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## S.S. WHITE TO THE RESCUE: SALVAGING FIRE-DAMAGED BASKETS WITH THE S.S. WHITE/PENNWALT AIRBRASIVE UNIT

Nancy Odegaard, Melissa J. Huber, Lara Kaplan, Teresa Moreno, Cheryl Podsiki

### Three Fire-Damaged Baskets

Three fire-damaged Tohono O’odham baskets were brought to the conservation lab of the Arizona State Museum by a private individual who had purchased the baskets in the 1960’s and 70’s. The exterior of the baskets were completely covered with a heavy layer of soot, which obscured their surface designs. Preliminary tests with conventional cleaning methods such as use of dry cleaning sponges or brush vacuuming proved to be either ineffective or impractical. The S.S. White Airbrasive Unit offered a relatively fast, easy way to remove the soot, restoring the appearance of the baskets to the point where their design and craftsmanship could once again be appreciated (Figs.1-6).

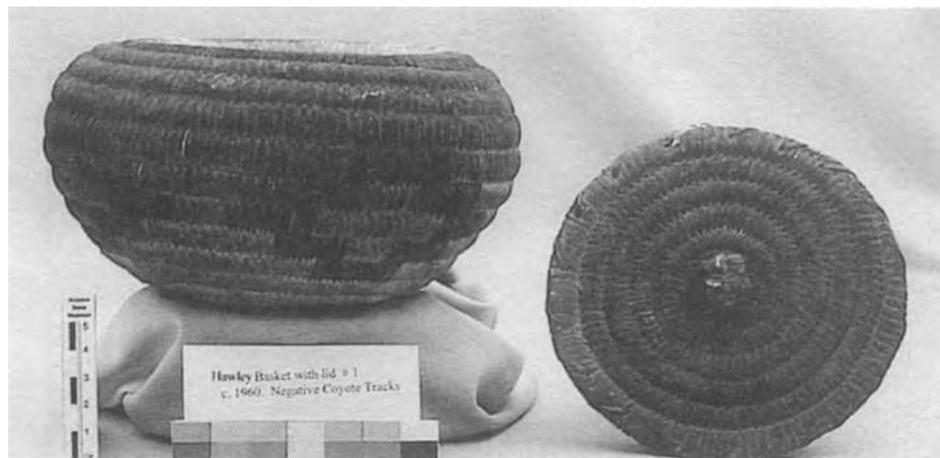


Figure 1. Before treatment. Jar-shaped, close coiled basket and flat lid with negative coyote track motif, c.1960, maker unknown. Ht: 6.5 cm, Dia: 18.2 cm.

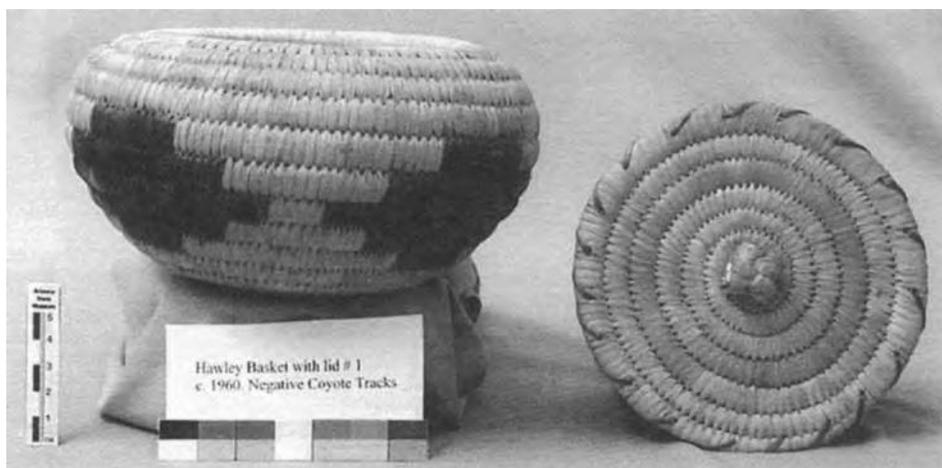


Figure 2. Basket shown in Fig. 1, after treatment.



Figure 3. Before treatment. Jar-shaped, close coiled basket and flat lid by Molly Lewis at Ak-Chin. Ht: 19.8 cm, Dia: 13.0 cm.



Figure 4. Basket shown in Fig. 3, after treatment.



Figure 5. Before treatment. Jar-shaped, open coiled basket and lid with decorative “wheat stitch,” c. 1974, by Margaret Lewis at Ak-Chin.

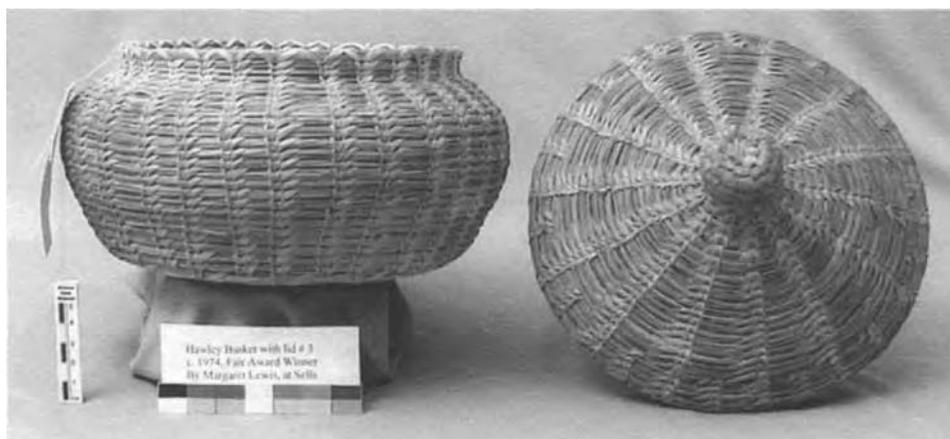


Figure 6. Basket shown in Fig. 5, after treatment.

### S.S. White/Pennwalt Airbrasive Unit

The airbrasive unit (Fig. 7) works by carrying abrasive powder particles in a high velocity gas stream through a hose to a tungsten carbide nozzle that precisely directs the flow of abrasive particles to the work area. Adjusting air pressure, powder flow rate, and choice of abrasive powder controls abrasive action. A cylinder of compressed nitrogen or carbon dioxide provides the air supply. The abrasive powder is placed into a mixing chamber within the unit that vibrates at a controllable rate. The higher the vibration, the higher the powder flow rate will be. The components of the unit provide a controlled mixture of powder particles that is delivered to the nozzle. A dust collection system collects spent powder (Pennwalt 1972).

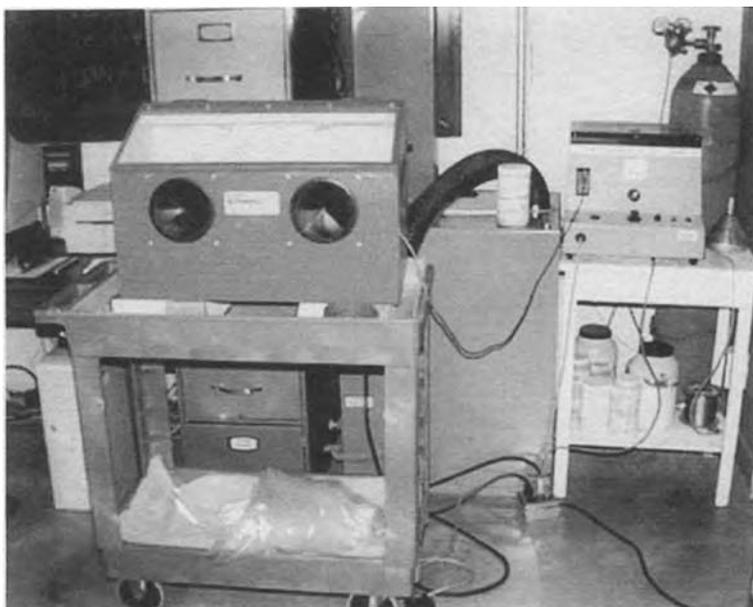


Figure 7. The S.S. Pennwalt airbrasive unit used in the treatment of three fire-damaged Tohono O'odham baskets.

### Abrasive Powder

Ground walnut shells were chosen for this treatment as the abrasive powder because it would remove the soot causing the least amount of damage to the surface of the baskets (Fig. 8). Though it worked effectively, the walnut shells did tend to clump and clog the nozzle. It also left a tenacious residue on the baskets that later had to be removed.

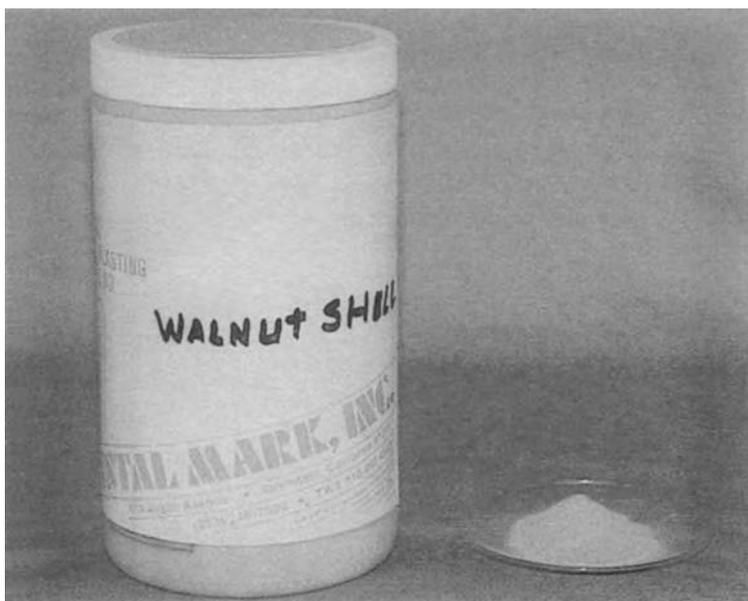


Figure 8. Ground walnut shell abrasive powder.

## Tradition

Contemporary pieces, like those represented here, carry on a long tradition of Tohono O'odham basket making. The Tohono O'odham are a Southeastern Arizona tribal community descended from the Hohokam culture. Hohokam basketry fragments dating from ca. 800 AD are known. Two traditional methods of manufacture include plaited and coiled basketry (Fig. 9). The plaited utilitarian items are no longer made, but production of coiled baskets has continued with highly skilled production of decorative pieces (DeWald 1979).



Figure 9. Carrying on a long tradition, a Tohono O'odham woman works on a contemporary piece of basketry.

## Materials

Tohono O'odham baskets are made using plants native to the Sonoran Desert in southern Arizona and northern Sonora, Mexico. There are no dyes used in production of Tohono O'odham baskets. The weavers rely solely on the natural color of the desert plants. Before a weaver begins even the first stitch, many hours must be spent harvesting and preparing materials. In the Tohono O'odham tradition, growing, collecting and preparing these natural fibers requires respect for, and knowledge of, the native environment. The coil, or warp, of the basket is made with beargrass (*Nolina microcarpa*), a long, narrow green grass with sharp edge. White (bleached) and green Yucca (*Yucca elata*) and black Devil's Claw (*Proboscidea parviflora*), a crawling desert vine, are used to create the stitches, or weft, of each basket (Fig. 10).

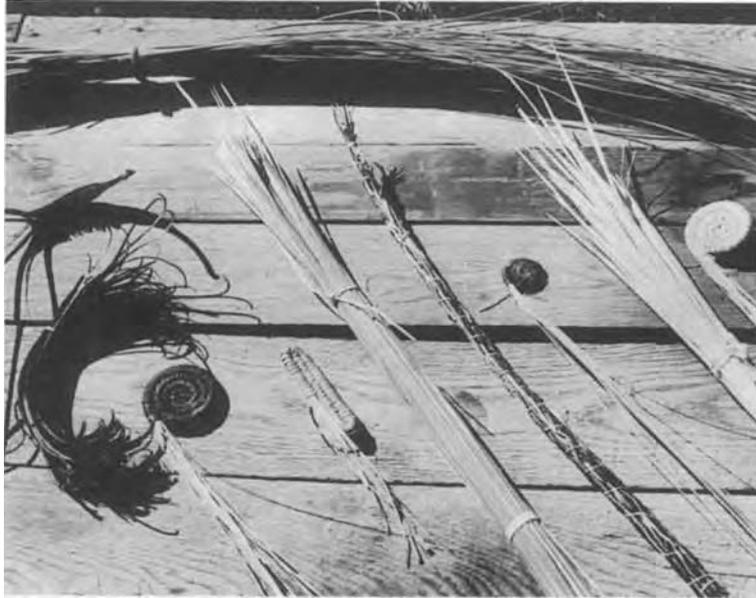


Figure 10. Native plants used in the production of Tohono O'odham baskets.

### **Ethical Considerations**

Air abrasion damages the surface of fragile artifacts through abrasive pressure. The decision to clean these baskets with a technique known to cause damage was not made lightly. Before proceeding, the ethical issues pertaining to this treatment were carefully considered. In this case, the determining factor in favor of air abrasion was that the baskets were part of a private collection that had been in a fire and that the owner wanted them restored to as close to their previous appearance as possible. In this situation, this treatment was considered a salvage operation. Air abrasion could potentially remove material, but charring had already physically altered the original surface of the baskets. Aside from the charring, smoke damage, and associated minor surface loss, the baskets were in good condition and were thought to be able to withstand treatment. It was ultimately decided that the benefits of recovering a closer approximation of the baskets' original appearance outweighed the detractions of using air abrasion. With the owner's permission, treatment was carried out on the three baskets as an experimental procedure to determine if the technique would be viable. The results of the treatment were highly successful. This project provided a unique opportunity for students and staff to test and refine an alternative treatment method.

### **Teamwork**

Collaboration among members of the lab to refine this technique was essential to the success of the treatment. Each person brought insight and experience as the treatment proceeded. First, a dental vacuum and artist blender brush were used for a preliminary surface cleaning (Fig. 11).



Figure 11. Melissa Huber, Conservation Assistant, performs preliminary surface cleaning on a basket lid.

The majority of the soot was removed from the exterior of the baskets by using powdered walnut shells in an S.S. White, Pennwalt airbrasive unit (Fig. 12).



Figure 12. Lara Kaplan, Conservation Intern, uses the S.S. White Airbrasive to remove soot from the exterior of a basket.

Though abrasive damage to the surface of the baskets was inevitable with this treatment, steps were taken to ensure that this damage would be minimal. The airbrasive unit was used at low pressure (between 40 and 60 psi) with crushed walnut shell powder. Pressure and powder flow were adjusted to find the optimal balance between pressure and cleaning power. In general, it was found that using lower pressures with higher powder flow removed soot with less damage to the surface. Holding the air abrasive nozzle at a perpendicular angle to the surface of the basket and moving the nozzle with the grain of the stitches reduced the incidence of this type of loss. A shield made from thick plastic sheeting in which a window was cut also lowered the potential for damage by minimizing exposure of the rest of the basket to scattered walnut shells (Fig. 13).

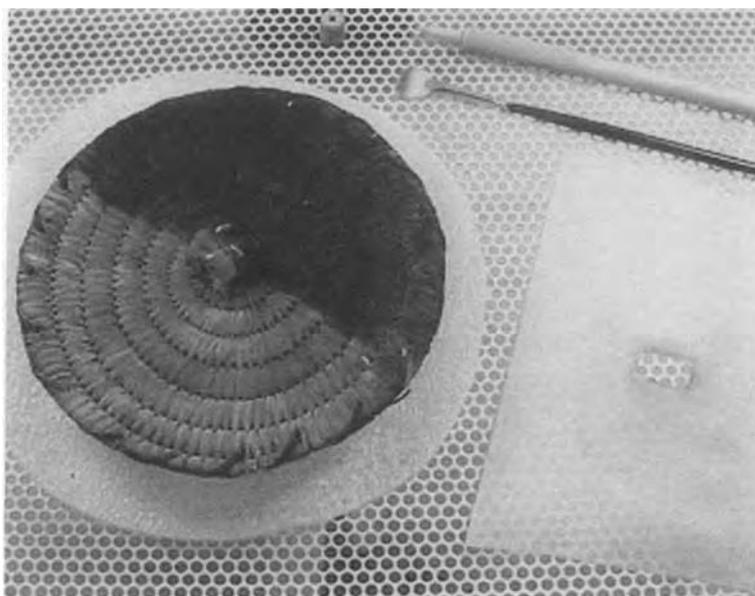


Figure 13. During treatment photograph of a basket lid with tools and plastic shield.

Following the airbrasive treatment, an airbrush unit (Badger Air-Brush Co.) was used to direct airflow onto the basket to remove walnut shell dust. The dental vacuum and brush were again used to gently remove any remaining dust from the exterior and interior of the baskets. Small polyurethane sponges were used to gently reduce any remaining soot and dust (Fig. 14).

As expected, the treatment caused shallow pitting to the surface of the basket. The visual impact of the pitting was difficult to determine, since the surface had already been altered by the fire damage. However, it appeared to be minor. A more serious and visually distracting form of damage occasionally occurred when the top layer of especially fragile areas of yucca leaf would lift in the current of the airflow and break. Fragile damaged areas were secured with methyl cellulose. Areas of noticeable loss were inpainted with gouache artist paints, after first applying a barrier layer of methyl cellulose (Figs. 15, 16, 17).

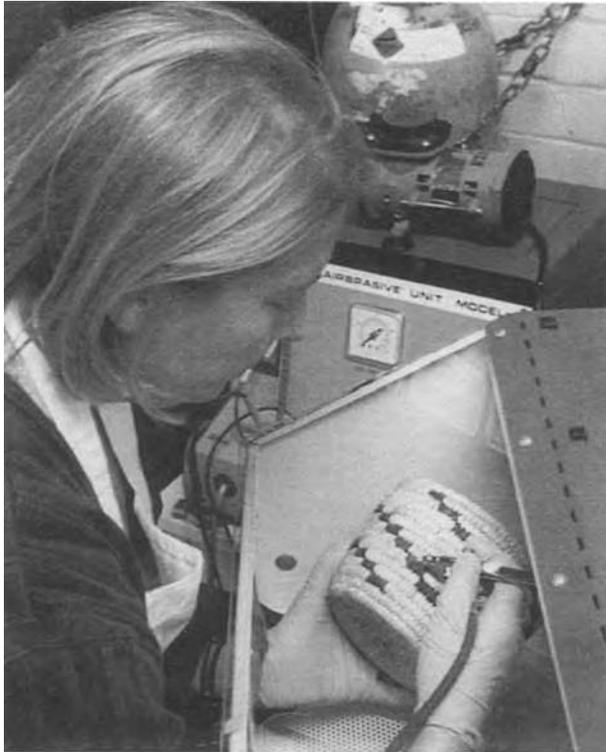
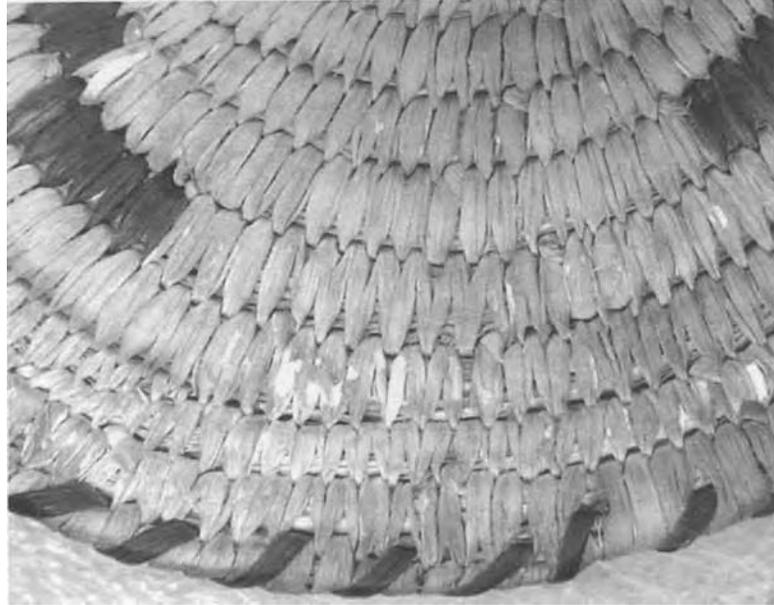


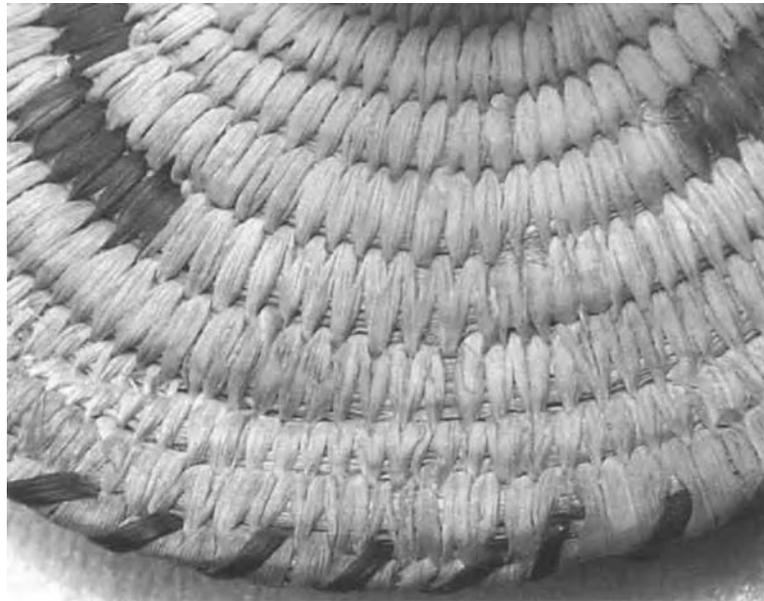
Figure 14. Nancy Odegaard, Conservator and Head of Preservation, utilizes an airbrush unit to remove excess abrasive powder.



Figure 15. Cheryl Podsiki, Kress Conservation Fellow, secures fragile damaged areas with methylcellulose.



**Figure 16.** Before treatment. Area of damage to the top layer of fragile yucca leaf as a result of the abrasive airflow.



**Figure 17.** After treatment.

Finally, a light coating of Renaissance micro-crystalline wax was applied with a dry cotton muslin cloth to the exterior of the baskets to protect the fibers and inpainted areas, as well as to restore some of the original sheen of the fibers (Fig. 18).



Figure 18. Teresa Moreno, Assistant Conservator, applies a coating of micro-crystalline wax to the exterior of a basket.

### Acknowledgments

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