May 18, 2012

Preserving photographs: ideals vs. realities

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Photographic Processes

Albumen
Ambrotype
Autochrome
Bromoil
Chromogenic
Calotype
Carbon print
Collodion
Collotype
Cyanotype

Daguerreotype
Digital
Dufaycolor
Dye sublimation
Dye transfer
Gelatin silver
Gum bichromate
Heliochrome
Inkjet
Melainotype

Opalotype
Palladium
Photogravure
Platinotype
Polaroid
Rotogravure
Salt print
Tintype
Van Dyke
Woodburytype
Composition of a Photograph

Light Sensitive Particles: can be silver, platinum, color dyes, pigments, iron salts

Emulsion: binder layer of gelatin, albumen, or collodion holds the image particles

[Baryta: creates a smooth glossy surface]

Base: support can be paper, glass, metal, plastic, fabric, etc.
Cased Photographs

Daguerreotype, 1839 - ca.1865
silver-plated sheet of copper

Ambrotype, 1851 - ca.1870
glass

Tintype, 1854 - 1930s
iron coated with black varnish
Paper Based Prints

Cyanotype

Platinum

Albumen

Gelatin Silver

Salted Paper

Chromogenic

Robert Frank

Dick Arentz

William Fox Talbot
Card Photographs

Carte de visite, 1859 – 1870s

Cabinet card, 1866 – 1900s

Stereograph, 1850s – 1920s
Other Formats

Photogravure (paper)  Lantern Slide (glass)  Photo Postcard (paper)

Autochrome (glass)  Instant  Transparency, Slide (film)
Negatives

Paper

Flexible plastic
(Cellulose Nitrate, Cellulose Acetate, Polyester)

Glass
Process Identification

Graphics Atlas is a new online resource that brings sophisticated print identification and characteristic exploration tools to archivists, curators, historians, collectors, conservators, educators, and the general public.

Begin exploring our study collection by selecting one of the following tools:

- **Guided Tour**
  Let IPI guide you through individual prints in a virtual study collection that contains processes ranging from the woodcut to the modern digital print.

- **Compare Processes**
  Compare traits across processes using views made with various lighting techniques and magnifications.

- **Identification**
  Learn about the distinguishing characteristics of each process. These pages contain step-by-step instructions on how to identify print processes.
Photographic Deterioration

- Physical damage
- Biological process
- Chemical change
Forms of Deterioration

- Paper deterioration
- Foxing
- Silver Mirroring
- Sulfiding (image fading)
- Glass deterioration
- Metal tarnish
- Emulsion peeling
- Surface scratches

Univ. of South Dakota
George Eastman House
National Gallery of Australia
Forms of Deterioration

- Broken glass support
- Emulsion lifting
- Shrinking film support
- Browning and sticking
- Silver mirroring of negative
- Deteriorated glassine enclosure
Forms of Deterioration

- Ghost image staining
- Insect damage
- Acidic paper & adhesives
- Brittle, rolled paper
- Mold growth
Color Photo Deterioration

cyan dye layer
magenta dye layer
yellow dye layer
paper base
Professional Conservation

Before

After

* Conservation work by Gawain Weaver
Preservation Standards

Temperature / Humidity / Light / Handling

- Store in locations with moderate and stable Temperature and Relative Humidity
- Avoid fluctuations ("cycling") of more than +/- 3°F and +/- 5% RH
- Black & White Film materials should be stored in Cool conditions
- Color materials (except on glass) should be stored in Cold conditions

Ideal Temp & RH for mixed collections:
60-70°F and 30-50% RH

COOL levels ideal for B&W film
COLD levels ideal for Color film & prints
**Preservation Standards**

**Temperature / Humidity / Light / Handling**

- **Nitrate** negatives should be separated and stored apart from other collection materials
  - Nitrate is potentially flammable and harmful to neighboring materials
  - Manufactured in the U.S. from 1889 – 1951, commonly used 1889 - 1930s
  - Identified by edge printing, notch code, or deterioration characteristics
    - Identify, segregate, duplicate

Ideal climate for Nitrate and Safety Film negatives:
35°F or less and 30-50% RH
Preservation Standards

Temperature / Humidity / Light / Handling

• Light levels should be kept as low as possible in storage and display areas
  • Place UV-absorbing sleeves over fluorescent bulbs and UV-absorbing sheets over windows or in frames
• Do not place photographs on permanent display, use surrogates whenever possible
  • Do not expose photos to daylight and never place in direct sunlight
• Some types of photographs are more susceptible to light damage than others

Best light level for display (depending on type of photo): 30-100 Lux / 12 week max
Preservation Standards

Temperature / Humidity / Light / Handling

• Provide photograph handling guidelines to all users
• Always use cotton or Nitrile gloves when handling photographs
• Only use pencils for labeling photos or when working near photos
• Never allow food or drink to be near photographs and work spaces
  • Always use supports with fragile or oversized photographs
  • Use book cradles for viewing fragile albums

Practice what you preach;
Be the best example of proper handling
Storage Enclosures

Photographic Activity Test
International standard test for evaluating photo storage and display materials
Archival Supply Vendors

- www.gaylord.com
- www.universityproducts.com
- www.lightimpressionsdirect.com
- www.archivalmethods.com
- www.hollingermetaledge.com
Storage Enclosures

General Rules

- Use only acid-free, lignin-free supplies that have passed the P.A.T.
- Provide each item with its own enclosure
- Store materials by format and size, keeping prints and negatives separate
  - Label all enclosures before placing materials inside
- Always insert items with the emulsion side away from the enclosure seam
  - Do not pack boxes too tightly
- Do not leave boxes too empty: provide archival “spacers” to prevent slouching and bending of materials
Storage Enclosures

Prints

Paper
buffered (alkaline) / unbuffered (neutral)

- less expensive
- easy to write on
- protect from light exposure
- protect from moisture & gasses
- must remove item to view

Plastic
polyester / polypropylene / polyethylene

- more expensive
- need specific pen to write on
- allows exposure to light
- can view entire object without removing from enclosure

Paper buffered (alkaline) / unbuffered (neutral)

Plastic polyester / polypropylene / polyethylene
Storage Enclosures

Negatives

• Do not re-use negative sleeves
  • Use Nitrile or Latex gloves when working with glass negatives
• Always insert negative with the emulsion side away from the enclosure seam
  • Store glass and sheet negatives vertically, resting on the long side
• Interleave every one-inch with archival corrugated boards for support
• Label boxes containing glass plate negatives with one of the following:
  Caution / Fragile / Glass / Heavy
Storage Enclosures

Cased Images
Storage Enclosures

Photo Albums & Scrapbooks

• Usually, do not remove photos from antique albums or scrapbooks.
• If removal of photos is recommended, first record the original order.
  • Each album or scrapbook should get its own enclosure.
  • Custom clamshell boxes ideal for valuable or fragile albums.
• Adjustable four flap boxes and drop-front print boxes also work.
• Place interleaving in books with: platinum / palladium prints, bronze powders, highly glossy prints, brittle / acidic / deteriorated or highly decorated pages.
Realities

Space / Time / Money
“The Perfect is the Enemy of the Good”
- Voltaire

Low Cost / No Cost Improvement to Climate Control*

- Keep winter heat low
  - Seal windows
    - Keep outside doors and windows closed
    - Block radiant heat from radiators
    - Keep equipment at one level 24 hours a day
- Separate materials that need special conditions

* Provided by NEDCC Preservation Leaflet 2.6
Cold Storage

Conserve O Gram

COS 14/10: Cold Storage for Photograph Collections: An Overview
COS 14/11: Cold Storage for Photograph Collections: Using Individual Freezer Units
COS 14/12: Cold Storage for Photograph Collections: Vapor-Proof Packaging

www.nps.gov/museum/publications/conserveogram/cons_toc.html
Digitization

Priorities:

1\textsuperscript{st} - Least chemically-stable materials / items with significant deterioration

2\textsuperscript{nd} - Most “valuable” items

3\textsuperscript{rd} - Items with greatest potential use

* Never discard original materials after digitization
Disaster Plan

• Identify and Decrease Risks
• Create a Cooperative Plan
• Identify Resources
• Set Priorities
• Write and Maintain the Disaster Plan
DISASTER PREPAREDNESS SUPPLIES

Natural disasters are largely unexpected weather phenomena. The key for a quick recovery is preparedness, and University Products carries the necessary tools and equipment to protect your collections, as well as products to restore them if damage should occur.

SAVE 15%

Severe weather
Hazardous materials
Water damage
Fire and smoke
Insect infestation
Mold and mildew

USE COUPON CODE PREPARE12
ENDS MAY 25, 2012

SHOP NOW
Tips

The Little Things

• Create surrogates for research use (photocopies often suffice)
  • Informative box and folder labels cut down on handling
• Refer to web videos for less complicated “conservation” procedures like removing photographs from “magnetic” sticky albums
• Evaluate which items “deserve” plastic sleeves: consider value and potential use
  • Keep one support board per box, use with one print at a time
  • Put multiple prints (in stable condition) in one enclosure
• Order large map folders and trim to various sizes as needed
**Tips**

**Helpful Tools**

- When possible, use Teflon tools to remove photos from acidic albums or mounts
  - Use pH testing pen on older enclosures before ordering new supplies
  - Use acid-indicating strips to monitor acetate negative “vinegar syndrome”
Preservation Grants

National Endowment for the Humanities

Fed/State Partnership
- Community programs
- Lifelong learning
- Educational programs

Office of Digital Humanities
- Experimental projects
- Digital institutes
- Transatlantic collaboration

Office of Challenge Grants
- Institutional development
- Financial planning
- Digital infrastructure

Division of Public Programs
- Readings and discussions
- Exhibitions
- Radio and TV documentaries

Division of Education Programs
- Teacher professional development
- Model curricula
- Classroom resources

Division of Research Programs
- Fellowships and stipends
- Collaborative projects
- Research centers

Division of Preservation and Access
- Humanities collections
- Reference resources
- Historic newspapers
Resources

Conserve O Gram

Northeast Document Conservation Center

The Library of Congress Preservation

NATIONAL ARCHIVES

AIC American Institute for Conservation of Historic and Artistic Works

Canadian Conservation Institute

Preservation 101
Preservation is a balance between providing access and protection.

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Most images by UofL Photo Archives / Elizabeth Reilly unless otherwise noted.
Images of archival supplies from Gaylord.com, UniversityProducts.com, HollingerMetalEdge.com
Preserving Photographs: Ideals vs. Realities

SLIDE 1: (Intro)

Good afternoon. I’m going to talk today about the preservation of photographic collections. I will begin with the basics of photo preservation including process identification and deterioration, and go over standards and best practices. Then I will speak a little bit about the realities many institutions face in their efforts to preserve collections of photographs, with constraints caused by limitations in time, space and money, and with these constraints in mind, I will close by offering a few tips for safeguarding your photographs within the accepted minimum levels of protection.

SLIDE 2: (Various Types of Photos)

Libraries, historical societies and other cultural institutions that hold photographic collections, invariably have an extensive variety of photograph types and sizes, made from a multitude of techniques and materials. I have listed here only some of the various photographs created in the years since photography was developed. Diverse collections pose a challenge in preservation, as many different kinds of photographic materials have different requirements for their best long-term preservation. With a variety of preservation needs in one collection, it is important for managers to have a base understanding of the most common photographic processes in order to make the most appropriate decisions for their continuing survival.

SLIDE 3: (Cross Section)

Every type of photograph has the same general composition - a base support, a binder layer, and a layer of light-sensitive image particles. (Most 20th century photographic papers also contain a Baryta layer between the Emulsion and Base layers, that produces a smooth, glossy surface). Throughout the history of photography, a variety of substances have been used in this general combination to create photographs. These assorted materials have different chemical characteristics and as a result, display distinct forms of deterioration. Because of this, they have different preservation needs. From daguerreotypes to ink-jet prints, each photographic format requires specific conditions for its ideal care and long term survival. Learning how to identify these different types of photographic materials and understanding their structure and individual types of deterioration will help you make the appropriate decisions for their preservation.

SLIDE 4: (Cased Images)
Cased images are commonly found in cultural heritage collections, and are some of the oldest types of photographs. In fact, daguerreotypes were the very first photograph introduced to the public in 1839. The image on the surface of the silver-coated copper plate can be wiped off very easily and is therefore housed under glass and in a case. They were created in standard sizes and are easily identified by their mirrored surface. If you can see your mirror reflection in the non-image part of the plate, then you are looking at a daguerreotype.

Ambrotypes are similarly fragile, but differ from daguerreotypes in that they are negative images on glass, which is viewed as positive when placed in front of a dark background. This is done with either dark fabric behind the glass plate, or coating the back of the plate with a black varnish. This process of applying a dark background to the glass plate creates a sense of depth – which is the identifying characteristic of an ambrotype.

Tintypes are images on a thin sheet of blackened metal. They are not as delicate as daguerreotypes and ambrotypes and do not need to be in cases, though they often were. Actually, a tintype under glass can be very hard to distinguish from an ambrotype. But most often tintypes were either mounted in a paper sleeve or left loose. Tintypes can be identified by their thin metal sheet.

SLIDE 5: (Prints)

Paper-based photographs most commonly found in archives can be a variety of processes, some more readily identifiable than others. Cyanotypes are unmistakenly blue. Salted paper print images have a very soft appearance because the silver particles of the image are embedded within in the fibers of the paper. Albumen prints are distinctively yellowed with age and display a tiny cracking pattern on the image surface. Platinum prints have a matte finish, extensive range of tones, and some show the brush strokes of the applied light-sensitive solution onto the paper. Gelatin-silver prints are commonly neutral black and white, unless they have been treated with tones such as sepia or selenium, which were popular in the 1920s and 30s. And, Chromogenic prints were the most common type of color photograph in the 20th century.

SLIDE 6: (Card Photos)

Card photographs were immensely popular and comprise the majority of lasting photographs from the nineteenth century. They are readily identifiable by their size and shape, the most common being Cartes de visite at 2.5 x 4 inches, Cabinet cards at 4.5 x 6.5 inches, and Stereographs with their side-by-side, nearly identical images. These types of photographs were typically albumen prints, which when unmounted will curl tightly – therefore the prints needed to be mounted to cards for support.
SLIDE 7: (Other Processes)

Some other processes that are likely to be found in archives are autochromes (an early type of color photo on glass), lantern slides (an early type of slide on glass), photogravures are a type of photomechanical process often used for publishing, instant photos like Polaroids, and transparencies and slides, which are positive images on film.

SLIDE 8: (Negatives)

Though not as varied as prints, there are a few different types of photographic negatives. A very early type is a waxed-paper negative that was mostly used by photographers in Europe during the 1840s and 50s. More commonly found in American archives are glass plate negatives of various sizes. From the 1850s to the 1870s, glass negs were created with the Collodion wet plate process and then the less common dry process. By the 1880s, the Gelatin dry plate negative process took over, and became the forerunner to flexible gelatin film, which Eastman Kodak introduced in 1889. Flexible film eventually surpassed glass plate negatives and is also found in a variety of standard sizes, in both roll and sheet format. The flexible supports of these types of negatives are made of cellulose nitrate, cellulose acetate, or polyester.

SLIDE 9: (IPI Graphics Atlas)

With so many different processes and materials, identification can be a daunting task. It takes a great deal of practice and exposure to rare materials to be a true expert in photographic process identification. The Graphics Atlas is a great tool offered by The Image Permanence Institute in Rochester NY, to help identify different print processes. It provides pictures of the distinguishing characteristics of each process, including characteristics of deterioration, and side-by-side comparisons.

SLIDE 10: (Deterioration Intro)

There are 3 different kinds of deterioration in photographs: Physical, Biological, and Chemical. Physical damage is caused by improper handling and poor storage methods. Damage in the form of fingerprints, tears, creases, scratches, and adhesives are all physical damage. Biological deterioration is damage to photographs caused by insects, rodents, and mold spores. And Chemical deterioration is caused by changes in the elements that make up the photographic material, that either deteriorate naturally, or react with pollutants in the environment, and appear in forms such as flaking, peeling, silver mirroring and fading.
The deterioration of photographs is an ongoing and natural process. Some photographs are constructed of incredibly self-destructive components, while others are more stable - but there is yet to be a photograph that is absolutely permanent. Fortunately there are recognized procedures for slowing the process of deterioration. In order to understand which procedures to enact, it is important to be able to recognize ordinary forms of photographic deterioration.

**SLIDE 11: (Deterioration prints)**

Some photographs display deterioration of the base paper, that is either a result of poor manufacturing, bad processing, damaging adhesives or acidic support boards, and appears as image flaking and staining. Foxing appears as small spots and is caused by impurities in the paper base or support such as lignin. Silver mirroring is caused by oxidation which results in the silver particles migrating to the surface of the print. General image fading, particularly in the highlight areas of silver prints, is called Sulfiding and happens when the silver in the photograph reacts with sources of sulphur, sometimes in the atmosphere, but usually from residual processing chemicals in the print. Albumen prints will fade and yellow over time, due to the inherent chemical reactions within the organic material. Cased images will often display small spots from deterioration of the cover glass, which can obscure the image and deposit harmful particles onto the surface of the plate. In addition to glass decomposition, Daguerreotypes can display tarnishing of the metal plate from oxidation. Ambrotypes can display a peeling of the collodion emulsion from the glass support. And, the surface of tintypes is susceptible to image loss from scratches.

**SLIDE 12: (Deterioration Negatives)**

Common deterioration of glass negatives, is certainly, breakage of the glass support, as well as the lifting of collodion emulsions. A common form of deterioration in Cellulose Acetate (or “Safety”) negatives is the shrinking of the plastic support. When stored in environments with temperature and humidity fluctuations, the plastic support will expand and contract thereby distorting and separating the emulsion layer from its base. When Nitrate negatives deteriorate, they turn brown and become sticky, often adhering to paper enclosures or other negatives. Silver mirroring can also appear in negatives as well as prints. And, improper enclosures, particularly those that are acidic, can cause deterioration of the negatives held inside.

**SLIDE 13: (Deterioration Other)**

The transferring of a photographic image onto material stored in contact with a photograph is called a Ghost Image and is common with platinum prints. Damage from insects such as Silverfish that eat the
organic material of photos can be extensive and very difficult to repair. Another form of organic
deterioration is mold growth that can happen when photographs are stored in environments with high
humidity levels or large fluctuations in temperature and humidity. Many photographs can also become quite
brittle with age, and especially when left rolled, can break very easily. And lastly, photographs can suffer
deterioration when in contact with acidic album pages or mounts, and harmful glue and tape adhesives.

SLIDE 14: (Deterioration Color)

Most color photographs found in archives are inherently unstable and prone to rapid deterioration. The organic dyes used in the chromogenic process, the most common of the 20th century, will inevitably fade. The result of this dye fading is reduced density and contrast, color shifting, and staining. The unstable dyes will fade at different rates, which cause color shifting. For example, when the cyan dye is the first to fade, the image will shift to a reddish hue. But as you may have noticed, not all old color photographs are reddish. This is because dye stability varied among assorted chemical processes and printing papers. So there are also color photos that have shifted to a yellow hue, or if the magenta dye was least stable, display a blue/green tint. Image staining in the form of yellow highlights and image borders is also common in old color prints that used the dye coupler process. There are some color processes that are much more permanent, such as Cibachrome or Kodachrome, that use Azo dyes or pigments, which retain their original color balance much longer than regular dyes.

SLIDE 15: (Professional Conservation)

There are many types of deterioration in photographs that can be addressed through specialized
treatments by a professional conservator, such as damage from silver mirroring, mold, foxing, stains, and
tarnishing. But, single-item conservation is not a feasible and cost effective solution for many institutions. Of
course condition is the initial factor, but the following must also be considered when deciding to send
something for professional conservation: the object’s potential research value, historical value, monetary
value, uniqueness and significance to the collection. Instead, preventative conservation in the form of best
practices and accepted standards for the storage and handling of materials has a more lasting impact on the
preservation of a collection.

SLIDE 16: (Preservation Standards - Temp & Humidity)

Over the years, specific preservation needs have been identified for different types of photos. However there are common factors affecting the permanence of all photographic materials, and therefore
some universal standards for photographic collections in general. The most significant issues in the preservation of photographs are the most common causes of deterioration: Temperature, Humidity, Light, and Handling.

All photographic materials are sensitive to Temperature and Relative Humidity (which is the amount of moisture in the air). High temperatures accelerate the rate of deterioration, causing image fading and discoloration, while low temperatures cause supports to become brittle. Too much humidity can cause photograph support layers to become soft and sticky, while low humidity levels can cause the binder layers to shrink and the supports to curl. Fluctuations in these measurements are especially damaging to photographs, and cause the greatest rate of deterioration. For the best preservation of photos, their storage environments must be controlled and kept at a constant temperature and RH. An optimal range for keeping diverse photographic materials in one room is around 65°-70° F and a Relative Humidity between 30-50%. Cool storage, around 55-65° F, is recommended for B&W film-based materials, and Cold storage, with temperatures 35°F or below, has proven optimal for color photographic materials not on glass.

SLIDE 17: (Nitrate)

It is strongly recommended that NITRATE negatives be stored separately from other negatives and collection material. Nitrate negatives present a potential hazard because they become highly flammable when they deteriorate, and release hazardous gasses that can harm nearby materials. Ideally nitrate materials should be kept in a cold storage environment. Nitrate film was used from 1889 through 1951, and can often be identified by edge printing, a “V” shaped notch that is first from the edge of the sheet, or from specific characteristics of deterioration. The best practice for Nitrate negatives is to identify them, segregate them from other collection materials, and duplicate them before they deteriorate beyond use.

It should also be noted that Cellulose Acetate known as “Safety Film”, which was introduced in 1923 to replace flammable Nitrate film, is also prone to deterioration and can be harmful to materials stored with it. Acetate film based degradation, known as Vinegar Syndrome, can be identified by a vinegar odor, shrinking of the film base and buckling of the final image layer. This type of deterioration is accelerated by storage in warm and humid conditions and can promote decay in surrounding materials.

SLIDE 18: (Light)

Light exposure causes yellowing, fading and embrittlement of photographic materials, effects that are cumulative and usually irreversible. Natural light is most harmful to photographs, but the UV light in
fluorescent bulbs is also damaging. UV filtering sleeves should be placed over fluorescent bulbs and UV absorbing sheets over windows in areas where photographs are stored, researched and exhibited. In general, light levels should be kept low, and ideally, turned off when not in use. Light levels for the display of photographs vary, as with all other factors of photographic preservation, it depends on the type of photograph. Most color materials and some historic processes are typically much more sensitive to light than black and white gelatin silver materials. But it is generally recommended that all photographs be on display within the range of 30 to 100 Lux along with the use of UV filtering glass and filtered bulbs, for a period of no more than 12 weeks at a time.

**SLIDE 19: (Handling)**

Whenever materials are handled, they become vulnerable to damage. Fingerprints on a print or negative can cause chemical damage. Careless handling can cause tears and creases, and improper placement in or removal from enclosures can cause damage. Every archive should maintain guidelines for handling photographic materials that are made available to all users, including researchers, volunteers, interns and staff. Rules such as no food or drink in archive areas, the use of pencils only, the required use of gloves when handling original items, the use of supports for oversize photographs and book cradles for photo albums should be standard, and in practice at all times, by all employees.

**SLIDE 20: (Storage Enclosures – PAT)**

The recommended approach to housing photographs is to provide several layers of protection by first placing individual photographs into sleeves or envelopes, then into folders, and finally into document storage boxes. This procedure may not be feasible in every institution or with every type of collection. In some cases, grouping photographs into folders and then into storage boxes is adequate.

The kind of individual enclosures used for storing photographs is another significant factor in the preservation of the materials. All housing supplies should be archival. But the terms “archival” and “acid free” are used often with products that may still contain lignin, dyes, coatings, or other harmful additives. Be sure the products you use have passed the PAT test and are supplied by a reputable dealer. The Photographic Activity Test is an accelerated aging test that determines whether harmful chemical or physical interactions will occur over time. If PAT passed supplies are not available, choose paper enclosures that are lignin-free, made of 100% rag or alpha-cellulose fibers, and are white or off white in color.
SLIDE 21: (Vendors)

Most vendors of archival supplies will advertise which items have passed the PAT, but if it is unclear, it’s a good idea to contact the vendor or manufacturer to ask them directly.

Listed here are 4 vendors who specialize in providing archival quality photographic enclosures to museums and archives throughout the country.

SLIDE 22: (Storage Enclosures – General Rules)

There are some common rules to apply to the housing of photographic materials:

- Of course, only use archival, acid and lignin-free enclosures.
- Ideally, each item should have its own enclosure that fits properly and provides ample support; fit is important so that items are not damaged by enclosures that are too small or damaged by shifting within enclosures that are too large.
- Materials should always be stored by format and size. Prints and negatives should never share an enclosure as they can easily stick together. If items of various sizes do need to be in one box, place the largest items at the bottom and smallest at the top to prevent uneven pressure on the photographs.
- Always label folders and sleeves when they are empty, to prevent damage to materials from the pressure of the pencil.
- It is also important to place items with the emulsion side away from the seam of a paper enclosure – this is because there is adhesive in the seam, and if by chance the adhesive migrates it will not damage the image side of the print or negative.
- Do not over fill boxes (which can prevent the safe retrieval of materials) or under fill boxes. Place archival “spacers” in boxes that are not full, to prevent slouching and bending of materials.

SLIDE 23: (Storage Enclosures – Prints)

Prints that are fragile, on brittle mounts, or larger than 8 x 10 inches should be stored flat and according to size in drop-front boxes. Ideal enclosures for photographic prints are archival window mats, which provide protection, support and allow the image to be viewed without removing it from the mat. But window mats can be costly and do take up a lot of space. So, Prints can also be stored in folder or individual sleeves, available in paper or plastic.

Paper enclosures are available in buffered and unbuffered. Buffered paper contains an alkaline to raise the pH of the paper, which absorbs or neutralizes acids from deterioration. Non-buffered paper is pH
neutral. Contrary to past recommendations, recent research has found that buffered papers can be used with any type of photographic material, including color, cyanotype and albumen.

The advantages of paper enclosures are that they are less expensive than plastic, are easier to write on, protect from light exposure, and are porous—thereby protecting the material from the accumulation of moisture and gasses. The disadvantage of paper enclosures is that they require the removal of the item for it to be viewed, increasing the amount of handling and making the photo more susceptible to physical damage.

Plastic enclosures made of inert polyester, polypropylene, or polyethylene, allow both sides of the object to be viewed safely, protecting it from fingerprints and surface damage, while also providing extra support. But plastic does not provide protection from light, it is generally more expensive, and it requires special pens to write on it. Plastic enclosures can also accelerate deterioration by trapping acidic byproducts of decay caused by inappropriate storage climates. The choice of paper vs. plastic enclosures may ultimately be a compromise between protection against handling, and protection against chemical damage.

SLIDE 24: (Storage Enclosures – Negatives)

When housing negatives…
- Do not re-use old enclosures that once housed deteriorating materials, as harmful chemicals can stay in the enclosure and affect items placed inside.
- Nitrile or latex gloves, rather than cotton, should be used when handling glass negatives, to prevent slipping or snagging on lifted emulsions.
- Again, it is important to always place the negative inside a paper sleeve with the emulsion side facing away from the seam of the enclosure. Four flap enclosures do not have any seams, and are recommended for brittle, fragile and glass negatives.
- Generally, sheet and glass negatives should be stored vertically, resting on the long side within the box, to prevent too much weight being placed on materials at the bottom.
- It is a good idea to insert an archival corrugated board between every one inch of negatives, to provide support and prevent slouching.
- Also, boxes containing multiple glass plate negatives can be very heavy, so it is important to clearly label the box with a word like Heavy or Glass, to make anyone retrieving the box aware of its weight.

SLIDE 25: (Storage Enclosures – Cased Images)

Every cased image should have its own enclosure and be stored on edge to prevent deposits of deteriorating glass from ending up on the image plate. Custom boxes are fairly easy to create and provide the
best protection for the object. Templates for creating boxes can be constructed according the standard plate and case sizes, and will provide adequate protection for all cased images. Plates without cases can be stored in custom boxes like the one shown here - but, this is just the ideal storage method - they can also be housed in small acid-free paper sleeves.

Since enclosures for cased images, and the images themselves, both need to be opened to be viewed, a great way to cut down on all of that handling is to create a guide for quick reference, with pictures of the photographs that are inside the cases. Rather than going through a box of 20 cases in box enclosures just to find the one image you are looking for, you can refer to the guide and simply find exactly which cased image you are seeking.

**SLIDE 26: (Storage Enclosures – Albums & Scrapbooks)**
- It is generally recommended to not to remove photos from antique albums and scrapbooks, unless advised by a conservator. But if you do disassemble an album, remember to record the original order of the photographs on the pages, with scans, photocopies or snapshots.
- Antique photo albums and scrapbooks should also have their own enclosures, such as an archival, sturdy and well-fitting box. Clamshell boxes can be custom made to fit any album, but adjustable phase boxes are also available and cost less. Standard archival drop-front boxes can also work for photo albums and scrapbooks, as long as they fit properly, or are filled with spacers to prevent shifting within a box that is too big.
- Albums and scrapbooks should be stored flat as their spines are often strained or damaged by the heavy pages.
- Interleaving should be used when the albums or scrapbooks contain the following: platinum or palladium prints to prevent ghost imaging; bronze powders from gilt borders and ornamentation; highly glossy photos which can be easily scratched; and album pages that are brittle, acidic, deteriorated or highly colored. When using interleaving, be careful not to add too much strain to a weakened album spine.

**SLIDE 27: (Ideal storage)**

Now that I’ve gone over all of the standards and best-practices, I assume everyone’s archives storage looks something like this. No? Probably not. We’re lucky if maybe part of one aisle looks like this.
SLIDE 28: (Realities – Time/Space/Money)

No, I’m going to guess that we all have some variation of this: drawers filled with acidic manila folders as enclosures. Materials still in original cardboard boxes. Loose items sitting on shelves. And rolled photos. Brittle, broken, rolled photos.

The reality is that limitations in space, time and money often override the standards and best practices of preservation. We all “make due” with what we have. And we are not alone – according to an IMLS study, 40% of institutions have no funds allocated in their annual budgets for preservation or conservation. The costs for archival supplies, HVAC systems and maintenance, storage space and staffing can be prohibitive. So how can we still make good preservation decisions while working within these constraints?

SLIDE 29: (Low Cost improvement to climate control)

“The Perfect is the Enemy of the Good” is a good mantra. Just because you may not be able to provide the ideal storage environments or best housing practices, does not mean that you should do nothing. The deterioration of photographs will not wait for our budgets to cooperate.

It is agreed that appropriate environmental control is the foundation on which all other photographic preservation activities lie. Anything else that you may do to prevent deterioration or repair damage will be undermined if the collection materials continue to be stored in poor environmental conditions. If your archive does not currently have temperature and humidity controlled spaces for the storage of photographic materials, then it is critical to attain the best storage environments with existing systems. At the same time, you should try to make it a priority to ultimately conform to national standards.

Here are some cheap and easy tips for improving climate control:

1. **Keep winter heat low:** If it becomes too hot in areas where photographs are stored, do not open windows, as they will let outside air in, and allow desirable winter humidity to escape. Provide a few sweaters and blankets for staff or visitors who feel cold with the temperature around 65˚F, and explain why you're keeping things cool.

2. **Seal windows:** Use plastic sheets and tape to seal windows on the inside in winter. In storage areas, line windows with aluminum foil to reflect sun and reduce heat.

3. **Keep outside doors and windows closed:** Weatherstrip doors and make sure both doors and windows stay closed to prevent the exchange of unconditioned outside air.
4. **Block radiant heat from radiators:** If you cannot move collections away from radiators in storage or exhibit spaces, cover wallboard with reflective foil and position this barrier between radiators and collections to protect objects from direct heat transmission.

5. **Keep equipment at one level 24 hours a day:** Don't change settings on climate equipment for nights or weekends, since damaging humidity fluctuations usually occur. Be sure humidifiers or dehumidifiers are on, and that they're always adequately filled (or emptied) to maintain steady conditions. Using the equipment you have continuously almost always increases annual energy costs, but keep in mind that some of the most acute short-term damage to collections is caused by discontinuous operation of climate control equipment.

6. **Separate collections that need special conditions:** Use available spaces the best way you can. Look to see if you can modify your use of space to better suit the collections. Are some spaces more stable than others? If some materials in your collections (such as nitrate or color) need different conditions from others, see if these can be segregated into groups with similar needs.

**SLIDE 30:** (Cold Storage)

As for materials that need special conditions, I mentioned earlier that cold storage is always recommended for color photographic materials. Many institutions cannot afford to install and maintain state-of-the-art cooling systems, so stand-alone freezers are often an economic choice for smaller collections that do not require large, walk-in vaults. But there are still many considerations when planning for storage in a freezer, such as collection size and use, desired freezer specifications, and proper enclosure packaging systems. I highly recommend The National Park Service’s 3 separate “Conserve o Grams” all about the proper ways to establish cold storage of photographic materials.

**SLIDE 31:** (General Tips) Digitization

Next to creating photographic duplications, digitization is great for preservation of the materials and expanding access. However, digitization does not come without its own costs: labor, and the storage & management of digital files are serious considerations when digitizing photographs. It must be noted that original materials should not be abandoned after digitization – technologies evolve rapidly and the continual migrating of files is very expensive, inefficient, and causes loss of image quality. Machine-readable means complex machinery hardware needs to be maintained in order to access files, while the originals will usually remain easily available.
Priorities need to be set when duplicating or digitizing photographs – the least chemically stable items should be copied first, then the most significant and valuable items, followed by items with the most potential for research and use.

**SLIDE 32:** (Disaster Plan)

One of the best methods of preventative preservation is to have a Disaster Plan. It will cost you some time and effort to put together, but the benefits will outweigh the hours spent when an emergency arises and your archive is prepared. A comprehensive, systematic, emergency-preparedness program will provide a means for your archive to recognize and prevent risks, create a cooperative plan that willingly involves multiple departments of the institution, identify resources such as local vendors and service providers experienced in the recovery of photographic materials, set protection and salvage priorities within your collections, and complete and maintain your plan. If this process sounds extensive, it is. Luckily, there are a number of tools and resources available on the web to aid institutions in the creation of a comprehensive Disaster Plan, such as D-Plan, which is a free online tool provided by the Northeast Document Conservation Center. And!....

**SLIDE 33:** (Coupon)

It just so happens that I received an email yesterday telling me that University Products is having a Sale on Disaster Preparedness supplies! So, I thought I’d pass the word…

**SLIDE 34:** (General Tips - The Little Things)

Also, don’t forget the little things – here are some general tips for minimizing damage to photographs while also making them available to the public:

- Access to original photographic objects is vital to only select researchers, so making copies for the general public to sift through, significantly cuts down on handling. Also, surrogates can be arranged artificially, such as in groups by subject, thereby making them easier for the public to access.
- Simple things like thoroughly descriptive box and folder labels can significantly cut down on needless handling.
- Some organizations, including The Smithsonian Institution Archives, have provided helpful videos on YouTube that show proper methods for things like creating a window mat and removing photos from sticky “magnetic” albums with dental floss.
The cost of archival supplies can be a serious obstruction to the best care of photographic collections, therefore evaluate which items go deserve to go in costly plastic sleeves – Items of greater value and frequent use will benefit a great deal from plastic enclosures.

The cost of so many archival support boards can add up, so keep only one board per box, to use with one print at a time.

- Often you can place multiple prints, which are stable and won’t harm other materials, in one enclosure such as a folder, or like shown here, a plastic sleeve.
- You can also order large archival map folders, and then trim them down to size as needed. You’ll often get multiple folders from one large one, and you don’t have to order various sizes.

**SLIDE 35: (Helpful Tools)**

There are also a few helpful tools to have on hand that will help with preservation, and hopefully save you money.

- Teflon delaminating tools are work very well to remove photos from sticky albums or acidic scrapbook pages. But I just learned on YouTube, that you can also use dental floss for this.
- A pH testing pen can be used on older enclosures that you are unsure are acid-free. If they prove archival, it will save you from ordering new supplies unnecessarily.
- And, A-D strips to monitor acetate negative “vinegar syndrome” can alert you to the harmful deterioration of collection materials.

**SLIDE 36: (Preservation Grants)**

Even after a series of rigorous budget cuts in Washington, there are still a number of grant opportunities for cultural and educational repositories looking for help with preserving their collections. I think this diagram from the NEH nicely illustrates their commitment to the preservation of humanities collections, which is felt through their annual Preservation Assistance Grants for Smaller Institutions.

I know that institutional matching requirements will often prevent some organizations from applying for grants, but there are still a lot of opportunities out there that require no or very little matching expense. Last year my archive received a Preservation Needs Assessment grant from the Center for Conservation of Art and Historic Artifacts, for a cost of just $350.

It can’t hurt to explore what grants are available – they are often the only means for the completion of many large-scale projects at cultural repositories.
Archivists and Librarians never trained in photographic preservation often find themselves in charge of diverse photo collections. Fortunately there are many resources available on the web to provide the information necessary for the lasting care of all types of materials. The identification of photographic processes and types of deterioration, specific standards for object housings and storage environments, and guidelines for proper display procedures can all be found online. For further information, I recommend referring to the websites of the organizations listed here.

I hope that I have provided some useful information about the preservation of photographs. I could not go over every scenario today, but I presented the basics for a general understanding of the subject. Knowing what kind of photographs you have, how to evaluate their condition, and understanding the standards for their optimal storage, will help you make the best choices for the preservation of your collection. It’s good to remind yourself that “The Perfect is the Enemy of the Good”, and that even doing little things to improve the safeguarding of your photographs will always benefit your collection in the long run.

Ultimately, photographic preservation is a balance between providing access to the collections while preserving the objects that make up the collections.