Factsheet:
Caring for photographic collections in museums

SCOTTISH MUSEUMS COUNCIL

Introduction

This factsheet aims to give a basic introduction to the care and preservation of photographic collections held in museums. Photographic material comes in many different forms. It ranges from rare prints and glass negatives produced during the pioneer days of early photography, to photo albums, 35mm slides, and bundles of colour snaps. Photographs might form an historical archive, or fine art collection, or be part of the museum's own records of its collection.

Unfortunately, it is very common to find that much of the photographic material is damaged. Over the past 150 years, photographic images have been created using a complex range of materials and processes. They are often vulnerable to damage in conditions that would be safe for other types of museum objects.

It is possible to prevent further damage occurring. To do this, museums have to

- provide the correct environmental conditions
- provide correct protective storage enclosures
- ensure safe handling and display

Very few museums can provide ideal conditions, let alone do this rapidly: the ideal would be keeping the collections in cold storage. However, by using a planned, practical approach to improving conditions and practices and by using compromises where necessary and safe, it is possible to protect the collections for future generations.

The storage environment

Most items in photographic collections are kept in the museum store for the vast majority of the time. If the conditions are right in the storeroom, the photos will be well protected. But, if the conditions are poor, chemical processes of deterioration can be set off and slow but irreversible damage will take place. The results of poor storage conditions can include

- fading
- colour changes
- silver mirroring
- discolouration
- embrittlement
- mould growth

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The recommended environment for storing photographs is as follows:

Storage environment	Recommended
relative humidity	stable between 30 and 40%
temperature	stable, below 16ºC
light	no light, except for access
air quality	reduced particulate and gaseous pollution
storage enclosures	only use specified chemically inert materials
formats and furniture	well organised and accessible

Relative humidity and temperature

Maintaining a cool dry environment is essential for the long-term preservation of photographs. One of the main reasons for this is because the rate of fading of photographic material accelerates sharply if the relative humidity rises. Fading is usually most noticeable in the loss of highlight details and in middle tones and shadow areas, making the images lose their three-dimensional appearance. Several other forms of degradation of photographic material are also accelerated if the relative humidity and temperature are raised.

Photographic emulsions are often made of gelatine. This can soften in a damp environment and stick to materials it is touching - such as sleeves, glass, or other photos. In a damp and warm environment, mould flourishes on gelatine and can cause severe staining and degradation.

In order to maintain a storeroom with the correct temperature and humidity levels effectively, the room should ideally be one that has a natural tendency to be cool and dry. The area should be monitored regularly to check that the right conditions are being maintained. It may be necessary to introduce dehumidification equipment to maintain a low relative humidity. Because of the low temperatures that are needed, it is better if the storeroom is not used as a working area by museum staff.

Air quality

Air can carry pollution in the form of gases and solid particles. Solid particles of materials such as soil, sand, soot, skin flakes and textile fibres are carried in the air as dust, and land on objects that are uncovered. Dust can be greasy, grimy and abrasive, and can be chemically and biologically active.

It is important to reduce the amount of dust entering the museum building. This can be done by making sure doors and windows are well sealed and ensuring that people entering the building walk over door mats. Storerooms should be cleaned regularly. Perhaps most importantly, all objects in storage should be kept in boxes or covered in some other way. This will protect them not only from dust but also from light.

Polluting gases include oxidant, sulphiding, and acidic gases. These can cause fading of images, colour changes, embrittlement, discolouration of paper, and weakening of binding layers. Sources of these gases include

- vehicle emissions
- wood, and wood products and finishes
- newly applied oil-based paints
- poor quality paper products
- some types of plastics, especially cellulose nitrate, and poor quality foams
- poorly processed photographic materials
- some textiles and rubber
- some cleaning materials
- photocopy machines

Sources of pollution need to be identified, and removed, or isolated from the collections. In addition, the damage from polluting gases can also be reduced by using card and paper products containing molecular sieves. Molecular sieves are particles designed to trap specific molecules (such as the gaseous pollutants listed above) by forming chemical bonds with them. The card and papers can be used to make sleeves, folders and boxes, or to line drawers and shelves. Examples of these products are MicroChamber® papers and cards. These materials are no more expensive than other good quality storage materials, and are effective in absorbing many harmful vapours.

Storage enclosures

Storage enclosures come in many forms. Most commonly for photo collections, they are sleeves, folders, and boxes. Good storage enclosures will help to protect photographic materials from

- handling
- light
- air-borne pollutants
- rapid changes in environmental conditions

It is very important that the storage enclosures, which are the materials that are in direct contact with photographic collections, are of the right quality. Paper and plastic materials of this quality are available from conservation suppliers. Enclosures made of the right sort of materials do cost more than those of a lesser quality but it is only these materials that will protect the collection adequately from damage. Significant damage can result from the collections being in direct contact with inferior quality materials.

Suitable quality paper based materials are

- free from wood pulp fibres, acids and lignin
- made from 100% cotton fibres, or have a high percentage of alpha cellulose fibre content
- neutral in pH (that is 6.5 - 7.5)
- free from sulphur, peroxides, metal particles and harmful sizing agents.

Suitable quality plastic based materials are

- inert
- free from plasticisers and coatings

If plastic storage sleeves are used, it is particularly important that the relative humidity in the storeroom is kept low, as a damp environment can cause photographic emulsions to stick to the plastic.

Acceptable materials for storage enclosures for photographs	
Paper and card	**Plastics**
• 'Silversafe' paper • unbuffered 'museum', or 'conservation', board • unbuffered acid-free tissue • MicroChamber® version of any of these	• polyester film (Melinex 515 by ICI or Mylar D by Dupont) • cellulose triacetate • polypropylene

All these materials are supplied by the large conservation material suppliers. Plenty of information detailing the quality of the products is provided in the suppliers' catalogues. Read this carefully and contact the supplier if necessary before deciding which product is the most appropriate for your collection. If in any doubt, contact a conservator for further advice.

Storage formats and furniture

As long as the right materials are selected for direct contact in storing the collection, there is plenty of choice of formats that can be used. The choice of format will depend on the size and shape of the objects, the number of objects, space and furnishings available, budget, and use of the collection.

As a rule of thumb, it is a good idea to provide three layers of protection for the objects:

- the **first layer**, which is direct contact with the photographic material, must be made of one of the materials listed above and will be in the form of a sleeve, envelope or wrapper
- the **second layer** might be a box, folder, or drawer
- the **third layer** could be a shelf or a cabinet

These three layers will provide good physical and chemical protection for the collection. The collections will be protected from sudden changes in environmental conditions, as the materials around them will provide a buffering effect. The three layers are useful to help handling, labelling, and organising the collection.

Shelving and cabinets in the storeroom should ideally be made of steel with a baked enamel finish. Wood, and especially composite boards such as MDF, can give off high levels of gaseous pollution that could damage the collection.

It is also really important that the furnishings in the store promote safe access to the collections. They should be easily accessible and clearly labelled. A well-designed store will help enormously to promote practices of good handling.

The table on the following page gives suggestions of how different objects in the photographic collections could be stored.

Photographic objects: suggestions for storage formats	
framed photo	• mounted in unbuffered card • sealed into good quality frame • stored upright in a frame rack
fragile photo album	• wrapped in acid-free tissue • inside a shallow acid-free box • placed horizontally on a shelf
robust photo album	• in 2-ply acid-free card wrapper • stored horizontally or vertically on a shelf
fine art photos	• mounted in unbuffered card • placed in Solander box, or other acid-free box • stored horizontally on a shelf
glass negatives	• individual sleeves - Melinex or Silversafe paper • stored upright on long edge in narrow lidded box • stored vertically on a shelf
lantern slides	• upright in original lidded wooden box (acid-free card dividers can be added to aid organization) • on a shelf
plastic negatives	• in strip-divided A4 Melinex sheets • clipped into a ring-binder box file • placed on a shelf
19th century photographic prints	• individual Melinex sleeves • with similar sizes stored together on edge in lidded acid-free box; there should be little room for movement; card dividers can aid organisation • stored on a shelf or • in divided Melinex sheets • clipped into a ring-binder box file • stored horizontally on a shelf
cased ambrotype or daguerreotype	• in a two-ply acid-free card wrapper, placed • placed in a lidded box • stored on a shelf

modern colour 3x5" photographic prints	if frequently accessed:
	• as 19th C photos, above
	
	if not frequently accessed:
	• in groups in original jackets, placed
	• placed vertically or horizontally in a lidded box
	• stored on a shelf

35mm colour slides	• in polypropylene or Melinex hanging files • stored in a metal filing cabinet
photos on thin, fragile supports, and unmounted, curling albumen prints	• in individual Melinex sleeves, supported by a piece of unbuffered card within the sleeve • placed in an acid-free lidded box • stored on a shelf

Labelling

Not only should the furnishings in the store be clearly labelled with their contents, but so should every layer of the packaging - that is boxes, folders, sleeves, and so on. Melinex sleeves are problematic to label but, as they are transparent, the accession number of the object can be read through them.

Individual items need to be labelled with their accession numbers. Photographic prints can be labelled on the back with an HB or 2B graphite pencil. If an indelible marking is needed, waterproof drawing ink can be used. It should be used in a pen with a very fine nib, for example a mapping pen. This is also the best way to label the back of photographic prints that have a smooth surface that resists marking with a pencil. The waterproof ink has to be left for quite some time to dry - if you touch it too soon, or pile works up too soon, it will smudge and transfer.

Handling

Photographic materials can be very easily damaged when they are handled. Some of the potential damage is the same as for other works on paper – for example tears, dirt, creases, abrasion, and so on. But there is an additional threat to photographic collections: if people place their fingers on photographic emulsions, the oils from their skin can irrevocably damage the work. For this reason, it is strongly recommended that, if prints and negatives are handled directly (that is, not viewed through a clear plastic sleeve), clean cotton or latex gloves should be worn. This is particularly important for handling negatives, where there is no margin around the emulsion.

Display

The same guidelines for materials that should come into contact with the photographic collections apply in display as well as in storage.

All types of photographic materials are light-sensitive to some degree - some more so than others. Exposure to light can cause fading of the image and discoloration and degradation of the paper and card supports. There are ways of reducing damage from light when objects are displayed. The intensity of the light needs to be low, the period of the display needs to be limited, and the ultraviolet component of the light needs to be removed.

The recommended display conditions are

- 50 lux (intensity of light) for all photographic material except for modern black and white photos, which can be displayed at 200 lux
- ultraviolet radiation: below 10 microwatts per lumen

- display periods should be limited: six months every 4-5 years is suggested; out of visitor hours the displays should be in darkness.

These conditions can be 'juggled' with. For example, if it proves impossible to reduce the light levels to 50 lux, the objects could be displayed in slightly brighter conditions, for a shorter length of time.

Some museums choose to display copies rather than original photos. If this is done, the copies can be displayed in bright light for long periods - while the originals are safely stored away in the dark.

Copying

Copies of photographic prints and negatives might be made for a number of reasons. Some copies are made for 'consumable' use - for example for display or sale to the public. In these cases, normal black and white processing is acceptable.

If a copy is made of a print or negative that is temporarily loaned to the museum, the copy will be a unique record within the collection. In this instance, it is important that the copying is done to 'archival' standards. This way, a stable artefact will be produced. In normal processing, chemicals are often inadequately washed out and this can lead to fading and chemical degradation damaging the newly produced item. Archival processing involves changing chemicals before they become exhausted, and washing out being done very thoroughly. Detailed instructions on how to carry out archival processing are available from literature on photography, good photographers, and photographic suppliers.

The archivally processed material should be cared for in the same way as the rest of the photographic collection to prevent it from becoming damaged.

Cellulose nitrate negatives and film

Between 1889 and 1939, cellulose nitrate was commonly used as the base material for film and negatives. Unfortunately, this material is not stable and it is dangerous to have it in the collection. As it ages and degrades, it gives off gases that are harmful to the rest of the collection. As it ages, the temperature at which it ignites decreases - to the point where it may spontaneously ignite at a temperature as low as 48ºC. When on fire, it burns rapidly and gives off toxic and combustible nitrogen oxide and carbon monoxide.

Cellulose nitrate needs to be identified, removed from the museum, and destroyed. Fire safety officers must be consulted about the destruction of the material. It may be possible to copy the material before it is destroyed, but this should only be done by someone qualified to do so.

Cellulose nitrate can be identified by its date, by degradation characteristics, and by a spot test.

Further information and advice

This is one of a series of factsheets, advice sheets and guidance notes produced by SMC on common collections care and preventive conservation issues. For more details, signposting to further sources of advice or information on how to contact a conservator, see our website at: www.scottishmuseums.org.uk

SMC also runs training days on the basic care of paper and photographic collections.

Selected reading

Standards in the Museum Care of Photographic Collections
Museums & Galleries Commission, 1996
ISBN 0948630426

Reilly, J.
Care and Identification of 19th Century Photographic Prints
Eastman Kodak Ltd,1986
ISBN 0879853654

Remple, S.
The Care of Photographs
Lyons and Burford, 1987
ISBN 0941130487

Wilhem, H.
The Permanence and Care of Color Photographs: traditional and digital color prints, color negatives, slides, and motion pictures
Preservation Publishing Company, 1993
ISBN 0911515011 / 0911515003

Compiled by Helen Creasy, Paper Conservator

The Stack, Papermill Wynd, McDonald Road, Edinburgh EH7 4QL
Tel 0131 550 4100 Fax 0131 550 4139
E-mail inform@scottishmuseums.org.uk
Web http://www.scottishmuseums.org.uk