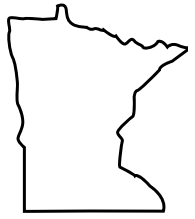


TECH TALK

This issue: Firearms • Part II



Conservation Treatments of Firearms by Paul Storch

Introduction

Once a condition survey of the firearms collection has been completed, following the suggestions in Part I, the treatment of objects that have been identified in the highest priority category for stabilization can begin. The following article describes the tools and techniques for proper disassembly and outlines procedures for cleaning and stabilization.



Cautions

Let me emphasize that this article is a general guide, not a substitute for the actual advice of a qualified professional conservator. I would also like to emphasize that older historic firearm types, such as matchlocks and wheel locks, should not be disassembled; many of these firearms do not have easily removable screws and pins. Note, too, that the procedures described in this article should not be used with highly ornamented firearms or those with stocks of exotic materials such as ivory and horn.

Extreme care and caution must be applied in the storage and handling of the solvents and chemicals recommended for the cleaning process. To accommodate the longest barrels, the fume hood should be at least 48 inches wide. If a fume hood is not available, an exhaust fan should be used as a minimal precaution. If engineering controls are non-existent or inadequate, then respirators must be provided and used according to the updated federal Occupational Safety and Health Agency (OSHA) respirator standard (29 CFR 1910.134). Both acetone and toluene are strong organic solvents, so do not breathe in their vapors. Keep skin exposure to all solvents to a minimum.

Smoking must not be permitted in the

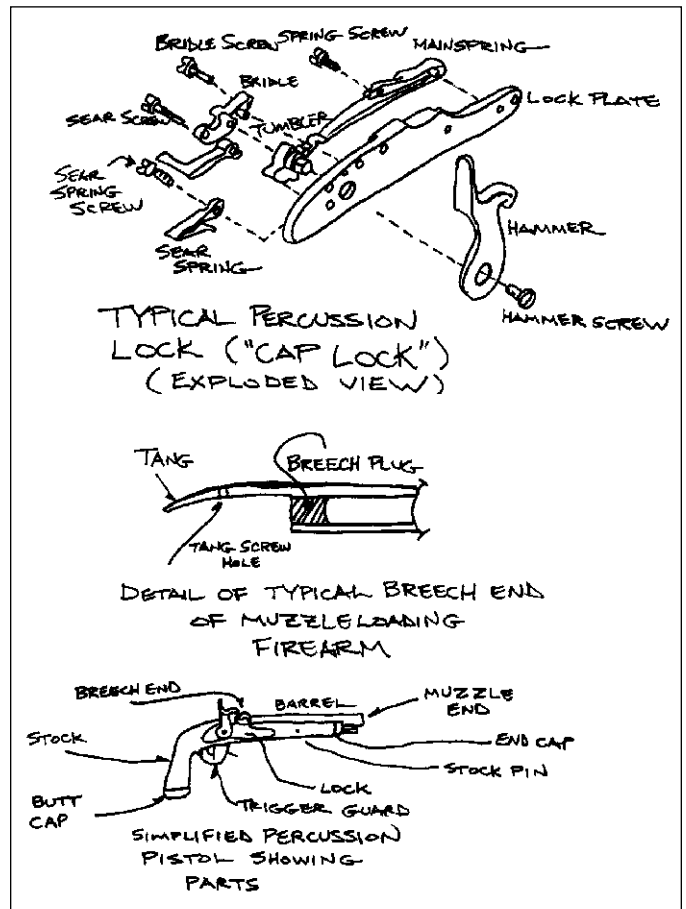
laboratory area while firearms, or any other objects, are being treated. Materials Safety Data Sheets (MSDS) must be on file for all chemicals being used.

These are available from the distributor and manufacturer. The Minnesota Pollution Control Agency (MPCA) and your local county PCA can be consulted for further details on the safe handling and storage of flammable solvents.

Disassembly and Treatment Procedures

The methods and procedures described below have been developed through experience with the treatment of 18th- and 19th-century American and

Figure 1 (right)
Schematic drawings of generalized firearms and components. (Not drawn to scale.)



Drawing by Paul Storch

European-made flintlock and percussion weapons, and are applicable to both short- and long-arms. Figure 1 (above) will help the non-conservator understand the terms used throughout this article that refer to the object components. Refer to the reference books listed in the bibliography for details on specific firearm models.

Editor's note:

TECH TALK is a bimonthly column offering technical assistance on management, preservation and conservation matters that affect historical societies and museums of all sizes and interests. Comments and suggestions for future topics are welcome.



Disassembly Procedure: Removing the Barrel from the Stock and Disassembling the Lock

1) *Removal of stock pins and wedges:* Gently tap out pins or wedges with a rawhide or wooden mallet and soft metal punch. Figure 2 shows a disassembled

Photograph by Paul Storch



Figure 2, above. A disassembled percussion-lock, muzzle-loading "Brown Bess"-type pistol, showing the components and standard tools used in the conservation treatment of firearms.

smooth-bore percussion pistol with the applicable tools. Look for evidence of previous removal to determine to which side of the stock the punch should be applied.

2) *Removal of tang screws:* Figure 3 (right) demonstrates the correct way to hold the gunsmithing screwdriver. Use a screwdriver head that fits both the length and width of the screw head.

3) *Removal of barrel from the stock:* Gently pull the hammer back to the half-cock position to free it from the pan or nipple. Turn the weapon over and, starting at the breech end, gently pull the stock upward while grasping the barrel as the barrel rests on the table. If the barrel is heavily corroded, it may adhere to the wood. A steady pressure will usually free it from the stock.

4) *Removal of lock from the stock:* Remove the side screw. Grasp the lock by the hammer and the front part of the lockplate and gently pull the lock straight out. Look for previous mends of the lock mortise area and try not to pull these out; however, if they do come out, save them for later repair.

5) *Disassembly of the lock:* Apply the mainspring vise to the mainspring. Make certain that the hammer is in the fired position, since this releases the tension on the springs. Let down the hammer slowly by carefully pressing on the *sear*, which is the lever near the rear of the lock. Remove the remaining parts.

6) *Removal of the trigger guard and assembly from the stock:* When the trigger guard and trigger assembly are held in with pins, do not remove them. If the trigger assembly is a double trigger (set type) mechanism, remove the large spring first. If other stock furniture is pinned to the stock, do not remove it. Butt plates can sometimes be removed and cleaned, if the screws holding them in turn easily. I would also discourage you from removing barrel plugs and percussion nipples from museum firearms, because the probability of damaging a unique object is so high.

Re-assembly

Re-assembly should proceed in the reverse order of disassembly. The mainspring on the lock should be replaced after the other lock parts are in place. Place the spring in its proper position, then compress it with the vise and slip the upper lip into the slot. Make certain it is properly seated, then remove the vise.

Figure 3, right. This shows the correct way to remove a screw from a historic firearm. Apply pressure perpendicularly to the screwhead while turning it. It is important to maintain this rigid perpendicular pressure to avoid stripping the screwhead.



Photograph by Paul Storch



Metal Cleaning

Degreasing: It is important that the following operation take place under a fume hood or with other adequate ventilation, using the proper gloves. Using cotton wool and cotton swabs, apply Stoddard's Solvent, or a similar mineral spirits-type solvent, to the metal parts. This should also remove surface dirt and some corrosion products.

Removing ferrous and non-ferrous corrosion: Apply a petroleum-based rust and lubrication oil such as WD-40 or the equivalent. **Do not use an oil with silicones or other "permanent" lubricant added.** Apply with cotton to both the patinated and unpatinated components. A mild steel brush and very fine steel wool (0000 grade and finer) may be gently used on heavily corroded, unpatinated parts.

Note: Brass brushes and scrapers, contrary to common gunsmithing recommendations, should not be used on exterior surfaces; brass is soft enough to leave a yellow metallic residue on the steel surfaces. Be careful to remove only the corrosion and not the patination layer. Avoid touching engraved and stamped areas with abrasive tools. Do not clean brass and silver parts until they shine. Remove the cleaning oil with acetone or mineral spirits; do not leave the oil on the parts as a coating. Following these steps may not remove all the corrosion, but it is good for first-level cleaning and stabilization. A conservator should be consulted for more difficult corrosion problems.

Cleaning barrel interiors: While holding the barrel over a solvent-resistant container, pour mineral spirits into the muzzle end. Discard dirty solvent in an approved container; do not pour down the drain. Secure the barrel in padded vises and clean it, using a brush of the proper caliber on the cleaning rod. Rinse out the barrel with solvent after each brushing, until the cotton patch comes out relatively clean. Finally, apply a liberal amount of rust inhibiting grease (called "RIG," sulfonated petroleum jelly) down the entire length of the barrel on a clean patch.

Coating metal parts: The best coatings to use are the Acryloid series of acrylic resins (Rohm and Haas; available from conservation supply distributors). Acryloid B-48N was formulated specifically for use on clean metal surfaces. Incralac is a similar polymer to B-48N, with the addition of a copper corrosion inhibitor. Both of these are soluble in toluene and xylene. Use a good quality natural bristle brush.

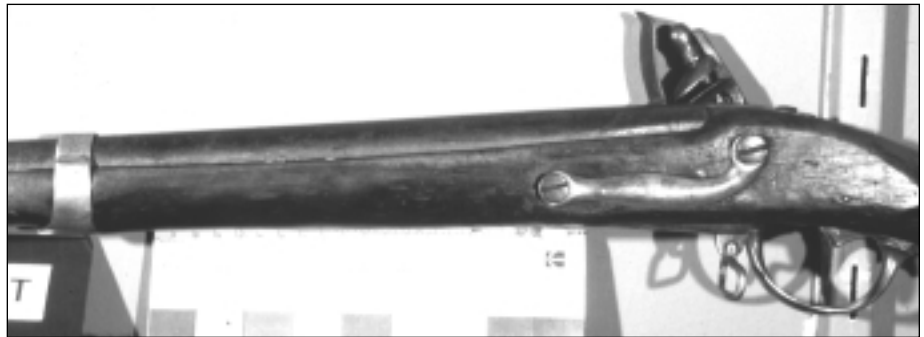
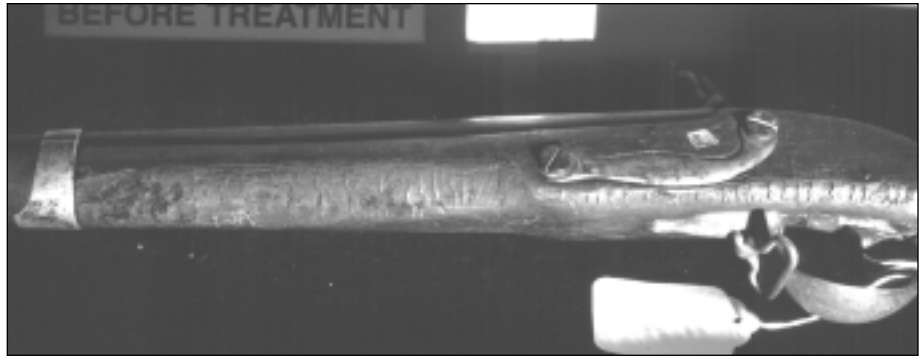


Figure 4a, right, above: Fire-damaged forestock. The wood is friable and fragile.

Figure 4b, right, below: Forestock after treatment by the author with consolidants and epoxy putty.

Photographs by Paul Storch, courtesy of Upper Midwest Conservation Association

Allow the parts to dry thoroughly before re-assembly. Reapply a small amount of coating to the screw heads after re-assembly. Coat the stock furniture before cleaning the stock.

Re-label the firearm: Refer to Part I of this article for a discussion of proper labeling procedures.

Cleaning the Wood

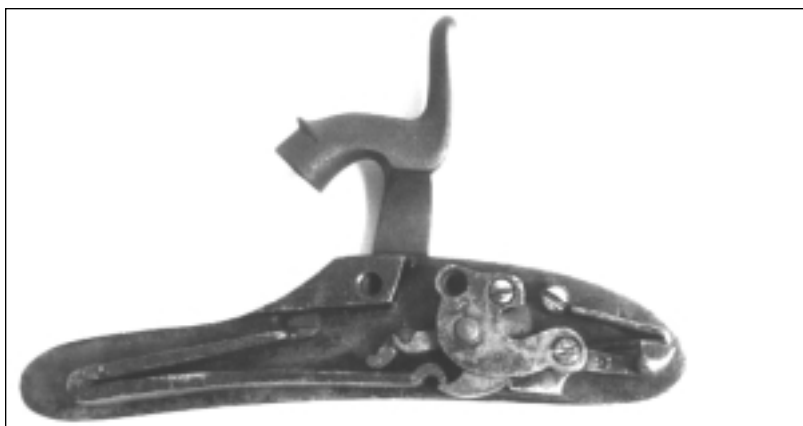
Removal of dirt and corrosion from the interior of the stock: Use Stoddards or mineral spirits on swabs. Do not soak the wood. Consult a conservator if insect damage or major breaks are found.

Cleaning the exterior: Use a mild soap, such as Murphy's Oil or Vulpex (available from conservation supply distributors) in distilled or de-ionized water at a dilution of 2-3 percent. Do not soak the wood. Wipe with a damp cloth after the soap application, then dry with a clean cloth. Consult a conservator if the finish is delaminating, water spotted, or needs other more involved treatment beyond simple cleaning.

Protective coating: Apply a good quality paste wax (without silicones) to the exterior surfaces of the wood. Petroleum-based microcrystalline waxes such



as Renaissance brand (available from archival and conservation supply distributors) or natural carnauba wax brands such as Butchers or Trewax are acceptable. The carnauba waxes are in turpentine. Follow the manufacturers application instructions carefully. Avoid waxing checkered areas of the wrist and forestock grip because wax makes it difficult to buff indentations and will dry to a light color, which is very visible.



Photographs by Paul Storch; courtesy of the Upper Midwest Conservation Association

Figure 5a, above: Exterior of percussion lock after re-browning and replacement of the hammer and hammer screw. Treatment by the author; the original tumbler was damaged.

Figure 5b, immediately above: Interior view of lock, showing replacement tumbler and assembly modification.

Other Levels of Treatments

It is important to know what should not be done to a historic firearm, and when the problem exceeds your skills and resources. Firearms that have been damaged by fire and/or water should be examined by a conservator prior to disassembly and cleaning. The use of epoxies or any other fillers or adhesives must be avoided except when applied by an experienced

conservator and their use is warranted by the condition of the object. (See figures 4a and 4b.) The procedures described above will clean and stabilize historic firearms with the minimum alteration of the original materials.

Do not attempt to “rebuild” parts, make replacement parts, or drastically alter the nature of the object by polishing or refinishing. There are cases when those operations may be performed, but other issues must be taken into account before they are applied. (See figures 5a and 5b.)

Always document each step of your treatment carefully with both photographs and written records. Note any special problems that arise during the treatment of the object. If followed carefully, these procedures should preserve both the historical and aesthetic value of a museum firearms collection.

Remember: Proper storage of firearms is also an essential part of preventive conservation. The firearms should be protected from dust and should be checked regularly for the recurrence of interior or exterior corrosion. Refer to Part I of this article for a more complete discussion of this topic.

FURTHER READING

The current Track of the Wolf, Inc. catalog has an extensive offering of books on the history and manufacture of historic firearms, and is also a good resource on the parts of the mechanisms:

- Edition 14-D, 1998-2000; Track of the Wolf, Inc.; P.O. Box 6, Osseo, MN 55369-0006
- McCann, Michael, “Respirators,” in *Art Hazards News*, Vol. 22, No. 3, 1998, New York.
- Fadala, S. and D. Storey, *Black Powder Hobby Gunsmithing*, Northbrook, Ill., DBI Books, Inc., 1994.
- Prytulak, G., “Threaded Fasteners in Metal Artifacts,” *CCI Technical Bulletin No. 17*, Canadian Conservation Institute, Ottawa, Canada, 1997.
- Storch, P. S., “Care and Handling of Firearms Part II: Disassembly and Cleaning,” in *Conservation Notes No. 9*, August 1984, Texas Memorial Museum, University of Texas at Austin, Texas.
- White, P. R., “The Care and Preservation of Firearms,” *CCI Technical Bulletin No. 16*, Canadian Conservation Institute, Ottawa, Canada, 1995.

Paul Storch has been objects conservator in the Daniels Objects Conservation Laboratory at the Minnesota Historical Society since January 1991. He is a frequent contributor to The Interpreter. Phone: 651/297-5774; e-mail: paul.storch@mnhs.org