Canadian Conservation Institute
Institut canadien de conservation

CCI Notes 6/5

Care of Quillwork

Introduction

Porcupine quills have been used extensively to decorate clothing, birch bark furniture, and personal accessories. In many of these objects, the quills have been beautifully coloured with dyes. Quills, which are naturally cream-coloured, are a specialized type of hair. They are composed mainly of protein and have a spongy interior with a hard outer coating covered by fine scales. Quills are resilient when fresh, but they can become brittle over time in poor environmental conditions. Damage to quillwork is caused primarily by unstable humidity levels, excessive illumination, dust, insects, careless handling, and poor storage conditions. Quills are best preserved through good housekeeping, good storage, and environmental control.

Handling

Quills can break easily, and must be handled carefully to prevent damage. Never allow quillwork to bend. When lifting or transporting flexible objects covered with quillwork, always provide support with a rigid board covered with thin polyethylene or polypropylene foam (e.g. Ethafoam, Microfoam, or Volara) sheeting, stable plastic sheeting (e.g. polyethylene), or acid-free tissue paper. Take special care with objects that have broken quills to prevent snagging on clothing, cotton gloves, etc.

Storage

Quillwork is light-sensitive, and should be stored in the dark. An enclosed storage unit or a covered, acid-free box is recommended.

Dust can become trapped within the finely scaled surface of quills as well as within surface creases and between fold lines of quillwork. Dust is abrasive, unsightly, and may be difficult to clean when lodged within interstices. Dust may also accelerate chemical deterioration, and may provide nutrition for insects or mould. Protection from dust is therefore important. Good housekeeping in the storage area is essential. Storing objects in closed drawers or boxes will help to prevent dust and dirt from settling on them. A covering of fabric or polyethylene sheeting will also afford some protection.

Damage from insects is a major consideration. The larvae of some common museum pests (e.g. clothes moths, carpet beetles) can destroy quillwork in a matter of days. Inspect these objects for insect damage every 3 months at a minimum (see CCI Notes 3/1 *Preventing Infestations: Control Strategies and Detection Methods* (www.cci-icc.gc.ca/crc/notes/html/3-1-eng.aspx) and 3/2 *Detecting Infestations: Facility Inspection Procedure and Checklist* (www.cci-icc.gc.ca/crc/notes/html/3-2-eng.aspx); see also Technical Bulletin 29 *Combatting Pests of Cultural Property*). Immediate attention is required if an infestation is detected. Contact the Canadian Conservation Institute for advice.

Flexible quill-decorated objects must be given rigid support when stored. Choose acid-free materials for their quality and durability. Do not hang quill-decorated clothing and other such flexible objects; hanging strains seams and threads, and also causes creases and folds that will distort the applied decoration. Instead, lay these items flat and lightly fill them with unbuffered, acid-free (neutral pH) tissue paper to maintain their shape. Interleave any overlapping areas of quillwork with tissue to prevent decorated areas from snagging on each other. Never place cotton padding or any other material with loose fibres in contact with quillwork as the quills may become tangled in the fibres and break. Place any loose pieces of quill in a plastic or acid-free container, label the container, and keep it with the artifact.

Cleaning

Cleaning quillwork is a delicate operation that should be avoided if possible. The need for cleaning can be greatly reduced by sound preventive measures.

If cleaning is considered necessary, begin by dusting quills gently with a soft watercolour brush. Bring the brush down in the direction of the scale pattern and brush the dust into the nozzle of a vacuum cleaner held at a distance. A piece of fine gauze or screening across the nozzle will prevent the accidental loss of loose pieces. If possible, use a mini-vacuum cleaner (e.g. models made to clean computer keyboards) or a regular vacuum cleaner that can be operated at a reduced power to lower the suction. Clean only a small area at a time, and use minimum pressure on the quills. Check frequently under a magnifying glass to ensure that no damage is being done.

The reaction of quillwork to damp cleaning depends on the type and colour of dye that has been used. Damp cleaning is therefore best left to an experienced conservator, as incautious cleaning can cause irreparable damage.

Illumination

Dyed quills are among the most light-sensitive organic materials. Keep the objects away from sunshine or daylight, and place them far from bright light sources. Since light damage is cumulative and irreversible, the light levels and length of time quillwork is exposed to light should be minimized as much as possible. Always store quill-decorated objects in the dark and display them for short periods only. When they are on display, keep light levels below 50 lux with an ultraviolet component less than 75 μW/lm. Information on the measurement of light levels can be found in CCI Notes 2/4 *Environmental Monitoring Kit* (www.cci-icc.gc.ca/crc/notes/html/2-4-eng.aspx). More in-depth information on light is available in *Light, Ultraviolet and Infrared* (www.cci-icc.gc.ca/crc/articles/mcpm/chap08-eng.aspx).

Relative Humidity (RH) and Temperature

Control of RH is important in the care of quillwork. The optimum RH is 45–55%, and extremes of dampness (RH above 65%) or dryness (RH below 35%) should be avoided. Rapid changes in RH are also detrimental to quillwork, as it is often attached to materials that respond to fluctuations in RH in ways that differ from the response of the quillwork itself. This problem is of particular concern for quillwork on birch bark (the bark does not move a great deal in response to changes in atmospheric moisture but the quills do, causing damage to the quills at their points of attachment).

Quillwork is not particularly temperature-sensitive, but it is usually found in association with materials that are. Therefore, it is important to maintain display or storage conditions that are less than 25°C. Make sure that the radiant heat from bright spotlights does not heat up tightly closed display cases or raise the surface temperature of quillwork on display, thus causing embrittlement. To prevent this temperature problem, maintain low light levels and use lights that do not emit a lot of radiant heat. Fluctuations in temperature can cause fluctuations in RH that lead to damage.

Environmental Guidelines for Museums — Temperature and Relative Humidity (RH) (www.cci-icc.gc.ca/crc/articles/enviro/index-eng.aspx) provides a general introduction to CCI's current approach to controlling ambient RH and temperature in museums. More information regarding RH and temperature is available in *Incorrect Relative Humidity* (www.cci-icc.gc.ca/crc/articles/mcpm/chap10-eng.aspx) and *Incorrect Temperature* (www.cci-icc.gc.ca/crc/articles/mcpm/chap09-eng.aspx).

Repair

Repairs, such as reattachment of loose quills, should be referred to an experienced conservator. Contact the Canadian Conservation Institute for advice.

Suppliers

Note: The following information is provided only to assist the reader. Inclusion of a company in this list does not in any way imply endorsement by the Canadian Conservation Institute.

Polyethylene foam (Ethafoam), cross-linked polyethylene foam (Volara), polypropylene foam (Microfoam):

Canadian Paper & Packaging Co. Ltd. (distributor)
www.cppinc.com

DuPont Global Headquarters (manufacturer)
www.dupont.com

Poly Foam Products Ltd.
Tel.: 905-678-0820

renovation centres, hardware stores, and craft suppliers

Unbuffered, acid-free (neutral pH) tissue paper, matboard, and cardboard:
conservation product suppliers such as:

Bibliofiche
www.bibliofiche.com

Carr McLean
www.carrmclean.ca

University Products of Canada
www.archivalproducts.ca

Woolfitt's
www.woolfitts.com

Polyethylene sheeting:
hardware stores

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Strang, T., and R. Kigawa. *Combatting Pests of Cultural Property*. Technical Bulletin, No. 29. Ottawa: Canadian Conservation Institute, 2009.

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Originally published 1983
Revised 1988, 1991, 2010

Copies are also available in French.
Texte également publié en version française.

Cat. No. NM95-57/6-5-2010E
ISSN 0714-6221