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### Ounce of Prevention: Care and Conservation of Works of Art

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AN OUNCE OF PREVENTION . . .

Care and Conservation of Works of Art

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BOWDOIN COLLEGE MUSEUM OF ART  
Brunswick, Maine

April 21 - June 24, 1979



## GLOSSARY

Though useful as a general reference, this Glossary is designed to augment information appearing on the exhibition labels. Terms on the labels which are in caps and are underlines appear, with more in-depth information, in the Glossary. Synonyms for glossary terms appear in capital letters within definitions below.

- ABRASION - The loss of finish, paint, or ground by mechanical rubbing or solvent action. Also applies to damage caused by the rabbet of a frame where it is in contact with the painting.
- ACCRETION - Accidental deposit of extraneous material on the surface of an object including pencil or pen marks, splashes, FLYSPECKS, fingerprints, drips or any other FOREIGN MATTER.
- BATTEN - A strip of wood attached to an object for reinforcement (also called CLEAT).
- BLEEDING - The dispersion of color into surrounding areas and materials often caused by exposure to water or solvents.
- BLISTER - 1) A convex bulge or separation of layers in the paint surface or coating layer, usually caused by excessive heat, solvent action, or both.  
2) The term is often used to describe BUCKLED CLEAVAGE.
- BLOOM - A bluish-white or sometimes yellowish cloudiness of the varnish film. Local bloom may result from handling. BLANCHING is distinguished from bloom, although they are sometimes confused. It is the change which occurs in old resinous or oil films when a solvent has been on them and has evaporated, removing some of the binding and leaving a milky appearance.
- BUCKLING - 1) The appearance of waves or bulges in a canvas that has slackened on its stretchers (also called COCKLING).  
2) A rupture in paint or ground layers produced by compression forces. See BLISTER and CLEAVAGE.
- BULGE - Appears as a raised area of the support and paint layer caused by a blow or pressure from the reverse of the object.
- BURNED - An object that has been exposed to a fire, excessive heat, photographic lights, or from concentrated sunlight. Paint can be blistered, paint and support can be charred, scorched, singed, or smoke damaged.
- CHALKING - The loss of the paint layer by powdering off. This is the result either of an insufficient quantity of binding medium in the paint as originally applied, or a breakdown in the binding medium as

a result of damage or deteriorating conditions.

- CHECK - A partial split in the wood, running along the grain of a board, panel, or carving. See also SPLIT.
- CHIP - A small piece of material which has broken away from the object.
- CLEANING - The careful, professional removal of surface grime and old varnish and retouched areas with tested solvents, after close technical examination of the object.
- CLEAVAGE - Separation between any of the layers in a stratified construction. In painting, a division parallel to the surface in the paint, ground, or support, or between two of these layers (also called LIFTING). INCIPIENT CLEAVAGE is the beginning of a separation, layers lifting up but not yet free. BUCKLED CLEAVAGE (also called TENTING) is a rupture in paint or ground layers caused by compression forces (see BLISTER). BLIND OR FLAT CLEAVAGE is interlayer cleavage (between layers of paint or between the paint and the support) which is not open to the surface.
- CORROSION - Chemical changes which take place in metals as a result of environmental agents (moisture, pollutants, airborne chemicals), or deliberately applied chemical agents. Corrosion varies from a pale green patina, changing the metal in color and slightly in texture, to highly textured encrustations (efflorescence) built up on metal surfaces.
- CRACKS (CRACKLE, CRAQUELURE) - In grounds, paint layers, and surface coatings, the term designates the system of cracks which develops in one or all of these layers on the drying or aging or distortion of materials. Several types are distinguished. FRACTURE or AGE CRACKS: Aged, brittle layers may fracture to form cracks with sharp edges and fine apertures. SHRINKAGE, TRACTION, or ALLIGATOR CRACKS: Produced by shrinkage in a rapidly drying upper layer lying over a slow drying still plastic underlayer. The pattern is a characteristic complex branching in which the edges are rounded, sloping to a relatively wide aperture. MECHANICAL CRACKS: Fracture lines that result from a blow or a dent and usually assume a cobweb-like pattern (CONCHOIDAL, SIGMOID) or those resulting from a scratch or rub which have feather lines (HERRINGBONE CRACKS).
- CRADLE - A brace of wood or metal ribs and crosspieces attached to the back of a painted wooden panel to reinforce it and to prevent warping and cracking. The members which run parallel to the grain are usually glued and are termed "fixed." The members running perpendicular to the grain are usually loose and are termed "sliding."
- CRAZING - A very fine system of cracking in the varnish or paint film which appears slightly opaque to the eye. It is found in aged films which

are very dry and are approaching their final states of embrittlement. It can powder off.

- CREASE - A line where the object has been folded at one time. A **STRETCHER CREASE** is a line where the stretcher has pressed against the back of the painting causing the outline of the inside shape to show up on the surface of the painting.
- CUPPING - When the edges of the paint film along cracks are curled or raised. It often leads to **CLEAVAGE**.
- DENT - Concave depression in the surface of a work caused by a blow or the pressure of another object placed against it.
- DESSICATED - The deterioration of a paint film or support because of lack of moisture.
- DETACHED FROM MAT - When the hinges on works of art on paper have become detached, resulting in the work's slipping in its mat or frame.
- DISCOLORATION - A change in the surface coating, paint, or support due to natural aging or external factors (includes **DARKENING**, **YELLOWING**, **STAINING**, and **FADING**).
- DISTORTION OF PLANE - A change in the two-dimensionality of the object due to mechanical or environmental factors. See **BUCKLING**, **DENT**, **DRAW**, **SAGGING**, and **WARP**.
- DRAW - A ripple or parallel ripples radiating from a corner of a stretched fabric, or parallel ripples running into a stretched fabric from an edge, usually caused by uneven tension.
- FADING - Applies to pigments which are impermanent and lose their tinting quality, or to supports which change their original coloration.
- FILLING - The material or process of adding putty or wax to areas of paint loss. These are usually then inpainted. Fillings can fall out or protrude.
- FLAKING - The loss of small islands of one or more layers of paint, sometimes including the ground, in conjunction with **CLEAVAGE**.
- FOXING - The pattern of brown, black, or orange spots on paper. The spots are stains caused by the decomposition of mold and micro-organisms which feed on the impurities in cellulose.
- FRAMING - Usually considered something which offsets the object from its surroundings. It is also used to protect the object from physical damage due to mechanical or environmental action and to ease the handling of the object.
- FUNGUS (MOLD or MILDEW) - A plant which sometimes grows in the paint layer or

the support or lining adhesive. It requires heat and high relative humidity.

- GOUGE - Implies that material has been scooped out or displaced.
- GRIME - Dirt of any kind, including soot, fingermarks, smudges, and dust.
- GROUND - A layer of material applied to prepare a surface for painting. Usually one or more layers of pigment in binding medium. Also PRIMING, GESSO (correctly applied only to the white, plaster-based ground on early panel paintings).
- HOLE - A loss in both support and medium. (PINHOLE: A tiny puncture such as could be made by a pin, pencil point, etc. ).
- HYGROSCOPIC - A term applied to materials such as wood, paper, bone, ivory, textiles, clay, etc., which are capable of absorbing moisture. When atmospheric conditions fluctuate, the amount of moisture within hygroscopic material varies accordingly. When the environment is moist or excessively humid, such materials swell or expand; when dry, the air extracts moisture from these materials resulting in cracking, warping and shrinkage.
- IMPASTO - Thickly applied paint, especially with pronounced brushwork. Often a trouble spot: look for cleavage, sagging, or flattening due to a lining process.
- INHERENT VICE - Characteristics or certain circumstances of the manufacture of materials, or the combination of essentially incompatible materials, such as paper and oil paint, which lead inevitably to deterioration.
- INPAINTING - Introduction of new paint into areas of loss in the original paint to restore design continuity. Opposed to OVERPAINT, which is new paint not restricted to areas of loss.
- INSECT DAMAGE - Covers a variety of deterioration caused by insects and larvae. Including: WORMHOLES, TUNNELING, SILVERFISH ATTACK, NESTS, FLYSPECKS (excrement).
- INSERT - Replacement of a loss in the support of a work by insertion of a piece of similar material.
- KEYS - Wedges applied to slots at the inner corners of stretchers and used to tighten the canvas by expanding the stretcher. Newer types of stretchers have replaced the key system by expansion bolts or spring mechanisms.
- LINING - Strengthening of a deteriorated original support by application of a strong new layer of material to the reverse. Adhesives used include aqueous ones (glue, paste), wax and wax-resin mixtures, and



synthetic resins. RELINING: Replacement of one lining with another. STRIP LINING: Temporary measure sometimes used to strengthen only the tacking edges of a canvas by application of strips of fabric. MOUNTING: The application of a solid reinforcement to a flexible original support (e. g., aluminum or hollow-core panels to canvas, cardboard or ragboard to paper, etc. ).

- MOLD/MILDEW - Fungi which thrive in moist, dark, undisturbed environments. These fungi are nourished by the sizing or paper fibers of a sheet and significantly weaken it. Mildew is a whitish coating or discoloration; mold is a furry coating. Mold and mildew can result in staining or foxing. If relative humidity is maintained below 65%, mold cannot survive.
- MOISTURE BARRIER - Any material of low moisture permeability applied to or around an object to retard the passage of moisture to or from it. Also: VAPOR BARRIER.
- MOUNT - An auxiliary support attached to structurally weak objects of paper or textile. Mounts on paper are adhered throughout, while textiles are sewn to a mount.
- PAINT - Powdered pigment suspended in a film-forming medium such as oil, glue or resin.
- PAINT LOSS - A missing area in one or more layers of a painted surface. Also: LACUNA(E), VOID. Specific terms often used: GOUGE, CHIP, FLAKE, ABRASION, etc.
- PATCH - A local reinforcement of a tear or hole. Although an adequate temporary measure, a patch can apply tensions which cause it to become obvious and which may in time lead to structural insecurity.
- PENTIMENTO - The appearance on the surface of a painting of an earlier design area which the artist had covered with final paint layer(s). This is a result of the increasing transparency of paints upon aging.
- PITTING - The breakdown of metals in an alloy under certain conditions, causing surface pits.
- SAGGING -  
1) A distortion of plane in a fabric support in response to excessive weight.  
2) A distortion of paint conformation caused by the response of still-plastic films and impastos to gravity. Also: STREAMLINES.
- SCRATCH - Linear lesion in or on the surface of the work, usually caused by a fine-pointed object.
- SIZING - A dilute solution of a gluey or resinous substance applied to a surface to reduce its absorbancy and improve its reception of paint or other coatings. Canvasses are usually sized before



priming (ground application); paper is almost always sized in manufacture.

- SPLIT - A rupture in wood running along the grain and causing a complete separation. See also CHECK.
- STAIN - A discoloration caused by an agent which has penetrated a porous surface. TIDE LINES: The borders of a stain, being the furthest extent of penetration and usually showing deposits of material carried along by the penetrant.
- STRETCHER - The wooden frame over which a fabric support is stretched, if the frame is equipped with joints which allow dimensional adjustment. If the frame cannot be expanded because the joints are fixed, it is called a STRAINER. The type of joint used and the type of expansion device are important clues to time and place of manufacture.
- STRETCHER CREASE - Creases or lines on the painting surface which follow the inside edges of the stretcher, caused by flexing the fabric against the stretcher. To avoid this condition it is advisable never to store paintings flat except in emergency situations.
- SUPPORT - Any material such as fabric, wood, metal, paper, etc., on which a work of art is executed. In a painting, the physical structure which holds or carries the ground, paint film, and surface coating. Usually divided into PRIMARY SUPPORT, the original canvas, paper, wood or whatever; SECONDARY SUPPORT, lining or reinforcement of this layer, and AUXILIARY SUPPORT, stretcher, strainer, or cradle.
- SURFACE FILM (COATING) - A transparent protective coating, often of varnish or wax, applied over a paint film. In traditional oil painting technique, such a coating serves to make surface reflection uniform and to saturate the colors for maximum brilliance. In examination, record: uniformity and degree of gloss, transparency or opacity, color, brittleness or tackiness, apparent deterioration or damage.
- TACKING EDGES - The extremities of a fabric painting support which are turned over the auxiliary support and serve as a means of attachment.
- TEAR - A rent or cut in the support with attendant damage to the design layers. Also: SLASH, CUT.
- VARNISH - A clear, colorless film applied to painting surfaces as a protective coating against atmosphere and grime, thus alleviating the need for glass on most painting frames. Varnish also works to equalize reflective surfaces. Eventually varnish will age and no longer provide this protection, at which time it should be removed and a new coat of varnish applied.
- WARP - The bending, arching, or twisting of a support that should be flat,

as a result of unequal tensions in the structure. Also: BOWING, DISTORTION OF PLANE.

WATER DAMAGE - Deterioration caused by flooding, soaking, condensation, or even high humidity. Water can dissolve many binding and sizing media, causing breakup of laminate structures (CLEAVAGE, FLAKING). It can cause dimensional reactions (WARPING, SHRINKAGE, etc.). In resinous films, water may bring about opacity (BLANCHING, BLOOM) or partial decomposition. Moisture encourages fungus and insect attack, which can be considered by-products of water damage. STAINING and TIDE LINES are other evidence of water damage.

WRINKLING - Irregular ridges and furrows formed in a paint or varnish film upon aging, when improper methods or faulty materials have been used. Usually related to the flow of a non-drying medium or to loss of volume in the film through evaporation. SAGGING and STREAMLINES are related phenomena, but are more related to the flow of undried paint in response to gravity, rather than to internal shrinkages.

We are grateful to the staff of the Williamstown Regional Art Conservation Laboratory, Inc., who compiled this excellent glossary and authorized its usage for the exhibition.

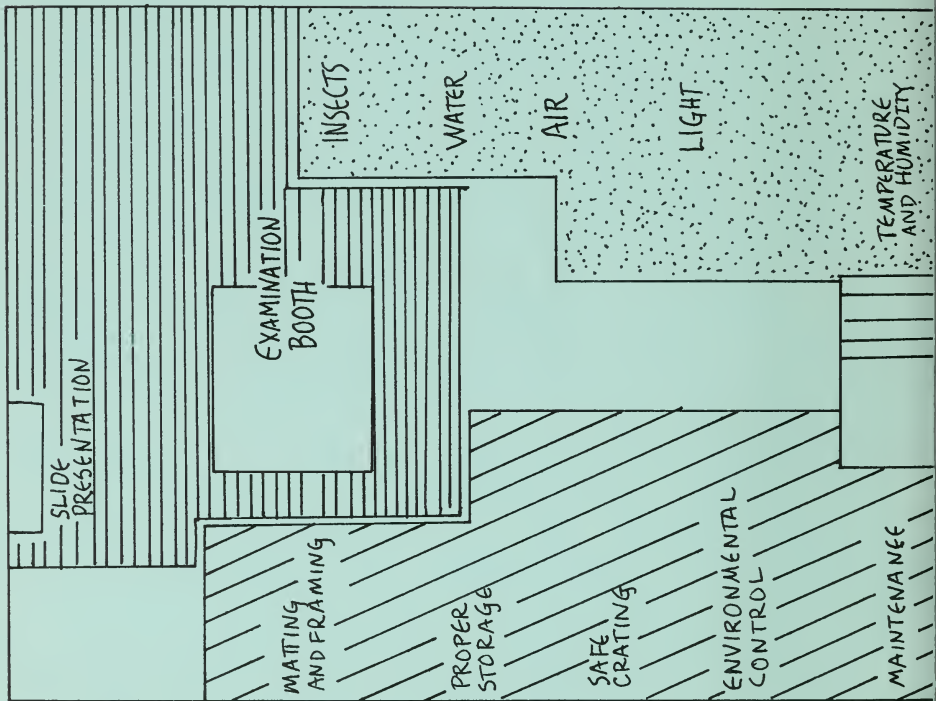


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FLOOR PLAN

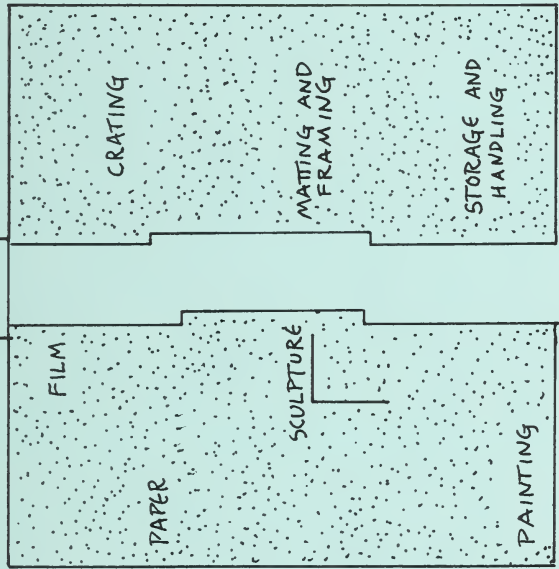
PART 3:  
PRESERVATION  
METHODS:  
PREVENTION OF  
DETERIORATION



PART 2: CONSERVATION:  
EXAMINATION AND  
TREATMENT

1C. ENVIRONMENTAL  
FACTORS

# PART 1: CAUSES OF DETERIORATION AND DAMAGE



1A. AGING AND  
INHERENT VICE

1B. IMPROPER HANDLING  
METHODS

FLOOR PLAN  
AN OUNCE OF PREVENTION... Care and Conservation of Works of Art





## GUIDELINES FOR PRIVATE COLLECTORS

The following guidelines are intended to provide the public with general information regarding the care and handling of objects. It should be emphasized that a professional conservator should be consulted when complex or severe problems relating to the condition of art objects are encountered. As a result of diverse training methods and experience, conservators/restorers vary considerably in technical competence and philosophy. As irreparable damage can result if an object is not treated properly, it is recommended that an area museum be consulted regarding the selection of a conservator.

### A. PAINTINGS

Do not hang paintings above radiators, heat registers, stoves or fireplaces. These areas are often dirty and have extreme and frequent temperature fluctuations.

Use only the length of picture wire necessary. Excess wire bound behind the painting can severely damage the paint surface.

Never carry a painting by the top of the frame or stretcher. The pressure is more evenly distributed if the painting is carried by holding both sides of the frame.

If you plan to take a painting down and store it, remove screw eyes, wires and other hanging devices to avoid causing damage to other paint surfaces or abrasion of frames with which the painting may come in contact. If it is necessary to stack one painting against another, separate them with cardboard.

Always use screws rather than nails in frames. Driving nails into the frame and removing them can cause excess shock to the painting.

### B. PRINTS, DRAWINGS, WATERCOLORS, AND PHOTOGRAPHS

Correctly framing works on paper is an important conservation technique. A framer should be instructed to use only quality materials, and framing methods should be carefully discussed. To double check on a framer's work, to give him specific instructions regarding procedure and materials, and to pay a little extra for materials of conservation quality are important prevention measures which prolong the life of the paper object by many years. Much of the damage done to paper is a direct result of ignorance or negligence in handling, all of which can be avoided easily.

Works on paper are most safely stored or displayed in mats hinged with a window cover, which protects the object and gives it additional structural support. Mats can, however, be dangerous and must be utilized with care. Mats made of normal wood pulp paper contain acid which is detrimental to fine paper, rendering it brittle and discolored, and causing structural weakness. Pre-nineteenth century paper is made from cotton or linen rags which do not contain acid. Therefore, it is the very old paper which, given proper care, is the strongest. Paper objects dating from the nineteenth and twentieth centuries may be made from wood pulp and inherently acidic. These papers will deteriorate much more rapidly than rag. Either type of paper is much safer in a mat made of 100% rag, or a new type of wood pulp paper which is manufactured without acid. This paper is more expensive and, unless asked to do so, a framer may not choose to use it. It is imperative that you request acid free or rag mat board if you want to preserve your art.

Hinges are used to adhere the work on paper to the mat. Never use or allow the use of any self-adhesive or pressure-sensitive tape as a hinge. The glues used in scotch or masking tapes are insoluble, become brittle and acidic with age, and leave dark stains on the paper, rendering it almost transparent. The correct way of hinging a work on paper is with Japanese long-fibered paper (of a weight comparable to that of the support) adhered with wheat starch paste which has been treated with fungicide (thymol). Wheat paste is non-acidic and is easily soluble. Supports which have been mounted a number of times may have a buildup along the upper edge of various hinging materials -- linen tape, masking tape, wood pulp paper tape, rubber cement, etc. -- which should be removed only by a conservator, since serious damage can be done to the paper if untrained hands try to clean it.

During the framing process, the frame should be thoroughly dust-proofed by taping the glass into the frame. The backing (the material placed behind the acid-free mount, usually foamcore or corrugated cardboard) should also be taped to the frame after it has been secured in place with corrosion-resistant brads.

In the past, backings were often pieces of wood attached to the reverse of the frame. If this condition exists, it should be changed as soon as possible. The high acidity in wood migrates through the mount and can acidify even very fine paper. Wooden backings also cause permanent stains as a result of this acidity. A drawing or print backed with wood may show dark brown ghosts of wood grain, knots, or seams. Any wooden backing should be replaced with cardboard or foamcore.

When a paper object is framed, it should never be in direct contact with the glass. The window front of the mat will provide sufficient "breathing room" to keep the paper off the surface of the glass and to prevent abrasion.

Works such as pastels, charcoal drawings and soft pencil drawings, liable to smudge, are much safer if kept framed, as the slightest rubbing against another object will shift or remove the medium. When framing the object, use glass; plexiglas contains so much static electricity that particles of medium will migrate toward it, and off the paper.

The importance of protecting works on paper from excessive sunlight or artificial light cannot be overstated. The heat from such exposure speeds up any normal chemical reactions, deteriorating the paper at a much faster rate than would occur through normal aging. The ultraviolet rays present in large quantities in sunlight and fluorescent light embrittle paper and accelerate deterioration, resulting in the fading or darkening of a work of art or its medium.

Watercolors are particularly vulnerable to the heat and fluorescence of natural or artificial light. They should not be displayed for years on end. Rather, they should be retired for several months at a time to avoid destruction.

Paper objects, in or out of frames, should be checked periodically for mold growth. A dry environment inhibits the development of fungi, which can seriously damage a work of art. A damp climate invites not only mold growth but also insect infestation, which must be monitored carefully. Silverfish thrive on the adhesives in paper, and their presence may disintegrate the paper considerably. Worms leave actual holes and tunnel-like paper losses. FOXING should also be monitored, as permanent stains develop from this condition.

## C. SILVER AND OTHER METAL OBJECTS

Silver reacts with sulphur in the air, as well as with other agents, and develops a film or deposit of tarnish. There are, however, measures which can be taken to minimize or to deaccelerate this process.

Handle silver as little as possible. Wear white gloves as fingerprints leave discoloring deposits on silver which accelerate the oxidation process. If this condition is left untreated, the silver actually can be eaten away in the location of the fingerprint.

Pure metallic silver, combined with sulphur or chlorine from the atmosphere, forms a surface layer of salts, referred to as tarnish. Rubber and rubber by-products, including latex paints, also contain sulphur which causes tarnishing. Therefore, it is detrimental to store silver on a rubber mat or on a shelf coated with latex paint. Similarly, some foods, like eggs, contain sulphur which causes discoloration of the silver. If silver objects are kept away from these materials, tarnishing will be deterred substantially. Salt cellars and spoons should be cleaned thoroughly after use, since salt deposits on silver can result in black spots termed "salt disease." Acute salt disease leads to corrosion of the metal. Silver also should be kept away from acidic foods such as citrus fruits and vinegar.

Polish silver as infrequently as possible, but polish before storing for extended periods; a soft and unabrasive cloth should be utilized. The soft flannel used to make silver storage bags is acceptable. The cloth should not be of a type that tends to pill or release small particles of fiber which would remain on the surface or demand additional rubbing for removal. Polish should be applied with as few strokes as possible to loosen tarnish. Every time a piece of silver is polished, the metal surface is worn down and very thin layers of silver are lost. A clean, high lustre may be achieved with minimal wiping. Certain areas which appear to be tarnished but will not easily come clean may be affected by firescale, a thin layer of oxidized metal which occurs when the object is being reheated during its creation. This film is permanent, has been on the object through its lifetime, and cannot be removed. Buffing severely tarnished silver should also be avoided; touchmarks identifying the silversmith and often providing other useful information documenting the piece, as well as fine engraved and chased decoration, can be worn away by excessive polishing.

The effects of abrasion through polishing are particularly evident on plated ware. Polishing eventually will remove the thin layer of silver from the object's surface, exposing the copper or other base metals of which the body is composed.

Some polishes have anti-tarnish formulas which may help to deter discoloration of silver. If silver is kept in a closed cabinet, anti-tarnish paper or refined camphor may be used to stall tarnishing, thus reducing the frequency with which polishing is necessary. Soft tissue also may be used to wrap silver to reduce exposure to air pollutants and salt.

## OTHER METALS

Metals tend by nature to oxidize or corrode when interacting with airborne or other chemical agents. Often a pale green-blue patina on copper or bronze is desirable and is sometimes artificially applied. However, excessive corrosion can pit or encrust the metal surface and seriously alter the design.

Metals should be kept in as dry a climate as possible, as moisture accelerates corrosion.

If metals are to be stored, wrapping them in soft tissue will partially protect them from chemicals in the environment. When storing metals, surfaces should be padded to avoid scratching and abrasion; never use tape of any kind.

Metal objects should not be handled with bare hands, as fingerprints leave oily deposits which accelerate corrosion.

Buffers and abrasive cleaners or detergents should not be used.

#### D. FURNITURE

Furniture should never be carried by its appendages (for instance, a chair by its arms), but should be grasped at the main body of the piece (the seat, in the case of a chair).

Furniture should not be dragged or pushed along the floor; this abrades the feet and puts undue strain on the legs.

Move furniture out of direct sunlight, which will provide too much heat and dryness, and may lead to fading, cracking, checking, or warping of veneer.

Extremely dry areas, such as poorly ventilated attics, are not suitable storage spaces for furniture. In addition to shrinking, cracking and checking, wood may become brittle and darkened, and glued joints may fail. Furniture stored in damp basements encounters other problems, including fungus growth which could lead to dry rot and the deterioration of finishes.

Wood furniture should be watched for the infestation of insects or the growth of fungi. The best prevention for this is cleanliness and ventilation.

Whether the atmosphere tends to be dry or moist, it is very important not to subject a piece of wooden furniture to frequent or dramatic changes in relative humidity. Rotting is accelerated in wood which is subjected to frequent wetting and drying, and cracking or warping can result from humidity fluctuation.

#### E. TEXTILES AND RUGS

Creasing textiles or costumes should be avoided, for it weakens the threads. Tissue paper should be used between folds. Textiles should never be "packed" but should be stored very loosely, in cold, dry, well ventilated areas to discourage insect infestation. All textiles should be monitored frequently for insects.

Textiles made with animal threads (wool, silk) are more susceptible to insect attack than others. Larvae, fungus and mold are particularly dangerous, but provided that the atmosphere is fairly dry, these organisms cannot thrive.

Rugs should never be folded; rather, they should be rolled on poles.

Rugs like other textiles, are susceptible to fading from overexposure to light.

Remove all staples, pins, and nails from rugs and textiles. These may rust and leave stains, and the resulting holes also cause damage to the weave.

## F. CERAMICS AND GLASS

In the event that a piece of glass or ceramic is broken, the results of the accident should be photographed immediately. Clear, close-up photographs are often an invaluable aid in the later restoration/reconstruction of an object. All pieces, no matter how small, should be saved and stored in individual envelopes to prevent abrasion.





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