



NatSCA

Natural Sciences Collections Association

<http://www.natsca.org>

Care and Conservation of Natural History Collections

Title: Disaster planning

Author(s): Reynolds, W. J.

Source: Reynolds, W. J. (1999). Disaster planning. In: Carter, D. & Walker, A. (eds). (1999). *Appendix III: Care and Conservation of Natural History Collections*. Oxford: Butterworth Heinemann, pp. 204 - 213.

URL: <http://www.natsca.org/care-and-conservation>

The pages that follow are reproduced with permission from publishers, editors and all contributors from Carter, D. & Walker, A. K. (1999). *Care and Conservation of Natural History Collections*. Oxford: Butterworth Heinemann.

While this text was accurate at the time of publishing (1999), current advice may differ. NatSCA are looking to provide more current guidance and offer these pages as reference materials to be considered alongside other sources.

The following pages are the result of optical character recognition and may contain misinterpreted characters. If you do find errors, please email web@natsca.org citing the title of the document and page number; we will do our best to correct them.

NatSCA supports open access publication as part of its mission is to promote and support natural science collections. NatSCA uses the Creative Commons Attribution License (CCAL) <http://creativecommons.org/licenses/by/2.5/> for all works we publish. Under CCAL authors retain ownership of the copyright for their article, but authors allow anyone to download, reuse, reprint, modify, distribute, and/or copy articles in NatSCA publications, so long as the original authors and source are cited.

Appendix III

Disaster planning

W. J. Reynolds

*Department of Entomology, The Natural History Museum, Cromwell Road,
London SW7 5BD, UK*

Introduction

The principles behind preparing for emergencies and the steps taken to minimize risks are dealt with in Chapter 7 on the collection environment and Chapter 9 on policies and procedures. However, because this subject is fundamental to the protection of natural history collections, the detailed procedural aspects of disaster planning have been expanded in this appendix.

Kidd (1992) assessed the threats to museums and galleries and concluded that 'fire and flood are both credible risks with high enough probability scores to keep the average museum director awake at least one night of the week, so a disaster plan might at least alleviate his or her insomnia'. Institutions which have suffered disasters have reported that damage could have been limited if a disaster plan had been in place. The benefits of having such a plan are described by Roberts (1995), who noted that the successful recovery of cultural property in Charleston, South Carolina, during Hurricane Hugo, was not luck but the result of good planning. An institution is more likely to be criticized for failing to prepare for emergencies than for making mistakes during one.

When designing a disaster plan, it is very possible that much basic groundwork will have been carried out already by institutions in the local community and it is recommended that the council and library or records office would be good places to seek practical advice, particularly relating to local

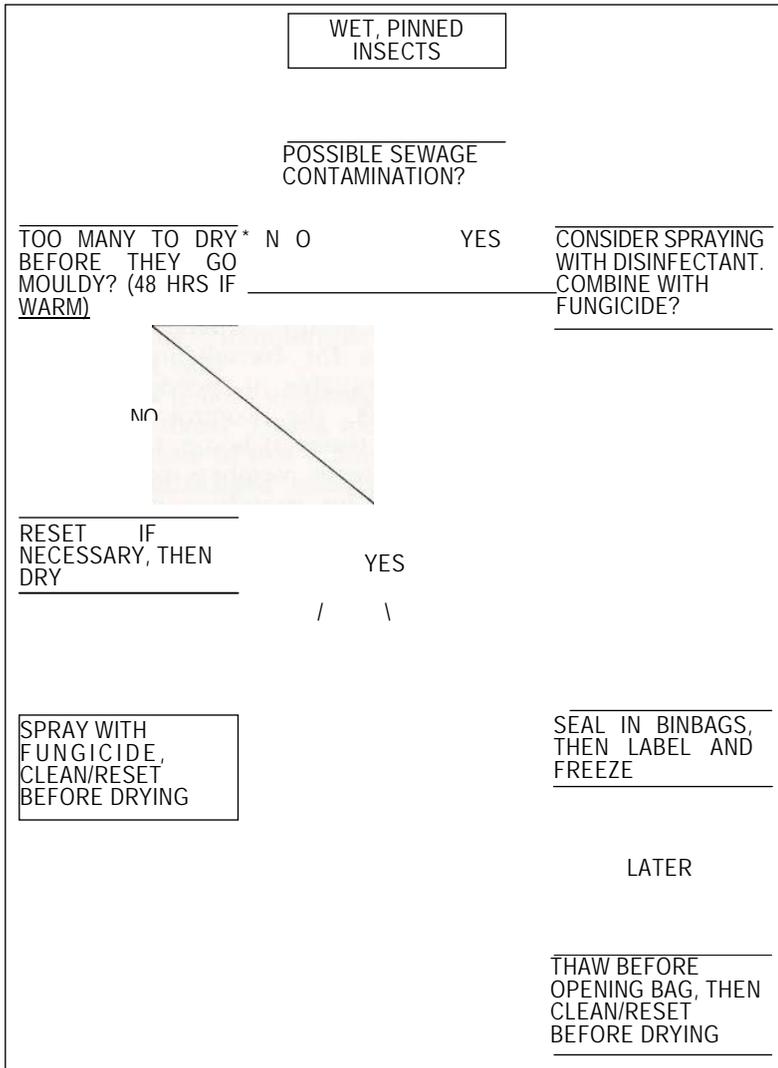
conditions. References on disaster planning include Roberts (1995), Hunter (1986, 1994), Cackett (1992) and Upton and Pearson (1978).

Although there are many accounts of disasters in libraries, archives and museums of art and antiquities, there is very little literature relating to post-disaster recovery of natural history collections. However, some guidelines on the emergency treatment of biological materials are given by Upton and Pearson (1994), and in anon. (1992) there is an account of a rapid response to a flood in the mammal collection in the Texas A & M, when 'much of the collection was placed, cases and all, in a freezer truck and thus stabilized...'. Williams (1993) presented further details on this salvage operation. Moore (1994) gives an account of the salvage operation mounted when an incendiary bomb struck the Botany Department of The Natural History Museum in London during the Second World War.

Steps to take in developing a plan

Plans should be written so that they can be quickly and easily understood. Flow charts (see Fig. AMA) for procedures are particularly useful since they are easier to understand than text. As Kidd (1992) points out, '...the initial activation of the plan could be the responsibility of a watchman or security guard, who may have to start things rolling at three in the morning, in the middle of a power cut and with water swirling around his knees' (see Appendix IV on a case study).

Figure A111.1 Flow chart for treatment of wet drawers of insects.



Suggested steps are:

- Appoint a co-ordinator or committee (see Pickering, 1996) who will carry out the following points.
- Evaluate the collections and draw up plans showing salvage priorities.
- Evaluate the threats to the collection and decide appropriate responses.
- Establish concise procedures for the salvage of items which need specific treatment, i.e. specimens, books and records.
- Liaise with local authorities, usually the local fire service.
- Equip one or more salvage cupboards or trolley.
- Set up an authorization procedure for contingency funds.
- Compile a disaster plan.
- Appoint and train a disaster team.
- Test the plan by having salvage exercises.
- Advise on (or lead) restoration of collections after a disaster.
- Prepare a report after a disaster.
- Review and update the plan regularly.

Disaster Plan

The following text is based on the current salvage plan of the Entomology Department of

The Natural History Museum, London. The Entomology Building has six floors and contains about 28 million insects. The bottom floor is at ground level and might be vulnerable to flooding. A safe area outside the building is designated as the Assembly Area where staff gather after an evacuation to await further instruction.

The Natural History Museum has a central 'Control Room' which monitors, controls and co-ordinates security 24 hours a day. The Control Room staff have written emergency procedures which include the initiation of departmental emergency plans by contacting the relevant salvage team. The Control Room holds a key to the Central Disaster Store.

At present, the Entomology disaster plan is concerned solely with the salvage of the insect collection housed in the Entomology Building. Books are the responsibility of the Library which has a separate salvage plan. Repairs to the structure and functions of the building and the installation of emergency lighting are carried out by 'Estates Management'.

Salvage teams

The number of people needed for a salvage team will depend on the size of the institution and its collections. The Entomology Department has four teams:

1. **Priority team.** These are responsible members of staff who live reasonably near the Museum and can be contacted quickly out of hours. They are given a high level of training and will be assembled as a first stage to assess the damage. They are arranged in order of precedence on the team list. The one nearest the beginning of the list takes charge – thus avoiding disputes and delay. One of them will also be contacted by the Control Room during minor emergencies outside working hours.
2. **Back-up team.** These also live near the Museum and are summoned if required. Further members of staff may also be summoned if necessary.
3. **Specialized teams.** These handle problems with the Library, and the

Molecular Systematics and High-Containment Laboratories.

4. **Management team.** These are senior staff who will need to be informed of a disaster.

Procedure for teams

In the event of a disaster occurring during working hours, team members should, after the staff evacuation procedure has been carried out, group separately in the Assembly Area for consultation. All staff should be available if needed. Outside working hours, the Control Room will telephone the teams at home. On arrival at the Museum, team members report to the Control Room for protective clothing and further instructions.

As general preparation, all team members are regularly briefed, have a copy of the disaster plan and ensure that they are thoroughly familiar with the detailed geography of the building, the position of those parts of the collection for priority protection, the location of salvage materials, and the position of service mains such as gas, water and electricity.

Initial procedures for the salvage team can be summarized as follows:

Out of hours:

1. On arrival at Museum, report to Control Room and Incident Officer to be briefed.
2. Collect protective clothing and put it on as advised.
3. With any other members of the team present, assess the situation.
4. The person nearest the top of the priority team list takes command and the appropriate action.

During working hours:

1. After an evacuation, do not re-enter the Museum until the Incident Officer says it is safe to do so.
2. Consult the senior member of Entomology staff present. Assess the situation together.
3. The person nearest the top of the priority salvage team list takes command and decides on appropriate action.
4. Collect protective clothing as necessary from the Control Room/Estates store.
5. All staff will help.

Synopsis of advice to salvage teams:

1. Take no risks at all — in the case of fire, no-one should enter any part of the site unless their presence is known to (and approved by) the fire officer in charge.
2. Initially:
 - Assess the full extent of the damage.
 - Locate priorities for salvage.
 - Establish salvage sorting areas and safe sites for salvaged material.
 - Consider whether to contact emergency suppliers — transport, freezers, humidity control etc.
0. Protect or remove undamaged material that is under threat. This is more urgent than moving material that is already damaged.
 1. When undamaged material under threat has been moved to a safe place, remove any items lying immersed in water to a dry place (except film negatives, transparencies, prints, microfilm and microfiches which, once soaked, should be kept immersed in clean water).
 2. Do not assist any items to dry out (but allow water to drain off) until professional advice has been received; this means no artificial heating/blowing of salvaged material. Do not attempt to close wet books or to unfold wet documents — leave them as found.
 3. Do not clean or wipe anything.
 4. Storage companies will only accept material that is well-wrapped, clean and organized. Use soft pencil for marking freezer-labels.
 5. Pay attention to the possibility of looters.
 6. Confirm who will deal with press/media inquiries (normally the Museum's Incident Officer or Press Officer).
10. If possible, keep copious notes of what happens and when, what is moved where, when and by whom. Take photographs (disposable camera with flash is in salvage cupboard). Remember: if it wasn't documented, it didn't happen'.
11. In addition to the supplies in the salvage cupboards, there is a torch on each floor in the Fire Marshal's office and a first aid kit on each floor.

Priority protection for collections

The entomology collections have been evaluated in terms of salvage priorities and floor

plans have been drawn up to provide information for the salvage teams. Throughout The Natural History Museum, salvage priority items are marked with red (first priority) (see Plate 38), blue (second priority) or green (third priority) labels. The same colours are used on floor plans showing the position of the items. The Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict (1954 — Part IV, A: 1.7) provides for distinctive triangular and square emblems as a means of identifying cultural property belonging to different categories, but how extensively these have been adopted is unknown.

Specific guidelines

Handling material during salvage

Collections must be salvaged before books, computers or research data. Salvage of damaged material is usually less urgent than removing undamaged material that is under threat. Human chains are an efficient way of moving large numbers of items quickly and safely and should be used wherever appropriate. If the lifts are unavailable and items have to be carried up or down stairs, great care must be taken and loads kept small enough to be comfortable, for example no more than two drawers of insects or a single drawer of index cards. Full drawers of filing cabinets are very heavy, so files should be removed for transport. Trolleys should be used wherever possible for moving items to the stairs. There should always be a trolley present on each floor.

Bookshelves and insect cabinets

These should be emptied from the top down, to avoid instability. However, if there is a danger of flooding, the very bottom shelves should be cleared first before starting at the top and working down.

Type cabinets

These are small enough to be carried by one person and have handles at the top.

Paper material

If books, reprints, files etc. have to be removed after a disaster, the best way to carry them is in plastic crates. A few crates are available from the Central Disaster Store. Others

can be hired at short notice. Insect drawers do not fit conveniently into crates.

Fire damage

No one should enter any part of the site unless their presence is known to (and approved by) the fire officer in charge.

Post-fire procedures and advice (adapted from a course at the UK Fire Protection Association and based on experiences at Saskatchewan Museum of Natural History as described by Spafford and Graham, 1993) are as follows (see also the sections under flood damage below).

1. Do not rub, brush or even touch sooty surfaces; fingerprints remain after cleaning and have to be abraded. Clean using industrial-strength vacuum cleaners and then dry-cleaning materials.
2. Soot gets harder to remove the longer it is left.
3. Smoke follows air-flow and leaves a lot of soot even in areas away from the fire.
4. Soot is particularly attracted to plastic surfaces and will penetrate cabinets and drawers.

Flood damage

Flood warning

When flooding of the basement might occur, the lower drawers should be removed and stacked on the tops of the cabinets and racks, giving priority to type cabinets. If the bottom two drawers from each cabinet are removed to safety, flooding to the depth of 20 cm could be accommodated with minimal specimen damage. Note that the bottom drawer space in *each* stack of type cabinets is empty, giving an extra 10 cm of clearance.

Actual flood or other water damage

1. If any of the upper floors are flooded (from burst pipes or following a fire) then water should be swept down the stairs using a 'squeegee' (broom with head replaced by a rubber strip; see Plate 41) from the Salvage Cupboard or the Central Disaster Store (see p. 212), taking care to prevent the water from entering the basement collection area, perhaps by using a Puddle Python (tube of absorbent material) across the doorway.

Staff on floors below the flood must be warned if there is a risk of water leaking through from above. They must also be warned if there is an electrical or infectious hazard or if radiological or toxic materials are involved.

2. If electrical equipment is affected by the flood, inform the Control Room who will instruct the duty engineer to isolate the equipment concerned. The engineer will display warning signs on the mains isolator switches so that power is not restored until the equipment has been inspected by a competent person.
Estates Management and the Departmental Health and Safety Liaison Officer or deputy should be informed as soon as possible. The fire brigade will not attend minor incidents but, in the case of major floods, they or Estates Management can use pumps to lower water levels to a few inches, after which wet-and-dry vacuum cleaners and squeegees have to be used. Both are available from the Central Disaster Store.
4. Mops, buckets etc. are in the Salvage Cupboard and cleaners' stores.
Estates Management will hire industrial fans, dehumidifiers etc. if needed.

Wet cupboards and drawers of insects

The most likely items in the Entomology Department to be in need of salvage after flooding are wet drawers of insects (Fig. AIII.1).

Water found lying on tops of cabinets should be mopped up or swept off immediately (sponges, cloths, 'squeegees' etc. are in the Entomology Salvage Cupboard).

If water is still dripping down from higher floors, lay polythene sheets over cabinets. A

1. roll of polythene sheeting, 2 m folded to 1 m X 100 m is in the Departmental Salvage Cupboard (another roll, 4 m folded to 2 m x 50 m is on top of the cabinets on the top floor).
2. Remove wet drawers, drain and dry them if necessary.
4. Check the status of submerged drawers. If they have proved watertight, remove them immediately. If they are full of water, leave them and attend to drawers threatened by

- a rise in water level or by waves created by people walking by. Only then deal with the saturated drawers.
5. To reduce the danger of mould, keep the temperature and humidity low (below 16–18°C and 55% relative humidity). In suitable weather, open the windows and ask for the heating to be turned off. Ask Estates Management to install dehumidifiers but probably not heaters.
 6. Monitor temperature and humidity on each affected floor. Equipment is already in place to do this but, if this is damaged, a hygrometer and thermometer are available in the Salvage Cupboard.
 7. If it is not possible to dry material before mould develops (two to seven days, depending on temperature), it must be frozen or treated with fungicide (in Salvage Cupboard) but ensure that health and safety regulations are consulted. The Entomology Department has its own freezers with room for about twenty drawers. Other departments also have freezers which may be available in an emergency. To freeze large numbers of drawers, contact outside companies providing refrigerated storage and transport, asking them to provide pallets. Place wet drawers in large polythene bags (bin bags) from the Salvage Cupboard, seal the bags with string and label them (minimum one label per pallet).
 8. If the insects themselves are wet and sewage contamination is suspected, consider spraying them with disinfectant (in the Salvage Cupboard).
 9. If the insects themselves are dry but the bottom of the drawer is wet, pour in fungicide*/disinfectant solution, taking care not to wet the insects, then drain.
 10. Wipe wet drawers and cabinets with fungicide/disinfectant.
 11. If in doubt, freeze. Material can be thawed and dried later.

*Thymol was tested as an antimould agent. Two cardboard boxes containing a variety of insects were soaked in water for thirty minutes. One box was sprayed with a 3.0 solution of thymol in alcohol then both were sealed in polythene bags and left at room temperature. After a week the insects in the untreated box were mouldy. Those treated with thymol did not become mouldy even after a further month in the bag. N.B. Safety precautions are necessary when using Thymol.

12. Wood expands when wet. Therefore, wet, wooden cabinets and drawers must be dried slowly to prevent cracking. Water will probably weaken glued joints (see Appendix IV on a case study).

Storage/treatment areas for salvaged material

Material that does not need freezing could be moved to a safe place for storage or recovery. The best location will depend on the circumstances and can be decided at the time. The Museum is big enough for it to be likely that there will be space available.

Drying drawers of insects

There are four methods by which drawers can be dried:

1. **Air-drying.** This process needs to be carried out in dry conditions which will probably mean moving the drawers elsewhere if the department is wet after a fire or flood.
2. **Ovens or drying cabinets** (there is room for about fifty drawers at a time in the Department facilities). This could damage drawers which could warp because of dehydration. Experience from the Innsbruck Museum disaster (see Appendix IV on a case study) suggests that, for drying by heat, it is always necessary to remove the insects from the drawer but that this is not necessary for freeze-drying.
3. **Heat treatment with humidity control.** Drawers or other objects are treated in a climatic chamber with warm air. A computer controls the temperature and prevents the humidity from dropping too low, thus preventing damage to drawers and specimens. This may be the best treatment for large quantities of wet drawers. A trial run of wet drawers was made with the help of the company Thermo Lignum. Two accession drawers, one made from mahogany, the other American lime, were immersed in water for thirty minutes, during which they filled up at the same rate. The drawers were left full of water for a further three hours, then the lids were removed and the water was poured out.

The lid of the mahogany drawer was much more difficult to remove, probably because of a difference in design. This removal took several minutes and needed a lever, showing that salvage after a flood could take a long time and need a lot of labour, since drawers would have to be drained before freezing. Thermo Lignum stored the drawers wet overnight and then, with their lids raised, the drawers were placed in the drying chamber. Drying was complete in sixteen hours: much quicker than freeze-drying and safer than using an oven or heated drying cupboard. The drawers were dried satisfactorily and are in use again. One of the drawers contained insects, some of which were damaged by the water but not by the drying.

4. Freeze-drying. The Museum does not have a freeze-dryer large enough to deal with salvaged material. Freeze-drying is likely to be slow and expensive compared with drying by heat treatment with humidity control.

Cleaning specimens

Little work has been carried out in this area but experience from the Innsbruck disaster (see Appendix IV on a case study) shows that the wings of Lepidoptera collapse when wet. Robust insects such as Coleoptera, Heteroptera etc. can be cleaned using an ultrasonic cleaner (see Chapter 2 on invertebrates).

Wet slides and glass jars

Wet labels are likely to be washed off microscope slides and storage jars of alcohol (see Appendix IV). Slides that are neither engraved with a reference number nor in envelopes, and jars that have no internal labels, may be impossible to reassociate with their labels.

The slides themselves will be unaffected if the mountant is Canada balsam or Euparal, which are not water-soluble, and even water-soluble mountants should be unaffected by up to a day's wetting (Paul Brown, pers. commun.).

Water may enter jars and they may need to be checked and fresh alcohol added (see Chapter 5 on fluid preservation).

Books and reprints

Treatment of library books must be left to library staff, but the treatment of papers such as reprints should follow these guidelines, taken from the library's salvage plan. Salvage materials are available from the Salvage Box in the Entomology library (see p. 212).

1. Temperature and humidity in areas where paper is drying should be kept within the range of 16–18°C and 50–60% relative humidity. Good ventilation will reduce the risk of mould growth.
2. If mould appears outside or inside books, urgent action is needed:
 - Isolate affected volumes.
 - Brush off loose mould gently with a small, soft paintbrush, either outside or in a well ventilated room.
 - Wipe bindings with a 2% thymol/alcohol solution on a tissue (see footnote on p. 209).
 - Pages should be interleaved every millimetre with thymol-impregnated sheets.
 - Survey constantly for signs of mould.
3. If only the container of papers (reprints, documents etc.) is wet, discard it and rehouse the contents.
4. If the papers are wet through and there are too many to dry before they go mouldy, wrap in white paper and freeze.
5. If partially wet, dry between blotting paper, using weights to flatten sheets when almost dry.

Dealing with the press (adapted from a course at the UK Fire Protection Association)

1. Appoint one person to interact with the press. This will normally be the Museum's Incident Officer (or Press Officer, if present). Everyone else should direct the press to this person. Press and cameras should be kept in one area if possible, away from the immediate emergency operations. A useful position for TV and press cameras should be provided if possible.
2. The objective is to give a clear, accurate picture of a confused situation. The first impact is important. It is far better to prevent a distorted account getting out

than trying vainly to correct it later. The media can help you achieve this, if you cooperate with them.

3. The person dealing with the press should make a clear statement and invite questions as soon as possible. He or she should be accessible to the media and give regular briefings, either giving confirmed information, on the record, or saying that confirmation cannot yet be given. Above all, evasion and speculation must be avoided. A follow-up phone number should be given to the press.
4. By good handling of the press, the organization can minimize damage to its image and possibly even encourage donations and other support for conservation and restoration work (see Appendix IV on a case study).

Post-disaster plan

1. Permanent storage areas must be carefully cleaned and dried and may need repairs or redecoration before books or specimens are returned.
2. Survey constantly for signs of mould.
3. Prepare a written report of the disaster and salvage procedures, assessing the total damage and pointing out areas where improvements can be made.
4. Rewrite plan incorporating lessons learnt.

Salvage equipment

It is recommended that salvage equipment should be stored in a convenient place, reasonably close to the collection and, if possible, where it is unlikely to be affected by a disaster. Consideration should be given to whether a number of such stores are necessary. Harris (1992) gives a very practical design for a salvage cupboard and gives comments on its design and suggestions on its contents.

Salvage stores

The Natural History Museum is very large and consequently has a number of salvage stores situated in appropriate places. The Central Disaster Store is the largest and is maintained

by the Estates Department with the Central Control Room holding keys for access. This store contains all the general emergency equipment likely to be immediately required in a disaster. The Entomology Department has two salvage stores, one for the collections and another for the library. The Collections Salvage Cupboard (Plate 41) is situated close to the first point of access to the Department. It is prominently labelled and the door fastened with a plastic cable tie which provides reasonable security but will break when pulled hard. The cupboard must be secure so that the contents are not taken unless there is an emergency. There is also a Salvage Box in the Entomology library. Additionally, chemical spills kits are kept on each floor and in the chemical stores. These kits are designed to deal with spills of aqueous solutions (including acids and alkalis), organic liquids and chlorinated hydrocarbons. For detailed lists of salvage equipment see p. 212.

Salvage organizations

Many countries have organizations and businesses specializing in recovery and salvage. They include professional organizations specializing in the restoration of fabrics such as tapestries or the recovery of books and records but not, so far, natural science materials. The Natural Hazards Research and Applications Information Center, USA published (1992) an international directory of relevant government agencies, academic centres and professional associations. London is equipped with many facilities which can assist in salvage operations and the Entomology Department keeps a list of companies who have agreed to be available in an emergency. Services covered include:

- Refrigerated storage and transport
- Drying services
- Dehumidification services
- Disaster control and recovery companies
- Extra crates and pallets

Acknowledgements

I should like to thank Jackie Britton of The Science Museum, London and Clare Valentine

List of emergency equipment in salvage stores at The Natural History Museum.

List 1. Contents of the	One long-handled squeegee for	Warning cones
Entomology Salvage Cupboard.	pushing water down stairs	Hazard tape
One roll of polythene sheeting 2 m folded to 1 m X 100 m (another roll 4 m folded to 2 m X 50 m on top of cabinets on top floor)	Mop and bucket	Safety barriers
Assortment of polythene bags, ordinary and self-seal	Diddle Duthane (tubes filled with absorbent material)	Plastic sheeting
One dustpan (useful water spoon) and brush	Other mops and buckets brushes vacuum cleaners etc in cleaners' cupboards	Tarnauline
One small sponge		Water-level kit
One pack of fifty kitchen cloths		Drain clearing rods
Two rolls of absorbent paper		Waterproof tape
Two sponges		Submersible pump
One bottle of disinfectant		Hoze line
One box of fifty large disposable gloves		Buckets and mops
One box of medium disposable gloves		Dustpan water sponges
Ten pairs large rubber gloves		Wet and Dry industrial vacuum cleaners
Five pairs of medium rubber gloves		Squeegee
Two pairs of goggles		Broom
One box of 18 dust masks		Shovels
One dust mask (organic vapour type)		Diddle Duthane
One hard hat		Roll of absorbent paper (Kimwipes)
550 very large plastic bags which fit an insect drawer		Tissues
One disposable camera with flash (27 exposures)		Kitchen cloths
One torch with batteries		Rubbish plastic
One clipboard with paper and pencil		Tools for breaking in etc
Three notebooks spiral-bound		Acro prong (builder's adjustable metal prong)
Six pencils		Short wooden planks
Six ball-point pens		Nails and screws
Two felt-tip pens (water-resistant)		Stole gun
Two marker pens		Ropes
Six rolls of parcel tape		Emergency glass handaxe
Assorted Post-it notes		Spirit-level
200 parcel labels (tie-on)		2-in-1 oil
One pack of elastic bands		First aid kit
One sharp knife with retractable blade		String
Three smaller knives		Rubber bands
Five pairs of large scissors		Tie-on labels
One pair of small dissecting scissors		Notebooks paper pens and pencils
One pair of snipping forceps		Brown paper sheets
One thermometer		Dustbins (large)
One hygrometer		Crates
One spray bottle containing 500 ml 3% thymol solution in industrial methylated spirit		List of contact numbers e.g. lift contractors and water supply company
One cable tie for securing the cupboard doors		
	List 2 Contents of the Salvage Box in the Entomology Library	
	Plastic sheeting	
	Ten rubbish bags	
	Two packets of Trans-tissue	
	500 sheets of blotting paper	
	300 sheets of newsprint	
	Thirty sheets of brown paper	
	Forty polythene bags	
	Eighty fifty bags and cone	
	Fifteen paper-towels	
	Two reels of freezer tape	
	Two handaxes	
	Two brushes	
	Three reels of cotton tape	
	One washing line	
	Five pairs of disposable plastic gloves	
	One felt pen	
	List 3 Contents of the Central Disaster Store	
	Overalls	
	Rubber boots	
	Goggles	
	Hard hats	
	Dust masks	
	Gloves	
	Ear-plugs	
	Scarves	
	Fire extinguishers	
	Fire-resistant bags for building a fire-proof barrier	
	Torches	
	Generators	
	Portable transformers	
	Emergency lighting — mains electricity and bottled gas	
	Spare electric bulbs	
	Extension leads and circuit-breakers	
	Hazard lights with spare batteries	
	Portable industrial fan-heater	
	Electrician's tape	
	Cable ties assorted lengths	
		List 4 Contents of a chemical sniffs kit
		Instructions for use
		Sodium carbonate (soda ash) 2 X 250g
		Potassium dihydrogen 2 X 330 g
		Keiselguhr, mineral absorbent, 6 X 500 g
		Ten bags

of The Natural History Museum, London for kindly sharing their salvage references with me. In addition, I have drawn extensively on information from salvage courses run at the Fire Protection Association, London, and at Surrey Fire Brigade's Training Centre in Reigate. I am grateful to both the editors of this book but particularly to Annette Walker for numerous suggestions and constant encouragement in preparing this appendix.

References

- Anon. (1992). Mammal collection at Texas A & M rescue. *ASC Newsletter*, **20**, 167.
- Cackett, S. (1992). Disaster planning. In *Manual of Curatorship* (M.A. Thompson, ed.), pp. 487-490. Museums Association, Butterworth-Heinemann, Oxford.
- Harris, M.R. (1992). Emergency cart for protecting collections from water damage. In *Storage of Natural History Collections: Ideas and Practical Solutions* (C.L. Rose and A.R. de Torres, eds), pp. 285-287. Society for the Preservation of Natural History Collections, Pittsburgh.
- Hunter, J.E. (1986). Museum disaster preparedness planning. In *Protecting Historic Architecture and Museum Collections from Natural Disasters* (B.G. Jones, ed.), pp. 211-230. Butterworths, London.
- Hunter, J.E. (1994). Museum disaster preparedness planning. In *Care of Collections* (S. Knell, ed.), pp. 246-261. Routledge.
- Kidd, S. (1992). Preparing for disasters in museums and galleries. *Fire Prevention*, **254**, 22-25.
- Moore, J.A. (1994). A salvage operation at The Natural History Museum. *Conservation News*, **55**, 40.
- Natural Hazards Research and Applications Information Center (1992). Disaster/hazard mitigation and recovery organizations: A directory of government agencies, academic centers, and professional associations. *Technology and Conservation*, **Summer-Fall**, 12-21.
- Pickering, J. (1996). Disaster planning for a sceptical museum. *Collection Forum* **12**, 14-20.
- Roberts, B.O. (1995). Emergency preparedness. In *Storage of Natural History Collections: A Preventive Conservation Approach* (C.L. Rose, C.A. Hawks and H.H. Genoways, eds), pp. 81-99. Society for the Preservation of Natural History Collections, Iowa.
- Spafford, S. and Graham, F. (1993). Fire recovery at the Saskatchewan Museum of Natural History: Part II. Post disaster clean-up and soot removal. In *Preprints of the 10th Triennial Meeting of ICOM Committee for Conservation*. AV^washington, DC, Vol. 1, pp. 420-426. ICOM Committee for Conservation.
- Upton, M.S. and Pearson, C. (1978). *Disaster Planning and Emergency Treatments in Museums, Art Galleries, Libraries, Archives and Allied Institutions*. The Institute for the Conservation of Cultural Material Incorporated, Canberra.
- Upton, M.S. and Pearson, C. (1994). Emergency treatment of materials. In *Care of Collections* (S. Knell, ed.), pp. 262-275. Routledge.
- Williams, S.L. (1993). Studies of dried tissues subjected to flood conditions and corrective measures. In *Program and Abstracts of 8th Annual Meeting of the Society for the Preservation of Natural History Collections*, Victoria, British Columbia, p. 11.

Further reading

- Advisory Committee on National Collections (Australia) (1986). *Counter-disaster management planning manual for the Australian national collecting Institutions*. Department of Arts, Heritage and Environment, Canberra.
- Anderson, II. and McIntyre, J.E. (1985). *Planning for Disaster Control in Scottish Libraries and Record Offices*. National Library of Scotland, Edinburgh.
- Association of Research Libraries, Office Management Studies, Systems and Procedures Exchange Centre (1980). *Preparing for emergencies and disasters, SPEC Kit 9*. Association of Research Libraries, Washington.
- Barton, J.Y. and Wellheiser, J.G. (1985). *An ounce of prevention: a handbook on disaster contingency planning for archives, libraries and record centres*. Toronto Area Archivists Group Education Foundation, Toronto.

Suppliers

- Thermo Lignum**, Unit 19, Grand Union Centre, West Row, Ladbroke Grove, London W10 AS, UK.

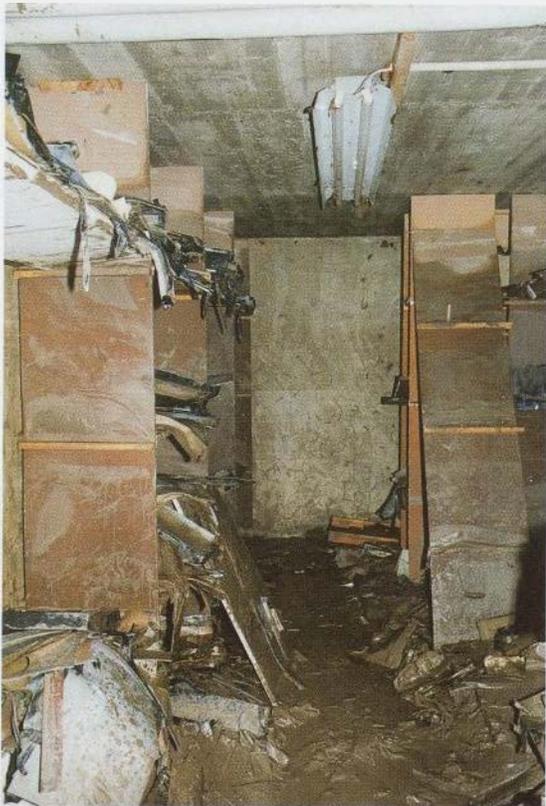


Plate 40 The herbarium hall with broken shelves and disintegrated herbarium boxes (Gerhard Tarmann).



Plate 41 Contents of the Entomology Department's salvage cupboard (The Natural History Museum).

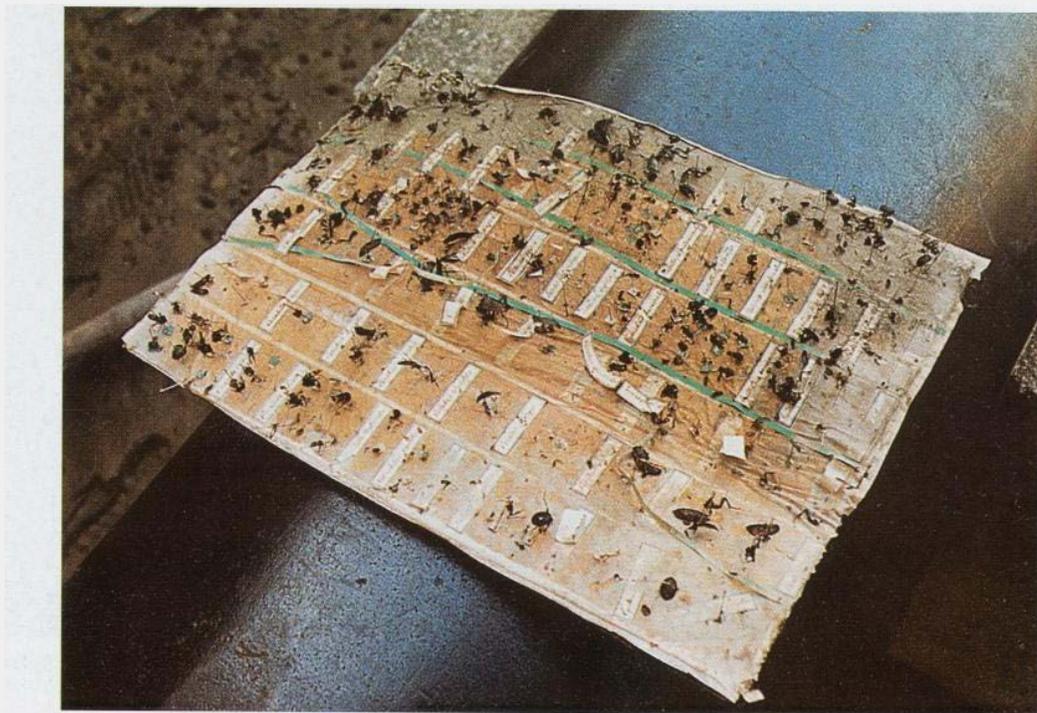


Plate 42 Coleoptera from a disintegrated cardboard drawer (Gerhard Tarmann).

Plate 42 Coleoptera from a disintegrated cardboard drawer (Gerhard Tarmann).