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Title: Guesstimating Storage Space

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Guesstimating Storage Space

In the new world of lottery bids and option appraisals people seem to want expert opinions at the drop of a hat or by the end of the week. I've been forced to develop some rules of thumb for answering questions such as "How much space would we need to store that lot properly?", "Would it fit into this building," and "Would it fit into that building if we decided to devote this gallery here to storage on display?".

Industrial space management techniques are not very helpful when it comes to planning for museum collections, except perhaps archive collections, since they assume large numbers of identical sized objects. Sue Walston and Brian Bertram wrote "Estimating Space for the Storage of Ethnographic Collections" in 1992 and it is excellent if you have a small enough collection or sufficient time to measure each object individually. The guidelines below work for assessing large collections, where most of the objects are relatively small, the sort one person can lift unaided. Heavy and large objects, requiring mechanical handling, are more difficult to generalise about.

Calculating the volume

The first step is to calculate how much space the collections need, in cubic metres. Start by measuring all filled storage, in other words not the aisle ways or empty shelves, and adjust the figures where the objects are crowded or stacked in such a way that access is unsafe. Add in growth figures, calculated from previous records, or curatorial expectations, and adjust them for the expected life of the new store. With mixed collections the total volume may be subdivided by environmental requirements.

At the National Museums and Galleries on Merseyside (NMGM) a survey was carried out on the re-storage of the Humanities collection. We used survey forms for each readily identifiable group of objects. Notes were made on the suitability of the existing storage, packing needed for transport, ideal storage, curatorial access required, and potential for storage on display, as well as the volumes and environmental requirements. All this information was then put on a database. Tackled this way 100,000 objects

were represented by less than 300 survey forms. We calculated that the main collections we have assessed in this way needed twice as much space now, 3 times as much in 25 years time.

Calculating the floor area needed for storage

Having arrived at a figure for the volume of storage required there are three main options; conventional fixed racking and shelving, compactor or mobile systems, and low density "storage on display" arrangements.

In compactor systems bays of shelving and cupboards are mounted on long trolleys which run on rails on the floor. When closed the system forms a solid block. For access the trolleys are rolled apart to create an aisle way where needed. "Storage on display" usually seems to end up looking like a very crowded museum display, with less labels than normal. Some of the objects will be on permanent view, behind glass doors, or case tops; others may be in drawers below a desk case, with Perspex or glass covers on each drawer for security. Public access implies that there will be more people in the store, so the aisles will need to be wider than in a "Museum Staff Only" store.

For the safety of both the objects and the staff it seems desirable to avoid the use of ladders as far as possible. It would therefore make sense to limit the maximum height of storage units to around 2 metres when most of the objects in the collections can be lifted by hand.

The formulas below give an indication of the floor space needed for each type of storage:

- **Fixed storage**: One square metre of floor space will accommodate one cubic metre of storage. *Diagram 1* shows this represented schematically. *Diagram 2* shows how it might look in real life.
- **Compactor storage**: One square metre of floor space will accommodate two cubic metres of storage. *Diagrams 3 & 4*
- **Storage on display**: One square metre of floor space will accommodate 0.5 cubic metres of storage. *Diagram 5 & 6*

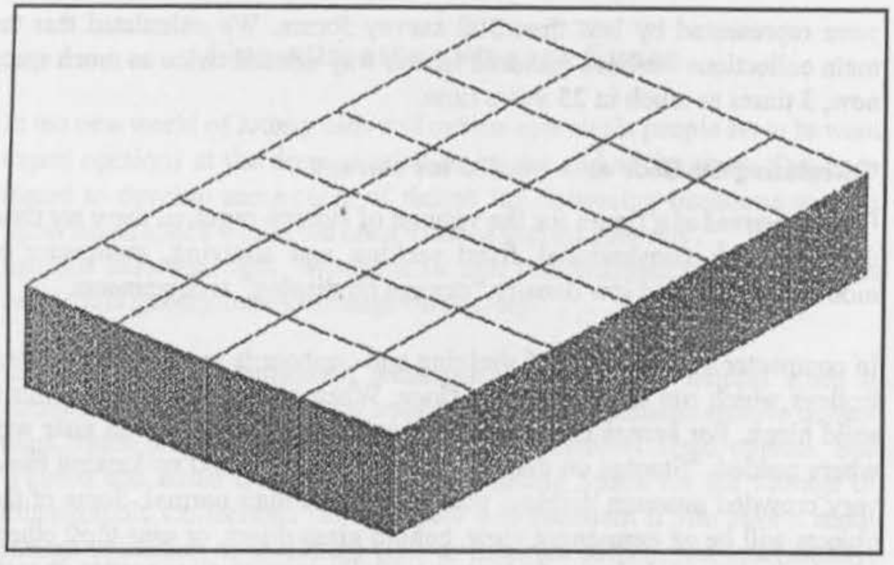

Diagram 1

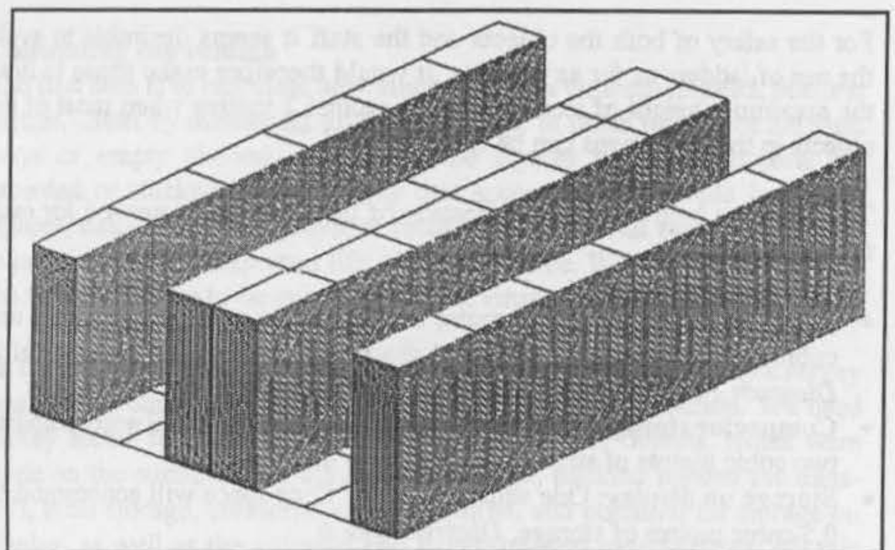

Diagram 2

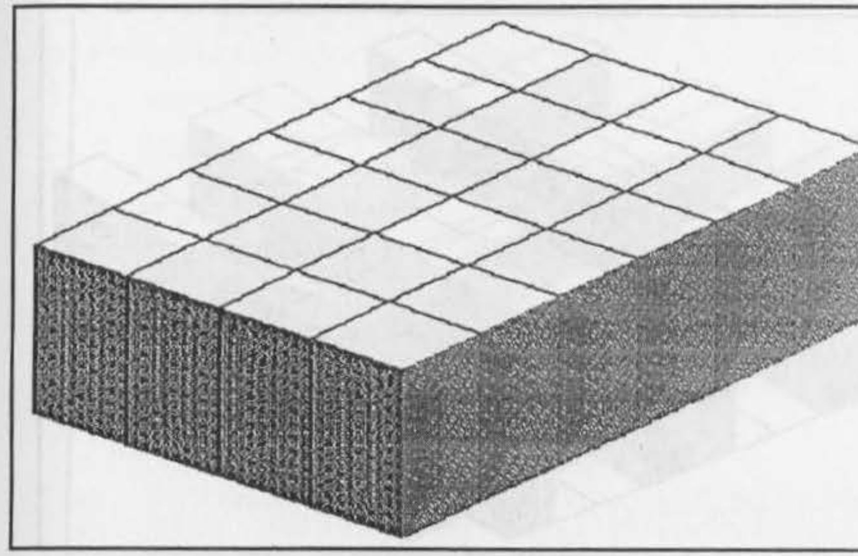

Diagram 3

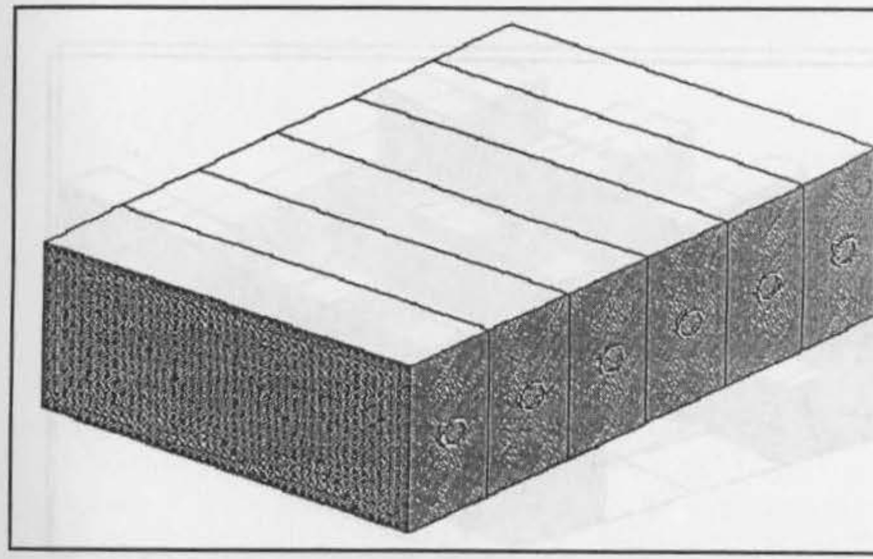

Diagram 4

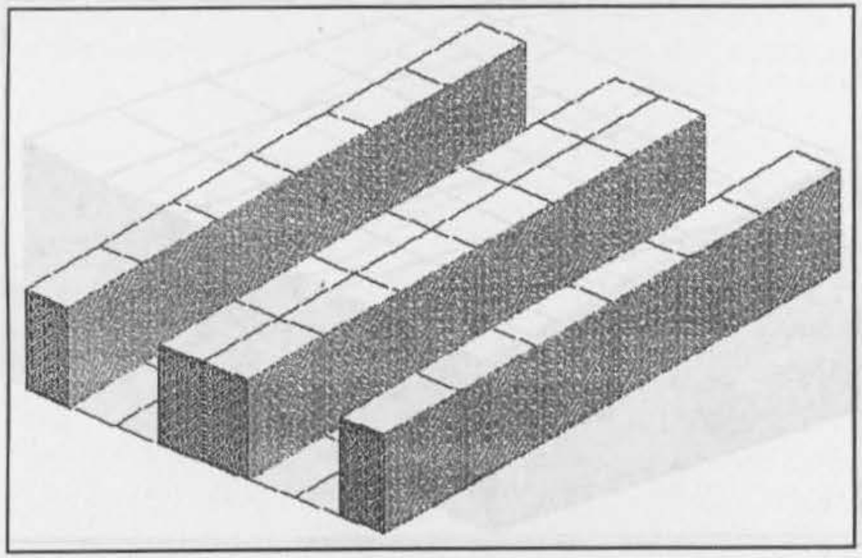

Diagram 5

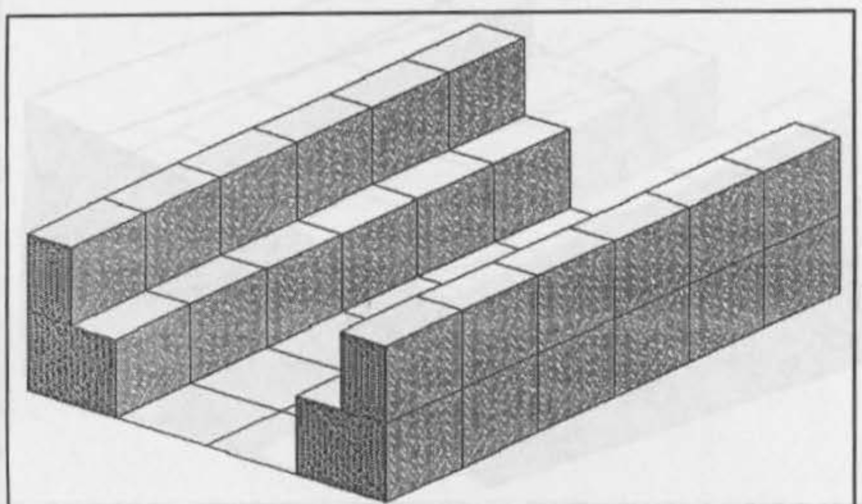

Diagram 6

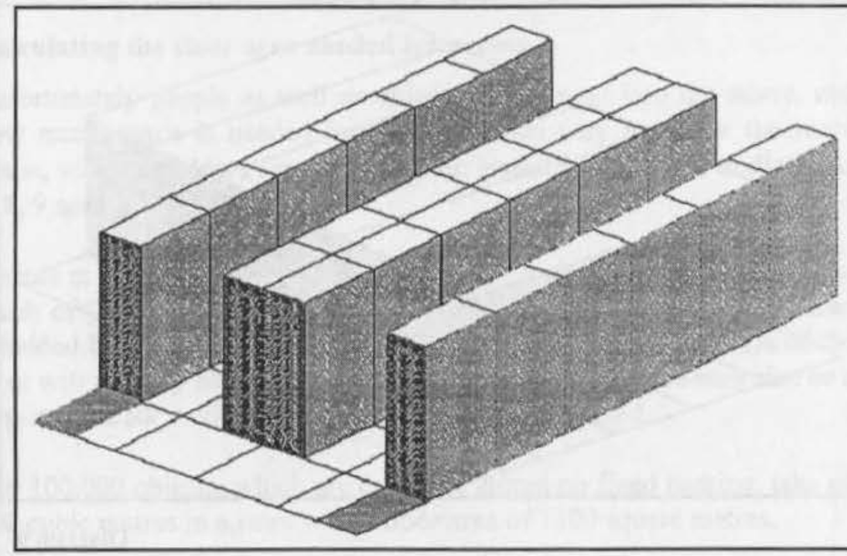

Diagram 7

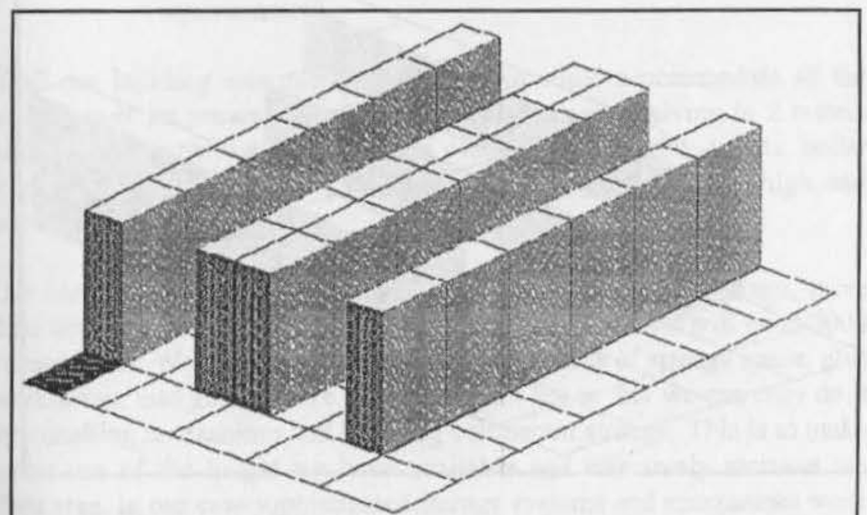

Diagram 8

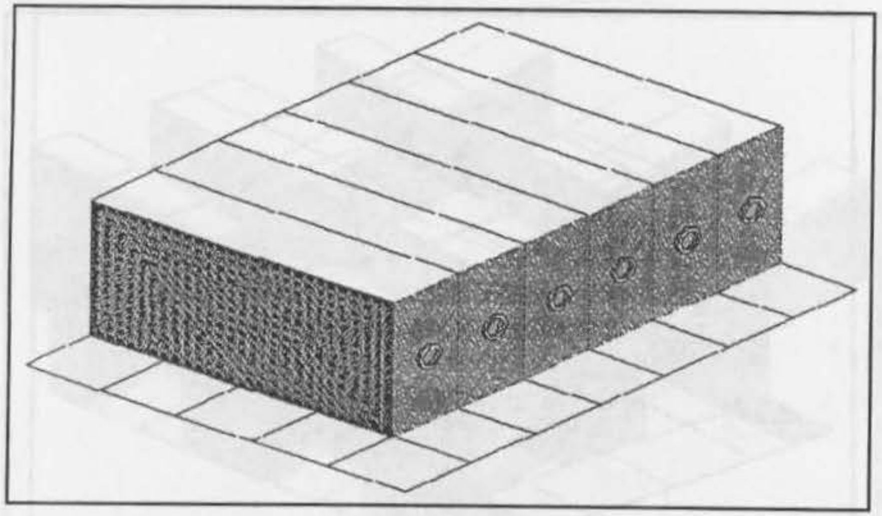

Diagram 9

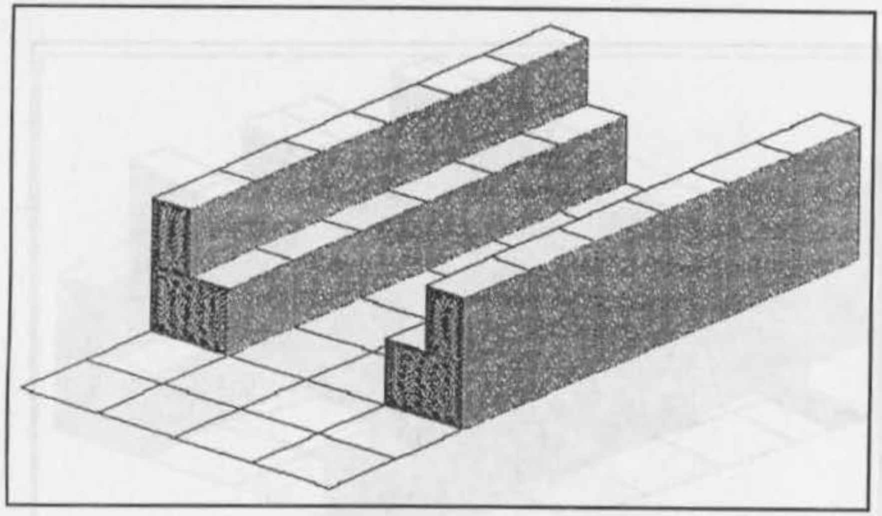

Diagram 10

Calculating the floor area needed for access

Unfortunately people as well as objects have to get into the stores, and how much space is needed for them depends very much on the room shape, where the doors are, and what the layout is, as shown in diagrams 7, 8, 9 and 10.

Deduct at least 20%, better 30% of the floor area before calculating how much of your collection will fit in. (This corresponds with guidelines provided by storage firms that with fixed storage only 30 to 40% of the floor will actually be occupied by the shelving units.) There may also be a requirement for workspace, desks, etc., to be considered.

Our 100,000 objects, which are currently stored on fixed racking, take up 900 cubic metres in a store with a floor area of 1300 square metres.

- Floor area available for storage = total floor area less 30 % access space
- Thus for our store floor area for storage = 1300 - 30% = 910 square metres.

If all our building was used for storage we could accommodate all the collection in its present overcrowded conditions on shelving to 2 metres high. However parts of the store are used for staff rooms, toilets, boiler rooms and work areas, so our shelving is actually 3 to 3.5 metres high, and our aisles are rather narrow.

Our survey showed that we needed 1900 cubic metres of storage, more than double what we have now, and in 20 years time we will need 3000 cubic metres. We are going to fit 1900 cubic metres of storage space, plus work areas, into 1000 square metres of floor space, but we can only do it by installing mezzanines and by using compactor storage. This is to make better use of the height we have available and effectively increase the floor area. In our case sophisticated storage systems and mezzanines work out cheaper than buying additional space.

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
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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