



# Conserve O Gram

August 1998

Number 2/10

## Hazardous Materials In Your Collection

The mission of many museums includes the mandate to collect and preserve artifacts. However, some of the objects and artifacts institutions are bound to preserve and protect from harm have the potential, if not handled properly, to harm us. Although it can seem frightening and overwhelming and an issue just easier to ignore, an institution can substantially reduce its risk to staff, volunteers, and visitors if it becomes informed about potential hazards. The information below, although in no way exhaustive, can help you begin to assess the risks and hazards associated with objects in your collection.

### *Hazardous Materials Used on Collections*

Ever since objects have been systematically gathered, caretakers of collections have attempted to discourage pest infestation to preserve artifacts. These efforts have led to the application of a wide variety of hazardous materials during preparation or storage. See the *Conserve O Gram* leaflets in this series that discuss several popular but potentially hazardous artifact treatments including ethylene oxide (2/2), arsenic (2/3), and dichlorvos (Vapona) (2/4). A partial list of other poisons, pesticides, and fumigants that are known to have been used on collection items in the past includes tobacco, camphor, strychnine, mercuric chloride, naphthalene, paradichlorobenzene (PDB), dichloro-diphenyl-trichloroethane (DDT), methyl bromide and cyanide. While these are no longer in use, their residues can still be present on or around artifacts.

Other types of treatments to objects in collections leave potentially hazardous residues as well. Sybarizing (or siburizing) was an arsenical mothproofing treatment applied to textiles. Potassium cyanide was used to clean some gold and silver objects leaving a white residue that produces the toxic hydrogen cyanide if wet.

### *Hazardous Materials Inherent in Collections*

Many types of museum collection items are made from components that are inherently toxic, dangerous, or hazardous or have the potential to become toxic, dangerous, or hazardous in time. Below is a list of different types of collection items and the possible hazards associated with them.

***Mounts/Specimens.*** Many types of both wet and dry specimens were preserved using arsenic. Under no circumstances should any mount be used for "hands-on" demonstrations for children or adults before it is tested for the presence of arsenic. See *Conserve O Gram* 2/3 for more detailed information on testing and storage procedures.

***Ethnography/Anthropology/Archeology.*** Many types of inherently toxic substances are used in ethnographic materials. Poisonous seeds may be used as decoration on clothing and in jewelry. Spears and knives may be coated with poisons. Grave goods are sometimes colored with red lead, white lead, cinnabar, and other toxic minerals and pigments. Objects may be contaminated with pathogens that can cause

disease including those removed from privy excavations, in areas that may have been flooded, or contaminated by sewage.

**Firearms/Armament/Edged Weapons.**

Unless you have verifiable written proof to the contrary, assume that all firearms are loaded and all shells, mortars, etc., are live. If deactivation of munitions is necessary, do not attempt to do it yourself! The sharp edges of spears, swords, and arrows may be coated with poisons or contaminated with biohazardous materials such as blood containing viable pathogens.

**Film.** Cellulose nitrate film begins to emit nitrogen oxide gases when breaking down. These gases are lung irritants and repeated exposures may result in chronic symptoms. A sweet warning odor may be emitted. A cellulose nitrate fire releases carbon monoxide, nitrogen peroxide and other very toxic gases. Cellulose ester films emit acetic acid that can cause irritation to the upper respiratory tract. They emit a vinegary odor when breaking down.

**Medical/Dental/Veterinary Equipment.** Handle with extreme caution as such objects may contain viable pathogens or toxic and/or controlled substances. Be extremely careful when handling containers as the substances may have leaked around stoppers or lids. The linings of bags may hide sharp objects such as needles or the toxic residue of spills. Broken thermometers can leave mercury residues. Ether or nitroglycerine, which can be found in doctors' bags, becomes unstable over time and can form explosive peroxides that are very sensitive to movement. In such cases, consult your site's emergency procedures for dealing with bombs and explosives.

**Textiles.** Weighted silks may contain arsenic and lead added to the silk during the manufacturing process and can pose a serious health hazard. Do not handle such items without vinyl or latex gloves. A personally fitted respirator with a HEPA cartridge should also be worn as air-borne dust containing arsenic or lead can cause respiratory cancers when inhaled.

Segregate the items from other materials as these substances may migrate to other textiles.

**Art.** Pieces of art, especially contemporary art, can include any number of hazardous materials including but not limited to body fluids; sharp objects, such as needles, knives, and broken glass; and toxic pigments.

**Metals.** Beware of lead in items such as sculptures, stained glass windows, food cans, and old bullets. Lead corrodes rapidly forming a white powder that is easily inhaled, ingested, or trapped in clothing. Ceramics may have been covered with lead glazes. Damaged glazes can break up into flakes or powder that can be inhaled or ingested. The mercury compounds used to coat the back of old mirrors can break down to drops of free mercury that can collect in the edges of old mirror frames. This mercury can also off-gas toxic fumes.

**Food.** Old unopened cans may be contaminated with botulism. Bacteria inside may cause the cans to swell and explode harming staff, exhibits, and other objects in the collection.

**Rocks/Fossils.** Over 200 types of minerals are known or suspected to be poisonous or cancer causing. Examples include specimens containing arsenic, asbestos, mercury, and those that are radioactive. Some rocks and fossils can be a source of radon, which is produced by the natural breakdown of uranium. See *Conserve O Gram 2/5* for more detailed information about the radon emitted from fossils.

**Radiation.** After 1898 some objects were painted with a mixture containing radium to make them glow in the dark. Although most no longer glow they are still radioactive. Such items include: clocks, watches, compasses, instrument panels, light switches, doorknobs, religious statuary, and chamber pot lids. Be suspicious of any health cures with RAD or RADI in the title. The Health Fount Radium Vitalizer is a water dispenser that contained a large piece of uranium. The water was sold as a health cure.

**Other.** Seeds and Asian lacquer beads can contain toxins that are absorbed through the skin. These were used in jewelry, rosaries, rattles and tourist items. Asbestos can be found in artificial ashes and embers sold for use in gas-fired fireplaces as well as in older household products such as stoves, fireproof gloves, stovetop pads, ironing board covers, and certain hair dryers. It may also be found in automobile brakepads and linings, clutch facings, and gaskets. PCBs may be found in generators, transformers, and many types of industrial equipment. As these objects deteriorate or if they are damaged the PCBs can leak out, exposing people to the hazard. Many objects were made with or incorporated substances now known to be harmful and every effort should be made to find out about the composition of unfamiliar objects.

### ***Simple Steps to Control Exposure***

Now that some of the types of hazards have been outlined, there are a number of steps that can be taken to protect staff, volunteers, and visitors from exposure.

***Inventory Hazardous Materials.*** Inventory the collection to ascertain what items have the potential for hazard. Review catalog cards for material types and lists of treatments. Visually inspect the collection for warning signs such as corrosion, bulging, strange odors, crystals, and other changes to the size, shape, appearance, and odor of an object.

***Practice Good Storage, Labeling, and Handling Routines.*** Use a storage method appropriate for the type of hazard, including hazardous storage cabinets found in many industrial supply catalogs. Ensure that others are aware of the nature of harmful materials. Label hazardous collection materials on the catalog card as well as on or near the object itself. Mark items in a way that will not permanently damage them. Tags, marked bags, enclosures in bags, and marked cabinets work well. Provide a tour of areas containing potentially hazardous collection materials to local fire personnel so they will be

familiar with the types of hazards they might encounter in the course of fighting a fire.

Follow proper handling guidelines such as wearing the proper type of gloves, donning smocks, lab coats, and other types of protective clothing as appropriate. Using a cart instead of carrying an object ensures not only protection of the object but protection of the individual handling the object as well. See ***References*** and ***Sources*** for additional information.

***Practice Good Housekeeping.*** Keep storage and work areas clean and free of dust and debris that can harbor harmful materials. It is good not only for the object but for those working with the objects as well. Work surfaces should be thoroughly wet mopped to ensure that hazardous particulates are not put in the air. When vacuuming is necessary, use a HEPA vacuum and wear a respirator with a HEPA cartridge as vacuum exhaust can circulate hazardous particulates. Change filters often.

***Practice Good Personal Hygiene.*** Wash lab coats and other protective clothing frequently. Do not wear home clothing that has been contaminated, as hazardous materials can be passed along to your family. It takes quite a bit less of a toxic material to affect children and household pets because of their small size. Wash your hands and face often and shower if necessary. Do not smoke, eat, drink, apply lipstick or balm, or contact lenses near toxic materials as the toxic materials are more easily introduced through the mouth and mucous membranes. Keep your tetanus shot up-to-date. Be aware of personal habits (licking fingers to turn pages, putting thread in your mouth, chewing on pencils or fingernails, etc.) that can facilitate the transmission of toxic materials.

***Wear Appropriate Personal Protective Equipment (PPE).*** There is no universal type of PPE that can protect from all types of hazards associated with collections. Masks, gloves, safety glasses, smocks, respirators, and other PPE should not be considered the main source of

protection from hazardous materials. They are not acceptable substitutes for good preventive methodology and should be relied upon for short-term projects or emergencies only.

**Maintain Material Safety Data Sheets (MSDS).**

This free fact sheet is provided by the manufacturer of toxic and hazardous materials to explain the possible hazards of a substance and the measures required to use and handle it. Although not standard in format, each sheet contains the same information. Keep an MSDS on file and easily accessible for each hazardous substance including arsenic, lead, asbestos, ethylene oxide, etc. They are available from the manufacturer, vendor, and the World Wide Web at <http://palimpsest.stanford.edu/bytopic/health/>.

**Dispose of Hazardous Materials Properly.**

Dumping toxic or potentially toxic items in the trash or down the sink is not acceptable. Research the proper disposal method and seek out your hazardous waste disposal coordinator.

**Get Expert Advice.** This *Conserve O Gram* is meant only as an overview to issues you may have to address in your collections. To work safely you should acquaint yourself with the up-to-date laws, regulations, and guidance available on proper health and safety procedures for handling hazardous materials. See the **References** and **Sources** sections for additional sources of information.

**Training, Training, Training!** Invest the time and funds to train staff members appropriately so that someone is adequately prepared to address these issues. Begin a small library of books, periodicals, and pamphlets. Many are available free or at a nominal cost.

**Sources**

Industrial hygienists specialize in health and safety. You can find a local contact through the American Industrial Hygiene Association (703) 849-8888.

Arts, Crafts and Theater Safety (ACTS) has a free helpline, (212) 777-0062, and a webpage at <http://www.caseweb.com/acts/>. It also has a variety of data sheets including "Understanding the MSDS."

**References**

Goldberg, Lisa. "A History of Pest Control Measures in the Anthropology Collections, National Museum of Natural History, Smithsonian Institution." *Journal of the American Institute for Conservation* 35 (1996): 23-43.

Miller, Patricia L. "Arsenic, Old Lace, and Stuffed Owls May Be Hazardous to Your Health: Health Hazards in Museum Collections." *Illinois Heritage Association Technical Insert* 50 (1991).

Sax, N. Irving. *Dangerous Properties of Industrial Materials*. New York: Van Nostrand Reinhold Company, 1979.

Rossol, Monona. *The Artist's Complete Health and Safety Guide*. New York: Alworth Press, 1994.

Schwoppe, A.D.; P.P. Costas; J.O. Jackson; and J.O. Stull. *Guidelines for the Selection of Chemical Protective Clothing*. 3rd edition. Cambridge, MA: Arthur D. Little Inc., 1987.

Linda Norbut Suits  
Supervisory Museum Curator  
Lincoln Home National Historic Site  
National Park Service  
Springfield, Illinois 62701-1905

---

The *Conserve O Gram* series is published as a reference on collections management and curatorial issues. Mention of a product, a manufacturer, or a supplier by name in this publication does not constitute an endorsement of that product or supplier by the National Park Service. Sources named are not all inclusive. It is suggested that readers also seek alternative product and vendor information in order to assess the full range of available supplies and equipment.

---

The series is distributed to all NPS units and is available to non-NPS institutions and interested individuals by subscription through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; FAX (202) 512-2250. For further information and guidance concerning any of the topics or procedures addressed in the series, contact NPS Museum Management Program, 1849 C Street NW (NC230), Washington, DC 20240; (202) 343-8142.