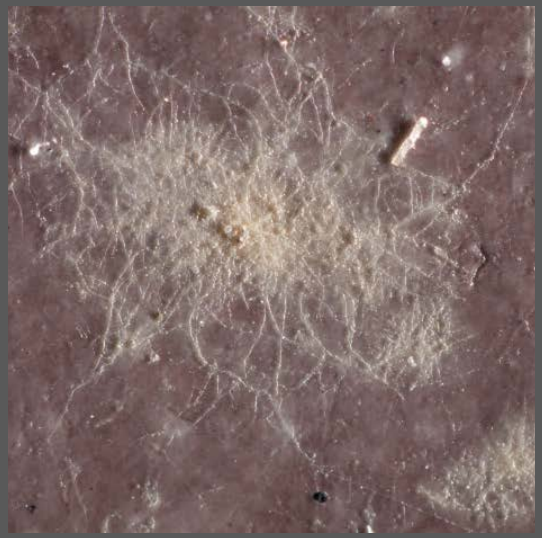
Types of Decay

- Chemical
- Mechanical
- Biological



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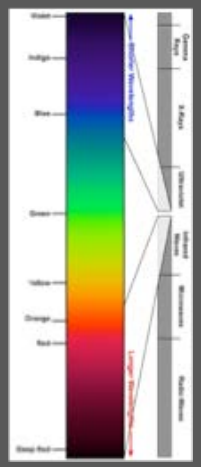
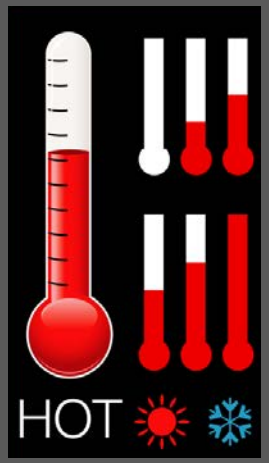
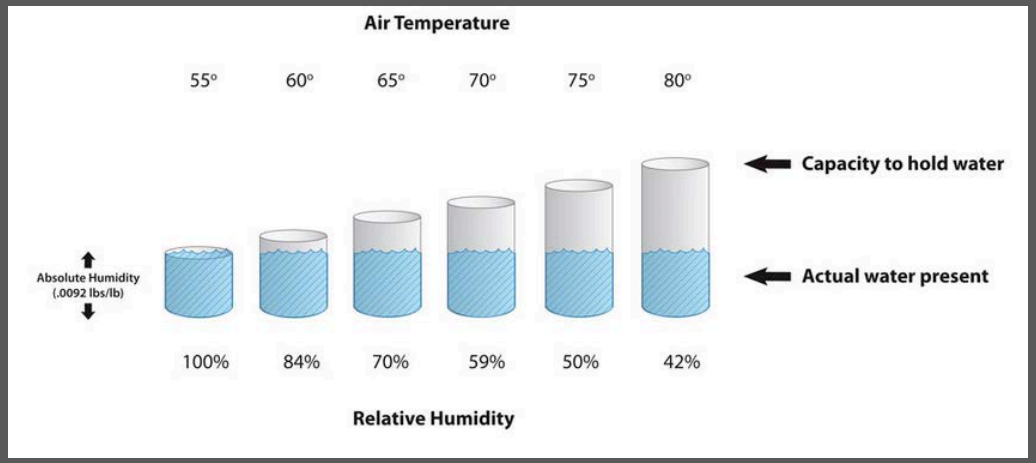
Causes of Decay

- 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

Albumen Print

- 100 lux (10 ft candle) for less light sensitive objects

Silver Gelatin
DOP

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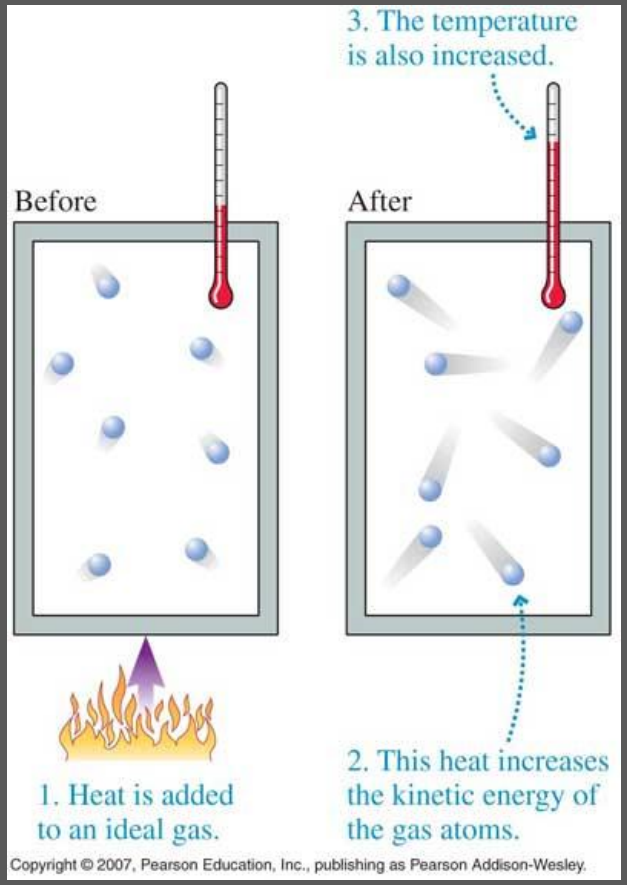
Environment

Temperature

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

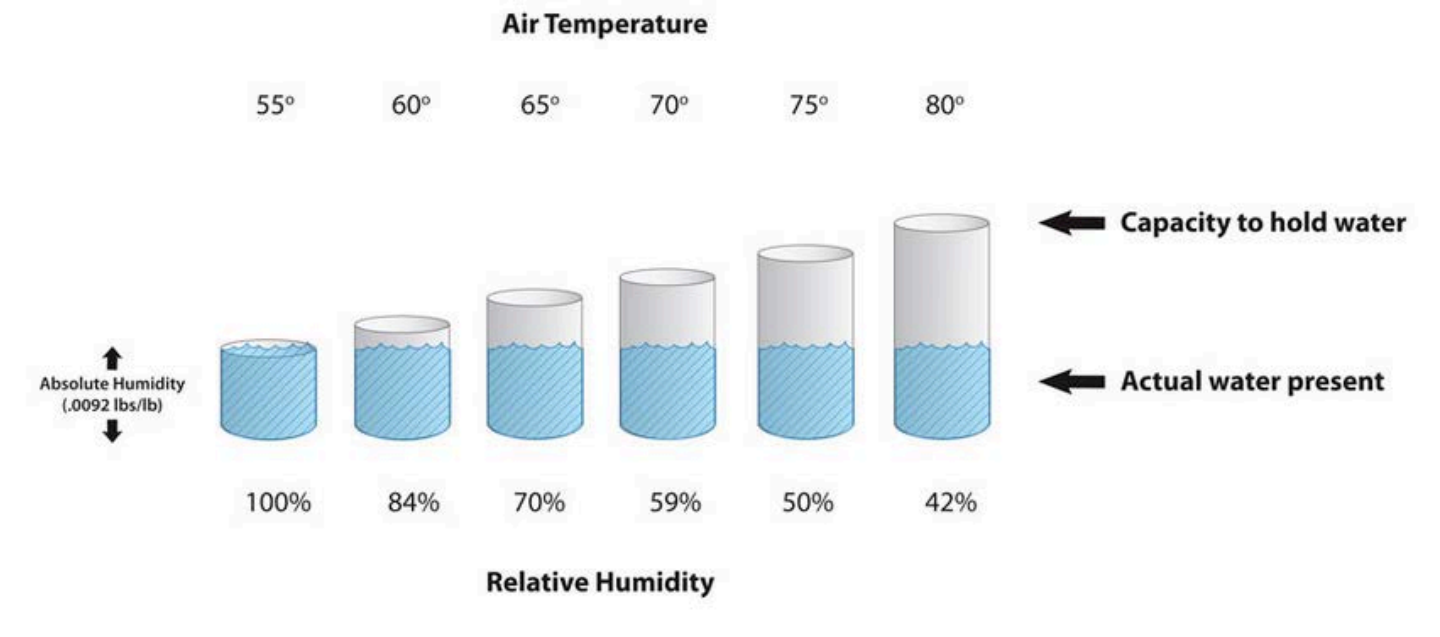
Why?

- 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.



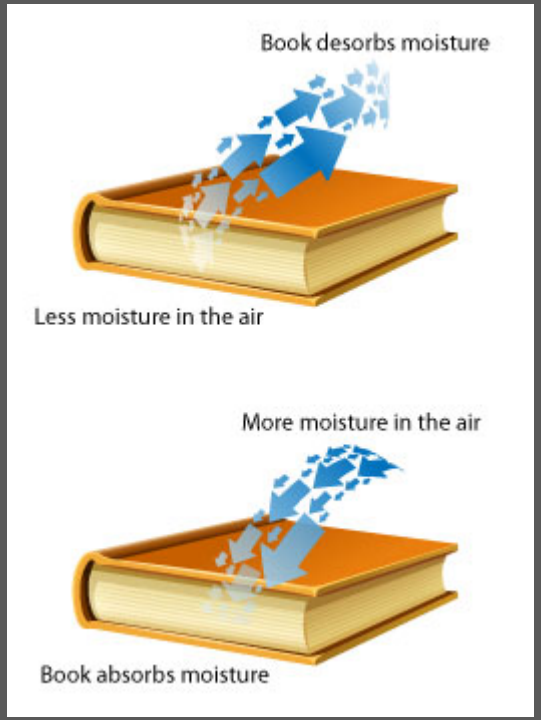
Water

A deeper look…

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

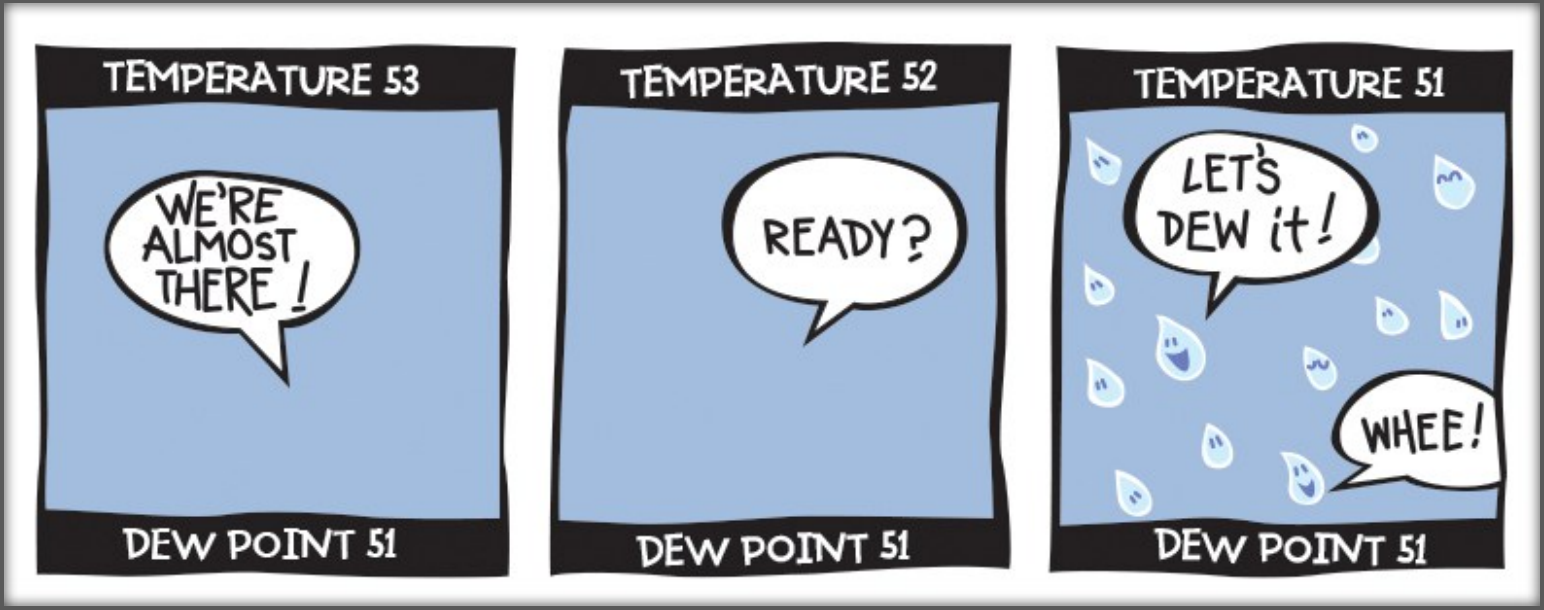
What this means…

- Mechanical
  - Objects physically expand and contract
- Chemical
  - Lots of water available for chemical reactions
- Biological
  - Mold city



Dew Point

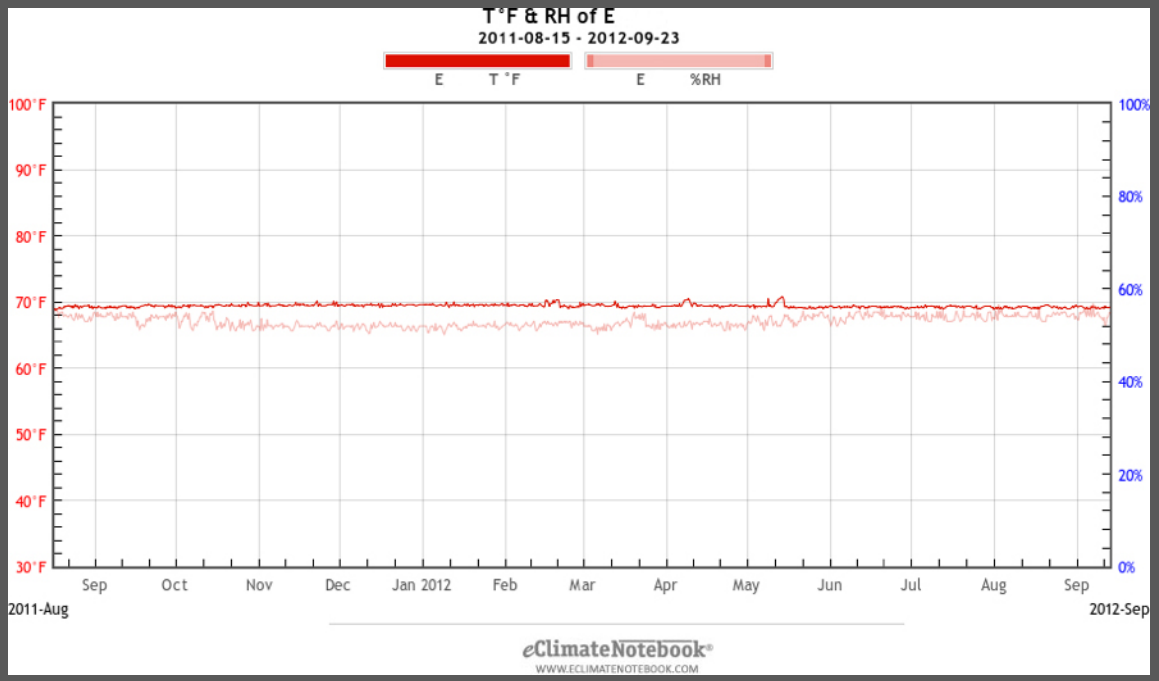
The temperature at which air containing a specific about of water becomes saturated. Dew Point determines the temperature and RH combination you can achieve.



Environment

70° F/21° C

50% RH



#1: Ideal Temperature

First, address chemical stability. Keep T low

Safe Zones

TEMPERATURE SAFE AND RISK ZONES	
68°F/20°C & Higher	• **High risk** for chemical decay for most materials • Increase in biological activity in damp conditions
55-67°F 12-19°C	• Cool temperatures slow the rate of chemical decay • Good for most materials except film and color photographs
40-54°F 12-19°C	• Cool temperatures slow the rate of chemical decay • Good for most materials except film and color photographs
32°F / 0°C Frozen Storage	• Best for film and color photograph collections • Required for degrading acetate and nitrate film

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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

RELATIVE HUMIDITY SAFE AND RISK ZONES	
70% RH & Higher	• **High risk** for chemical and mechanical decay • **High risk** for mold growth and biological damage
65-70% RH	• 70% – **High risk** for mold growth and corrosion • 65%> – **Increased risk** of chemical decay and mechanical damage
55-65% RH	• 60%> – Potential for mechanical damage in vulnerable materials • 55%> – Corrosion **risk** for metals and metal elements
30-55% RH	• Generally safe zone for most materials
30% & Lower	• Beneficial for chemical decay • **High risk** of shrinkage & brittleness for organic materials • Safe for most inorganic materials (metals)

Safe Zone →

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Moisture Equilibration

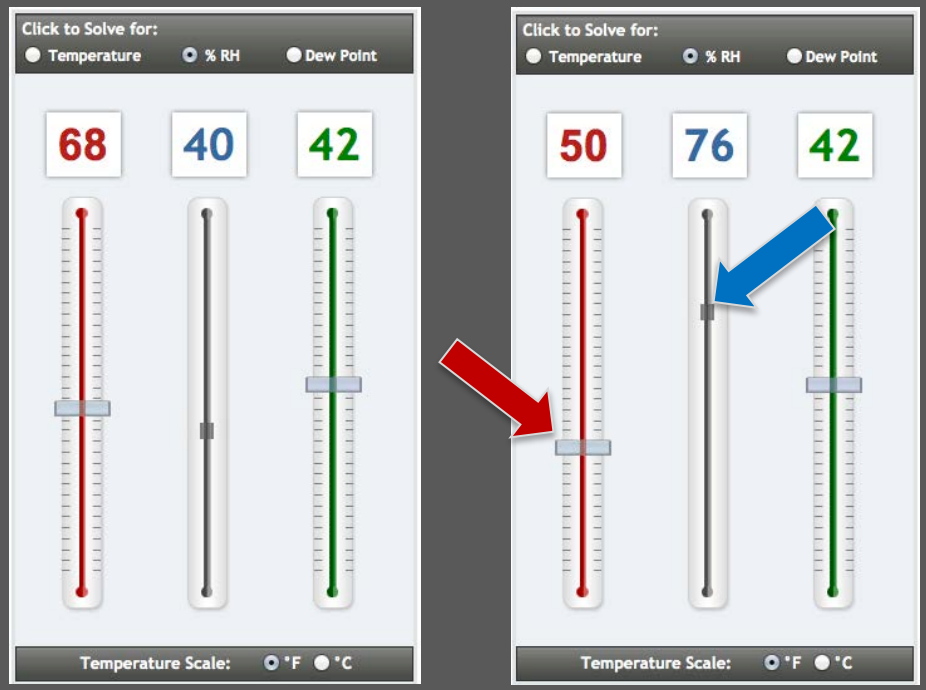
Slow!

Materials	Enclosures	90% Equilibration
Hardcover Book	Book on shelf	One month
35mm film	Metal can	Six months

Moisture Equilibration at 20˚C (68˚F)

Environment

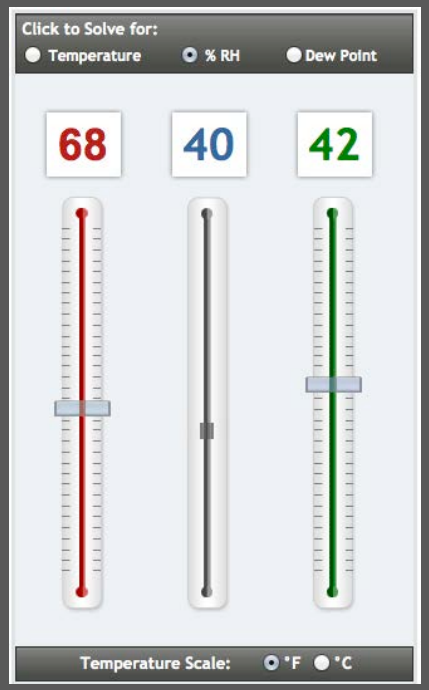
Dew Point Calculator: www.dpcalc.org

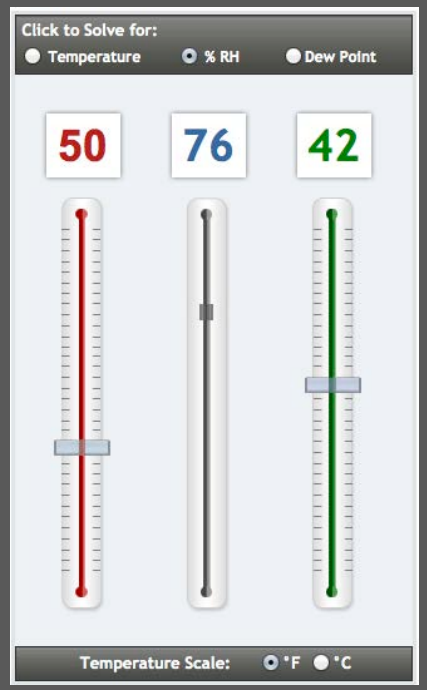


Constant Dew Point, Change in Temperature

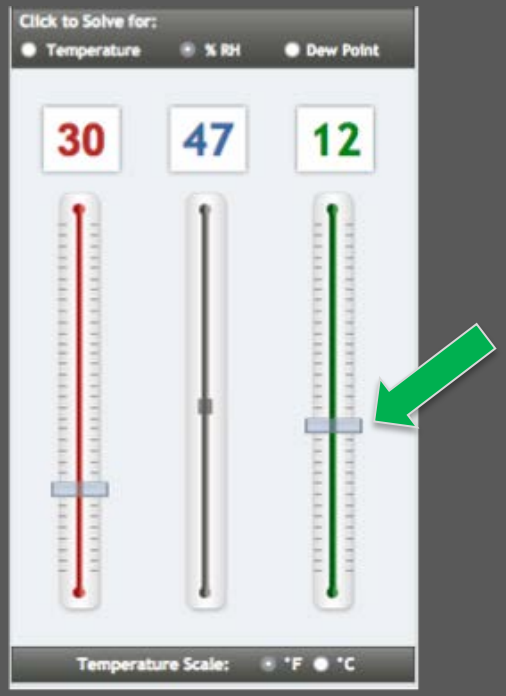
Environment

Dew Point Calculator: www.dpcalc.org





Constant Dew Point, Change in Temperature



Lower Dew Point

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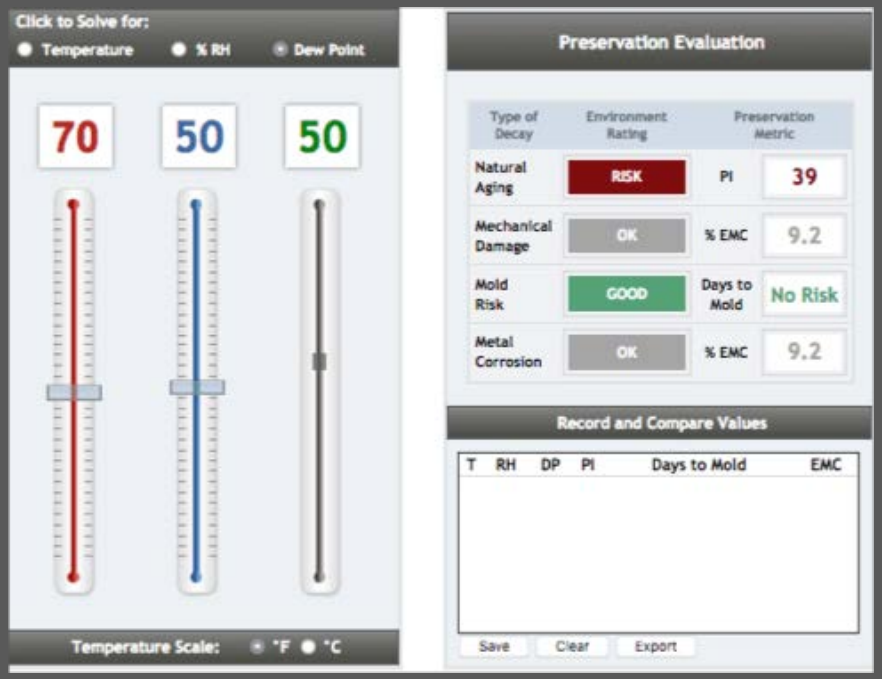
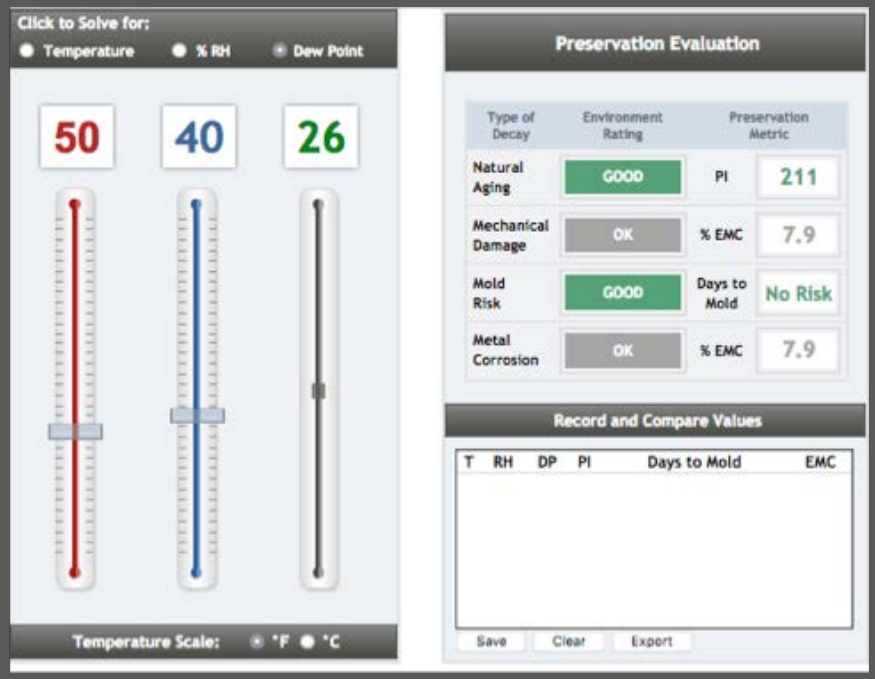
Monitoring the Environment





Compare T & %RH and its effect on preservation quality

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Preservation Metrics

- PI
  - Preservation Index
- TWPI
  - Time Weighted Preservation Index

TWPI > 75	**GOOD – slow rate of chemical decay**
TWPI 45 – 75	**OK – generally OK but fast decaying organic materials will be at elevated risk**
TWPI < 45	**RISK – accelerated rate of chemical decay in organic materials**

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Preservation Metrics

- % EMC
  - Equilibrium Moisture Content

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

Preservation Metrics

- Mold Risk Factor

MRF ≤ 0.5	GOOD – little or no risk of mold growth
MRF > 0.5	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.

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

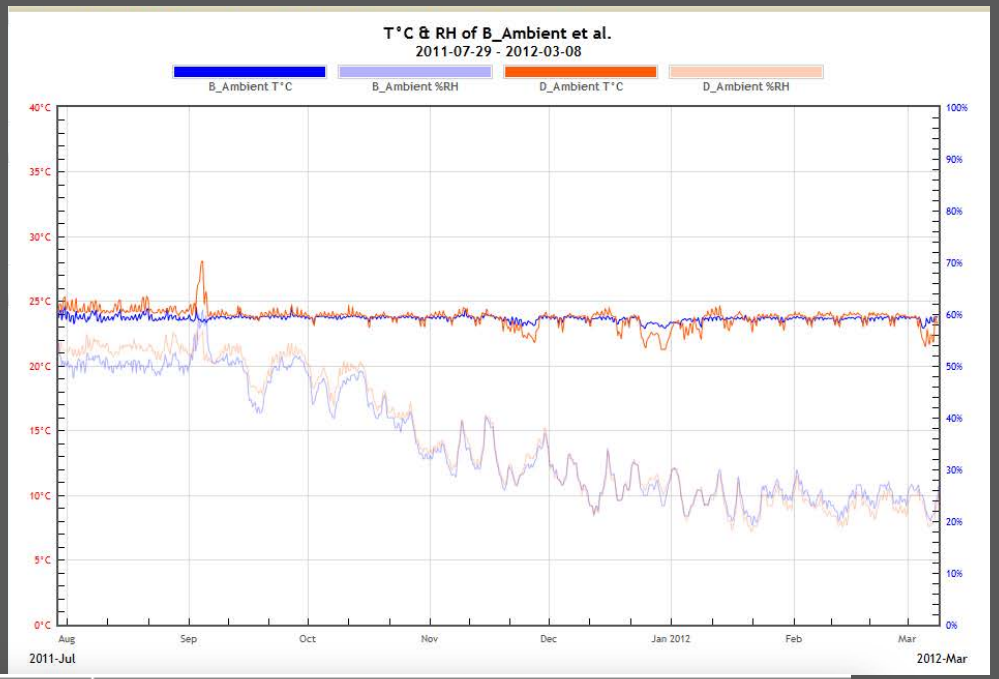
- Inside cases
- Central location in storage or exhibition space
  - Away from doors, air vents, heating/cooling/humidity control equipment




Monitoring the Environment

Electronic data

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



eClimateNotebook

Risk Summary		Preservation Metrics	
Natural Aging	RISK	TWPI	31
Mold Risk	GOOD	MRF	0.08
Metal Corrosion	RISK	%EMC Max	11.8
Mechanical Damage	OK	%EMC Min	7.2
		%DC Max	1.28

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Some Specifics

Temperature

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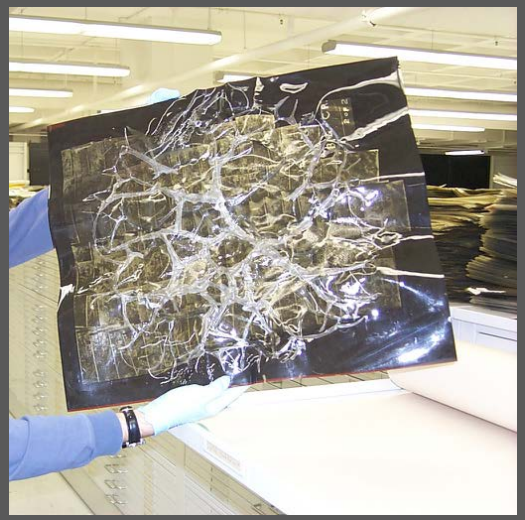
Cold or Frozen

Chemical instability



Cellulose Acetate Film
Cellulose Nitrate Film

Chromogenic Prints
Chromogenic Film

Inkjet

Color Processes

- Which of these is best preserved in "frozen storage"?

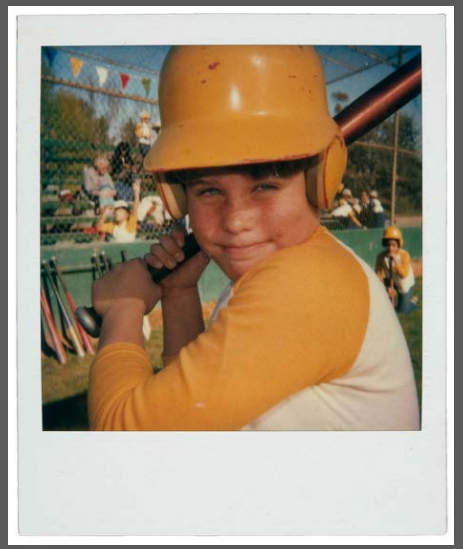
Chromogenic

Silver Dye Bleach

Dye Imbibition

Don't Freeze!

- Glass Plates
- Internal Dye Diffusion Transfer



Gelatin vs Collodion POP

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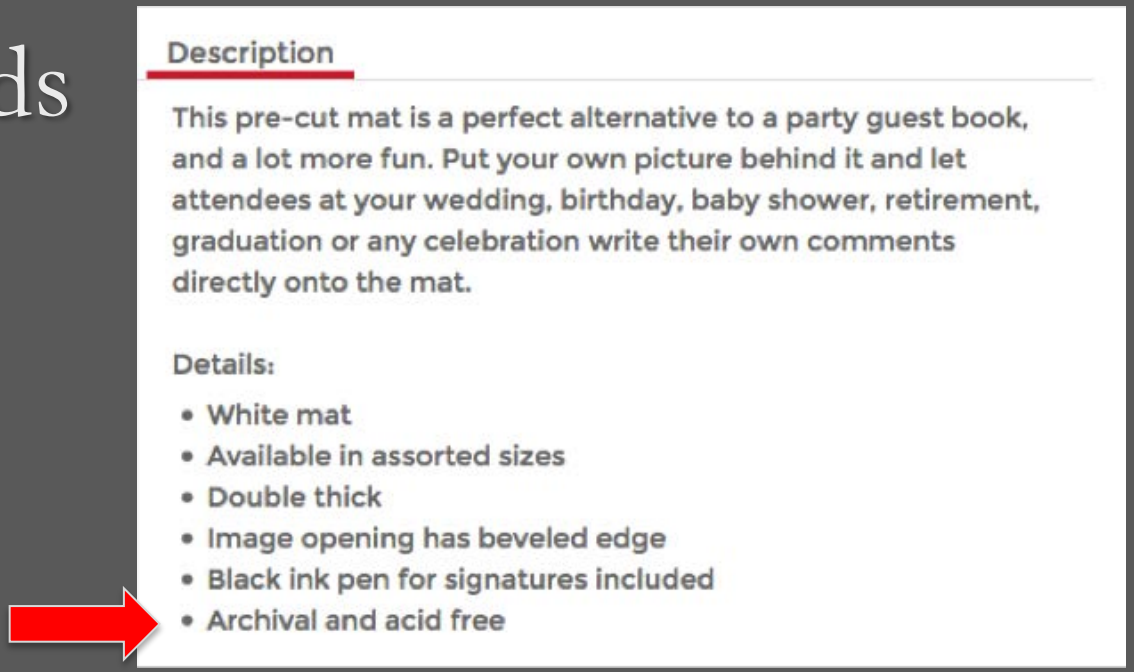
Preparedness

- 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

PASSED P.A.T.

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

- Passed P.A.T.
- Alkaline Reserve: 2% by weight calcium carbonate ($CaCO_3$)
- 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

Features	Specs
Brand	Gaylord Archival®
Type	Specialty
Material	70 lb. text
pH	7.0
Acid-free	Yes
Lignin-free	Yes
Buffered	No
Passed P.A.T.	Yes
Color	Cream

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Plastics

- Good
  - Polyester (PET)
  - Polypropylene
  - Polyethylene
- Bad
  - Polyvinyl Chloride (PVC)
  - Cellulose Acetate
  - Anything greasy to the touch and/or smelly

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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/

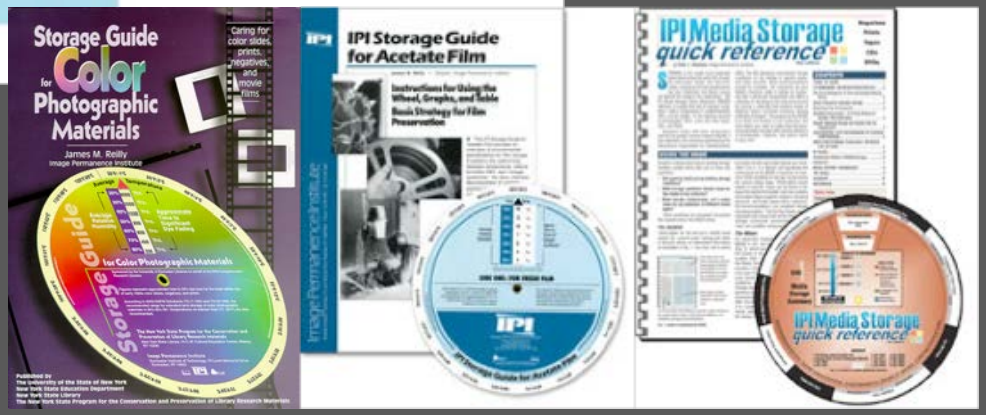
Resources

FilmCare.org

STORAGE CONDITIONS 30-55% RH	NITRATE	ACETATE		POLYESTER	
		B&W	COLOR	B&W	COLOR
ROOM 68°F (20°C)	Unacceptable	Unacceptable	Unacceptable	Acceptable	Unacceptable
COOL 54°F (12°C)	Unacceptable	Unacceptable	Unacceptable	Acceptable	Unacceptable
COLD 40°F (4°C)	Acceptable	Acceptable	Acceptable	Best Practice	Acceptable
FROZEN 32°F (0°C)	Best Practice	Best Practice	Best Practice	Best Practice	Best Practice

Note: Degrading acetate and nitrate should be frozen.

RATING SYSTEM	
Unacceptable	Likely to cause significant damage.
Acceptable	Meets ISO recommendations.
Best Practice	Will provide an extended lifetime.



- www.filmcare.org
- www.imagepermanenceinstitute.org

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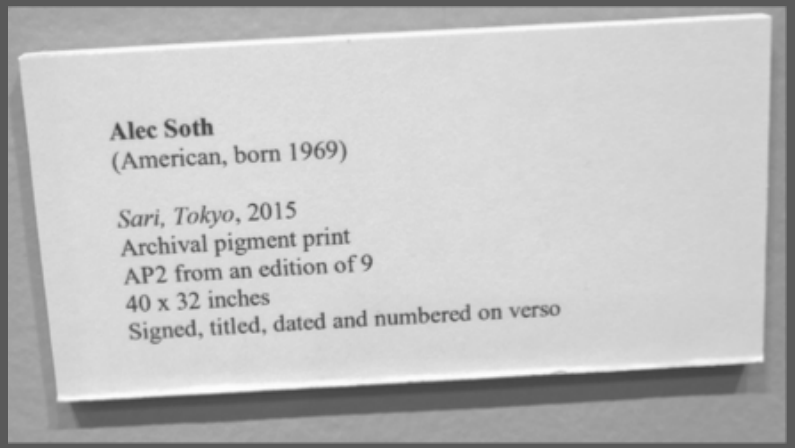
Collections

Access: Nomenclature

Some processes have MANY different names

What's in a name?

- Should describe what it is…
  - Technology
  - Materials



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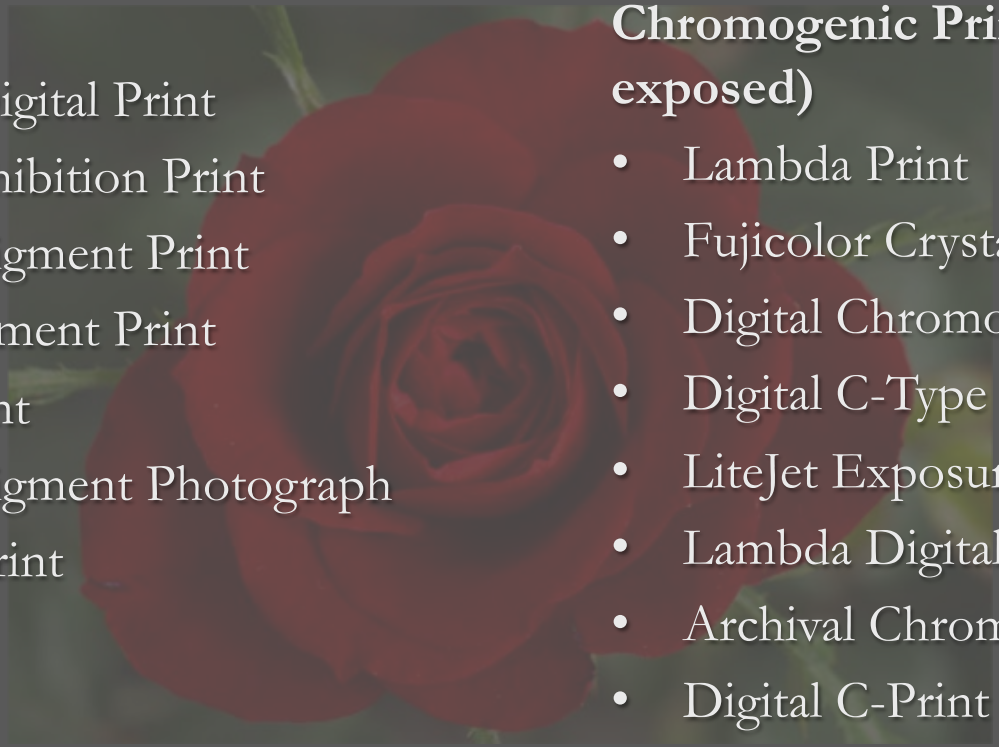
Access: Nomenclature



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"

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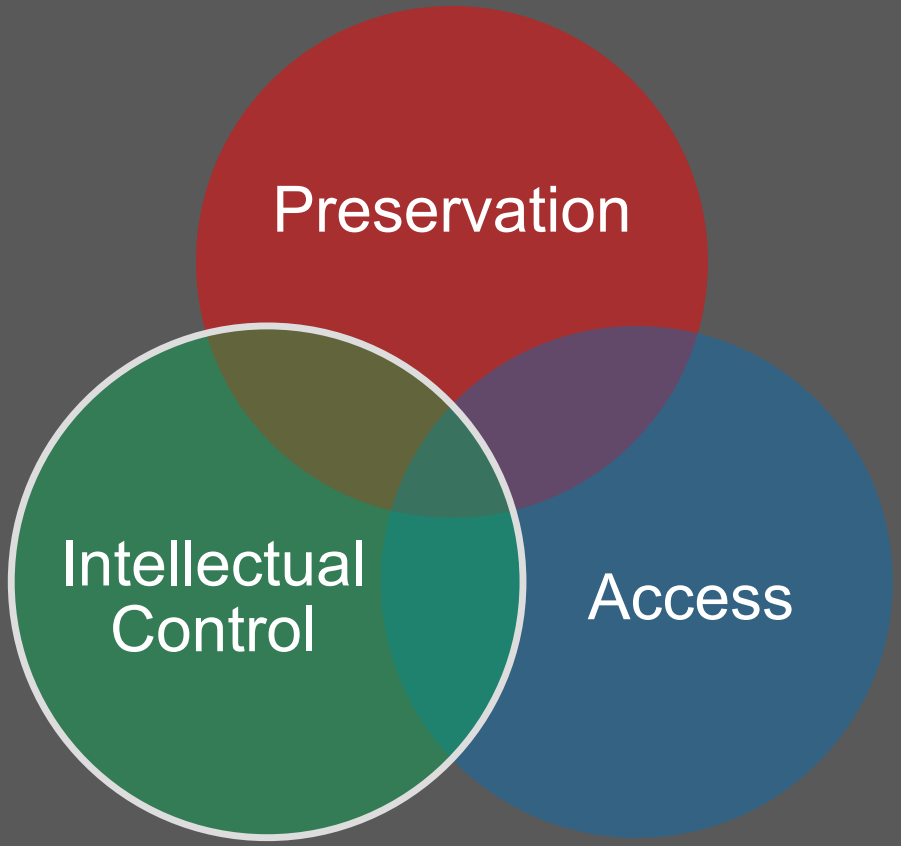
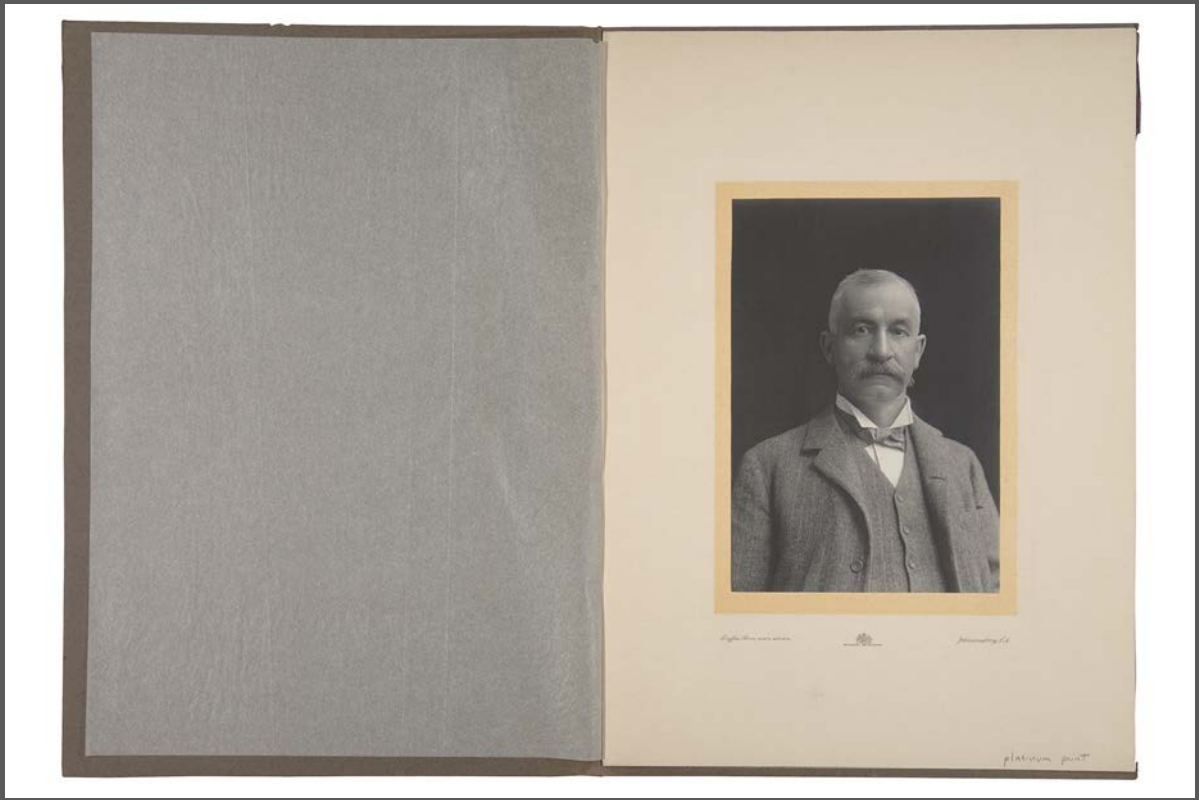
Access

- 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

Collections



Intellectual Control



- How photographs were used, by whom, and when
- How the materials contribute to aesthetics

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Intellectual Control

Edward Steichen
Portraits—Evening

Gum bichromate
over silver-platinum print
Metropolitan Museum of Art

Edward Steichen
Mr. and Mrs. Steichen

Photogravure
National Gallery of Art

Edward Steichen
Portraits, Evening

Photogravure
Gibson Gallery

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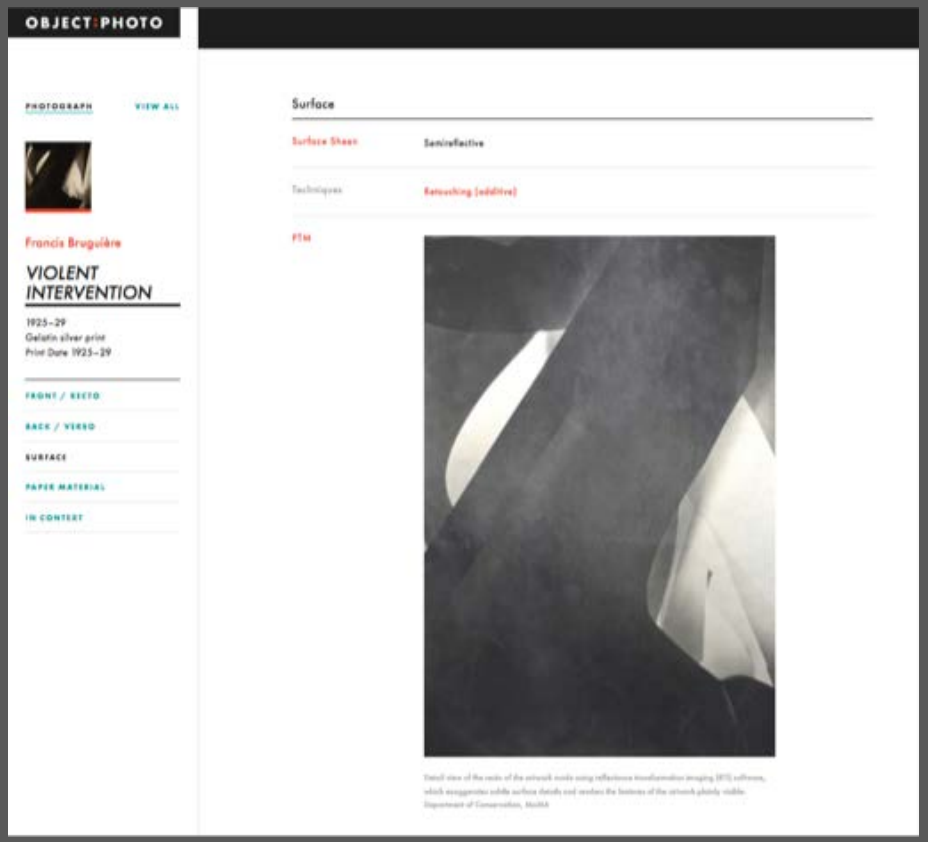
Resources

- 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?