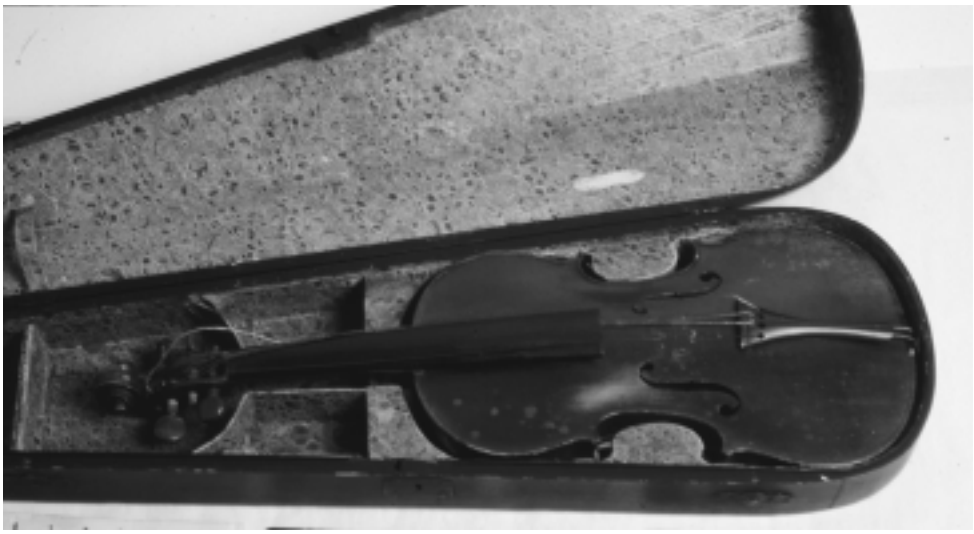
Caring for musical instruments: Part 2

by Paul S. Storch

This is the second of two Tech Talk articles about the challenges of caring for musical instrument collections. Paul S. Storch, the Minnesota Historical Society's senior objects conservator, looks at common types of instrument materials and how they react to their environment. Part 1, in the May Interpreter, *covered instrument coatings, leather and plastics. Part 2 covers instrument wood, metals and textiles and discusses how to handle, display and store musical instruments.*



Minnesota Historical Society photos by Paul Storch

Fig. 1: This violin from the Minnesota Historical Society's collection, dating to the 1850s, had loose strings and a missing bridge.

Wood

Wood can be found in many familiar forms in musical instruments – from drum bodies and sticks to the violin family and other stringed instruments (see figures 1 and 2). The type of wood used for a particular instrument – whether hard wood from deciduous trees or soft wood from coniferous trees – is chosen for its sound qualities, durability, regional availability and appearance.

The physical characteristics of this versatile material are discussed fully by R. Barclay in *The Care of Historic Musical Instruments* (see References, page 6). A brief word here about moisture content and relative humidity will serve to introduce some basic measures for preventative conservation. After harvesting, wood is dried before it is crafted into an instrument shape. During the drying process, the wood loses moisture until it is in equilibrium with its environment. It is then described as seasoned. Because of variations in ambient conditions, dryness is a relative term. An object made of wood that has been cut, dried, worked and stored in the arid southwestern United States will have a very different moisture content from an object made in the more temperate and humid region of Appalachia.

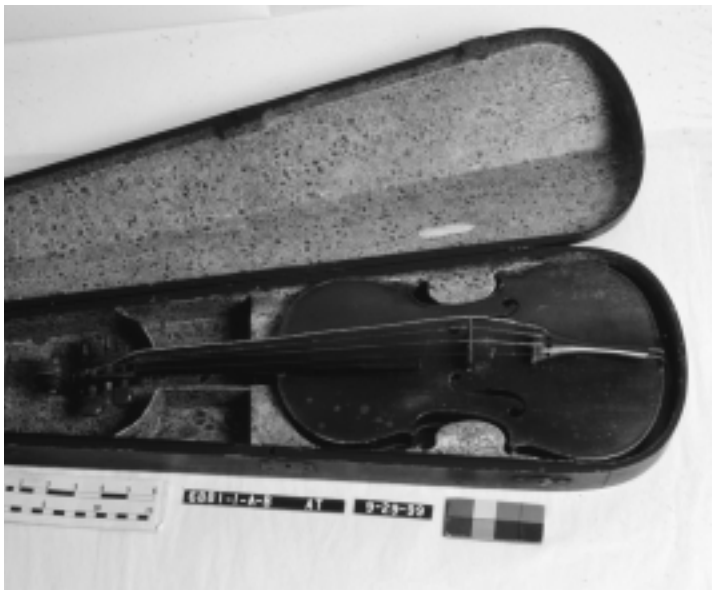


Fig. 2: Repairs to the violin in fig. 1, including a new bridge, brought new life to an artifact from Minnesota's territorial days.

Once an object is transferred to a museum, the key to its conservation is to prevent further loss or gain of moisture, preferably by maintaining as closely as possible the object's original climatic conditions. (This is a basic principle for the preventative conservation of all organic-material objects.) In practice, however, this is rarely feasible. In fact, in cases where an instrument has already adapted to another humidity level, it is no longer desirable to maintain the conditions of its manufacture. In addition, the presence of other materials on wooden musical instruments makes

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specific guidelines about moisture content and relative humidity difficult to establish. Most often, compromise climates are recommended (see Table 2, page 6). Wooden instruments do not have to be played regularly to maintain their tonal qualities; it is more important to maintain a consistent environment for them.

Metals

A wide range of metals and alloys are found in musical instruments, including brass, copper, iron, lead and "noble" metals such as gold and silver (see figures 3-6). Gold and silver are usually found as platings on baser metals like brass and copper.

Metals are less vulnerable to breakage and the common deterioration factors that affect organic materials. The most prevalent problem experienced by the metal components of musical instruments is corrosion – the reaction of refined metal with water or water vapor, oxygen and mineral salts. Improper cleaning and polishing also can introduce corrosive chemicals such as ammonium hydroxide, which reacts with copper alloys such as brass. The rate at which corrosion occurs depends on temperature; objects corrode faster at higher temperatures. For example, silver tarnishes twice as fast at 84 F as it does at 64 F.

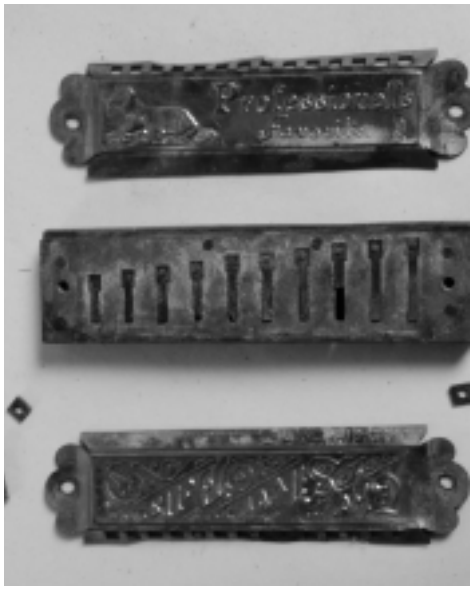

Fig. 3: The lead alloy reeds inside this harmonica were severely corroded. To stabilize the instrument, it was disassembled for cleaning and coating.

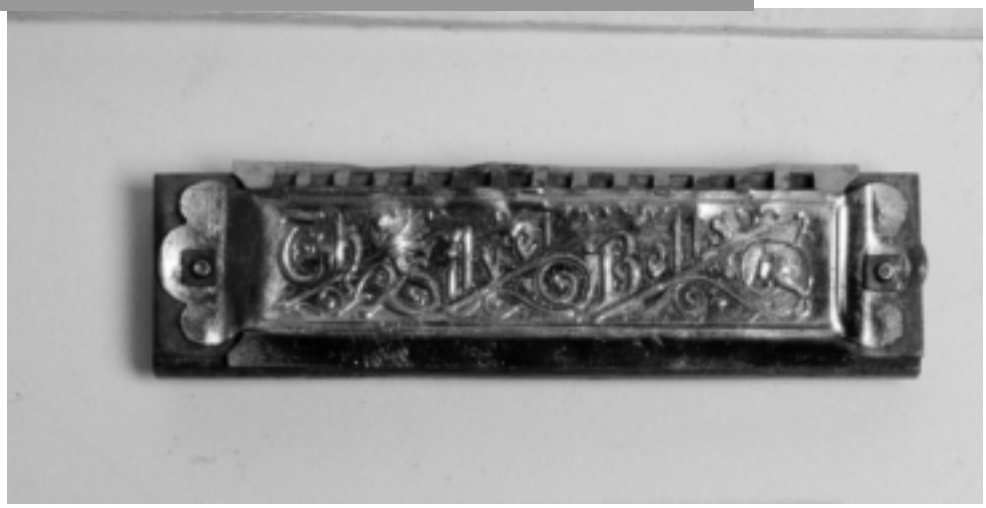

Fig. 4: After stabilization treatment of the metal and wood components, the harmonica from fig. 3 was reassembled.

Iron, used in fittings of musical instruments, is prone to corrosion under a wide variety of conditions and environments. Ambient moisture often causes a light layer of surface corrosion on iron components.

Lead is commonly used in solder joins and as weights in keyboard instruments. The most reactive metal, it is always found in a corroded state (see figures 3 and 4). Lead darkens with exposure to air; in contact with wood and wood products that emit acetic and formic acids, it forms a loosely adherent, whitish powder. Thin lead components can become structurally weakened by this type of corrosion.

Copper and copper alloys on musical instruments are more stable. But the surfaces of these metals usually tarnish from handling and exposure to oxygen and other gaseous contaminants. This is often erroneously referred to as *patina*. In the context of conservation, a patina on metal is an intentional chemical treatment of the metal surface that acts to protect it from further, disfiguring corrosion.

Silver or silver-plated instruments are generally found in a darkened, tarnished condition (see figures 5 and 6). This thin layer of tarnish is usually silver sulfide. On silver-plated brass instruments, scratched areas where the base metal is exposed may suffer bimetallic corrosion.

Textiles

Textiles, though rare in musical instruments, may be found in objects of non-European origin and as reinforcements and linings of wooden stringed-instrument resonators. Textiles used in this way are fragile because the commonly used hide-glue adhesives become stiff and brittle over time and may discolor the textile. When textiles are used on wooden objects, the differential expansion due to fluctuations in relative humidity can cause tears in the lining and changes in the adhesive.

Textiles found on instrument straps and handles also are vulnerable to deterioration. Exposure to light, especially natural daylight, can cause the textile to become brittle and organic dyes and pigments to fade.

Preventative conservation

Once you familiarize yourself with the materials used in historic musical instruments and the condition problems you may encounter with

them, you are ready to address questions of how to handle, display and store the objects in your collection.

Table 2 offers an introductory guide to the long-term safekeeping and preservation of musical instruments. These basic preventative measures for the proper maintenance of the instruments in your collection will help to minimize damage and deterioration.

For matters relating to the conservation or restoration of musical instruments, including their cleaning and other interventive treatments, it is strongly recommended that you consult an experienced professional conservator. Taking advice from those not trained in conservation techniques – dealers, collectors, traditional instrument makers, musicians – can result in irreversible and costly damage to a valuable object. Be proactive with the artifacts in your care. It's always better to prevent deterioration than to repair damage done.

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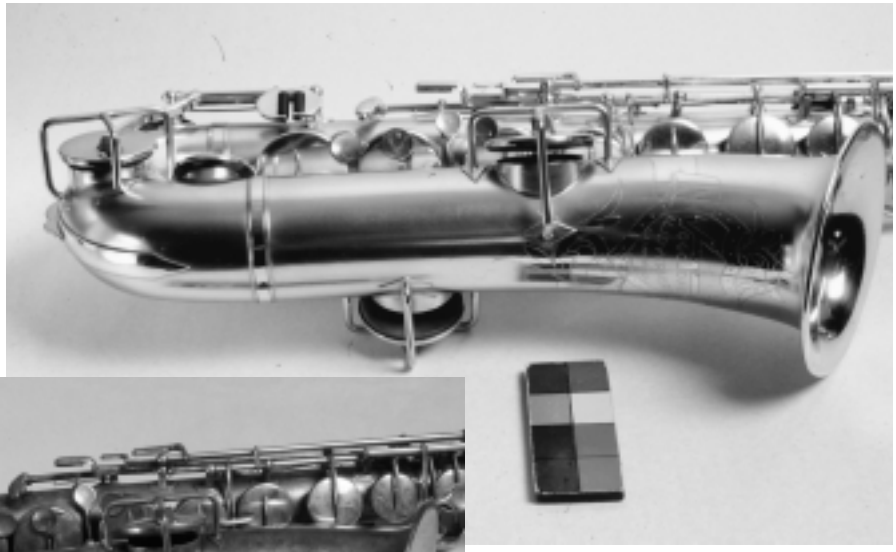

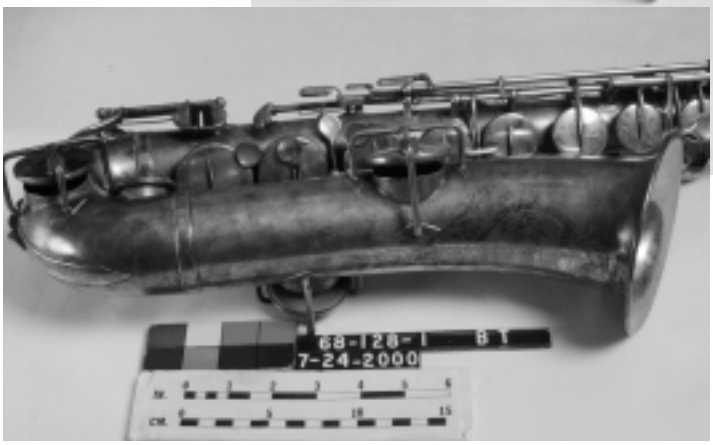

Fig 5 (left): A silver-plated saxophone dating from about 1900 showed overall tarnish.

Fig 6 (above): After cleaning and coating, the saxophone's decorative details, previously obscured by a layer of tarnish, shone through. Smooth surfaces have a matte finish, while engraved areas are highly polished.

Editor's note:

Tech Talk offers technical assistance on conservation, historic preservation and museum management issues that affect historical societies and museums of all sizes. Suggestions for future topics are welcome. Send ideas to Interpreter Editor, Minnesota Historical Society, 345 Kellogg Blvd. W., St. Paul, MN 55102-1906.

Getting the conservation help you need

Minnesota Historical Society

Paul Storch, the Minnesota Historical Society's senior objects conservator, examines the condition of a metal artifact.

Conservators in the Minnesota Historical Society's Daniels Objects Conservation Lab are available for phone or e-mail consultations. Call the Society's Conservation Department at 651-297-1867 or e-mail conservationhelp@mnhs.org.

Questions about the conservation of musical instruments may be e-mailed to paul.storch@mnhs.org. For previous Tech Talk articles by Storch, visit the Society's web site, www.mnhs.org/about/publications/techtalk.html.

For a list of Professional Associate and Fellow members of the American Institute for Conservation (AIC) who are qualified in various specialized fields, call the AIC at 202-452-9545.

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Table 2: Recommendations for Handling, Display and Storage

Material	Handling	Display	Storage
Coatings	Work with clean hands or plastic gloves; avoid cleaners, solvents and preservative coatings.	Low light levels: 50-100 Lux and <300,000 Lux/hrs. Moderate relative humidity (RH): 40-50%.	Same as for display; dark storage.
Leather	Work with clean hands or plastic gloves; avoid cleaners, dressings and other preservative coatings unless recommended by a conservator.	Internal supports when possible. Low light levels if dyed: <50 Lux, <150,000 Lux/hrs. Moderate RH: 40-50%.	Same as for display; use unbuffered acid-free tissue and paper products for support; dark storage.
Plastics	Work with clean hands or plastic gloves; avoid cleaners, solvents and preservative coatings of any type.	Low light levels: <50 Lux, <150,000 Lux/hrs. Moderate RH: 40-50%. Temperature not to exceed 72 F.	Same as for display; dark storage.
Wood	Work with clean hands; avoid damaged and flaking painted areas; avoid cleaners and preservative coatings.	Moderate light levels: <100 Lux, <300,000 Lux/hrs. Moderate RH: 40-50%. Avoid temperatures above 72 F.	Same as for display; use buffered acid-fee tissues and paper products; dark storage.
Metals	Use plastic gloves; avoid abrasive and chemical cleaners and preservative coatings.	Avoid contact with acidic and corrosive materials. Light and RH levels must be compatible with the most sensitive components of composite objects.	Same as for display.
Textiles	Work with clean hands.	Low light levels: <50 Lux, <150,000 Lux/hrs. Moderate RH: 40-50%. Protect from dust accumulation; use mounts and supports for straps.	Same as for display; use unbuffered acid-free paper and board materials for support; protect from dust, crushing and creasing; dark storage.

References

The following resources can serve as a starting point for further inquiry into the care of musical instruments.

Bachmann, K., ed. *Conservation Concerns*. Washington, D.C.: Smithsonian Institution Press, 1992.

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Blank, S. "An Introduction to Plastics and Rubbers in Collections." In *Studies in Conservation*. Vol. 35, no. 2, 53-63. London: International Institute for Conservation, 1990.

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Torres, A., ed. *Collections Care: A Selected Bibliography*. Washington, D.C.: National Institute for the Conservation of Cultural Property (Heritage Preservation), 1990.