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# CCI Notes

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# 9/7

## Silver — Care and Tarnish Removal

### Introduction

A thin layer of dark tarnish can quickly destroy the surface lustre of silver. This layer consists mainly of black silver sulphide, and is caused by sulphur-containing compounds in the air such as hydrogen sulphide. Tarnish can be removed from silver mechanically with a polish, chemically with a dip, or electrochemically. This Note describes these three methods for removing tarnish from silver, and explains how to store and display silver objects.

Since each polishing or chemical tarnish removal method removes a certain amount of underlying silver as well as the surface layer of tarnish, tarnish removal should not be done frequently on museum objects. Preventing tarnish by using tarnish-inhibitive products in sealed storage containers or display cases should be a priority (see “Storage and Display” below).

### Handling

When handling silver, wear clean cotton gloves. The salts and oils that are on skin can mark the silver and can leave fingerprints.

Coins and medals have special requirements regarding handling. Please refer to CCI Notes 9/4, *Basic Care of Coins, Medals and Medallion Art*.

### Examination

Before cleaning or removing tarnish from a piece of silver, examine it carefully. Look for hallmarks or other identifying marks that will tell you if the piece is solid sterling silver, silver plate (as in Sheffield Plate), or electroplated.

Try to determine how the piece was constructed. For example, are there solder joins or hollow sections such as handles and feet? If so, then any method that requires the object to be totally immersed in a liquid cannot be used.

Check for gilding or other surface inlays. Polishes will damage gilding. Silver dips, if used without care, will over-clean silver that has a chased, engraved, or embossed decoration.

If the object is silver plated, any method of tarnish removal may be very damaging. Decide in advance what the final surface appearance should be.

The decision to remove tarnish from silver should be made jointly by a curator and a conservator.

### Cleaning

First, clean the silver to remove any particles or residues that will interfere with the tarnish removal process.

Washing or swabbing with an anionic detergent (see CCI Notes 13/9, *Anionic Detergent*) in distilled water will be safe for most objects, provided that any non-metallic parts (e.g., felt pads, bone or ivory handles) or wooden attachments are not allowed to get wet. After washing, rinse the object with distilled water and dry it with a soft cloth or with warm air.

Detailed guidelines for cleaning bright metal are given in CCI Notes 9/3, *The Cleaning, Polishing and Protective Waxing of Brass and Copper*.

### **Tarnish Removal**

Tarnish removal can be accomplished by one of three methods: polishes, chemical dips, or electrochemical reduction. The method chosen often depends on the object. For example, submersion in soapy water or chemical dips is not appropriate for composite objects such as teapots with ivory handles, candlesticks with rosin or plaster in the base, or silver boxes lined with wood.

### **Polishes**

Polishes are somewhat abrasive and, while they remove silver and tarnish from the surface of an object, they leave behind a pattern of fine scratches. The extent of this scratching can be tested by using the polish on unscratched Plexiglas. The depth and pattern of scratching that results on the Plexiglas will be similar to what would appear on the silver surface. Since manufacturers can change the content of a polish without informing consumers, the polish in each new container should be tested on Plexiglas before being used on silver.

The resulting finish, or scratch pattern, is often influenced more by the polisher than by the polish. The polisher must take care to minimize damage from abrasive polishing.

Do not use general, multi-purpose metal polishes on silver; they are more abrasive and remove more silver from the object than do silver polishes.

### **Polishing Cloths**

Silver polishing cloths, such as Birks Silver Polishing Cloth, are cloths impregnated with an abrasive material. These cloths are the most gentle means of abrasive polishing because, by their very nature, they do not contain the concentration of abrasive particles that would be found in a liquid, paste, or foam polish. Such cloths are most useful for buffing lightly tarnished silver.

### **Waddings**

Waddings, such as Duraglit Silver Polish, that contain an organic solvent instead of water are useful for polishing silver objects that cannot be exposed to water. However, abrasive particles will be left behind, so as much of this residue as possible should be removed by brushing with a soft brush or by rubbing with a soft cloth.

### **Liquids, Pastes, and Foams**

Some gentle liquids, pastes, and foams are recommended, such as Twinkle for Silver, Goddard's products, Hagerty's products, and Silvo.

Do not leave polish containers open or use old polishes, because they tend to dry out. When this happens, the fine, abrasive material conglomerates into larger particles, making the polishes more abrasive and prone to leaving deeper scratches.

If the object can safely be exposed to water, remove polish residues with an anionic detergent and distilled water.

Most commercial silver polishes contain a tarnish inhibitor. The presence of an inhibitor is not necessarily beneficial because, although they slow the tarnishing rate of silver for a short time, when the objects start to tarnish they do so rapidly and unevenly. Inhibitors might also make it difficult to apply a lacquer if one is necessary.

In their article "A Comparative Study of Silver Cleaning Abrasives," Wharton et al. (see "Recommended Reading") recommend making a polish using an

abrasive suspended in distilled water containing a non-ionic detergent. The authors studied many abrasive materials, and recommend suitable ones for polishing silver. They conclude that it is less damaging to clean silver with a mild abrasive over a longer period of time than with a more aggressive material for a shorter time.

### **Chemical Dips**

Chemical dips work by dissolving the tarnish on an object at a faster rate than the underlying silver.

Although manufacturers of commercial dips recommend submerging the object totally, this can often lead to over-cleaning if the object is left in the dip until all tarnish, including local stains, are removed. The recommended, safer practice is to apply the dip locally using a cotton swab, and then rinse the object with distilled water to remove any excess dip.

Chemical dips are composed of an acid and a complexing agent. Acids are corrosive and will damage niello, bronze, stainless steel knife blades, and organic materials such as wood. In addition, the acids and complexing agents may be harmful to the user. Therefore, be sure to work in a well-ventilated space, and wear rubber gloves when using these products.

Silver should be exposed to the dips as little as possible to avoid pitting the metal. Chemical dips should never be used on objects that have sealed hollow components, such as candlesticks and trophies with hollow feet or teapots with hollow handles. Once the dip leaks into the cavity through small holes or imperfections in the joins, it becomes virtually impossible to wash the chemical out.

A yellow discoloration may be left on the silver object after dipping. This can be removed by gentle polishing with a silver polishing cloth. Keep in mind that objects cleaned with a chemical dip often look "new" because there is no tarnish left in the deeper recesses of the design.

## **Electrochemical (Galvanic) Reduction**

When a silver object is placed in contact with aluminum and both are submerged in a warm solution of sodium carbonate (washing soda), any tarnish on the silver slowly disappears. The process is electrochemical (galvanic), with the carbonate solution acting as the electrolyte. As long as contact is maintained between the two metals, the aluminum corrodes and hydrogen gas is produced. This gas then reacts with the tarnish, reducing it back to silver metal. After using this method, the object must be rinsed well with distilled water to remove any traces of electrolyte.

Silver from the tarnish remains on the surface of the object in the form of rough particles that leave a dull, matte finish. This can be removed by gentle polishing with a silver polishing cloth.

Pitting of the object can occur if the aluminum plate has become inert due to a build-up of corrosion products or residue from the dissolution of the aluminum. Periodically removing the surface layer on the aluminum with abrasive cleaning or by boiling in a fresh carbonate solution will avoid this problem.

Objects cleaned by this method may tarnish more quickly than silver that has been polished. As in the case of chemical dips, objects with sealed hollow components should not be subjected to aqueous solutions.

## **Storage and Display**

All silver objects should be kept clean and free of dust and surface grime.

The formation of tarnish inside display cases can be minimized by using desiccated silica gel to keep the relative humidity low, and activated charcoal or a suitable commercial product to remove tarnishing gases.

Tarnish need not be removed before storage. It is better to remove tarnish from silver only when necessary, such as for display purposes. Whether

silver must be stored with a bright and shiny finish will depend on a variety of factors that must be considered for each collection.

Tarnishing can be minimized during storage by placing individual silver objects inside polyethylene bags and then sealing the bags using tape, heat sealing, or a self-sealing bag. It is always good practice to wrap or support each piece of silver with non-buffered tissue paper (sulphur-free and of archival quality) to buffer changes in relative humidity and to prevent transfer of harmful materials from the storage environment to the silver. Additional protection against tarnishing can be achieved by placing small containers of desiccated silica gel and activated charcoal inside the bag. Alternatively, the silver may be wrapped in a tarnish-inhibiting cloth, such as Pacific Silvercloth, before placing the object in the polyethylene bag.

Lacquering or waxing is not recommended for silver because of the difficulties in obtaining an even coating. If the coating has not been applied well, it may be uneven or have streaks and small holes so that when the object retarnishes, the end result may be worse than if no coating had been applied at all. However, in an open display where a coating is deemed to be necessary, microcrystalline wax or lacquers such as the acrylic Incralac or the nitrocellulose Agateen are suitable.

## **Suppliers**

*Commercial silver polishes and dips:*  
jewellery stores, department stores,  
grocery stores, and hardware stores

*Plexiglas:*  
plastics suppliers

*Silica gel:*  
most laboratory equipment and  
chemical suppliers

*Pacific Silvercloth:*  
Birks Jewellers

### *Non-buffered tissue:*

Conservation Resources  
8000-H Forbes Place  
Springfield, Virginia  
22151 USA  
Tel.: (800) 634-6932

### *Incralac:*

Conservation Resources  
8000-H Forbes Place  
Springfield, Virginia  
22151 USA  
Tel.: (800) 634-6932

Stanchem Inc.  
401 Berlin St.  
East Berlin, CT  
06023 USA  
Tel.: (203) 828-0571

### *Activated charcoal:* chemical suppliers and

Calgon Carbon Canada, Inc.  
6303 Airport Road, Suite 304  
Mississauga, Ontario  
L4V 1E3  
Tel.: (905) 673-7137

### *Agateen:*

Agate Lacquer Mfg. Co. Inc.  
11-13 43rd Rd.  
Long Island City, NY  
11101 USA  
Tel.: (718) 784-0660

### *Anionic detergents:*

International Guilders Suppliers  
Ltd.  
1541 Startop Road, Unit 12  
Ottawa, Ontario  
K1B 5P2  
Tel.: (613) 744-4282

### *Non-ionic detergents:*

Conservation Materials Ltd.  
1275 Kleppe Lane #10  
Sparks, NV  
89431 USA  
Tel.: (702) 331-0582

## Recommended Reading

Canadian Conservation Institute.  
*Anionic Detergent*. CCI Notes 13/9.  
Ottawa: Canadian Conservation  
Institute, 1992.

Canadian Conservation Institute.  
*Basic Care of Coins, Medals and Medallic  
Art*. CCI Notes 9/4. Ottawa: Canadian  
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*Recognizing Active Corrosion*. CCI  
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*The Cleaning, Polishing and Protective  
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Institute, 1988.

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Display, and Tarnish Removal,"  
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Selwyn, L. and C.G. Costain.  
"Evaluation of Silver-Cleaning  
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Wharton, G., S.L. Maish and  
W.S. Ginell. "A Comparative Study of  
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