SQUARE PEGS, ROUND HOLES: THINKING CREATIVELY ABOUT HOUSING AND STORAGE

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ABSTRACT: Providing proper housing and storage of archival materials is a primary goal undertaken in all archives. Standard containers for manuscripts, documents, photographs, three-dimensional objects, and other archival materials are readily available. However, for nonstandard, unusual, or complex objects that require additional support, developing housing or specialized storage can be problematic. Thinking creatively about housing and storage of archival materials increases the wealth of housing options available to archives even when a conservator is not available. Archivists can incorporate premade and traditional archival supplies in innovative ways to create structures that store and protect, while at the same time, limit handling during use and exhibition. Three basic methods (sink mats, boxes with fillers, and archival sleeves and wrappers) can assist in this process and are illustrated with examples from the Iowa State University Library Special Collections.[1]

Introduction

Archivists face increasing pressures in their work to care for and provide access to their collections. They must be proactive and think creatively when considering how to store and stabilize their materials. This article provides brief descriptions of some basic housing techniques that can be adapted to specific uses and implemented without the services of a conservator. These techniques include sink mats, standard and custom-fit boxes with added supports, and the use of archival plastic for sleeves and wrappers.

It is always a challenge balancing the demands of time, limited budgets, and the importance of individual objects when selecting appropriate housing options for collections. Sufficient time must be allocated to develop a housing plan, analyze supply needs and priorities, locate resources, study supply options, and develop customized solutions. Budgets, always constrained, must support the specialized housing needs of individual high-priority items, without compromising support for the collection as

a whole. The role of the user and the frequency of handling for research or display of materials also add to the physical stress being placed on items. And finally, the archivist must consider the multiple and occasionally conflicting needs of the individual object or artifact—format, fragility, structure, dimensions, weight, shape, frequency of use, and centrality to the collection—when making difficult decisions about customized housing and storage. Although the physical considerations often drive the need for a conservation or housing decision, other factors will require archivists to adjust and develop suitable storage options. Ultimately, all the preceding factors will need to be taken into account when establishing preservation priorities at various levels, including high-level needs requiring conservation expertise, as well as medium and lower-priority materials that can be handled in-house by the archives' staff.

The techniques described in this article have traditionally been used to deal with medium-priority materials, that is, items requiring stabilization, but not of a high enough priority to merit full conservation treatment. However, as will be demonstrated, these techniques can also be applied to high-priority items when resources are not available for conservation treatment but special housing is necessary. They may also be applied to materials that are used frequently by patrons and which also have unique needs in regards to storage that cannot be met by traditional archival housing. When the non-conservator makes creative use of simple housing solutions, the benefits are many. Archivists can be self-reliant in providing the appropriate housing for a problematic item, oftentimes accomplishing this in-house and thus alleviating the need for any transport. These basic techniques are also faster and less expensive than sending work to a professional conservator. Finally, any effort to properly house archival materials is better than doing nothing at all.

Background

Those of us responsible for the care of collections know well the potential for loss or neglect of artifacts. The difficulty often lies in the ever-increasing variety and complexity of conservation issues archivists face, and the limited resources available to provide necessary or ideal treatment and storage. This is especially true for archives that lack an in-house conservation lab and trained conservator. Understandably, administrators of libraries, archives, historical societies, and museums may not wish to invest in an in-house conservation program, given the availability of other conservation service providers. However, with that said, all cultural institutions must be held accountable for the care of their collections. To this end, archivists can adopt a range of activities, from simple refoldering to item-level conservation, to protect their collections. And at a minimum, as effective stewards of their collections, they should certainly be familiar with publications of the Society of American Archivists that cover activities such as paper humidification and flattening, fastener removal, and dry cleaning.[2] These are all treatment options that can generally be carried out in typical archives without the oversight of a trained conservator.

Beyond the basics, the care of objects in archival and conservation literature generally focuses on the technical aspects related to physical deterioration of materials and cor-

responding conservation treatments. Included in this subset of the literature are topics as diverse as the effects and stabilization of iron gall inks in manuscript collections, historical overviews and discussions of the embrittlement of paper and the effectiveness of paper splitting, and the difficulties of caring for ethnographic materials that are complicated by their composite nature and cultural or religious significance.[3] This type of literature focuses on complex treatments often associated with highly specialized fields of conservation and applies to unique materials with specific physical and chemical damage. For most archivists, undertaking this type of item-level treatment is not realistic, especially when weighed against the needs of the entire collection or their own level of expertise.

On a collections level, the preservation literature also addresses general management issues, including storage and handling techniques; appropriate environmental conditions; storage facilities; housekeeping; and best practices for storing specific materials such as books and paper, photographs, magnetic media, and film. There are also numerous box-making manuals available that provide step-by-step instructions on measuring for custom-fit enclosures, and building an array of box types.[4] As for selecting materials to construct boxes, the literature also provides description and assessment of the selection and use of specialized materials[5] such as archival plastics and paperboards.[6] It is generally accepted that boxing items physically protects them, secures loose parts, and shelters them from fluctuating temperatures and relative humidity. Unfortunately, there are also potential drawbacks (theft, lack of visual clues, and the trapping of volatile deterioration by-products)[7] associated with boxing.

Much of the current literature, then, seems to address either highly complex treatments of specialized material (presumably by a trained conservator), or the most basic care, handling, and storage of archival collections. Unfortunately, a question that is often overlooked in both the literature and in practice lies somewhere in between these extremes: Are there conservation options, particularly housings, that are tailored to the specific object but do not require the services of a conservator, or purchase of large and expensive equipment? In other words, what about the irregularly shaped items that every archives possesses that, due to their size or contours, or perhaps because of limitations in storage space and environment, require creative deviations from standard practice? This segment of the literature, aimed at archivists and administrators who may not have the benefit of an in-house conservator, but who have escalating conservation needs, is limited. Certainly, there are occasional discussions in the literature of specific objects (from inflatable rubber boats to Mardi Gras costumes)[8] and the creative solutions conservators have devised to display and store them; however, what the literature does not do as thoroughly as one would hope is to assist the archivist, more generally, in thinking creatively about housing and storing problematic or unusually shaped or sized objects.

Authors who have presented housing solutions addressing irregularly shaped or sized objects have often done so in journals that archivists may not consult regularly due to their extremely technical nature, such as *Restaurator* or the *Journal of the American Institute for Conservation (JAIC)*, both of which have presented useful articles in this area. Examples include handling oversized documents, creating modified sink mat housings for brittle art objects and oversized maps, and designing paper-based supports

for small objects such as folding fans.[9] One particularly useful article presents solutions developed for the University of Washington Library, incorporating premade containers and customizing them by adding internal support features.[10] Though technical and written primarily for conservators, these articles do make clear that stabilization and improved housing are important steps in caring for collections.

Sink Mat Structures

Image 1: Matted drawing: *Flat paper objects can be matted with an additional cover board to provide support and protection during storage and handling. (Photo by Michele Christian.)*

A common housing structure for works of art on paper, photographs, and valuable documents or manuscript pages is a window mat that provides structure and protection during storage and handling. These window mats are made of museum or archival mat board with an opening cut to the dimensions of the image not unlike window mats used in framing. The window mat is then hinged to a backing board and a cover board, both made of museum board, so that the window mat is between two solid mats. The cover board provides an extra layer of protection during storage. The flat object is then attached to the backing board.[11] The thickness of the window mat prevents the surface of the object from coming in contact with the framing glass or protective cover board (see image 1). These techniques are usually carried out by paper conservators or conservation framers, and can be expensive. One limitation of a traditional mat used in framing is its depth. A traditional window mat cannot accommodate raised surfaces or flat objects with some thickness, such as topographical maps and even severely cockled manuscript pages. Sink mats take this basic structure one

step further. The depth of the "sink" accommodates the thickness of the object that a folder or standard mat and frame would not allow. The sink mat is made of corrugated board, museum board, or archival foam core, layered to establish the desired depth. The mat can be built up around the object when designing a sink mat for a rectangular object,[12] or, for irregularly shaped objects, the opening can be cut out of the sink mat material with a scalpel or utility knife to perfectly fit the object. Modified versions of sink mats provide a variety of storage solutions for fragile flat objects with some thickness or raised surfaces.

Adapting the standard sink mat to incorporate a hinged cover creates a protective enclosure that can be stored flat or on edge, as long as there are no loose or fragile pieces and the overall size and weight of the object permit this. Good candidates for simple sink mats are three-dimensional topographical maps that are often made of thin, brittle plastic. These maps create housing problems that are often solved by placing them on top of map cases without physical protection for the maps themselves. This solution also limits the number of topographical maps that can be stored since stacking these fragile maps directly on top of one another can easily cause damage. Creating a large sink mat with stiff covers made of lignin-free board or corrugated polypropylene[13] enables the stacking of sink mats in a drawer or on top of a flat surface, and improves handling by providing physical protection and support.

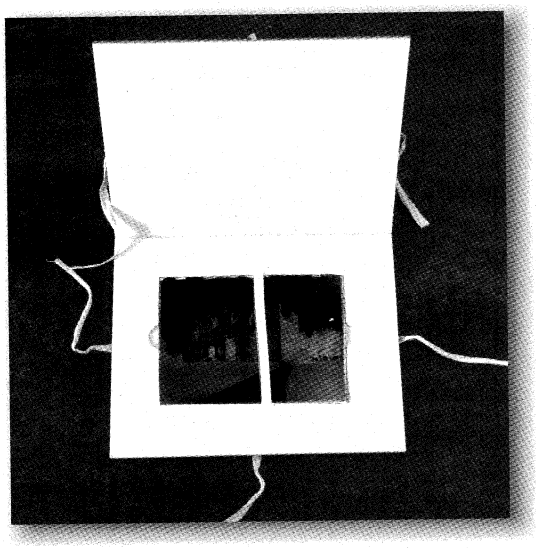

Image 2a: Broken glass plate negative: *Pieces of a glass plate negative can be placed into a sink mat emulsion-side down to prevent chipping and grinding of the broken plates during storage and handling. The pieces can be oriented so that the image can easily be viewed. (Photo by Michele Christian.)*

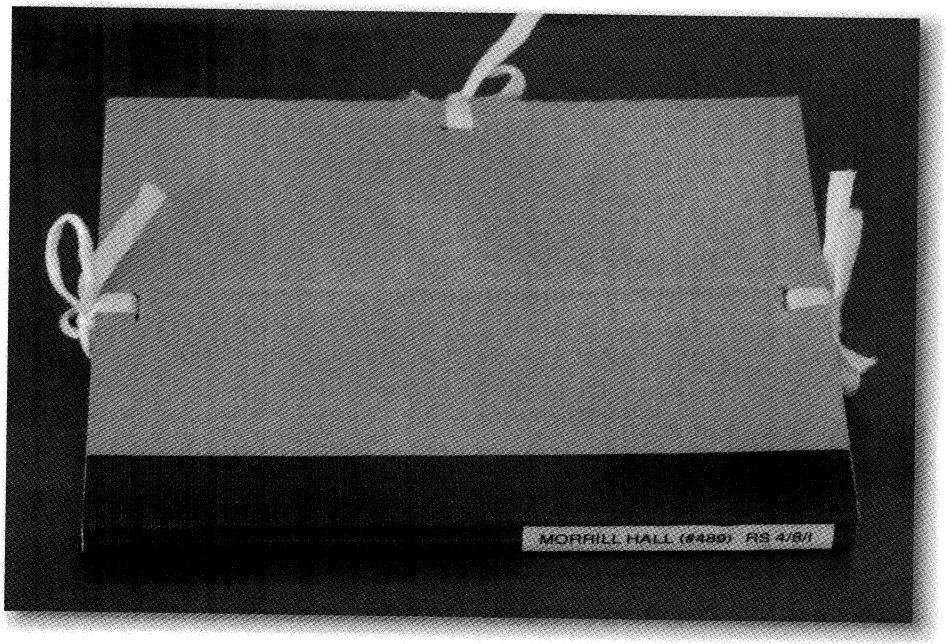

Image 2b: Portfolio containing the sink mat: *A portfolio structure with ties further protects the broken glass plate and improves labeling, storage, and handling options. (Photo by Michele Christian.)*

Broken glass structures such as glass plate negatives, lantern slides, ambrotypes, and glass or ceramic tiles can benefit from a modified sink mat enclosure in a multitude of ways, and are an excellent candidate for an irregularly shaped sink mat. Typically these items are sleeved and housed in a box on edge. Unfortunately, broken glass causes uneven pressure points against intact glass plates if stored in the same box. Broken pieces may also grind and chip, causing scratches to or flaking of the emulsion if sleeved together, and of course handling broken glass can be a hazard. Within the modified sink mat, the broken pieces can be positioned so that they are aligned properly (see image 2a). Building the sink mat into a portfolio structure with ties (see image 2b) further secures and protects the glass plate. By establishing a uniform enclosure size based on the largest glass plate in a collection, multiple sink mats can be securely housed in a standard box. Labeling the edge of the sink mat allows for quick and easy identification of glass plates when they are stored upright, eliminating unnecessary handling and viewing. With the broken pieces stored together and oriented correctly, there is less likelihood that the pieces will need to be handled for viewing or become separated. To improve the viewing of transparent media, thick polyester sheets can be used to sandwich the glass plates and hold them in the sink mat. This allows the plate to be lit from behind, bringing out the image and allowing for improved viewing and image capture.

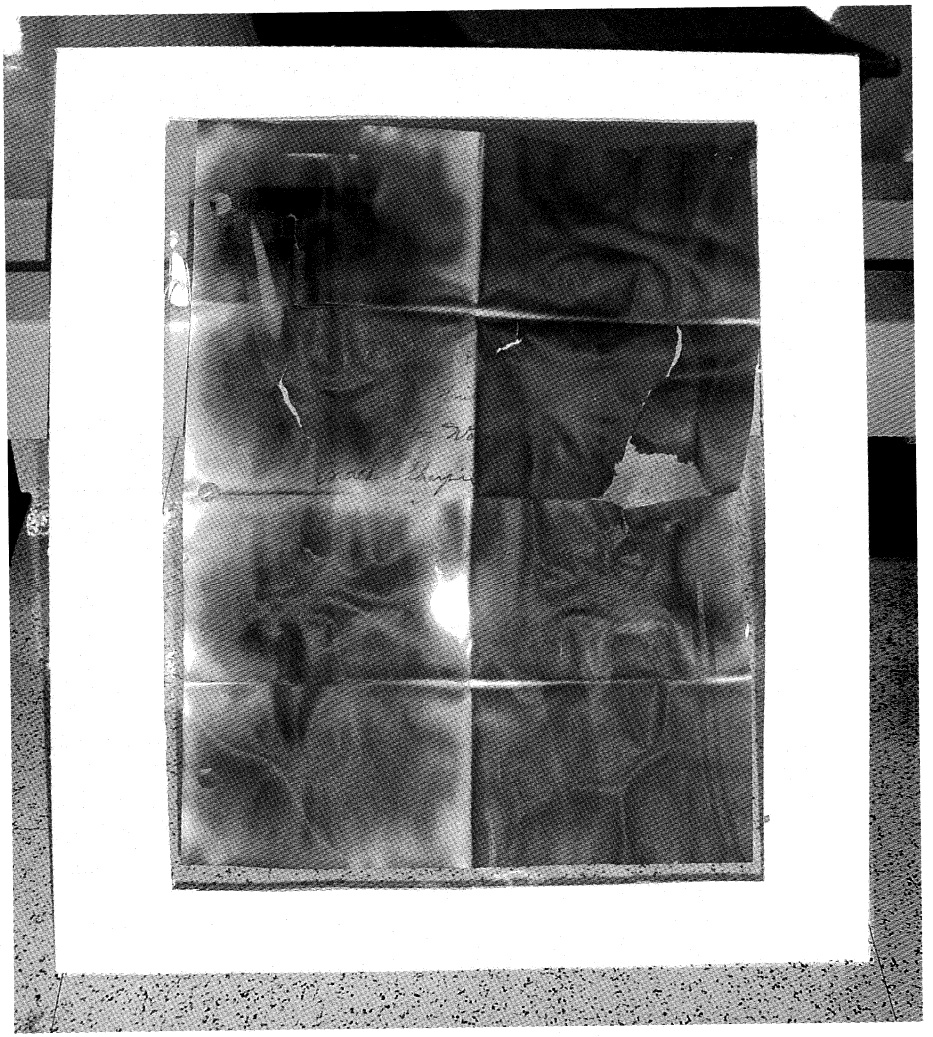

Image 3: Charred document sink mat: *Cockled documents like this unevenly charred document can be placed in a sink mat to accommodate the added thickness due to cockling. The document is held in place between two sheets of polyester. (Photo by Hilary Seo.)*

Sink mats also provide secure housing for cockled or distorted documents on paper or parchment. An illustration of this technique emerged at a 2006 workshop conducted by ISU Library staff for the Midwestern Association of Forensic Scientists, focusing on "questioned documents." Document specialists face unique problems in examining and storing partially charred paper, which typically cannot be flattened or handled without causing breakage and loss. Humidification of the charred portions of a document has little to no effect, since the paper fibers have been converted to carbon. The

solution to this problem also needed to be one that could be performed quickly in a forensics lab, not a conservation lab. Conservators proposed as a solution a single- or double-sided sink mat made with archival foam core and polyester sheets.[14] To prevent crushing but still allow for viewing, the cockled document was placed loose in the sink mat between two polyester sheets that were adhered to the sink mat frame (see image 3). The increased dimensionality caused by the cockling created some tension within the sink mat to hold the document in place. Polyester strips attached to the sink mat frame could also be used across flat corners or portions of the document to secure it within the opening, and hinging cover boards to the sink mat would further increase support of the object. Once in the sink mat, the cockled document could be handled, filed with other evidence, or submitted in court without fear of loss or damage. For items that are cockled and cannot be flattened, or are simply not a priority for more expensive treatment, this modified sink mat is a relatively quick and easy technique. Water-damaged parchment, oval convex photographic portraits, and cockled manuscripts or diplomas are excellent candidates for various types of sink mats. However, polyester should not be used on items with powdery or flaking media such as pastels because of the surface charge retention of the polyester (static cling).

Boxes with Fillers

Every archives uses a standard assortment of boxes, including record center boxes, archival document boxes, and object or flat storage boxes. Almost everything imaginable in an archives will fit in a standard premade box available through a multitude of vendors.[15] Standard boxes are relatively inexpensive and generally accommodate a wide array of typical archives materials, while custom-fit, cloth-covered clamshell boxes with leather labels are expensive and usually reserved for the most valuable items. What many archivists overlook is the middle ground that is increasingly available. This includes affordable custom-fit boxes and standard boxes that are easily fitted to the object. Certainly, stuffing boxes with tissue can serve this purpose easily and economically. However, there are other techniques and materials that better protect the item by preventing movement in general and by eliminating the bumping of heavier items within the box.

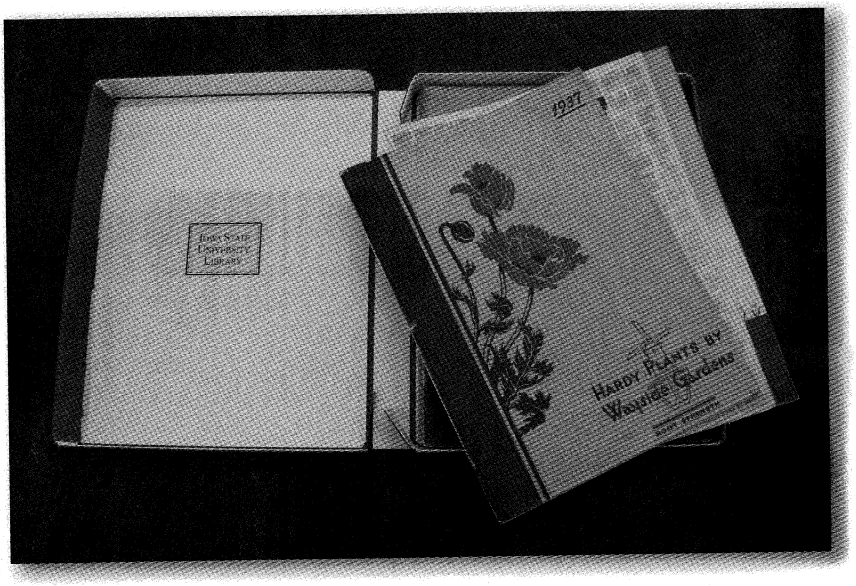

Image 4: Corrugated clamshell box with loose serial issues: *Affordable custom-fit clamshell boxes can be purchased from a variety of vendors by simply providing height, width, and thickness measurements. These can be used to secure loose issues as well as provide protection for bound volumes. (Photo by Michele Christian.)*

Affordable custom-fit clamshell boxes are available from several vendors.[16] These boxes are made of archival fluted corrugated board and are prescored and die cut to the dimensions of a specific object. All one needs to do to purchase these is to measure the height, width, and thickness of the item and send the dimensions off to the vendor with title and call number information. The major drawback is the weight capacity of the box due to the relatively lightweight corrugated board. In the case of large, heavy materials, a stronger solid tan or gray-white board typically used for standard archival boxes is recommended. Unfortunately, there are fewer vendors that provide this option. These custom-fit boxes can easily be used for books that require or deserve more protection due to value, fragility of binding materials, or loose parts such as spines or detached boards. They can also provide better protection and security for individual serial issues that should not be bound (see image 4). These issues may need some treatment or support to be shelved but may not be a priority for such attention. A custom-fit box will provide the security and stability for the loose issues better than a standard pamphlet or magazine box, since it provides a closed microenvironment and does not allow for movement or sagging of the contents.

With a little creativity and the right materials, other hard-to-shelve items can be housed to fit on standard library shelving. Some items may be susceptible to damage, or may cause damage to nearby items, due to their structure or size. These objects may have functional protruding parts such as clasps, bosses, and wire spirals, or decorative, fragile pieces attached, as is often the case with artist's books. Materials used to create the object may also be a concern. Fragile or soft outer materials are easily

damaged during routine shelving, and other materials such as untreated wood or leather experiencing red rot (desiccated leather) cause damage to surrounding items. The size of objects also creates shelving dilemmas, since small items can easily be misplaced among larger items, and can also cause uneven pressure points on neighboring objects. For example, a small book shelved upright next to a larger book will not support the entire surface of the larger book, potentially leading to warping of the latter. Similarly, a small heavy object placed directly on top of a large object may cause an impression and/or warping of the larger object below. For these odd sizes, shapes, and protruding parts, standard and custom-fit boxes fitted with polyethylene foam,[17] corrugated cardboard, or museum board pieces will provide physical protection for the object, and will make the odd-sized or shaped item easier to shelve with other material. These items do not have to be segregated and shelved separately to prevent damage or loss; they can easily be integrated into existing collections on standard shelving.

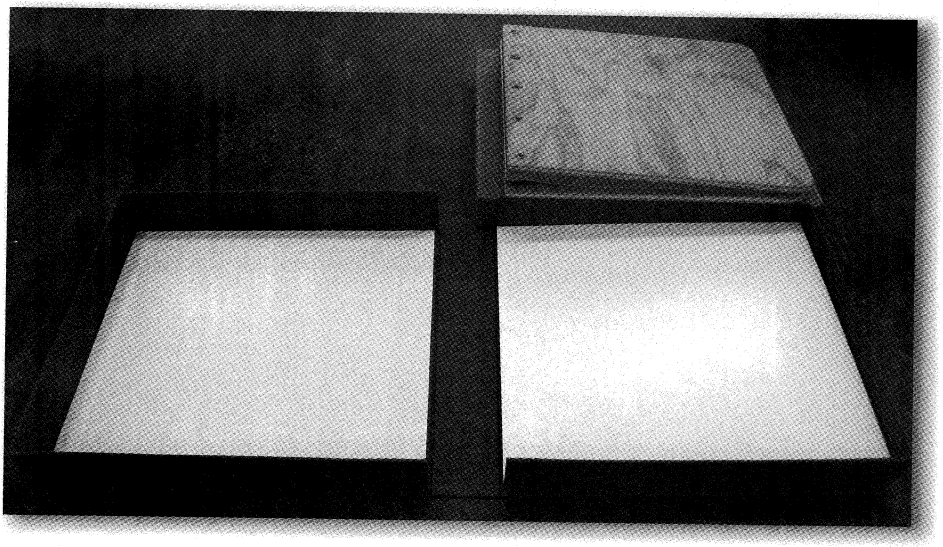

Image 5a: Clamshell box with plinth: *An angled base constructed of museum board accommodates the wedge shape of a book, providing even support and pressure for the book inside the clamshell box. (Photo by Michele Christian.)*

One of the most common adjustments for a book box is an angled base or plinth, usually constructed like a ramp with museum board or archival corrugated board. This can accommodate the wedge-shape of some gapping books, such as those with vellum bindings that may yawn due to the shrinking of the vellum over time (see image 5a). The box provides some pressure on the volume and protection from a fluctuating climate that would exacerbate the problem. Another common insert designed for miniature books or other small objects is frequently made of polyethylene foam. The box is fitted with an insert that contains a space large enough for the miniature to be inserted. It may also have a cloth tab that wraps under the miniature so that when it is pulled, the miniature gently lifts out of its nest (see image 5b). More complicated fillers

for the aforementioned artist's books with decorative materials incorporated into the binding can also be constructed with foam or paperboard shaped to fit the book and accommodate these raised decorative aspects.

Image 5b: Miniature in clamshell: *Polyethylene foam with an opening cut out for a miniature artist's book can be used to fill a standard-sized clamshell box. The miniature can then be safely shelved with the collection without fear of loss or damage to fragile cover materials. (Photo by Michele Christian.)*

The basic concept of an insert can be applied to a variety of problem book structures and adapted to other objects that are difficult to store. Board or foam cutouts can be more creative than a simple opening for the object to rest in, and the filler can be built up or cut out to accommodate any uneven surface.[18] For example, the 1895 death mask of Margaret Stanton is an artifact that the staff in ISU's Special Collections Department brings out frequently for exhibits and tours, especially for grade-school children who find the item fascinating. This plaster cast from the Victorian era is not fragile per se but will shatter if dropped, and is awkward to handle. A customized housing was created for this artifact by layering two four-inch-thick pieces of polyethylene foam together and cutting them down to an appropriately sized support for the mask. The top surface was then cut at an angle to improve viewing. Carving out a crater on this angled surface provided a depression that was custom fit to the underside of the mask. The angled piece that was removed was then carved to fit over the mask for added protection when not on display. Once the bottom support was covered in clean, unbleached muslin, the entire support was ready for a storage box. A custom-sized,

premade archival box, like an archival hatbox, would have worked perfectly in providing a cost-effective and simple storage solution. However, it was decided that the premade box was not quite as attractive as a cloth-covered box, and in the end, an attractive archival box with a drop front and removable lid was designed to support and display the mask (see image 6). The customized angled support in either a premade or cloth-covered box effectively serves two purposes: the mask is properly stored, yet can be used for exhibits without requiring removal or repositioning of the mask for viewing. The mask no longer slides around in an archival box stuffed with acid-free tissue, and can quickly be brought out for display to visiting donors and tour groups.

Image 6: Death mask: *Margaret Stanton's plaster-cast death mask is frequently used by the Special Collections Department for tours and exhibitions. In order to limit handling and address both storage and display needs, a box fitted with polyethylene foam was designed to support the mask at an angle to improve viewing. (Photo by Michele Christian.)*

Standard or custom-fit boxes or portfolios can also be used to secure multiple-object items with mixed formats or sizes. Books, oversized maps or drawings, computer or video storage devices, cards, game pieces, samples, etc. are brought together by the creator, who often intends for these items to be viewed or used together. Separating the pieces in storage based on size or format may make retrieval difficult, and could increase the chances of permanently disassociating the pieces from one another. One way to prevent accidental separation of items is to use polyethylene foam to fill a box or portfolio, securing the various objects in one container and providing flat surfaces to eliminate pressure points for larger items that lie on top; however, this assumes that oversized, flat storage is available. Map collections often have books with large maps folded to fit within the dimensions of the text block. Many of these maps are printed

on thin paper that has become discolored and brittle over time, and folding and unfolding these deteriorated maps causes the paper to break along the folds and easily tear when unfolded. The best solution for these maps is to be removed, flattened, treated, and encapsulated. The book itself can remain on the shelf while the map is stored in a map drawer, or a portfolio can be fitted with a foam support to house the book and map together. A foam sheet the thickness of the book and with the dimensions of a standard portfolio (or of the map itself) can have a window cut to accommodate the book. With the foam support adhered to the portfolio, the book is secure in the foam and the map can be placed on top of the book and foam support. More complicated arrangements are easily accomplished with varying thicknesses of foam and a little ingenuity (see image 7).

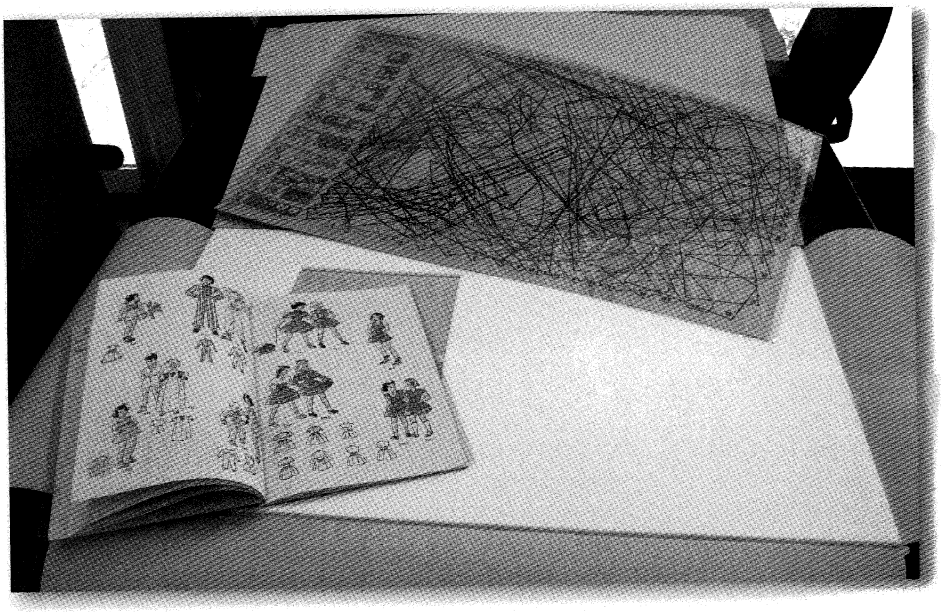

Image 7: Multiple-format housing: *Objects of varying sizes can be nested in foam, with larger flat items placed on top, allowing associated materials to be housed together. (Photo by Michele Christian.)*

Archival Sleeves

The availability of archival-quality plastics such as polyester, polypropylene, and polyethylene in sheets, rolls, folders, L-sleeves, and U-sleeves has opened the doors for archives to develop simple protective devices for a wide array of collections materials. These products are excellent for sleeving photographs and encapsulating maps, and to provide support and protection during storage and handling. Beyond basic sleeving and encapsulation, these plastics can be used in a variety of ways to stabilize and protect other types of archives materials.

Something that all archivists should keep in mind before sleeving or encapsulating items is the acidity of the item. The pH (acid level) of paper is easily tested with a pH pen available through archival supply vendors. Making a small mark on a discrete area of the paper (remember that the mark is permanent) will indicate the pH level through a color change. (Purple indicates a pH 7 or higher, which is neutral or alkaline, whereas yellow indicates a pH below 7, or acidic). Deacidification of acidic paper documents (not photographs or other paper-based materials with media that may interact with the nonaqueous deacidification spray solvent or water in an alkaline water bath) is recommended prior to encapsulation. This slows the paper deterioration process and prevents the buildup of volatile compounds that further the deterioration process within the enclosure. If deacidification cannot be accomplished and the paper item requires viewing on only one side, a sheet of buffered paper (acid-free paper with an alkaline reserve) with the same dimensions as the object should be included in the encapsulation. (Note of caution: do not use buffered paper with protein-based materials such as albumen prints or silk.) If both sides of the paper item must be viewable, a buffered sheet cannot be included. In this case, instead of sealing the polyester sheets on all sides, use L-sleeves, whose two open sides encourage some airflow.

One simple example is the use of standard encapsulation or sleeving techniques on fragile items such as unmounted albumens or cyanotypes, or other thin paper items. This provides the archivist the opportunity to mat items without concerns over hinging techniques that may cause water damage, bleeding of inks, or distortion of the artifact, or unsupported mounting techniques that may lead to sagging of such thin, soft paper items. A small (3" x 2") cyanotype of the Iowa Agricultural College's "Old Main" building was donated to the ISU Special Collections Department. The image had been removed from a scrapbook that was not included in the donation, leaving the unmounted image vulnerable to damage. Due to its size and fragility, the photograph was encapsulated and matted with photo corners to show the entire image—including the edges, since the cyanotype was printed to the edge. The polyester provided support and protected the surface from scratches. The dimensions of the mat (8" x 11") allowed the cyanotype to be housed in a folder within a document box (see image 8.)

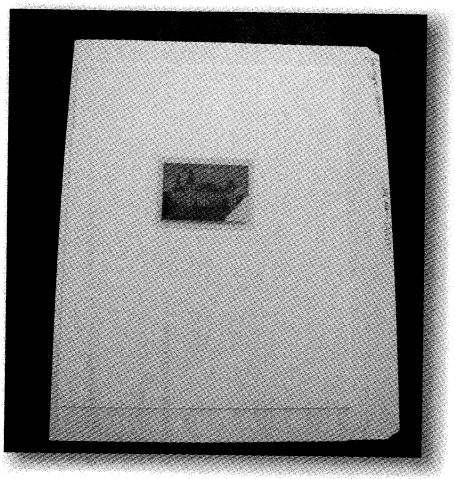

Image 8: Encapsulated cyanotype: *Small images such as this cyanotype can be encapsulated and mounted on museum board so that they are supported and can easily be housed in a folder within a standard document box.*

Scrapbooks also create many challenges for archives: they are often made of less-than-ideal materials for long-term preservation, and contain mixed media including organic material from corsages to hair, and plastics. Overstuffed albums experience stresses on the binding, and over time pages and items become loose. Scrapbooks frequently do not fit on standard shelves. Sticky or "magnetic" photo albums that were popular in the 1970s and still available today are now making their way into our collections. Pressure-sensitive adhesives on the pages have aged and caused a variety of problems, including staining of paper items, powdering, permanent adhesion, or migration or weakening of the adhesive. Some items simply fall out, while others can no longer be removed without damage. The plastic page covers may have turned yellow or brittle and may no longer stick to the album pages. Removal and sleeving or recreation of the pages may require more time and skill than is available or than the album merits in terms of its value to the collection. A stopgap approach may simply be to remove the questionable plastic sleeves and encapsulate the pages with polyester sheets. The loose pages can then be boxed.

As with any scrapbook, prior to undertaking extensive treatment, making a photocopy or digital facsimile of the original is recommended to record the original look and organization of items. The facsimile can also be employed as the use copy. With a high-quality surrogate in place, there may not be a need to treat the scrapbook beyond securing loose items and placing the scrapbook in a drop-front box with spacers that fully support the structure and stop damage to already fragile pages and covers.

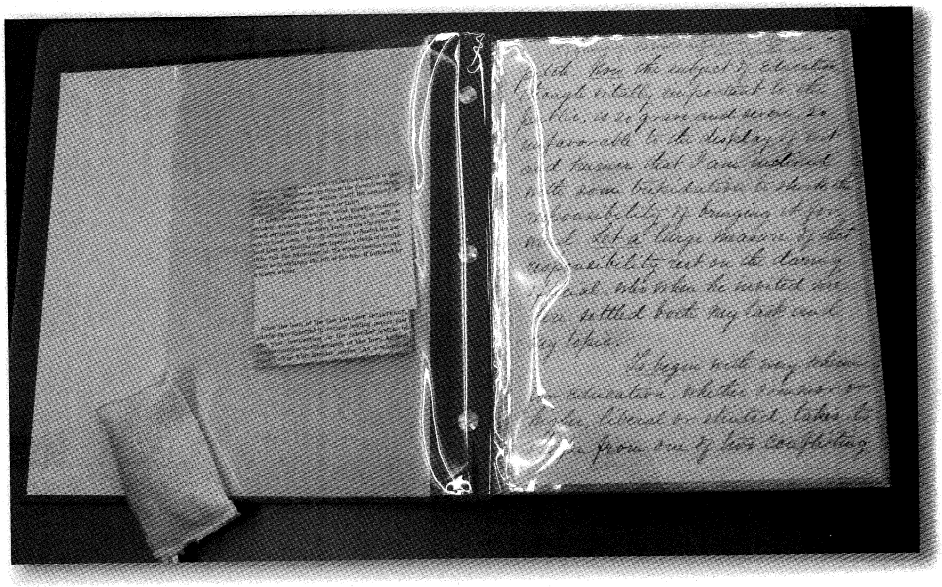

Image 9a: Adonijah Welch speech: *With the clippings removed from the manuscript pages and encapsulated separately, the text of the speech is no longer obscured. (Photo by Michele Christian.)*

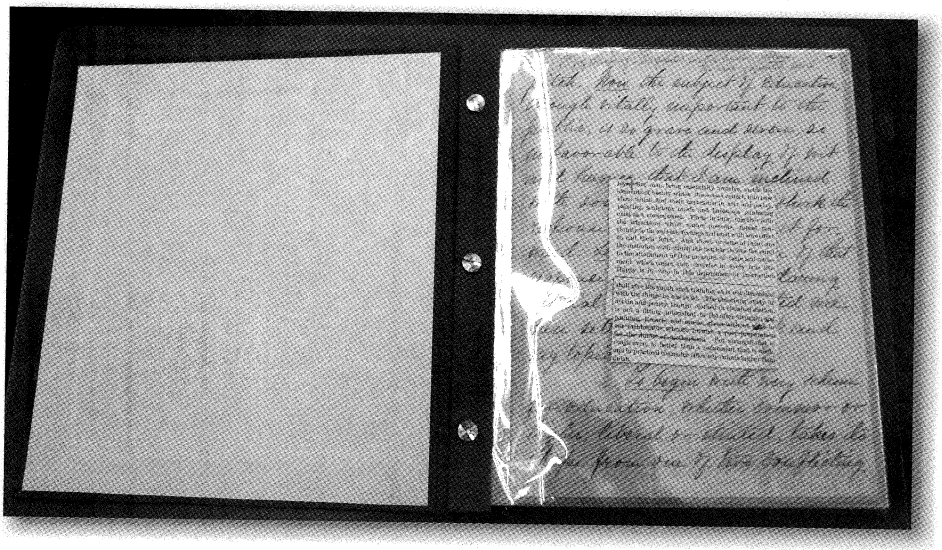

Image 9b: Adonijah Welch speech with overlapping clipping: *Encapsulating the clippings separately allows them to be viewed directly over the manuscript page where they had originally been adhered. (Photo by Michele Christian.)*

In the case of scrapbook or manuscript pages with overlapping or collage-type creations, pages and their layered content can be treated by deconstructing one or two layers, then encapsulating the individual items according to layer and orientation on the page. This is a time-consuming approach that significantly increases the weight and thickness of the scrapbook, and should not be applied to all scrapbooks. It should be used only in cases where the original organization is significant, important information is covered, and certain items need added protection. Some items in scrapbooks will not lend themselves to this technique. Items that are folded and need to be opened, such as cards or pamphlets, obviously cannot be sealed shut. The advantage to this layered encapsulation is in the ability to reveal important text or images and reconstruct the layers as the creator intended, in polyester, so that each layer can be peeled away to reveal the next. A successful use of this technique can be seen in the manuscript of a speech by Adonijah Welch, ISU's first president. Small pieces of printed text had been rubber-cemented onto several manuscript pages, obscuring the text of the speech. The pieces of printed text were first removed from the manuscript by conservation staff and then the manuscript pages were spray deacidified[19] and encapsulated with seals on three sides and a wide binding margin that was left unsealed. Although in-house conservation staff carried out the removal of the printed text, the process as well as other high-level conservation treatments could have been outsourced and the encapsulation performed by in-house archives staff, resulting in a hybrid approach that best utilizes an archive's available resources. The small pieces of printed text were encapsulated in polyester sheets of the same dimensions as the manuscript pages. They were positioned between the polyester sheets and secured in place with spot welds—though small pieces of double-sided tape could have also been used. By floating the piece in

polyester over the manuscript page, the original layout of the page remained intact, but the printed piece could be peeled away to reveal the full text of the speech (see images 9a and 9b). The encapsulated pages were then post bound (see image 9c) and stored in a document box with the archival collection.

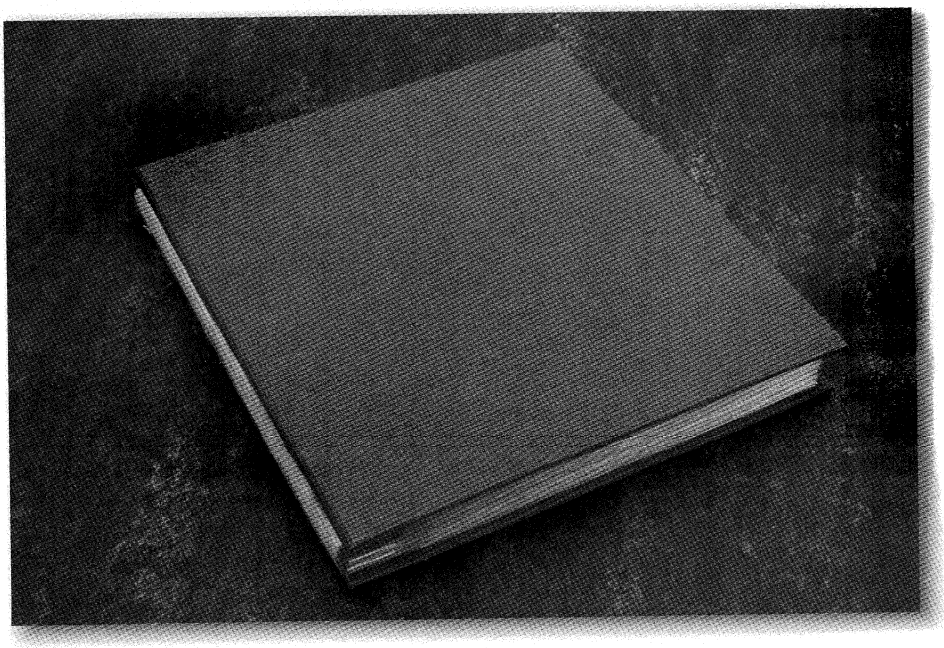

Image 9c: Adonijah Welch speech encapsulated and post bound: *Polyester encapsulated pages can be secured in a post binding. Holes are punched or drilled into the binding margin of the polyester and appropriately sized cover boards so that screw-posts can be inserted to secure the covers and pages together. (Photo by Michele Christian.)*

Archival Wrappers

Various archival-quality plastic sheets can also be used as wrappers. Polyester, polypropylene, and polyethylene sheets are ideal for protecting book covers when the book does not need further stabilization—and, unlike a box, the sheets do not add undue thickness. For books with book jackets, red rot, soft-textured covers, or covers made of potentially damaging materials such as wood or pressure-sensitive adhesives (stickers, old book tape), a simple wrapper will protect the cover of the wrapped book and its neighbors, while still allowing the covers (or jacket) to be viewed. This is also a simple way to protect book covers from labeling practices. The wrapper not only protects the book on the shelf and during handling, but also provides a carrier for call number labels, bar codes, and property stamps, so that these inventory control devices do not damage the object. CoLibri is a system that creates tight-fitting polyethylene

jackets for hardbacks and paperbacks by fusing the edges of the polypropylene sheet together and trimming off the excess materials in one step.[20] Although it requires a special welding machine to fuse the polypropylene sheets together, it is quicker and easier than scoring and folding polyester sheets, and the resulting jackets do not need to be held in place with tape as polyester wrappers do. If the goal is simply to provide a carrier for labels, a polyethylene strip can also be wrapped around a book cover (head to tail) and secured to itself with double-sided tape. Call number labels can then be adhered to the strip. The drawback to this method is that the call number labels are not located on the spine for easy shelf reading, and will be in direct contact with the neighboring book.

Another way to create polyethylene jackets is with a polyweld, which is used to weld polyester for encapsulation.[21] Use the polyweld to weld the polyethylene into a long tube that is as wide as the book is tall and approximately four times as long as the book is wide. One cover is slipped into one end of the tube, the tube is wrapped around the book's cover and spine, and the other cover is slipped into the other end of the tube (see image 10a). The drawback to this approach is that the multiple layers of polyethylene covering the book create a somewhat hazy or less-than-transparent barrier to the cover. However, this same structure can be designed with a paperboard support that stabilizes the volume even if one or both cover boards are detached.[22] The paperboard support is cut slightly narrower than the book and is approximately twice the height plus one thickness. The support is secured to the polyethylene tube between the tube and the back cover, then wraps under the foot of the book and is creased twice to accommodate the thickness of the book. The loose end of the support is creased several more times so that it can easily be flexed to tuck between the front cover and the polyethylene tube (see image 10b). To prevent the text block from sagging, a piece of board the same thickness as the bottom square and the width and thickness of the text block can be adhered to the portion of the support that wraps under the foot; the board must be positioned so that it fits between the front and back boards and does not interfere with the spine or joints of the book.

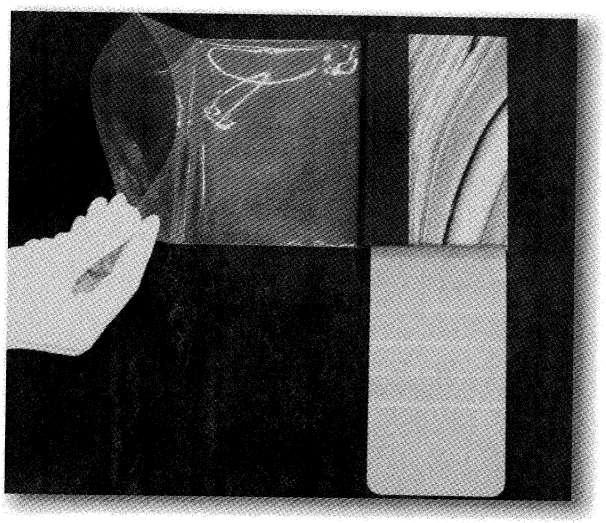

Image 10a: Polyethylene book wrapper with support: *A polyethylene tube can be used to make a protective wrapper. (Photo by Michele Christian.)*

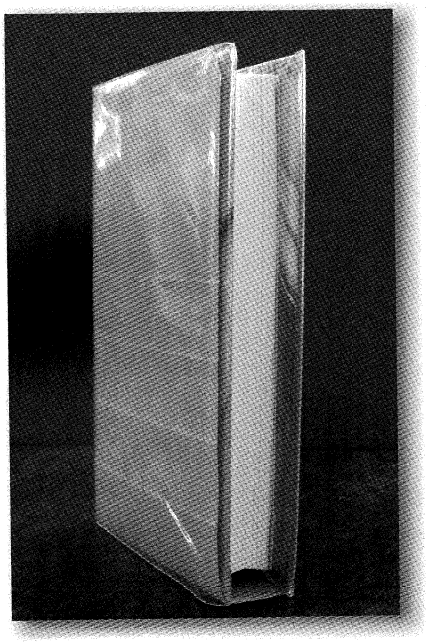

Image 10b: Polyethylene book wrapper with support: *A paperboard support can be added to the wrapper to secure loose boards and provide more stability during shelving. (Photo by Michele Christian.)*

Using Standard Supplies

Another option for archivists working without the assistance of a trained conservator is to use readily available standard supplies, and customize them for specific collection needs. While it is easy to be overwhelmed by the variety of choices available, it is well worth the time to study catalogs and traditional premade containers carefully to determine what works best for problematic documents and objects. The goal is to choose the appropriate housing in terms of size and support—disregarding, if necessary, the fact that the housing might have been intended for a completely different type of object, but also keeping in mind that adding cushioning or wrapping objects with materials such as acid-free tissue, archival foam, polyester batting, or polyester felt or muslin can adjust for slight differences in dimensions. A number of specific examples follow, including potential uses for artifact boxes, pamphlet binders, and other types of housings.

A collection of cased images including daguerreotypes, ambrotypes, cased tintypes, and albumen prints provides a good example of adapting an appropriately sized premade housing designed for another purpose. Originally, the items were stored loose and upright in acid-free folders in archival document boxes. Because there was no support for the images, they moved within the box when the collection was being used or moved. To safeguard the material, a solution was developed using artifact boxes with dividers that were padded with archival tissue to store the cased images flat in a map case. During the rehousing project, the images were also photographed, creating a use copy and allowing for more restricted access to the originals. Thus, researchers had access to a print copy while the original was safely stored away.

The basic pamphlet-binder structure—front boards and backboards joined by a flexible cloth spine—can also be used to solve a variety of simple housing needs. Premade pamphlet binders are available from a variety of library and archival supply vendors. These are not only useful for protecting simple pamphlet structures, but can easily be modified to house thin, flat items. Hinging or adhering a premade archival envelope with a sling (a paper wrapper that fits inside the envelope to protect the item as it is removed from or inserted into the envelope) provides a simple housing that does not alter or mar items such as thin books, loose pages, or article clippings. Adhering one edge of a polyester L-sleeve to the binder, with the sealed edges aligned with the foot and fore edge of the binder, creates a simple flat storage solution for larger flat items that are not easy to handle due to size or fragility (see image 11). For thicker items, a simple four-flap enclosure made of archival paperboard can be adhered to the binder. Premade versions of these storage options are available from vendors in preset sizes, and most vendors can provide custom sizes as well.[23]

Image 11: Pamphlet binder with L-sleeve: *Flat items that are fragile and difficult to handle can be placed in a polyester L-sleeve that has been secured to a standard pamphlet binder. This housing provides protection for the item and easy viewing of both front and back. (Photo by Michele Christian.)*

Other premade structures such as containers for rolled items, textile boxes, clamshell boxes, and photo-storage boxes can all be fitted with fillers, dividers, or padding to provide customized storage for irregularly shaped objects or to solve multiformat collection-storage problems. Vendors have also developed many specific storage containers that solve some shelving difficulties that may otherwise require the purchase of special shelves or drawers. There are boxes for various audiovisual and computer media that make shelving, even within print collections, easier on standard open

shelves. Many of these solutions have developed out of specific consumer requests, so archivists should consider working with archival supply vendors when they have specific, ongoing storage needs. Archivists should feel comfortable asking vendors for samples or suggestions, and should be willing to have a solution custom-made for a specific collections problem.

Conclusion

The three basic structures presented in this article (sink mats, boxes with fillers, and wrappers) are intended to provide archivists with a starting point for solving some difficult storage and handling problems. Although specific examples were provided to help illustrate the use of the techniques, they are not meant to be limiting. The safe and creative application of these concepts will hopefully add to the in-house options archivists have for providing individualized housing, thus improving the physical protection of irregularly shaped or sized artifacts in their collections. Archivists should apply appropriate judgment when dealing with artifacts; their intention should be to house the artifact without causing damage or altering it in any way. The nonconservator can easily apply these techniques using premade enclosures available from a variety of archival supply vendors without requiring extensive conservation training or expensive equipment. By applying various housing methods with a little creativity, the archivist can have a significant impact on the long-term preservation of his or her collections.

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NOTES

1. This article is based on the spring 2006 Midwest Archives Conference presentation "Square Pegs, Round Holes," given by the authors in Bloomington, Illinois, April 28, 2006. It is available electronically at http://www.midwestarchives.org/illinois/MAC_2006_Spring.html. The authors are in no way promoting or endorsing the cited companies and their products over others with similar products, nor are they censuring others through omission. As with all vendors and service providers, it is recommended that references, services, products, and materials be assessed before using any product or service.
2. Mary Lynn Ritzenthaler, *Preserving Archives and Manuscripts* (Chicago: Society of American Archivists, 2003).
3. R. Van Gulik and N. E. Kersten-Pampiglione, "A Closer Look at Iron Gall Ink Burn," *Restaurator* 15:3 (1994): 173–187; Jana Kolar, Jasna Malešic, and Matija Strlic, "Antioxidants for Stabilization of Iron Gall Ink Corrosion," in *14th Triennial Meeting, The Hague, 12–16 September 2005: Preprints (ICOM Committee for Conservation)*, ed. Isabelle Verger (James & James Science Publishers Ltd., 2005): 186–192; Irene Brückle and Jana Dambrogio, "Paper Splitting: History and Modern Technology," *Journal of the American Institute for Conservation* 39:3 (fall-winter 2000): 295–325; Monika Gast, "Paper Splitting: A Problematic but Indispensable Method in Paper Restoration," *Restaurator* 14:4 (1993): 234–252; and Ann Shaftel, "Conservation Treatment of Tibetan Thangkas," *Journal of the American Institute for Conservation* 30:1 (1991): 3–11.
4. For box-making manuals, see *Boxes for the Protection of Books: Their Design and Construction*, compiled by Lage Carlson, John Bertonaschi, Margot Healey, Lynn Kidder, Nancy Lev, Bob Muens, Carol Paulson, and Carrie Beyer (Washington: Library of Congress, 1994); Richard Horton, "Technical Leaflet 4.6: Card Stock Enclosures for Small Books," in *Preservation of Library & Archival Materials: A Manual*, ed. Sherelyn Ogden, (Andover, MA: Northeast Document Conservation Center, 1999): 277–283, also available electronically at http://nedcc.org/resources/leaflets/4Storage_and_Handling/06CardStockEnclosures.php; and "Enclosures," in *Collections Conservation Treatment: A Resource Manual for Program Development and Conservation Technician Training*, compiled by Maralyn Jones (Berkeley: The Library, University of California, Berkeley, 1993).
5. For example see, Helen Lindsay, "Protective Packaging: An Introduction to the Materials Used to Produce Archival Quality Boxes, Folders, Sleeves and Envelopes," *Journal of the Society of Archivists* 21:1 (2000): 87–140; and Sherelyn Ogden, "Technical Leaflet 4.4: Selection of Suitable-Quality Storage Enclosures for Books and Artifacts on Paper," in *Preservation of Library & Archival Materials*, 267–270, available electronically at http://nedcc.org/resources/leaflets/4Storage_and_Handling/04StorageEnclosures.php.
6. For example, see Meg Brown, "Know Your Plastics: Safe Enclosures for Books and Non-book Materials. A Report of the ALCTS Preservation and Reformatting Section Program. American Library Association Annual Conference, Chicago, July 2000," *Technical Services Quarterly* 19:1 (2001): 67–69, and Mark G. Vine and William K. Hollinger, "Active Archival Housing," *Restaurator* 14:3 (1993): 123–130.
7. Ellen McCrady, "Accelerated Aging and the Effects of Enclosure," *Abbey Newsletter* 8:2 (April 1984): 28–29.
8. For example, see Wilma Bouwmeester, "Making a Mount for a Rubber Inflatable Boat," *SSCR Journal* 4:2 (1993), and Mary Gissing, "Absolutely Mardi Gras: From a One-night Stand to an Exhibition," *AICCM Bulletin* 22–23 (1997–1998): 40–49.
9. For example, see Susan Page and Diane S. Nixon, "Storing and Handling Oversized Documents," *Restaurator* 15:3 (1994): 129–141, and Hugh Phibbs, "Paper-based Supports," *Journal of the American Institute for Conservation* 36:3 (1997): 263–267.
10. Kathryn Leonard, "Shelter and Sanctuary: Customizing Protective Enclosures," *Archival Products News* 13:3 (2006): 1–4.
11. Northeast Document Conservation Center, "Technical Leaflet Section 6, Leaflet 6: How to Do Your Own Matting and Hinging," in Preservation of Library and Archival Materials, third edition, (Andover, MA: Northeast Document Conservation Center, 1999): 382–389, available electronically at http://www.nedcc.org/resources/leaflets/7Conservation_Procedures/04MattingAndHinging.php. A variety of mounting options exist, including hinging, corners, and edge strips.
12. Ibid., 381 and 383. Provides basic information on sink mat construction.

13. Coroplast is a proprietary name for corrugated polypropylene board. When a supply distributor uses an unfamiliar term or name, it is recommended that the material be identified. This may require contacting the manufacturer directly.
14. Archival foam core such as Fome-cor is made with an inert, extruded polystyrene core layered between two acid-free and lignin-free paper liners. Mylar and Melinex are proprietary names for polyester sheets. When a supply distributor uses an unfamiliar term or name, it is recommended that the material be identified. This may require contacting the manufacturer directly.
15. For an extensive list of services and supplies see: SoliNet, "Conservation and Preservation Services and Supplies," http://www.solinet.net/preservation/leaflets/leaflets_templ.cfm?doc_id=110.
16. Two companies that are currently making custom-fit clamshell boxes out of fluted corrugated board: Custom Manufacturing Inc. (CMI), http://www.archivalboxes.com/, and the HF Group, http://www.thehfgroup.com/.
17. Ethafoam, Volara foam, and Plastazote are examples of proprietary names for linked and unlinked polypropylene foam used in libraries, archives, and museums. When a supply distributor uses an unfamiliar term or name, it is recommended that the material be identified. This may require contacting the manufacturer directly.
18. Phibbs, 263–267. Provides an alternative to sculpting foam.
19. Spray deacidification was carried out using Preservation Technologies' Bookkeeper Spray Product. This is a nonaqueous deacidification process that leaves an alkaline buffer in the paper and neutralizes acids.
20. For more information, see http://Co-libri.com.
21. One method of encapsulation is to fuse the edges of polyester sheets using a polyweld machine. The polyweld has a long heat element that melts the sheets together along the edges, unlike an ultrasonic encapsulator that uses ultrasonic vibrations to fuse the polyester sheets wherever the stylus draws a line.
22. Carlson et al, "Polyethylene Book Jacket," in *Boxes for the Protection of Books*, 2-11–2-15.
23. Two vendors that currently offer these types of products are Archival Products, http://archival.com/, and University Products, http://universityproducts.com/.
24. Hilary T. Seo and Tanya Zanish-Belcher, "Pitfalls, Progress, and Partnership: Collaboration between Special Collections and Preservation in Academic Libraries," *Collection Management* 30:3 (2005): 3–19.