

TREATMENT OF FIRE AND WATER DAMAGED RECORDS

IT IS to be expected that the larger and presumably more important library and archival establishments today are fully cognizant of the ever-present possibility of fire-damage to their holdings and that they have provided suitable protective equipment. Such establishments are usually manned by guards day and night, are housed in fire-resistant buildings, and are generally provided with the automatic fire-detecting system and carbon dioxide fire-extinguishing equipment as recommended by the National Fire Protection Association.¹ The danger of any large-scale conflagration or appreciable water damage under such conditions is almost negligible.

Unfortunately the greater percentage of valuable records and volumes are not housed under these ideal conditions but are kept as best they may be by multitudes of smaller libraries, archives, and other establishments of a public or private nature that may not be primarily concerned with records protection. These records are subject to varying hazards and every year a sizable bulk of the material is destroyed by fire. It is impossible to estimate the quantity of valuable papers and books that have been lost by this means in the past, but it is safe to say that the world is substantially poorer in a cultural way not only because of the great well-known fires of the past, such as the burning of a large part of the Alexandrian Library in 47 B.C., but also because of the losses sustained in the innumerable lesser fires of later dates. Although great advances have been made in the knowledge of fire prevention and fire extinguishing, the smaller establishments now in existence that are unable to provide the recommended forms of protection are still dangerously subject to fire hazard, and in spite of all possible precautions it may be expected that records will continue to be lost and damaged by fires of the future.

It has been the experience of the National Archives in its work with other agencies that the damage resulting from these inevitable catastrophies may be largely reduced and in some cases almost completely eliminated by careful and intelligent handling of the records materials as soon as possible after the fire has been extinguished. It is the purpose of this paper to describe the methods that have been

¹ *Protection of Records: Consolidated Reports of the Committee on the Protection of Records* (Boston. National Fire Protection Association, 1939), 88 pp.

found generally adaptable and have best served the purpose of putting the remnants of a group of fire-damaged records in good usable condition.

The records custodian faced with the problem of rehabilitating a group of burned and water-soaked materials should make a careful inspection of the area as soon as possible after the fire has been extinguished to determine the extent of the damage and to plan for the orderly salvage and evacuation of the material if these should be necessary. This tour of inspection should certainly be made before any debris is cleared away or any reconstruction of a permanent nature is undertaken. The custodian will generally find that in a moderate fire the records on top, if they are loose papers on open shelves, will have suffered the greatest fire and water damage but that they have in turn protected the sheets below them. Papers stored in folders or small boxes are frequently found in good condition although the containers may have burned to some degree. If a considerable quantity of water has been used to extinguish the fire, some of the records on lower shelves or directly on the floor may be completely water-soaked.

After the custodian has appraised the damage he should form a definite plan for handling the material that will result in the greatest salvage in the least possible time and with the least amount of skilled labor. In almost every case of fire and water damage it is assumed that maximum salvage of all materials is desired; and if that is true, the plan should be based upon the physical nature and requirements of the various types of records materials affected rather than upon their relative values. Bound volumes, because of their complex nature, are subject to the greatest potential damage and should be cared for immediately after the dry, charred papers have been set aside under cover for safekeeping. Wet papers, both burned and not burned, should be handled next, and last of all the dry ones may be sorted and repaired where necessary.

Small Scale Rehabilitation of Fire and Water Damaged Records

In order to describe the method of approach in salvaging records after a fire, it will be assumed that there has been a fire within a record room of a fire-resistant building. The fire attained considerable intensity before it was extinguished by the water, some from the overhead sprinklers and some from the fire hose. The building

structure itself was undamaged but the furniture, shelving, and some of the records were badly charred. The records consisted of a large section, from floor to ceiling, of leather, paper, and cloth-bound volumes; loose papers filed vertically in folders in file cases; loose papers laid flat on shelves, some in folders and some without covering; and a group of maps, both paper and tracing cloth, which had been left on a table.

Upon examining the room after the firemen had left, it was found that the loose paper records stored on the open shelves had suffered the greatest fire damage. Those on the tops of the piles were badly charred and some may have been burned beyond recovery. The papers stored lower were burned around the edges and somewhat damp. One pile of papers had been pushed from the shelf by the force of the water and the sheets were scattered on the floor in the water and debris. The papers in the file cases seemed to have suffered little water damage but appeared to be scorched and brittle from the intense heat. The volumes on the whole were not badly burned but those near the top were wet from the spray from the sprinkler nearby. A few of the bindings had burned somewhat and the pages of these volumes were scorched on the edges. Those tightly packed on shelves appeared to be in better condition than those that had been more loosely arranged. The maps on the table were mostly heavy mounted sheets and seemed to be more wet than burned.

In such a situation the actual total loss of material should be relatively small and it should be confined to the few top loose papers that had been stored flat on open shelves. All else should be salvaged in such condition that it may be immediately usable or safely stored pending suitable rehabilitation at a later time.

First Aid

Salvage operations that will aid considerably in the eventual rehabilitation of the materials may probably be carried out advantageously in the following order:

1. The loose papers scattered on the floor should be picked up, carefully smoothed out where crumpled, and placed individually between white blotters to dry. The identification of the series, or of the individual papers where desirable, may be written directly on the blotters.

2. The very badly charred loose papers on shelves should be

carefully covered with blotters to prevent loss of fragments but left in place for the time being.

3. The water-soaked volumes should be taken from the shelves to a dry room where they should be stood on end with their covers spread to permit rapid drying. A glass-topped table is ideal for this unless the material is actually dripping, in which case blotters should be used to remove as much water as possible. The drying of the volumes will be hastened if a fan is used to circulate the air around them. If the water-soaked volumes are removed soon after the damage, the bindings and pages will not stick together, molding will be prevented or at least minimized, and it is unlikely that the dye in the binding materials will stain the pages.

4. The maps should be blotted to remove excess moisture and then spread out singly on a flat surface to dry by exposure to the air. It is not advisable to place this type of records material directly between blotters because the paste used in mounting maps may seep through the backing and cause the maps to stick to the blotters.

5. The damp papers that have not been scorched should be carefully separated from one another and ironed immediately or placed individually between blotters to dry. The damp papers that are embrittled from the heat or burned to any degree should not be ironed but must be dried by interleaving with blotters.

All this work should be carried out within twenty-four hours of the fire or before the moisture has evaporated to any extent in order to minimize the amount of subsequent treatment of the material that will be necessary.

Further Repair

Maps:

When the maps are fairly dry they should be placed between waxed papers and then in turn between white blotters and pieces of corrugated paper. This arrangement may be built up to include a number of maps and then weighted until drying is complete. A large piece of masonite or other wallboard is excellent to provide the even pressure over a large surface that map flattening requires. If necessary, additional weight may be supplied by placing heavy objects on top of the board. The maps should be allowed to remain for several days under this pressure to provide the ample time for complete drying that will prevent the later curling or buckling of the material.

Bits of charred paper or other foreign materials may be removed from the surface afterwards by gentle scraping or lifting with a thin knife. In some instances superficial dampening of the surface may be required to aid in the removal of the dirt, but this means should not be employed unless the other method has failed. After the maps have dried thoroughly the edges should be carefully examined to determine whether or not the water has loosened them from their cloth backing. Any parts that are not securely attached to the mount should be repasted. If the pasting needed is extensive, the maps should be replaced under the weight to dry again.

If a map on tracing cloth has been thoroughly wet, it may apparently have lost a good deal of its sizing and will be limp and somewhat out of shape. It should be carefully suspended while still fairly damp from a taut cord or a rust-proof wire so that it may hang freely in the air with the warp or lengthwise of the material hanging vertically. The sheet should be carefully attached to the cord across the entire width so that all parts will hang down smoothly without sagging. The cloth should hang undisturbed in this way until practically dry when it may be safely handled. It may then be taken down and pressed lightly with a warm iron on a firm ironing surface. A tracing carefully treated as described should show little or no distortion or other ill effects of its wetting.

Volumes:

After the bindings of the volumes have become moderately dry by exposure to the air as previously suggested, simple jackets of heavy waxed paper should be made for them so that the books may be laid flat with the covers closed without risk of the binding cloth sticking to or staining the pages or the surface on which the books rest. The next step consists of examining the pages of the wet volumes, separating them from one another by inserting a thin spatula if necessary and interleaving the sheets with thin white blotters or other absorbent paper. The volumes, stacked with heavy blotter padding between them, should then be placed in a book press under light pressure to flatten the sheets and to eliminate warping of the boards during the drying. Care must be exercised that the pressure is exerted on the boards only and that the hinges and back extend beyond the press. After twenty-four hours the volumes should be removed from the press and examined. The pages may not be perfectly dry

but under ordinary circumstances they should have no tendency to cling together when the damp blotters are removed. If the paper is extremely heavy and has been thoroughly soaked, however, it may be desirable to replace these blotters with dry ones and repeat the treatment. When the blotting papers are finally removed, the books, still in their waxed paper jackets, should be stacked in piles with their title strips alternating from left to right. It is recommended that the volumes be separated from each other in these piles by placing corrugated paper between them. A weight of about five to ten pounds should be placed on the top of each pile and this whole arrangement should be left undisturbed in dry air for at least a week or until the covers have dried thoroughly. If the volumes have been too badly damaged to respond to this simple treatment, it may be necessary to uncase them, flatten the boards and dry the pages separately, and then replace the casing. Under ordinary conditions, however, if the treatment of the wet volumes is undertaken promptly, there should be little need of resorting to this method, which is not only more time-consuming but also requires the services of an experienced bookbinder. Volumes that have been partially burned and have shrunk or warped somewhat around the edges will certainly require expert care in any case. The old boards must be entirely discarded and new ones that are large enough to protect the pages adequately must be provided. During the rebinding process the pages should be carefully examined and repaired if necessary. Probably nothing need be done where charring has been superficial and has been confined to the edges, unless the paper has been subjected to such intense heat that it has discolored or embrittled noticeably. In such cases the pages must be painstakingly separated, individually laminated or otherwise strengthened, before they are rebound. Badly charred pages must, of course, be strengthened before rebinding.

Loose papers:

After the maps and volumes have been satisfactorily disposed of, attention may be directed towards the repair of the loose papers. Those that had been water-soaked, whether burned or not, have been separated while wet and placed between blotters as a first-aid measure. It would now be advisable to examine systematically and sort out the other papers, separating those that have been burned to a greater or less degree and will need repair from those remaining in good condition. Unless the papers in folders are very weak and badly

charred, they may be most conveniently handled by transferring them with their identification from the old, damp, or charred folders to new ones. The papers that had lain free on the open shelves will probably be more seriously injured than the others and these should be interleaved with blotters to protect them as much as possible from loss and fracture until their repair may be undertaken.

After the whole collection has been carefully examined and sorted, the material will probably be divided into several well defined groups: (1) the water-soaked and burned sheets between blotters; (2) badly burned sheets between blotters; (3) the free papers in good condition that need no treatment; (4) papers in new folders that are brittle and that should be repaired; (5) papers in new folders that need no treatment; and (6) papers in the original folders. Of these categories, those sheets placed between blotters should have first attention. Those merely water-soaked may be dried by ironing or by pressure and will need no other treatment. The burned ones should be carefully laminated by means of heat and pressure with transparent thermoplastic sheeting, or if this method is not available, the documents may be covered with such a sheeting that is supplied with an adhesive for direct hand application. Either method will provide sufficient additional strength for safe handling of charred papers.

Large Scale Rehabilitation of Fire and Water Damaged Records

It has been assumed, in the foregoing discussion, that the bulk of material damaged has been relatively small but valuable and that the resources of equipment and labor for its rehabilitation have been rather limited. If the damage is extensive, however, and labor, equipment, and materials are plentiful, certain modifications may be suggested. Large quantities of wet papers may be quickly and effectively handled by ironing with a mangle. Large quantities of charred papers can be handled most economically by laminating with heat and pressure. If such equipment is not available close to the scene of the catastrophe, the documents may be safely shipped to a laminator by interleaving them individually with blotters somewhat larger than the documents and tying the bundles securely with string. There appears to be no really satisfactory rapid method of treating wet volumes on a large scale, but it is highly important that all of them be removed from their shelves and separated from one another as quickly as possible, before the glue sizing of the book cloth binds them together into a solid mass. If papers or books are allowed to

remain in wet masses for any protracted period, they not only stick together but may mildew and become stained with the inks and dyes used in their manufacture. Some of the water-soluble inks may blur or disappear entirely under such circumstances, but if the material is separated and handled promptly little real permanent damage may be expected.

Later Salvage

Although it is always desirable, it is not always possible to deal with fire-damaged records immediately, and the custodian may sometimes be faced with the problem of salvaging what he can from a fire which has occurred a month or two previously. Here the problem is quite different and the method of approach must necessarily be modified to some extent. The percentage of salvage may be as great, but the task will be far more time-consuming and expensive than it would have been if immediate first-aid treatment could have been undertaken. More equipment, and more careful and highly skilled workmen, will be required. The volumes may be found glued together, the boards warped, and the colors streaked and staining the pages. The loose sheets may also be stuck together and badly shrunk or wrinkled. The process of separating these pieces must be carefully carried out, using a very thin, large spatula to lift each sheet. The papers must be moistened by exposure to air of high humidity and then ironed or flattened under pressure. Pages of volumes may be handled in the same way with little danger of damage, but the bindings themselves will at times defy satisfactory separation and it is to be expected that a relatively large proportion of the bindings, which may have been in good condition, must be discarded and replaced with new ones. If the pages have been stained by the dye of the bindings, there is nothing that may be safely done to remove the discoloration because any bleach that would be effective would also dangerously weaken the paper. Mildew stains on paper are also extremely resistant and no attempt should be made to remove them other than to dust the sheets with a soft cloth. Mildew on bindings may be reduced and occasionally completely eliminated by wiping the bindings with a cloth moistened with carbon tetrachloride or other dry-cleaning solvent. Leather bindings that have been wet or exposed to excessive heat will benefit considerably by a liberal application of a suitable leather dressing, rich in neat's-foot oil. This

treatment will help to prevent excessive brittleness and premature decay. Salvageable buckram bindings may give satisfactory service without treatment but their appearance and general texture will be improved if a coating of a clear lacquer which does not contain cellulose nitrate, shellac, or varnish, is applied. The ethyl cellulose and the vinylite resin base lacquers have been found suitable for this use. The volume should be air-dry and conditioned to the normal humidity of the storage area before any lacquer is applied.

From this discussion it will be apparent that although fire and water damage have always ranked high among the enemies of records and have caused the complete destruction of enormous quantities of them in the past, such damage should not, in most cases, be considered irreparable. A high percentage of salvage from all but major disasters is generally possible if the problem is approached and handled promptly in a logical and orderly manner based on the physical requirements rather than on the intrinsic value of the records affected. If the records are carefully repaired in the best manner available, little loss should be anticipated from the usual type of records fire.

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