NSCG Newsletter

Title: The use of the 'dynamic' system for fumigating museum objects

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Source: Kingsley, H. (1998). The use of the 'dynamic' system for fumigating museum objects. *NSCG Newsletter*, *Issue 7, The Ten Agents of Deterioration, 3. Pests*, 7 - 8.

URL: http://www.natsca.org/article/1110

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modified precisely by computer. In both the warming-up and cooling-down phases of the treatment the relative humidity is controlled in such a way as to ensure that the humidity balance is maintained. As a result, no dehydration can occur.

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The Use of a 'Dynamic' System for Fumigating Museum Objects

The fumigation of pest-infested objects has been carried out at the Science Museum for a number of years. In April 1997 a pest strategy was written to support the Museum's Collections Management Policy Statement. The Conservation Section, in conjunction with setting up an Integrated Pest Management programme (IPM), had begun to investigate methods of fumigation which presented a non-harmful treatment for the objects but did not create a health and safety hazard to its staff.

The most common insect pests identified as harmful to the Museum's collections are *Attagenus smirnovi, Anthrenus sarnicus, Stegobium paniceum* and *Anobium punctatum.* In the past, methyl bromide had been used to fumigate infested objects coming into the store. This is still an acceptable treatment for many wooden items although it is not appropriate for most composite objects as methyl bromide will react with sulphur-containing materials and also attacks metal surfaces. Methyl bromide is known to deplete the ozone layer and can create a health hazard to those exposed (methyl bromide is specified as a Part 1 poison, Poisons Act 1972). Therefore an alternative treatment was explored.

Initially, the use of high levels of carbon dioxide was investigated. When exposed to high levels of carbon dioxide, insects open their spiracles allowing body moisture to escape, so causing them to die from dehydration. Two fumigations were carried out with good results. Although treatment using carbon dioxide appeared successful, there were a number of reasons why another method was explored, not least Health & Safety issues, availability and cost. Following a course on "Pest Management and Control For Museums", organised jointly by The Getty Conservation Institute and The Conservation Unit of the Museums & Galleries Commission, I was encouraged to investigate the use of a 'Dynamic' system using nitrogen. A 'Dynamic' system refers to a method of fumigation where an inert gas is used to flush out air from a bag/chamber until low levels of oxygen are attained. These levels are then maintained for a specified period of time.

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The Pest Problem Within The Dry Arachnida and Myriapoda Collection

Arachnid and Myriapod specimens are preferably stored in 80% methyl alcohol as this preserves soft-part anatomy, lost if specimens are dried. The Natural History Museum additionally has significant dry-pinned material dating back to the early 19th-century and housed in 208 entomological drawers (mostly Hill units). The dry collection is now not of great scientific importance as in recent years much of the type material has been restored in spirit; many specimens are just large and showy with little data. However, most of the dry specimens were donations and some have an important historical component, so the collection has been largely maintained in its original form. Unfortunately, in some parts of the collection, specimens are poorly preserved, especially tarantulas with soft abdomens, and brittle millipedes. Scorpions and centipedes with their flattened, highly keratinized bodies, appear to have fared much better. Parts of the dry collection have been subject to the ravages of the Guernsey carpet beetle - *Anthrenus sarnicus* - the larvae of which have reduced some spider specimens to a mere pile of legs and frass!

At first glance, it is not apparent how pests were able to gain access to the collection. The dry collection is separated into three discrete blocks to the rear of the store room away from the interior doors. There are no windows through which beetles can fly. However, there are several air ducts leading out of the storeroom to the roof, along with a 'dumb