

## SURFACE PROBLEMS

Problem	Description	Treatment/Prevention
<b>friable media</b>	ink, paint, or photographic emulsion-cracked or powdered, may be separating from support material or show losses of media.	avoid handling if possible. If necessary to handle object, use extreme care, keeping object horizontal, do not put mylar or plexiglas near the surface (the static charge will pull the loose pieces of media from the support material).  Friable media problems require conservation treatment. Call a conservator.
<b>blocking</b>	glossy paper with a clay coating on the surface, often used in art and photography books. Water/high moisture will cause pages to stick together (blocking) and coated paper to stick to glass that it may be touching.  Paint in contact with glass may block.	if blocking is severe, there may be no way to reverse the damage - do not pull blocked areas apart or from glass until first consulting a conservator.
<b>acidic medium</b>	Iron gall ink and verdigris are two examples of acidic writing/coloring materials that cause deterioration of the paper on which they are written. This deterioration can cause areas to weaken and break, leaving holes and losses.	provide adequate support when handling or moving the object and consult a conservator for treatment possibilities.
<b>abrasion</b>	the top layer of the surface is scraped, often changing the surface quality. Can affect all materials in libraries and archives.	protective enclosures are the best protection against abrasion. A simple mylar wrapper will help protect materials against damage from abrasion.
<b>mold</b>	powdery white, green, red, purple or black - three dimensional build-up on the surface of an object. Isolate mold infested items from the rest of the collection. Old, inactive mold leaves stains of varying colors, with support material weakened.	a soft brush can be used to sweep the mold off the surface. Do this away from other materials (in a separate room or out of doors) to insure the mold spores do not infect other objects (see "environmental problems" - vermin)
<b>light damage</b>	(see "ENVIRONMENTAL PROBLEMS" - light/photochemical)	
<b>surface deposits</b>	dirt, soot, and insects and rodent droppings and stains that interfere with the visual quality of an object. Fly specks are black dots on the surface.	dirt may be removed by brushing or dry cleaning and washing. Deposits from insects can be carefully removed using a tweezer to lift them off the surface. (see "environmental problems" - vermin)

## SUPPORT PROBLEMS

Problem	Description	Treatment/Prevention
<b>holes/losses</b>	vermin, handling, storage and problems in the manufacturing processes are major causes of holes and losses. These missing areas can occur in all materials found in archives and libraries -- leather, vellum, paper and textiles. See ("surface problems" - acidic media)	In most cases, conservation treatment can correct the problem, especially if the missing area makes the artifact more vulnerable to further damage. Prevention involves environmental controls and good handling and storage practices.
<b>tears/punctures</b>	tears and punctures are common problems often caused by handling or flaws in the manufacturing process. All materials found in archival collections are vulnerable to tears and punctures.	Conservation treatment can correct most problems. Prevention involves good handling and storage practices
<b>embrittlement</b>	embrittlement, loss of flexibility, is usually accompanied by discoloration. Embrittlement can occur for a number of reasons. Some paper, leather, vellum and cloth are composed of materials that deteriorate rapidly. This is called inherent vice. A good example is newsprint. Embrittlement can also be caused by environmental conditions (see "environmental problems" - pollution).	Embrittlement is a vast problem affecting many materials from the mid-nineteenth century to the present. Much work is being done on mass deacidification and large programs have been set up to microfilm and photocopy brittle materials.
<b>distortion</b>	(see "DISTORTION")	

# ENVIRONMENTAL PROBLEMS

Problem	Description	Treatment/Prevention
<b>light/ photochemical</b>	<p>fading- inks, paints dyes lighten in color, extreme cases of almost complete loss of color - breakdown of organic material.</p> <p>shift in color - often seen in leather and cloth dyes and watercolors - one component of the color mixture is more fugitive, fades quickly and results in a different color than the original.</p> <p>browning - chemical reaction causing browning of the paper. High light level combined with low moisture content can cause rapid embrittlement in paper</p>	<p>once damage has occurred, there is little that can be done, UV shielding materials on windows, lighting, cases and frame glazing is the best prevention.</p>
<b>temperature/ humidity</b>	<p>cycling - repeated raising and lowering of temp/humidity can cause materials to become out of plane (see "distortion").</p> <p>dryness - combination of low humidity and high light levels/high pollution levels, causes rapid embrittlement (see "support problems" - embrittlement).</p> <p>moisture - causes cockling, mold growth, limpness and distortion of plane.</p>	<p>the best protection against environmental problems is both complicated and expensive. However, this is an area of conservation that is the most cost effective. Generally speaking, the better the HVAC system, the safer the collection.</p>
<b>pollution</b>	<p>smoke, smog, particulates, salts (marine air) - gaseous pollution combines with moisture in the air to form acids which are deposited on materials, this leads to embrittlement, discoloration, deterioration and ultimately loss. Particulates are deposited on the surface of exposed materials causing discoloration and abrasion.</p> <p>off-gassing of solvents and caustics from new poured concrete, raw woods, paints and finishes and laminated woods .</p>	<p>pollution problem prevention is involved with the HVAC system. Filters remove the particulates and cleaners wash the gaseous pollutants from the incoming air.</p>

## ENVIRONMENTAL PROBLEMS, CONTINUED

Problem	Description	Treatment/Prevention
<b>vermin</b>	<p>insect damage, evidenced by holes, insect casings, loss of materials and deposits, some insects leave deposits in their path.. Fungal problems (mold)- caused by a combination of high humidity and high temperature.</p> <p>rodent problems can occur in any building, especially historic buildings. Food in storage areas is an attractant to rodents.</p>	<p>it is important that there is a determination of a new infestation. Materials infested need to be isolated from the rest of the collection. Traps, checked frequently will show if there is an insect or rodent problem.</p> <p>Development of an IPM (Integrated Pest Management) program helps in the identification of problems.</p> <p>Control of the environment will help in controlling mold problems. Good housekeeping measures help to control all vermin problems.</p>
<b>disaster</b>	<p>flood, earthquake, tornado, fire, hurricane - generally the greatest damage in all disasters is the effects of water.</p>	<p>all institutions need to have a disaster plan with staff members assigned specific duties. In a disaster involving large amounts of materials, it is imperative that conservators trained in disaster salvage are called.</p>

# DISTORTION

Problem	Description	Treatment/Prevention
<b>cockling</b>	"bumpiness" of the support material. Laminated materials which are cockled may incur damage from the tension of the cockled areas causing cracking/loss of the medium on the surface. Framing of cockled materials may cause further damage from blocking or abrasion.	humidification and flattening may help to put the object back into plane.
<b>wrinkles/creases</b>	some wrinkles/creases are the result of the manufacturing process. Others result from poor handling, sometimes in combination with poor environmental conditions. Wrinkles and creases can cause surface media to crack, chip and flake. They also may distort the image and may be easily abraded.	humidification and flattening may help to put the object back into plane. There may be evidence of a hard crease even after flattening due to the damage of the paper fibers in the creased area.
<b>warp</b>	stiff, thicker materials may develop a warp due to storage/environmental conditions. As with cockling, tensions can cause damage to the surface if the support material is warped.	humidification and flattening may help to put the object back into plane.
<b>rolled materials</b>	traditionally maps and architectural drawings have been rolled for easy storage. Over time, rolled materials hold tight to the rolled shape, making it difficult and risky to unroll the object. As with cockling, tensions can cause damage to the surface if the support material.	humidification and flattening may help to put the object back into plane. Flat storage in folders, housed in flat files is the preferred storage solution.
<b>fire damage</b>	in addition to the smoke and soot damage from a fire, the heat can cause charring and shrinkage in some materials. Skin materials, vellum and leather, are very vulnerable to heat damage and are easily distorted by heat.	once skin materials have incurred heat damage, there is little that can be done to eliminate the distortion. Paper and textile materials may be repaired and flattened if necessary.

# STAINS

Problem	Description	Treatment/Prevention
<b>foxing</b>	round spots, sometimes a dark center point, with a lighter stain radiating outward. The causes of foxing are not completely understood.	some foxing stains can be removed by bleaching. Materials that are in contact with foxing stains may benefit from interleaving to keep the stains from migrating.
<b>handling</b>	oily, random staining, often seen in the corners where materials have been handled.	removal of handling stains is often difficult, requiring conservation treatment using solvents and subsequent washing.
<b>water stains</b>	water stains are caused by the wetting of an object and the movement of dirt and sizing materials. The dirt and size move to the dry areas and then stop creating a dark, uneven line, called a tide line.	washing will often remove much of the dirt from tide lines. Some tide lines cannot be removed or the dark line reduced. This requires the attention of a conservator.
<b>acid migration</b>	discoloration from direct contact with acidic materials. Often seen in bound volumes, where paper pastedowns and flyleaves are against leather turn-ins and are browned and brittle from the acid.	removal or isolation of the acidic material will stop the acid migration. However, there is little one can do to reverse the damage.
<b>inherent vice</b>	Some paper, leather, vellum and cloth are composed of materials that deteriorate rapidly. Newsprint, iron gall inks, chrome tanned leather are examples of materials that deteriorate rapidly.	little can be done to slow the deterioration of materials produced of poor quality materials. Controlling the environment, limited handling and repair of damage will help slow deterioration.
<b>adhesive stains</b>	some adhesives cause staining and embrittlement. Animal glues may turn brown and cause staining. Pressure sensitive tapes have adhesives that brown and stain over time. Adhesive stains, can often be identified by the adhesive residue left on the surface.	a conservator may be able to remove stains with solvent treatments and washing.
<b>biological/mold</b>	(see "SURFACE PROBLEMS"-mold)	some mold stains may be lightened by washing. Stained areas may be very weakened and require mending and strengthening.  (see "ENVIRONMENTAL PROBLEMS" - vermin)

# BASIC CONSERVATION GUIDELINES

KATHLEEN ORLENKO

## OFF THE SHELF

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**handling/use**

damage from handling is often avoidable if care is taken. Hands need to be clean to avoid staining. Supports should be used especially with fragile or easily damaged materials such as brittle paper, items with tears/losses, fragile media and very limp materials. Mylar, foam core and rag mat board are all good support materials.

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**exhibition**

Light is the greatest danger to items on exhibit (see "environmental problems" - light/photochemical and temperature/humidity). The effects of light exposure are cumulative, the longer exposure, the greater the damage. Rare materials should not be left on permanent or indefinite exhibit. Supports for items on display need to be constructed of materials which are inert and non-abrasive. Exhibit items need to be secure, not subject to handling or touching by visitors, falling off walls, or being damaged by other items or exhibition supports. Framed items need to be matted and framed following conservation standards.

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