CONSERVATION

Harold W. Tribolet

Librarians and archivists face a great number of administrative problems: personnel, building programs, heating, air-conditioning, trustees, and so on. This discussion adds a new dimension—conservation—to their problems. Many of the points touched upon will not help specifically in handling the tons of day-to-day materials charged to their care, but they will consider the hazards of disintegration and the techniques of preservation of rarities.

At one time conservation was a pure craft, and still is more or less; however, today the craft and the science of conservation have merged. With this merger, we now have a more positive solution to the complex problems of adding years to the life of important material of the past and of the present.

Strangely, many of the early conservators were very secretive about their techniques; they were not inclined to share their knowledge; and too much emphasis was placed on the tradition of the craft. Amusing stories about techniques and formulas have been passed down from one generation to the next. An example of such a story involves the simple operation of oiling leather bindings. One man proudly told that his Grandfather had always used banana peels to furnish leather bindings, and he said: "There is nothing better." This man supported an unproved and questionable technique, and ignored the scientists who have proposed other solutions for leather preservation. The story is typical of those passed on from one generation to another. In most instances, they have done no good and in many cases they have done harm.

The eight factors which cause disintegration are: heat, light, air, moisture, insects, other materials, inherent characteristics, and people.

Objects stored in attics or in areas where there is excessive heat disintegrate much faster than do those items that have been stored under ideal conditions. In fact, conservationists use heat to make accelerated age tests.

Materials exposed to sunlight fade and become dehydrated. Fluorescent and incandescent lighting as well as reflected natural light also cause objects to show early signs of disintegration.

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Fortunately, it is possible to retard the injurious effect of light with controlled illumination and light filters.

Some people believe that air promotes the life of paper; however, this is not true. Many of the objects that have lasted best have been preserved in book form under compression. The Gutenberg Bible is a good example of this. Copies of the book that are not exhibited are in better condition than those frequently exposed to the atmosphere, much of which is polluted to some degree.

Paper exposed to excessive moisture for prolonged periods frequently suffers from destructive mildew or unsightly foxing.

The ravages caused by insects around a library are so well known that there is no need to elaborate upon them.

By "other materials" we mean the migration of injurious acids from one material to another. As an illustration, a short time after a newspaper clipping is placed inside a book, a discoloration—acid damage—becomes evident on the adjoining leaves. The bad material, in this case the newspaper clipping, always affects the good material, and the migratory action is never in the other direction.

The inherent characteristics of the objects to be preserved are important. If poor materials are involved, a short life span can be expected unless ideal storage conditions are provided. Good materials have a better chance of survival under adverse conditions, but they, too, will respond favorably in a suitable environment.

People create a number of hazards through poor handling of items, often a result of pure ignorance. The simplest illustration is the extensive way in which pressure-sensitive plastic tape has been used to repair damaged paper during the last decade or so.

Let us suppose that we have a sheet of early eighteenth-century paper that shows signs of bad handling: torn margins, water spots, and applications of pressure-sensitive plastic tape. Assuming that the image is on one side of the paper, it would be possible to adhere a piece of thin mulberry tissue to the back of the piece of paper to support it. This provides physical support for the weakened fibers. An operation of this kind requires paste and many conservationists consider old-fashioned wheat paste the best. Suitable support for the damaged sheet of paper could also be provided with a piece of all-rag, chemically-safe paper. Silk chiffon is sometimes used. This material, however, has limitations which are determined by the adhesive, and the chemical characteristic of the paper to which it is being applied. For example, a piece of paper which is highly acidic will cause disintegration of silk chiffon much earlier than all-rag paper which is chemically safe. Silk chiffon is nevertheless considered a good supporting fabric where transparency is essential.

In handling a recent restoration involving a historically-important insurance policy, which had been reduced to hundreds of

irregular pieces of paper by broken glass, silk chiffon was selected as the best supporting material. It was possible to paste the many fragments and slide them into correct position on the silk, making the document whole and strong.

Other materials which successfully support paper are cotton, linen, and a relatively new material known as polyester web, a matted mylar fiber that has been found to be most useful in supporting folding maps, for it is very strong in relation to its thickness. All of the bonding problems involving mylar fiber have not been solved; however, the material is worthy of further experimentation.

When a broadside, drawing, or similar sheet of paper requires mounting or hinging to a rigid support, an all-rag fiber board should be used rather than a board made of impermanent fiber. Poor board liberates acids that migrate to the paper placed against it, causing discoloration and disintegration.

If a mounted piece is to be displayed in a frame, it is advisable to provide a mat, also made of all-rag board. The mat will keep the item away from the surface of the glass on which moisture will sometimes form under certain atmospheric conditions. A piece of moisture-proof material should be applied to the back of a framed piece, attached to the wooden molding, to prevent the penetration of moisture through the back surface. A great number of framed documents and drawings have been ruined or damaged from moisture absorbed from a wall, especially an outside wall, and from excessively humid air.

When both sides of a paper object are to be protected and displayed, it can be supported within a contour mat, then placed between two sheets of Plexiglas UF1, a clear plastic formulated to give protection against injurious light rays, both natural and artificial. Although Plexiglas will break, it does not splinter as glass does. The National Gallery of Art in Washington, D. C., recently installed this material over its skylight glass to diminish the light problem. This plastic should not, however, be placed over an unfixed pastel, for static electricity may develop and cause the chalk to loosen.

Paper that is badly worn, weak, and on the fringe of total disintegration can be deacidified, then laminated between thin plastic film and tissue. In this process heat and pressure combine the materials into one unit. If a book is involved, the leaves are taken from the binding, laminated, then rebound, usually in a new cover, for the thickness of the paper is increased by the lamination.

Experimental work in this country and in Europe is attempting to perfect a deacidification process that can be applied to the leaves of books that do not require lamination or rebinding. It is a difficult problem, for the chemical vapors that are most beneficial to the paper cause a warp to develop in the leaves, especially when the grain of the paper is horizontal. When the technique is perfected, and it

probably will be, it will extend the life span of millions of books at a very low cost.

Many paper objects—books, broadsides, etchings, prints—that have developed stains can be bleached with liquid chemicals. Special care must be taken in handling wet paper and, of course, the chemicals must be mild. In most instances the washed paper is sized with gelatin and dyed to bring it back to its natural color. H. J. Plenderleith, formerly with the British Museum Research Laboratory, recommends Chloramine T as a safe chemical for the washing process. This chemical must be washed out of the paper before the job is considered finished. When washing, sizing, and tinting an object, one's aims should be the retention of the original characteristics of the paper, whether it be a book, broadside, or other paper object. The indentations in a printed piece should not be removed; this can be accomplished by pressing the wet paper when it is about 99 per cent dry between soft white blotting paper.

Simple tears in paper can be repaired with mulberry tissue or cotton fibers, applied with wheat flour paste. Avoid the handy pressure-sensitive plastic tape, for it is not a suitable material when permanence is a factor. A sophisticated restoration can be accomplished by the addition of a matching paper to an incomplete piece of paper. In this process, fibers are pulled from the old and new pieces of paper, then pasted together. If a laid paper with obvious chain marks is being treated, the chain marks of the two pieces of paper should be aligned.

Paper pulp, prepared by cooking paper scraps, then balling them, and finally mixing them with water before application, is a good material for repairing small holes, such as worm holes and perforations. Another way of repairing perforated paper is to perforate an identical piece of paper with the same type of machine which was used for the original perforation. The little circular pieces of paper punched out can then be mixed with thin paste and pressed into the holes of the paper being restored by means of a dental tool. This type of restoration is better for antique paper than smooth, modern paper.

If a book lacks a leaf, a simple facsimile can be installed, using a photograph or a photostat made from a complete copy of a similar book. A better solution is a Xerox reproduction, made on paper that resembles the paper in the book. The most sophisticated kind of a facsimile requires an engraving, made from a photograph of an original leaf, ink carefully mixed to match, and finally an impression on the correct paper. Since such a facsimile could lead to deception, it is advisable to stamp or print the word "FACSIMILE" in the gutter margin.

Although all facsimiles are not identified as such, they should be. In trying to identify facsimile pages in a book, the following steps should be taken:

1. Examine each leaf against a strong light to determine if the chain marks or other characteristics of paper are identical.
2. Using your fingers or a guage, check all leaves to determine if they are abnormally thick or thin.
3. With a magnifying glass, examine the edges of the leaves and observe the marks left by the cutting blade of the gulliotine cutter. Any leaves that have been added will not have identical serrations, because they were cut with another knife.
4. Turning the pages of the book, look for particles of dirt or migratory stains—the fly speck or foxing marks—that transfer from one page to another. If the marks are not visible on the opposite page, then it is probable the clean page is a facsimile or one that requires further examination.

Vellum is the most independent and probably the most permanent of the materials used for the leaves of books, book covers, broadsides, diplomas, and similar documents. Very little can be done or needs to be done to lengthen its life; however, in some instances it must be flattened or repaired. If a sharp crease or fold must be eliminated, the vellum is moistened or humidified, then drum-stretched on a flat surface with weights around the edges. Never use a steam-iron to solve this problem! If a void has to be filled, a piece of similar vellum can be bonded into position. If a tear must be repaired, stitches with suturing-gut will provide the desirable strength.

A sympathetic restoration of existing binding materials is desirable, to be sure, but in some cases there is not enough of the original material to save or it is entirely gone. In such instances, a period style or replica binding can be applied. To illustrate this point, the rare first illustrated edition of The Canterbury Tales came to us in an inadequate binding applied during the last century. After the leaves were repaired and sewn in the style of the fifteenth century, wooden boards were laced to the cords of the raised bands, and a calfskin cover was applied. In the manner of the period of the book, all details of reconstruction were kept deliberately crude, the tooling of the leather was irregular, and finally the leather was discolored and rubbed.

Most of the leather used for binding and restoration work is tanned in Europe, where great emphasis is put on the longevity of the skins produced. The best skins are vegetable tanned in the traditional way, are free of injurious acids, and are treated with a protective salt to resist the effect of the polluted atmosphere. Although vegetable tannage is excellent and is easily manipulated, it does have an affinity

for the acids in the air. On the other hand, chrome tanned leather does not have this weakness, but it is difficult to form and tool. One English tanner is now doing a combination tannage which may be superior to the traditional process.

Although little can be done to preserve cloth bindings, apart from putting them into protective cases, leather binding must be treated periodically with preparations that have been found to be beneficial. The initial treatment involves application of a solution of potassium lactate then, after this has dried, a mixture of neat's-foot oil and lanolin. Currently this dual treatment appears to be the best. We hope, however, the scientists will eventually develop a single, all-purpose solution to protect leather from polluted air, insects, and mold. Cleansed air, controlled humidity, and an even temperature are, of course, important elements in the preservation of leather.

Vellum bindings will not benefit from any preparation known today. The material can, however, be cleaned with an eraser or a damp cloth with saddle soap.

Since all of us are only temporary custodians of the things we possess or have under our control, it is important that we recognize the serious responsibility of preserving the objects of the past. Preservation alone may suffice in some instances and restoration in others. It is a decision that is not always easy, but we are obligated to know and understand what can be done.