



# SAVING YOUR Treasures

*A Website about what you can do to protect and preserve the things of importance in your life*



## **Gerald R. Ford Conservation Center Nebraska State Historical Society**

1326 S. 32<sup>nd</sup> Street, Omaha, NE 68105 (402) 595-1180, Fax: (402) 595-1178

[nshs.treasures@nebraska.gov](mailto:nshs.treasures@nebraska.gov)

[www.nebraskahistory.org](http://www.nebraskahistory.org)

### **CARING FOR IRON ALLOY OBJECTS**

The care of iron alloy objects, while seemingly simple, is a process that requires careful thought and attention to detail if a successful outcome is to be assured. There are many factors to consider. Your object should be examined to make sure it is strong enough to withstand the amount of handling needed for these activities. Examine the structure and surface of your object carefully, looking for cracks, weak areas, old repairs, and loose or missing parts.

It is also important to determine if there are original decorative or protective surface finishes on the object before beginning to clean. Paint is a good example of an organic decorative and protective coating material. Because they are so reactive, iron alloy objects are often protected with paint coatings. Plating is a coating of one metal over another metal, and tin or zinc plating may be found on some objects created with thin sheets of iron. Zinc plating is generally referred to as galvanizing. Another important type of decorative and protective surface sometimes applied to iron alloy items is a patina. A patina is a thin chemically induced layer of relatively stable corrosion on the surface of an object. Patina can also form over time from use and handling and can give an object the "patina of age". Many iron alloy artifacts, particularly weapons, may have original patinated surfaces of dark brown or dark blue. Brown patination may easily be mistaken for rust. These organic and patinated surface layers should not be removed and could easily be ruined by the cleaning procedures listed below.

Thick layers of iron corrosion are highly expansive, disfiguring, and difficult to reduce. The cleaning procedures listed below are not appropriate for heavily corroded objects, as they are ineffective on these surfaces.

It can sometimes be difficult to determine the structural or surface condition of an object. If your piece is very special, seems fragile, appears heavily corroded, has decorative coatings or other metals such as copper alloys (brass or bronze), silver, or gold, please consult a conservator in order to assess all the issues relating to its care.

If you determine that your object is strong enough, has no evidence of original organic or inorganic surfaces, and has only minor corrosion, proceed with a cautious and gentle approach.

Commercial cleaning products are generally to be avoided, as many contain corrosive chemicals such as ammonia, harsh abrasives, acids, or bases, which can permanently damage artifacts. They may also contain corrosion inhibitors that can cause unusual and tenacious patterns of re-corrosion on your object. The materials and techniques listed below have been tested and found to be safe and effective when used in a careful and sensitive manner.

Provide a clean well-ventilated work area for the cleaning and waxing process. Place a clean piece of soft muslin or other soft cotton on the table as a work surface. Wear nitrile or latex gloves to avoid contaminating both your object and yourself. Oils, salts, and acids from your skin can easily cause corrosion to metal surfaces. Remove or mask out any non-metallic elements, such as wooden handles, with thin polyethylene wrap to protect these parts from cleaning materials.

**Materials to Have on Hand:**

- Clean cotton padding placed over a stable work surface
- Heavy polyethylene sheeting to protect the padded work surface
- Cotton swabs or pads, as needed
- Gloves: latex, vinyl, or polyethylene
- Mineral spirits
- Ultra fine (4/0) steel wool
- A penetrating lubricant that displaces moisture, such as WD 40® or CRC 3-36®
- Soft clean natural bristle brushes, such as haké, watch, or paint brushes
- Stiff natural bristle brushes and bamboo skewers, as needed
- Apron or smock to protect clothing
- Clear microcrystalline paste wax, such as Renaissance© wax, or a clear hard paste wax available in hardware stores such as Butcher's© wax or Behlens® paste wax.
- Clean natural bristle stippling or stencil brushes, or shoe buffing brushes, for waxing and buffing

**Procedures for Cleaning:**

1. Remove any loose dirt or dust by brushing lightly with a soft brush or camel hair paintbrush. If brushes have metal ferrules, cover them with tape to prevent them from scratching the object. Do not use dusting cloths, as they will not get into small crevices, and can scratch artifacts if trapped grit is rubbed over surfaces. If the artifact has soil that is firmly attached, a stiff paintbrush or stippling brush may be needed. Vacuum away any residues, brushing the dust towards the vacuum nozzle.
2. Remove any waxy or oily accretions by lightly brushing the area with a natural bristle brush or cotton swabs dampened with mineral spirits. Rinse the brush in a small container of mineral spirits or replace the cotton swabs as they become soiled. Clean the brush or replace the swabs regularly to avoid scratching the surface with loosened rust and accumulated grime.

3. To remove minor rust deposits, wet small wads of 4/0 ultra fine steel wool with the penetrating lubricant and rubbing gently. If the corrosion is more tenacious, apply some of the lubricant with a brush and allow it to penetrate for up to 48 hours, keeping it covered with polyethylene sheeting to reduce evaporation. After a sufficient amount of time has elapsed, the rust should be easier to rub away. Do not use bronze or tin wool in a mistaken attempt to reduce potential abrasion. These materials will actually leave a thin layer of copper alloy or tin on the surface that will increase the rate of corrosion through a process called galvanic interaction. Never immerse an iron object in a bath of water, as it will begin rusting almost immediately. Old wax can be pushed off with the blunt end of a bamboo skewer. Wax residues may be removed with mineral spirits.
4. Once the corrosion has been reduced, clear any residues with clean mineral spirits on swabs or brushes or clean pieces of soft cotton rags. A clean soft brush may be used to remove any remaining residues from crevices or recessed design elements. Allow the artifact to air dry. Finally, remove the protective wrap applied to non-metallic components.

Your piece is now ready for the application of a wax coating. The wax used for this purpose is a clear microcrystalline paste wax. Gloves should be worn to avoid contaminating both your object and yourself. Non-metallic elements such as wooden or ivory handles can also be *lightly* waxed following the same directions if they are approached with care. Only objects that have been properly cleaned and dried should be waxed.

#### **Procedures for Waxing:**

1. Apply a small amount of paste wax to a clean stencil brush and rub thinly over the entire surface of the object, being careful to get complete coverage. Do not apply too much- a **little** wax goes a long way.
2. Wait a minute or two and buff the wax out with a clean stencil or shoe buffing brushes. Wax has a plate-like structure, and buffing helps to align and compress it into a more continuous and protective coating. If you accidentally leave the unbuffed wax too long; simply apply a little more wax to soften the previous coat, then buff immediately.
3. To maintain the coating, periodically dust the artifact with a soft haké brush, checking each time for evidence of rust or corrosion. The wax should provide good protection for at least a year, depending on atmospheric and handling conditions. (When corrosion is noted, remove the old wax with mineral spirits, reduce any rust that may have formed, and re-apply as above.)
4. For items on permanent view, or for pieces that will not be used, consider having a conservator apply a more durable clear organic coating. Stable organic coatings can provide up to twenty years of protection and minimize repeated handling of objects. This procedure should only be carried out by a professional conservator.

If you have any concerns about the care of metal objects, consult a conservator in your area for further guidance.

**WARNING:** When working with solvents, be sure to follow all recommended safety precautions noted on the containers. Mineral spirits are strong, reactive chemicals and their fumes can be harmful to your health when not used as instructed. **Always be aware of the location of the nearest fire extinguisher when working with flammable solvents and waxes.**

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