NSCG Newsletter

Title: Microscope Slide Collection Storage, the horizontal or the vertical? How should slide collections be housed?

Author(s): Brown, P. A.

Source: Brown, P. A. (1998). Microscope Slide Collection Storage, the horizontal or the vertical? How should slide collections be housed?. *NSCG Newsletter*, *Issue 9*, 43 - 46.

URL: http://www.natsca.org/article/710

Caveats and tips

- Check floor loadings
- Check sizes of doorways
- Check the room dimensions are correct
- Use mezzanines rather than high shelves, if possible, since access will be safer.
- Existing wooden drawers can be transferred to new storage.
- Shallow plastic Eurocrates cost about £12 each, and can slot into a shelving system. They could provide similar storage conditions to metal drawers which cost about £90 each.
- Existing cabinets can be mounted on mobile bases to convert them to compactor storage
- Compactor systems keep dust and light out without doors when they are closed. Cupboard doors add 30% to the cost of each cabinet .

Conclusions

The method described is only a first step, a feasibility stage in planning storage, but gives comparable results with cutting cupboards out of graph paper and shuffling them on floor plans, and saves an awful lot of time.

Vivien Chapman
Head of Organics Conservation
NMGM

Microscope Slide Collection Storage, the horizontal or the vertical?
How should slide collections be housed?

This is a write up of the lecture I gave at our meeting at Liverpool this year. It has elements of previous information given at Ipswich AGM 1996, printed in the Biology Curator Issue 10 special supplement and presented as a poster at the Cambridge SPNHS meeting in 1997. But I make no apology for being motivated by a mission to evangelise and spread the word about microscope slide collection care and conservation.

Do you have a collection of microscope slides in a corner of your stores that quietly gathers dust? Are you aware that they may not be permanent? Do you consider the specimens and their mounts to be as seemingly inert as the glass of the slides? Of course, glass must not be considered to be permanent in the long-term scheme of things either. If the answer to this question is yes then do I have news for you! I used to think that the slides I made would last forever but I no longer take such for granted.

I look after a collection of about half a million microscope slides. The first problem with storing a collection of this size is its weight! My slides are on the top floor of the Entomology building at the Natural History Museum in South Kensington so if they decided to break through the floors, they would take all below to destruction. I have calculated that the floor has to cope with 0.3 metric tonnes per square metre, or circa 4 kiloneutons per square metre. Most normal house floors have a weight loading of 5 kiloneutons but in my case the 17 kiloneutons quoted put my mind at rest. Our floors are built to take the weight of a tank.

With some disquiet other colleagues, and I noticed that some aphid greenfly slides were deteriorating. Shrinkage of the mountant due to water or solvent loss distorts and destroys the specimen and allows air in which may oxidise both mountant and specimen. Crystallisation of a gumchloral mountant occurs when chloral hydrate crystals form after water loss. Such crystallisation can be reversed by removing the protective ring and rehydrating the slide in a warm moist environment, although the crystals may

have disrupted the specimen already. Another form of gum chloral deterioration is blackening which can erode the specimen away. This may be due to a surfeit of phenol in the process and be precipitated by exposure to light as photographers use phenol as a blackening agent. Remounting such slides are a major raison d'être for me at the NHM.

Such problems arise from the unstable chemistry of the mounting medium but some deterioration can be alleviated by the four lines of defense against environmental variation. Controlling the ambient conditions, firstly inside the store and secondly inside the cabinet is important; and then thirdly the protection offered by plastic or paper slide envelopes (used in vertical storage) and finally by sealant rings of a suitably inert substance. Old plastic envelopes were manufactured out of plasticised Polyvinyl chloride which became brittle and yellow and possibly emitted hydrochloric acid. With the cooperation of Cliff Gothorpe of Preservation Equipment Ltd., we have developed a thick archival quality polyester envelope for our needs that can be bought from this company.

The final line of defense, the sealant ring painted round the coverslip reduces the drying out of mountants especially in dry environments. When the ring fails in a dry environment, evaporation, shrinkage, discolouration and cracking can occur. When relative humidity and temperature are too high, sweating can occur making a sticky slide and which promotes fungal attack of the mountant especially in water based mountants. So the main point of this talk is that microscope slides need a controlled environment as much as any other group of specimens. Environmental conditions should be as stable as possible and this helps if ones storage furniture is sealed as much as possible.

In the Natural History Museum generally the thinner and more solid the slide mounts the more likely they will be stored vertically. The thicker or more liquid the mounts, the more likely they will creep under the influence of gravity when stored vertically. Some say that all mountants will creep with time, as does the glass itself such as in the glass panels of the giraffe case at Ipswich Museum.
A draw back with horizontal storage is that fewer slides can be stored in the same sized cabinet than if they were vertical. Hill units with horizontal

slide drawers hold 5,250 slides. Hill units with vertical slide drawers can hold 10,000 slides when full. Before storing slides vertically they must be baked hard in an oven at 30-40 degrees centigrade to avoid the mountant creeping. Often have the inexperienced placed wet slides vertically to find after a few weeks, a gooey mess of mountant and specimen on the floor of the drawer and sticking neighbouring slides together.

Liquid mounts should never be stored vertically as the seal will be much more prone to damage by jostling with other slides and the specimens will also sink to the lower edge and be damaged against each other or against the edge of the mount. Likewise dry mounts in wood or plastic well slides should be stored horizontally.

Other less satisfactory storage systems are storage in loose slide boxes each holding 100 slides in racks with can fall off shelving and which take up far more space than drawers do. Horizontal storage in wooden or cardboard trays in boxes also takes up much more space. The NHM Copepod collection is stored on cardboard trays in cardboard boxes within wooden cabinets. The method by which a collection has been stored has often been dictated by the method of storage of the major donated collection of that group of organisms which formed the nucleus of the Natural History Museum's main collection.

Vertically stored collections in drawers can be more easily added to than horizontally stored slides. They can be arranged taxonomically with closely related families, genera and species together with associated indices, as with many other dry or spirit collections. They can also be arranged alphabetically, and because they are thin and card-like with some protection afforded by the glass (and envelopes), they can be their own index. This forms a database of genera, species, geographic distribution, host species data, collection dates and different sexual forms etc. without the need for a separate card index. Also vertical slide collections can have short bottles of specimens in spirit, pinned dry specimens in unit trays and dried host plant samples all in the same drawer.

Specimens on stubs used for Electron Microscopy can be added to a slide collection as in the NHM's Copepod collection where they are housed

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 Brittania 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.