

DEALING WITH COLLECTIONS HAZARDOUS TO HEALTH

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Objects in the museum collections have often been made of materials that are injurious to health. It is also common that originally harmless objects have later been contaminated and become hazardous. As people working with museum collections are constantly exposed to poisonous, unhealthy or otherwise dangerous substances and objects, investing in occupational safety is extremely important. However, in Finnish museums, the potential hazards of historical objects are still widely unknown and therefore the occupational safety is also insufficient.

In 2014–2015 Helsinki University Museum underwent an extensive transfer of both its permanent exhibition and its collection storages (19, 22–27). Packing and moving tens of thousands of objects meant having to investigate potential risk factors. This led to improving the occupational safety practices, which were previously quite inadequate. During the project, a manual for working with hazardous collections (8) was written for the museum's internal use. As many Finnish museum professionals have shown a lot of interest in the manual, there are plans of writing a publication about hazardous collections and occupational safety in cooperation with The Nordic Association of Conservators in Finland (NKF-FI).

Precautionary measures are very important when working with medical, scientific or otherwise contaminated collections. Careful upfront planning and competent supervision of work, orientation of workers, a safe

approach to work and suitable personal protective equipment are great methods for improving occupational safety. In Helsinki University Museum a lab coat, vinyl gloves and safety shoes are the basic level of personal protection used when working with harmless objects. When needed, the gear can be upgraded with e.g. a disposable respirator, nitrile gloves and safety goggles or, in extreme cases, with a powered air-purifying respirator and protective clothes or chemical suit covering the entire body. Organizing storages to be as safe as possible, using hazard warning signs and documenting both certain and suspected risks thoroughly also helps to prevent problems in the future (12, 2).

Medical and pharmaceutical collections may contain a wide range of hazardous objects as they often include a variety of different instruments, devices, drugs, specimens etc. Wax models and mouldages may be coloured with dyes containing lead, mercury or other heavy metals (4, 41–42; 22, Table 10). Formalin used in wet specimens can evaporate (24, 38). Asbestos is occasionally used for heat insulation in objects such as incubators and sterilizers (e.g. 15; 24; 11, 67). Insulating oil in the transformers of e.g. X-ray machines may be carcinogenic polychlorinated biphenyl (PCB) (22, Table 9; 12, 3; 10). Mercury can escape from broken thermometers and blood pressure meters (24, 39). Drugs may contain components such as arsenic (e.g. 1), mercury (e.g. 6), digitalis (e.g. 2), and radium (e.g. 20). Ether, nitroglycerin and picric acid are explosive substances (9, 4–5; 12, 2). Broken glass or sharp instruments such as needles and scalpels may pose a threat to museum workers. It's also possible that some of the instruments are not completely free of pathogens. (9, 1)

Even objects that aren't originally dangerous can be contaminated. In the past pesticides such as arsenic or mercury salts, DDT and naphthalene were used to combat various pests detrimental to collections. (7, 32–33) Collectors may even have subjected objects to pesticide treatments long before museums acquired them. (14, 11) Also, mould and mildew can affect the collections. In fact, mould is one of the most serious sources of damage to library, archival, and museum collections, as well as a potential health threat to the people who care for collections. Mould spores are everywhere. To grow, they need moisture and organic host material on which to grow. Mould will grow on any organic material offering suitable nutrients. Some moulds are toxins and can cause serious illness or even death in susceptible individuals. Even exposure to moulds not highly toxic can have serious health consequences. High concentrations of moulds can cause allergic reactions, respiratory problems, dizziness and headaches. (17, passim; 13, 1)

In 2016 the sewer pipes in a museum building belonging to the University of Helsinki had burst, which led to a massive mould infestation of the agricultural collections housed there. Together with the university's Centre for Properties and Facilities, the Helsinki University Museum carried out a large-scale project to save the collection of some 2500 objects as well as photos, books and archival materials affected. This involved building a temporary structure where the objects could be processed. The structure had ventilation and heaters to prevent the regrowth of the mould. Dataloggers were used to monitor the relative humidity and temperature in different parts of the structure. Assigned dirty and clean sides were used to handle mouldy and cleaned objects respectively. About 1500 of the objects were deemed fit to be rescued. They were then cleaned mechanically, treated with appropriate solvents (ethanol and acetic acid), subjected to peroxide decontamination and ultraviolet radiation. A team of six museum professionals and a conservator were hired to do the hands-on work, which was coordinated by the Helsinki University Museum's project planner together with the head of collections. Powered air-purifying respirators and protective clothes were used to protect the people working with the contaminated objects. An alarm system was installed in the structure to keep the collections safe, as well as to keep outsiders out of harm's way. Hazard warning signs and fences were also used to ward off people. Some aspects of the project were shared via a blog. (5; 16; 23; 25) Fortunately, most of the considerable costs of the project were reimbursed by insurance.

The most recent project dealing with hazardous collections in Helsinki University Museum was the packing and moving of a storage of more than 500 liquid medicines and solid chemicals in the late spring of 2018. The project was carefully pre-planned. Information about the potential dangers of the components in the chemicals and medicines was searched e.g. in the Sigma-Aldrich (21) and PubChem (18) sites. The most dangerous ones were deemed to be removed from the collections. About half of the medicines and chemicals were kept in the collections and stored safely in ventilated cabinets.

It is extremely important to consider safety issues and to use appropriate equipment when dealing with collections potentially hazardous to health or detrimental to other collections. We at the Helsinki University Museum have learned a lot in the past few years. Our goal is to keep learning about the subject and developing our safety procedures. We also want to share our findings and best practices with other museum professionals.

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