Cultural Stewardship Program
Conservator Hack: Using Heat for Fumigation

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The use of low temperatures for pest control is well known, but did you know that high temperatures can be used to kill insects? Although insects can adapt to cold temperatures if given enough time, they cannot effectively adapt to high temperatures above 50°C. All insect life stages die at these elevated temperatures. As far back as the late 18th century, some taxidermy specimens were “baked” to preserve them against insect predation. Today, heat is used for pest control in the agricultural sector, and for bedbugs in buildings. High temperature fumigation has been discussed in conservation circles for over 30 years, and there is even a company in Europe that specializes in this for museum collections: https://www.thermolignum.com/en/thermo-lignum-warmair-method.html .

Though it is impractical to ship our collections to Austria for fumigation, it is possible to use solar heat as a low cost pest control fumigation method for some artifacts during the Canadian summer, especially if there is limited freezer access or if the artifacts to be treated do not fit into a freezer.

Natural history collections, carpets, textiles, wood (bare or painted), books, bolts of cloth, herbarium sheets and bales of tobacco have all been treated with solar fumigation but solar fumigation is not suitable for all types of artifacts. Waxes, resins and adhesives may soften at high temperatures; heat may not sufficiently penetrate thicker objects; and heat is one of the factors used in accelerated ageing tests. Since solar fumigation only requires a short period of time, the elimination of a serious pest infestation may justify a slightly shorter lifespan.

The process of solar fumigation is most effective if artifacts are treated individually, since this reduces the amount of time required. Artifacts are wrapped in cotton and suspended inside heavy black LDPE (low density polyethylene) bags until the required interior temperature is reached. Bagging the artifacts helps slow down moisture loss within the object that would occur if it were simply baked in the sun. However, moisture can form on the shade side of the bag so the object must be suspended within the bag and protected by a cloth wrapping, to protect damage from condensation that may form inside the bag during the process. Artifacts are removed from the bag to cool once the heating process is complete.

Solar fumigation is more complicated to set up than low temperature fumigation, and is not suitable for all types of artifacts. If you think that solar fumigation may work for your artifacts, or have any questions regarding the process, please contact me through email: conservator (at) museumsmanitoba (dot) com