AID TO A HURRICANE-DAMAGED MUSEUM

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Almost two weeks after the disastrous hurricane Camille a request was received by the Smithsonian Institution from a Major Newton Carr for aid to the damaged Jefferson Davis Memorial Shrine on the Gulf coast at Biloxi, Mississippi. This request was forwarded to the Conservation-Analytical Laboratory of the United States National Museum together with a telephone number purporting to serve Major Carr. Contact with him in Mississippi was ultimately established only after a search of one and one half hours duration with the invaluable aid of the Institution's telephone Supervisor via Federal communications, many of the commercial lines being inoperative.

The situation eventually reported to us was that the Jefferson Davis Home was situated across a road from the beach in eighty acres of gardens together with a 'Hospital' for the sons of Confederate veterans, a Summer-house used by Jefferson Davis as a library, and buildings serving as homes for the staff. All of these buildings had been severely damaged by high winds (a peak velocity of 218 mph) followed by a wave of sea-water twenty-eight feet high. Some of them had been wrecked. The staff had lost their homes and possessions and were now housed in the period-rooms of the Jefferson Davis mansion. These were on the second floor and had resisted damage although the heavy entrance stair had been carried away. The ground-level basement room, used as a museum, had fared worse. This floor had lost the use of its air-conditioning system and most of the windows facing the Gulf. After the crest of the wave these rooms had remained flooded to a depth of two feet or more by wind-whipped sea-water.

In the interval since the hurricane, Major Carr had obtained an emergency generator which enabled them to pump up non-potable well-water. He had used the services of fifty men from Keesler Air-Force Base to help improvise living facilities for the staff, to wash the worst of the mud and silt from floors and walls of the museum buildings, and out in the grounds to collect together various kinds of wreckage, including objects from the museum.

Major Carr was now requesting Federal aid in dealing with hundreds of documents, pictures, books, costumes, uniforms, and objects of leather and iron that had been damaged by sea-water and silt. The museum staff had no experience of the conservation of objects. We found later that it consisted of the newly-appointed young director and his wife; two ladies, Daughters of the Confederacy; and the Shrine's caretaker who had cared for the premises for as long as anyone could remember.

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It was clear that advice-at-a-distance would be ineffective and that professional attention at the earliest possible moment was essential if extensive damage from rapid growth of moulds in the damp climate was to be prevented.

Funds sufficient to send two conservators and to pay for essential supplies were requested from sources of emergency aid but at the last had to be obtained from the funds of the United States National Museum.

During Friday, August 29th, various materials and tools that might prove useful were assembled from local suppliers and from several sources within the Smithsonian. Most of these were infact put to use and are listed below. They totalled over one hundred pounds in weight.

Air transport could not be obtained on Saturday (it was Labor Day weekend) but the authors did arrive at Gulfport airport during mid-afternoon on Sunday 31st. The journey had been interrupted by a hydraulic fault in the plane and was continued from Mobile by limousine, bypassing blocked roads and crossing very slowly in single file a long bridge whose thirty-foot-long concrete deck-slabs had been lifted by waves and variously moved as much as thirty inches out of line.

A preliminary survey of damage at the Jefferson Davis Memorial Shrine confirmed that physical conditions were still as had been reported and in addition revealed that moulds were rampant, even though the fans that we had earlier requested had already been installed. (Our instruments indicated relative humidities between 84 and 92 per cent and temperatures of 78 to 84 F throughout our stay.) The permanent staff had arranged for themselves temporary, just tolerable, living conditions but were living on care-parcels from friends and relatives and appeared understandably to be suffering from their experience. Phones were inoperative. Various voluntary helpers came in from time to time and occasionally slept overnight on the verandah of the mansion. We visitors were housed at a nearby motel occupied largely by emergency offices and construction workers. At the museum, we shared meals in the kitchen with the others.

The museum rooms presented a desolate appearance. Three long upright and slope-top double-sided cases were still crowded with the entire collection of letters, prints, photographs and newspaper clippings, each described by loose labels. Sea-water had penetrated the slope-top portions and stained the paper variously: brown stains resulted from displacement of natural deterioration products; red stains derived from dye washed out of the maroon felt lining of the cases. Moulds covered leather objects to a depth of a quarter inch or more. Books in stacks were bursting with interleaved paper toweling. Elsewhere in the room, cases had been emptied to allow them to be washed out and their contents had been stacked on every available surface. All

of the glass was slimy with salt films and the mats of framed prints were bellying from contact with wet walls. Next to the museum room an open passage housed drying lines and visitor-guide-rails crowded with silt-covered and stained quilts, costumes, and uniforms, some of them brought over from the adjacent 'Hospital' which was no longer secure from night-time vandalism.

Fortunately, part of the electric supply had been restored so that fluorescent lamps whose starter switches remained intact were still operative. Nevertheless, from time to time power failed because sea-water had seeped into under-floor cable-conduit.

A program of work was organized with several objectives: to do as much as possible for the museum objects in a limited time with the few facilities available; to instruct the staff; and to raise their morale to a level at which they could carry on the work by themselves after departure of the Smithsonian team and perhaps even complete it before the scheduled re-opening.

Two classes of object were selected for treatment: first the hundreds of documents which provided the historical data in the museum displays; second, uniforms and dresses which would stand out from the documentary background in the restored display. Other objects might be treated as opportunity served.

Immediate treatment of the documents was hindered by the incomplete record system: once separated from their loose labels many would be difficult to identify. This problem was dealt with by making pencilled charts of the layout of each of the six cases with only sufficient detail to identify the various exhibits. Our large sheets of Japanese mending-tissue proved invaluable for this purpose, permitting roughly same-size sketches, thereby simplifying later interpretation by the staff. Subsequently the documents from each slope-top case were removed and sorted into batches of similar material for treatment together, while the loose associated labels were stored in cardboard boxes strapped each to its corresponding case with masking tape.

The laborious documentation proceeded slowly (in some areas objects stacked one upon another had stuck together) and it was considered imperative that steps be taken to halt growth of moulds in display cases that could not be charted immediately. Although these had been opened in order to facilitate drying, the ambient high humidity and lack of windows and of an operating airconditioner, together with the presence of sea-salt serving as a humectant, kept them moist. It was, therefore, decided to thymolise the objects in situ. This was to be done by first laying sheets of thymolized paper over the whole contents, then confining thymol vapor by means of a second layer of polyethylene sheet -- used in place of closing the glazed top of the case -- and then raising the concentration of thymol by playing heat-lamps on the polyethylene in order to volatilize the thymol below. Accordingly, volunteers were

set to work: melting thymol crystals into blotting paper by application of a laundry iron; cutting polyethylene to a size that would seal the case and fixing it into position with masking tape; connecting a heater-lamp into a tangle of extension leads strung overhead, then waving the lamp down the length of the case and back for hours (one of the faithful volunteers was fortunately an orchestral conductor!). Naturally, before covering the objects over, those materials especially sensitive to thymol (varnished frames, etc.) or to heat (tortoise-shell, etc.) had been removed.

Contemporaneously with this work on documents, preparations were made for improving the condition of uniforms and costumes. One sequined dress whose multi-layer train was still sodden and growing moulds had been opened to the air with the aid of cords and clothes-pins and then exposed to a steady air-flow from a fan set up nearby. Several Confederate uniforms that were heavily coated with silt and clearly needed a wash were now hung in the airy passageway and the most robust of them selected for treatment first. This was begun by a volunteer gently brushing off caked silt with the aid of a type-brush. Before long, a mound of this had accumulated beneath the hanging coat.

Meanwhile, a washing-tray for continuation of the treatment was under construction by other volunteers. A corner of the museum distant from display cases and near to a doorway opening on to the lawn was selected as its site. A double-width door that had been washed into the grounds from a quarter-mile away served as a base (we were never able to remove the doorknob!). It was turned into a tray by adding a frame nailed up from the 2" by 4" lumber freely available from the piles of wreckage and then lined with polyethylene sheeting, its travel-punctures sealed with Magic-Mend tape. The tray was supported horizontally on two oildrums chocked with cinder blocks in order to facilitate the tilting-out of used water. This water could be discharged when required through a low place cut in the four-inch wall of the tray. It could be dammed at other times. It was allowed to discharge into a sloping wooden trough lined with polyethylene and to run out on to the nearby lawn. Water was available under pressure from the well through several hundred feet of garden hose. This laid out in the sun and allowed the water to become heated to as much as 130°F before it entered the tray through a trigger-controlled nozzle. A screen for the support of uniforms in the water was made from aluminum insect-screening found in the grounds. In order to forestall damage to fabrics the sharp cut ends of wire at each end of the pieces were carefully bent sideways and the ends of the screening rolled over them.

Following the brushing and thorough cleaning through a screen by vacuum, a preliminary soak was given for about an hour in plain water. Flexing of the fabric at this stage allowed much of the silt to fall away through the screen, which was then lifted on laths (taken out of modern trellis bounding the building) to allow the silt to be washed and sponged from the tray. To a fresh bath of warm water, Orvus detergent was added and the resultant solution gently worked through the fabric

by flexing. Residues of silt and various localized deposits of unknown origin were freed by further brushing. After inspection of the outer surface the sodden uniform was again raised on the laths and the tray drained. Next, a rinsing bath was assisted in its action by inserting the spray nozzle inside the uniform and driving water through the fabric from the inside, inch by inch. After a final rinse in which the presence of detergent could not be detected by its foaming action, the uniform was draped to drain on one of the museum's damaged mannequins, standing above the tray and stayed by ropes. Overnight, drying was accelerated in the air-stream from a slowly-running fan. Subsequently other uniforms were treated similarly.

Epaulettes decorated with metallic thread were removed from uniforms and treated separately. If merely dull these were brightened by polishing with velvet. Several areas, however, were already encrusted with green corrosion products. These were removed by applying a poultice of paper pulp containing bottled lemon juice (the only source of citric acid available).

The most fragile object to be washed was a lady's full-length yellow silk two-piece dress. Areas of its fine fabric had already split off. Washing would clearly be a hazardous operation but the consequences of leaving it stained with mud and salt water were likely to be even more destructive. The weak areas were therefore protected by facing both sides with wet-strength paper (obtained from the kitchen) affixed by clothes-pins. A treatment similar to that of the uniforms was applied but flexing was of the gentlest sort, soft sable brushes -- not the stiffer-type brushes -- were used under water to remove silt caught in hems and the water-jet was never allowed to impinge upon the fabric.

The approach to the final drying stage presented some problems because it was considered that the strength of the delicate fabric was inadequate to support the weight of water that would be held in it. For this reason, a cone that would fit closely within the dress was constructed from p.v.c.-coated fiber glass insect-screen and worked into the inside while the dress lay supported in water. The narrow end of the cone was then lifted out, bringing a short length of the fabric out of the water to drain. Successive further lifts at intervals to permit drainage enabled the whole to be raised eventually and to be supported at the apex of the cone alone. At this time, multitudinous filmy ruffles in the overskirt were smoothed out with the fingers. The skirt of the cone was then expanded by insertion of a folding chair to allow free access of air for rapid drying in the stream of air from the fan. Once dry, a rigid supporting form was constructed from chicken-wire covered with p.v.c.-covered fiber glass screening sewn on with nylon fishing line. This form presented a soft outer surface that would be in contact with the dress. It could be shaped to support the garment as required and would serve to minimize future flexing of the already weakened fibers.

In parallel with the later stages of textile washing, preparations were in hand for the more thorough treatment of the documents now all charted, aimed at washing out salt and stains and adding fungicide. Volunteers were set to work constructing a series of five work-stations on a twelve-foot long work-table that had been washed in.

The first stage required a soaking bath, simply made by laying another frame constructed from two by four lumber directly on the work-table and laying polyethylene sheeting inside it. In due course, this would be filled with hot water boiled in installments in the kitchen. Documents whose ink was fast would be laid in it and time allowed for the sea-salt to diffuse out. For emptying, a syphon was made from plumbers' fittings that happened to be handy: it was anticipated that several refills would be necessary.

The second stage consisted of a sloping glass plate on which wet documents could be placed to drain sufficiently to allow space in the paper for taking up a little fungicide from the next stage.

At the third stage were located two trays (one had formerly watered the mansion's guard-dogs) filled with a three per cent aqueous solution of sodium pentachlorophenate -- the strongest solution our limited supply permitted us to make. The solution would be diluted in each sheet by the water already present.

The fourth stage contained another draining plate on which we hoped for a preliminary drying in order to prevent loss of fungicide to the blotters employed for flatting later. A powerful lamp and a fan were slung from the joists overhead but the fan could not be used, even running slowly, without fluttering the paper.

The fifth stage was a pile of felts and blotters topped by a board that could be weighted down by about thirty one-gallon bottles of drinking water selected from the emergency supply.

This arrangement worked reasonably well. Had there been space and material it could have been improved by extension of the draining and drying areas and by an additional stack of blotters and felts. In fact, a photo-glazing machine that was used for glazing of rewashed photographs -- fungicide was not applied to these -- was also used to speed the drying of other items but we could have used more of them.

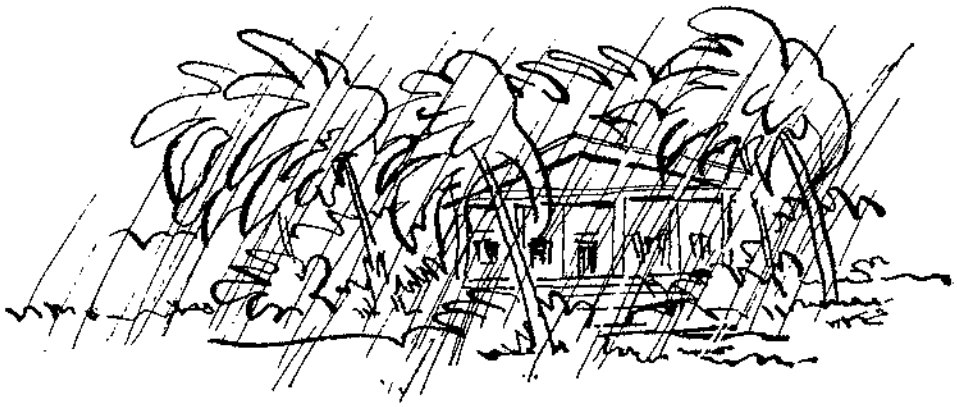
Once started, the various interlocked operations of supply and manipulation had to be continued until the treatments begun had been completed. This situation, arising on our last full day of work, resulted in treatment of an immense number of documents (over 800 we believe) during a working day commencing at 8:30 a.m. and continuing without breaks of more than a few minutes until 1:30 a.m. the following day -- resulting in painfully swollen ankles for one of us! This was the third in the series of injuries: first, 30 bites by mosquitos despite precautions; second, extensive bruising of the forearms caused by repeated tilting

of the textile-washing tray, weighing up to 300 pounds when loaded.

Other operations had been carried out at various times as opportunity served, usually directed toward halting the damage from moulds. For example, before our arrival volunteers had already mopped over exposed glass but another helper was now shown a method of dealing effectively with the slimy film that still remained. Other volunteers were shown how to dismantle the glazed picture frames from the brick basement walls, in which moulds were growing, and how to brush off the growths outdoors and apply fungicide. Formalin was used on the glass and alcoholic pentachlorophenate was applied to mats but nothing was applied to the prints themselves because time did not permit preliminary examination in order to assess the suitability of each for this treatment. The moulds -- black, green, yellow and white -- found on objects were brushed off out-of-doors. Books that could not be washed readily were freed of dried mud by applications of Opaline pads, page by page out in the open air, for as long as volunteers could be found to do it.

During the few hours available early in the day of our return to Washington a new survey of the situation was made and various priorities for further work were discussed with the Director. He had already been introduced to standard texts on conservation and some detailed suggestions were now made, in particular concerning disinfection of the thousands of books in the library which had by now been given a temporary roof. Further advice was proffered, on request.

The above story ignores many details of activity but does draw a general picture of the kind of aid that a museum may need after a natural disaster. In summary, during five days that included travel for 1800 miles, the Smithsonian team had worked a total of forty-six hours, built equipment, organized at one time as many as six volunteers of unknown skills into useful activity, washed and stabilized over 800 documents, cleaned four costumes, introduced museum people to the principles of conservation, and recorded highlights of the operation in a series of about one hundred photographs. (Manuscript received November 15, 1969)



LIST OF MATERIALS TAKEN TO BILOXI

Tools

2 Polyethylene sprayers, finger-pumped
2 Infra-red heater lamps with sockets, leads and handles
Min. of 3 x 12' Extension cords with multi-way adapters
2 Thermohygrometers, hair. Abbeon, 4" dia. No. 4F/100
20% - 100% RH, + 20° - 100° F Temp.
4 x 18 Clothes-pins (clothes pegs)
1 Staple gun and reserve of staples
Hammer and 4" nails (on site)
Cross-cut saw (on site)
1 Mat-knife (Stanley # 299)
1 Scissors 6"
1 Scissors 10"
2 Laundry irons
4 Cellulose sponges
2 Cotton wadding, 16 oz. rolls, Grade A
2 Trays (Dishes) c. 22" x 26"
2 Glass plates c. 30" x 20"
1 Rubber roller-squeegee
1 Photo print-dryer, flat bed - obtained locally
1 Vac. cleaner with tools (on site)
4 Fans, 20", electric and cords (two-speed most useful)
6 Micro-spatulas, 1/4" wide
5 Spatulas, steel, assorted sizes 1/2" to 2"; wood handle, 6", flexible corrosion resistant steel 3/4" blade double type; stainless steel 8" long; flat blade 1 1/2" x 1/4"
3 Tweezers, plastic
3 Tweezers, metal
1 Spring balance in oz
4 Opaline pads (art gum powder in stockingette bags for cleaning documents)
2 Magic-rub (architects' plastics erasing material)
3 Brushes, acid-swab 3/4" long bristle, 3/8" square
4 Brushes, bristle 1/2" long x 1/4" x 3/4" (type-cleaners) stiff, wooden handle
2 Brushes, sable flat 2" wide x 1/4", bristles 1 1/2" long, 7" handle. Acid swab, flat brush with tin handle 5 3/4" long, 5" handle, 3/8" wide, 1/4" wide handle; 23/32" bristle length
1 x 12" Stirring rods for mixing solutions, 12 mm diameter, glass
6 Coat-hangers - local supply
1 Glass bristle brush - silversmiths quality
3 Photolamp reflectors with clamps and stands and 100 watt lamps (light in dark places)
Hand lens x 10 and pocket torch
1 Cutting shears for chicken wire

CAMERA, Flash gun essential

Materials

15 ft Paper-makers' drying felt, 79" wide
63 sheets white blotting paper, 24" x 38" (96 1/2 cm x 61 cm)
2 balls brown twine (drying line, etc.)
4 rolls masking tape, crepe backed, 60 yd rolls
2 rolls Magic-Mend cellulose acetate pressure-sensitive tape 3/4", 36 yd roll (water proofing holes in polyethylene sheet, etc.)
12 yds 28" p.v.c.-covered fiberglass insect screening (18 mesh/inch)
6 Note-pads
12 Graph paper, largest
Japanese mending tissue, 28 1/2" x 19" Yotsuban #1 thick, #2 med. thick, #3 thin
8 oz rice-starch paste, ready for use
1 pint Dry-paste, mixed with water ready for use and paste, rice starch - all cooked
20 yards Polyethylene sheeting 6 mil lay flat, at least 72" wide
dozens Paper cups (for solutions)
dozens Styrofoam cups (props, spacers, airing-tubes when bottoms removed)
1 roll 3 x 50 ft. 1/4" dia. sash cord + ropes from packages
1 roll Aluminium foil 18" wide (kitchen foil)
6 yds 6 ft wide Chicken-wire 1" (shaped supports)
11 x 50 yd roll Lustron fishing line + needles (sewing insect screen)
3 Starter-switches for fluorescent lamps damaged by water
1 roll Wet-strength tissue, kitchen material
10 yds 6 ft Burlap (sacking)
3 pints Formalin
3 lbs Thymol crystals
1 lb Citric acid (or lemon juice)
7 1/2 lb Orvus detergent (Procter and Gamble)
6 pts Ethanol, absolute, 200 proof (Denatured alcohol would serve equally well)
1 lb Sod. pentachlorophenate
1 pt N/10 silver nitrate acidified with nitric acid in dark bottle
1 cartridge Ion-exchange mixed resins with inlet tube to accept 1/2" hose (making de-ionized water for testing)
6 1/2" test-tubes in rack
1 pt "Silver Dip" and Tarnish-preventive spray
1 qt Acetone

Source of water.
Means of heating water.

BULLETIN

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