Principles of Preservation

by Hugh Phibbs

Problem solving is a critical part of preservation framing. Since the materials that come in to the shop can be infinitely various, no simple set of procedures or techniques can be expected to accommodate their physical and chemical needs. Meeting those needs requires constant innovation on the part of the preservation framer. Yet, such innovation must be executed in accord with preservation principles. What can guide the framer in such innovation?

History provides a great source for instructive examples. Solutions that have worked in the past offer us an important ingredient: Success. Nothing is more important than a history of success to work in which there is no room for errors, as is true in preservation. Work in museums and conservation studios is based on strategies that have succeeded previously. The staff of such institutions tends to remain in place for long periods, building up a memory of how problems have been handled and how those solutions can be adapted to meet new situations. Let us look at a few historic examples that can inform preservation practices.

Solutions that have worked in the past offer us an important ingredient: Success.

The Romans kept their empire functioning for centuries with the roads that connected the far-flung parts of their empire. Amazingly, many of these roads are still in use, today, thousands of years later. (It is hard to imagine any road that we have built today remaining in service for the next 2,000 years.) The Roman roads were built to be deep and flexible. They were supported by deep layers of carefully chosen soils that buffered the upper layers of the road surface, isolating them from adverse local conditions. The surface of the road could be said to "float" on the deep underlayers.

This sort of isolation is found in crates used for shipping art. In such crates, the inner box in which the art is housed rests on blocks of foam that are sized so that they compress slightly under the weight of the box. This support isolates the art from the shock and vibration that the crate may encounter.

In addition, the flexibility of the tiled surface of Roman roads allows the road to hang together, even if it is forced into a new shape. The idea of flexibility—or bending without breaking—is key to hinging, edge supports, and other preservation support strategies. Hinges that are passed through slits in the back mat have the capacity to hold the hinged sheet, even as they can yield, slightly, when the mat is bumped. Such hinges also allow for slight lateral movement if the sheet expands in response to a rise in relative humidity. The same thing is true for paper edge strip supports, which are secured to the back mat beyond the edges of the sheet. *(To read more about edge strip supports, see "Preservation Practices," PFM, September 2004.)*

Another instructive example can be found in the history of Southeast Asia. As the British were leaving their former colony, Burma, they decided to take a huge bronze bell that sat in a temple in Mandalay. The British engineers succeeded in getting the bell onto a barge on the Irawady River, but then it fell off and into the water. Try as they might, the British were not able to lift the massive bell out of the mud. After they had gone, the Burmese dived down to the bell and lashed pieces of bamboo to it. As more and more hollow bamboo sticks were attached to the bell, it gained buoyancy and eventually floated to the surface. This allowed them to pull it ashore and back to its home in the temple, showing that small increments of support can hold remarkable weight.

This same principle holds when the weight of an item is distributed across a paper or foam support. The paper or foam may not be capable of carrying the object's weight if it were concentrated in a small area, but when that weight is spread out over a long side, the paper is quite strong enough. Similarly, the massive Eiffel Tower, which sits on four wide feet, has its weight so well spread out that it presses down on the Paris soil with no more force than we do when we sit on a chair. The camel's foot, the snowshoe, the lizard that is able to run across water—each illustrates the advantage of weight distribution.

When we see three-dimensional items in a museum display, they are likely to be supported by metal pins or thin rods that have been coated with non-reactive plastic. There, the weight of the object is not widely distributed; rather it is concentrated on the tiny area of the pins, since the preferred aesthetic for visual presentation employs as little visible support as possible. Given the fact that the display case will not be moved, this aesthetic can be allowed. If that same item were sent out of the museum on loan, it would be given a conformal support structure for travel and it would be set in its display support upon arrival at its destination.

Since frames move, they should give the same kind of support that the travel housing provided. If pin supports are to be used, the frame should be designed so that the object can be removed and packed for travel and can be reinstalled when it is to be reunited with its frame. In this way, the principle of broadest, conformal support is maintained.

When a suspension bridge was to be built across the gorge below Niagara Falls, builders faced the problem of how to get started, given the rigors of the terrain. The solution came in the form of a toy: a kite. A kite was flown across the gorge and a cord was attached to the end of its string. The cord was used to pull the end of a rope across, and a small cable then was pulled over by means of the rope. Ultimately, a full-size cable was in place, and this allowed other cables and portions of the bridge to be installed.

This concept of moving from smaller and lighter to larger and heavier is also useful to preservation. When delicate objects are supported in cradles or conformal sink mounts, a series of progressively thicker and stronger papers and polymer films or non-woven sheets of polyester fiber ("spunbonds") can be used to support the object. This means that the more delicate inner layers can yield to conform to the surface of the object, while the outer layers maintain their support. Also, the inner layers can tear during an impact to the support structure while the outer layers will catch the object.

One final example comes to us from South America. For decades, scientists marveled at the incredibly tight joints between the stones in the buildings and walls that the Incas built, until some filmmakers, working for Public Broadcasting, thought to ask the descendants of the Incas how they would make such a wall. These descendants pounded the stone that was to fit into the wall until it was roughly the right shape, and then they levered it into place. They rocked the stone, so that the places in which it touched its neighbors were visibly abraded on the surface of the stones. They could then pound those high spots down, refit, and repeat the process until the stone fit, perfectly, into the gap. Dentists use the same technique with a form of paper similar to carbon paper when they are checking the fit of a crown against the tooth that it opposes.

This measuring technique is one that should be part of any successful preservation operation, since rulers and tape measures have a limited range of exactitude. Whether one is using metric or inch measurements, the subdivisions available are finite and can be subdivided only so far. If a piece of matboard is marked at the proper interval, it can be used to transfer that dimension to the site where the measurement is needed. This sort of measuring is critical when supports are being created for objects, which must be held, securely, at the proper places.

It is hard to overestimate the ingenuity of our ancestors. The things they did with levers, pulleys, rollers, and inclined planes can be difficult for us to reproduce with modern hydraulics, motors, and the like. Since the workings of the inside of a frame should not include electronic or other active elements, antique technologies are more appropriate models for solutions to our problems.

Antique construction techniques are not the only ones that can be adapted. Techniques used in woodworking and sewing can also serve as models for solutions to preservation problems. It is important that, whatever the source, such solutions conform to the principles that are essential to preservation: gentle, steady, non-confining support; the use of non-donor material; exclusion of excessive light, humidity, and temperature; protection from traffic, shock, vibration; and pollution; and closure of the support that allows for safe and expeditious removal at a later date.

This list may appear to be a bit daunting, but the help we gain from our observation of successful examples in the past gives us greater insight into how our innovations can succeed.

Hugh Phibbs, Preservation Editor, is the coordinator of graphics conservation services in the Department of Exhibitions and Loans, Conservation Division, National Gallery of Art, Washington, D.C. He has taught workshops for the National Conference, the AIC, PPFA, the conservation programs at Winterthur/University of Delaware, and the Smithsonian Resident Associates Program. He also compiled the matting and framing section of "The Book and Paper Group Outline."