

Conservation Notes

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Preservation of materials stored in repositories is one of the most important responsibilities of archivists. Unfortunately, many archivists do not receive sufficient education in the varied aspects of preservation during their formal training; and few have the opportunity to receive training in some of the restoration techniques. Some archivists may have access to the services of a conservator who can perform the restoration and advise on the preservation, but most archivists are not able to avail themselves of such professional advice and service. Left to themselves, many archivists either despair of their inability to prevent the decay of their collections, attempt to correct the deficiencies with well-meaning intent but using erroneous information, or apply methods of repair based on their own judgement.

Although it is impossible for me to produce conservators using this series of articles, I believe that archivists can do much toward preserving their collections if given guidance and information. Therefore, the intent of this series is to provide some basic information as a starting point, and it is up to the individual archivist to make use of this information after reading the suggested references and practising on valueless or dispensable materials. But I caution all readers with the advice that most conservation methods will be beyond their abilities unless they have received conservation training. In their reading of conservation literature, the novice may consider some methods quite simple and not realize there are complexities underlying even the most basic conservation method.

Let me state, now, that I consider book and paper conservation as a two-headed beast — that of restoration, on the one hand and preservation, on the other hand. Restoration is correctly the responsibility of the professional conservator who should consult the custodian in regard to legal, historical and curatorial aspects. Preservation is chiefly the responsibility of the custodian who should consult a conservator for advice. Good preservation practices do much to reduce the need for restoration. Correct and meaningful information imparted to a custodian enables the custodian to properly preserve their collections.

Well, enough for the philosophical aspects of conservation and onto something more useful. In preparing for this initial article I was at a loss

as to what information should be included. I have little knowledge of the awareness of the reader towards conservation but a simplistic series may benefit no one. The editor has suggested such broad topics as conservation of paper, sound tape, microfilm and computer output; as well as specific topics such as the use of microwave ovens for drying water-sodden records, mass conservation techniques and aspects of photographic conservation.

Therefore, I shall appeal to the reader for suggestions as to topics, and they can forward them to me (or the editor). I shall be unable to answer questions on an individual basis and will select from the most frequent requests the topics which will appear in this series. The format for this series will consist of either one topic per article, several topics with a relationship to one another, or several short, diverse items which would aptly fit the title of this series. In any case, I shall endeavour to include sources of further information so that the reader may understand the topics discussed in more detail.

For the first series I have chosen the topic of leather preservation because many archives contain such material, and the care of leather in archives generally has not received the same attention as the care of paper.

For centuries a variety of tanning processes have been used by nearly all societies as a means of preventing putrefaction of the collagen protein fibres in hides and skins. (A hide is from a large animal such as a cow, a skin is from a smaller animal such as a calf). A result of the Industrial Revolution during the 19th century has been the proliferation of a wide variety of tanning methods as well as their accompanying dressing and finishing processes.

These processes produce leathers with properties to suit, generally, specific needs (e.g. dye affinity, flexibility, durability, waterproofing), and all leathers will react differently in a particular environment. Likewise, such leathers cannot be expected to benefit from the same preservation treatment. As an example, some leathers — mainly undyed or lightly coloured — will be darkened by cleaning or dressing and these preservation methods may cause further or future damage. Also, leathers found in an archive are usually a part of an object and the leather treatment may cause irreparable damage to the other part of the object.

Untanned skins, such as vellum and parchment, generally react differently to their storage environment and cannot be preserved in the same manner as leather. (Fortunately, the process of preparing vellum and parchment is such that the skins can better resist the environmental factors which cause leather deterioration).

Leather is a chemically complex material and the overall conservation of leather (and untanned skins) requires the assistance of a professional when dealing with anything of value. However, the preservation of the leather is something an archivist can perform quite readily.

The most important preservation method is proper storage. Micro-organisms require organic materials such as protein, starch and cellulose

for nutrition, and all of these materials are found in archives. Leather is a protein and is generally bonded to paper (cellulose) using starch — and/or protein-based adhesives. Dampness allows the germination of micro-organisms (they are airborne) and colonization will continue as long as the environment is suitable. A relative humidity above 65% will support micro-organic growth, and therefore, a safe range of relative humidity (R.H.) in a storage environment is 45-55%. Once started, the growth of micro-organisms proceeds fastest in warmth. Suitable storage temperatures would be in the range of 10-20°C., but higher temperatures are permissible if the R.H. is within the range mentioned.

Temperature control, however, is important for the other reasons. Chemical reactions require energy — the more energy the faster the reaction. Temperature is the numerical indication of heat energy, and thus, high temperatures accelerate the chemical reactions of deterioration. (A rule of thumb is for every 10°C. rise in temperature the rate of a chemical reaction doubles, the converse being true, also). In addition, high temperatures cause a loss of moisture, and leather in a storage environment can desiccate due to high temperatures.

Thus, the proper storage environment for skin materials is an R.H. range of 45-55% and a temperature range of 10-20°. Any deviation will accelerate the degradation of the materials.

But what can one do if improper storage has resulted in the deterioration of leather and other skins? Most micro-organisms can be killed by placing the object in sunlight, out of doors, for about 2-3 hours. Following this treatment the dry growth is brushed-off outdoors whilst wearing impermeable gloves and a face mask (if possible).

If the leather is dark in colour, unpainted or ungilded, many molds can be exterminated by applying methylated spirits using a cotton bud or swab. But, one must test an unobtrusive area and wait until no odor of the alcohol remains before deciding whether any colour change will occur due to the treatment — the alcohol could be a solvent for the fatty acids in the leather and bring them to the surface.

Other alternatives include applying an aqueous solution of the fungicide para-nitrophenol; treatment for at least 24 hours in a thymol cabinet; or fumigation in an ethylene oxide chamber. The latter is effective for all forms of micro-organic growth.

Needless to say, all of the above will be a waste of time and money if the materials are returned to an uncontrolled storage environment.

Another preservation procedure which can be performed by any custodian is cleaning of the leather. Cleaning can be performed if the surface is intact, i.e. not peeling, cracking off, powdery or not a 'suede' finish. Dust may be removed by brushing with a medium to soft artist's brush into a vacuum cleaner hose. The end of the hose should be wrapped with plastic tape to blunt the sharp edges. A better protection is to drill a hole through a rubber or cork stopper which will fit the vacuum hose end and insert a piece of polyethylene or rubber tubing into the

stopper. One can then brush the dust into the tube with little risk of damaging the artifact.

For more stubborn surface dirt mechanical cleaning can be done using a vinyl eraser (e.g. Staedtler Mars No. 52650) or powdered rubber (e.g. Draftclean Pads). Care is necessary to avoid over-rubbing and removing some of the material. Although the use of liquid cleaners for stubborn stains is a temptation, this is best left to a professional.

Suede or velvet-finished leathers (including buckskin or rawhide) are best cleaned using powdered rubber by lightly rubbing in a circular motion and vacuuming away the particles. White cornmeal is also useful for this cleaning. Any further cleaning should be done by a conservator.

After surface cleaning, leathers may require further cleaning using 'wet' methods involving the use of substances specially designed for leather. There are, however, several cautionary factors one must be aware of before attempting the use of these materials. Firstly, most smooth leathers, even dry, stiff and buckled leathers, can be cleaned, but if the leather is crumbling, flaking, 'red-rotted', suede, velvet-finished, parchment, or vellum, 'wet' cleaning should NOT be attempted. Secondly, all leather preparations have advantages and disadvantages so they must be chosen with care and the label instructions should be followed. Thirdly, most dressings tend to darken the surface, so they should be tested in an unobtrusive area to see if the discolouration is acceptable or unacceptable. Also, most leather preparations and dressings involve water or other solvents which may affect the leather dyes or painted or gilt portions, so pre-testing is a requirement. Lastly, all preparations and dressings must not be allowed to come into contact with materials other than the leather because they will stain or damage these materials, possibly irreversibly.

Generally, I recommend only two cleaning preparations, either saddle soap or the froth of a well-beaten solution of Castile soap and water. Either of these cleaners should be applied using a dampened sponge not a sodden sponge — one should avoid allowing too much water contact with leather. The soap is then removed with a clean, damp sponge and finally blotted dry with a clean cloth. Avoid excessive rubbing, only a light application in a circular motion need be used. Allow the cleaned material to dry for 24 hours in good air circulation.

Many leathers, especially vegetable-tanned leathers, contain water-soluble tanning salts which may be removed during cleaning. There is a solution — 7% aqueous potassium lactate — which many conservators recommend be lightly-rubbed onto dry, clean leather to replace these salts. Potassium lactate is also reputed to inhibit the production of sulfuric acid within the leather when the air pollutant sulfur dioxide is absorbed. The advantages of this solution versus the disadvantages of probable darkening and staining of the leather when water is added to it are still a matter for debate. Personally, if the leather is to be stored in a proper environment, including filtered air, such a treatment is not necessary.

As a final treatment for cleaned leather, it must be dressed or lubricated. Leathers are lubricated as part of the tanning process but as they age, especially if they haven't received proper care, the lubricant is lost and the leather becomes stiff. Dressing replaces these lubricants and generally restores flexibility to the leather, thus increasing its durability and enhancing its preservation.

There are a number of commercial dressings available and a number of formulations devised by conservators which may be suitable. One must be aware that the commercial dressings may contain chemicals which can deteriorate, in time, and damage the leather. As well, many of the formulations devised by conservators have been questioned as to their suitability for both use and preservation. Most dressings which are not emulsions (i.e. they don't contain water) are combinations of oils and waxes which must be worked into the leather or the surface will remain 'greasy' and act as an attractant for dust and dirt.

One preparation that can be made readily is that of 1 part Neats-foot oil to 1 part lanolin, heated and mixed together in a double boiler until fluid and uniform, and poured into a storage bottle or other air-tight container. To use the dressing one first lightly swabs the leather with a clean, damp sponge and waits for 5-10 minutes so some of the water is absorbed by the leather. Then, using a small gauze pad or cotton swab, a small amount of dressing is rubbed into the leather using a circular motion or a stroke in one direction. Hard rubbing is not required because the dressing will be absorbed by the leather. One is cautioned about allowing the dressing to touch any other material but the leather because permanent staining will occur. Also, for undyed leather or leather of a light colour, there will be a permanent darkening of the leather.

The dressed leather is allowed to 'dry' for 24-48 hours in a manner such that the leather does not touch any surfaces. One may have to repeat the dressing if it is fully absorbed and the surface still feels 'dry' or if flexibility has not been regained.

The final step in the dressing process is to polish the leather with a soft clean cloth — mainly to remove any unabsorbed dressing. Because most oils oxidize in the air and lose their effectiveness, dressing should be repeated every few years.

One type of leather which cannot undergo conservation is that called 'red-rotted'. 'Red-rot' is the chemical degradation of the collagen protein fibre converting the tough flexible leather into a brittle condition which eventuates as a loosely-bound red powder. The most commonly thought of cause for this is attack by sulfuric acid — produced when the leather absorbs sulfur dioxide from polluted air. Not all leathers are affected, but most vegetable-tanned bookbinding leathers seem particularly susceptible.

The best preservation against 'red-rot' is storage in an environment which removes air-pollutant gases. As mentioned, treatment with potassium lactate solution is reportedly effective, and routine dressing may prevent onset of the problem. But, passing air through a water-

spray or activated charcoal filter in an air conditioning system is the best preventative.

Affected leather shows a distinctive pink colour just underneath the leather surface or at places which have suffered abrasion or flexing. Progressive degradation produces a reddish hue to the under-surface. 'Red-rot' is generally not detected until this red colour appears because most repositories do not regularly and routinely inspect their leathers. Once the outer surface begins to crack away, the brittle, or worse powdery, undersurface becomes noticeable.

Such leather cannot be treated with potassium lactate or dressing because there is little or no fibre remaining, and thus, the entire leather network cannot support itself. It has been suggested that consolidation with a clear acrylic resin which remains flexible and will not darken with age is suitable, but I know of no such product available in Australia. (Borden's Krylon 1301 is used in the United States and Pliantex is used in England).

The use of a consolidant on leathers found in archives, i.e. on materials still subject to handling, may not be sound practice. These resin solutions contain solvents which may dissolve leather dyes, or the binders in label inks and gilding. It is unlikely the resin can be removed without damaging the surface. There is no guarantee the resin will remain colourless and flexible indefinitely. And finally, even if a suitable product is found, manufacturers often change formulations without notification, thereby possibly changing the expected performance of the product.

Therefore, in cases of suspected 'red-rot', a professional should be consulted. Generally, the only alternative is rebinding which brings into question a possible change in the legal nature of the artifact, or in the least, alters the historical nature of the artifact. It is the possibility of 'red-rot' causing the destruction of all leather in a repository which emphasizes the requirement for preventive conservation.

As final words of advice, no custodian should attempt any of the above preservation techniques on artifacts without having previously practiced on valueless leather. And, I strongly urge all who are interested in employing these techniques to first consult the references which follow — especially Horton and Middleton.

USEFUL REFERENCES

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