Culture keepers: Conservators use science, ethics to preserve treasures

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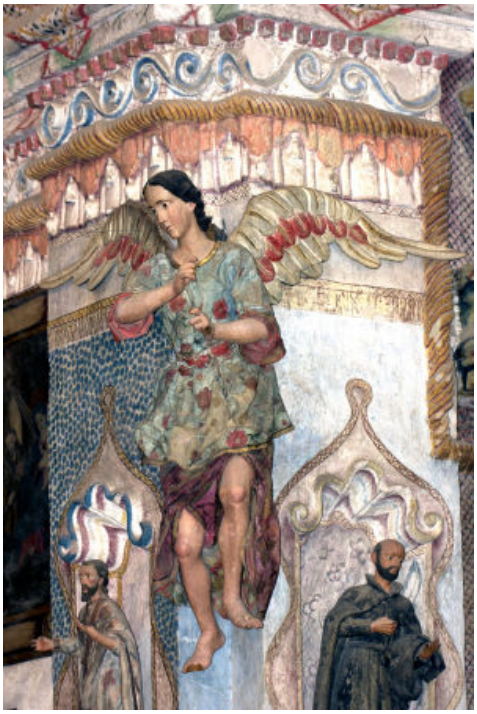

Photos by Susan E. Swanberg | Wick Communications Science Intern

Angel in San Xavier del Bac

A colorfully painted angel adorns the wall at San Xavier del Bac.

They gather evidence, take samples, look for fibers and test for trace elements, but they're not conducting a crime scene investigation.

Conservators of cultural history are working behind the scenes to stabilize, preserve or restore cultural property for future generations.

Whether it's a historical building, the treasures they contain or cultural artifacts found beneath the sands of the desert, these experts use steady hands; an understanding of material science, chemistry and engineering; and an appreciation of aesthetics to conserve the remnants of cultural history. Add to that a keen sense of ethics.

The conservation toolbox includes both ancient and modern methods.

For example, a traditional mixture of prickly pear mucilage (a sticky substance used as an adhesive) and lime plaster was used in many original adobe buildings. To stabilize or restore deteriorating adobe structures, conservators now recreate the traditional plaster.

Modern conservation techniques include microscopy, x-ray technology, mass spectroscopy and DNA testing to identify materials used to create an object.

Conservation techniques vary depending upon the condition of a cultural object and the material it inhabits. Plaster, fabric, leather, clay, precious metals

San Xavier del Bac is a living, breathing church where the Mass is celebrated every day.

Conservation terminology

Cultural property: Objects, collections, specimens, structures or sites identified as having artistic, historic, scientific, religious, or social significance.

Conservation of cultural property: Involves interventions that aid the long-term preservation of cultural property.

Preventive conservation: Preventing or reducing deterioration and damage using policies and procedures form handling, storing, exhibiting, packing and transporting cultural property. Preventive conservation includes integrated pest management.

Restoration: A type of conservation that attempts to return cultural property to its original appearance, sometimes by the addition of nonoriginal material.

Stabilization: A type of conservation that attempts to maintain the existing integrity of cultural property while minimizing deterioration.

or ephemeral materials such as the beargrass and devil's claw often used in Tohono O'odham basketry each requires a unique approach.

"I'm a material girl," says Nancy Odegaard, Ph.D., lead conservator and head of the preservation division at the Arizona State Museum on the campus of the University of Arizona. "I'm fascinated with how people made things. How did they do that? Why did they do that?"

Odegaard and her staff work primarily on non-architectural objects such as ceramic pots, woolen rugs, leather items and basketry.

Other experts, including Steve Gastellum, facility manager, and Alex Lim, exhibits specialist and architectural conservator at Tumacácori National Historical Park, preserve architectural structures.

Tale of two missions

Although some if its statues are damaged, the restored Moorish-inspired facade of San Xavier del Bac mission southwest of Tucson looks solid and durable. Step through the carved mesquite doors on a weekday morning and you'll hear the voices of singing schoolchildren. Look up and you'll see colorful frescoes decorating creamy plaster. Paintings on the walls illustrate lessons taught to parishioners of old. Wood angels hover above celebrants and visitors alike.

Rebuilt by the Tohono O'odham people between 1783 and 1797 on the foundation of Father Eusabio Kino's simple adobe church, the White Dove of the Desert endures as a living, breathing functional church.

The colors may not be as bright as they once were, and some of the decorative features have faded to a mere outline, but the mission has largely survived the ravages of sand, sun, wind and time.

About 40 miles to the south stands a smaller structure — dignified and silent except for the whispers and footfalls of students of history and curious tourists. San Jose de Tumacácori, also established by Father Kino, has a magnificent if rougher-hewn facade.

The monument at Tumacácori includes the outline of the original Jesuit church built in the 1700s and the remains of the Franciscan church built in the 1800s.

Step through the doorway of the church and you'll find empty walls and patchy plaster with few decorative elements remaining from its glorious past. Time took its toll here. The mission is in a state of arrested decay.

These two missions exemplify the values and ethics involved in architectural conservation. The present state of the building — whether it is in use or in ruins, whether it contains other cultural objects such as paintings or sculptures — all determine which conservation philosophy is most appropriate.

Ethics of conservation

"Don't do anything you'll be sorry for," says Werner Zimmt about the role of the conservator of cultural property. Zimmt is a former E.I. Du Pont de Nemours Inc. chemist, now a museum fellow who works with the ASM preservation division.

According to Odegaard, that's another way of saying conservation interventions should be reversible.

For example, says ASM Associate Conservator Teresa Moreno, a shattered pot must be restored using reversible processes in anticipation of mistakes that might have been made in their assembly or the possibility

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that superior restoration techniques might be developed in the future.

A classic reversibility failure is the use of Portland cement to restore earthen architectural structures (such as the adobe churches at San Xavier del Bac and Tumacácori) during much of the 20th century.

Portland cement dries hard. Applied over adobe, it traps moisture, causing damage to the underlying earthen material. Unfortunately, Portland cement was used on the exterior plaster of the church at Tumacácori and some of the interior plaster, destabilizing the delicate adobe. Similar restoration techniques were used at San Xavier del Bac.

The problems with Portland cement are now well understood, but removing the non-historic cement further weakened the integrity of the Tumacácori monument.

In addition to doing no harm, conservation of a cultural object requires a nuanced level of restraint. Conservation involves human intervention, but the object must ultimately speak for itself.

"We don't add our own voice," says Odegaard of conservators.

This is why an art background can sometimes be a disadvantage to a conservator. An artist might find it difficult to resist adding a flourish here or an interpretation there.

It's also important for conservators to be sensitive to the cultural considerations of the creators of the object. According to the code of ethics of the American Institute for Conservation of Historic and Artistic Works (AIC), "All actions of the conservation professional must be governed by an informed respect for the cultural property, its unique character and significance, and the people or person who created it."

Odegaard will keep this tenet in mind while she's in northern Iraq for three weeks sharing some of her techniques with Iraqi conservators.

Conservators as scientists

Behind the scenes at the Arizona State Museum is a state-of-the art laboratory for the study and conservation of cultural objects. On a waist-high table covered with acid-free archival paper is a leather purse with a long, metal-studded strap. A richly dyed wool rug covered by archival paper rests upon a nearby counter.

The laboratory is a quiet but busy place where professional conservators and trained volunteers work side by side. Moreno and laboratory coordinator Gina Watkinson keep the place humming while Odegaard is away.

In a back room, surrounded by microscopes, Dick Bisbing is training UA conservators in the art of slide preparation. Bisbing, an expert in the microscopic analysis of trace elements and paint, is a retired forensic scientist, educated at Michigan State and formerly employed by McCrone and Associates of Chicago, the firm famous for its analysis of the Shroud of Turin.

In order to know how to conserve a cultural object, it's necessary to know something about its composition. Identifying the original materials can be like working an archaeological dig, says Bisbing, except that you're working under a microscope.

Layers of paint can obscure the original color of an object, but Bisbing knows how to get back to the basics.

First you take the smallest sample necessary for the analysis. Sometimes it's possible to "self sample," that is to take a sample from an area of the object that is already damaged or peeling.

Once you locate an original layer of paint, the color must be matched before the object can be restored. The Munsell color classification scheme enables a conservator to categorize the original color along three parameters: hue, value and chroma.

At the end of the analysis, an object can be restored by adding paint close in color to that of the original. Here the ethics of conservation step in again. The object shouldn't be made to look new, only restored sufficiently to ensure that the object's original artistic message is intact.

Battling the environment

Cultural objects are immersed in their surroundings. Humid or dry, polluted or pure, light or dark — the environment will impact the durability of an object. How objects are stored or exhibited can also affect their lifespan.

For example, says Moreno, the wool rug under the archival paper "outgasses" or emits sulphur gas that can affect nearby objects. Sulphur tarnishes silver. If a silver object and a wool rug are exhibited together, a careful conservator will minimize the time wool and silver share the same space.

Architectural structures are more difficult to protect as they are exposed to the elements. Sometimes difficult choices must be made to stabilize or preserve a structure.

Superintendent Frank "Boss" Pinkly, the first steward of Tumacácori, found the monument in an extreme state of disrepair — missing its roof. Pinkly researched the history of the missing roof and added a new roof that he believed was compatible with history.

One could debate for hours whether this was the right decision, however the new roof stabilized the interior of the church.

A new debate

Gastellum and Lim, modern stewards at Tumacácori, have faced their own difficult decisions over the years. Tough economic times make it impossible to undertake all the projects on their wish list. Even though money is tight, however, the ravages of gravity and erosion and time continue. A structural weakness in one part of the church can trigger a chain reaction of deterioration in another part of the structure.

A recent report notes damage in the adobe over the front door of the church — a problem that might require changing the look of the iconic entryway. There'll undoubtedly be much debate about how much intervention is necessary to preserve the integrity of the doorway.

With modern science, a touch of art and their finely tuned conservator's ethics to guide them Gastellum and Lim will make the best decision possible — a decision that will preserve the monument for generations to come.

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