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Introduction

This is the third in our series of pull-out guides to risks facing museum collections. In this issue we look at 'pests'; their monitoring, effects and prevention.

We are very grateful to the authors and the Natural History Museum for providing us with the first eight of our articles. These are post-prints from a meeting held in December.

Our next issue will look at Theft & Vandalism. Articles are invited relating to experiences of dealing with both. Pieces on 'preventative' measures implemented would be very welcomed, as would case studies of repairs and 'remedies' adopted following an incident.

The Insect Pest Problem at The Natural History Museum, London

Over a 2-year period, 1994-1995, a pest survey was undertaken on a consultancy basis of the Natural History Museum's wide-ranging stores and galleries. The final report highlighted primary areas of concern and made eleven specific recommendations. This summary is published with the permission of the NHM.

Insect pests were found to be endemic within the structure of the museum. Due to the age of the South Kensington buildings and subsequent structural modifications and additions, there are countless ducts, cavities and other dead spaces which harbour organic debris. This debris, which includes dead birds, bird nests and rodents, supports a population of Dermestid beetles. The major pest present is the Guernsey carpet beetle, *Anthrenus sarnicus*. The larvae of this species move freely, becoming established in specimens within the collection. Heaviest concentrations of *Anthrenus sarnicus* were found in mammals and reptiles in Zoology Storeroom 1 and in the Entomology building; this species was also a notable pest on the dried Crustacea, mammal skins and skeletal material. The biscuit beetle, *Stegobium paniceum*, occurred in parts of the Herbarium; the brown carpet beetle, *Attagenus smirnovi* and the American wasp beetle, *Reesa vespulae* occurred in some of the galleries and the Entomology building. Damage to objects in the galleries was very limited because of widespread use of DDVP (2,2-dichlorovinyl dimethyl phosphate) slow release strips. At the time of the survey many gallery areas were very dirty. This accumulated dirt was supporting populations of *Anthrenus sarnicus*, *Attagenus smirnovi* and the clothes moth *Tineola bisselliella*. The design of many displays did not seem to provide for efficient routine cleaning.

Of the outstations, the Wandsworth store has the facility to maintain temperatures below 16°C and at the time of the survey there was no evidence of active pests. But there is great potential for future problems if temperatures cannot be kept low. At Tring, old parts of the building showed signs of infestation. The use of DDVP slow release strips in the bird cabinets since 1975 has prevented any damage to specimens.

Both South Kensington and Tring have a Dermestarium for cleaning skeletal material. The one at Tring was well managed whereas the other, at the time of the survey, was disused and acting as a major breeding source of *Anthrenus sarnicus*.

Recommendations for pest prevention and control

The Museum has potentially more material at risk from infestation than many other museums. Staff vigilance and effort has helped to maintain high standards in some areas. This and the use of DDVP strips has prevented serious damage to collections. However, instigation of a museum-wide policy of pest prevention is essential to prevent pests from reservoirs within the museum from spreading into other parts of the collection and causing problems. Such a policy is evolving within the museum and considerable progress has been made since 1994, but to continue this evolution towards a successful strategy, certain key points must continue to be addressed. Although specific to the NHM, these points could form the basis of a strategy in many museums.

1. Continue to increase staff awareness and discipline by education and training in pest management by means of seminars and information exchange. There is also a need to develop this training as part of a museum-wide

pest management strategy, as pest problems are not specific to individual departments.

2. The level of routine cleaning in galleries, working and storage areas must be consistent and effective. Financial pressures that dictate team cleaning rather than dedicated areas for specific cleaners might lead to reduced standards. The concept of "deep cleaning" must be taken on board by the Museum to tackle difficult areas in galleries and stores. Experience in other museums has shown that this can be very effective when it is properly organised and there is adequate equipment to do the job.

3. When there are provisions for controlling the environment, the temperature should be maintained below 18° C, or as low as possible, to prevent insects breeding.

4. The pest monitoring programme has revealed pest insect activity in unexpected areas. Monitoring should be widespread and regular with records co-ordinated through the pest control sub-group.

5. Although chemical treatments should be seen as only one aspect of an integrated approach, localised treatments by trained staff using Drione desiccant dust are valuable for control of insects in dead spaces. The need for occasional remedial treatments with other residual insecticides such as Empire 20 must be evaluated on a case-by-case basis and may require the employment of an outside contractor.

6. The use of DDVP slow release strips is a crucial component of the current pest control programme. The use of such strips in gallery cases and storage areas has prevented what would have otherwise been serious damage to collections both on display and in store. The use of DDVP strips should continue in closed areas but care must be taken regarding the safe storage and disposal of strips.

7. In the current climate of pesticide registration, it is possible that the approval and use of DDVP strips may be restricted in future years. As these strips are such an important component in the Museum's policy, serious consideration must be given to alternative methods. There is no direct chemical replacement for DDVP and therefore any loss of this product will have to be met with a new approach involving increased inspection and use of methods such as freezing, heat or gaseous nitrogen.

8. All incoming material must either be treated by freezing at -30° C or examined in a quarantine area.

9. Investment in new storage furniture by some departments has definitely decreased the risk to specimens. Specifications for new furniture should include adequate protection of specimens by pest exclusion.

10. Any proposals for new buildings should include provision for pest exclusion and prevention at the design stage. Any alterations within the existing building should take account of the overriding need to separate collection storage, working and library areas.

11. Museum collection policy (through Collections Impact Statements) should take account of future care of collections, and adequate resources must be available to process new material. Risk assessment by means of condition surveys should be used to determine priorities. Careful consideration should be given to a long term programme of "disposal', and re-housing of currently exposed and vulnerable material.

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Since the Pinneger Consultancy - Progress and problems

Pest control in The Natural History Museum's life sciences departments has traditionally relied on insecticides - Naphthalene (discontinued since 1989) in Entomology, Lauryl chloropentaphenate (discontinued since 1992) for flowering plants, and Dichlorvos still in use in Zoology. Concerns regarding Health & Safety have necessitated re-assessment of such routine blanket treatments, and in turn focussed attention on the need for 'Integrated Pest Management', an approach that requires an appraisal of each aspect of museum life as it impinges on pest control. In The Natural History Museum, the initial impetus for this [for us] novel approach was provided by the 'Pinniger Consultancy - 1994-5'.

As noted above, the consultancy resulted in eleven principal recommendations. In some areas, there has been notable progress - formal course training, a widespread monitoring programme and consequently more targeted use of insecticides, the introduction of quarantine procedures, investment in new