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Removing Mould from Leather – Canadian Conservation Institute (CCI) Notes 8/1

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Introduction

Leather and skin objects are particularly susceptible to mould growth. Leathers and skins retain materials that were deposited during use, or those that were applied in an attempt to keep leather flexible and attractive. The leather and applied materials are food sources for mould. Although mould spores are always present in the air, they are able to grow only if environmental conditions are suitable. Relative humidity (RH) between 65 and 100%, warm temperatures, and poor air circulation promote mould growth. Generally mould will grow after two days at 90-100% RH, 10 days at 80% RH and 100 days at 70% RH. More information on this can be found under Agent of Deterioration: Incorrect Relative Humidity.

Is it mould?

Mould growth can appear as a low growth in various colours that cover a large area or isolated spots. Brown to black is easily noticed on light coloured skins or leathers, and white or light coloured growth on darker leathers. If several objects are mouldy and in a confined space the first indication could be the smell.

Oils, waxes and other products can form a white deposit on leather and skin surfaces that could be misinterpreted as mould. Wear protective equipment as outlined below and test a small area with a cotton swab dipped in mineral spirits. The swab should be blotted on paper toweling and then rolled over a small area in an unobtrusive spot. After the solvent has evaporated (leave for about 15 minutes), examine the area. If the white deposit disappeared, the problem could be a change in applied waxes rather than mould. If in doubt, treat as a mould covered object.

Mould is a serious health concern. Every effort should be made to limit human exposure to it. Personal protective equipment (PPE) should be worn when handling mouldy leather objects. People with allergies, respiratory conditions or a suppressed immune system should not be in contact with affected material or where the mould infestation is located.

The minimum level of PPE suitable for a small amount of mould (1 m^2 or less of visible mould) is a N95 or N100 disposable respirator, disposable gloves, disposable apron and non-vented goggles. If the amount of visible mould is more extensive, a greater level of personal protection is required. Some fungi produce volatile metabolites that cause unpleasant odours, including the characteristic smell associated with mouldy materials. The health effects of exposure to microbial volatile organic compounds have not been well studied. They may be responsible for some health effects. If a strong mould smell is

present, a respirator with a combination of particulate and organic vapour cartridges is recommended. Some particulate disposable respirators incorporate nuisance-level organic vapour relief and may be appropriate for some circumstances, such as short exposure time to low levels of contamination, if the mask fits well against the face.

For more information on personal protective equipment for small mould problems or where larger numbers of objects are affected and more specific PPE is required, refer to Technical Bulletin 26 *Mould Prevention and Collection Recovery: Guidelines for Heritage Collections*.

Treatment

The information presented here is useful when a few mouldy leather objects are discovered. If the mould contamination is extensive (more than a few artifacts), refer to Technical Bulletin 26 *Mould Prevention and Collection Recovery: Guidelines for Heritage Collections* for a comprehensive description of the health effects associated with exposure to mould, recommended PPE, and cleaning equipment and techniques.

If mould is discovered, isolate the infested object by sealing it in a plastic bag or container. This will prevent the transfer of spores to clean areas of the collection and the rest of the building. If the leather or skin is dry, it can remain in a container or sealed in plastic until it can be cleaned. Label the container and identify contents as contaminated with mould.

If the leather or skin is wet or damp, it should be dried as quickly as possible or placed in a freezer to prevent further mould growth. **Freezing:** Before freezing, seal the object in a polyethylene bag or wrap with polyethylene film and seal with tape (e.g. duct, vinyl). Label the container and identify the contents as contaminated with mould. Freezing is a quick method of killing actively growing mould. However, although the mould's vegetative growth will freeze and break down, the spores are able to withstand the cold temperatures and remain viable. Freezing is also a good option when there are numerous wet or mouldy objects as it eliminates the urgency to treat or dry all wet artifacts within a short time frame. Household horizontal chest freezers operate between -18 and -28°C and can be used for a small number of objects. In general, freezing is safe for leather artifacts. If in doubt, check with a conservator. The leather will need to be thawed, dried and cleaned when time and resources are available. Thaw the leather in the sealed bag to avoid additional moisture from condensation but **ensure that the bag is opened and air drying is started once the leather has reached ambient temperatures. If left in a sealed bag the mould will grow.**

Air drying leather and skin: Air-dry the leather inside a fume hood or outside, on a clear dry day, away from people and building air-intake systems. Open the bag while wearing the appropriate PPE. Turn objects to dry all surfaces but limit handling so that the mould is not pushed into the leather surface. If the shape has become distorted, pad with foam pieces, or plastic bags filled with foam peanuts, toweling, etc.

Cleaning: Close vacuuming is one of the most effective ways to remove mould growth and reduce the number of mould spores on the artifact. Be systematic and thorough when removing the mould and carefully vacuum the object all over, not just where mould growth can be seen. If possible, go over the object twice, the second time in a perpendicular direction to the first pass. Hold the vacuum nozzle very close to the object and allow the suction to pull the mould off. A soft brush can be used to direct mould that is otherwise difficult to remove toward the nozzle. If the mould smears, the leather or skin may not be dry enough to clean. To avoid dispersing mould spores into the environment, a vacuum cleaner fitted with a high-efficiency, particulate air (HEPA) filter is strongly recommended.

If the mould is near decorative elements, such as beadwork that is poorly attached, use a softer brush and cover the vacuum nozzle with nylon window screening secured in place with an elastic band. This will prevent detached pieces being sucked into the vacuum cleaner. Move the vacuum nozzle back slightly to reduce suction at the surface being cleaned. Vacuum cleaners with a variable speed control that can modify the vacuum suction are useful when cleaning leather or skin objects that have weakly attached components.

When the vacuuming has been completed, wash all work surfaces, equipment, and tools with a water and detergent solution. These items should then be disinfected with a dilute solution of household bleach and water (the bleach is diluted by a factor of 10). A contact time of 10 minutes is required to ensure complete disinfection.

Exercise caution when handling and discarding contaminated items (packing material, PPE, vacuum cleaner bags, etc.). Place contaminated debris in thick (6 mil) plastic garbage bags or two layers of thin plastic garbage bags. Seal and discard the bags in an outdoor garbage container.

Even though the leather has been carefully cleaned, some fungal spores and fragments are likely to remain and may be a health concern for some people. Individual susceptibility will vary. There are no guidelines or regulations for handling objects after removing mould. It may be appropriate to adopt a cautious approach and identify the object in a manner that allows users to take precautions before touching it. This should

include wearing disposable gloves when handling the object and washing hands with soap and water afterwards.

For additional information on mould remediation consult:

National Collaborating Centre for Environmental Health (NCCEH). *Mould Remediation Recommendations*. Vancouver, BC: NCCEH, 2014.