A Brief Look at Recent Developments in the Preservation and Conservation of Special Collections

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ABSTRACT

DUE TO THE IRREPLACEABILITY OF MATERIALS as well as the innumerable variations in physical condition and storage needs, special collections present many challenges to preservation and conservation professionals. In reaction to these challenges, there have been many advances and changes within the fields of preservation and conservation. The goal of this short paper is to highlight some of the skills and technological advances that have changed the way special collections are preserved in reference to two approaches: item-level conservation and collections conservation.

One of the most fundamental aspects of special collections stewardship is preservation. Due to the irreplaceability of the collection materials as well as the innumerable variations in physical condition and storage needs, these collections present a great many challenges to preservation and conservation professionals. In reaction to these ongoing challenges, there have been many advances and changes within the fields of preservation and conservation that allow us to approach these collections more effectively than ever before.

In the past few decades, there has been a shift in philosophy about how preservation professionals approach special collections. Traditionally, special collections have been treated as collections of individual artifacts or small groups of objects. Conservation treatments such as binding repairs and paper mending have been done on a case-by-case basis, as individual pieces are used or acquired. This methodology is still valid for special collections; for instance, collections of incunables or the manuscripts of a famous author should almost always be approached in this manner. In cases of item-level conservation, books and other library items are considered

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independently of their neighbors when treatment decisions are made and are treated in such a way as to maintain the most authentic representation of the original artifact as possible. Recently, this approach has been emphasized outside of special collections in such publications as *The Evidence in Hand: Report of the Task Force on the Artifact in Library Collections,* a CLIR publication coauthored by Stephen G. Nichols and Abby Smith (2001).

A more forward-looking philosophy concerning special collections conservation, however, is the view of a collection as a whole, or what has become known as collections conservation. Collections conservation, in reference to special collections, focuses on the use of preventative maintenance. This practice concentrates on such concerns as environmental controls, protective enclosures, and other nonintrusive means of preserving materials and utilizes them to lengthen the life of the collection as a whole, not as individual pieces.

The goal of this short paper is to highlight some of the skills and technological advances that have changed the way special collections are preserved in reference to these two approaches: item-level conservation and collections conservation. The developments discussed are by no means an exhaustive list of all the advances in the field but simply topics deemed by the author to be worthy of note.

Item-Level Conservation

Item-level conservation for special collections materials is rooted in traditional skills and techniques that have not changed for many centuries. In addition to these techniques, however, are many advances that have improved the reversibility, effectiveness, and speed by which conservation treatments are performed. Most recently, there have been a number of mechanical and chemical developments that have made the conservator's work easier. Of these, three that are worthy of note are the development of mechanical paper splitting, computers-assisted leaf-casting, and mass deacidification.

Paper splitting by hand has been utilized by conservators for many years to salvage those papers which are exceedingly brittle but for which lining or encapsulation may not be appropriate. This process involves splitting the two faces of a sheet of paper away from each other and reinforcing the paper core with the addition of new materials. It is only recently, however, that this process has been produced mechanically. Developed by the ZFB (Zentrum für Bucherrhaltung) company in Germany in 1994, mechanical paper splitting now offers an aesthetic paper strengthening option in addition to lining and encapsulation and has become affordable to larger institutions in Europe and even the United States despite the company's location (Zentrum für Bucherrhaltung, 2003). Although this process is still not commercially available stateside, it will undoubtedly be only a matter of time until there is either a U.S. provider or smaller paper splitting machines available for conservation labs to purchase.

The integration of computer imaging and mechanization as aids in pulp fills and leaf casting is also an example of the successful use of modern technology to improve a traditional repair technique. Leaf casting, a more mechanized version of pulp filling of paper losses, involves pulling a slurry of pulp and water through losses in paper with a vacuum pump over a fine screen. This method accelerates drying times and evens the coverage of paper pulp to losses over traditional pulp filling by hand. With the additional assistance of digital cameras, computer programs can now determine the area of loss for a flat piece of paper and approximate the amount of paper pulp to be added to a slurry for the leaf casting process to give an almost flawless fill.

Although by its very name not strictly an item-level treatment, mass deacidification bridges the gap between the invasive item-level repair and the less-invasive collections conservation methods. Mass deacidification is the integration of basic (pH > 7.0) salt particles into the interstices of paper to help combat the inherent production of acids as paper degrades. The development of this product has seen many trials and permutations over the past decades. Beginning with investigations into the use of Diethyl Zinc (DEZ), and moving onto the commercially produced Wei T'o and BookKeeper products, mass deacidification has become increasingly more reliable and effective as well as less reactive with printing and drawing inks. The present affordability and reliability of mass deacidification treatment, in conjunction with the ever-increasing use of permanent paper in publishing, may very well lead to a future with less materials suffering from embrittlement. Indeed, although the mass deacidification process was initially designed for use on circulating collection materials, increasing numbers of rare and semirare materials are receiving this treatment.

Collections Conservation

The field of collections conservation has seen many advances in the past few decades, and many of them even within the past few years. In the matter of environmental control, there have been several products introduced to the market that have made the monitoring of special collection environments a simpler task and have assisted in determining what environmental conditions are appropriate for specialized materials. These advances are in addition to the ever-improving reliability of HVAC (heating, ventilation, and air conditioning) units, and the improved availability of cold (below 65° F) storage units.

Dataloggers have existed for some time, but only recently have they become affordable enough for most collection managers to utilize them. Dataloggers are small computers that record temperature and relative humidity and, in some instances, light levels. They are highly mobile and produced by a number of manufacturers. Through an interface with a PC, collection managers or preservation staff can determine how often the environmental conditions should be sampled and monitor the storage environment of their collections. The information stored in the datalogger can be downloaded into Microsoft® Excel or other specialized programs for easy interpretation.

Building on the availability of dataloggers, the Image Permanence Institute (IPI) has developed the *Preservation Calculator*[1] and is currently developing the *Climate Notebook*.[2] These digital tools enable easy interpretation of the data collected from hygrothermographs, psychrometers, or dataloggers and translate this data into practical terms relating to the overall health of the collections. A more general tool, the *Preservation Calculator*, offers information relating to the general aging rate of library collections and the overall risk of mold in relation to temperature and relative humidity data input by the user. The *Climate Notebook* software, which recently finished its first round of field-testing, offers a much more in-depth view of the effects of storage environments on collections. By manipulating data sets downloaded from a datalogger, the *Climate Notebook* allows for an institution's personnel to view storage conditions over a period of time and relates those conditions in a variety of terms, including temperature and relative humidity variation, averages of those conditions over time, the natural aging rates for a variety of specific collection materials, and the risk of mold under those conditions.

Control of pests and mold, and their eradication, are also areas that have seen great advances in the past few years. In contrast to the zealous use of chemical fungicides and insecticides in the past, the practice of "Integrated Pest Management" has made great inroads through promoting the limited use of chemicals as well as utilizing controlled environments and other, nonchemical means of insect control. In many special collections, chemicals are used only as means of last resort and, even then, the chemicals used are much less toxic than those previously employed. In addition, freezing to kill adult insects and their larvae/eggs, the use of HEPA vacuums for removing dormant mold, and the use of oxygen scavengers and anoxic environments to kill insects have greatly improved the ability for preservation professionals to eradicate pests without unnecessarily exposing materials and themselves to harsh chemicals.

Storage environments have also seen great advances over the past decade. Although the preservation and conservation community has known for many years that acid neutral or basic (pH > 7.0) paper materials with no lignin are appropriate for the long-term storage of most library materials, some additions to this knowledge have given broader opportunities for advanced long-term storage for specific item types. The integration of molecular sieves into archival papers has allowed for the enclosures constructed from them to actually trap harmful off-gassed materials such as acetic acid from acetate film stock. Additionally, the use of impermeable films, such as the commercially available Marvel Seal, can be custom cut and heat-sealed to make almost completely impermeable containers. These containers can be used in conjunction with desiccants and oxygen scavengers to produce highly inert storage environments.

In addition to traditional book and paper collections, another area in special collections preservation that has seen a great deal of progress is film preservation. The term "film preservation" is used loosely to include motion picture film and still photographic film, as well as microfilm. Some advances in this area include *A-D Strips* produced by the Image Permanence Institute, which can be placed in enclosed spaces, such as drawers and boxes, to detect the presence of acetic acid, the primary indicator of "vinegar syndrome," or the chemical decomposition of cellulose acetate film bases (Image Permanence Institute, 2002a). These strips, made available commercially in the late 1990s, have greatly decreased the time necessary to survey film collections for vinegar syndrome, have increased safety by eliminating the need for people to "sniff" for film degradation, and have also allowed for the easy quantitative evaluation of the degree of acetic acid being off-gassed.

One last area of progress in film preservation is the recent ability to salvage distorted acetate negative images. This process, developed by the Chicago Albumen Works, essentially removes the image-bearing emulsion layer from the deteriorated base plastic, relaxes it, and duplicates it onto an interpositive or through digital scanning (Chicago Albumen Works, n.d.). Although complete image salvage is not always possible with severely deteriorated images, this method does offer an option for film preservation that was not possible ten years ago.

Although these highlights do not cover all the advances in special collections preservation and conservation in the past decades, they do illustrate the immense amount of research and development that has been taking place in this area. This is not in any way indicative that the task is even close to complete, however. As we better use technology as a tool to preserve our collections, so, too, do authors and artists use technology to aid in their creativity. As these technologies become increasingly more diverse and affordable, many acquisitions into special collections will include digital media for which there are no standards for preservation. The "conservation" of lost digital media through emulation, or by other means, as well as the continued access to the innumerable formats for recorded audiovisual materials, will be an area of much needed research in the coming years.

Notes

1. The *Preservation Calculator* is available for free download at http://www.rit.edu/~661www1/sub_pages/8contents.htm.
2. For more information, see Image Permanence Institute (2002b).

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