

Voice from the Vault

By Gregory Sanford, State Archivist

Breaking the Mold

I confess that during late night rummagings through my refrigerator I occasionally unearth food with longer beards than the state archivist. Mold can be fascinating, but it usually not welcome on food or records. In recent weeks, however, I have heard from several clerks, and one librarian, who have had to deal with mold in their offices.

The Archives is currently blessed with a UVM graduate intern through a program of the Snelling Center on Government. Lois Coulter, a graduate student in Historic Preservation, has been helping the Archives update its disaster plan. I asked Lois to write up a short piece on mold and records

The Problem of Molds in Collections, by Lois Coulter

"Molds" and "mildew" are the generic terms given to a wide variety of molds, mildew, fungi, algae, rusts and yeasts which feed on living or organic material. While dormant mold spores cause little damage, active mold colonies excrete an enzyme that breaks down the host material, weakening and altering paper and book bindings; many molds contain pigmentation that irreversibly stains paper, cloth or leather. In addition, several varieties of molds result in respiratory ailments making the presence of active mold colonies a significant health hazard.

Microscopic spores are everywhere, transmitted by air currents as well as contact with humans or animals. Once established, spores may remain dormant until environmental conditions are favorable for growth. Molds require only high humidity and warm temperatures to become active. A musty odor, the presence of stains or the appearance of a fine web of filaments or a bushy growth of almost any color indicate an outbreak of mold. The sudden appearance of mold in a collection is a signal that changes in the environment have allowed the spores to germinate.

Mold species commonly found in libraries and archives prefer the starches, gums and gelatin found in book bindings and the cellulose fibers that make up paper. "High temperatures, poor air circulation, dim light, and accumulated grime assist and accelerate the growth of mold once it has germinated, *but only high relative humidity and moisture contents of the substrate can initiate and sustain mold growth.*"¹

In outbreaks involving less than 300 cubic feet of records, where no

toxic molds are present, enlisting outside aid is not necessary. When mold is detected, a mycologist should be consulted to determine the mold species. Some molds are highly toxic to humans and require more specialized treatment.

People with compromised immune systems, asthma and other respiratory ailments as well as diabetics, those on steroid treatments, and people with serious allergies should not be exposed to either the area where the mold outbreak occurred or to the infected items. All others should wear protective clothing and HEPA filter masks when exposed to active mold colonies.

Once an active mold colony is discovered, three actions must be taken: establish the cause of the environmental changes, isolate the infected items, and thoroughly clean and dry the affected areas. Reducing the humidity and increasing air circulation is essential to discouraging mold growth. Optimum relative humidity is below 50% with a temperature in work spaces below 70F. Discovering the source of the environmental change is also essential to preventing the further proliferation or recurrence of mold colonies. Regulating the environment to maintain a steady temperature and relative humidity is sound collection management policy.

Isolation of affected materials deters the spread of the mold. Infected items should be sealed in a plastic bag and removed to a clean area with relative humidity below 45% for decontamination. Once in a clean environment, the items should be removed from the plastic bag to discourage further mold growth. Wet or damp materials should be dried immediately or frozen until appropriate treatment options can be undertaken. All dry materials should be cleaned with a soft brush to remove remaining mold spores. Exposure to ultraviolet light will inhibit mold growth and may kill molds (sustained exposure to UV light, however, is not good for records).

The area where the mold outbreak occurred should be disinfected with a mild bleach solution. All HVAC system components in the area will require cleaning and disinfecting as well. Until the affected area is thoroughly cleaned, removed items should not be re-filed. "Spores, active or dormant, are ubiquitous. Although it is impossible to get rid of all the spores, mold growth can be controlled."² Finally, before any new material is introduced to the collection, it should be quarantined and carefully inspected for any signs of mold or insect activity.

The most important step is the careful regulation of relative humidity in the collections storage area. "Problem environmental conditions that may contribute to higher humidity levels need to be corrected. Repair leaking pipes, gutters and downspouts, cracked windows, a problem roof, deteriorated brick, masonry pointing, or cracked walls."³ Regular inspections of the HVAC systems, regular cleaning and the maintenance of good air circulation in the storage areas will help keep

the area free of the media required to nourish spores.

(Footnotes)

¹ Managing a Mold Invasion: Guidelines for a Disaster Response, Conservation Center for Art and Historic Artifacts

² Emergency Salvage Of Moldy Books And Paper, Northeast Document Conservation Center

³ Mold and Mildew: Prevention of Microorganism Growth in Museum Collections, National Park Service