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horizontally in 'dry' card well slides. The curation of scanning electron microscope stubs is discussed by Julia Golden (1989, 17-26).

Are you aware of any active deterioration in your slide collection? It is so easy to think of slides as being inert and safe as they cannot be eaten by *Anthrenus*. Some mountants were never meant to be permanent preservative media. So beware, store your collection in stable conditions and monitor them for deterioration.

References:

Brown, P.A., 1997. A review of techniques used in the preparation, curation and conservation of microscope slides at the Natural History Museum. *The Biology Curator* 10 (special Supplement) pp. 33.

Golden, Julia, 1989. Golden oldies curating SEM specimens. *Collections Forum* 5(1) 17-26.

*Paul A. Brown
The Natural History Museum*

The Perfect Relationship? Balmforth Cabinets and The Natural History Museum Entomologist.

This is a story about the importance of a good working relationship between the customer and the manufacturer, the customer being the Natural History Museum in South Kensington and the Manufacturer being Balmforth Engineering Ltd. of Bedfordshire.

The story starts with old wooden mahogany Hill units each filled with 20 well manufactured and original wooden and glass topped drawers. Our problem was that the Hill units are often warped and split so were not sealed against environmental variation and the predation of insect munching *Anthrenus*, *Attagenus* and *Rheesa* beetle species. We have cleared many of these carcasses of their drawers and then sold off the carcasses. Initially Mike Fitton visited the Smithsonian Institute in 1990 and was impressed by their insect storage system and the efficient and cheap metal cabinets they have. He was keen to improve and standardise our storage systems and to try and stop the endemic local pest problems inherent in the old Hill cabinets and open accessions racking and allow for planned collection expansion. We used Ron McKinley's specifications as a basis for our own requirements.

Other companies have supplied us with metal cabinets. Spirit collections have been stored in metal spirit cupboards such as this but we are now rehousing such collections

Spirit cabinets made by Dexion Ltd. of Brierley Hill, West Midlands, which now hold the Caddis fly and lacewing spirit collection. Abbeycross Fabrications made carcasses for the compactor units which have been used to store the glass topped and bottomed Rothschild lepidoptera collection drawers. Here we have a birdwing butterfly seen from below so that the specimen need not be removed from the drawer to view its underside. Each cabinet cost £195 in 1994.

The compactor system itself was manufactured for us by Britannia Storage systems of Colchester, which cost us £139,044. On an older compactor base, the buffer bars were sited low on the frame which caused a trip hazard. The new specification avoids this by siting the buffer bars high up on the cabinet tops.

We needed new steel cabinets to hold the Hill unit drawers. Three companies were approached who made prototypes for us and we took the best features and worked up the final specification from them. These companies kindly allowed us the freedom to do this. Balmforth won the contract and we liaised closely to improve the specifications and so we jointly developed the design. We do not hold the design copyright but we do get a cheaper deal on the cabinets. They prove to be similar to secure cabinets used by the Ministry of Defence for their secure telephone exchanges. The NHM Coleoptera collection now has 569 cabinets in six double-backed rows and two cabinets high. We are expecting a further 31 cabinets to arrive on this floor. *for this collection.*

Other cabinets have been built to hold the different dimensioned accession drawers that have been, and still are, in open racking. In 1996 a further 36 cabinets were ordered to rehouse our Mosquito collection of which 16 have been funded by Zeneka Agrochemicals to the tune of £8,990. Also a collection of Acridid grasshoppers from the Natural Resources Institute at Chatham came with £30,000 pounds to cover cost of 36 new cabinets.

The cabinets sit on square metal plinths which in turn sit onto bolts which can be adjusted to level the unit. The units do flex if the floor is not flat so the adjustable legs keep the carcasses square thus ensuring the doors close and locks fit perfectly. These units are also designed with magnetic face panels which can be easily removed to gain access for cleaning.

rest
The Hill drawers run on wide metal runners edged with Teflon to ensure smooth running. The runner flanges are wide so as to take narrower drawer sizes if required. Initially these Teflon edges were not glued and were prone to fall off the metal flanges, so now they are 'superglued'. The doors are edged with a foam buffer with a fifty-year life expectancy so the foam needs to be accessible for replacement. Two strips also run along the back panel to cushion drawers as they are replaced in the carcass. The foam used is EPDM ethylene prodimethylene which is resilient to squashing.

Closure bolts on the top and bottom edges of a door pull the door toward the carcass when turned shut to improve the seal. These cabinets are not completely airtight as this would make them too expensive but they are

considered *Anthrenus* proof. Dead spaces in the carcasses have access holes with rubber bungs so that insecticides such as Constrain and Drione can be inserted. The handles chosen are based on a car door handle, which was decided upon after much discussion. Some say that these handles are a hazard as they catch passing staff. Older similar cabinets have no handles, being opened by key only which run the risk of keys braking in locks. The label holders are made of acrylic and are prone to snap if abused.

Problems with the specifications were identified and quickly rectified and the design improved for future orders. We did not pay up until the cabinets were perfect. The big order of £¼ million and the knowledge of replacing all our Hill units and open racking ensures good customer care. In Edinburgh the same cabinets can be seen at the Royal Museum Storage and Research facility at West Granton and 12 drawer cabinets can be seen at the National Museum, Cardiff who also have joined us thus increasing the order and reducing the price for each unit. At York Museum, Paul Ensom has used these cabinets to store minerals. Using computerised jigs, the dimensions can be changed easily with little change in cost. You can order these cabinets from Balmforth or from Preservation Equipment.

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