



CCI Notes

11/2

Storing Works on Paper

Introduction

Paper is vulnerable to physical and chemical deterioration. Works on paper require simple, careful storage under controlled conditions. The following are the most common causes of damage to works on paper:

- creases, tears, folds, abrasions, and stains caused by careless handling or crowded storage
- acidity resulting from poor-quality materials and methods used in the manufacture of some paper artifacts
- migration of impurities from poor-quality materials, such as adhesives, tapes, and cardboards, in contact with paper artifacts
- uncontrolled environment

Appropriate storage procedures, careful handling, and good house-keeping practices will help to minimize these problems.

Preparing Works on Paper for Storage

Examine and document works on paper to assess their condition and to determine the appropriate storage methods.

Remove loose dust and dirt by carefully dusting with a soft brush.

Remove any foreign materials that do not form part of the artifact. Plastic envelopes or sheeting, newspapers, acidic wrapping papers, cardboard mats or backings, dried adhesive tapes, metal fasteners such as paper clips, and other foreign substances contribute to the degradation and disfigurement of paper.

Examine artifacts for signs of biological infestation by mould or insects before housing them with the rest of the collection.

If works are to be stored together in a folder, drawer, or box, those on poor-quality paper should be separated from those on good-quality paper to avoid the transfer of acids and other contaminants.

Paper artifacts should be properly enclosed for protection in storage. Oversized works, works in a fragmentary or warped condition, or works with delicate images of pastel, charcoal, chalk, or flaking paint may require special containers or mats that are larger or deeper than usual to protect vulnerable surfaces and to preserve fragments.

If the work is in a frame that does not meet current conservation standards, consider replacing the frame.

There are many circumstances where caution is necessary, and it is advisable to consult with a paper conservator before proceeding.

Materials

Use only acid-free materials to store works on paper. Both neutral-pH and alkaline-buffered products are acceptable for storing most works on paper.

The boards and papers recommended for conservation purposes are those described by manufacturers as "100% rag", and are available either buffered (pH 7.5 to pH 8.5) or unbuffered (pH 7). Less expensive boards made from highly purified woodpulp buffered to pH 8.5 are an acceptable second choice. White or ivory boards are recommended.

Inert polyester film (Mylar Type D Super Clear) is available by the roll in thicknesses ranging from 2 mil to 7 mil.¹ The most useful thickness is 3 mil. Mylar is also available in prepared folders, sheets, sleeves, and envelopes to store works on paper. Other types of plastic film should not be substituted. However, because it can pick up and hold an electrostatic charge, polyester film is not recommended for use with works of art on paper that may offset, such as charcoal, pastel, chalk drawings, and watercolours. Polyester film is generally recommended only for archival material such as maps, documents, posters, letters, etc.

Lightweight corrugated polypropylene sheeting, such as Cor-X, Coroplast, or Poly Flute, is another inert storage material that may be useful.

Storage Methods

Interleaving

A simple way to protect works on paper is to interleave them with acid-free tissue or, for larger pieces, with heavier acid-free paper. To prevent the interleaving sheets from moving, cut them to fit the inside dimensions of the storage container. Place one sheet between each work.

Folders and Enclosures

Individual folders or enclosures provide even greater protection than that given by interleaving. Because they are heavier and enclose the artifact, folders and enclosures provide better support and safety when a work is moved. They are also useful as a surface on which to record cataloguing and other information pertaining to the work. Folders and enclosures are available from archival suppliers in a variety of materials, styles, and sizes. Simple folders are easy to make using sturdy, acid-free paper or lightweight matboard (see CCI Notes 11/1, *Protective Enclosures for Books and Paper Artifacts*).

Mats

The most suitable method of providing support and protection for works on paper is to mat them individually, provided that this is aesthetically appropriate. Mats reduce the risk of damage during handling. A window mat also protects the image surface (see CCI Notes 11/5, *Matting Works on Paper*). For additional protection, a sheet of acid-free tissue or lightweight paper can be placed between the image and the window mat.

To facilitate flat storage, collections consisting of numerous works can be stored in mats cut to standard sizes. This allows the use of standard-sized frames for exhibition. Matted works can also be placed in boxes or in storage units for further protection.

Boxes

Works on paper that have been interleaved with tissue, or that have been placed in folders, mats, or polyester film, can be stored in acid-free boxes. This will further protect them from light, dust, atmospheric pollutants, and accidental damage. Boxes and other enclosures also act as buffers against fluctuations in humidity.

Acid-free boxes of various sizes, shapes, and constructions are available from archival suppliers. Some are made of lightweight card stock with reinforced corners. Others are made of sturdy corrugated board.

Corrugated boxes are shipped and stored flat and can be folded into a box shape when needed (Figure 1). Inert materials, such as polypropylene (Cor-X, Coroplast), are also used to make archival boxes.

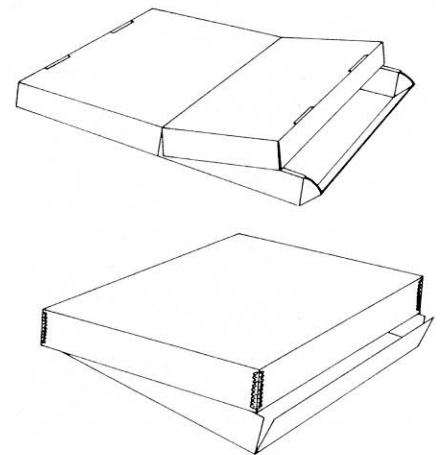


Figure 1. Archival boxes.

The strongest and most durable type of flat box is the Solander box (Figure 2). It is made of heavy board lined with good-quality paper and covered with cloth. It has a hinged back that opens

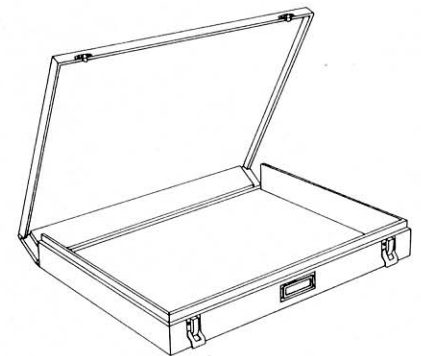


Figure 2. Solander box.

flat, making it easy to lift works into and out of. The contents of each box can be listed on the exterior.

Housing the Collection

Works on paper should be stored in a clean, dust-free environment. Good housekeeping practices will help to eliminate the problems of dust, dirt, insects, and rodents.

The location of storage units is an important consideration. Avoid the following:

- attics and basements
- outside walls that may be subject to fluctuations in temperature and relative humidity
- radiators and heating ducts
- water pipes
- direct sunlight

Sturdy horizontal shelving made of enamelled steel is ideal for storing boxes containing works on paper. Wooden shelving can also be used, but should be painted with two coats of interior acrylic latex paint, or with one primer coat and one top coat, to retard the migration of volatile contaminants. It is recommended that the painted shelves be allowed to air for one month, to allow for any paint vapours to disperse, before being used. Stacking of boxes should be kept to a minimum. Map cabinets and shallow drawers can also be used to store works on paper, especially oversized works or those enclosed in folders.

Storage Environment

To retard the deterioration of paper, it is important to control temperature, relative humidity, and light. Any effort expended in controlling these factors will have a positive effect on the condition of the collection.

Temperature and Relative Humidity

A low temperature in the storage area slows the rate of deterioration of paper and increases the lifespan of paper. However, where human comfort and cost are a consideration, the maximum acceptable temperature is 21°C.

Relative humidity (RH) over 60% accelerates chemical and biological deterioration. It also promotes the distortion of paper. Therefore, the recommended RH level for general paper collections is below 50%.

Research supports the theory that at 20°C and 30% RH, the lifespan of a typical woodpulp paper is twice what it would be at 20°C and 50% RH. Many collections are in a state

of chemical self-destruction, but low temperature and low RH can slow this process dramatically. While some variation in temperature and RH is acceptable, strive to maintain constant levels.

NOTE: Although lower RH and temperature may help to increase the lifespan of paper, keep in mind that they may also cause the paper to become more fragile. Therefore, even greater care should be exercised during handling under these conditions.

Light

Exposure to both natural and artificial light can cause photochemical deterioration of paper and of images on paper. This may result in pigments and dyes fading, and in the paper substrate discolouring. Filter out damaging ultraviolet rays present in sunlight and in fluorescent lights (see CCI Notes 2/1, *Ultraviolet Filters*). Turn off lights in storage areas when the areas are not in use. In areas where paper artifacts are exposed to light, the ultraviolet component should not exceed 75 microwatts/lumen. Block light from windows with blinds or drapes. If windows cannot be blocked, use ultraviolet filtering material.

Whether in storage or on display, it is necessary to reduce the amount of light and to restrict the exposure time for paper artifacts. The recommended level of illumination for sensitive materials, such as watercolours, coloured prints, and works on poor-quality paper, is 50 lux or as low as possible. A maximum level of 150 lux is recommended for works without light-sensitive materials, such as stable carbon inks on good-quality paper.

CCI has produced a Light Damage Slide Rule to assist conservators, curators, and designers in making decisions concerning lighting artifacts and works of art. This slide rule, with the accompanying instructions, may be purchased from CCI.

Suppliers

Companies listed below provide catalogues upon request.

Mylar, cardboard boxes, polypropylene boxes, acid-free or buffered tissue papers and board:

University Products of Canada
6535 Millcreek Drive, Unit #8
Mississauga, Ontario
L5N 2M2
Tel.: (416) 858-7888
Toll-free: 1-800-667-2632
Fax: (416) 858-8586

Bury Media & Supplies Ltd
B-5 4255 Arbutus Street
Vancouver, B.C.
V6J 4R1
Tel.: (604) 731-3439/5838
Fax: (604) 736-7493

Archival Conservation Resources
(Canada) Ltd
P.O. Box 2506
Station "D"
Ottawa, Ontario
K1P 5W6
Tel.: (819) 994-1127
(Distributor for Conservation Resources)

Carr McLean
461 Horner Avenue
Toronto, Ontario
M8W 4X2
Toronto Area: (416) 252-3371
Ontario (except area code 807):
1-800-268-2123
All other areas: 1-800-268-2138
Fax: (416) 252-9203

Woolfitt's Art Enterprises Inc.,
390 Dupont St.
Toronto, Ontario
M5R 1V9
Tel.: (416) 922-0933
Fax: (416) 922-3017

also

Calgary, Alberta
Tel.: (403) 278-0565
Fax: (403) 278-2050

Solander Boxes:

Opus Binding Ltd
Unit 15
15 Capella Court
Nepean, Ontario
K2E 7X1
Tel.: (613) 727-5063

Solander boxes are also available from other conservation distributors. Check with your museum advisor for a local distributor of equipment and materials or refer to

Museum and Archival Supplies Handbook (MASH). 3rd edition. Toronto: Ontario Museum Association and the Toronto Area Archivists Group, 1985.

This is an excellent resource and is available from

Ontario Museum Association
George Brown House
50 Baldwin Street
Toronto, Ontario
M5T 1L4
Tel.: (416) 348-8672

or

Toronto Area Archivist Group
P.O. Box 97
Station "F"
Toronto, Ontario
M4Y 2L4

Further Reading

Dolloff, Francis W. and R.L. Perkinson. *How to Care for Works of Art on Paper*. Boston: Museum of Fine Arts, 1971.

Johnson, E. Verner and Joanne C. Horgan. *Museum Collection Storage*. Paris: UNESCO, 1979.

Ellis, Margaret Holben. *The Care of Prints and Drawings*. Nashville, Tennessee: AASLH Press, 1987.

Clapp, Ann F. *Curatorial Care of Works of Art on Paper*. 3rd edition. Oberlin: Intermuseum Conservation Association, 1978.

A number of other publications you may wish to consult are listed below. All of these books are inexpensive and contain sound, basic advice on all aspects of the care of collections. We highly recommend that you refer to these books.

Graham-Bell, M. *Preventive Conservation: A Manual*. Victoria, B.C.: British Columbia Museums Association, 1983.

Available from
British Columbia Museums
Association
514 Government Street
Victoria, B.C.
V8V 4X4
Tel.: (604) 387-3315

Provincial Museum of Alberta.
Housekeeping Our Heritage: Practical Advice for Alberta Collections. Rev. ed. Edmonton, Alberta: Alberta Culture, Provincial Museum of Alberta, 1984.

Available from
Provincial Museum of Alberta
12845-102 Ave.
Edmonton, Alberta
T5N 0M6

Canadian Council of Archives.
Basic Conservation of Archival Materials: A Guide = Manuel de conservation des documents d'archives. Ottawa: Canadian Council of Archives, 1990.

Available from
Canadian Council of Archives
West Memorial Building
Room 5078
344 Wellington Street
Ottawa, Ontario
K1A 0N3

Banks, Joyce M. *Guidelines for Preventive Conservation*. Ottawa: Council of Federal Libraries Committee on Conservation and Preservation of Library Materials, 1987.

Available in Canada through
Associated Bookstores and other
booksellers or by mail from
Canada Communication Group
Government Services
Ottawa, Ontario
K1A 0S9
Catalogue No. SN3-167/1987
ISBN 0-660-53823-7

Endnotes

1. **Mil:** "A unit of length equal to 0.001 inch, often used for specifying diameters of wires and glass fibres." (Whittington, Lloyd R., *Whittington's Dictionary of Plastics*, 2nd ed., Westport, CT: Technomic Publishing Co., Inc., 1978, pp. 201-3).

Copies are also available in French.

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