



Conserve O Gram

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Caring For Silver And Copper Alloy Objects

When caring for silver or copper alloy objects on display in museums or historic house settings, it sometimes becomes necessary to do more than simply provide preventive care measures. Objects that have been damaged, mishandled, or have become tarnished often do not accurately reflect the appearance originally intended by the artist or maker. Procedures discussed in this *Conserve O Gram* include the cleaning, polishing, and waxing of decorative arts objects. They are not appropriate for ethnographic or archeological materials.

While the procedures outlined are sometimes necessary, they should not be undertaken lightly. The misapplication of this treatment could damage an object. Consult a conservator relating to the care of the specific object in order to assess all the issues involved. Before starting any treatment, be sure you have identified the metal properly. See the sources listed in the references in this leaflet for information on identifying metals.

Examine the Object

The object should be examined to make sure it retains structural integrity prior to undertaking the procedures. The object's structural integrity is of paramount importance because these procedures involve a considerable amount of handling. Examine the structure of the object carefully, looking for cracks, weak areas, old repairs, and loose or missing parts. Once you have thoroughly examined the structural condition, consider the surface of the object.

When examining the surface it is important to determine if there is an original organic surface

coating. In some cases this is simple. Paint, for example, is a readily apparent decorative and protective coating material. Other coatings, however, may not be so easily seen. Transparent organic coatings like shellac were sometimes applied to copper alloy surfaces as part of the manufacturing process. These coatings were employed both to prevent surface oxidation and to provide a gold-like appearance. Inadvertent removal of such a coating would permanently diminish the value of the object. These transparent coatings are often visible under long-wave ultraviolet light illumination. If coatings are deteriorated and lifting from the surface, they may be readily viewed with a good stereo microscope.

Patina is another important type of decorative and protective surface often applied to silver or copper alloy objects. A patina is a thin chemically induced layer of relatively stable corrosion on the surface of an object. While patinas can form naturally over time, they were often intentionally created as a part of the finishing process. Patinas could be created in a number of colors, but shades of brown, gray, or black were most common. Patinated surfaces were sometimes enhanced and further protected with a thin coat of clear or pigmented wax. Objects may also be gilded with a thin layer of gold that can be destroyed by polishing.

If the object is determined to be structurally sound, with no evidence of original organic or inorganic coatings, and has only minor superficial soil and/or tarnish, proceed with the following techniques cautiously. Materials and techniques used should be extremely gentle to avoid causing unnecessary deterioration. Don't use commercial

polishes, as many contain corrosive chemicals such as ammonia or harsh abrasives that can permanently damage delicate surfaces. They often also contain corrosion inhibitors that, while useful on household items that are polished regularly, can cause unusual or tenacious re-corrosion in the museum setting. The materials and techniques listed below have been tested by conservators and found to be safe and effective when used in a careful and sensitive manner.

Preparation

Provide a clean, well-ventilated work area for the cleaning process. Use a large padded work table, adequate light, and sufficient ventilation to remove solvent vapors. Place a clean piece of cotton flannel, soft muslin, or other soft cotton on the table as a work surface. Wear protective nitrile gloves to avoid contaminating both the object and your hands. When choosing gloves, avoid those processed with chlorine, as these have been found to tarnish silver after only a short period of contact. Safeskins® powder-free 6 ml nitrile gloves are one of several good choices. Wear a clean, white cotton smock or apron to protect your clothing. Use thin sheets of clear polyethylene on the object to cover any nonmetallic elements, such as wooden or ivory handles, to protect them during cleaning.

Cleaning

Remove any loose dirt or dust by dusting lightly with a soft brush directed towards the nozzle of a HEPA (High Efficiency Particulate Air) filtered vacuum. This can be a somewhat awkward operation, so be sure the object is fully padded and supported, and cannot fall. Hake brushes are good choices for dusting because their handles are made entirely of wood or bamboo. If a soft artist's brush is used, cover the metal ferrule with tape to avoid scratching the object. Do not use dusting cloths, as they will not reach into small crevices and can scratch objects if trapped grit is rubbed over surfaces.

Remove unwanted waxy or oily accretions by moistening some loose cotton with mineral spirits and wiping the surface. Wax trapped in candle cups may be removed by allowing some mineral spirits to stand in the cup for a short period of time and then removing the softened material with cotton swabs. Old polish residues often contain waxy components and sometimes can be removed by applying a few drops of mineral spirits to the spot, waiting a few minutes, and removing with swabs. Be very careful when doing this to avoid scratching the surface with old polish and accumulated grime. Change swabs often to reduce risk and use a rolling rather than rubbing motion. Be sure to work in a well-ventilated area when using solvents.

Polish residues that cannot be removed with mineral spirits may sometimes be removed with cotton moistened with a very dilute solution of detergent (a few drops) in distilled or deionized water, and then wiped with clean, distilled water. A small amount of waiting time may help facilitate removal. Gently agitate with a soft sable paintbrush to help loosen embedded material, using great caution to avoid scratching. Rinse thoroughly. Take extra precautions in cases where iron may have been used to strengthen rims. Do not wet these areas under any circumstance. Do not allow liquids to penetrate hollow handles or other hollow parts that are difficult to rinse or dry. Never immerse the object in a bath of water.

In some cases, light tarnish can be removed from silver or copper alloy objects by simply wiping the surface with cotton moistened with denatured alcohol. Before deciding to polish, test clean a small area with denatured alcohol and examine the results to see if polishing is necessary. If polishing is not needed, wipe the object gently with pieces of flannel or loose cotton, changing them frequently to prevent surface abrasion. Allow the object to dry completely in a warm, dust-free environment.

Polishing

If polishing is necessary, mix a small amount of precipitated calcium carbonate and denatured alcohol together in a shallow dish. Do not substitute ground chalk or whiting for the calcium carbonate – they are abrasive and will scratch the object's surface. The mixture should be approximately the consistency of cream. Apply a small amount of polish to the object with a small piece of clean flannel or a wad of loose cotton, rubbing gently in a circular motion. Replace the cotton or flannel often as you work so that you are not merely grinding the removed tarnish and used calcium carbonate back into the surface. A cotton swab may be lightly used to remove tarnish in recesses, although complete removal of tarnish is often undesirable. Darker tarnish in the recesses often helps the design elements stand out. It takes very little calcium carbonate to polish an object - a common mistake is to use too much.

Once polishing has been completed, remove residues by rinsing the surface with cotton dipped in clean denatured alcohol. It is important at this point to change the pads on the table and to change your gloves so that you are working on a clean surface. As before, do not allow liquids to enter hollow handles or other places that are difficult to clean or to dry. Dry the object thoroughly by wiping with a clean, dry piece of flannel. To remove any remaining traces of polish material, buff the surface with a clean cotton Selvyt® cloth. This cloth has a cut velvet surface that traps stray particles.

Apply a Protective Coating

To protect the object from water and air-borne pollutants, apply a small amount of microcrystalline paste wax to a soft, clean dry cloth or very soft brush and rub it over the entire surface of the object, being careful to get complete coverage. Do not apply too much wax; only a small amount is needed. Wait a minute or two and buff the wax out with clean pieces of old

silk or clean old nylon stockings. These will not leave lint trapped in the wax. Wax has a flat plate-like structure and buffing helps align and compress the plates for a more complete and protective coating. If you accidentally leave unbuffed wax on the surface too long, apply a small amount of fresh wax to soften the dried wax and buff immediately.

To maintain the wax coating, periodically dust the object with a soft natural bristle brush and check for evidence of tarnishing. The wax should provide good protection for at least a year or two, depending on the environmental conditions and the amount of handling the object receives. When tarnish is noted, remove the old wax with mineral spirits and reapply as described above. For objects on permanent display, consider having a conservator professionally clean the object and apply a stable organic resin coating. This durable and protective coating can provide up to twenty years of protection, and minimizes the repeated wear and tear associated with periodic polishing.

Safety Issues

When working with solvents, always follow all recommended safety precautions noted on the containers. Both denatured alcohol and mineral spirits are strong, reactive chemicals and their fumes are harmful to your health if not used as instructed. Always be aware of the location of the nearest fire extinguisher when working with flammable solvents and wax products that contain solvents.

Sources

Unbleached cotton flannel is available from Testfabrics, Inc. P.O. Box 420, 200 Blackford Avenue, Middlesex, NJ 08846; (908) 469-6446.

Safeskins® 6 ml nitrile gloves are available from Fisher Scientific, Inc. 711 Forbes Avenue, Pittsburg, PA 15219; (800) 766-7000.

Orvus® detergent, precipitated calcium carbonate, and Renaissance® microcrystalline wax are available from conservation suppliers, such as Gaylord Bros, P.O. Box 4901, Syracuse, NY, 13221-4901; and Conservation Resources International, L.L.C., 8000-H Forbes Place, Springfield, VA 22151; (703) 321-0629.

Selvyt® buffing cloth is available from jewelers supply companies.

Hake brushes are available from good quality art suppliers.

Mineral spirits are available from local hardware stores.

References

Hodges, Henry. *Artifacts*. London: John Baker, 1981.

National Park Service. *Museum Handbook*, Part I, Appendix Q: Care of Metal Objects.

Weisser, Terry Drayman. "Metal Objects." In *Caring for Your Collections*. Edited by Harriet Whelchel. New York: Harry N. Abrams, Inc., 1992.

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