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Introduction

This is the second part in our pull-out guide to risks facing museum collections. In this issue we look at Flood. The following 3 articles describe different causes of flood. All these incidents occurred recently and we are grateful for the contributors putting 'pen to paper' whilst still most likely mopping up!

Whilst there are various preventative measures one can take, and a disaster plan in place, often the flood itself will trigger different measures for the emergent removal and protection of the specimens. Sally Ann Yates offers some useful advice on effective salvage methods.

The next issue will deal with 'Pests'. Articles are invited on experience of breakouts, control methods and conservation of damaged specimens. Please also note the 2 events at The NHM and The Conservation Centre featured on page 5 of this newsletter.

Donna Hughes



Burst pipe at Hampshire County Council Museums Service, 6th January 1997

A Happy New Year, especially to our site manager at Chilcomb House in the form of a burst pipe in the loo in the Old House store, situated near the front entrance. Above the burst is a small storeroom with paintings, some prints, drawings, ephemera and books. Water flooded behind the old-fashioned fuse box but did not seep into it. Both water supply and power were turned off before anyone entered the building! Water also flowed into the corridor and

seeped through into stores, through carpets and under doors. Luck was on our side, however, a further one hour of incoming water would have started to affect the nearby main store for prints and ephemera.

As usual, prompt action saved nearly all the material - emergency lighting was set up using an on-site petrol generator since no mains electricity or lights could be used. Puddles were vacuumed away and staff quickly removed artefacts to safe and dry stores. Bubble-wrapped paintings were immediately unwrapped to remove trapped water. These were slightly moist and could simply be blotted dry - a few more hours and they

would have required extensive drying and conservation. The affected area itself and moist objects were not warmed due to likelihood of warping. Instead, sheets of blotting paper were used to draw moisture out of the worst affected items and portable de-humidifiers were quickly installed. The air-drying programme was entirely successful.

The casualties were two school photographs and some unimportant picture frames whose gesso became detached. The silver linings to this cloud were not only the prompt discovery of the flood, just in time forestalling a more serious disaster, the water bypassing the fuse box but also a review of the plumbing, electricity and other services to this building. We hope that these will be renewed with an up-to-date system as soon as possible.

*Simon Moore
Hampshire County
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Flood in the Biology Stores at Bristol Museum

During autumn and winter months of 1996 the Bristol City Museum & Art Gallery suffered a series of floods. This report concentrates on the first and largest of those floods in the biology stores and discusses how techniques were developed for dealing with subsequent floods.

Background information

On the morning of Sunday 29th September a roof gully area was discovered, by patrolling security staff, to be flooding. The rain had been heavy for several days and the gully drains had been blocked by debris. The water had reached a depth of 2 ft in places and was flooding into the adjoining Geology store. The museum has a disaster plan and the Conservation Manager was called out to supervise this emergency. The Fire Brigade found the gully difficult to access and were unable to pump the water out. Subsequently, contractors cleared the blocked drains by rodding, thus releasing a huge volume of water into the drainage system.

What caused the flood in the biology store?

The water gushed through the drainage system at high pressure

until it hit another blockage (or was it the original blockage which had been pushed further down the system?). The majority of the water then exited through an unsealed drain cover located in the biology store. The Conservation Manger left, after the initial flood had been cleared, to check the basement stores and found that the Biology store was flooded to a height of about an inch throughout, with significant seepage into two adjoining stores.

Why did the drains block?

- The pipe diameter was reduced by a slow build up of lime scale or concretions, particularly where two sections of pipe are joined.
- The heavy rains washed leaf litter, general dirt and pigeon debris (possibly including a carcass) off the roof areas into the drains causing further obstructions.

Immediate action

The museum was closed and all staff on site helped. As it was a Sunday, collections staff were contacted from the emergency call out register, which lists who to phone when different areas of the museum are affected. Where possible, objects at risk were moved away from the water. The

clean up operation was organised by the senior staff with specialist collections staff advising on their particular stores and additional help from front of house staff. The bulk of the water was directed to an unblocked drain situated nearby. A chain of people with brooms and mops was formed, and the water from the biology store, was released by opening and closing the main door, thereby controlling the volume of water sent to the drain. The main aisles in the biology store were cleared of water within three hours, however water leaking from under cabinets and in hollows of the uneven floor, remained for most of the day. A few support people were essential to phone extra staff and equipment suppliers, and to bring in food and drink for the hot and exhausted team. After a while, it was easier to leave the floor to dry by evaporation through the action of dehumidifiers.

Equipment used

Some useful equipment was already stored nearby in our 'disaster cabinets'. Wellies, polythene and rubber gloves were needed (especially as sewage contamination was suspected). Wet vacuums were essential for tackling deep water. Once the level of water was down to a few centimetres we used mops, brushes and

disinfectant, all of which were conveniently accessible from the cleaners store. Corrugated cardboard was used to make the floors less slippery and for drawing water out from under cabinets. Equipment such as mop heads had then to be discarded due to possible sewage contamination. It was essential to set funds aside to restock on emergency equipment.

We found the following items useful in tackling subsequent floods. Rubber "squeegees" (large windscreen wipers on poles) were very useful for directing water. Also planks of wood with a rubber/plastic cover along three sides were placed as barricades and were used as impermeable props for wooden furniture. Sandbags, supplied by contractors, were also used. Later more powerful wet vacs were purchased.

Extent of damage

After such a dramatic flood we were very lucky to have sustained relatively little specimen damage. This was mainly because we had a disaster plan and most of the biology collection was already raised off the floor by various means. Some cabinets are placed on wheeled metal trolleys and other cabinets have large ornate feet or deep scuff boards which raise the

bottom of the cabinet. The worst casualties were items which were stored directly on, or close to, the floor. These were a case backdrop painting by a well known Bristol artist, three large elephant skulls and three herbarium specimens. The damaged painting was treated immediately by the Paintings Conservator by facing the paint with tissue and placing it inside an improvised humidity tent. Because of this quick action only 15% of the painting was damaged and that is treatable. The herbarium specimens were assessed by Paper Conservators and placed between blotting paper to dry. The elephant skulls were moved to benching and allowed to dry at the same rate as the rest of the store. The greatest amount of damage was to materials such as empty boxes, bubble wrap and polythene, these were potentially contaminated by sewage and had to be discarded. Without the specialist knowledge and vulnerable object assessment from the collections staff on site, the specimen damage could have been much worse.

What happened next?

Three industrial dehumidifiers were used to slowly reduce the 80% relative humidity. General dampness, rather than direct contact with water, was a concern.

The Natural History galleries

The flood originated in the main natural history gallery, where more than 280 specimens of taxidermy were displayed. Around 300 more mounted mammals were stored under cased displays. It took some time for the news to "trickle down" to the Natural History curators. By the time I learned that our gallery was affected, the Fire Brigade had arrived and were wrestling with a powerful jet of water spraying horizontally from a wall. The water on the floor was visibly spreading and rising. I was unaware then of how rapidly it was draining into lower floors of the building.

Specimens stored in cupboards under display cases appeared to be most at risk, as the water rose almost to the level of the first shelf (10 cm). Initially, I was the only member of staff available to begin moving these specimens to the safety of nearby offices. A colleague soon joined me, but it took an hour before any further help was available. (Most of the staff were part of a human chain rescuing paintings from stores below). Despite the obvious risk to the specimens of being handled, the risk from the rising water seemed greater. We removed all the undercase specimens to nearby offices but left the displays intact.

After the flooding stopped, Natural History curators, the Head of Collections and the Principal Conservator discussed the best course of action to safeguard the specimens on display. The dioramas that received the direct force of the water jet contained polar bear, reindeer, musk ox, arctic fox and a rather grubby lemming.

There was no obvious sign of wetness inside the cases: these 1970s dioramas were built to last! We decided that the risk to the diorama specimens from hurried handling would be greater than leaving them in their cases. We opened the gallery windows, installed a portable dehumidifier and left the gallery to dry.

The next day, we removed the case fronts of the dioramas to allow any moisture to evaporate. There was no sign that water had got into any case, but the floorboards beneath were still wet. Our initial examination showed that only two specimens had become noticeably damp, a deerskin and a polecat. I had overlooked their store cupboard when we cleared the gallery. Dampness had seeped up from the floor and the closed cupboard door prevented evaporation.

The Assistant Director decided almost at once not to reopen the Natural History Galleries. The galleries were soon to be closed anyway for refurbishment and to accommodate new interactive science exhibits. The flood brought forward gallery closure only by four weeks. We decided to use two galleries unaffected by the flood for temporary storage of mounted mammals from the store cupboards. We have now fitted out an office with shelving and will pack and move the specimens there shortly. At the same time, a specialist natural history conservator will assess the condition of taxidermy specimens.

Other collections

At the height of the flood, most efforts were directed to the rescue of some 300 paintings from a picture store below the Natural History Galleries. Staff formed a chain to move paintings to safety. The cascade of water from the ceiling of the picture store damaged the plaster. Soon, staff were in some danger of being hit by falling sections. They also found themselves working in near-darkness as there is no natural light in the store and no emergency lighting.

The wet pictures were leaned

against walls around the galleries and allowed to dry out overnight. Most of the paintings were glazed and backed. Consequently, damage proved to be mainly to the frames rather than to the canvasses.

The archaeology collections in the basement were also affected by the flood. Fortunately, little sensitive material was stored there and the damage has mainly been to furniture and to the fabric of the walls, floors and ceilings.

Après la deluge

The museum remained closed the day after the flood, but it took only a few days for most of the public areas to be re-opened. Three natural history galleries will remain closed for the summer. One art gallery is temporarily fitted out with racking whilst the damage to the picture store is made good, and also is still closed.

The local media showed enormous interest in the incident, especially in the dramatic rescue of the paintings. The publicity has been mainly positive, emphasising the dedication of staff and the effective way in which the museum coped with a crisis.

The public have expressed considerable disappointment at the closure of the natural history

galleries. Although no real damage occurred to displays, the wooden floor of the affected gallery began to lift as it dried out. Four weeks later, the raised floorboards are a minor hazard and still appear to be moving.

What have we learned?

1. The prompt action of staff meant that little serious damage has occurred to specimens or paintings. Had the incident occurred at a weekend or overnight, however, the potential damage was considerable.
2. The museum is reviewing the need for high pressure fire hoses in the building, particularly as the water authority and not the museum controls the stop valve.
3. The large quantities of water made ceilings unsafe.
4. Sturdy cases, raised off the floor, protected Natural History specimens from the immediate effects of the flood. Had specimens been on open display, they would have been badly damaged, many probably destroyed.
5. The museum's management team is gathering comments and feedback on the incident from

staff. The museum's disaster plan will shortly be reviewed in the light of experience gained by the flood.

Gabriela MacKinnon
Birmingham Museum



Editor's Note

Following their flood, Bristol are thinking of purchasing absorbent water protection cushions. These are thin pillows which, with a dry weight of 400 grams, can absorb 23 litres of water in 3 minutes. *Spirebourne Ltd* who sell this product (Sorbarix@A20) can provide more information; tel/fax: 01428 644483. I would be interested in hearing from anyone who has used this product.

Some Considerations on Water Damage to Museum Collections

Disaster pre-planning is vital to ensure that damage to artefacts is kept to a minimum and that environmental conditions are stabilised as soon as possible. Risks need to be evaluated and a contingency plan carefully developed to reflect the needs and characteristics of the collection(s) and building(s) (ref.1 + 2). One of the greatest risks to Museum collections is water and the following are some ideas for consideration when assessing risks and salvage operations for museum collections.

Water in disaster situations is often primarily considered in terms of its relationship with fire. Indeed, the major damage to objects can be caused by the water used to extinguish the fire, rather than the fire itself. Of course, water damage can occur totally in its own right, arising from leaking roofs or gutters, burst pipes or even a tap left running.

Water may rise or it may fall. Storing and displaying objects away from floor level is an immediate advantage for protection against flooding. If water is rising, lower

shelves can be emptied first, or the bottom drawer of a plan chest or cabinet may be emptied or removed, together with its contents. Take care that cabinets or shelves do not become top heavy and unstable. If water is falling, polythene sheeting can be useful to create a barrier and direct water away from objects.

If items are enclosed within a container - e.g. a cabinet, box, display case or frame, considerable protection can be offered against water ingress. The containers need to be solid enough to withstand water penetration and display cases need to have reliable ceilings. Boxes made from good quality card will protect their contents for a surprising length of time. Of course it depends on the quantity of water involved, as most materials and constructions used for Museum storage and display cannot withstand submersion. Call out procedures by which staff can be contacted on a 24 hour basis are vital - the faster objects can be salvaged and treated the better.

Floors below the flooded area must be checked and areas cleared or sheeted over as a precaution until the flood has been fully cleared up and the source dealt with.

Humidity in flood situations can be