SCIENCE *of* Scrapbooking

BY DANIEL BURGE

Preservation Q&A

Many companies sell products into the scrapbook market, and most are keenly aware of the need to imply their products are of archival quality. How they come to that conclusion is of major concern to you.

MERYDITH MATHIEUS, OF FRIENDS & FAMILY SCRAPBOOKING IN TEXAS, ASKED A GREAT QUESTION ABOUT PRESERVATION AND HOW TO ACCURATELY TEST THE ARCHIVAL QUALITY OF SOME OF THE PRODUCTS ON THE MARKET TODAY. HER QUESTION FOLLOWS.

"I have done some testing on scrapbooking supplies on my own at home, but have NO IDEA as to whether or not it is effective. For example, I have put metal decorations that I wanted to use on a scrapbook page into a pouch (i.e., commercial scrapbook page protector that is supposedly "safe") with acid-free white cardstock. I waited two weeks to see if any acid that might have been in the metal decoration had transferred itself onto the white cardstock. I took out the white cardstock and used a pH pen to test for acidity where the metal decoration had rested. The pH pen stayed blue on my white cardstock and therefore I assumed it was okay to use the metal decoration. As you can see, this is hardly objective testing, but it was the best I could come up with for at-home use.

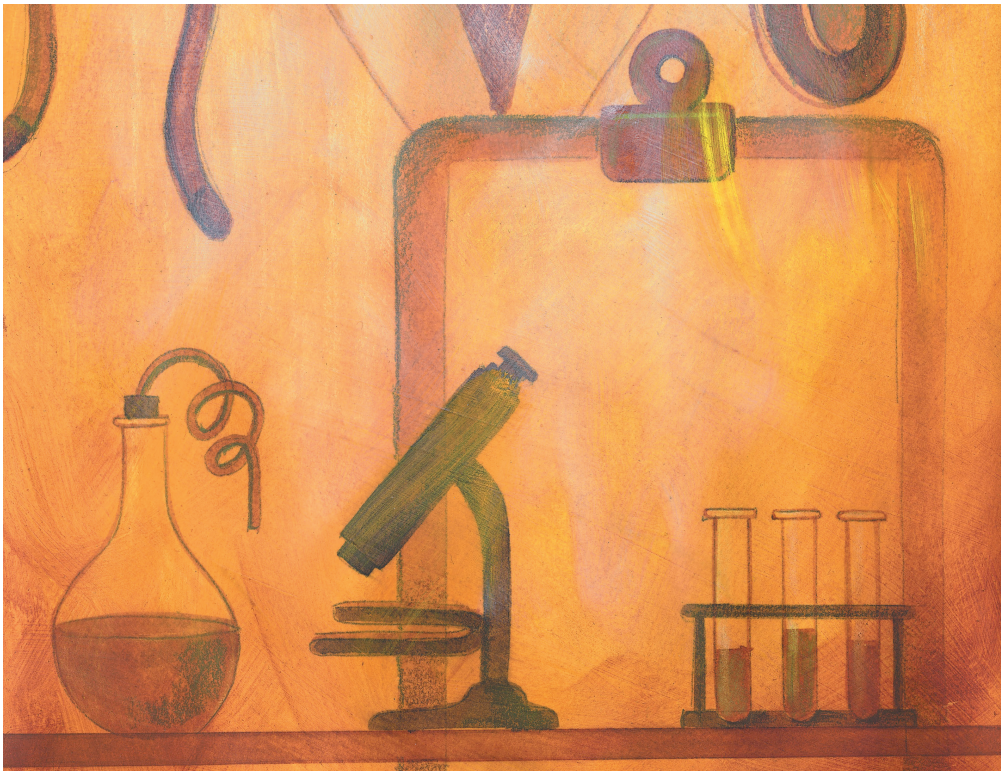
I also wonder about the safety of the boxes, containers, and plastic pages I use to store my scrapbooking supplies. Again, I have put white acid-free cardstock into the container/box for two weeks and tested the cardstock with my pH pen afterward to see if any acid would be detected.

Embellishments are a very popular trend in scrapbooking now, but I am unsure whether a lot of these items are safe (like glitter, micro-beads, buttons, metal decor, ribbons, flexi-foam). Since a lot of these items are non-permeable, I don't see how my pH pen can test their acidity. Reference my test for the metal decorations. How reliable is such home testing with just a pH pen and white cardstock? Should I wait longer than two weeks? Any suggestions of testing decorative items would be much appreciated!"

I HAVE BEEN A CONSULTING MEMBER OF THE scrapbook industry for many years on a variety of issues related to preservation. I do not intend to suggest which products to buy or which techniques are best. Products and trends in our industry change rapidly, so any advice on what to buy or which technique to use would probably be useless next year. By teaching you some of the principles and concepts behind preservation and preservation science, I hope to provide information that will be helpful for years to come.

Merydith's test method is well thought out, but because she is missing a few facts, her results will probably be inaccurate. First, it's important to know that just because a material is not acidic now doesn't mean that it will not become acidic over time. In fact, all paper products tend toward greater acidity. This is why paper manufacturers add alkaline buffers to their products. Over time, these buffers can absorb acids slowly forming within the paper or being absorbed from the atmosphere and neutralize them to salt and water. Acids that might build up over time would be hard to predict with your method because you are testing in real-time.

It's important to know that just because a material is not acidic now doesn't mean that it will not become acidic over time.



Here's an example of what I mean by real-time testing, and I hear this one a lot. In this well-meaning experiment, ink samples, photos, or digital photos are placed on a windowsill for a week and then checked to see if the colors have faded. If the color has not faded, then the experimenter assumes the ink or imaging material to be lightfast. In reality, all that he or she has determined in this weeklong test is whether the colors will last one week. The only way to see if they would last twenty years on the windowsill would be to leave them there for twenty years.

So, how do you predict what something will look like far into the future? The way that scientists find out if a material will change over the long-term is to accelerate the aging process. One of the ways to accelerate aging is to **INCREASE CONCENTRATION OF THE HARMFUL AGENT.** For your test, the harmful agent in question was acid. In paper, acids are formed internally through a variety of ways (acid-hydrolysis or the thermal degradation of lignin) or absorbed from the external environment, either from the air (from pollution) or adjacent objects (like embellishments). For testing materials that generate harmful contaminants internally, such as paper, scientists put them in sealed bags so that the air in the room doesn't dilute the concentration of the contaminant. For examining the effects of harmful contaminants in the air, they use special chambers into which the contaminant can be introduced in controlled amounts.

Another way to accelerate aging is to **INCREASE THE MOISTURE CONCENTRATION.** Acids need moisture to form, move, and react with scrapbook materials and photographs. The higher the moisture content of the air, the more acids can form and the more reactions can occur. The moisture content of your test will be directly proportional to the relative humidity of the test environment. In other words, your test would produce one set of results in Hawaii where it is usually humid and another set of results in Arizona where it is usually dry.

In addition to artificially aging a material, you also need a way to measure any changes. Therefore, an important part of predictive testing is using the right detectors for change and the right measuring devices.

The last way to accelerate aging is to **INCREASE THE TEMPERATURE.** Increasing temperature increases the chemical reaction rates. The higher the temperature, the faster the changes will occur in the material. In the laboratory, we use special incubation chambers to increase both the reaction rate (by controlling temperature) and the concentration of moisture (by controlling relative humidity). In addition, we sometimes use the special methods discussed above to increase the concentration of harmful agents (such as acids). Resist the temptation to use your home oven as a high-temperature test chamber. Not only is there a real fire risk as the heat goes up in the oven, the humidity will go down making any results invalid.

In addition to artificially aging a material, you also need a way to measure any changes. Therefore, an important part of predictive testing is using the right detectors for change and the right measuring devices. In your test, you used the white cardstock as the detector for change and a pH pen as the measuring device. What you probably didn't know was that the paper stock you used most likely contained alkaline fillers that neutralize any acids emitted from the embellishment. The net result was that you might have had an

Continued on Page 131

acidic embellishment that couldn't cause the paper to become acidic enough for you to read with your pH pen.

As for using the pH pen as your measuring device, you have potential for inaccuracy here too. The pen works by spreading a line of special dye (called indicator) onto the surface of the paper. The presence of acids or alkaline materials in the paper causes the dye to change to one color for acid and to another color for alkaline. The accuracy of this method is dependent on many things, including the acid level directly at the paper's surface, the presence of special dyes or coatings on the paper's surface, the cleanliness of the paper being tested, the state of the indicator dye in terms of its own useful shelf life, and the amount of acids that the indicator dye may have absorbed from the atmosphere and/or previous tests. Wow, that's a lot that can go wrong. This is why you should avoid using pH pens for testing acid levels. However, pH pens are truly effective for evaluating materials already in use for which a decision about replacement must be made.

By using a real-time test with a faulty test detector and an unreliable measuring device, chances are almost all of the materials you try it on will "pass" even though they may prove over time to be harmful to photos and your scrapbook. In science, we call this a false positive. By using special artificial aging equipment, appropriate detectors and measuring devices, and published standardized test methods, scientists are able to minimize the chances for a false positive. In simpler words, their answers are more likely to be right.

By using a real-time test with a faulty test detector and an unreliable measuring device, chances are almost all of the materials you try it on will "pass" even though they may prove over time to be harmful to photos and your scrapbook.

An even more fundamental problem with Merydith's test is her basic assumption that acids are the problem to begin with. Yes, acids can be bad. Some acid types are worse than others, but just because a material is acid-free doesn't mean that it is safe for your scrapbook! There are other chemicals in scrapbook products and in the air around us that can also do great damage. Testing only for acids can give a false sense of security when other, even greater dangers, lurk beneath. Unfortunately, many members of our trade still use "acid-free" as a catch-all term implying scrapbook-safe and photo-safe.

Many companies sell products into the scrapbook market, and most are keenly aware of the need to imply their products are of archival quality. How they come to that conclusion is of major concern to you. Inappropriate test methods (or worse, the complete lack of any test methods) on the manufacturer's part may result in your selling products labeled as "archival" that aren't archival at all. With careful questioning, you can know which ones really are archival and have been shown to be so through accurate testing.

HERE IS A BRIEF SUMMARY OF PRINCIPLES AND CONCEPTS TO REMEMBER:

1. Homemade tests are often at great risk for false positive results.
2. The real-time tests by manufacturers are also at great risk for false positive results.
3. Accelerated aging requires increasing the harmful agents, moisture, and/or temperature.
4. Accurate preservation testing requires skill, special apparatus, and good test methods.
5. Acid-free doesn't tell the whole story about scrapbook safety.
6. Just because something is photo-safe doesn't mean it's scrapbook-safe.

SOME POTENTIAL QUESTIONS TO ASK INCLUDE THE FOLLOWING:

1. Were tests performed to prove the claim?
2. Do these tests rely on a pH pen or an ad hoc method, or were they performed in an appropriate laboratory following accepted test methods?
3. Were these tests performed by the company or by an independent laboratory?
4. When were these tests last performed? Have there been any formulation changes since then?

If the tests were ad hoc and performed three years ago on the desk of the company's sales representative, you have a legitimate reason to question their validity and should ask for further proof of archival quality. If the tests were recently performed in an independent laboratory following a standardized method, then you can have at the very least the assurance that the company is striving to match their products to their claims.

Daniel Burge is a Research Scientist at the Image Permanence Institute at the Rochester Institute of Technology. He has been investigating the potentially harmful interactions between photo storage products and photographs for the last twelve years. He is also active as a member and educator in the Scrapbook Preservation Society.