Preservation Practices

by Hugh Phibbs

Basic Testing of Preservation Materials

Preservation is a discipline that is informed by careful observation and thoughtful inference. There are no large science grants to fund the examination of the physics of the window mat or chemical changes within the frame as it hangs on the wall. As we advance preservation techniques and methods, we must rely on our understanding of conditions and circumstances that we have seen in old frames or storage boxes, but we are by no means confined to examples that come from older matting and framing.

In a recent newspaper column about better housekeeping, the fact that plastic planters placed on vinyl floors can cause permanent stains was lamented. This example illustrates the fact that some preservation maxims may require careful interpretation. Generally, one can say that keeping like materials together promotes their preservation. A plastic pot on a plastic floor would seem to follow that principle.

Plastics, however, are chemically quite complex. They often contain components—such as plasticizers—that are not chemically incorporated into the molecular structure of the plastic polymer. This is exactly what the plastic planter stain exemplifies. It may be another part of the plastic that is migrating out—a part that is not chemically integrated enough to remain in the plastic.

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It has been noted that the use of plastic-based adhesives on pressure-sensitive tapes in combination with plastic-backed photos may have similar consequences. The plasticizers that have been used to soften the polymer in the tape adhesive may migrate into the plastic sheet that supports the photo. How can we assess such risks? How can we gain insight into which of our materials and techniques will perform well over time and which may have unintended consequences?

Relying on the scientific data that is provided by manufacturers and laboratories may lead to false optimism or pessimism. Science gives specific answers to specific questions. It requires that variables be limited so that the results can be certain. Experiments are carried out using large numbers of samples and controls to ensure that the peculiarities of one sample do not jaundice the results. In a shop setting, this sort of testing is not feasible. However, one can make simpler tests; and while they will lack scientific certainty, they may also enhance the experiential understanding of the framer in the same way that the careful consideration of the performance of materials and methods in the old frames that we examine open does. "Table top" experiments can extend this sort of learning to materials and methods that have not been in use for years.

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Experiments can be conducted by using test pieces to represent the material that will be put in the mat or frame. When this is done, verisimilitude is critical. All of the test materials must be as close as possible to those that will actually be used. If a commercial product is to be used, it should be of the same vintage and type as that which will be employed. Such products contain proprietary ingredients, which for valid commerical reasons, are not disclosed to the public and they can only be factored into the test if the exact product is used. Many products are reformulated, over time.Tapes may be given different adhesives or carriers, and while those that are intended for preservation usage are usually well labelled when such changes occur, products that are intended for general usage may not have such scrupulous labelling, since the change may have little meaning to the public at large.

If chemically equivalent materials can be acquired for testing, the conditions under which a test is carried out should mimic the conditions of intended usage. In regard to time, this is difficult to achieve. Heating the samples can accelerate chemical reactions, but it can also produce reactions that would not occur at normal temperature.

Since framing issues involve the presence of light, the addition of more light than would normally be in contact with a well-installed frame can be useful for simulating the future. This is because the law of reciprocity states that light exposure is a function of light over time. If one wants to test the ultraviolet filtering potential of a glazing material, test samples of that material that cover various light sensitive colorants and support materials can be set up in a window that allows strong sunlight to fall on them. Half of the sample can be covered with aluminum foil to shield that part from light and to allow it to serve as a control for the uncovered portion.

The vapor barrier potential of materials that will be used to seal mat and glazing packages can be tested with desiccated cobalt salt humidity indicator cards. Since such cards can be made completely dry without affecting their performance, it is best to condition the test materials and the card to very dry conditions before they are sealed in the test package. Being dry, they will be different from their surrounding conditions and the ability of the packaging materials to maintain this difference will indicate the vapor barrier potential of those materials. One cannot do this by making the contents of the package damp, since the indicator salts will run from one spot to another if they are made too wet.

The drying can be accomplished by placing the card and board that represents the matting in a warm heat press or in a pan that has been set on a stove that has been turned to its lowest setting. The test materials and a cobalt salt humidity indicator card can be dried together, and when all of the indicator spots on the card are blue, these materials will be as dry as possible. The package into which they will go should be prepared so that the

dry materials can be inserted rapidly. With the dry sample and indicator card in the package, the open edges of the package should be closed and sealed promptly in order to maintain their condition.

When the package sealing is complete, the condition of the environment in which the package will be kept should be periodically monitored. One should keep the prevailing local conditions in mind. In warm coastal areas, the climate is likely to be damp throughout the year.

Sealed packages for these areas must be made with glass, since moisture can come through acrylic sheet and, over time, the interior of the package will grow damp and stay that way. In temperate coastal or low elevation areas, one can expect a damp summer along with dry conditions throughout much of the winter heating season. In mountainous areas, the climate will be drier and the difference between the desiccated contents of the package and its surroundings will be less; making the challenge to the sealing materials less severe.

Since a completely dry package will be extremely desiccated, it should be expected to change when it is sealed using most methods; however, the rate at which a package changes will be indicative of the efficacy of the seal. In normal circumstances, there are not likely to be long periods during which a sealed package will be expected to face such a severe differential of conditions between its interior and its surroundings. Most houses can be expected to become rather dry in the range of 10 to 30 percent relative humidity at 70 degrees Fahrenheit during the heating season. Some parts of a house may go higher than 50 percent R.H. at 70 degrees Fahrenheit at times when the climate outside is warm.

While the problem of moisture coming through exterior walls into the home is widely appreciated, less attention has been given to interior and exterior walls that adjoin bathrooms. Since vapor barriers are not used in interior construction, the moisture that comes from frequent showering can invade and penetrate the walls around the bathroom. As in the case of the exterior wall, that moisture will be trapped by the frame and its glazing unless the frame has a sealed package inside of it or a vapor barrier dust cover.

A sealed package that is not hermetically sealed can be expected to become slightly wetter in the summer and slightly drier in the winter in most buildings, but the changes in its interior will be slow and moderate. It is difficult to say exactly how a test package should perform, but careful observation of the differing performance of different materials and package designs will enhance the preservation framer's understanding of which are more or less effective.

Other tests can be carried out. Pens for testing pH or acid detecting strips can be used to assess the acidity of materials that may be considered for use in framing, but most of the products that are marketed as being acid- and lignin-free are as advertised.

The physics of hinging and edge or corner supports can be tested by securing sample pieces of paper in mats, framing them with acrylic, placing them against the wall at normal height, and letting them fall to the floor. Since this imitates a common accident, the performance of the supports can be usefully illustrative of what one might expect to happen if the wire or hanger failed. Hanging hardware can be tested with heavily loaded frames and taping strategies for glass can be studied with lites of glass that are taped and shattered. If one pulls tape off of glass that is held above loose pigment on a support, the static created by the removal of the tape will be shown by the quantity of pigment that comes up to the glass. Anyone who has access to leaves of karat gold can attach one end of the leaf to a back mat and frame it with a spacer behind differing glazing materials. This test, devised by Steve Wilcox, is an elegantly dramatic example of the static potential of the glazing.

Framers are known for their innovation and inquisitiveness. As designers and manufacturers, framers want to know how their products can be expected to perform. Simple testing is the best answer to that question. None of these tests can be expected to give definitive or scientifically sound results, but they very useful for informing the preservation framer's sense of which materials and methods will perform well. Conservators routinely carry out such simple tests as they evaluate techniques and chemistry, and this kind of testing should be something that is shared between conservation and preservation. ■

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.