

Notes and Communications

Unrolling Maps for Flat Storage

by JAMES TURNER*

Introduction

A review of the literature on the preservation and handling of maps reveals that little has been written about this important question. Most articles deal with storage conditions and storage systems. Monographs on library and archival map collection usually contain only a small section on preservation which does not go into detail. What information is offered is generally quite valuable; however, since the economically difficult times in which we live assure that many institutions will not be able to hire trained conservators, it is important to provide practical advice for map custodians.

Preservation and handling problems particular to maps arise mostly because of their size. As a rule they are not amenable to binding nor can they conveniently be boxed. Often their size is not proportional to the thickness or strength of their paper support, so that they need to be backed or encapsulated in order to endure the stresses to which they are subjected in handling. Maps are best stored flat. This kind of storage provides the most support and the least stress, although there is some argument in the literature whether vertical or horizontal storage is more appropriate for maps. It is agreed that flat horizontal storage is better for large folio volumes in libraries, but vertical storage is widely accepted. Although there is doubt whether vertical storage is suitable for maps, Joanne M. Perry makes a convincing case for use of one vertical storage system, the Ulrich Planfile system.¹ In any event horizontal storage is more natural and generally map cabinet systems are preferred. Sometimes storing maps rolled is the only possibility, and Thomas Nagy gives sound advice on this method.²

Like other archival documents, maps should be handled carefully and as little as possible. White cotton gloves help protect the document from skin excretions. Mylar encapsulation provides even better protection. This method is adequately described in the literature and is excellent for institutions with limited resources because it is relatively

inexpensive and easy. Environmental storage conditions are important as maps spend almost all their lives in storage, and the requirements for maps in this regard are the same as for other documents on paper.

Maps usually arrive in an archives rolled up because transporting them is much easier in this fashion. Often they have been stored that way for years, and archives often continue to store them rolled. Some archives use pigeon hole storage cabinets for this purpose, but such cabinets are not recommended because they are difficult to clean. Insects can also hide deep inside them. The ends of maps are exposed to dust and those protruding are in danger of crumpling or breakage.

Large map cabinets are expensive and heavy, and take up space, but even with these disadvantages they provide the best storage. Maps are usually stacked in them interleaved with acid-free paper, or alternatively each has its own folder of acid-free stock. Removing maps for consultation requires much care and the stack down to the desired map must first be lifted off. It is too dangerous to pull the map from the stack.

Information on how to unroll maps for flat storage is scant in the literature, and this paper will concentrate on describing procedures that can be used safely.

Unrolling maps for flat storage

Soaking a map in water quickly relaxes the paper fibres and the map can then be unrolled easily, but since there are too many unknowns before the map is opened out, serious problems may arise if this method is used. Slowly humidifying a map will have the effect of relaxing the fibres, but since the action occurs gradually far more control is possible and there is far less danger. Unrolling maps for flat storage is not a difficult task if one is well equipped and has a clear idea of what to do. Usually a homemade approach is appropriate because procedures are not so critical as to require a high degree of precision, and because a permanent facility is not essential.

Humidifying maps to permit unrolling

Your institution may already have a permanent facility in the form of a vacuum chamber. It can be loaded with maps and a humid microclimate created in which the maps sit until they have become limp. Any residual fumigant or deacidification product in the vacuum chamber's circulation system should be beneficial rather than harmful to the maps.

A technique that has been used widely for creating a humid atmosphere is to use a plastic garbage can with a few litres of water in the bottom, standing the maps in a smaller, dry container such as a plastic pail placed within the can. With the garbage can lid providing a seal, a humid environment is created by evaporation of the water. It may even be necessary to add water at some point, as maps are often backed with cotton or linen and may also be on thick paper themselves, so that they may absorb all the moisture. Before adding any water, the maps and their support container must be removed to avoid splashing them.

A variation of this technique is to substitute a plastic garbage bag for the lid of the garbage can. This is done if the map rolls are so long that they jut out above the top of the can. The garbage bag should be tied to the can to hold it closed, providing a seal. Plain cotton archival tape of the type used to tie books and paper documents together will do nicely for this purpose. Stretch cables with S-clamps on the ends, of the kind found in

hardware and automotive supply stores, can also be used. If adhesive tape such as masking tape is used to make the seal, care must be taken when it is time to lift off the garbage bag to remove the tape entirely or fold it under so that it adheres to the plastic bag, otherwise the tape may catch on a map while it is being removed, and cause the map to tear or fall into the water. This technique is simple and works well, but it requires several hours to humidify a few maps.

Another technique along these lines is to use a large, deep plastic tray with water in the bottom and the maps sitting on a support through which the evaporated water can pass, such as plastic grid fluorescent light screening. This works faster than the garbage can technique. If a Plexiglas top is also used, the action inside the tray can be observed.

If a large-scale operation can be arranged, it is then possible to process a much greater number of maps in a relatively short period of time. It is a good idea to plan a session of unrolling maps when a team is standing by to perform any necessary treatments. Since the process is gradual and controlled, team members should not feel pressure to make hasty decisions concerning treatment, and of course only the minimum required to ensure proper conservation should be done at the time.

A small room can be used as a humidifying chamber. Alternately, a temporary greenhouse structure can be constructed by building a wood frame and covering it with plastic sheeting, or a small stack area can be enclosed, using shelving as scaffolding from which to drape plastic sheeting and to hold maps during humidification. Any available racks which will adequately support the maps during humidification are suitable, as are clotheslines made from cotton archival tape which can be strung — about 20 centimetres between lines is enough to provide adequate support — and the maps laid across them. Gauze or fishnet supports also work well because they provide good support yet permit circulation of the humid air. Any combination of these techniques can be adapted to local circumstances. Since there will be a sudden increase in humidity in the surrounding area when the operation is finished and the plastic walls are removed, some exhaust outlet needs to be provided if documents are stored nearby. Building the chamber near a window should take care of the problem.

Fan-type home humidifiers hold almost 25 litres of water and are ideal for creating and maintaining even humidity in the chamber. Small steam producing humidifiers of the type made for sickrooms are not recommended. They create too much heat and do not provide enough humidity, as well as requiring a great deal of electricity.

In most cases it is not necessary to provide any special temperature control. Warm air holds more moisture than cold, but the warm, humid conditions helpful for unrolling maps also favour mould growth. The maps undergoing treatment should be supervised constantly, checked at least every half hour, and left in the humidifying chamber only until they can be unrolled easily, without strain or danger of breaking. They should not be left so long that fugitive inks have a chance to bleed, nor should they be left overnight.

Unrolling maps

The humidified maps should be placed, one by one on clean, white blotters on a table, and opened very gently. This often requires two people, in which case a verbal run-through of the operation should be done to ensure coordination. Often maps which have been rolled for years tend to roll up again, although this will depend on the degree to which they are

humidified. The humidity causes temporary weakening of the cohesive strength of the paper, so that adequate care must be taken in handling. The end flap should be placed near the edge of the table, and the roll gently opened onto the table, using its surface for support. Clean weights may be used to hold the map down if there is so little resistance that there is no danger of breaking. If there is resistance or if a map requires force for unrolling, it should be returned to the humidification chamber. Sometimes at this stage it is possible to see inside the roll and gain valuable information about colouring, inks, and inside damage.

If the roll has been partially opened it may help to return it to the humidification chamber with two rolled ends even if the rolled ends are touching. This will expose more surface to the humid air and speed the process of humidification. If, however, the paper is so weak as to break, leave well enough alone. Ensure also that the corner of the roll will not act as a blade edge and cut through the map, creating a gash. It is important to check what kind of surface you are rolling the end onto. Is there any risk of ink transfer, surface dirt you might grind in, or a tear started that might continue if the edge of the paper sheet is introduced?

As each map is opened it should be examined immediately for:

- (i) Mould growth. This should not have occurred, but it is important to be completely sure, otherwise deterioration may continue. If there is any sign of mould growth, a thymol fumigation treatment should be carried out immediately.
- (ii) Ink bleeding. A rolled-up map should not be left in the humid environment long enough that its inks bleed; however, many inks are water-soluble and usually it is not possible to examine inside the roll properly, let alone perform tests, until the map is opened. The humid atmosphere may have been enough to start some inks bleeding. If this happens, fan the appropriate local areas gently once the map is unrolled and harm will be kept to a minimum. In practice bleeding will very rarely occur if maps are humidified only enough to permit unrolling.
- (iii) Breakage. If this occurs, it is probably due to unrolling the map before it was humid enough. The uneven humidity in the paper will also subject the map to other stresses which may cause additional breakage. Return the map to the chamber for further humidification.
- (iv) Flaking. Maps most likely to suffer from flaking are those on thin paper which has been backed on cloth and varnished on the surface. If flaking begins, remove the map from the humidifying chamber. Continuing humidity will soften the adhesive holding the map to its backing, and many small pieces may break away and be permanently lost. Flaking maps and maps on cracked (mosaic-like) support media must be left to a trained conservator for unrolling.
- (v) Loose dirt. Often the exposed outside flap is particularly dirty because of dust accumulation. The excess dust should be removed. A portable car vacuum usually works well for this purpose. Cover the nozzle with cheesecloth to prevent the loss of any loose pieces, and approach the work cautiously. A fine brush will also work well. If any loose dirt is found once the roll is opened, it should be removed immediately, if this can be done safely. If the dirt does not come off easily, it is better left until the map is dry, otherwise it may be forced into the paper fibres. If additional treatment is required, it should probably be deferred. At this point the map is ready for flattening.

Flattening and drying

When maps are small enough, they need only be placed between felts or blotters and pressed gently. If they are larger, they may be stacked interleaved with felts or blotters. With gentle, even weight applied to the top of the stack, they should be left to return to their normal humidity overnight. The gentle pressure on the relaxed fibres will help the maps dry flat.

If any ink has been rendered unstable by the operations undertaken up to this point, the map containing it must not be placed between felts or blotters to dry. The ink will transfer and the viscous residue paste formed by humidifying the ink's medium may even cause the map to stick to the felt or blotter. A cold suction table will dry such a map nicely, but if none is available the map can be air-dried. When it is almost dry it can be placed between felts or blotters, on condition that the ink is thoroughly dry. This can be achieved by gently fanning the recto, as well as fanning locally if required. A blowdrier is suitable for this purpose only if the air stream is cool and the force at which it hits the paper surface minimal. Alternately, the map can simply be air-dried, in which case it will buckle slightly, but this solution is far better than attempting any risky operation. It is always possible to flatten the map later, humidifying it slightly from the underside once the inks have restabilized and been protected.

A word to the wise

Remember, paper fibres should be humidified just enough to relax them; wetting the map is not required. Spraying a map with fine vapour to humidify it quickly is tempting, but must also be avoided. If humidity gets into the paper too fast, surface dirt will be washed in. The inks on the recto of the paper will not yet have been tested for stability in water. Furthermore, breaks or other weaknesses in the paper hidden from view may give way and cause additional physical damage to the map.

Do not attempt any of these procedures if you are in doubt about them, otherwise damage to the maps is almost sure to result. First practice the operations on some expendable posters or blueprints. Make sure you understand what you are doing, and that common sense prevails at all times. Particularly fragile and valuable maps require the skill and experience of a professional conservator.

Conclusion

Once the maps have dried thoroughly they are ready for flat storage. It is a good time while they are being processed to make notes on which of them need to be backed, encapsulated, or repaired, or require other treatments. In this way, if funds become available the selection process will be facilitated, and the collection need not be gone through and handled again for this purpose. Maps too fragile for use should be earmarked for conservation treatment, and retired from active use to be put away where they will not be in danger of further deterioration.

The techniques described here for unrolling maps for flat storage should be considered in the overall context of a conservation programme. Ideally professional conservators would be available to plan and oversee operations, but since many institutions are not

able to avail themselves of professional conservation services, it is hoped that these techniques will prove helpful to untrained but caring staff. With some practice using safe techniques it is possible to become quite skilled at unrolling and flattening maps, and in the long run it is far less dangerous than allowing users to consult rolled maps.

Notes

- * I would like to thank the following people who read this article and made helpful suggestions and comments: Monique Papineau, Conservation Binder, Archives nationales du Québec, Montreal; Michael Thompson, Supervisor, Paper Conservation Division, National Archives of Canada; Denise Pélissier, Archivist, Université de Montréal; John Leide, Associate Professor, Graduate School of Library and Information Studies, McGill University; and Jane Dalley, Chief Conservator, Provincial Archives of Manitoba.
- 1 Joanne M. Perry, "Vertical Map Storage," *Special Libraries* 73 (July 1982), pp. 209-10.
 - 2 Thomas Nagy, "A New Way of Storing Rolled Maps," *The Archivist* 12, no. 5 (Sept.-Oct. 1985), p. 9.