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# Conservation: Some Basics

BNDL014

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TL098 – Leather Bookbindings: Preservation Techniques (1977)
TL127 – Care and Display of Glass Collections (1980)
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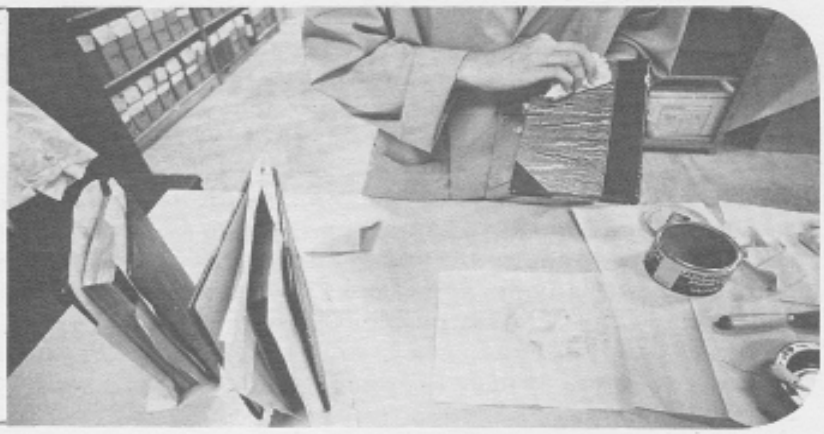
technical leaflet



# LEATHER BOOKBINDINGS:

## *preservation techniques*

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**Texas A&M University Library**

Regardless of size, most all libraries, museums, or historical societies have leather bound books in their collections. Depending upon several factors, these books may or may not be considered rare. But be they common or rare editions, most people consider a leather binding aesthetically more pleasing than a cloth one, and there is often a feeling of regret on having to replace an original binding. Although leather can be a durable material, it is also highly susceptible to chemically caused deterioration. Consequently, some form of preservation treatment is needed if an institution wants to properly maintain its holdings of leather bound books.

Deterioration of leather bindings is primarily caused by impurities that are left in the leather after the tanning process or absorbed by the leather after binding. "Vegetable tanning" is the most common process for producing bookbinding leather. This process utilizes chemicals (tannins) extracted from the bark of trees such as the oak, sumac, and hemlock. Early forms of this process, the chemistry of which is not fully understood, caused the absorption, by the skins, of water soluble organic salts called "non-tans." These non-tans resisted the attack of residual or absorbed acids on the leather fibers and acted as a natural preservative. The resulting product was very permanent, but the various steps of washing the hides, removal of hair and residual flesh, soaking, drying, and coloring literally took months to complete.

When the Industrial Revolution provided the technology for more rapid dissemination of knowledge, book production increased accordingly. By the early nineteenth century, the traditional tanning methods could not produce enough leather to meet binding demands. The introduction of cloth bindings eventually solved the problem, but prior to this a change in tanning methods also appeared.

Nineteenth-century alterations of the traditional vegetable tanning processes reduced the time for the finished product

from months to a matter of days. Unfortunately, the speeding up of the tanning process washed out the protective non-tans to the extent that the leather produced was of an inferior quality and highly susceptible to deterioration.

During the last half of the nineteenth century, librarians throughout the western world began to note the rapid decay of bindings on relatively new books in their collections. This urgent problem led to a series of studies culminating in a report sponsored by the British Leather Manufacturer's Research Association (BLMRA) in the 1930's. This report confirmed that the presence of sulphuric acid in the leather was the chief cause of deterioration and that buffering salts or non-tans were needed to neutralize the destructive effects of the acid. Substitutes for the natural non-tans had to be developed as the tanning methods were washing them out. R. Faraday Innes, principal investigator for the BLMRA report, concluded that a seven percent aqueous solution of potassium lactate applied to leather bindings would inhibit the effects of sulphuric acid present in them. Since that time, a periodic washing of leather bindings with potassium lactate solution has become the standard preservation measure.

There are, however, other preservation factors to consider besides inhibiting the effects of acid. Curators should, for instance, exercise the common sense preservation methods relating to control of excessive amounts of heat and light. Continued exposure to bright lights will fade the colors of bindings and will actually cause the fabric of leather to deteriorate. Light also generates heat, and if books are placed too close to a light source (as they may be in a display case) the heat generated may dry the binding sufficiently to warp the book or cause cracking of the leather. Ideally, book storage areas should be air conditioned in order to filter out atmospheric pollutants and to maintain temperatures conducive to the preservation of leather. Institutions should strive to keep book storage areas as cool as possible, at least within the range of 60 to 75 degrees Fahrenheit, and, preferably, at a relative humidity of 50 to 60 percent. Humidity at 70 percent or above will foster growth of molds and accelerate the progression of a powdery decomposition of leather known as red rot. On the other end of the scale, moisture and natural lubricants present in leather will be drawn out rapidly when the humidity is at 40 percent or lower, thereby increasing the likelihood of cracking.

Whatever environmental precautions one takes, however, leather bindings will in time lose some of their natural oils and fats which serve as lubricants to prevent cracking during normal handling. To replace lost oils, conservators have produced a variety of compounds which are applied directly to the leather. Most have a neat's-foot oil or lanolin base and include some form of wax and a mold inhibitor. Although some curators prefer to use a mineral oil or petroleum jelly, it should be noted that most experts agree that mineral oils should be avoided; although they at first appear to give good results, it is reported that, after a period of time, leathers treated with them tend to harden and crack. The authors experimented with petroleum jelly as a dressing and found it generally inferior to a neat's-foot oil-lanolin formula. Although books treated with petroleum jelly show no signs of embrittlement or cracking after three years, the absorption time for petroleum jelly was twice as long as an oil-lanolin dressing, and the books treated with petroleum jelly tended to remain slightly gummy and tacky for a lengthy period. Petroleum jelly, however, did have one advantage over the oil dressing. On a book badly deteriorated by red rot, and generally beyond help, petroleum jelly compacted the powdery leather and improved the book's general appearance. Such an application of petroleum jelly could forestall the inevitable rebinding, but only temporarily.

There is a variety of oil-based leather dressings available. Formulas may be found in such books as George Cunha's *Conservation of Library Materials* and J. S. Rogers and C. W. Beebe's *Leather Bookbindings: How to Preserve Them*, and Carolyn Horton provides a detailed discussion on the merits of several in her book on conserving library materials. The choice of a dressing depends almost exclusively upon a curator's preference and, to a certain degree, on the environment in which books are kept. The British Museum formula, for instance, seems to be unsuitable for the climate of the United States as many cura-

tors report that it leaves bindings tacky and gummy. Another factor to consider is that this formula, as well as some others, contains wax. The addition of wax to leather dressings is usually done to give a binding a higher gloss when buffed. However, wax tends to inhibit the penetration of subsequent treatments, and many preservators exclude formulas containing wax for this reason.

The dressing described below is generally known as the New York Public Library formula or formula number six. It was chosen for its simplicity, its availability commercially, and on the basis of recommendations by experts in the book preservation field. Based upon our own experience, we consider it an effective dressing, widely accepted and easily made or purchased.

## Selection of Books for Treatment

Before actually describing the application of preservatives it might be best to discuss the selection of books to be treated. One of the first considerations is to be certain that the binding material of the book is actually leather. Some bindings which may appear to be leather are, in fact, fabrics or of a paper composition with a leather-like grain stamped on them. If there is a doubtful case, examine any areas of the binding which might be frayed (the head and tail caps of the spine and the corners of the boards are principal areas of wear), and it is usually possible to detect strands of fabric or layers of paper. Any books bound in artificial leather should not be treated.

Vellum and alum-tawed bindings should also be excluded from treatment. Such bindings may be distinguished by their light colors. Aged vellum is usually a cream or buff color while alum-tawed bindings are lighter still, almost white. Both materials are extremely permanent and chemically different from vegetable tanned skins. Consequently, they do not require the same treatment as other leathers. Usually a temperature-humidity controlled environment is sufficient as a preservation measure. Potassium lactate solution and leather dressings should not be applied to either material. If extremely dirty, some experts allow that vellum may be washed with the lather of saddle soap. Alum-tawed bindings, however, are sensitive to water and even saddle soap should not be applied to them. An occasional suede binding may be encountered; it, too, should be excluded from the use of the preservatives described herein.

It should also be emphasized that, in selecting leather bound books for treatment, those that show no signs of deterioration should be included. Too often it is assumed that only books that are already cracked or peeling are to be treated. In many cases, if such symptoms are present, the damage may already be irreversible. Bindings that appear to be sound should receive equal consideration as they may profit most from the application of potassium lactate solution and a dressing.

Finally, the application of potassium lactate and a leather dressing will, to some degree, darken the color of the leather. The darkening effect is a normal condition of the treatment and should be expected. However, if a book is afflicted with red rot to the point that the leather is powdery, potassium lactate solution probably should not be applied. In the first place, potassium lactate will not benefit a binding in such an advanced stage of deterioration. Secondly, the large water content of the solution will permanently harden and blacken the powdery leather. If a binding is already powdery to the touch, the only alternatives are to have it rebound or, perhaps, to use a dressing that acts as a compacting agent. In the latter case, the book will have a better appearance, but this treatment will only be a stop-gap measure.

## Materials to Be Assembled

After books have been selected for treatment, the final preliminary step is to assemble the following materials in the work area:

soft paint brush 1½″ wide
eraser (Pink Pearl or Magic Rub)
length of thin wire (ca. 3″)
shallow dish or ash tray
cotton balls
cotton swabs
sponges (optional)
paper towels
saddle soap (Properts)
leather dressing
potassium lactate solution
poly-vinyl adhesive
soft cloths


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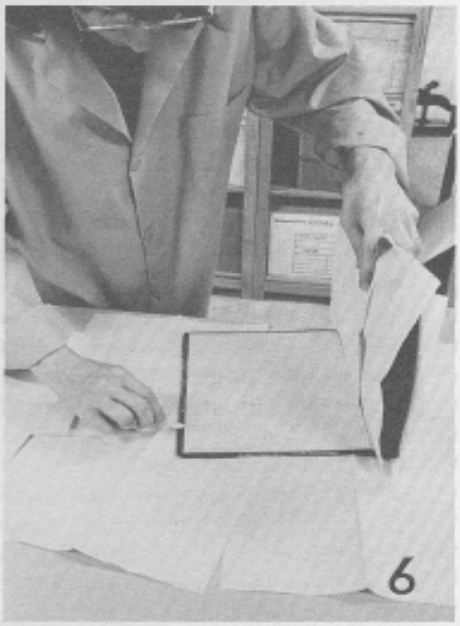
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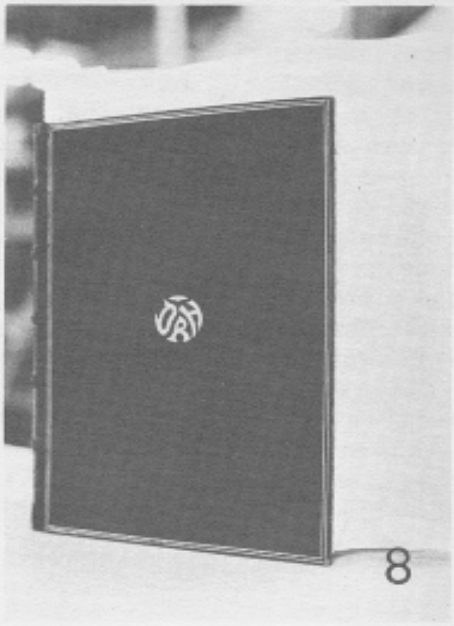
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## Step One

The first step in treating any book is to dust it thoroughly. Since most institutions do not have vacuum cleaners suitable for this task, a soft-bristled paint brush or cloth will suffice. A brush, however, is particularly useful for dusting the head, tail, and fore edge. In doing this, tip the book forward, with the spine facing up. Then dust the top of the pages, brushing toward the fore edge. Take care to hold the book quite firmly so that dust cannot slip down between the pages (illustration #1). Also take care to dust the books in an area where the dust removed will not resettle on the books to be treated or on other books not scheduled for treatment.

After dusting, it may be advisable to clean the head, tail, and fore edge with an eraser. Two brands of eraser which are known to be gentle enough for this purpose are Pink Pearl and Magic Rub. Erasing should be done in the same manner as dusting, with the book tipped forward to prevent eraser crumbs from slipping between the pages. Excess crumbs should be brushed away. It is useful to cut a small wedge of eraser for use in cleaning edges that are difficult to reach. Hard rubbing should be avoided as this will damage the tops of the pages. Gilded edges should not be erased (illustration #2).

## Step Two

Examine the boards and spine for small tears or portions of leather that have come loose. This leather should be reattached with a poly-vinyl acetate adhesive such as Jade No. 454 or Elvace No. 1874. A wire is useful in applying a thin coat of the glue to the under side of the leather. Be sure to use the glue sparingly and judiciously, as PVA adhesives are fast drying, and a drop or two in the wrong places can lead to problems. After the glue has been applied, the leather should then be pressed into place, with care taken to eliminate any air bubbles. Such mends are hardly noticeable after the cover has been oiled, and the resulting improvement in appearance is well worth the effort (illustration #3).

## Step Three

If the cover is not too soiled, the book is now ready for application of the potassium lactate solution. However, if it appears dirty, it can be cleaned with a saddle soap. Before applying saddle soap, slip a paper towel, or a sheet of paper, between the front and back covers to protect the pages. These protectors should be large enough to extend about one-half inch from the edges of the book. The purpose of these inserts is to protect the pages of the book from coming into contact with the dressings. If paper towels are used, caution should be exercised as they are highly absorbent and a drop of potassium lactate or leather dressing on the towel can quickly seep into the area being protected. Regardless of what type of insert is selected, it should be used throughout the remainder of the treatment.

The saddle soap should be applied with a cotton ball or a sponge using only a lather with as little water as possible (illustration #4). Cotton balls are preferred applicators in this step as sponges absorb dirt which is almost impossible to wash out. If sponges are used, they should be replaced frequently. Next, wipe the cover thoroughly with another clean, lightly dampened cotton ball to remove any excess soap lather. It is important to note that saddle soap and water will raise stamping somewhat and may remove gold tooling; therefore, they should be used sparingly, with not too much pressure applied in the scrubbing process. Excess water may also darken or stain the leather permanently.

Another minor problem that arises in the treatment of leather bindings is call number labels. They should be removed either during this step or, if saddle soap is not applied, at the beginning of step four below. Pressure-sensitive tapes or labels should not be used on leather bindings. When removed, these adhesives tend to peel away small bits of leather and thus scar the binding. Most likely a gummed paper label has been used; if so, it may be removed by moistening with an artist's type brush dipped in potassium lactate solution. Again, caution should be used not to apply too much moisture to the labels

in an effort to saturate them for quick removal. If there has been acid migration from these labels, excessive water will darken the leather and leave an unsightly spot on the spine. Most gummed labels come off readily with just a little water and ample patience.

Once off, and the whole treatment completed, the call number label problem reappears in regard to reapplication. Generally speaking, common sense indicates that bits of acidic paper should not be applied to the bindings, and pressure sensitive adhesives should also be avoided. Even if gummed labels are reapplied, they do not adhere well due to the oil freshly absorbed by the binding. It is equally undesirable to ink the call number directly on the binding. The simplest and cheapest solution is to use book marks made from acid-free stock. These marks should be about one inch wide and about one inch higher than the book in which they are to be used. They are placed between the front cover and the free front end paper with the call number written on the protruding tab. Librarians, however, sometimes resist the use of these markers as they make the books more difficult to locate. The only other alternative, which is more costly, is to use a dust jacket of a polyester material and then apply the call number labels to the jacket in the conventional manner. Individual preference, financial consideration, and one's willingness to compromise will influence the final decision in most cases.

## Step Four

A very important step in the preservation process of leather bindings is the application of a potassium lactate solution. This formula replaces the natural protective salts in the leather which are lost in the manufacturing process or through time and handling. In addition, it enables the leather to absorb a dressing more evenly.

The potassium lactate solution is applied in the following manner: Pour some of the solution into a dish. Saturate a cotton pad with the liquid, squeezing it out enough to prevent dripping. Grasp the body of the pages of the book in one hand, leaving the covers slightly apart. With the other hand, sponge the cover with a gentle blotting motion. The solution is normally absorbed by the leather very quickly. If, however, it beads up on the surface, sponge the cover again with the cotton pad. It is important to obtain an even coverage (illustration #5).

The turn-ins should be treated last, as they are awkward to sponge without staining the end papers. A convenient method of handling them is to moisten a cotton swab with the solution and roll it over the turn-ins—do not rub (illustration #6). Then set the book upright with its covers slightly open and allow it to dry twenty-four hours.

It is best to wear a rubber glove when applying the potassium lactate solution as it contains a small amount of paranitrophenol, a toxic chemical. Also, the solution will leave a temporary yellow stain on one's fingernails if a glove is not used.

## Step Five

After the drying period, the binding is now ready to be oiled. A simple and effective dressing for this purpose consists of neat's-foot oil and anhydrous lanolin. It may be applied with one's fingers or with a piece of cloth. When doing one-half or one-quarter bindings, a cloth works best as it allows more control in applying the oil to areas close to the boards of the book. The dressing should be worked well into the binding, particularly at the hinges. All leather parts of the cover should be oiled except the turn-ins (illustration #7). When the book has been thus treated, it should be left to set at least twenty-four hours to allow the oil to penetrate the leather (illustration #8). If all of the oil has not yet been absorbed, leave the book standing and continue to check it at least once every twenty-four hours. It is relatively easy to see when the leather has completely absorbed the dressing.

## Step Six

After the oil has been absorbed, the only remaining task is to buff the cover with a soft cloth (illustration #9). The use of a dressing containing wax or applying a wax directly to the binding would give a higher luster. However, we do not advocate the use of wax in any form for the reason stated above and because we have found that, after a period of time, wax applied directly to the binding can chip off and take thin flakes of leather with it.

## Frequency of Treatment

There is no set time period for retreatment of books. The frequency of treatment depends almost entirely on the environment in which books are kept. If the books are shelved in a temperature-humidity controlled library which has filtered air conditioning, there is less need to treat them as often as books that do not have such advantages. Suffice it to say that books should be inspected once a year, and, if they appear dry, they should be retreated. Carolyn Horton recommends that books should be treated at least once every five years. The only cautionary note in this area is that over oiling, either during the initial treatment or with too frequent subsequent treatments, may result in supersaturation of the binding and the penetration of oil into the pages. This is rare, however. Generally, common sense will prevail as to the amount or frequency of oiling.

As to the reapplication of potassium lactate solution, there is some disagreement among conservators. Many conservators routinely reapply potassium lactate before each reapplication of leather dressing. Others contend that a one-time application of potassium lactate is sufficient. The authors, however, believe that an occasional reapplication of potassium lactate is in order, at least until there is documented evidence that a single application is sufficient. Regardless of the pros and cons of the one-time treatment, if a book is ever sponged with saddle soap or water after its initial treatment, it should receive an application of potassium lactate as the water from the soap may wash out the protective salts in the leather.

## Conclusion

Leather book bindings should be included in an institution's regular preservation program. The above technique, regularly applied, will not only save on rebinding costs but will also preserve the original state of a book. Aside from the fact that a portion of a book's value is dependent upon its original binding, we tend to forget that the use of leather as a binding material is actually representative of an historic period. In this latter context, books become historical artifacts and deserve the same consideration as other period pieces.

In any book preservation program, a controlled environment serves as the first line of defense. To the extent possible, leather bound books should be stored out of direct lighting in an area with a relative humidity of 50-60 percent and with a temperature between 60 and 75 degrees Fahrenheit. However, because of leather's tendency to contain or absorb impurities, specifically sulphuric acid, environmental controls by themselves do not provide sufficient protection. Leather bound books need regular treatments of potassium lactate solution to neutralize the effect of acidity and regular applications of a dressing to maintain the suppleness and appearance of the leather. A conscientious program along these lines will increase the life of leather bindings to the point that the greatest threat to them comes from careless and frequent handling.

## A Note on Supplies

For smaller institutions, it is probably advisable to purchase potassium lactate solution and leather dressing pre-mixed from commercial supply houses. Potassium lactate not used during application can be poured back into the original container. A pint of it will last a long time. However, for those who wish to prepare it themselves, the formula is reprinted here:

| | |
|---|---|
| Potassium lactate U.S.P. | 7.00% |
| Distilled water | 92.75 |
| Paranitrophenol | .25 |
| | 100.00% |

Most local chemical suppliers will be able to provide the above ingredients. Druggists should also be able to supply them; however, druggists in some areas report that the potassium lactate has to be specially ordered. We found that it is much simpler and quicker to buy the solution pre-mixed.

The neat's-foot oil lanolin leather dressing is also readily available from commercial suppliers. A small amount of it also goes a long way with normal application. However, the ingredients for this dressing are much easier to obtain than for the potassium lactate solution. Most saddle shops carry neat's-foot oil, and the anhydrous lanolin can be purchased readily from druggists. The formula consists solely of these two ingredients:

| | |
|---|---|
| Neat's-foot oil, 20 degrees Centigrade, cold test | 60% |
| Anhydrous lanolin | 40 |
| | 100% |

To mix, place four parts anhydrous lanolin in a double boiler and heat until the lanolin is in liquid form. Stir in six parts neat's-foot oil, then pour into a suitable container and allow to cool. Once the mixture has set, it is ready for use. It should be stored in a cool place to keep from breaking down.

The remainder of the materials used in the treatment process can readily be purchased from art supply stores, saddle shops, grocery stores, department stores, and drug stores. Potassium lactate solution and leather dressing in pre-mixed form are readily available from TALAS, 104 Fifth Avenue, New York, New York 10011.

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**All photographs in this leaflet are the work of A. Tracy Row of the Arizona Historical Society.**


Carol Burlinson's knowledge of bookbinding techniques derived from her experience with the archives project of the Arizona Historical Society. Since that time, she has been cataloging special collections of the Sam Houston Library at Texas A & M University.

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American Association for State and Local History

*Technical*
LEAFLET

# Care and Display of Glass Collections

By Barbara Lang Rottenberg
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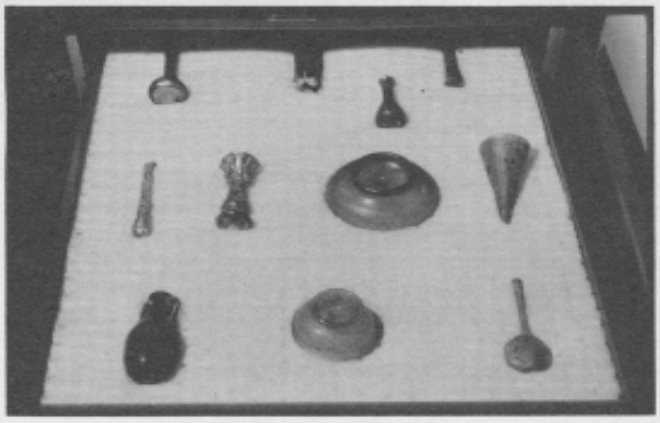
Glass is a paradoxical material. Although it is chemically resistant and extremely hard, it is very brittle and shatters easily on sudden impact. Glass also can be damaged permanently by a hostile environment. For these reasons, preventive measures should be emphasized when caring for glass collections.

To prevent accidents or deterioration, curators first must learn of the problems to which glass is prone and then do their best to avoid those situations in which problems may arise. They never should hesitate to seek expert advice, drawing on the knowledge and experience of others whenever necessary. By learning more about their collections, curators may be better able to protect them.

## Museum Environment

Although glass gives an impression of stability, it is not immune to such external factors as heat, light, and moisture. Deterioration is sometimes more difficult to detect in this material than in textiles or wood, but it most certainly can occur.

All glass should be stored in a stable environment away from radiators, heating outlets, or air conditioners. A relative humidity of forty-five to fifty percent is considered suitable for glass that is structurally sound. It is also agreed that, ideally, the relative humidity should not vary more than four percent above or below the accepted norm at whatever point that may be established (R.O.M. 1976, p. 157). This stability is important as the possibility of damage occuring to glasses increases with sharp changes in temperature and extremes of



relative humidity. Glass objects have been known to shatter when taken from a warm environment to an extremely cold one (McGrath 1971, p. 80). Some glasses also may respond poorly to changes in the moisture content of the air.

Glasses with unstable chemical compositions may be hygroscopic; that is, they chemically attract water. In a poorly ventilated area, a sudden drop in the relative humidity may cause condensation within a vessel. If this moisture is allowed to remain on its surface for an extended period of time, it will interact with the glass, changing its chemical structure and damaging its appearance (Losos 1973, p. 3). Glass that has been damaged already or is innately unstable due to improper manufacture is especially vulnerable to these effects.

Strong sunlight is also a potential source of difficulties. Most sands used in the manufacture of glass contain iron oxides, substances that give a green or yellow tinge to the resulting product. To counteract this effect, early glassmakers used manganese dioxide as a decolorizing agent. When exposed to ultraviolet light, manganese dioxide becomes photo-oxidized and turns pink or violet, a process known as solarization. This change can best be seen in the amethyst color of many old telegraph insulators. Even more modern glass is not exempt as selenium, a substance that served as a decolorizer in the early twentieth century, photo-oxidizes to an amber hue. In general, solarization is a slow process, but it is cumulative and will, with time, permanently alter some specimens. Therefore, it is wisest to avoid direct sunlight when displaying or storing glass. If sunshine cannot be omitted, protect the object with ultraviolet filters. An illumination level of up to three hundred lux is suitable for glass that is structurally sound (R.O.M. 1976, p. 161).

Of greater import is the fact that sunlight can cause cyclic changes in temperature and relative humidity within closed cases. As has been previously described, these changes can cause irreversible damage in unstable glasses. It is not necessary to avoid diffused natural light when displaying glass, but it is important to prevent heat build-up and sharp changes in relative humidity that may accompany direct sunlight. Thermal shocks caused by rapid temperature changes might damage any glasses, even those having a stable composition.

Certain glass requires special care. To produce colorless ware, many early glassmakers over-refined the alkali salts used in a batch. Some also added a larger proportion of the salts to the sand as this lowered the fusion point of the glass and made it easier to work (Werner 1966, p. 45). The resulting ware was colorless but also, unfortunately, extremely sensitive to moisture.

Under unfavorable conditions, this type of glass tends to deteriorate. Moisture from the air attacks the surface, leaching the alkali from the glass and causing fissures in the surface. In the early stages of this condition, the extent of the damage is not too apparent because moisture fills the tiny cracks and makes the glass seem transparent. If the vessel is dehydrated, however, the moisture leaves the fissures, propagating a network of fine cracks on the surface. If the object is left in the same environment, the process of leaching and dehydration will continue, causing the cracks to enlarge and robbing the glass of its transparency (Brill 1975, p. 121).

This process is known as crizzling and its presence can be readily identified by a fine surface network of crazing. The earlier stage of this condition may not be observed easily, but a vessel marked by incipient crizzling can be detected under a microscope or by rotation under proper illumination. If deterioration is occurring, light silvery rays will be visible (Brill 1975, p. 121).

No satisfactory treatment has been devised yet for crizzled glass. An object subject to this problem can be stabilized by storing it in an environment where the relative humidity is maintained between forty-five to fifty percent. Under no circumstances should crizzled glass be heated. Care must be taken also with such lighting devices as spots to prevent localized high temperatures (Brill 1975, p. 121).

Glass "disease" also may manifest itself in a different fashion. As the alkali in unstable glass is leached to the surface, it interacts with the atmosphere to become an extremely hygroscopic substance, potassium carbonate. This material will absorb moisture from the atmosphere at relative humidities as low as forty-two percent. At this relative humidity, the surface of the glass subject to this problem will feel slippery to the touch, a state known as "sweating." If the relative humidity stays high for an extended period of time, the moisture will accumulate and eventually begin to drip down the surface or "weep" (Werner 1966, p. 45).

Weeping glass cannot be cured, but it can be stabilized by storage in an environment where the relative humidity is maintained below forty-two percent (Plenderleith 1972, p. 346). This requires the use of calibrated silica gel and air-tight containers. The silica gel will have to be checked on a regular basis and changed when its ability to remove moisture from the air has deteriorated.

Both forms of glass disease are closely related. Weeping glasses show some signs of the crizzling process while crizzled glass will weep if kept at high humidities. As both problems occur in glass containing too much alkali or too little lime, the different reactions may be caused by long exposure to different environments. For example, weeping glass occurs more frequently in England where the relative humidity is generally high. Crizzling, on the other hand, is more common in the dryer areas of North America.

Glass disease is most often associated with seventeenth- and eighteenth-century glass, although it has been known to occur in both earlier and later specimens. It has afflicted objects from a wide range of areas—Europe, China, and the United States (Brill 1975, p. 121). Curators with this type of glass should be aware of the problem. They should examine suspect glass and isolate it in proper storage if it shows signs of incipient crizzling. Early detection will help to ensure that the beauty and transparency of these objects will not be lost (Reisman 1977).

### Handling and Transporting

The rules for handling glass are similar to those for any work of art. They involve common sense and a thorough knowledge of the collection. Differences do lie in a few areas, however. Although gloves should be worn when handling museum objects, they should be avoided when dealing with most glass. They reduce sensitivity, increasing the risk of dropping a piece or of holding it too firmly. Well-washed hands, kept free from dirt and moisture by the use of a clean white towel, are preferable. A second cloth of a fine napless fabric such as silk can be used to remove any fingerprints. The exception to this rule is glassware with badly deteriorated surfaces. As the moisture on a person's hands may remove little flakes and further damage the glass, thin surgical-type gloves should be worn.

When transporting glass, remove any loose parts such as lids or stoppers and put them aside to be carried separately. Lift each piece with both hands; slide one underneath and use the other for balance. Very small artifacts, of course, require only one hand. Spouts, finials, and even handles should not be used for lifting and carrying as they may have been cracked or repaired previously, leaving them in a weakened condition. Large thin items such as mirrors and window panes may be safer if carried in a vertical rather than a horizontal position. This changes the distribution of strain and reduces the risk of breakage. For very large pieces, a well-padded cart or dolly is necessary, one equipped with rubber or plastic-covered wheels to reduce vibration. The object must be positioned carefully for stability. The basic rule for handling glass is to treat each piece as though it had been damaged and might come apart in one's hand.

Occasionally, it may be necessary to send glass by shipper. Personal experience with a particular firm is the best way to assess its reliability (Keck 1970, p. 44). ICOM further suggests that objects of particular value or fragility be accompanied by a member of the museum staff.

When shipping artifacts, proper packing procedures are very important. For shipments inside North America, cardboard boxes can be used. The Corning Museum of Glass recommends that boxes be of double-faced board meeting a two hundred-pound (one hundred-kilogram) test and preferably not larger than twenty-five by twenty-five by thirty inches (sixty-five by sixty-five by seventy-five centimeters). The tops should be taped down and a strong cord or steel straps used to secure them. When making large shipments in North America or when sending packages overseas by boat, the use of wooden boxes is advisable. These should have screwed tops and should be at least five-eighths-inch (one and five-tenths centimeters) thick. Steel straps should be used as reinforcement. Overseas shipments sent by air can be made in the cardboard boxes previously described if the objects are quite light; if heavy, wooden crates are preferable. Packing materials include tissue paper, excelsior, brown paper, newspaper, shredded paper, and vermiculite.

The goal of good packing is to suspend the objects in the buffer material. They should be well-supported without being pressed down. This ensures that the packaging receives any vibrations or bumps that may occur without transferring them to the object.

This goal can be reached by wrapping the glass in loose crumpled paper, carefully protecting every protruding part. Using a commercial material such as "Air Cap," the object should be encircled several times. If the vessel is hollow, crumpled material can be gently placed inside; avoid exerting too much pressure. Packing materials should be perfectly dry as moisture is doubly dangerous in the unventilated confines of a box.

After wrapping, place the objects in the container. At least three inches of buffer material, either excelsior or crumpled paper, should surround each item, and an equal amount should be employed to pad the sides of the box or crate. Very heavy or unusually fragile items can be packed with padding in separate containers and then placed in a larger one. These individual boxes should be separated from each other by three inches and from the bottom by about four inches of packing material. It is always advisable to place the heaviest items closest to the bottom (Corning 1972, p. 2).

Proper labelling is important. All sides of the container should be marked with the words "Fragile," "Glass" or "Verre," and "This Side Up." At least two clearly written address labels should be used. A list of the objects included in the container should be placed inside the cover along with a note explaining any unusual details (Corning 1972, p. 2).

It should be remembered that damage is at least as likely to occur during packing as in transit.

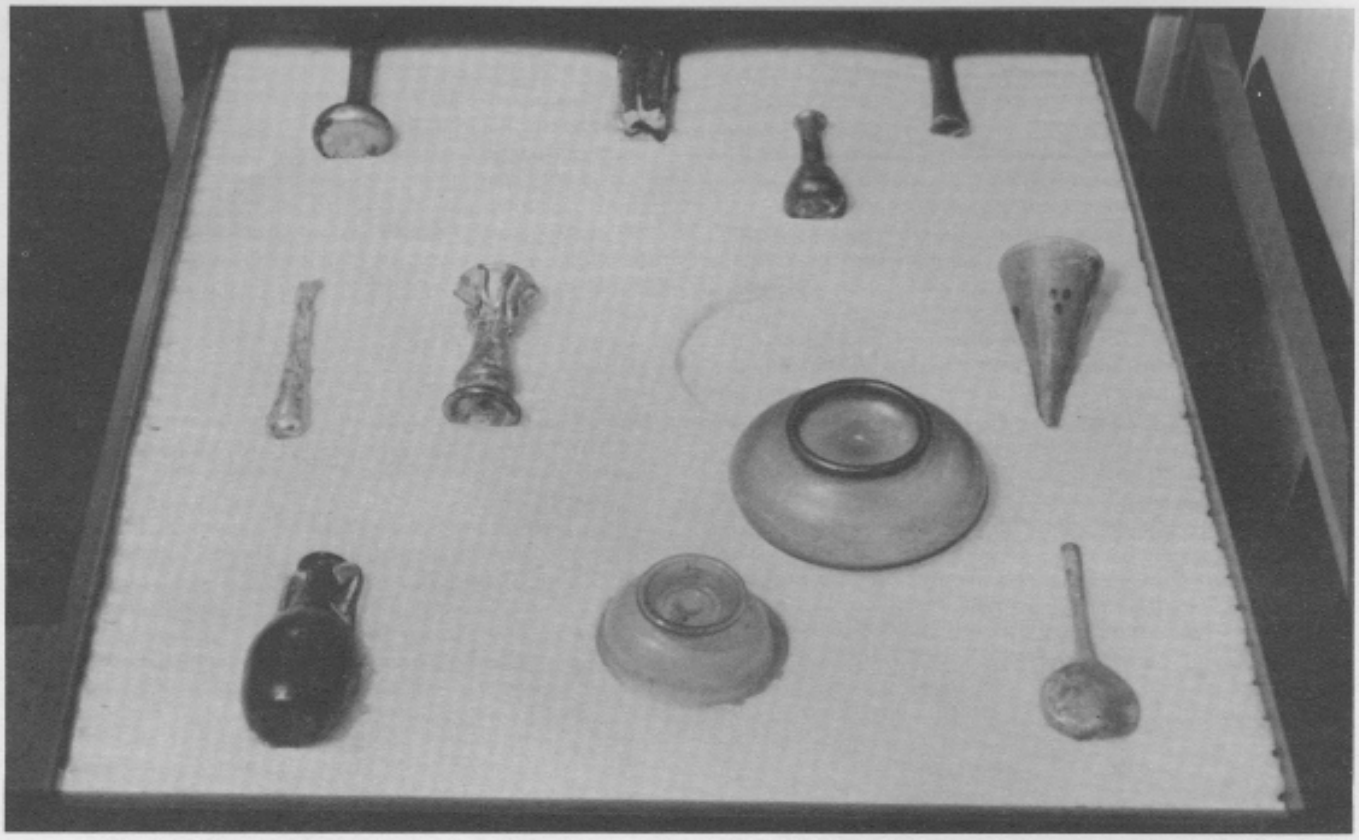
When shipped in cold weather, boxes of glassware should not be unpacked until they have time to warm-up to room temperature.

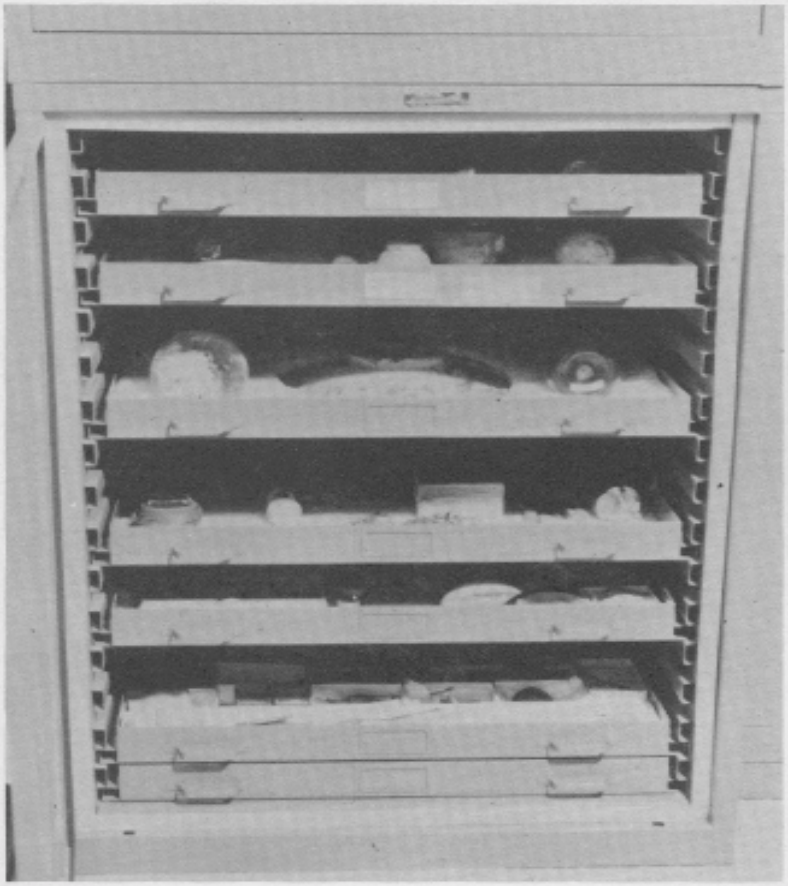
### Storage

Storage facilities vary considerably from museum to museum. The two most common types employed are moveable drawers in some form of cabinet and shelving, preferably closed. Of the two, the latter is in some ways superior; its fixed quality is its most important asset.

When using shelving, certain rules should be followed. The structure should be sturdily built and well-balanced so that it can withstand any jarring without tilting. Deep shelves are to be avoided as the possibility of breakage is increased when reaching is necessary. Cushion surfaces and place each object so that it is well-spaced from others and resting firmly without protruding beyond the edge of the shelf. Certain objects, such as wide-mouthed bowls, may be more secure when resting upside down, but these should be checked first for thin or repaired sections that might not support the vessel's entire weight. If space is limited, then stacking may be necessary. Care should be taken that a stack contain pieces of similar shape, each cushioned by some form of buffer material. As a final precaution, minimize traffic in storage areas.

moveable drawers, generally is not used for glass. It is possible, however, to adapt it successfully. One method is to line the drawers with several layers of





*To adapt moveable drawers for storage of glassware, line the drawers with several layers of microfoam. Place one layer of foam on the bottom of the drawer; cut holes in the second and third layers to form separate nests the shape of each piece of glass to be stored.*

"Microfoam." One layer is placed whole on the bottom of the drawer. The second layer, and possibly the third depending on the shape of the object, is cut to form a small separate nest for each piece and is then placed on top of the first layer. The nest need only be large enough to secure the item. By leaving a small space between cut-out areas, several glass objects can be stored safely. Drawers then can be removed without any danger of jarring while the contents remain readily accessible. This method is particularly useful in museums where space is at a premium or where collections consist of especially fragile specimens.

### Cleaning

When cleaning glass, as in most other museum situations, a thorough knowledge of the collection is important. Before attempting any treatment, examine each piece carefully with a magnifying glass and a good light. Check for surface wear, cracks, and old repairs. Consider the type of glass and the nature of the decoration. The cleaning method selected will depend on the results of the examination.

Glass that is in good condition without any repairs or surface deterioration can be washed quite simply in warm, never hot, soapy water. A deionized soap such as "Orvus" is recommended, but any mild, good quality detergent will do. Ideally, distilled water, available in many stores for use in steam irons, should be used for washing, but if budget considerations do not permit its purchase, then room temperature tap water will serve. A small amount of water softener such as Calgon will improve the performance of the detergent in areas where tap water is hard. It also will prevent chemical build-up and filming on glass surfaces.

Wash each piece separately in a plastic basin. Metal and porcelain basins are not recommended but can be adapted for use by lining them with dish towels. Similarly, taps should be buffered with rubber nozzles.

After washing, rinse well in room-temperature water. An addition of two to five percent ammonia to the final rinse water will result in a more brilliant sparkle (Pawlick 1979). Ammonia is a very useful cleaning agent as it acts as a degreaser, but it should never be used on glass with surface deterioration or metallic decoration (McGrath 1971, p. 81). Drain and dry the piece immediately, using a soft lint-free cloth. Linen towels, soft chamois leather, and even old baby diapers are some of the materials recommended by museum conservators.

Drying glass scrupulously is important, for not only will it improve the object's appearance, but it also will discourage surface deterioration. Water trapped inside bottles or decanters will attack the glass and, with time, pit and dull it. This damage cannot be reversed but can be avoided with a little extra care. Drain narrow-necked vessels upside down overnight before drying. A final rinse with an ether-alcohol mixture will speed up evaporation and especially is recommended for older European glass (Losos 1973, p. 4). Decanters can be dryed by putting a rolled-up paper towel in them. Bottles and decanters never should be stored with their stoppers in place as this can cause condensation.

In the past, collectors, and even some museum curators, treated pitted glass by coating it with mineral oil or Canada balsam. The oil filled in the surface irregularities and improved the object's appearance by allowing light to pass through naturally. This technique is not recommended as the oil tends to accumulate dust and is sometimes difficult to remove. Until a substance is developed that can safely treat this pitting problem, the best treatment of pitted glass is to keep it clean and dry.

Although glass is nonporous and, strictly speaking, should not stain, old organic deposits such as dried wine may be difficult to remove. A variety of methods can be used. At the Canadian Conservation Institute, organically stained glass is soaked in a solution of Orvus, ammonia, and water (Segal 1978). Afterwards, a cloth or cotton balls are inserted carefully and rubbed around to remove the particles. At the Royal Ontario Museum, a similar technique is used, but if it fails, a solution of twenty to thirty percent hydrogen peroxide in water is used to bleach the stain. This method is generally successful with organic material but will not remove iron stains which may be similar in appearance (Moncrieff 1975, p. 99).

To remove lime deposits, the Corning Museum reports considerable success with a product called Lymoff, made especially for this purpose. The manufacturer's instructions for the product are as follows:

> *Dissolve one teaspoonful of Lymoff in each quart of water (never use boiling water) in vessel to be treated. Soak lime-coated articles with Lymoff solution for at least four hours or more. Lime will dissolve. Rinse with hot water before using. To hasten removal of thick lime deposits in vessels use a stronger solution, soak for four hours or more, then wipe out as much lime as possible and continue soaking with fresh solution.*

Lymoff may not be successful with aged deposits, nor should it be used on vessels with metallic decoration. In questionable cases, it is always a good idea to consult the manufacturer before using any product (McGrath 1971, p. 79).

Bottles and other sturdy vessels that are extremely soiled may respond to a more mechanical form of cleaning. They can be soaked overnight in a mixture of water softener, detergent, and water. Next day, a handful of uncooked rice can be added and gently swirled around. This should dislodge any dirt. The vessel then can be rinsed. Avoid pouring the rice into the sink as this may clog the drain. If the vessel is too thin for this technique, remove as much dirt as possible with a soft brush, taking care not to scratch the glass with any metal brush ends.

These techniques are not suitable for all glass. Mended objects should not be submerged in water as the adhesive may be affected seriously. Glass that has been broken and repaired, therefore, should be dabbed clean with a towel dipped in an ammonia and water solution.

Weathered glass also requires special care. In *The Deterioration and Conservation of Painted Glass*, R. G. Newton defines weathering as a "phenomenon which occurs as a result of physio-chemical reaction between the glass and its surroundings. As a result of the reaction, some of the original constituents of the glass are removed, and its vitreous appearance is spoilt or destroyed." The weathered surface can vary considerably in appearance: some afflicted glasses are dull and opaque, while others are quite lovely with an iridescence caused by an altered refractive index (Reisman 1977). Such glass should never be washed but should be cleaned gently by blowing.

Modern iridescent vessels, such as those produced by Tiffany, have been treated chemically to produce a similar surface effect. They are not necessarily unstable but still merit a little extra caution. They should be cleaned as gently and as seldom as possible (McGrath, 1971, p. 77).

### Repair and Restoration

In spite of the care taken to protect museum pieces, accidents do occur, and it becomes necessary to deal with a broken object. A trained conservator experienced in dealing with this type of problem is always the best choice, but in the small museum with no conservation personnel, it may fall to the curator to deal with the damaged artifact. Some conservators feel that the curator simply should put the damaged specimen away until it can be repaired professionally (Segal 1978). Others feel that anyone who is reasonably dexterous and possesses a knack for neat, exacting work can mend most glass (Pawlick 1978).

The curator should study each case separately, taking into consideration the value of the object and the extent of the damage. Will the object eventually reach professional hands? What are its chances for survival if not mended? How difficult will the repair be? If the curator decides not to attempt to mend the glass, the pieces should be placed, well-spaced and individually wrapped, in a padded box where they will not be lost or misidentified. The curator should resist the temptation to test the joints. If, on the other hand, the job must be done, then practice and perfect the technique before tackling the museum piece.

The degree to which an object is to be restored has always been hotly contested. Generally, it is agreed that an artifact should be returned to a state where it can be appreciated for what it was. The nature of the object, its particular merits, will determine that state (Hodges 1975, pp. 37-38). The restorer should aim at achieving integrity of form, color, and decorative effect and should base the work on the evidence provided by the piece itself—never on conjecture. The anticipated stability of the object also should be considered (Errett 1977, p. 19). The repair should not detract from the overall appearance of the object but still should be visible to the careful observer. Any restoration work must be recorded carefully.

Once the decision to repair a particular piece has been made, the next step is to clean the broken fragments. Cleanliness is important in all conservation work, but it is particularly so in glass restoration. The basic rules for cleaning glass apply here, but extra care should be taken to prevent the deterioration of the fracture surfaces.

In some cases, it may be necessary to remove old glue from previous breaks. Until the development of epoxies, adhesives were of three main types (Savage 1967, p. 24). The first, glue made from gelatin, generally was used on organic substances, leather, wood, or paper. It can be removed easily by soaking in warm water. The second type consists of resins such as Canada balsam which frequently were used for mending glass. They have a tendency to darken and crack from exposure to air and can be removed by soaking in an alcohol bath. Celluloid adhesives such as Durofix or Duco form the last class of adhesives. They can be recognized by their highly transparent, blistered appearance and can be dissolved by soaking the glued object in an acetone bath for approximately one hour (Andre 1976, p. 18).

When soaking a glass object, it is advisable first to wrap it in cheesecloth. This will protect it and will prevent the loss of any pieces. Cover all baths to prevent evaporation. When the pieces come apart—they should never be forced—any remaining traces of adhesive can be removed carefully with a brush. The object then can be rinsed in warm water.

Epoxies are more difficult to undo. They can be recognized by their smooth, somewhat yellowed appearance and can be treated by soaking the glued object in warm water for three or four days (Reisman 1977). An alternate technique is to soak the wrapped vessel in an acetone or vinegar-filled bath for a similar period (Pawlick 1979). The fragments should then separate on their own accord. The remainder of the glue can be removed by careful brushing, and the pieces should be rinsed well in warm water.

Some manufacturers have developed special solvents to remove their epoxies. It is always a good idea to consult the manufacturer before using any such product. As these solvents are extremely powerful, it is advisable to solicit a second opinion from a trained conservator.

Once the surfaces are clean, the pieces can be arranged on the workbench in such a way as to indicate the manner in which they will fit back together. This may require a considerable amount of work, but it will cut down needless experimentation and help prevent mistakes in the later stages. Clues to the proper arrangement will lie in the decoration, the shape and thickness of the fragments, and, in some cases, variations in color. The goal is to arrange the fragments by starting at the center of the piece—from the foot of a vase upward and from the middle of a bowl or plate outward. This generally will be the order in which the object will be assembled (Andre 1976, p. 31).

The choice of adhesive is the next major consideration. At Corning and in many European museums, epoxy glues are preferred to temporary adhesives (Errett 1977, p. 19). Epoxies are permanent, and there is little risk of a mended object collapsing at a later date. They also can be applied in very thin layers which makes possible a close mend. On the other hand, epoxies are not as easily removed after

## TYPES OF GLUES

| *Glues* | *Distributor* | *Advantages* |
|---|---|---|
| Araldite AY103 and Hardener HY956 | Ciba Company GmbH<br>Wehr, Baden, Germany<br><br>Ciba-Geigy Canada, Ltd.<br>205 Bouchard<br>Dorval, Quebec<br>H9S 1B1 | 1. Transparent, does not yellow<br>2. Same refractive index as most glasses when applied thinly<br>3. Cures at room temperature<br>4. Very thin<br>5. Does not dry up or become brittle |
| Epo-Tek 301 | Epoxy Technology, Inc.<br>65 Grove Street<br>Watertown, Massachusetts 02172 | 1. Cheaper than Araldite<br>2. Does not yellow |

curing, and any mistake in restoration is more difficult to reverse. It is important, therefore, to practice techniques before tackling a museum piece. Epoxies should never be used with crizzled glass. For a discussion of glues, see the box above.

The process of repairing the break can be undertaken now. Remove any foreign material from each fractured edge with a swab dipped in ammonia followed by a swab dipped in acetone (Errett 1977, p. 19). An even dispersal of the acetone is an indication that the adhesive will spread smoothly. The pieces now can be assembled systematically and taped in position, generally in the order already described and in such a way that tensioning is even. Scotch Magic Tape is preferred at Corning as it is a flexible and effective adhesive (Errett 1977, p. 19). The tape should be applied to one side only, always the side without decoration. It never should be used on flaking, deteriorated surfaces.

When the pieces are properly seated, run adhesive into the cracks with a fine metal spatula. The fluid epoxy will seep between the fragments and fill any small gaps. The excess should be removed evenly and carefully to ensure a strong join and prevent shape distortion. The object then can be placed aside to allow the adhesive to set, supported by the tape, or, if necessary, a sand table or laboratory stand. Any clamps used with stands should be padded to protect the glass.

Certain objects are more difficult to repair. Both sides of cone-shaped or narrow-necked vessels, for example, may not be accessible. When this is the case, cut apart the tape on the object at a convenient place. The adhesive can be applied to all the cracks, and the object refastened. Always glue glass in the morning so that any slipping or distortion can be repaired before the glue sets (Errett 1977, p. 19).

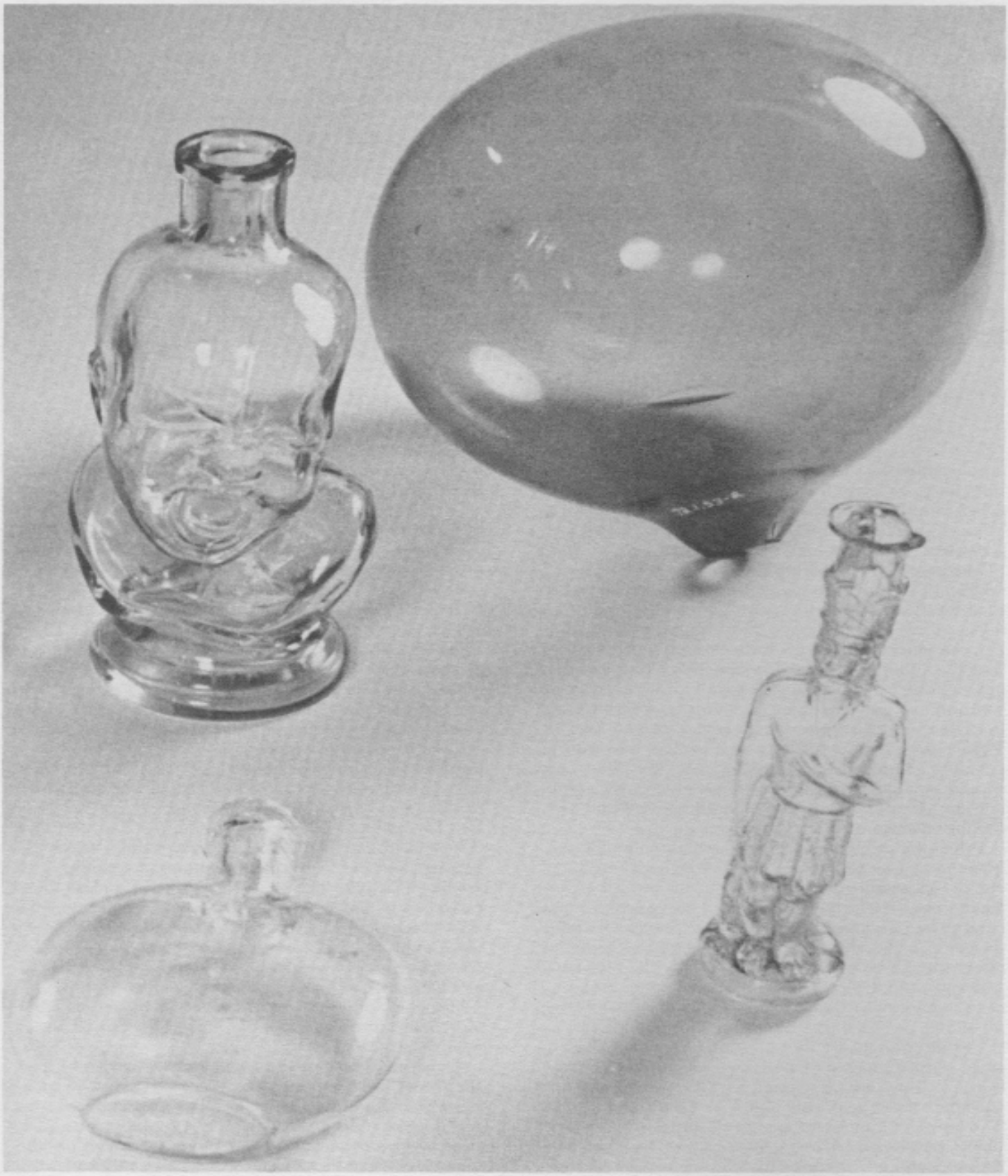
The restoration of an incomplete object is much more complex and should be undertaken only by a trained conservator. The curator must decide whether restoration is truly desirable, considering the importance of the artifact, the extent of the damage, and the effect restoration will have on its appearance or stability. An object of outstanding historical or documentary significance justifiably can be displayed incomplete. If the decision is made to proceed with restoration, then the object should be transferred to an experienced conservator.

The curator never should hesitate to seek expert advice in any matter concerning the care of the collection. If an object merits treatment and there are no conservation facilities in the area, curators may write to the Corning Museum of Glass or, in Canada, to the Canadian Conservation Institute. Advice also can be sought at colleges that provide training programs in conservation. These schools sometimes need material for their students to work on and may even be willing to accept objects for restoration work.

### Display

The basic purpose of the museum exhibit is to present material from the museum's collection in a fashion that will interest, inform, and stimulate the public. The nature of the exhibit will depend on what the curator is trying to say. A display that attempts to awaken an appreciation of the aesthetic values of a particular class of artifacts will differ from one explaining its technological development. In this sense, glass is like any other object. The manner in which it is displayed will depend on the reason for exhibiting it.

Once the theme of the display has been established, the pieces to be exhibited must be selected. The small museum with a limited collection occasionally may wish to expand the scope of its presentations by borrowing glass from other museums or from private collectors. Members of collecting societies frequently are delighted to have their collections exhibited. Involvement in such groups is one means by which the small museum can expand beyond the boundaries set by its collections while cementing ties with the community. Another source of material to be



*Four glass items from the Guild Collection of Americana at the Nassau County Museum in Old Bethpage, New York: top, a late nineteenth-century medicine bottle in the shape of a crying child and a "witches' ball" of light green glass used to ward off evil spirits; bottom, a flat-sided, mid-nineteenth-century clear glass flask and a nineteenth-century scent bottle in the form if an Indian.*

considered is contemporary glassblowers, many of whom work in rural districts. A special exhibition of their work, possibly with examples sold in the museum shop at the same time, would give them the publicity that they badly need. Many of these glassblowers are equipped with portable furnaces, and it might be possible to sponsor a special exhibition of glassblowing techniques in conjunction with the regular display.

The overall purpose of the exhibition having been determined and the roles of the individual pieces assigned, their organization and the means of displaying them will follow. The Corning Museum has exhibited glass in a variety of fashions—on shelves, mirrors, and translucent plastic, on velvet-covered tubes, affixed to the backs of cases, on revolving pedestals, on Plexiglas supports, and with magnifying glasses. Some objects are featured as single items in specially designed cases while others are grouped together for a different kind of visual effect. Effective display requires good organization, an imaginative use of materials, and an attention to object security.

The single most important detail in the effective presentation of glass is lighting. Glassware, particularly crystal, owes much of its beauty to the manner in which it responds to light. The type best suited to a particular display depends on the nature of the objects and the desired effect. Crystal, for example, looks best if lit by a concentrated, high contrast beam such as provided by a light box or spot. Other glass with surface decoration may benefit from a raking light that brings out surface details. Still others are seen most effectively when lit from behind. Regardless of positioning, most "colorless" glass contains barely perceptible amounts of blue or green and often is viewed best under lighting of a similar color (Lusk 1971, p. 18).

Although the small museum with a limited budget may not be able to afford expensive equipment, it can still, with a little ingenuity, create dramatic and successful lighting effects. The type of illumination produced by a lightbox, for example, can be mimicked easily by concentrating a beam of light and directing it onto a displayed object. When bottom lighting is used, this can be accomplished very tidily with Plexiglas shelving. Generally, Plexiglas is covered with a protective paper. When the plastic has been cut to shelving size and the position of the object on the shelf has been determined, its base can be traced onto the protective paper. The remaining covering is removed, and the surface painted. When it dries, the small pieces of paper corresponding to the bases are removed, and the shelf is put in place over the illumination source. The result is a poor-man's lightbox.

An interesting variation of this can be produced by placing a clear glass object atop a steady polished rod or block of colorless acrylic. The block is seated above a hidden light box. Rods that are three or four inches in diameter will transmit large quantities of light from comparatively low-level sources and create beautiful sparkling highlights in the glass above. The rods themselves appear much as they do in normal ambient light (Lusk 1971, p. 18).

When planning lighting, environmental factors also must be considered. Although glass is not considered a light-sensitive object, there have been a few reports of slight color changes attributable to light (R.O.M. 1976, p. 159). Generally, it is agreed that low levels of illumination, fifty lux, should be maintained for ancient iridescent glass (Pawlick 1978). A slightly lower level of ambient light in an exhibition room will, by contrast, make case lighting more effective.

Stable glass can tolerate much higher levels of illumination—up to three-hundred lux is considered safe—but is still sensitive to the changes in temperature and relative humidity that can result from improper lighting. Wherever possible, light sources should be placed outside cases. If this cannot be done, then low intensity sources should be employed in well-ventilated cases that permit heat dissipation (R.O.M. 1976, p. 154). Generally, intensity is controlled by decreasing the wattage or the number of lighting devices used. Spotlights, particularly those placed within cases, should be of the cool-beam type that filters out infrared radiation (R.O.M. 1976, p. 161). Locate all lighting devices so they are readily accessible for cleaning and servicing.

A variety of materials can be used as backgrounds for displaying glass. Two, opal Plexiglas and mirrors, require special mention. Opal Plexiglas is a useful background when back lighting is required within a case. It will hide the source of illumination from the viewer while allowing diffused light to pass through. Mirrors are valuable in revealing significant details hidden from view on the sides of objects. When placed below, they can offer new and interesting perspectives or reveal details hidden by strong downward lighting. Mirrors also can be used to redirect beams of light for special effects. The Royal Ontario Museum recommends the use of mirror Plexiglas rather than regular mirror glass because it is less expensive and more easily worked. Care should be taken to ensure that the adhesive used with this Plexiglas is the one recommended by the manufacturer (Kennedy 1978). Be aware, too, that very fine decoration such as etching tends to disappear in reflections.

A wide range of materials is suitable also for making stands. Modern synthetics such as Plexiglas are becoming more and more popular because they are strong, inconspicuous, and easily worked. By investigating the catalogues produced by the various exhibit supply houses or by studying stands used in stores to display glass, it is possible to discover suitable designs. A saw to cut the Plexiglas, fine grade sandpaper to smooth rough edges, and a heating element to shape it are all that is required. The stands can be attractively built without sacrificing strength or stability.

Metal generally is not recommended for holding glass as it can scratch or stain it. If metal is the only material available, it can be adapted for use by painting with several coats of thirty percent polyvinyl acetate in toluene to cover the exposed surface (P.A. Lins 1977, p. 8). Polyvinyl acetate or PVA is a vinyl plastic dispersed in ethyl alcohol and is used in a

variety of conservation and restoration situations (Phillimore 1976, p. 23).

The safety of the exhibited objects is the most important factor to be considered. Glass's slick, virtually friction-free surface can present a few interesting twists to the problem. A glass vase placed on a shelf that is only a few degrees off the horizontal will slide with any vibration and eventually end up against the front of the case. Glass also is apt to break if toppled. It is, therefore, important that display cases be stable and sturdily built, perhaps even fastened to the floor. Shelves should be horizontal and carefully fixed. A small dab of Stic-Tac or wax at the front edge of an object will discourage sliding.

To prevent jarring, special attention should be paid to case layout. Aisles between displays need to be wide enough to permit freedom of movement. Dead-end galleries that force visitors to retrace their steps are to be avoided. An exhibition that develops a pattern flow by case layout, thematic development, and effective ambient lighting will do much to prevent traffic problems and possible accidents.

## Conclusion

The successful maintenance of a glass collection depends on two main factors, the creation of a stable and protective environment and the avoidance of human error. Strive to eliminate unnecessary handling and, above all, treat each object, regardless of value, as the most important piece in the collection.

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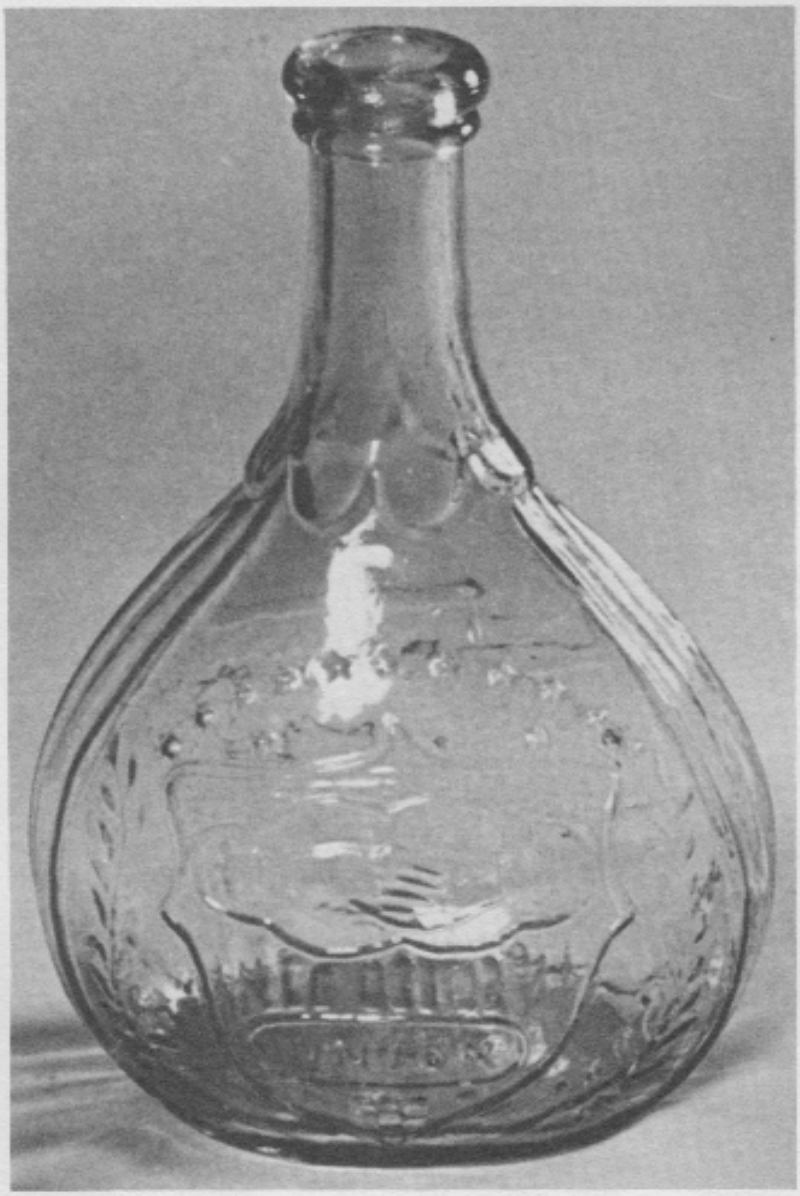

*An early nineteenth-century whiskey flask featuring clasped hands over the word "Union," from the Guild Collection of Americana at the Nassau County Museum in Old Bethpage, New York.*

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TECHNICAL LEAFLET 127

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American Association for State and Local History

*Technical*
LEAFLET

# Cyanotypes: A Modern Use for an Old Technique

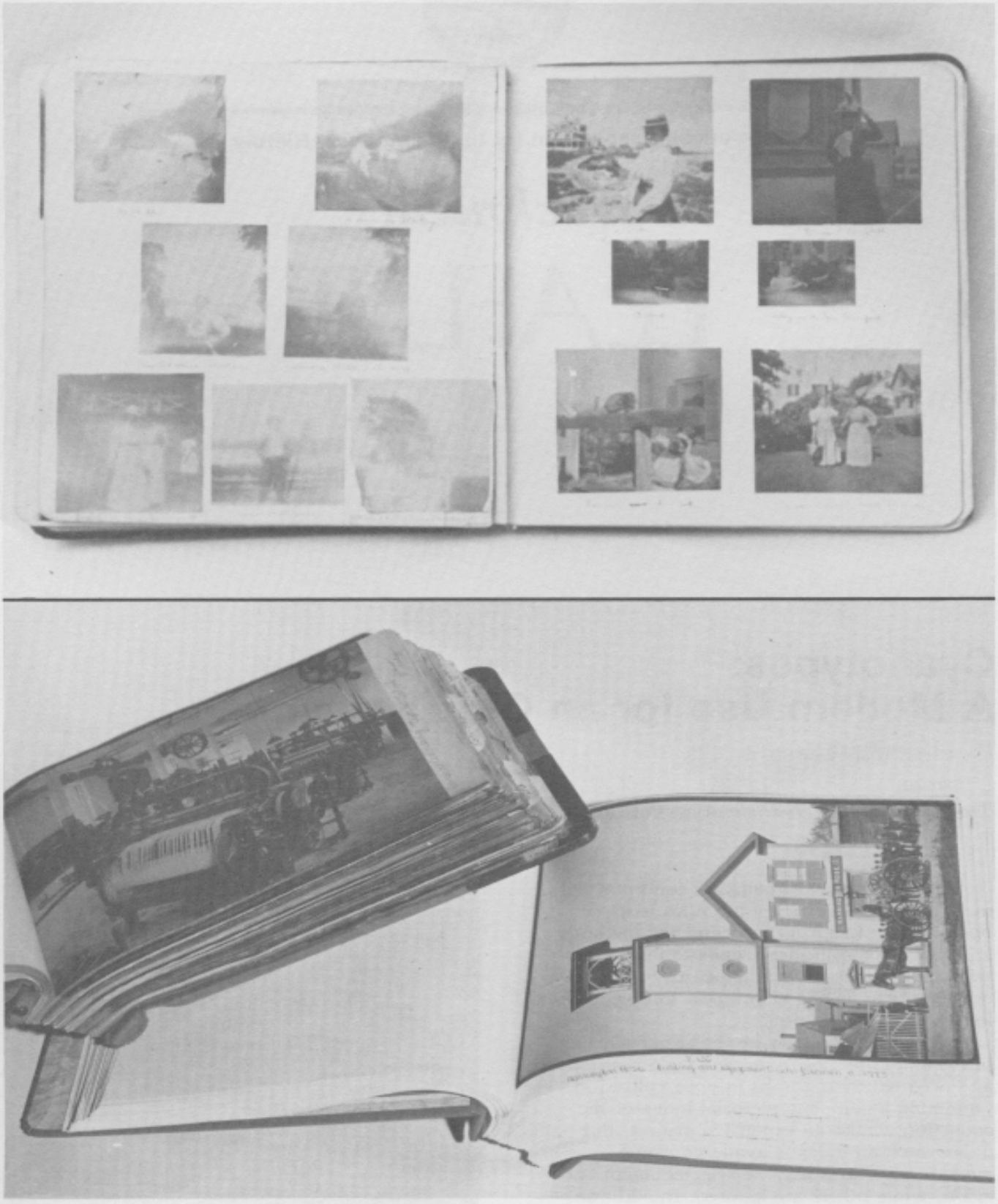
**By Elizabeth Lessard**
*Librarian*
*The Manchester Historic Association*

A lack of money, a constant condition with many historical agencies, often leads to operating by temporary, emergency methods with the hope of finding funds to do a more thorough job later. Such a lack of funds, however, can spur a willingness to take a new look at an old technique.

Such a situation may be the case regarding prints and copy negatives of the glass negatives and original photographs in your collection. Obtaining a complete pictorial index of the collection can be an expensive project. But unless such an index is available, some appealing pictures may be selected again and again, while others are ignored. In addition, such an index is essential to protect the original photos and the precious glass negatives from unnecessary handling. Each time a copy of a glass negative is needed, a contact print is

Robert W. Hubner Collection

*An inexpensive cyanotype pictorial index will insure that no appealing photograph in a collection is ignored.*



Manchester Historic Association

*The 1890 family photo album, top, shows faded photos, left page, in comparison to the clearer cyanotypes at right. The albums pictured below attest to the sharpness and stability of cyanotypes—early nineteenth-century cyanotypes at left and 1980 cyanotypes printed at the Manchester Historic Association.*

made—sometimes several prints are necessary to get as clear and sharp an image as possible—and then the print is photographed to obtain a film negative. An original print is photographed, a negative obtained, and then a contact print is made. In both cases the negative and the print should be stored in separate acid-free envelopes, in separate files.

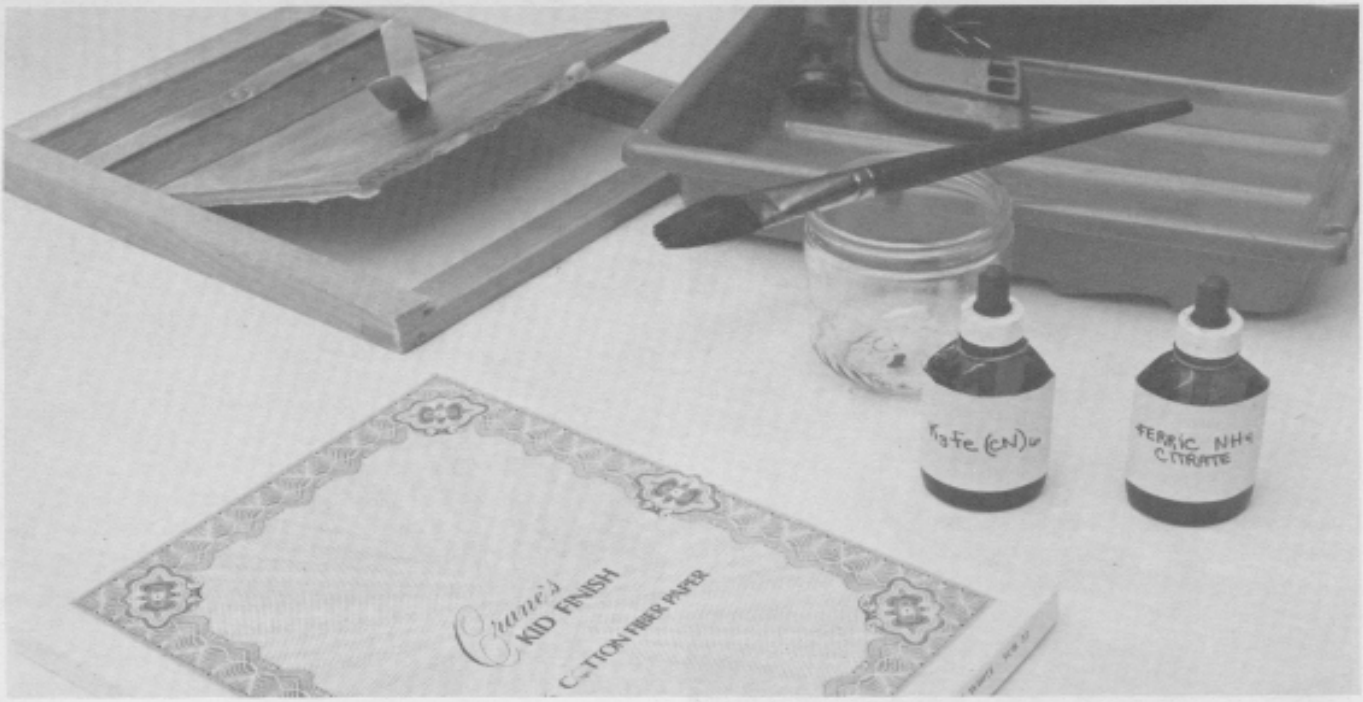
The only available visual index may be Xerox copies. Sometimes these copies are quite clear, but more often they are uneven, giving some indication of content, but none of quality. And, subjecting fine original photographs to Xerox risks damage to them. This leaflet proposes cyanotypes as a simple, inexpensive alternative for establishing a visual index.

### The First Cyanotypes

The English astronomer Sir John Herchel first introduced this photo printing process in 1842. He coined the word "cyanotype" to describe the effect of light on ferric, or iron, salts. After coating paper with potassium ferricyanide and ferric chloride or ferric ammonium citrate, Herchel placed the paper under a negative and exposed it to light. Then, after the paper was washed with plain water, a blue image appeared that was very stable. By the turn of the century, photographers were using cyanotypes as an easy, cheap method for making proofs. Herchel's process became the basis for commercial production of coated papers, called blueprints, adopted by engineers and architects for plans and layouts. A 1896 photo album in the Manchester Historic Association collection composed of both black-and-white photos and cyanotypes shows the comparison in permanence between the two. The fading black-and-whites are in dismal contrast to the clear, sharp cyanotypes, which were thought to be less desirable as prints. More information on cyanotypes and other early photographic methods can be found in *The Keepers of Light, A History and Working Guide to Early Photographic Processes* by William Crawford (Dobbs Ferry, N.Y.: Morgan and Morgan, 1979).

### Searching for Materials: Paper and Chemicals

Although the supplies needed for the cyanotype process are not rare or expensive, neither are they common in photo supply houses. When selecting paper for cyanotyping, contact your local stationer. The single important consideration is that the paper be unbuffered, and a good choice is Crane's Kid Finish PS 8111. This thin, high quality, unbuffered paper is produced in white, grey, and ecru and comes in 8½-x-11-inch letter size convenient for printing from 8-x-10-inch or smaller negatives. Sometimes such stock is difficult to find in quantity. It is wise, therefore, to designate more than one stationer as supplier and to buy enough to carry over the time




Manchester Historic Association

*Although the supplies needed for cyanotyping are simple, the chemicals used to coat the paper may be difficult to find and the paper may be difficult to acquire in sufficient quantity.*

needed for them to receive another shipment. Another paper choice, Strathmore Artist Drawing Paper, is readily available in artist supply stores. This paper is much heavier than the Crane's and comes in sheets large enough for use in processing cyanotype prints from 11-x-14-inch negatives.

Turn-of-the-century commercial blueprint paper with the coating required for cyanotyping is no longer available. Therefore, chemicals for coating the paper—ferric ammonium citrate and potassium ferricyanide—also must be obtained. In themselves, these chemicals are simple enough, but if no one is using them, photo suppliers do not stock them. Ferric ammonium citrate is especially difficult to find. A perusal of photographic journals, however, will bring to light advertisements of companies offering to supply any photographic need. Or, you can place a special order for the chemicals through local suppliers.

### Working Space and Tools

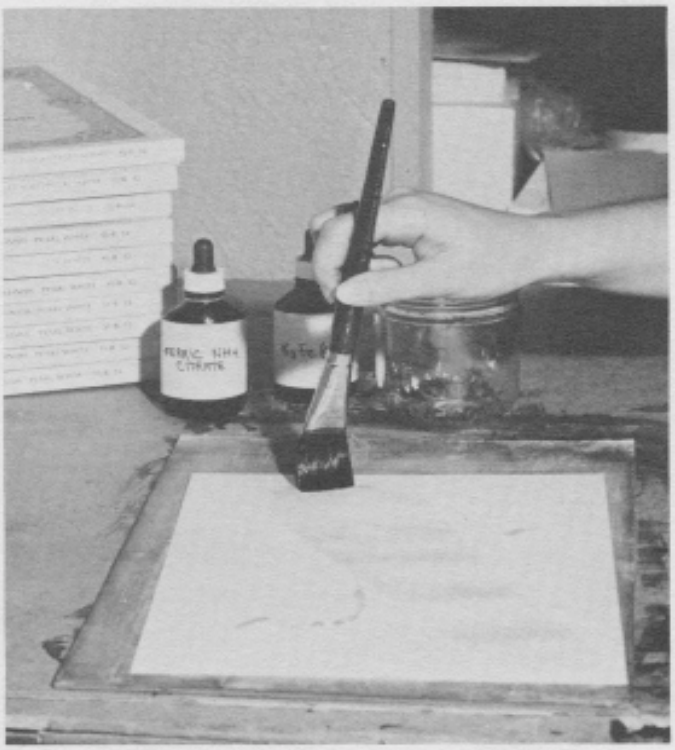
Producing cyanotypes is so simple that the whole process can be set up in a janitor's utility closet. Once such a space is secured, assemble the needed tools for the process: a milliliter measure, two brown storage bottles large enough to hold one-hundred milliliters of each chemical, a wide-mouth, one-half-pint jar or measure, a pipette or medicine dropper, a one-inch-wide sable paint brush, a plastic wash tray, a photographer's hose and syphon, properly sized print frames, drying lines and clips, and a file notebook for the finished cyanotypes.

### Coating the Paper

To prepare the chemicals, mix twenty grams of ferric ammonium citrate with one-hundred milliliters of water at 20°C (70°F). In a separate container, mix eight grams of potassium ferricyanide in one-hundred milliliters of water at the same temperature. To protect them from light, store these mixtures separately in the two brown bottles. Ferric ammonium citrate, available in both brown and green, is the primary light sensitive component—the green is the more sensitive and gives better results. Potassium ferricyanide is the color-producing component. Use both of these solutions within forty-eight hours for optimal results.

Mix together the two solutions in equal parts in small amounts—twenty-two drops of each will coat one sheet of Crane's 8½-x-11-inch Kid

Manchester Historic Association



Manchester Historic Association

*A janitor's utility closet at the Manchester Historic Association, left, provides ample space for processing cyanotypes. An important step in the cyanotype process is to coat one side of the paper, right, with a light-sensitive chemical.*

Finish paper, and thirty-two drops of each will coat one 11-x-14-inch sheet of the Strathmore paper.

To coat the paper, pour a puddle of the mixture in the center of the sheet. Using the sable brush, spread the mixture out first horizontally to the edges, then vertically to the edges, insuring an even, complete cover. Be careful not to get the solution on the metal ferrule of the brush because the iron salts will react with the metal and contaminate the remainder of the mixture.

Another method of coating the paper is to float the paper in a "bath" of solution. This process is less satisfactory, since the resulting chemical coating on both sides of the paper eliminates using the back of the image as an information sheet.

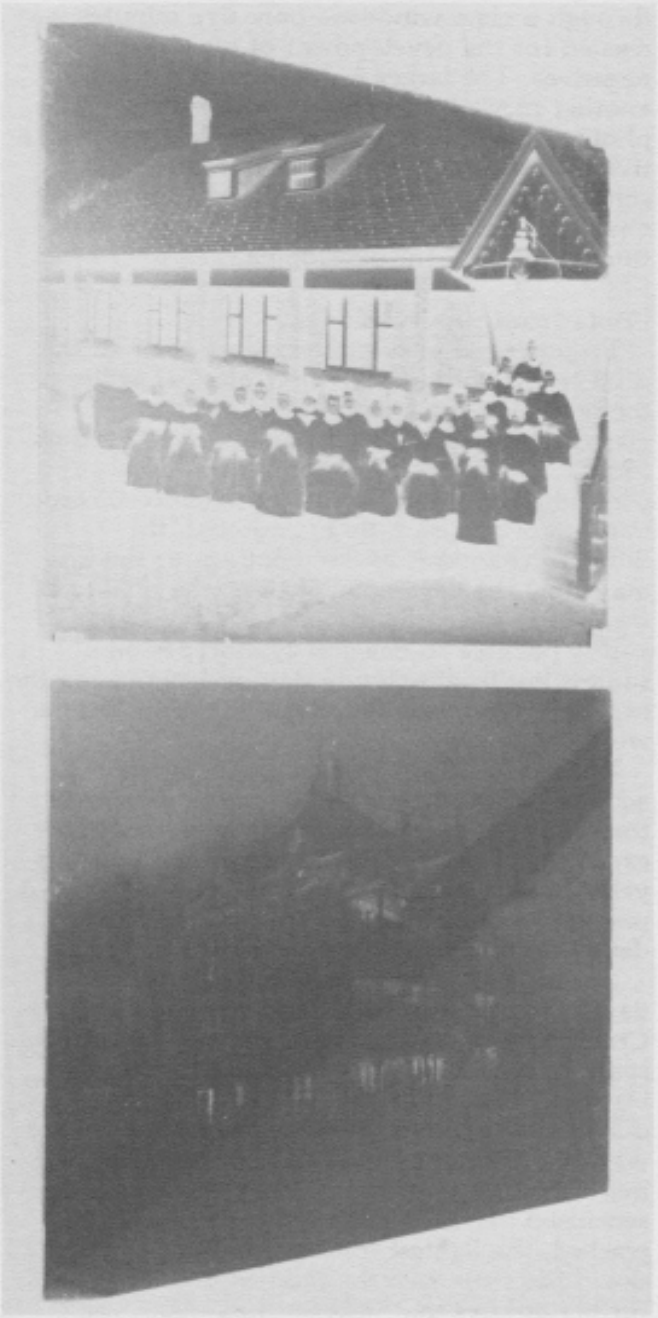
The coating may be done in ordinary light—indoor daylight or a seventy-five-watt unshaded bulb in a ceiling fixture—but the paper must be dried in the dark. Hang the paper by clips to lines in a closet for three to four hours. Use a dryer if the paper is needed in a shorter time. After the coating is dry, store the paper for several days in a dark, dry place to protect it from day- and ultra-violet light sources.

### Prints From Glass Negatives

Before printing, clean the side of the glass negative *without emulsion* with lens cleaner to remove dust and fingerprints and to insure maximum detail. Then place the negative in a print frame so that the emulsion side will make contact with the paper. Place the *coated side* of the paper against the emulsion, position the print-frame backing and clamp it firmly, and expose the whole to sunlight for up to fifteen minutes. Although some find them difficult to use, cotton gloves are a wise precaution to protect both the technician and the glass negative during the process.

Many variables must be taken into account when processing cyanotype prints. For example, there is no control over the thickness of the glass on which the negative has been placed. Glass that is not uniformly thick seems to cause a greater variance in the density of the emulsion and indicates an amateur photographer. To bring them to proper development, these negatives must be checked visually.

To check visually the development of the cyanotype, *very gently* lift the paper from the negative. Make sure that at least 40 percent of the paper remains in direct contact with the negative to assure proper realignment if necessary. Inspect what can be seen of the image for detail and clarity. If the image is clear enough, the exposure is complete. Time varies on these uneven glass negatives from about five minutes in direct sun to fifteen minutes in sunlight through a window. Most such amateur work appears on 4-x-5 or 5-x-8-inch negatives.



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*Development times varies. The thin negative, above, can be processed more quickly than the thicker dark negative.*

The work of capable professional photographers takes less time to process. One such photographer worked entirely on 4-x-5-inch negatives. In direct sunlight—not

through a glass window—only five minutes was needed for the development of most of these negatives. The larger 8-x-10-inch negatives of another turn-of-the-century professional photographer were exposed completely during a five-to-seven-minute time span in direct sunlight. Strathmore paper absorbs more chemicals and so takes longer—as much as thirty minutes—for developing.

### Prints From Film Negatives

To process film negatives, place them in the print frame with a clear sheet of glass against the non-emulsion side of the film. In effect, a glass negative is put together. Then proceed as for glass negatives. Film negatives—both 8-x-10-inch and 4-x-5-inch—take ten to fifteen minutes of exposure time. Although the different chemicals in the emulsion or the film may slow the development time, the quality of the cyanotype is the same.

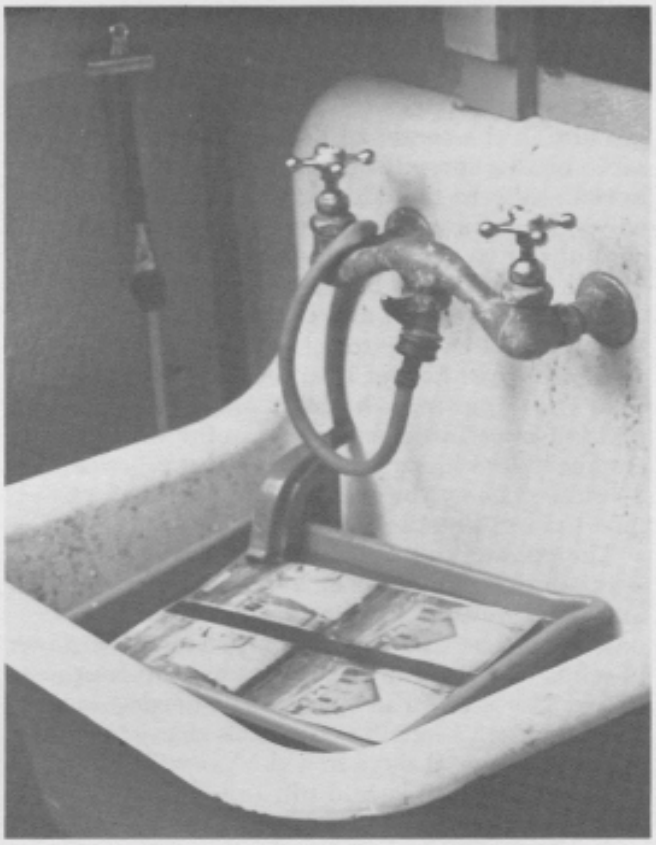
It is possible to develop cyanotypes on a sunless but bright-cloudy day by lengthening the exposure time since the ultra-violet rays do the work.

With very little experience, one becomes accustomed to the variations in the density of the negatives in relation to the time needed for exposure. A clear, detailed image in a greenish-yellow color indicates complete development. A pale print indicates under exposure, a loss of detail in the mass, or over exposure.

If you want a more specific guide for developing the prints, turn to one suggested by Crawford in *Keepers of the Light:* a Kodak #2 step-tablet or a "blue-strip." Crawford further instructs, "Place the tablet next to the negative during development. After exposure but before washing, compare the print and the tablet and mark the first step that shows darker than the sensitized paper. When the cyanotype is washed, the lightest tone will be several tones down the strip than the marked one." He further advises that instead of sunlight, use a Sylvania 275-watt sun lamp for thirty minutes at a distance of fifteen inches from the print frame. Price quotes for the lamp range from $23.95 to $31.96; the lamp standard costs from $18.00 to $23.00.

### Finishing Touches

After development, wash the print in 20°C (68°-70°F) for about five minutes. Too little washing leaves a residue of ferric salts on the print which will cause blotchiness. The image should be a bright blue against a white background. Any remaining trace of the greenish-yellow color—the color after exposure and before washing—indicates that the print has not been washed long enough.



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*After sufficient development time, the cyanotype print is washed in a bath of plain water. Any remaining trace of the ferric salts results in blotchiness on the prints.*

Hang the prints to dry, usually for about one hour, then put them into a press to flatten. Number the finished cyanotype and indicate the subject in pencil on the back along with whatever pertinent information thought necessary. Punch holes on the left-hand edge and insert the finished cyanotype into a slotted lock binder.

Cyanotypes fade on exposure to light but return to the original color if left in the dark to oxidize. A bath of hydrogen peroxide—a 3 percent solution to twenty milliliters of water at 20°C—also brings back the color. Place the print for only a *few seconds* in this bath, rinse it well with plain water, and then hang it to dry. Further toning and tinting can be done with other chemicals and Crawford describes them.

### The Routine

Processing cyanotypes can develop into a simple routine that works something like this: Coat the paper during late afternoon hours so that it can hang to dry overnight. First thing the next morning, set up the work space, place the

Manchester Historic Association

*The finished cyanotype, like this print from a 1910 plate by photographer George Bean, appears as a bright blue image on a white background.*

paper and negatives in the print frames, and set them out for exposure. While the negatives are developing, remove from the press those cyanotypes done the previous day and number, notate, and bind them. When the new prints are developed, wash them, hang them up to dry, and set up the print frames again.

### The Merits

The chemicals involved in cyanotyping are relatively harmless and the process is simple and inexpensive. The cost has been calculated to be 8.2 cents per 8-x-10-inch image. To budget-watchers this is a considerable savings over the 55 cents per image for a black-and-white glossy.

Cyanotyping will not replace the need for flexible negatives and black-and-white prints of photograph collections. In the absence of either a negative or print, however, a cyanotype can be photographed to produce a very good negative and print. The process can serve to protect the collections, to index visually what is in them, to replace images in case of loss, and to manage administratively the collections.

### Sources for Supplies

*Photographic Formulary*
Missoula, Montana 59801
Write for catalogue.

*Textile Resources*
5629 West Adams Boulevard
Los Angeles, California 90016
Write for catalogue; offerings include chemicals and other supplies needed for making cyanotypes.

Elizabeth Lessard serves as librarian at the Manchester Historic Association in Manchester, New Hampshire. The author wishes to acknowledge the efforts of photographer Ernest Gould, member and volunteer of long standing at the association, who found the materials for the association's cyanotype project; University of New Hampshire student Susan Perkins, who, during the summer of 1980, processed approximately fourteen-hundred cyanotypes from glass and flexible negatives in the association collections; and Klaus B. Hendricks, chief of picture conservation, Public Archives of Canada in Ottawa, who, during the 1978 AASLH Seminar on Photographs at the University of Rochester in New York, encouraged the undertaking of the project.

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HISTORY NEWS TECHNICAL LEAFLET

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FOR STATE AND LOCAL HISTORY

# Bringing up Boomer: Archival Care of Mid-Twentieth Century Media

BY BRUCE MACLEISH AND GREG HARRIS

Conservators and collections managers are renowned for their lively imaginations and feelings of impending doom. Are things really as bad as we say? Have not these artifacts survived for years without our tender ministrations? The answers are yes—and no. Sometimes things are as bad as we say, but the deterioration does not happen overnight and so is not easy to see. And in general, the various forms of media will not survive for long without special care; again, the proof is not rapidly apparent. Despite this gloomy outlook, most of us engaged in preservation are vitally interested in keeping for the future as much of the record as possible.

**Most photo albums contain materials that are short-lived, including some that may contribute to the deterioration of photographs. Note the black strip of adhesive in this album.**

An old copy of *Life* magazine will tell you about the past, but does not a photo of your own town or your own family tell you more? Perhaps the comforting thing about preserving these materials is that you can do *something,* even if it is not spraying the artifacts with goo and bathing them in glop. The educated and restrained hand can accomplish a lot, and the nice thing is that the images and information will be more easily accessible, as well.

Assuming that most media artifacts will be handled occasionally, it is of paramount importance that handling does not harm the objects. All of the media discussed here are best handled using clean white cotton gloves, so that moisture, salts, and acids from your hands are not transferred to the artifacts. If you object to wearing white gloves, at least wash your hands often, and keep in mind that gloves are definitely a safer alternative for safeguarding your collection. Have plenty of gloves on hand. Ordinary laundering will suffice for keeping them clean.

## PHOTOGRAPHS

By the end of the nineteenth century, photographs were becoming a means of imaging that was within the reach of many Americans. Point-and-shoot cameras were available, and although they were not the sophisticated instruments they are now, they produced good pictures. Through the twentieth century, amateur and professional cameras were developed that were easier to handle and produced better results with less work. The original product of photography, the black-and-white image, was also improved, up to a point.

There was an exciting new direction with the invention of color photography processes, and these were quickly embraced by photographers as a means to record the thrilling vibrancy of a scene, and the subtlest nuance. Color photos, being chemically complex, and based upon more unstable substances than black and white, for the most part, were found to be troublesome and disappointing in the long run. Still, baby boomers and their families have shot countless millions of color photographs in the quest to document their lives. Still some modern films, papers, and techniques brought with them their own problems.

Like so many kinds of objects, photographic materials are best preserved by a combination of passive approaches to care. There is no "magic bullet," miracle fluid, or special lamination that will guarantee longer life for a photo. In the simplest terms, photographs are affected by their environment, so it stands to reason that the best environment will preserve photos for the longest time. That is the theory. For those materials that are affected by chemical or physical instability—dramatically known as "inherent vice" to curators and archivists—all our efforts at preservation may be nothing more than a gallant gesture.

**There is no "magic bullet," miracle fluid, or special lamination that will guarantee longer life for a photo. In the simplest terms, photographs are affected by their environment, so it stands to reason that the best environment will preserve photos for the longest time.**

## CARING FOR PHOTOGRAPHS

Photographic materials are affected by many elements of the environment, so close attention should be paid to everything surrounding them, in storage or on display. The atmosphere itself can have a great influence on the longevity of photos, as it does for most materials. High temperature and high humidity tend to accelerate chemical actions that can destroy most kinds of photos. Direct deterioration of paper and other materials is also hastened by such conditions.

Thus, finding a suitable storage facility can be challenging. If you try to rule out high temperatures for photo storage, that often eliminates attic spaces or perhaps areas next to furnaces or chimneys. High humidity conditions often exist in basements—another traditional, catch-all storage spot that is usually unsuitable to this purpose.

By all means, check the conditions in your current or proposed storage spot. A hygrothermograph or a digital data logger is the best kind of tool, since either one will give you continuous readings of temperature and

humidity, so you can see what happens, and when. This is important, because there may be brief "spikes" of high temperature or humidity that can be cured easily. Using an instrument such as a maximum/minimum gauge for temperature and humidity gives you only those extreme readings; you cannot tell when, or for how long they occurred. Still, at least there is a clue that indicates better or worse conditions. Less expensive instruments include humidity indicator cards that change color according to conditions. While these can only tell you the conditions at the moment, they are reliable and useful if you cannot afford the more expensive instruments.

If heat can damage photos, do cold temperatures help preserve them? In general, yes, though few archives and collectors can afford refrigerated storage. Cold temperatures bring with them their own set of difficulties, including control of humidity levels and condensation on items removed from storage, yet the overall effect is beneficial. For media that are known for inherent vice, such as cellulose nitrate negatives or movie film and color media, cold storage will do the most good. Lacking a large freezer or cold room, you should seek moderate temperatures (preferably below 70 F.) and relative humidity levels between 40% and 60%.

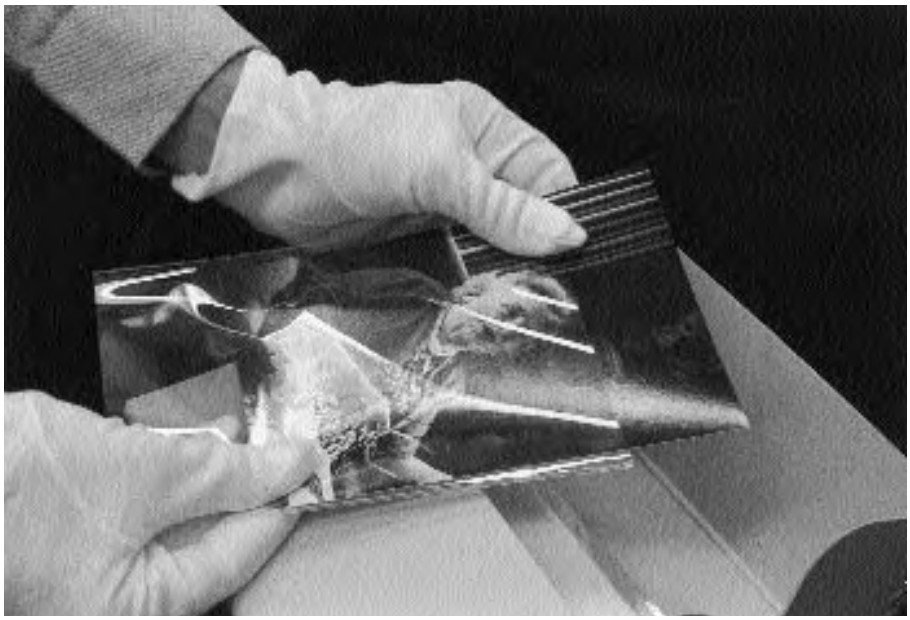
## ARCHIVAL MATERIALS

Housing for photographs is also very important because there is often a large quantity of foreign material enclosed with the photographs. A collection of prints that is stuck in a cardboard box or in a clutch of low-grade paper envelopes will be affected by the acid in the surrounding materials. Change those to archival quality materials, and the deleterious influence is gone. That does not guarantee eternal life to the artifacts, but certainly a longer one.

Acidic storage materials will hasten the deterioration of photographs, but so will alkaline conditions. Acid usually comes on the scene in the form of poor quality paper products—those that are not intended for archival purposes. Alkaline materials are sometimes present in papers and boxes that are particularly created to be archival, but not necessarily for photographs. In those archival materials an alkaline buffer may have been added to counteract acids left in the paper from processing; this approach is generally cheaper than making materials that are inherently free of acids and serves some purposes perfectly well. The alkaline buffer can also help to slow down the self-destruction of acidic materials. Paper and board that you do want to use with photographs is thus: neutral pH, acid-free, lignin-free (lignin being one of the acidic components of wood), and nonbuffered. There are a host of trade names for the stuff, but the goal is to have virtually no influence on delicate substances, such as those that form photographic images.

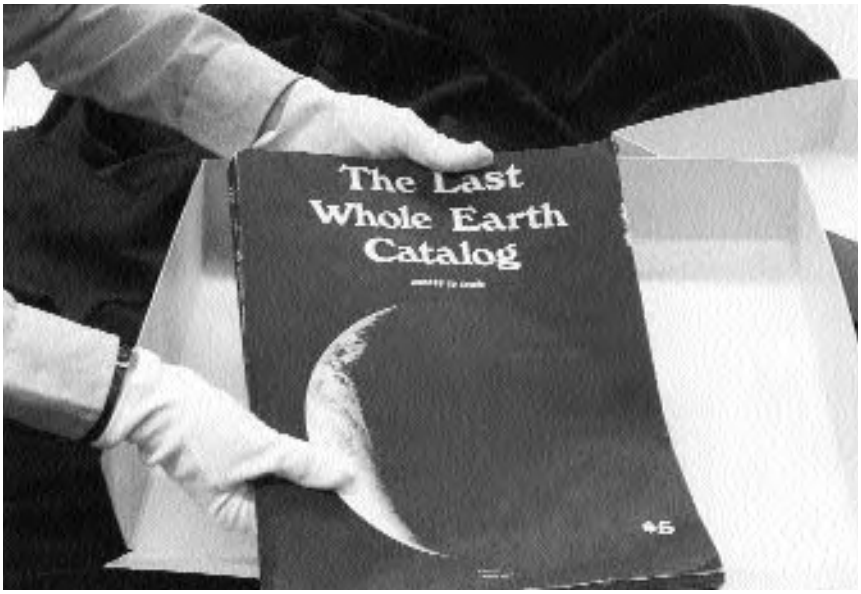
## ENCLOSURES

If you know that the environment for your photos is going to have some large swings of temperature and humidity, then using paper housing materials makes the most sense, since they are not apt to trap condensation against the images. The main drawback is that you cannot see the negative or print if it is in a paper envelope. One of the handiest kinds of paper envelope is a flat, T-shaped piece of paper. The ends of the "T" are folded in to create the envelope; thus it has no seams and no glue. It also can be unfolded so that you can lift a delicate photo out, rather than sliding and potentially scratching it. This is especially good for large-film and glass-plate negatives. Another advantage of paper housing is that you can write on the envelope easily to identify the contents. Just be sure the photo is not inside when you do this, no matter how careful you are, and use a pencil or archival pigment ink pen.



**Photographic prints housed in polyester film sleeves or envelopes may be viewed and handled more safely than loose prints. Prints in sleeves have an added advantage in that they may be handled without gloves.**

Plastic enclosures of many kinds are available for housing photos, and of course, the main attraction is that you can see what is inside. Increasingly, the archival items may be found in some local emporiums, but if you or the sales person is not absolutely certain what you have, you may be hastening the demise of your collection, rather than slowing it. The archival plastics are usually polyethylene, polypropylene, and polyester (widely known by the trade name Mylar). These have various attributes of clarity, rigidity, and so forth, and are made up in many sizes of sleeves,




**Cheaply produced publications may be brittle and discolored after twenty or thirty years. Archival wrappings will help slow their deterioration and protect them in storage.**

envelopes, and loose-leaf pages. Often, the most convenient types cost the most, but in any case, figure out your entire strategy before you start buying anything: will the sleeves or envelopes go into a box, a drawer or a binder of some kind? Again, be sure that the materials you buy are archival, which means they are inert and will not harm your photos.

## HOUSING THE IMAGES

Now that you have a system to hold the separate images, what do you do next? Well, this is a good point to pause and look at some storage materials to avoid. Already mentioned were ordinary cardboard and paper, including the wrappings that photo materials come in from the factory or processor. Vinyl pages and vinyl-covered loose-leaf binders should be avoided because they contain plasticizers that can harm many materials. Have you ever noticed how an aging vinyl notebook sticks to things, and how the vinyl becomes brittle after a while? So-called magnetic album pages should also be shunned, because the adhesive that holds everything in place tends to discolor and stain its surroundings and sometimes becomes hard and tenacious. The cheaper plastic pages generally become quite brittle after a decade or so, and the black paper for mounting the photos is of poor quality for long-term use.

The best housing is one that puts no strain on the photographs, so this tends to rule out loose-leaf binders unless you store them so that the pages hang straight down, in a file drawer, for example. Being practical, though, having the binders lying flat is all right, as long as you do not pile many of them together. Standing them up on a shelf tends to let dust settle in from the top and the pages sag and bend. Storing photos in boxes seems to be the way to go: you can pick sizes to suit your objects, they are handy for moving around without touching the individual items, they each hold a relatively small number of items, and they offer good protection from light and dust. The best approach is to use flat storage, but this means buying more boxes. At least consider it for large items. Vertical storage boxes must be full to support their contents properly so that prints and negatives do not sag and curl up. To fill any empty space, place a piece of acid-free board next to the pictures and lightly stuff a bit of acid-free tissue behind it to hold things up straight. Remember, the acid-free materials should be nonbuffered.

There are many other storage methods available, and most of the ones from reliable sources are fairly safe. Albums can be purchased with archival page covers and archival paper pages and mounting corners, and the albums or binders themselves can be found that are made of acid-free fabrics, adhesives, and boards. Various kinds of fancy storage cases are made in a similar way. Slides can be stored in semi-rigid archival pages kept in a file drawer or a polypropylene box. Vendors are always offering new types and sizes of storage materials to make caring for photos more convenient. Just keep in mind which specific materials are safe to use next to your collection, and try to create storage conditions that do not physically stress your photos and offer a fairly stable environment.

**There are many other storage methods available, and most of the ones from reliable sources are fairly safe.**

## MARKING PHOTOGRAPHS

A word about marking photographs might be in order, since personal or archival collections are of little use if identification of the images cannot be maintained. As you might expect, the conservator's suggestion is to avoid touching the object at all, and the curator's suggestion is to impose on it as little as possible for marking. To avoid damaging the photo, and to minimize the amount of marking material, it is best to mark each photo with one identifier, be it a name, title, or accession number. Certainly, do not write long lists or descriptions on the backs of original prints. Using sticky labels does not help, since the adhesive may damage the photo over time, as may removable labels or tape. To mark prints, write the identifier on the back, in a consistent place near the edge, using a No. 2 pencil. Try to write gently, so that you do not damage the emulsion. On resin-coated paper prints, a normal pencil will not work, so try a glass and plastic marking pencil— *not a pen.* The pen-

cil is somewhat waxy and can be erased from a slick surface. It should not be substituted for a regular pencil on standard prints, because it is much harder to erase from porous paper.

For slides, tiny labels may be the best marking method. You should keep in mind the drawbacks of the labels, but the fact is that slides themselves are unstable over a period of more than a couple of decades. Film and glass negatives should not be marked directly, but their enclosures may be labeled. Another tack is to write on a piece of archival board or paper and place that in the sleeve with the negative. Aside from being easy to do, this method allows you to be very wordy, if you wish. Again, use only pencil or pigment ink pen.

## PHOTO ALBUMS AS ARTIFACTS

If you have to deal with photo albums, prepare yourself for some real challenges and some equivocal advice. Some albums are considered historic documents because they hold more information than just the pictures, or perhaps a certain arrangement of pictures, that is significant. If that is the case, then you have to accept the deterioration that may be caused by the album covers and pages and the adhesives that are in contact with the photographs.

If your decision is to rescue the pictures from their surroundings, you may find that the pictures are falling out of the album; the adhesive is staining the pictures; the pictures are stuck fast; or a combination of the above. To minimize problems, you should consult a paper and photograph conservator. As you may suspect, neither the decision nor the removal process is simple when dealing with photo albums.

Copying any sort of medium is often the best approach to preserving the image, if not the original object. Since discarding original materials goes against the grain of museums and archives (not to mention private collecting), preserving and copying might be considered. Once you create a copy you have removed the image one step from the original, and you have another image to preserve for the future. Looking ahead in this scenario, you may expect to recopy images every couple of decades, both for preservation and for technological compatibility. The implications of that will be tidily dropped from this discussion, but they are certainly worthy of examination from philosophical and practical points of view.

**Hollywood has long known how to evoke an era with a strategically placed Sinatra clip, a baseball broadcast through a dashboard speaker, or a few chords from Steppenwolf's *Born to Be Wild.***

## A WORD ABOUT EPHEMERA

The "high-falutin'" archival assessment for paper objects states that such objects are temporary, referring usually to trade cards, broadsides, and so forth. To members of the baby boom generation, many of the icons of our younger days fall into this category: concert posters of the Grateful Dead or Smoky Robinson, *The Whole Earth Catalog,* underground publications, and school yearbooks. These icons of "boomer" culture deserve the care that any paper artifact receives, but remember that some items are properly called "ephemeral." Cheap paper and quick binding methods may mean that a favorite book or catalog is pretty fragile now—and growing more so by the day. This is the place to use buffered acid-free tissue for wrapping or layering and acid-free boxes for horizontal storage. Prints and posters should always be stored flat, if possible, so you may have to make your own boxes. This is a scant introduction, so by all means read more about the care of books and paper if you have important items in your care.

## SOUND RECORDINGS

Sound recordings may be a baby boomer's fondest connection to former days. Hollywood has long known how to evoke an era with a strategically placed Sinatra clip, a baseball broadcast through a dashboard speaker, or a few chords from Steppenwolf's *Born to Be Wild.*

These recordings come in a wide variety of formats and require a number of different preservation strategies. Vinyl records—33 1/3, 45, 78 rpm (LPs, 7″, 10″ discs)—were the most popular commercially produced sound recordings of the era. Like many other materials, they survive fairly well in the right climate, and


**A record album may compromise several parts that require archival protection: the disc, the original paper sleeve, and the album cover.**


**The baby boomer era marked the beginning of a great proliferation of ephemera, each type requiring specific archival care if it is to survive more than a few decades.**

with minimal handling. The most obvious sort of destruction for recordings is the warping that occurs if a disc is left in a hot place, and, once this occurs, there is little that you can do to repair the damage short of contacting a professional sound engineer. Vinyl discs function through physical contact of the stylus with the rippling marks in the groove to create an analog signal (as opposed to digital). Anything on the surface of the record will either be dragged along by the stylus or ground into the groove, diminishing the sound signal and potentially damaging the disc. Sliding a dusty record in and out of a stiff sleeve can cause scratches too, and of course, playing a disc on faulty or inappropriate equipment can damage the disc and mar the sound quality.

Briefly, cleanliness and very careful handling will help your albums last longer. Never allow your fingers to touch the grooves on a disc. Instead, carefully cradle the platter on the outside edge and, if need be, place your fingers on the label when inserting the disc in a sleeve. Another method would entail wearing clean white gloves. Cleaning a particularly grimy record may be a job for a sound professional, but you can try a lint-free moist cloth or anti-static brush, gently stroking in the same direction as the grooves. Consider placing each disc in a new acid-free non-static dust sleeve, and save the original sleeve if it has lyrics, graphics, or other historical information. An album cover may be of greater historical value than the disc; remember those shocking images that were changed on David Bowie and Moby Grape albums, for example? To keep an album cover from becoming abraded and worn-looking, you can place it in a transparent archival cover. When the records go back on the shelf (preferably in a box), store them upright. Avoid placing pressure on the discs by positioning a vertical brace of equal size to the record every six inches or so on wide runs of shelving. When necessary, use heavy-duty bookends. Finally, if a disc will be played, be sure the turntable, tone arm, and stylus are in clean, top-notch order, so the playback equipment does not damage your carefully preserved collection.

Magnetic sound recordings are most commonly found on 1/4″ open-reel, cassettes as well as the signature format of the 1970s—eight-track cartridges. These tapes all incorporate a synthetic support with a layer of metallic particles embedded in a glue-like binder. If one were to envision adhesive tape stretched out, glue side up, with metallic shavings sprinkled onto the glue, you would have a caricature of a magnetic recording tape. The weakest link in this concoction is the binder. Over the years the binder breaks down much like glue that fails to hold photographs in a scrapbook. As the binder gives way, the magnetic particles are shed from the tape and the recorded signal is lost.

During recording, the record head in a tape machine magnetizes the particles in a pattern that can be read by a play head during playback, much like the stylus reads a groove on a record. The tape support is extremely thin, and when it is wound tightly over a long period of time, the signals imprint on the areas of tape that they contact, creating a noticeably double signal known as "print-through." This can be combated by slowly rewinding a tape at play speed.

**From events of national significance: Dallas 1963, the Beatles on "The Ed Sullivan Show" to local rituals: suburban back-yard barbecues, small-town parades—film or video cameras captured the events that define the baby boom era.**

If the tape is unique or significant as an original object, make provisions to store the paper box, plastic cartridge, or plastic reel in an environment that is best for that type of material. The only sure way to preserve the signal from a magnetic tape is to re-record it onto a new tape, duplicating it every ten to fifteen years. Digital technology may hold the solution for long-term sound storage but, for the moment, sound archivists recommend periodic transfer to high-quality 1/4″ open reel tape stock. Store tapes upright so that the stress is on the hubs, in a secure, ventilated area. Avoid wide fluctuations in temperature and humidity—65°F. and about 30% relative humidity are achievable goals. Keep tapes away from water pipes, sprinklers, floor drains, and leaky roofs. Ideally, one should have the archival origi-

nal, a use or reference copy, and a preservation or protection copy stored off-site. Be sure to service all of your audio equipment regularly, and do not discard machines that are needed to play unusual types of tapes. A final rule of thumb is to test all playback equipment with a tape that you can afford to lose. The sound of a faulty tape deck eating a master recording is not music to anyone's ear.

## MOVING IMAGES

From events of national significance: Dallas 1963, the Beatles on "The Ed Sullivan Show" to local rituals: suburban back-yard barbecues, small-town parades—film or video cameras captured the events that define the baby boom era. Film and video require two very different approaches to preservation because of their physical and chemical differences.

The most commonly found film sizes in collections are 35 millimeter (mm), 16 mm, 8 mm (see chart), and Super 8. The widest, 35 mm, was primarily used for large-budget productions and newsreels. Cellulose nitrate, a flammable film support that, if stored properly, produces a beautiful image, was generally phased out of use before the baby boom era. Collection managers should nevertheless be on the lookout for stray cans of this film and call a qualified film archivist to explore off-site storage or disposal options. Nitrate is primarily 35 mm wide, but in rare instances it was split into two pieces and shot with a 16 mm camera. It usually has "NITRATE" printed on the edge of the film next to the sprocket holes, and, to an experienced film person, has a distinct look, feel, and smell. Cellulose acetate safety film is by far the most common type of film for all applications, color as well as black and white. All commercially produced films are made from master negatives that are processed repeatedly to create prints, while home movies are usually reversal (positive) films and are, perhaps, one of a kind. Film sound tracks are either optical, and printed on the film along with the images, or magnetic, involving a magnetic strip affixed to the film support. Optical tracks are most common and more stable, whereas magnetic sound tracks often develop "drop-outs" from binder deterioration and loss of magnetic medium.

The chemicals used to create film and the residue from film processing continually interact, which, over the years, will degrade the film. This conflict is intensified with inadequate storage and handling. Ideally, film should be stored off of the original reel, wound onto a core, and placed in a flame-retardant, chemically inert archival film can—polypropylene is the most common. Cans should be properly labeled and, unlike magnetic tapes, stored on cores horizontally. Storage environments should be cooler and dryer than those for paper-based materials, with recommendations ranging from 60°F. and 30% relative humidity, all the way down to below-freezing temperatures. Unique films should be inspected on a film bench or viewer and not exposed to the stress of a projector. Video reference copies made by experienced labs are the best viewing option, but keep your film originals, as they are truly an archival medium. With proper storage and handling, film is the most stable format for preserving images.

Video tape is made of the same material as magnetic audio tape and, as such, has the same storage requirements. For the past three decades video tape has been


**A good archival environment may be difficult to achieve, but protecting film reels in correctly sized canisters is an essential first step in preservation. Playback units, rare artifacts themselves, must be in excellent condition to avoid harming tapes, films, and discs.**

made in a wide variety of sizes and formats: 2″, 1″, 1/2″ open reel, Beta, VHS, 3/4″, SVHS, 8 mm, BETA SP, and a host of also-rans. These sizes all require specialized playback machines in order to access the tape signal; therefore, technical obsolescence is of paramount concern. Keep old playback equipment until you can transfer your entire collection to a single, current format. On a local level, universities and television stations sometimes have equipment that can be used to make tape transfers. Once again, be certain that the machines are in good working order before inserting your master tapes. Keep archival and "use" copies in separate locations, and service your equipment regularly. When in doubt, call on a video conservation specialist who has the tools and experience to solve your problems.

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## ASSOCIATIONS

**Association of Moving Image Archivists**
**c/o The American Film Institute**
PO Box 2799
2021 N. Western Avenue
Los Angeles, CA 90027
Foremost North American professional organization dedicated to film and video preservation and access.

**Association of Recorded Sound Collections**
PO Box 543
Annapolis, MD 21404-0543

**International Center for 8mm Film**
PO Box 335
Rowley, MA 01969-0735

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Wilhelm, Henry and Carol Brower. *The Permanence and Care of Color Photographs.* Grinnell, Iowa: Preservation Publishing Company, 1993.

## SOURCES OF SUPPLY

**Conservation Resources, International**
8000-H Forbes Place, Springfield, VA 22151
703-321-7730; fax 703-321-0629
lignin-free, acid-free boxes, boards, papers and conservation tools and equipment

**Gaylord Bros., Inc.**
Box 4901, Syracuse, NY 13221
800-634-6307; fax 800-272-3412
general conservation supplies, acid-free storage containers for film and sound recordings

**Light Impressions**
P.O. Box 940, Rochester, NY 14603-0940
800-828-9859; fax 800-828-5539
photo storage supplies, acid-free materials, general conservation supplies

**Plastic Reel Corporation**
Brisbin Avenue, Lyndhurst, NJ 07071
201-933-5100; fax 201-933-9468
archival film cans and cores

**TALAS**
130, Fifth Avenue, New York, NY 10011
212-736-7744; fax 212-465-8722
book preservation and general conservation supplies

**University Products**
P.O. Box 101, Holyoke, MA 01041-0101
413-532-9431; fax 800-532-9281
general archival and conservation supplies; acid free storage containers for film and sound recordings

 Technical Leaflet #195, "Bringing up Boomer: Archival Care of Mid-Twentieth Century Media," included in *History News,* volume 51, number 4, Autumn 1996. Technical Leaflets are issued by the American Association for State and Local History to provide the historical agency and museum field with detailed, up-to-date technical information. Technical Leaflets and Technical Reports are available through *History News* magazine to AASLH members or to any interested person. Membership information or additional Technical Leaflets may be acquired by contacting American Association for State and Local History, 530 Church Street, Suite 600, Nashville, TN 37219, (615) 255-2971; fax (615) 255-2979.

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# Maximizing the Benefits of a Conservation Assessment: Some Tips for the Small Museum

By Laurie Booth

## INTRODUCTION

*General conservation assessments of museums have been conducted for over twenty years, but confusion about their nature and purpose persists. This technical leaflet intends to clarify many of the issues associated with conservation surveys, with the goal of enabling those museums that wish to undergo the process to extract as much benefit from them as possible.*

## WHAT EXACTLY IS A GENERAL CONSERVATION ASSESSMENT?

A general conservation assessment is a study of a museum or cultural institution conducted by one or more conservation professionals, often in tandem with a preservation architect, which results in the production of a detailed report recommending actions the museum should take to improve the preservation of its collections and buildings. As the building is the first line of defense for the collections it houses, and often the museum's "primary artifact," an architect is often a critical member of the assessment team. In most cases the architectural assessor will generate a separate report concentrating on preservation issues specific to the buildings included in the survey. This technical leaflet, however, will concentrate on collections assessments, although some aspects of architectural assessments will be discussed tangentially.

Topics that are typically addressed in a general assessment include various collections management issues, including housekeeping and custodial services; general artifact handling; transport and shipping; collections processing and marking; museum staffing and administrative issues; and all pertinent museum policies and procedures, written or unwritten. The museum environment is also addressed, including light monitoring and control, temperature and humidity monitoring and control, internal and external air pollution sources and their filtration, and pest control. Exhibit and storage conditions are also critically important components of a general survey, and basic security issues and emergency preparedness issues should be addressed as well. A number of other topics may also be discussed if the assessor feels they are pertinent to the care of collections, such as funding and fundraising activities; special events and leasing activities; and educational programs. In most instances, a general conservation survey is not designed to address the condition or conservation needs of individual artifacts. Rather, the focus of a general survey is to illustrate ways the museum can better maintain its collections and the buildings that house them.

## *What do we do if we want a conservation assessment of our museum?*

Fortunately, there are a number of granting agencies that will help fund general conservation assessments and some are relatively easy to secure. Most federal agencies have prerequisites for eligibility for funding, but generally these standards are fairly minimal. As the majority of museums fund general surveys using federal grants, these sources will be reviewed here. Institutions are, of course, free to use their own funds to hire conservation assessors, or approach state funding agencies or private foundations for assistance. If your museum is contemplating applying for federal grant funding for any project, all the federal agencies recommend that you contact a program officer to discuss your plans, *before beginning the application process.*

### Conservation Assessment Program

The Conservation Assessment Program (CAP) administered by Heritage Preservation and funded by the Institute of Museum and Library Services (IMLS), funds more general conservation surveys than any other source in the United States. In fact, Heritage Preservation was largely responsible for standardizing the general survey by recommending what CAP assessors should address in them. These grants are awarded on a first-come-first-served basis, so it is important to send your application in as early as possible, but as they are not competitive grants, an applicant that meets the IMLS statutory definition of a museum will eventually succeed in obtaining a grant. The grantee is required to provide some funding, which is determined by a sliding scale based on the size of the museum's budget. The grant money awarded by the IMLS for CAP assessments is limited (the maximum award is $6,540 for two assessors), and as the fees charged by assessors vary, your museum may find that the grant award is inadequate to cover all the expenses incurred. Generally speaking, CAP grant awards are usually enough to fund a survey for a small to medium-sized institution with only a few buildings housing collections. Larger institutions with multiple buildings, extensive collections and/or a large number of employees may prefer to seek alternate funding from the IMLS Conservation Project Support program or another granting source. In addition, libraries, archives, and similar institutions may not be eligible for CAP grants. As with most federal grants, museums must meet certain requirements to be eligible for funding. For instance, the IMLS requires that the institution have a fulltime staff person, either paid or unpaid, and be open to the public for a minimum of 120 days per year.

Heritage Preservation has established a fairly elaborate set of forms and procedures that help ensure that the grant awardees get a thorough and useful assessment. They recommend that assessors working for the CAP program address specific issues as outlined in their publication: *The Conservation Assessment Program*,

All photos courtesy of Harry S. Truman National Historic Site

**A careful inspection of storage is a critical aspect of a general conservation survey.**

*Handbook for Assessors.* Heritage Preservation requires that assessors and museum grantees sign a contract outlining the services to be provided, the costs involved, and the timeline for the site visit and completion of the assessment report. In addition, Heritage Preservation maintains a list of approved assessors; generally conservators and preservation architects working for the program are required to have performed a minimum of two general conservation surveys previously and have a minimum of five years of experience in their respective fields before joining the program. If your institution cares for one or more historic buildings (defined as buildings over fifty years old), you will likely be eligible to have a preservation architect survey the building(s) in addition to a collections assessor. Heritage Preservation will automatically send each successful grant recipient curriculum vitae for at least three prospective assessors. Assessors are typically matched to the institution based on geographic location and the type of collections the museum cares for. In addition, Heritage Preservation includes a longer list of approved CAP assessors sorted by geographic location. Keep in mind that you are not obligated to choose an assessor from the curriculum vitae provided to you. You may choose *any* assessor active in the CAP program. Heritage Preservation will forward to you additional information on other candidates if you request it. While you may be tempted to hire an assessor working close by, it is quite possible that an assessor further away may, in fact, be a better choice. The Institute of Museum and Library Services currently allows only one CAP or IMLS-CP general assessment per institution, so it is particularly important to choose your assessors carefully.

### National Endowment for the Humanities, Preservation Assistance Grants

The National Endowment for the Humanities (NEH) will fund general conservation surveys in the form of Preservation Assistance Grants. This is a competitive grant that will award up to five thousand dollars for the survey. These grants do not require a monetary contribution from the institution. As this is a federal grant program, museums must meet standard requirements similar to those for the IMLS to be eligible for funding. Unlike the CAP program, the institution is entirely responsible for choosing its own assessor(s) and determining every other aspect of the project, including the amount of time the assessors will spend on-site, what topics will be discussed, and what will be included in the report. In general, if your institution wishes to concentrate on a collections assessment and is not interested in hiring a preservation architect, the major advantage of using NEH funding is that the total amount available for funding a single assessor is larger than the CAP program provides. In addition, the NEH will provide funding to libraries and archives that may not be eligible for a CAP assessment. It is also possible to use NEH funds to update an out-of-date or inadequate general assessment conducted earlier, although the institution must present a compelling argument why a new assessment is necessary in order to convince the panel reviewers that the project is worth funding.

**A careful inspection of storage is a critical aspect of a general conservation survey.**

### Institute of Museum and Library Services, Conservation Project Support Grants

For those institutions with extensive collections, numerous buildings or sites, or large numbers of employees, the best choice for funding a general conservation survey is often an IMLS-CP grant. These grants are competitive and require matching funds from the institution, but will award up to twenty-five thousand dollars per project. The institution is responsible for choosing its own assessor(s), and, as with the NEH grants, all other aspects of the project must be determined by the museum in conjunction with their chosen consultants. Many museums choose to apply for IMLS-CP funds so that a team of assessors can be brought on-site. Such an approach is the most efficient way to survey a large historical society, for instance, with multiple historic sites. In addition, many museums prefer to use a team of specialized consultants to concentrate on specific issues or collection areas.

### National Endowment for the Arts

In theory, the National Endowment for the Arts (NEA) can be used to fund general conservation surveys, although they have rarely been used for this function in the past. Institutions interested in applying for conservation or preservation-related grants typically apply to the Museums Division of the NEA (this is a departure from previous years). These grants are competitive and require matching funds from the institution, but will award up to $150,000 per project. For this reason, these grants could (in theory) be used

to fund surveys of exceptionally large institutions requiring a team of conservators for longer periods of time, for instance. While libraries and archives may not be eligible for funding from the NEA, organizations caring for a large range of decorative arts, crafts, folk arts, fine arts, and similar collections are eligible. These are competitive grants requiring matching funds from the institution.

## How do we choose assessors for our museum?

Hiring an experienced assessor is probably the single most important factor in extracting the maximum benefit from a general assessment. Whether you are selecting conservators and preservation architects from Heritage Preservation's list, or must choose consultants on your own, it is definitely worth the effort to check into the backgrounds of those you are considering. Evaluate the following in making your decision:

1. *Is the assessor appropriately trained?* Does the assessor have a strong background in preventive conservation if he or she is intended for a collections survey, or in historic preservation if he or she will be your architectural assessor? Does the assessor have formal training in conservation, architectural preservation, or in other relevant areas?

2. *Does the assessor have sufficient experience performing general assessments?* Heritage Preservation has this information on file for their list of assessors and can provide it on request for museums undergoing CAP assessments. Has the assessor performed assessments for institutions similar to yours? Ask that the assessors you are considering provide a list of at least four to five institutions that they have surveyed with contact names and numbers. Keep in mind that the best collections assessors are usually those with strong backgrounds in preventive conservation. You will probably want to choose an assessor who has surveyed more than just a handful of museums. In addition, keep in mind that just because your museum has a large collection of textiles does not mean that you should necessarily choose a textile conservator as your assessor. It can be very useful to hire someone familiar with the types of collections you have, but it is also important to hire someone who is comfortable dealing with more general issues like climate control, emergency preparedness, collections management, and the myriad other issues that should be addressed in the assessment.

3. *Does the conservator have good references?* Contact other institutions that have used the assessor for general surveys. When discussing assessors with other institutions, and when interviewing the assessor yourself, you may wish to inquire about the following:

• *How long are the assessor's reports?* Beware of reports that are too brief. While this may be hard to gauge, a small, one-building historical society should expect a report at least thirty pages in length, and many will average over seventy. Some reports will include appendices with additional useful information, but appendices are not typically counted as part of the assessment report.

• *Was the assessor successful in addressing the institution's primary concerns?*

• *Did the assessor address all the required issues in a complete manner?*

• *Did the assessor understand the issues specific to that institution?* Try and determine if the assessors' attitudes, philosophy, and working methods will be compatible with yours.

• *Was the assessor on-site for enough time to meet staff and physically visit all pertinent buildings or areas to be included in the survey?* CAP surveys usually require a minimum of two days for this.

• *Did the assessor complete the report in the time allotted?* Ask prospective assessors to indicate how much time they will need to complete the assessment report.

• Also, keep in mind that conservators are typically the best judges of their fellow professionals, so you may want to ask that a prospective assessor include other conservators in their list of references.

4. *Can the assessor send you a sample report or a sample executive summary?* This can be particularly insightful when comparing more than one assessor's work. While assessors are typically not allowed to share assessment reports with others, assessors can usually edit out titles and place names to generate a sample report if necessary.

## How should we prepare for an on-site visit?

One of the first things that needs to be determined is the amount of time the assessors will spend touring your site. Conservation Assessment Program guidelines currently require assessors to spend two days on-site. However, the time needed to complete an accurate evaluation of an institution may take longer, particularly for those institutions with multiple buildings or a large number of employees. CAP assessors are therefore allowed to determine how much time will be required for each institution. Prospective assessors should be given as much information about the size and complexities of your institution as possible, so they can accurately estimate how much time will be needed for both the on-site visit and for the preparation of the report.

Prepare a contract with the assessors to be involved in the survey and make sure that all pertinent aspects of the project are agreed to beforehand. Important components of the contract should include all fees, including estimates for supplies, per diem, travel expenses, and similar expenditures. If

**Conservators should check both visible and ultra-violet light levels throughout exhibit and storage areas.**

large firms are being used as consultants, the museum may wish to specify which individual(s) will be involved in the project. The schedule for the project should be outlined, including dates for the on-site visit and a due date for the draft and final report. The museum may wish to indicate if there are copyright restrictions involved with any photographs or videos of the building or collections.

One of the more important issues addressed in a general survey is the topic of environmental control. For this reason, assessors will want to see any records that are kept of your institution's temperature, humidity and/or light levels. Preferably, appropriate equipment should be purchased or borrowed well in advance of the site visit in order to generate environmental data that can be reviewed by the assessors and included in the report. These issues should be thoroughly discussed with your assessor before-hand, including the type of equipment recommended and the method to be used when monitoring.

Many museum personnel feel the almost irresistible compulsion to clean up and improve as much as possible before the assessor(s) arrive on-site. Not only is this not necessary, it can be counter-productive. For instance, one small museum decided to reline all their exhibit cases with a very attractive new fabric only to be told by their assessor later that the fabric was inappropriate for use with the artifacts on exhibit. Museum personnel should keep in mind that "skeletons in the closet" are not likely to shock their assessors (these folks have probably seen much worse), and on the contrary, these "eyesores" can usually be turned into compelling grant proposals. However, museum personnel should make sure that the assessors are able to access all pertinent rooms and spaces, such as overcrowded storage areas where artifacts stored on the floor may block access to other artifacts, for instance.

If you receive a CAP grant, Heritage Preservation will forward a Site Questionnaire to the institution prior to the assessors arriving on-site. This document is designed to formally record pertinent information likely to be useful to the assessors while they are on site, and usually improves the quality of the assessment report. This form also indicates to museum personnel the topics that should be addressed in the survey. Many assessors working outside the CAP program will provide similar forms for the institution to fill out.

All assessors will probably need at least thumb-nail sketches of the buildings to be surveyed, preferably with rooms either numbered or titled for consistent referencing. The architectural assessor will also want to examine any available blueprints for the building(s) if they exist. The collections assessor should be offered copies of pertinent collections management documents, such as the collections policy, collections manual, long or short range institutional plan, building use plan, conservation plan, emergency preparedness plan, environmental monitoring data, etc. The architectural assessor should be provided with any pertinent building preservation documents, including historic structures reports, previous building surveys, building maintenance schedules, etc.

In most cases, it is preferable to have both the collections assessor(s) and architectural assessor present together on-site for at least part of the survey. This is particularly useful if the assessors have never worked together before. In addition, you should make every attempt to schedule your on-site assessment for a period when most of your staff or appropriate volunteers are also available. In addition, board members should be strongly urged to meet with the assessor(s) if at all possible, for instance at the exit interview or during a working lunch or dinner.

## *What will the assessors do while they are on-site?*

In most instances, it is usually advantageous to give the assessor(s) a brief tour of the facilities, pointing out specific issues that you wish addressed in the report. The assessors will typically need to interview a number of staff persons and volunteers. This should be discussed before-hand so that the appropriate personnel know when they will be needed. If necessary, create an agenda with meeting times for specific individuals. It is important for the appropriate staff to indicate to the

assessors all problems and issues that they want addressed both on-site and in the report. The assessors should be made aware of events or issues not immediately apparent at the time of the visit, such as seasonal flooding or pest problems, special holiday events or festivals, or procedures for closing the museum during the winter months, for instance. The assessors should be allowed easy access to all pertinent areas of the institution, including attics, basements, mechanical rooms, off-site storage buildings, etc. Any security or logistics issues should, of course, be resolved before the assessors arrive on-site. Most assessors will need some time to inspect the facility on their own and will take time to record temperature, humidity and light levels in various areas of the museum, particularly if such data is otherwise unavailable. It is also typical, and, in fact, desirable, for assessors to take pictures (or videos) and notes while working.

Request that the assessors participate in an exit interview with pertinent staff before they leave the site. The assessor should provide an overview of their initial findings, usually stressing what they view as their top priority recommendations. As assessors may take several months to generate the assessment report, the exit interview should be used to discuss recommendations that may require immediate attention. This is also a good time for museum staff to reiterate what they wish to see addressed in the assessment report.

## *What should we expect from our assessment report?*

The assessment report is very important to your institution, as it represents the most tangible result of the conservation assessment process. Your institution's ability to properly care for its collections and buildings may be compromised if the report is incomplete or in error. As a general assessment is a pre-requisite for the award of many other conservation-related grants, all or part of it will typically need to be included in these grant applications. An incomplete or inadequate assessment report can contribute to the denial of a grant award. It is obviously more difficult, for instance, to obtain grant funds for a project that is not mentioned or given a low priority in the assessment report.

Most general assessments generally follow the guidelines established by Heritage Preservation for use in the Conservation Assessment Program. These are well outlined in several Heritage Preservation publications, including *The Conservation Assessment, A Tool for Planning, Implementing and Fundraising,* and *The Conservation Assessment Program Handbook for Assessors.* In general, those topics that should be addressed in the report include the following:

1 General information about the museum;
2 Staffing and administrative issues, particularly as they impact collections care;
3 The facilities (this will be the heart of the preservation architect's report, while the conservator may only deal with this section tangentially or when facilities issues directly affect collections, i.e. when the roof is leaking or when an electrical hazard might increase the risk of fire);
4 Climate control and environment, including an evaluation of temperature, humidity, and light levels;
5 Pollutants and particulates, including methods for controlling both particulate and gaseous pollutants in the museum;
6 Pest control;
7 Collections policies and procedures, and general comments on the condition of the collections;
8 Exhibitions;
9 Collections storage;
10 Emergency preparedness;
11 Conclusions or summary;
12 Executive summary, which should include a prioritized list of recommendations.

The better assessment reports will clearly describe conditions that existed at the time of the assessment, including descriptions of rooms, exhibits, and buildings, and delineate deficiencies noted at the time of the visit. Usually, each section will include numerous recommendations that are detailed, and as specific as possible. Unfortunately, most of the problems encountered with assessment reports involve "sins of omission" that usually result in recommendations that are incomplete or simply left out of the report. In other cases, reports include recommendations that are too vague or leave doubt as to how the situation can be remedied. For example such a recommendation might state: "Humidity levels were noted to be too high in many areas. The museum should therefore take steps to lower humidity levels to fifty to fifty-five percent RH". A better recommendation would state: "Humidity levels were noted to be too high in Gallery A, B, and C, particularly during the months of June, July, and August of 2003. The museum should hire a HVAC engineer experienced with museum systems to inspect the air handlers servicing these areas and recommend repairs, upgrades, or replacement equipment as appropriate."

Recommendations in the report should be prioritized into at least three categories indicating their relative urgency. Heritage Preservation suggests that recommendations include a suggested time frame for implementation as well.

As mentioned previously, reports often come with attached appendices that are used to expound on topics addressed elsewhere in the report. Heritage Preservation recommends that appendices be included, but they are not required, and can take many forms. Because of copyright restrictions, many assessors will append their own material or use articles that

**Most conservation assessors will rely heavily on notes and photographs taken on site when preparing the assessment report.**

have no copyright restrictions.

By nature, assessment reports tend to be critical. While a good assessor will take time to praise the institution for their progress and accomplishments, the purpose of the assessment is to delineate everything the museum can do to *improve* existing conditions. It is useful to approach the assessment process as the first step in improving conditions at the museum and as a valuable tool for seeking assistance from outside agencies. Keep in mind that the report is essentially as private a document as you wish to make it. Only the assessor, specific grant agency personnel, and others you choose, have access to the reports.

In addition, the wise assessor will generate a report that is designed for a fairly generic audience. As many institutions have high turnover rates, assessors do well to assume that future readers may be totally unaware or poorly versed in the issues discussed during the on-site visit. For this reason, the assessment report may initially seem too "basic" for more informed viewers.

## *What happens after we receive our report?*

In most cases, the assessors will forward an initial draft to you that should be carefully reviewed for factual errors. Do not be reluctant to discuss the report with the assessors and make sure that issues that are unclear or not thoroughly reviewed are revised to your satisfaction.

In most cases, museum personnel can use assessment reports to develop an institutional conservation plan. While this may sound like a daunting task, it usually only involves reviewing the recommendations made in the report and assigning them an institutional priority. This may or may not coincide with the priority assigned by the assessor. It is also useful to be able to indicate in the conservation plan whether the institution is acting on, or has completed, the task suggested in the plan. This is a wonderfully graphic method of showing interested parties the progress you have made in implementing your conservation plan. This type of document can be a powerful appendix to a federal grant application and can often be used in lieu of the general survey report.

Most institutions find assessment reports a powerful fundraising tool. As the reports represent an objective and professional analysis of the preservation needs of the institution, they can be most effective in convincing staff, board members, local governments, support groups, private foundations, state entities, and federal granting agencies of your particular needs.

While the assessors are, of course, under no obligation to stay in touch with you after the assessment process is complete, most assessors will encourage you to contact them with questions or concerns, particularly if you are interested in pursuing projects outlined in the report. Many assessors have considerable experience with grant applications and will welcome the chance to assist you.

## SUMMARY

A general conservation assessment is a powerful tool that will help your museum integrate conservation practices and principles into the everyday activities of the institution. Implementing the recommendations generated from the assessment report will not only extend the life of your collections, it often helps prevent staff from pursuing inefficient or even damaging collections management practices. In addition, a general assessment is usually considered a prerequisite should the institution wish to apply for federal grant funds for conservation or collections management projects. At this level, the federal grants are highly competitive, however, and institutions will need a good assessment report or conservation plan in order to effectively compete. It is therefore critical that staff choose their assessors carefully. Informed staff will also be able to ensure that the entire assessment process is a productive and positive one. Ideally, the museum and their conservation assessors will develop a close relationship over time, allowing staff to keep abreast of future developments in preventive conservation, and thus further strengthening the institution's ability to properly care for its collections.

## RESOURCES

Heritage Preservation is a national non-profit organization organized to promote the conservation of our nation's cultural heritage. 1625 K St., N.W., Suite 700, Washington D.C. 20006, 202-634-1422, www.heritagepreservation.org.

Institute of Museum and Library Services, Office of Museum Services, 1100 Pennsylvania Avenue, NW, Room 609, Washington, DC 20506, 202-606-8539, www.imls.gov.

National Endowment for the Arts, Nancy Hanks Center, 1100 Pennsylvania Ave., N.W., Washington, DC 20506, 202-682-5576, www.nea.gov.

National Endowment for the Humanities, Division of Preservation and Access, 1100 Pennsylvania Ave., N.W., Washington D.C. 20506, 202-606-8570, www.neh.gov.

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*Capitalize on Collections Care.* Heritage Preservation, 1625 K St., N.W., Suite 700, Washington D.C. 20006, www.heritagepreservation.org.

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*Guidelines for Selecting a Conservator.* American Institute for Conservation, 1717 K Street, N.W., Suite 200, Washington D.C. 20006, 202-542-9545, aic.stanford.edu.

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*The Conservation Assessment: A Tool for Planning, Implementing & Fundraising.* Heritage Preservation, 1625 K St., N.W., Suite 700, Washington D.C. 20006, www.heritagepreservation.org.

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