

## Preservation and Conservation of the Photographic Archive at the Egyptian Agricultural Museum: A Comprehensive Approach

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### Abstract

The photographic archive at the Egyptian Agricultural Museum comprises a vast collection of visual records spanning centuries, documenting the rich agricultural heritage of Egypt. Recognizing the significance of this collection, our preservation and conservation efforts have been guided by a multidimensional strategy. This abstract provides an overview of the comprehensive approach we have undertaken to ensure the long-term preservation and accessibility of these historical treasures. It prioritized proper storage conditions. This involves maintaining stable temperature and humidity levels in dedicated storage facilities equipped with archival-quality materials. The implementation of acid-free storage enclosures, protective sleeves, and custom-made storage solutions has safeguarded photographs from physical deterioration. Digitization has played a pivotal role in enhancing access to the archive while reducing the risk associated with handling fragile originals. Conservation interventions were carried out with the utmost care and respect for the original materials. It employed modern conservation techniques to address issues such as fading, discoloration, tears, and mold growth. This includes surface cleaning, repair of tears, and the application of non-invasive stabilizers to enhance the physical condition of the photographs.

### Keywords

The Egyptian Agricultural Museum, Photographic Archives, Preservation, Conservation.

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## Introduction

The Agricultural Museum in Egypt the purpose of its establishment was to document Egypt's agricultural memory, and a window from which all generations overlook Egypt's agricultural civilization, as well as being a center for agricultural culture. It was carried out in 1930 when the Egyptian Council of Ministers issued a decision on November 21, 1927, and initially called it "Fouad I Agricultural Museum". This museum can be considered eight museums, not one museum, and the area of this museum exceeds thirty acres, equivalent to 175,000 square meters, and it is the first agricultural museum in the world [1].

The Cairo Agricultural Museum complex, located right off of Salah Salem St. in the neighborhood of Dokki, is a gem of object collections and archival holdings hidden in plain sight. Its under-utilized collections will be of interest to historians and social scientists working on agriculture, food, natural history, political economy, rural Egyptian history, and public works from the Pharaonic period until present day. The museum is also a rare find for scholars interested in material culture and museum studies in modern Egypt. Its exhibits stand as an archive in and of themselves. They provide material testament to developments in the natural sciences, anthropology, food science, visual culture, and curatorial practices as many of the collections and dioramas remain untouched since the first half of the twentieth century [2].



Fig. 1. Shows the location of the museum near the Nile River in the center of Cairo

## 1. History of the Egyptian Agricultural Museum

In 1930, King Fouad of Egypt established the Agricultural Museum in the Cairo suburb of Dokki in the palace of Princess Fatima, the daughter of the great Khedive Ismail. It is one of the first agricultural museums in the world—second only to the Royal Agricultural Museum in Budapest. The museum was officially inaugurated by King Farouk in 1938 when he selected the venue to host 18th International Cotton Congress. The Agriculture Museum was preceded by an array of agricultural expositions organized by the Khedival Agricultural Society (later Royal Agricultural Society), an organization determined to improve agricultural methods in Egypt, and “the lot of the fellah.” The society created a small agricultural museum in 1920. This initial collection was ultimately modified into a cotton museum, which later became a part of the “Fouad I Agricultural Museum” when it opened to the public [1].

The Museum's initial collections consisted of an array of objects donated from scientific institutions throughout Egypt, including the Royal Geographical Society, the Royal Agricultural Society, and the Egyptian Department of Antiquities. Hungarian artists oversaw the creation and curation of the museum's first displays. With its holdings "lying halfway between a museum of natural history and a purely agricultural museum," the Egyptian government mobilized the museum as cultural and educational space for the public until the 1960s. For the next thirty odd years, the museum was essentially left for dead. Most of its artifacts and object collections were relocated to storage, and the exhibition halls were transformed into makeshift government offices, presumably for Ministry of Agriculture staff. In the 1990s, restoration projects began in earnest. As they were completed, sections of the museum were slowly reopened to the public beginning with the Hall of Ancient Egyptian Agriculture and the Cotton Museum in 1996. Currently, the museum complex is composed of seven exhibition halls (the museum pamphlet refers to these entities as small museums), a library, research laboratories, greenhouses, and a cinema. The grounds surrounding the museum have been maintained as a beautiful garden space, with two Pharaonic-style gardens located near the entrance to the Hall of Ancient Egyptian Agriculture [2].

### *1.1. Collections*

As mentioned above the Cairo Agricultural Museum boasts seven exhibition halls which depict varying topics in natural history and agricultural science. The majority of the museum's labels are in Arabic; however, some exhibits provide English translations.

### *1.2. Scientific Collections*

The Scientific Collections Hall is the oldest in the museum. The first floor is dedicated to ethnographic materials that depict the social and economic lives of the Egyptian fellahin. The most stunning exhibits of this building are the large, life-size dioramas of a rural wedding procession, and a village souk complete with a community form, a café

with galabiyya-wearing men laughing while smoking shisha, and even a female fortune teller reading shells. There are also rooms specializing in rural handicrafts, “habits and customs,” and the High Dam. The second floor houses a large natural history collection of taxidermy animals native to Egypt and Sudan, with rooms specializing in the life-cycles of domestic farm animals, insects and crop pests, as well as a room of popular Egyptian products and manufactured food goods from the 1940s and 1950s.

### *1.3. Botanical Revolution Hall*

This hall, also referred to as the “Plant Kingdom Museum,” was established in 1935. Its exhibits depict Egypt’s field crops, horticultural and garden plants, and popular agricultural machinery. The first floor specializes in grain crops such as wheat, barley, corn, and rice, and also has a room on onions and garlic. The second floor specializes in fiber crops, and rooms on fruits, vegetables, legumes, and more.

### *1.4. The Cotton Museum*

In many aspects the original collection of the Agricultural Museum, the Royal Agricultural Society organized the Cotton Museum in 1920, and opened it to the public in 1926. The collections in their most recent state were inaugurated in the Cairo Agricultural Museum in 1996 on Eid el Fellah (a feast day commemorating the victories of the peasantry and the implementation of Nasserist agricultural reforms after the 1952 revolution). The collections explore the importance of the cotton crop over the long duree of Egyptian history in its many forms from field to finished product, and include rare cotton the seeds and fibers from varying species of cotton crop grown around the world.

### *1.5. Ancient Egyptian Agriculture*

This collection highlight’s role of the Nile River and the importance of agriculture in the economic, social, and spiritual realms of Pharaonic civilization. Many of these collections were acquired between 1932 and 1938 as donations from the Egyptian Museum and the Egyptian

Department of Antiquities. Cappers and Hamdi (2007) provide original catalogue entries for specimen in this collection as well as some in the “Greek, Coptic, and Islamic” collections below.

#### *1.6. Agriculture in Greek, Roman, Coptic, and Islamic Periods*

These collections represent the second stage of development in early Egyptian agriculture from 332 BC, when Alexander the Great conquered Egypt, until the rule of Mohammed (Mehmet) Ali Pasha in 1805. However, the majority of materials are concentrated in the Greek and Roman periods. They highlight the role of plants in society (from popular field crops to medicine), the raising of livestock, and the social lives of the peasant classes at in these periods.

#### *1.7. The Syrian Hall*

This exhibit, inaugurated on July 31, 1961 commemorates Egypt and Syria’s short-lived union in the form of the United Arab Republic from 1958 to 1961. Its contents include information on trade between the two countries, and provide a collection of Syrian handicrafts, produce, and rural life.

#### *1.8. The Egypt-China Friendship Exhibition*

Opened in 2013, this exhibit is composed mostly of art and ceramics donated from China to illustrate the thriving political relationship between Egypt and China.

#### *1.9. Library*

The library, located near the research laboratories a way off from the main buildings, is a charming and pleasant workspace. The museum’s library is a quaint two-floor building with an array of books, periodicals, and maps ranging from the mid-nineteenth century until the early 2000s. The subjects of the collection focus on a variety of agriculture and “agriculture-adjacent” materials such as botany, horticulture, public works, livestock, geography, and the social and economic aspects of rural life. Some examples of publications held in

the library include volumes of Mémoires Présentés à l'Institut d'Egypte from the 1880s until the 1930s, yearly reports from the Department of Public Works from the 1880s onwards, and a Ministry of Agriculture periodical entitled Zamieel al-Fallaah published in the 1930s. Certain publications of the Ministry of Agriculture can also be found here, however most of those materials are held in the library of the Ministry of Agriculture and the National Agricultural Library (both located down the street from the Agricultural Museum). This is the area where most of the old periodicals, governmental reports, and "rare books" from 1880 until 1950 are housed [3].

## 2. Preservation Processes

### 2.1. Handling of Archive

- Always begin working with photos use ALL clean hands.
- Keeping photographs through the outer edges, or use cotton gloves or clean Nitrile gloves plastic.
- The fingerprints harmful photographs too, as the passage of time, the acids and oils resulting from the skin of distorting or fading image.
- Care must be taken in dealing with the pictures in order to avoid mechanical damage such as scratches caused by the wrong approach, folds, cuttings, cracks in the photographs.
- Use a support like a piece of clean plate to deal with large images or fragile.
- Avoiding the use of rubber bands - this is the alarm - and metal fasteners such as pins or paper clips where they can rust or staining the image.
- You must work photocopies or digitalizing for the important, damaged or heavily used photos, where it is to use copies instead of the original images that are stored carefully.
- Never preserve photos using the pressure-sensitive tape, since this material is very deteriorated over time.

### 2.2. Archive's Theme

The Agricultural Museum archive is located in Dokki district, Cairo. The museum houses four archives that include photos of all the artifacts in the museum. One of these archives was chosen as the practical part of the study. This archive is dedicated to the collection of pieces in the Museum of Ancient Agriculture. It is one of the museums in the Agricultural Museum. It dates back to the opening of the museum.

### 2.3. Documentation

The archive was documented and photographed using color and gray scales, and all areas of weakness and damage were recorded. This process took place in two stages, the first part documenting the cover and the second part documenting the photos.

### 2.4. Archive documentation

Figures 2 and 3 show the documentation process for the cover, showing the damage aspects of the cover and binders:



**Fig. 2.** Show the documentation process of the cover using Gray and colour scale

- Dirt and dust weakly sticking to the surface of the album: which is easy to remove with soft brushes.



- Dirt and dust strongly sticking to the surface: which can be removed by cleaning with distilled water.
- Dryness in the outer shell of the archive.
- Weaknesses: in separate places, but it is more evident in the places where the pages are folded as a result of the bad use of archives.
- Missing areas: in different places.
- Corrosion, scratches, and abrasions in the leather covering of the archive: it is difficult to restore it, as it is a historical part of the archive.
- Separation of pages: can be reminded.

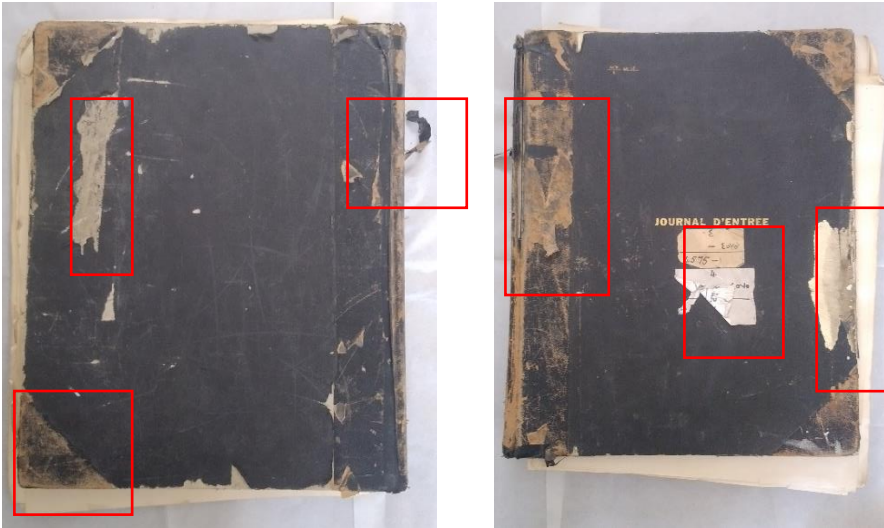


Fig. 3. Shows damage aspects of the cover, dirt, dryness, missing parts, corrosion, separation of pages

### 2.5. Photographic documentation

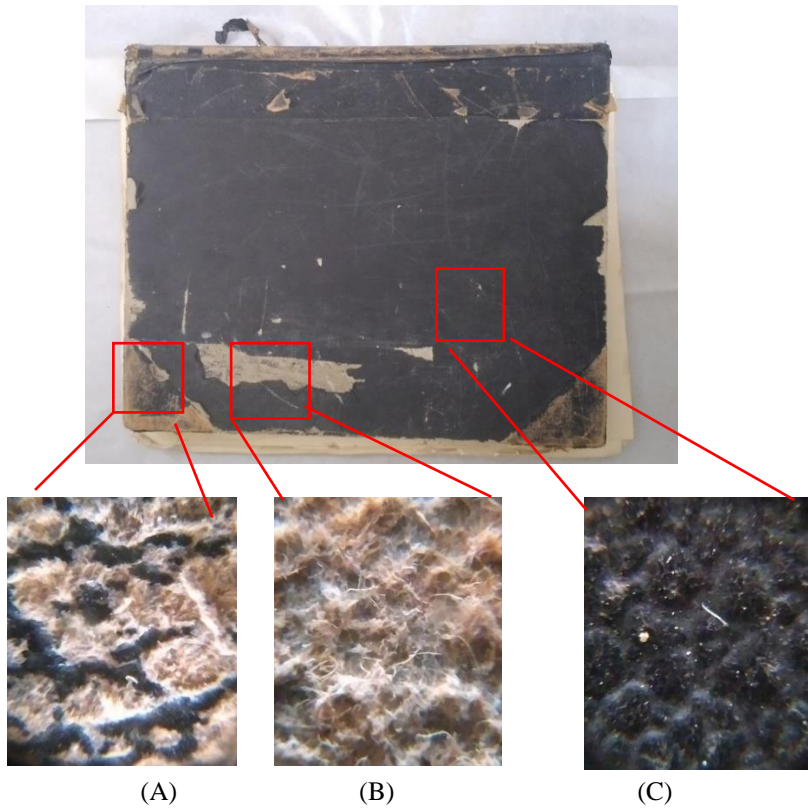
Figure 3 shows the documentation process for photos and pages, showing the aspects of damage:

- Dirt and dust with poor adhesion: to the surface of pages and photos, which are easy to remove with soft brushes.

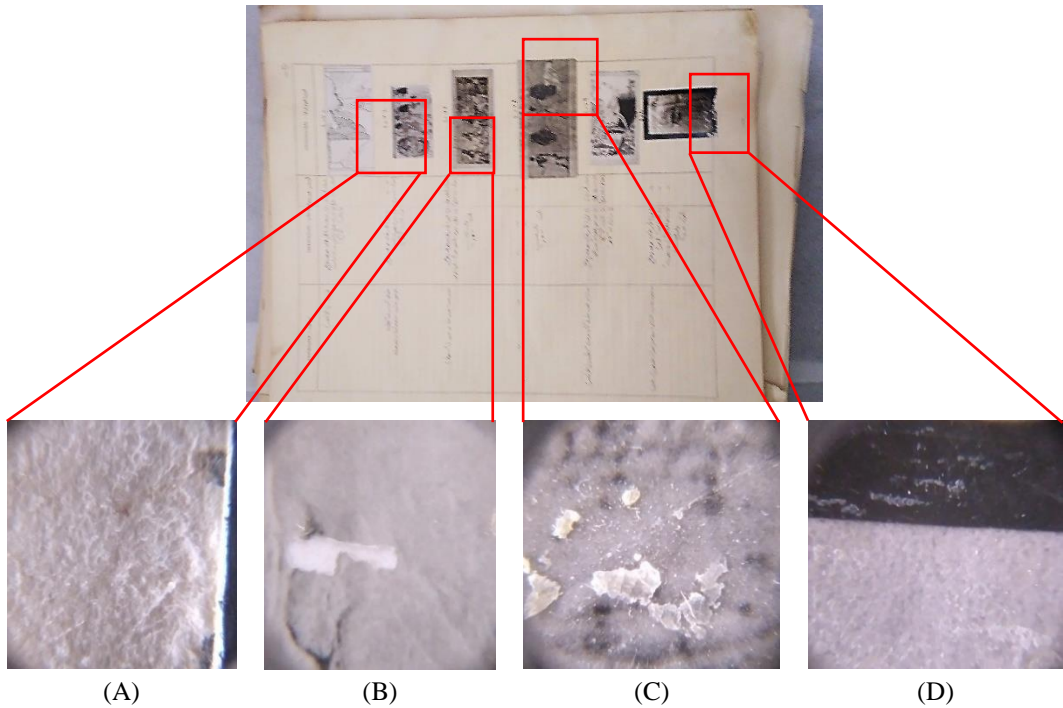
- Dirt and dust sticking to the surface: It is caused by dust sticking to the adhesive used to fix the photos, which can be removed by cleaning with distilled water.
- Weaknesses at the edges of the pages as a result of mishandling.
- Some pages were torn as a result of poor handling.
- Tears in some archive pages as a result of mishandling.
- Some pictures are split.
- Silver Mirroring in some pictures.
- Stains of the adhesive used to fix the images.
- The presence of fingerprints on the photos as a result of mishandling.
- There are inks on some of the pictures.

#### 2.6. *USB examination*

USB microscope 60X was used to examine the cover and photos and to show the aspects of damage (figures 4 and 5).



**Fig. 4.** USB Microscope 60X used to examine the surface of the cover, showing signs of damage on the skin surface of the cover, where the form of abrasion appears in the skin layer, A: shows the abrasion in the surface of the skin, B: shows severe corrosion, scratches, and abrasions in the surface, C: the area of the cover without damage.



**Fig. 5.** USB Microscope 60X was used to examine the surface of the photos, showing aspects of damage on the photos surface, A: Shows remnants of the adhesive used to fix the photos, B: Shows abrasion in the photo, C: Shows salts on the photo, D: Silver mirroring and fingerprint.

## 2.7. Conservation Processes

### 2.7.1.1. Cleaning Processes

#### – Mechanical Cleaning

Figure 6 shows tools that are used during cleaning processes.

- Use the soft brush to remove the dust from on the cover surface and from the inside of the surface of the photos and pages.
- Then follow this use of the erasers in cleaning the surface of dust and plankton whether the surface of the album or the surface of the inner pages without compromising photographs.



**Fig. 6.** Shows tools that are used during mechanical and chemical cleaning processes



(A)



(B)



(C)



(D)

**Fig. 7.** Shows mechanical and chemical cleaning processes. A: Use soft brushes to remove the dust. B: Use erases to remove dirt and dust. C: Chemical cleaning to remove stains from pages. D: Chemical cleaning to remove stains from photos

### – Chemical Cleaning

Figure 7 shows mechanical and chemical cleaning processes.

- The Illuminated Magnifying MG2B-3 (Illumination: LED Light, Lens Diameter: 90 MM, Magnification: 2.5 ×) during cleaning process.
- The inks have been tested on the cover surface for their sensitivity to cleaning with water and ethylene alcohol.
- The ethylene alcohol was used with 1: 3 to clean the cover surface.

#### 2.8. Remove adhesive stains

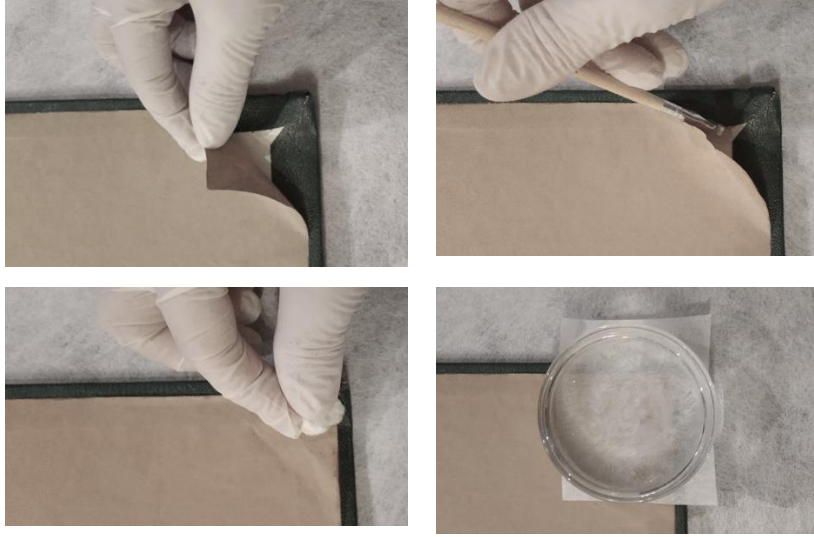
The adhesive stains were removed by mechanical means using a spatula. This process took some time due to the sensitivity of the paper and the effect of the adhesive on it, as the presence of these residues eroded the surface of the paper and became brittle.



Fig. 8. Shows the removal of adhesive stains mechanically using a spatula

#### 2.9. Fixing Separate Areas

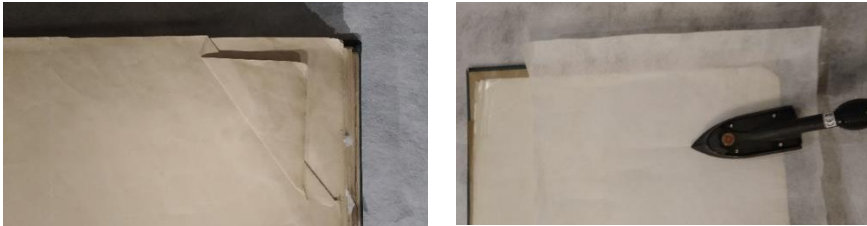
Figure 9 shows the process of fixing the separate pages with Klucel G dissolved in 3% ethyl alcohol.



**Fig. 9.** Shows the process of fixing the separate pages

#### 2.10. *Flattening the dented papers*

The dented papers were flattened using the iron for the paper's straightening. The process was done indirectly on paper. Where Japanese papers were used as a protector for archival paper. That's between two degrees of 20°C - 30°C, (Figure 10).



**Fig. 10.** Shows the process of flattening the dented papers

#### 2.11. *Tears Treatment*

The tears were treated using Japanese paper of 12 mm thickness (which is suitable for the same thickness of archive paper). Klucel G dissolved in 3% ethyl alcohol was used as an adhesive (Figure 11).



Fig. 11. Shows the process of treating tears

### 2.12. *Storage of The Archive*

The process of preserving and restoring the archives of the Egyptian Agricultural Museum was completed and handed over to the museum's archivist. Recommendations were made for the archive's storage process to be stored in  $18^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ,  $50\% \text{ RH} \pm 5\%$ .

### 3. Conclusion

In conclusion, the preservation and conservation of the photographic archive at the Egyptian Agricultural Museum reflect our commitment to safeguarding Egypt's agricultural heritage for future generations. By combining best practices in archival storage, digitization, conservation, and public engagement, we aim to ensure the enduring legacy of this unique collection.

Preservation and conservation processes for photographic archives typically involve a combination of practices, including proper storage, handling, digitization, and restoration techniques. The specific conclusions and recommendations would depend on the goals and methods of the research conducted. The preservation and conservation processes were carried out on the archives of the Egyptian Agricultural Museum. Where the archive was documented and



recorded. The environmental factors surrounding the archive and storage method were evaluated. Aspects of damage have been identified in the archives. Storage process was carried out to preserve the archive in a controlled area.

#### 4. Recommendations

##### – *Maintaining a Suitable Environment*

Photographic materials benefit from a cool, dry, well-ventilated storage environment. High temperature and relative humidity increase deterioration and promote the growth of mold and mildew, which could mar surfaces and break down binder layers. Avoid storing photographs in the attic, the basement, or along the outside walls of a building where environmental conditions are more prone to extremes and fluctuations and where condensation may occur. In some storage situations, seasonal adjustments such as dehumidifiers or fans may be necessary to improve problematic environmental conditions. The optimal storage conditions for most photographs are a temperature of 20°C and relative humidity in the range of 30–40 percent. Film-based negatives and contemporary color photographs benefit from storage in cooler environments of 30–40°F and 30–40 percent relative humidity.

The emulsion layer is particularly attractive to insects as a food source, gelatin emulsions are very susceptible to mold attack caused by high humidity. Continual changes in relative humidity may cause silver mirroring. For a mixed collection of historical photographic prints, slides, and negatives, or if the collection comprises only photographs, keep the relative humidity in the range 30 – 40 % with only a 5 % daily variation. Higher levels of relative humidity can be tolerated if lower storage temperatures are maintained.

##### – *Choosing Storage Enclosures*

Keep photographic materials in enclosures that protect them from dust and light and provide physical support during use. Chemically stable plastic or paper enclosures free of sulfur, acids, and peroxides are recommended. Plastic sleeves should be constructed of uncoated

polyester, polypropylene, or polyethylene. They should not be frosted. Paper enclosures should have passed the Photographic Activity Test (PAT), a test designed to determine the safety of an enclosure in contact with a silver photographic image. If PAT test results are not available, choose paper enclosures that are lignin-free, 100 percent rag or alpha-cellulose fibers, and have a white or off-white color. Film-based negatives, which can produce acidic gasses as they age, should be stored separately from other photographic materials. Place individually housed prints, negatives, and cased objects in acid-free, durable boxes that will afford further protection. The storage of photographs in albums serves the dual purpose of organizing groups of images while protecting them from physical and environmental damage. Albums can be wonderful sources of historic and genealogical information. Preserve them intact when possible and store them in custom-fitted archival boxes. Magnetic or self-adhesive albums can damage photographs and should not be used.

– *Displaying Photographs*

Photographs should be protected from extended exposure to intense light sources. Limit exhibition times, control light exposure and monitor the condition of the photographs carefully. A prolonged or permanent display of photographs is not recommended. Use unbuffered rag-board mats, and frame photographs with archivally sound materials. Use ultraviolet-filtering plexiglass to help protect the photographs during light exposure. Reproduce vulnerable or unique images and display the duplicate image, in this way, the original photograph can be properly stored and preserved.

– *Housekeeping Guidelines*

An overlooked area of collection maintenance is keeping the areas where photographs are handled or stored clean and pest-free. Paper fibers, albumen, and gelatin binders are just some of the components in photographic materials that provide an attractive food source for insects and rodents. It is vital that collection areas be free of debris that might

encourage pests. Food and beverages should not be allowed. Apart from the potential for attracting pests, accidental spills can irreversibly damage most photographic objects.

– *Handling Procedures*

Most damage to photographs results from poor handling. A well-organized and properly housed collection promotes respect for photographs and appropriate care in handling. When images can be located quickly, there is less possibility of physical damage. Establish handling procedures and adhere to them whenever photographs are being used. View photographs in a clean, uncluttered area, and handle them with clean hands. Wear clean white cotton gloves to lessen the possibility of leaving fingerprints and soiling the materials; however, be aware that gloves may reduce the manual dexterity of the user. Support photographs carefully and hold them with both hands to avoid damage. Keep photographs covered when they are not being viewed immediately. If it is necessary to mark a photograph, write lightly with a soft lead pencil on the reverse of the image.

– *Disaster Preparedness*

Disaster preparedness begins by evaluating the storage location and the potential for damage in the event of a fire, flood, or other emergencies. It is important to create a disaster preparedness plan that addresses the specific needs of the collection before a disaster occurs. The location and manner in which photographs are housed can be the first line of defense. Identify photographic materials that are at higher risk of damage or loss. Remove all potentially damaging materials such as paper clips and poor-quality enclosures. Store negatives and prints in separate locations to increase the possibility of an image surviving a catastrophe. If a disaster occurs, protect the collection from damage by covering it with plastic sheeting and/or removing it from the affected area. If using plastic, make sure not to trap moisture as this could lead to mold growth. Evaluate the situation and document the damage that

has occurred. Contact a conservator as soon as possible for assistance and advice on the recovery and repair of damaged materials.

– *Common Concerns and Solutions*

The following problems are commonly encountered in photographic collections:

*Broken, torn, or cracked photographs:* If the primary support of a photograph sustains serious damage, place it carefully in a polyester sleeve with archival board support. If the photograph has a flaking binder layer or friable surface components, such as the pastel coloring often seen on crayon enlargements, place it in a shallow box, not a polyester sleeve. Do not use pressure-sensitive adhesive tapes to repair torn photographs.

*Soiled photographs or negatives:* Do not clean photographs with erasers. Brush soiled photographs carefully with a clean, soft brush. Proceed from the center of the photograph outward toward the edges. Do not attempt to clean photographs with water- or solvent-based cleaners, such as window cleaners or film cleaners. Improper cleaning of photographic materials can cause serious and often irreversible damage, such as permanent staining, abrasion, alteration, or loss of binder and image.

*Photographs or negatives adhered to enclosures:* High-humidity environments or direct exposure to liquids can cause photographs to adhere to frame glass or enclosure materials. This is a very difficult problem to resolve, and great care must be taken to reduce the possibility of further damage. If a photograph becomes attached to adjacent materials.

*Deteriorated negatives:* Chemical instability is a major factor in the deterioration of early film-based materials. If film-based negatives are brittle, discolored, sticky, or appear wavy and full of air bubbles, separate the negatives from the rest of the collection.

*Broken glass negatives or ambrotypes:* Place broken glass carefully in archival paper enclosures. Use a separate, clearly marked enclosure for each piece to reduce the possibility of scratching or further damage. For

long-term storage, construct a custom sink mat that holds the pieces of broken glass, separated by mat-board shims, in one enclosure.

– *7 Storage Principals*

- 1) Location: sites, facilities and areas for records storage should be located away from known hazards and be convenient to user needs.
- 2) Environmental control: records should be stored in environmental conditions that are appropriate to their format and retention period.
- 3) Shelving and packaging: the shelving, equipment and containers for records storage should ensure that records are secure, accessible and protected from deterioration.
- 4) Maintenance and security: records storage facilities, areas and records should be maintained to safeguard their security, condition and accessibility.
- 5) Protection from disaster: disaster management programs should be established and maintained to ensure that risks to records are minimized and managed appropriately.
- 6) Careful handling: the retrieval and use of records in storage areas should be subject to controls that prevent damage and deterioration.
- 7) Accessibility: records should be stored and controlled in facilities where they can be identified, located and retrieved easily.

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