

BIODIVERSITY IN STOREROOMS

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ABSTRACT

Zoology collections preserved in museums worldwide contain a broad variety of materials.

Designing and adapting storerooms for these collections is no easy task and is more difficult when reusing existing buildings. However, suitable environmental conditions can be created in old buildings to preserve and improve storerooms where all types of collections are conserved, with packaging adapted to the different types of material.

INTRODUCTION

The Barcelona Natural Science Museum (MCNB) houses a natural history collection in a modernist building, constructed in 1888 as the Cafe-Restaurant for the International Exhibition held at Ciutadella Park, in Barcelona.

After several years, the building became the Biology Museum and since then has held the zoological collections.

With the growth of the collection in the last 30 years, it has been necessary to carry out several readjustments to streamline the area. However in some storerooms, especially that which houses the large animals, there was no more space available. The Museum had to reconsider the use of spaces and locations and look for other buildings where the collections could be housed.

Such reconsideration has both advantages and disadvantages. Some examples are explained below, all of them related to the recent history of storage of the chordates (mostly vertebrates) collection at the MCNB. (Figure 1)

STOREROOMS: WHY? HOW?

In Natural Science Museums, the proportion of specimens displayed in relation to the total number of specimens held in the collections is very low, often below 1%. This means a major effort needs to be made in preserving material held in reserve.

Zoological collections consist of organic and other types of material, lifeless or not, used for preparation throughout the museum's history. The zoological collections of chordates are classified as: mounted animals (fur), study skins (fur), disarticulated skeletons, mounted skeletons, tissue samples, whole animals preserved in alcohol. This biological material is (bio)diverse and its storage requires different solutions and adaptations. (Figure 2 – 3)

WHY IS SO MUCH MATERIAL STORED?

Firstly, it is essential to preserve collections in good condition to enable their use for cultural and scientific purposes, and of course to guarantee they are successfully passed on to subsequent generations. The scientific and cultural use of the collections mainly involves consultations carried out by scientists from different disciplines (zoology, paleontology, medicine, anthropology). Other specimens are used in permanent and temporary exhibitions in the museum itself and in temporary exhibits in other museums. Finally, many specimens are used by museum education departments and other natural science centers. Another common method used for studying scientific material is temporary loaning to research centers.

HOW SHOULD MATERIAL BE STORED?

The stores should hold the material in an organized fashion. Collection size can vary greatly, from a

few thousand specimens. Thus, creating a suitable storage environment is one of the most effective ways to prevent deterioration and damage. This can be done at the macro-level, i.e. covering an entire building or collections warehouse, or at the micro-level (a display case, furniture unit or box).

Michalski (1990, 1994) defined some agents of deterioration that harm long-term preservation. Physical forces, or possible falls, deformation of material due to overcrowding, and so on, the actions of thieves and vandals, dissociation or loss on location of items, fire, water, pests, pollutants, temperature and inappropriate relative humidity. The presence of agents of deterioration or incorrect conservation factor values, pose risks that must be minimized whenever storage is planned. Here are some possible solutions: The weight of the material and the weight of various containers such as compact cabinets and similar should always be taken into account. The material the containers are made of is also important (anodized aluminum, galvanized steel, etc.). These

containers could be part of the furniture (fixed or movable) depending upon the decisions taken by the technical team in charge of the collections. Safety systems to prevent damage from floods and fire should be planned or installed. Pests such as insects should be avoided by using an insecticide system, with temperature control and good insulation.

Suitable environmental conditions in accordance with appropriate conservation standards are as follows: the harmful effects of light should be avoided, by installing systems to control relative humidity and temperature within those limits set by the standards. Possibilities range from continuous air conditioning systems, systems to correct deviations in relative humidity (humidifiers, dehumidifiers) or temperature (air conditioning) in order to isolate the material in individual containers, within closed cabinets and stores isolated from the elements, allowing environmental control and overall environmental stability of the material. Moreover, it is also important to provide access to stored materials in order to attend to questions,

loans, carry out equipment checks and preventive maintenance tasks, and allow people to work safely and effectively with the collections. In addition, installing security systems to prevent access by unauthorized persons and establishing strict protocols to prevent accidental loss of specimens are measures that help ensure the integrity of the collections over time.

STARTING FROM SCRATCH

If the Museum's collections have the option to stay or move to areas specifically designed for storing material, it is imperative to consider the following issues:

Where?

The main dilemma is whether the collections will be housed in the same building or near the centre of public activity. Firstly we need to bear in mind that it is necessary to provide access for people and materials of a certain size and weight. Therefore, it is much better not to place stores on high floors without guaranteed accessibility. Meanwhile,

underground levels that are often accompanied by the risk of flooding and high relative humidity should be avoided unless these factors can be solved with good building insulation and / or good air conditioning.

What functions are necessary?

It is essential to know beforehand which operations need to be carried out involving the collections, such as preventive conservation work, scientific consultation, registration, quarantine, whether the collections will be visited by the public or not, etc.

Other questions: What form? What will we save? How do we arrange everything?

All collections can be categorized in order to calculate the space needed for each of them, taking into account their current surface area and forecast growth.

A spreadsheet can help in the computation and possible groupings of collections. Another system that can be used is measuring the area occupied by existing storage units (drawers, shelves,

trays) and then calculating the surface area needed for each group, along with predicted growth.

It is important that the collections technical team is directly involved in the planning of the space needed for collections, and that they participate in deciding the features of each space (accessibility, sealing, security services, etc). Communication between the Museum's technical team, architects and the construction company is absolutely vital. There are many options and styles to choose from when planning to build a sound storage space for collections. Each museum will decide, depending on its policy and its internal conditions. Nevertheless, some advice must be heeded, such as the possibility of dividing up spaces for each collection. Since each type of collection requires specific conditions, this will also help optimize the space and resources to be used.

Furthermore, using the enclosure walls must be avoided, since there may be large temperature differences between interior and exterior, as well as condensation and leaks. In addition, a

good emergency plan should be prepared in case of accidents or incidents. Any furniture used should also provide for the needs of the stored collections in terms of use, weight and fragility. In order to preserve specimens, only suitable materials should be used, such as polyethylene, cotton wool, paper and board free of acid-resistant inks, among others.

NOT STARTING FROM SCRATCH

Many museums around the world are located in buildings which were built for other purposes. In recent decades some of the world's great museums have constructed new buildings to house museums or parts of them. Some examples are the Natural History Museum in Berlin, Naturalis in Leiden, the British Natural History Museum in London, and so on.

The zoological collection of the Natural Science Museum in Barcelona is located in a building designed to house a late nineteenth-century Cafe-Restaurant. It is a building with many small and medium size storerooms. The chordates

collection is the smallest in numerical terms but the largest in terms of volume. Distributing specimens throughout the building has led to over 15 storage areas spread over five floors. The dimensions of the warehouse space, proximity to the lift, the space available for consultation and isolation from the outside have been key factors in distributing this collection at the Castell dels Tres Dragons. The chordates collection is distributed throughout all floors. Thus, in the spaces closest to the main gates (spaces for work and consultation), in the basement, collections of a greater weight and size were installed, arranged in compact cabinets. These are collections of whole animals in alcohol, tissue collections and the osteology collection of large mammals. (Figure 4 – 5 - 6)

The bird collection (stuffed and skeletons) and the collection of small mammals (stuffed and skeletons), arranged on shelves, are distributed on higher floors here. (Figure 7 – 8)

The above-mentioned material is light and, despite being relatively distant

from the workspace, it can be transported easily.

Since 2005 the Museum has been carrying out studies on the environmental conditions of all its storage areas. Data collected continuously include temperature and relative humidity. These analyses have allowed us to discuss the continuation of some stores, installing corrective measures for environmental conditions, such as the air conditioning in a storage area housing fur, because the temperature there in summer was higher than that recommended for correct preservation of the specimens. The results of the analyses of environmental conditions have made it possible to program and implement changes in collections between storage areas. Recently, we moved several groups of small stuffed mammals and also a collection of birds' wings to a storage area with better insulation and climate control.

The building is like a labyrinth and, among other factors, several of its storage areas have very high ceilings, and this causes difficulties when trying to achieve good insulation conditions. Advice from

different experts together with our own experience has led to the implementation of a conservation strategy. Thus, in those places where environmental conditions cannot yet be controlled, thorough tasks of preventive conservation are performed. The lack of space for large animals forced the museum to search for external warehouse storage. This is storage space in a company with 24 h surveillance, with individual storage spaces that have restricted access and a loading dock next door. Environmental conditions were measured beforehand and were close to recommended relative humidity and temperature standards. Before specimens are taken to the new location, their documentation needs to be completed (pictures and measurements of each specimen). Moreover, they must be organized and arranged once they arrive at the new warehouse, and regular checks need to be established to ensure the conservation of this distant collection. (Figure 9)

It is true to say that increased storage space allows for growth of the collections. However, external storage

spaces have introduced difficulties into collection management at the level of consultations, loans, reviews of preventive conservation, etc. The MCNB is currently undergoing a process of change that will imply over the course of several years an important re-arrangement of zoological and geological collections. This is an opportunity to improve storage conditions for materials in reserve. Experience from previous years should help in making appropriate improvements in scientific collections. There are opportunities that should not be missed.

CONCLUSIONS

One of the goals of the collections technical team is to have modern storerooms where neatly arranged material can be housed in sound environmental conditions. In addition, it is important that they can work easily in appropriate facilities. These important objectives are only reached in some museums, while others still have a long way to go. Meanwhile, storerooms in old buildings must be adapted in order to

house collections material, and must be suitable for properly conserving collections.

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Link to the video shown during the presentation at the workshop:

Seedmagazine "Save by Science" Justine Cooper

http://seedmagazine.com/Saved_By_Science/sbs_slideshow.html

FIGURES



Figure 1. "Castell dels Tres Dragons" zooloogy building at the Barcelona Natural Science Museum.



Figure 2. Mounted mammals and mounted skeletons.



Figure 3. Disarticulated bird skeleton.



F4



F5

Figure 4. Storage of whole animals in alcohol.

Figure 5. Tissue collection storage, conserved in alcohol.



F6



F7

Figure 6. Large mammal skeletons in the storeroom.

Figure 7. Stuffed birds in a corridor



Figure 8. Stored bird skeletons



Figure 9. External storage space housing large animals