

Protection of the Natural History Museum Collections Some Valuable Methods

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Abstract: *The key to long term preventive conservation in natural history collections is control of the collection environment. The benefits of an efficiently managed and well controlled environment include not only protection for the collection but better working conditions for the museum staff. A strategic approach to environmental management will ensure that the problems are understood and priorities assessed, so that the best possible use can be made of the resources available. A simple approach to environmental management is to consider the various agents of deterioration like pests, fire, incorrect temperature and humidity. The direct control of these environmental agents may be achieved at the following level: locality, site, building etc.*

Keywords: Environment, Management, Conservation, Natural history collections

I. INTRODUCTION

Understanding the environmental conditions in which pest thrives might be used as the key avoiding fact to control pests (Masner, 1994). There are four aspects that help the pest prosper like warmth and these factors are often interlinked with each other. We can avoid entry of pests into museums with this we can keep the infested specimens in quarantine and treat it. It is also essential to identify the degree of risk from pests to collection on display and in the stores. Developing pest management includes the following aspects to manage

1. Isolating the infested or new coming materials to avoid the entry of pests into the museums.
2. Setting up the implemented methods to identify and detect the infested specimens.
3. Building good infrastructure and maintaining housekeeping.
4. Preventing the entry of pests into museums.
5. Banning the activities and practices which invite pests into museums.
6. Taking the quick action to cap the spread of infestation.
7. Inspecting the stored collection periodically to monitor the infestation and infested specimens should be immediately removed and treated.
8. Keeping the well maintainable trash management.

Probably cleaning could be considered the most effective strategy of managing the pest. Only organic material attracted by the pest keeps the museums' environment untidy and it might reduce the impact of an infestation.

II. CONTROLLING ABIOTIC FACTORS

Abiotic factors are also responsible for the deterioration of the stuffed natural history collection and it includes deterioration due to climate, the infrastructure of the natural history museum and miss handling specimens.

2.1 Temperature and Relative Humidity

It has been observed that cool conditions are more sustainable for stuffed natural history collections. Cool environment discourages pests from breeding, temperature below 20°C discourages insects' breeding, and temperature above it encourages it (Strang, 1992). During the experiment it has been observed that temperature 25°C to 35°C allows insects more rapidly to complete their cycle. So it may result in insects like cloth moth, beetles completing their life cycles in a year. It might not be possible to lower temperature in public areas but lowering the object's storage temperature could be feasible. If we manage to keep the temperature of storage at 15°C then we might eliminate insects. Still, it is found that

the museum gallery is often warm and temperature also rises due to the large number of visitors that come to visit museums. It also puts humidity at a higher level.

Control of relative humidity is crucial for the suppression of mould and it also discourages the breeding of insects. If the level of relative humidity rises above 70% then the growth of mildew and fungus starts. Good air circulation and consistent control of temperature and relative humidity shall prevent the moulds. It will discourage dermestid beetles from breeding in the museum, from preventing the humidity in museums' environment and dehumidifiers must be installed. The proper ventilation must be kept with it so we can improve the environment in museums and keep the preserved species in a well maintained state.

2.2 Area of Storage and Display

The ideal temperature and relative humidity should be maintained at storage and display facilities and there are various instruments that could be used to maintain suitable environmental conditions in the museum equipment like A.C, dehumidifiers and fans etc. The optimum R.H. ranges between 45% - 55%, and temperature must be at 20 C to 25°C and these environmental conditions are considered suitable to control the pest growth. There are various cost cutting techniques that could be implemented in museums like silica gel to maintain humidity inside the showcase. The new specimens must be kept in isolation before being allowed in the museum. New specimens should be treated to get it free from infestation and they must be sterilized by fumigation.

2.3 Hygiene and Cleanliness in the Museum

Housekeeping of the museum might reduce the danger from insects. Insects can find food source from anywhere in the museum though most of the beetles might prefer a specific food many are there those can eat anything available in their reach, anything discarded by human like nails, hairs and even the shed skin cells may also provide more than adequate food for their survival. So special attention should be paid to the cleanliness many insects love to hide in the dark spots and these insects remain undisturbed for longer times. The population of insects may start from a very small source and it increase to a considerable amount when it happens these insects seek for food source in the museum collection. Garbage is also a big issue and it elates infestation in the museum; garbage is a quiet place for insects and the pests' population increases by double folds. Cockroaches and other insects dwell in the pile of garbage and these insects shall transport bacteria and germs by carrying it on their body.

All rubbish and bins should be recycled and the container should be lined with plastic bags. Plastic bags should be closed with twist tie and these bags kept cleaned on a regular basis. The hygiene should be maintained in the museum's environment. The clean environment in the museum prevents infestation up to larger scale. The container of garbage should be replaced on daily basis. All type of waste inside the museum should be managed and maintained properly.

2.4 Building

Most of the collections are permanently kept in the building which may not have been built for housing natural history collections, so there is a continuous need of building new facilities; It provides excellent opportunities to create high quality and long term storage for natural history collection. In discussing the natural history buildings, these buildings hold the most valuable and vulnerable collection of nature. This material is irreplaceable so the buildings must be techno savvy and built with the synchronization of keeping the natural stuffed specimens saved.

2.5 Drainage and Damp Control

The wetness in museum creates suitable conditions for pests and proper channel of rainwater and the drainage of running water must be managed. Blocked gutter and hindrance in running water make it worst and water accumulated around the vicinity paves the way for wetness and it makes suitable conditions for the breeding of insects. So it is essential that all the areas around the vicinity of the museum should be drained adequate. The drainage system should be equipped with non return valve to stop the backflow of water. Dampness could be treated with the help of the waterproof layer on the walls and floors.

2.6 Fire

Humankind has lost a large chunk of valuable natural collection due to the outbreak of fire so it needs to build fire proof building for this natural reservoir. However, most of the curators and caretakers are aware of the danger from fire but awareness must be spread to tackle this fateful incident. Wilson (1995) suggested that a thorough risk management be carried out by some expert engineers to evaluate risk. It generally suggested the brick and RCC (reinforced concrete cement) are the most suitable material for museum structure. Steel is also used widely in RCC building but it should be born in mind that steel is a good conductor of heat, it may conduct heat throughout building and cause severe fire.

The wood of timber and other flammable materials like wall and floor coverings should be kept minimum as much as possible and the highly combustible material must be avoided. In the older buildings like the Zoology Museum in AMU, Aligarh, there must be double fire extinguisher for a precautionary measure. Smoke impacts specimens and water also has an adverse effect on the stuffed. Smoking is exceedingly difficult to exclude but all the air condition functioning should have self ducting and the self scaling fire door should protect the rooms and ventilators' shafts can act as the chimneys, it should not be opened directly into the areas where the specimens are kept, the danger could be reduced more if we protect it by fireproof doors. It is also essential in the case of fire we should be able to leave the areas as soon as possible. Compartmentation might be considered the best technique to reduce the damage in the museum.

2.7 Detection and Control System for Fire

Smoke detectors help detect the fire so the museum buildings should be equipped with smoke detectors and fire alarms. The fire extinguishers should be available at the time of need CO₂ is considered reliable and a good fire extinguisher in case of the electric fire. Prompt and quick action can avert the fire situation and it can reduce the cost of damage. A fire officer should be appointed for the implementation of an emergency action plan. Almost all fire extinguisher plans are based on water.

2.8 Water Sprinkler Systems

Water sprinkler systems are relatively cheap and efficient. Still, water carries the risk of damaging the specimens and traditionally water systems are avoided in museums. However, computer control system of water sprinklers are employed, the pipes of this system remains dry, and water only allowed when the sensors initiate the alarms. In this way the water is only delivered at required spots.

2.9 Separation of Function

Museum buildings must be constructed with the priority of maintaining a suitable environment for keeping specimens safe. It is also useful if museum buildings have a separate room equipped with control environment. The prime concern of maintaining environment should be to preserve specimens not to comfort humans. The environment must be controlled according to the specimens and sustainability of natural history collection. Rooms which hold collection must be designed in a way that they can maintain the maximum suitable environment.

The collection which comes to the museum must be quarantined for a specific duration. So a room for quarantine would be an advantage for keeping specimens safe and secure from infestation. It is suggested that the stuffed natural history must not be kept close to infested material.

III. AWARENESS PROGRAM AND WORKSHOPS FOR THE MUSEUM STAFF

For the integrated pest prevention awareness spread the words about preventive measures. Awareness programs help the museum staff too. Workshops helps curators and museum staffs keep pace with the new techniques of Museology field these vocational training workshops dispense the information about the seriousness of curative and preservation work. It trains museums staff about it.

3.1 Security

The security must be regarded as one of the prime importance. Protection from physical vandalism is an important and serious issue. It offers great help in protecting the valuable collection from physical forces criminals and fire; an alarm system should be in place. Presence of unauthorized or unsupervised persons in the reserved area for any purpose, might

cause the disastrous effects on natural collection. Any unsupervised person causes an accidental fire can be very much devastating. CCTV cameras should be installed to keep the vigilance inside the building. Threat from damage by vandalism should also be considered with priority.

All the entry points into the building premises should be fitted with secure locks. The windows that might be used as accessibility by illegal vandals should be barred permanently.

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