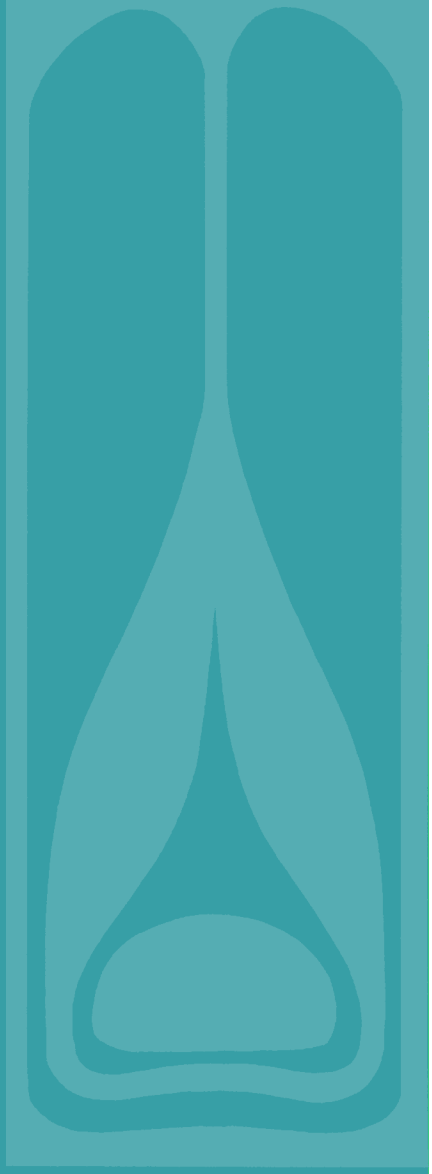
Conservation

# Wise Guide



Alaska State Museum

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# PREFACE

The field of conservation has undergone major changes since the time Alice Hoveman started to compile information into a conservation guide for Alaska museums. Her goal was to address some basic questions that often came to her concerning care for collections. She covered many materials, such as baleen, argillite and totem poles, which are likely to be found in collections in Alaska, but which are not that common in other parts of the U.S. Her product was the *Wise Guide*. It is a tribute to her understanding of the fundamental needs of the museum community in Alaska that the *Wise Guide* has stood the test of time and is as valid today as it was a decade and a half ago. This reprint keeps the original text largely intact, correcting only a few minor inaccuracies. I have revised Appendices 1 and 2 to provide the most up-to-date lists of conservation suppliers and conservation related organizations. The World Wide Web was not even an idea when Alice first wrote this guide; now it is a fundamental tool for gathering information. Most of the suppliers and organizations cited in this revised edition have websites that provide conservation information and online ordering of supplies.

Scott Carroll
Conservator
Alaska State Museums

# INTRODUCTION

Preservation of collections is one of the fundamental missions of all museums. If an object is significant enough to be acquired by a museum as a part of the permanent collection then it deserves to be preserved. Though museums have long considered preservation of collections as a basic responsibility, it is only within the last decade or so that conservation has begun to receive the attention and financial support it deserves as a fundamental part of museum services.

Museum conservation is broadly defined as the study of deterioration and well considered attempts to slow or correct this deterioration. All matter naturally deteriorates. By understanding the mechanisms that cause deterioration of materials in the museum environment, the museum professional can predict and consequently control the rate of deterioration of collections. The methodology applied in museums to control this rate of deterioration is called "preventive conservation." Preventing, or more accurately, minimizing further deterioration to objects is an essential component of a sound conservation program.

## Using This Manual

Preventive conservation starts with accurately recognizing the factors that cause deterioration of objects in the museum. Chapter 1 discusses the environmental factors that influence the condition of objects, and offers some solutions to the more common problems in museums. Chapters 2 through 12 describe specific deteriorating conditions for individual materials, along with recommendations for handling, and marking the object with catalog numbers. In most sections, cleaning of objects has been purposefully deleted. Only under specific conditions, within strict guidelines, can one suggest treatments for cleaning and this would be solely dependent upon the condition of the object. So, for safety's sake, keep objects clean. Don't let them get any worse. If the condition of an object cannot be stabilized, consult a conservator.

At the back of the manual is a Glossary of terms and a Bibliography for those interested in researching the subject further. Appendix 1 is a listing of supplies, equipment, and suppliers which may be useful to museums in Alaska. Appendix 2 is a partial listing of conservation related organizations. Note that conservators specialize in the treatment of particular materials (textiles, metals, paintings, works of art on paper, books, photographs, decorative arts or ethnographic artifacts). They also perform examination and treatment of objects while abiding by the "Code of Ethics" and "Guidelines for Practice" set forth by the professional organization of conservators, the American Institute for the Conservation of Historic and Artistic Works.[1] With a basic understanding of conservation and a knowledge of the standards by which conservators work, a museum can better select the appropriate conservator to perform contractual services.

## Acknowledgements

This manual is written for collectors, curators, and registrars of objects from Alaska. It is an introduction to museum conservation and to the preservation of materials. Mostly, it is an attempt at explaining the deterioration of objects in lay terms and how to prevent it. I am deeply grateful to the Alaska State Museum staff and administration for their support throughout the preparation of this manual; to Eleanor McMillan and Roxana Adams for editing contributions; to the Institute of Museum Services for providing a Conservation Grant for this printing; and to the many conservators and conservation scientists listed in the Bibliography for sharing their valuable insights and research.

April 1985
Alice R. Hoveman

# PREVENTIVE CONSERVATION

## TEMPERATURE AND RELATIVE HUMIDITY

Achieving sound conservation practices in a museum requires knowing how to recognize signs of active deterioration and then knowing what to do about it. This section explains the five categories or factors in the museum environment that generally cause deterioration to objects and suggestions on how conditions can be improved.

Relative Humidity is the measurement (expressed in percent) of the moisture in the air as compared to the maximum amount of moisture the air can hold (causing condensation) at that same temperature. The colder it is in the museum, the greater the capacity of the air to condense moisture (humidity).

Many artifacts in museum collections are composed entirely or in part of humidity sensitive materials. Humidity sensitive materials (especially wood and ivory) react to changes in the atmosphere's relative humidity by changing dimensions. When moisture is absorbed, objects swell. When objects dry out or release moisture to the air, the objects shrink. When humidity conditions fluctuate so do the dimensions of the various components of humidity sensitive objects. This action creates a stress on joints as well as on the molecular bonds and result in damage. The lifting of veneered surfaces, splitting and warping of wooden and ivory objects, failure of joints in furniture, lifting of paint from wooden surfaces indicate damaging humidity fluctuations. Even argillite becomes more prone to damage when conditions are dry. On the other hand, very high humid conditions will promote the growth of fungus and mold on organic materials, corrosion of metals, and swelling and softening of untanned skins and the emulsion layer of photographs.

Some artifacts are sensitive to heat variations in the museum. Untanned skins and hides are especially vulnerable to damage since they will shrink when exposed to heat.

1. Discovering the problem – Ideally, the generally accepted conditions for most organic materials (wood, bone, leather, paper, textiles, natural fibers, ivory, etc.) are a constant 68 to 70 degrees Fahrenheit* and 40% to 50% relative humidity (RH). Inorganic materials (metals in particular, and stone or ceramics) and untanned skins and hides are maintained best at lower RH levels of 35%-40%.

   Measure temperature and/or relative humidity with monitoring equipment such as a psychrometer, hygrometer, thermometer and/or a recording hygrothermograph. Monitoring the museum's environment should be done on a regular basis with accurate and reliable equipment. Monitors are available from scientific suppliers and some conservation materials suppliers and range in price from $30 to $2,000. (Appendix 1) Accuracy and recording ability of the equipment usually increases with cost. (The Alaska State Museums' Environmental Monitoring Kit is loaned to museums statewide to measure temperature, relative humidity and light levels.)

   Survey the collection to find out if a temperature/relative humidity problem exists. Look especially at organic materials since they can be expected to react more dramatically to humidity/temperature changes. Do wooden artifacts or wooden doors and windows shrink and crack in the winter? Are skin artifacts shrinking and drying? Is there any mold growing anywhere in the museum? These are all signs that a problem exists.

2. Solutions – Ideal temperature and relative humidity conditions may be impossible to achieve without costly renovations. Maintaining a constant relative humidity at a point at which you can generally maintain it is most important, perhaps-somewhere between 35%-40% RH. A slow variation of relative humidity between summer and winter is acceptable and better than rapid fluctuations. Monitor daily and record fluctuations or rapid changes in RH and try to analyze and eliminate the causes. Windows may need better insulation to keep inside temperatures more constant. Lights may be too bright and too hot, or the thermostat is turned up in the morning causing the temperature to rise suddenly. These factors contribute to a fluctuating

*Unless otherwise indicated, all temperature readings will be in Fahrenheit.

environment during a 24-hour period. If the museum is warm and too dry, keep the thermostat lower to allow the humidity to stay higher.

Buffering materials, such as carpeting, draperies, and upholstery made of natural fibers which are hygroscopic (readily give up and take in moisture) or conditioned silica gel (Appendix 1) can contribute to maintenance of a steady RH. These materials can be used throughout the museum or they can be incorporated within the exhibit case to create a 'micro-environment'. If the museum's environment is difficult to maintain it may be possible to maintain the environment within the exhibit case or 'micro-environment' through the use of these buffering agents.

People also affect the environment by giving off both heat and moisture and the poorer the ventilation, the greater the effect. Overall, the presence of large groups of people in the museum will cause the temperature to rise and the relative humidity to fall. Therefore, when groups are scheduled, the thermostat should be lowered to reduce the anticipated moisture loss.

# LIGHTING

Energy is necessary for deterioration to occur and light is a form of energy. Light deterioration to materials is related to the sensitivity of the object to light damage, what radiation or kind of light (ultra-violet, visible, or infra-red), and to the amount and duration of exposure. Ultra-violet light is the most damaging radiation to light sensitive artifacts. Infra-red radiation is the least harmful, however, the heat generated from infra-red radiation can be harmful to heat sensitive materials (see section on Temperature). Light causes irreversible damage to light sensitive museum artifacts. Materials such as silk, paper and watercolors are more light-sensitive than others and damage caused by light results in the fading of colors, yellowing of papers, and weakening of fibers.

Measure ultra-violet and visible light with an UV monitor or a light meter that measures in lux or foot-candles respectively. To accurately measure the amount of light focused onto the object, hold the meter near the surface of the object with the photo-sensitive cell directed at the light source and follow the manufacturers directions for operating the specific meter in use. In the case of measuring ultra-violet light, note that the distance between the object and the light source has no bearing on the amount of UV. When measuring visible light note that the illumination level decreases as the distance increases between the object and the light source. Therefore, one way to reduce the amount of visible light on an object is to increase the distance between the object and the light source.

1. Ultra-violet (UV) light – A reading on an UV monitor of more than (75 UV/lm) from a light source tells you that the light needs an UV absorbing filter. This can be achieved by using ultraviolet absorbing filters either on the light tube or somewhere between the light source and
   the artifacts, such as on the exhibit case when the light source is too hot for a thin plastic UV absorbing film. Materials that most effectively absorb ultra-violet light are Plexiglas® UF3 or plastic films with UV absorbing additives. (Appendix 1)

2. Illumination levels of visible light – Optimal illumination levels for museums are:

   a. Highly Light-Sensitive Materials (textiles, paper, watercolors, color photographs, dyed leather, furs and feathers, including mounted vertebrates, botanical specimens, baskets, and painted wood). Maximum 50 lux or 5 foot candles for display; darkness for long-term storage.

   b. Moderately Light-Sensitive Materials (undyed leather, horn, bone, ivory, unpainted wood, and oil paintings). Maximum 150 lux or 15 foot candles for display; darkness for long-term storage.

   c. Insensitive Materials (metal, stone, porcelain, ceramics, and jewelry). Unlimited, but subject to temperature considerations.

As a guide, for outdoor daylight calculations the British standard assumes a dull overcast sky at 5000 lux.

Conversion factors: 1 lux = .01093 foot candles
1 foot candle = 10.764 lux

3. Lighting aternatives – The more obvious lighting choices available to museums are incandescent bulbs, fluorescent tubes, and/or sunlight.

   a. Sunlight has the highest level of ultra-violet light and is the least controllable lighting source. The general recommendation for most museums is that artifacts never be directly exposed to sunlight. When this is a problem, such as in an historic house with many windows, sunny areas can be curtained or shuttered to eliminate overexposure. The windows should also be filtered for UV using UV absorbing plastics or Plexiglas® (but not on thermo-pane glass, which will crack).

   b. Incandescent bulbs produce approximately 5% UV and are difficult to filter because they are very hot. Generally, to filter UV from incandescent bulbs use plastic filters on the exhibit case, away from the hot bulbs. Incorporating 'dimmer switches' into the system can reduce illumination levels for incandescent bulbs. Because incandescent bulbs create heat build-up, they should always be well vented and not placed less than approximately 20 inches from objects.

   c. Fluorescent tubes, though cooler than incandescent bulbs, produce approximately 12-15% UV and are easily filtered using plastic UV shields that slip over the tubes. The illumination levels of fluorescent tubes can be easily lowered using darker plastic shields. (Appendix 1) If fluorescent tubes are situated inside exhibit cases the ballasts must be vented to prevent heat build-up.

4. Other suggestions:

   a. Point the light source at a white wall and use the reflected light for illuminating artifacts.

   b. Point the light source between artifacts rather than right at the center of them.

   c. Reducing ambient light levels in the general areas of the museum will help to reduce glare on exhibit cases thereby reducing the need for increased lighting within the case.

   d. Keep light sensitive objects in storage in the dark!

   e. Rotate the display of light sensitive objects as often as possible to reduce exposure to continuous lighting.

   f. Use lower wattage light bulbs.

   g. Reduce the duration of exposure; turn lights off when not being viewed; install visitor operated or self-timed light switches.

# POLLUTANTS

There are a number of specific atmospheric pollutants that may affect the deterioration of artifacts.

1. Sea air, damp with salt spray, increases the local relative humidity thereby creating a more conducive environment for mold growth. Museums located near the seashore should watch for this possibility, particularly on cellulosic materials, e.g. baskets and paper.

2. Sulfurous gases (in cities and industrial areas) can cause widespread deterioration of museum artifacts. Sulfur dioxide is the most damaging; it is eventually converted into sulfuric acid that attacks a wide variety of materials. The rotting of paper and textiles can be traced to the action of sulfuric acid, and this acid is responsible for the powdery and decayed condition of old leather book bindings.

3. Dust, microscopically, has very sharp edges that can be abrasive to surfaces of artifacts. Good housekeeping, vacuuming the floors and shelves regularly will help to reduce the dust and keep it from accumulating. Even a clean feather duster will pick up a considerable amount of dust. Loop pile carpeting is better than cut pile (cut pile gives off more loose threads); an entry with a good doormat will help keep the dust from entering the building. A clean museum will also help guard against insect infestation.

4. Soot: If the museum is heated with an oil fired hot air furnace, the possibility exists for a "puff-back" to occur. A "puff-back" is a furnace malfunction that emits an extreme amount of oily black soot. Most importantly, check the furnace regularly, keep it in good working order, clean the stack and establish a routine maintenance schedule and checklist.

5. Museums should check their air intake systems for proximity to loading zones, parking areas or other sources of potential pollutants. Air filters should be changed regularly.

# INFESTATION

Not all bugs are harmful to museum collections though two extremely destructive insects are the clothes moth and carpet beetle. Dirty, dark and neglected conditions are conducive to insect infestation. Therefore, good housekeeping and regular examination of artifacts is the best protection against the possibility of an insect problem.

1. Detection: Watch for new piles of fine saw dust, tiny holes in artifacts and actual live insects. It's easy to mistake old insect evidence for an existing problem. To assure proper identification and eradication of an existing infestation find the live culprit.

   One seemingly 'old fashioned' though effective way to catch a bug is to place sticky traps in the museum. Once a live insect is found, an entomologist should positively identify it to determine whether or not it is harmful to the collections.

2. Fumigation of museum artifacts should be left to professionals. Fumigants are deadly poisons, hazardous not only to museum staff but to the objects as well.
   As information regarding artifact fumigation is constantly being updated, contact a conservation laboratory should you become aware of an existing insect problem in your museum.

# HANDLING

**Proper handling of museum objects is largely common sense***

1. Treat every object in the permanent collection as unique and irreplaceable.

2. No smoking around artifacts! Aside from the danger of accidentally starting a fire, there will be a build-up of corrosive tar on objects.

3. Keep your hands clean, even when using gloves. Use clean gloves only. Handle works of art, especially metals, with gloves at all times. Require this of visitors to the collection room. (Dirt or oil from fingers can cause serious damage.) If you use plastic form fitting surgical gloves you can safely handle heavier objects with smooth surfaces such as ivory and argillite. Do not handle these heavy smooth objects with cotton gloves that will not grip the object safely.

4. Handle artifacts as little and as infrequently as possible. For example, if you are looking at an object resting on a table, it does not necessarily involve handling. Handle the object only if it is absolutely necessary. Explain this to visitors too.

*Because museum staff are generally the people to handle museum objects, when damage occurs, it is often caused by carelessness on the part of museum staff. Handling of museum objects increases the likelihood or probability that damage will occur. However, anyone handling museum artifacts should be instructed to follow these general guidelines.

5. Handle only one object at a time, no matter how small. Use both hands in carrying.
6. Make sure that there is a clean place on which to set the object down before you move it. Be aware of any peculiarities of the material involved such as loose or protruding sections and look for existing damages before moving it.
7. Use a padded box to carry an object from one location to another. Acid-free or acid-free buffered boxes are best for long-term storage. Acceptable padding materials include washed cotton or muslin fabrics; acid-free or acid-free buffered tissues, or clear polyethylene plastic sheets. Do not place plastic 'bubble-pack' in contact with artifacts. A coating on the plastic contains a sulfur compound and will cause deterioration to sulfur sensitive artifacts (silver will tarnish).
8. Use a cart to transport large or unwieldy objects or more than one object from one place to another. Do not overload the cart, pad each object, and cover the load with polyethylene to minimize rapid environmental changes.
9. If there is the least doubt that one person can safely carry an object, get help! Do not risk the object.
10. Take your time. Move slowly while carrying objects or pushing carts containing artifacts. Learn that certain types of carts steer better from one end than the other.
11. When using an elevator to transport artifacts, be sure to lock the operating mechanism during loading and unloading.
12. Make no sudden or unnecessary movements in the vicinity of artifacts.
13. Never walk backwards in the vicinity of artifacts. Always be aware of what is behind you and how close you are to it.
14. Never drag an artifact or push it a short distance across the table: Carefully pick it up with both hands and set it down the same way.
15. Because of the dangers presented by floor cleaning operations, crawling insects, possible floods, never leave works of art or artifacts sitting directly on the floor.
16. Remember that damages caused by careless handling frequently do not become visible for a considerable time. If the surface of a painting is bumped, it may be months or years before cracking and lifting of the paint surface appear. A damaged artifact may suffer loss of value or appearance.
17. Document all damages found (Appendix 3). In the event of an accident, record damages and save all fragments.
18. Never discard packing materials before thoroughly searching for fragments that may have dropped off in transit and for evidence of insect pests.

# BASKETRY AND BASKETRY FIBERS

1. Traditional Alaska Native baskets are woven with grass, bark, or root fibers or combinations of these. (See baleen section for baleen baskets.) Other materials such as wool, beaks, claws, skin, dyes of many colors, glass and plastic beads may be woven into the basket for decoration. These basketry fibers are chemically composed of cellulose, hemicellulose, and lignin (as is wood and paper). It is the characteristics of these chemical constituents that give a basket its physical and chemical properties.
2. Briefly, the agents that cause deterioration or degradation to basketry fibers are water, oxygen, acids and strong alkalies, heat, light, mechanical stress, and biological attack. Therefore:

    a. Baskets should not be exposed to moisture of any kind.

    b. Baskets should not be exposed to high heat.

c. While in storage, baskets should remain in the dark since they are extremely light sensitive. Light will fade color decorations and accelerate deterioration of the basketry fibers. While on exhibit, baskets should be exposed to a low level of light that is filtered for UV. The length of exposure to light should be minimized.

d. Keep a watchful eye out for insect problems. Look for little holes in the baskets, fine dust and especially live insects.

e. Baskets should never receive any rough handling. Lift baskets by supporting them under their bases. Do not lift baskets by their rims or knobs.

f. If a basket has a lid, do not remove it by lifting the knob. The knobs will eventually weaken and tear. Remove lids by lifting them off at the sides or edges of the lid, being very careful to ease them off gently and slowly.

g. Baskets should not be stacked when in storage. If it is absolutely necessary, line the baskets with a soft polyethylene plastic to aid in removing the smaller ones, and only stack them if they are loose fitting.

3. Safely mark baskets with catalog numbers using a brown cotton/polyester thread (or a thread closely matching the color of the basket) and a small white paper tag without a metal border. Write the catalog number on the paper tag using India ink or any other non-water soluble ink or pencil. Thread and paper tag should be attached either through existing holes or by passing the thread between the fibers using a thin beading needle.

# WOOD

1. Wood has been used extensively over the years and any museum will have in its collection a wide variety of artifacts composed either entirely of a single piece of one species of wood, or in combinations with other woods or other materials; in a variety of sizes and shapes; painted and unpainted; waxed or varnished; and in widely differing degrees of degradation. Some wooden artifacts may be decorative; others may have had a more utilitarian or functional history.

2. The condition of wooden artifacts upon arrival at a museum depends partly on the expertise and woodworking knowledge of the original artist or craftsperson and/or partly on exposure to any of the more obvious agents of wood deterioration, e.g., decay-producing fungi, wood-boring insects, fire, mechanical wear, and weathering. All of this is part of the object's history. However, once the object becomes a part of the collection, maintaining it in a stable condition is most important. Since baskets and wood are both composed primarily of cellulose, their agents of deterioration are the same, and they include: water, oxygen, acids and strong alkalies, heat, light, mechanical stress, and biological attack.

   a. Wood's response to relative humidity: The geometry of wooden artifacts changes in response to varying changes in the museum's relative humidity. In other words, as relative humidity increases, the cells in the wood expand or swell as humidity is absorbed. When the relative humidity decreases, the wood gives off moisture to the air and the cells shrink in size. If the museum's relative humidity constantly fluctuates, so will the dimensions of wooden artifacts. This particularly damages joined wooden artifacts, veneers, and inlays. Wooden artifacts accustomed to a more humid environment and then suddenly placed in an excessively dry environment will show signs of cracking and/or warping. Painted wood is also susceptible to increased damage caused by changes in RH. The wood layer expands and contracts and the paint layer does not. This creates a strain between the layers causing the paint to crack and eventually flake off.

   Optimum conditions for wood are 50-55% RH and 68°F. If the museum's relative humidity remains stable, so will the size of the wooden artifacts. Sudden and/or drastic changes in relative humidity must be avoided (especially bringing wet wood directly into a warm, dry museum). If the museum is heated in winter and no humidification is provided, then keep the temperature as low as possible (a one degree drop in temperature results in about a 2% rise in relative humidity). Keep

only offices and workshops in the comfort range.

b. Wood is decomposed by light; therefore, light levels should remain in the moderate range (see Lighting section) for continuous display.

c. Check for insects and insect damage regularly. Look for small piles of sawdust underneath a small hole in the wood, indicating that wood-boring beetles are or have been present. If the wood is damp and rotting, small holes and larger "frass" (sawdust) may indicate the presence of carpenter ants. Try to find a live insect so that identification can be made and proper action taken.

3. Mark catalog numbers with India ink over a thin and dry strip of clear adhesive (Acryloid® B-72) painted in an inconspicuous place.

# TOTEM POLES

The philosophy regarding preservation of totem poles has changed during the last several decades. Years ago totem poles were removed from original sites and placed in museums or totem parks. More recent totem preservation projects have aimed to preserve totems in the places where they were originally erected.[2]

1. Totem poles were generally carved of Western Red cedar, though yellow cedar is used in Northern Southeast Alaska.

2. The agents that may cause degradation to totem poles in Alaska include moisture; fire; wood destroying fungi; wood-boring beetles; carpenter ants; wind and vandalism. Conservation of totem poles includes eliminating the harmful or deteriorating conditions to wood to create a more stable or more conducive environment for preservation.

   a. Fungal decay: fungal damage can, in fact, originate within the living tree.[3] Therefore, if reproductions of totems, or parts of totems are a part of any preservation project, use only healthy, well seasoned wood.

   b. Other fungal activity may occur where there is adequate nourishment (from the wood), water (greater than 20% free moisture needed for growth), oxygen and moderate temperatures. This activity starts and advances rapidly at the ground-line or below if the base of the totem pole is in very damp or wet soil with inadequate drainage, or if the wooden base is inserted into a concrete or cement lined ditch where water drainage has not been provided. Also, accelerated deterioration occurs in upper areas or top portions of poles where the wood end-grain is exposed to rain and moisture absorption. Wood in these conditions will degrade rapidly.[4]

      1. Surface treatment: A coating of paint that is soundly attached and in a continuous, unbroken layer will impart protection from weathering. A broken, chipped, or cracked paint layer exposes more of the wood to weathering. Generally, newly carved and painted poles are left to weather naturally. Older poles that have been repainted several times can be stripped close to the original layers.[5]

      2. Capping techniques: Upper portions of the carved wood where end-grain is exposed to moisture absorption should be capped unobtrusively. Preferred materials to select from include microcrystalline or paraffin wax, and copper or aluminum sheeting.

      3. Mounting techniques: If a totem pole is to remain in a vertical position, out of doors, then it must have proper drainage and be safely mounted. The base of the actual totem pole should not be set into concrete, as it will only restrict pole drainage. Original poles with bases or wooden support beams should be placed into ground packed with varying sizes of stone in order to increase water drainage. A wood preservative can be applied to prevent decay.[6] However, all chemical preservatives should be used with caution and the manufacturers directions should be followed. A pole without an extended base (one which is cut off or designed with no portion to place into the ground) can be mounted above ground level and supported with a metal or wood beam. A metal beam

can be placed into a concrete base that has a dome shaped top to facilitate drainage. A new pole can be secured to the beam with large bolts. Old poles are best strapped to the support beam with bands made of a sealed or painted metal (stainless steel).

4. Joints: joints such as wings or beaks should be checked for strength and water absorption. If appendages or portions of the pole are reproduced in new wood, the newly carved section should be attached with dowels and the joint should be adhered or sealed with a marine glue or putty.

   c. Insect damage: insect damage in totem poles does not always mean there is current insect activity. Not all insects damage wood. Before considering any form of fumigation, first find a live insect and have it properly identified.

3. Documenting the condition of totem poles is done with simple measuring techniques.

   a. Probe the pole (especially at ground level where fungal activity may be advanced with a 1/4"rod to feel for sound (hard) wood and then record the depth.

   b. Use a moisture meter to accurately measure moisture content.

   c. Take photographs of the surface to record condition.

   d. If available, use other non-destructive analytical processes such as X-ray and Ultra-sound to measure interior densities of totem poles.[7]

4. Location: When erecting a new or relocating an older pole consider; will the totem pole be relatively protected from strong winds and wind damage? Will the pole stay damp continually because it is too shaded, or in a low-lying area? Is security a problem? Is annual maintenance provided to the totem pole and park? Does the site have cultural or historical significance?

## FURNITURE

Furniture in museum collections can vary widely according to species of wood, construction details, and condition. Once placed in the museum, the factors that cause deterioration to furniture are the same as with any artifact composed of wood, and they include: water, oxygen, acids and strong alkalies, heat, light, mechanical stress, and biological attack.

1. To prevent damage from constant wear and tear, historically significant furniture should not be used. If space is at a premium and historical furniture must be used for storage, store only lightweight artifacts in drawers that open easily, though not often.

2. Never push or drag furniture along the floor.

3. Do not lift furniture by the top, or other decorative parts. Lift it from a sturdy bottom part.

4. Take drawers out before moving furniture, noting beforehand their original location. This makes the object lighter; also, this eliminates danger of drawers sliding out and becoming damaged.

5. Mark catalog numbers with India ink over a thin and dry strip of clear adhesive (Acryloid® B-72) painted on the furniture bottom. Do not apply any pressure sensitive tapes or tags to polished surfaces.

## PAPER

1. Paper has been manufactured from a multitude of vegetable or cellulose fibers, prepared into pulp by a combination of hand, mechanical and chemical means and formed into handmade sheets by a craftsperson or formed into continuous webs of paper by machines. Therefore, papers differ in fiber, weight, opacity, surface, thickness, color, size, permanence and durability.

2. Paper can last for centuries if properly made and cared for, though generally it is fragile and highly susceptible to damage by environmental conditions, insect pests, and mishandling. Deterioration of paper may also be caused from inherent faults. Newspapers and paperback books, for instance, are made from types of paper that are by nature short-lived. Therefore, using a permanent paper, such as a fine all-rag paper, acid-free or acid-free buffered paper wins half the battle of preservation.[8]

    a. High temperatures and high light levels accelerate the deterioration of paper. Excessive humidity encourages the growth of mold. The optimum conditions for the preservation of paper are, as with baskets and wood, 50-55% RH at 68 °F. Lighting should be kept to minimum levels.

    b. Abrasion can cause damage to paper. Unmatted works of art or pieces of paper should be separated by a smooth, acid-free or acid-free buffered tissue and never be stacked directly on top of each other. For optimum protection from abrasion valuable pictures should be matted with acid-free mat board, rather than left loose.

3. Works of art on paper can be stored in flat drawers or in acid-free buffered boxes, separated from each other by acid-free tissue.

4. Encapsulation is a method of physically protecting papers in clear polyester or plastic. Encapsulation requires only the film (Mylar®), special double-faced encapsulating tape, cutting tools (a utility knife and scissors), and a straight edge. Encapsulating is less drastic than lamination because the paper is not actually fixed to the protecting film. Only the edges of the film adhere to each other and the paper is held in place as if it were in a clear envelope.

5. To be safe, use only starch paste and Japanese tissue for adhering valuable papers. Other pressure sensitive tapes (Scotch® tape, masking tape, etc.), gummed brown wrapping tape, rubber cement, synthetic glues, or heat-sealing mounting tissue are not easily removed and/or cause yellowing of paper.

6. Catalog numbers should be written on the backside of a piece of paper with pencil.

# SKIN AND SKIN PRODUCTS

1. Alaska's museums contain many objects composed of skins or hides obtained from a variety of birds, mammals and fish, and processed with or without feathers and fur. In addition to skins and hides, membranes from the bladders, stomachs and tendons of animals are used to make clothes, bags, and threads to decorate objects and much more. Depending on the period of time from which the object dates, by which culture it was produced, and the desired results and use of the skin, one or more of the many processing methods may have been employed in the alteration and manufacture of the skin.

2. In general, all skin and skin products have in common the chemical constituent collagen, which is a type of protein. The deterioration of collagen is caused by:

    a. excesses of heat (causing shrinkage of the fibers);

    b. excesses in moisture (causing swelling of the fibers);

    c. combinations of heat and moisture (eventually causing the collagen to dissolve as in fish and skin glues);

    d. excesses of moisture and the presence of microorganisms (mold growths causing staining and further putrefaction);

    e. attack by insects (ingesting mostly the furs);

    f. and attack by alkalies or acids. Damage caused by these conditions is irreversible.

3. Avoid extreme heat from radiators, heat pipes, sunlight or incandescent lights. A new heating system suddenly introduced into a museum will cause skin artifacts to show

serious signs of shrinkage. This can be disastrous to objects composed of wooden frames and skin covers like umiaks, drums, and their models. Shrinking skins put such a tremendous strain on wooden frames that the skins split and/or the wooden frames crack or warp.

4. Provide ventilation to minimize growth of micro-organisms.

5. Stuff skin artifacts or leather containers with acid-free paper or plastics to retain (or regain) original shape, and store or exhibit each object so that the pressure of its own weight does not distort its shape.

6. Do not hang objects by their straps or leather attachments. Use an alternate or replacement strap if possible and/or provide support at the base of the object.

7. Avoid rough handling of any kind. Dry, brittle skins and gut tear easily!

8. There are two ways to mark leather and gut objects.

    a. Write the catalog number using India ink on a white cloth or paper tag or twill tape (tags without a metal frame, to avoid the possibility of staining from rust). Allow the tag to dry thoroughly and sew it onto the object with white thread through a seam or available attachment.

    b. To mark the catalog number onto objects of leather or gut that are not soft and absorbent (like white brain-tanned deerskin or smoked-tanned moose hide) apply a small strip of clear adhesive (Acryloid® B-72) or titanium white acrylic paint to the skin. Wait until this has thoroughly dried, then apply the catalog number with India ink. Again, wait until this is completely dried before handling.

# LEATHER

1. In order to increase resistance of skins and hides to deterioration and to achieve a specific product for use, skins and hides are chemically and mechanically altered to produce what is called leather. The conversion of animal skins and hides into leather involves four major steps:[9] cleansing and purification of the corium layer of skins or hides; chemical stabilization; lubrication, coloring and chemical modification to produce the varied, tanned products; then drying and using mechanical processes and surface treatments. The term "tanning" can be used loosely to refer to the chemical stabilization processes of which there are three main systems: aldehydes (including oil or smoke tannages); aromatic phenolic (including vegetable tanning); and mineral tannage systems (also known as tawing).

2. The optimum environment for leather is a stable relative humidity of 50% (+ or - 15%) and temperatures ranging from 55-75° F.

# UNTANNED SKINS, HIDES AND GUT

1. Attempt to maintain the optimum relative humidity at 35-40% and temperatures below 68 °F.

2. Untanned skins and hides are stiff and brittle in the dry state. Provided a stable, clean and safe environment, they will remain in good condition for many, many years. However, these materials are prone to damage from rough handling causing abrasion, tears, cracks, etc. Dirt and dust can build up on the surface.

3. Kamleikas (or gut parkas)

    a. Though many people have asked about 'relaxing' gut parkas, it is not necessary from a preservation point of view. Information regarding the original processing methods and identification of the animal origin of the membrane may be obscured or lost if the gut material is subjected to the chemical manipulation necessary to 'relax' it. Altering the gut chemically can also cause a change in the color and opacity of the gut thereby conveying an altered and inaccurate appearance of the piece. Since gut will remain in a stable condition if proper humidity and temperature levels are maintained, treatment for 'relaxation' purposes is not recommended.

b. A warped or misshapen gut parka with no colorful applications may be temporarily softened to return it to its proper shape. If the piece has been embroidered, however, the color may dissolve and spread. A piece without decoration can be sprayed with cool water until it becomes soft. In this softened condition, the gut can be bent and shaped. Upon drying, the gut will stiffen and retain its new shape. This treatment should only be used if the piece is badly warped or misshapen, since water deteriorates skins.

# BONE, IVORY AND TEETH

1. Bone, ivory, and teeth are chemically composed of both inorganic and organic substances, the percentage of which varies according to the species of the animal, the part of the ivory used, and its condition. The inorganic portion of bone, ivory and teeth is mainly calcium phosphate associated with carbonate and fluoride.[10] The organic portion is called ossein, which is a protein, mainly collagen (as in skins and hides). Viewed through a pocket lens, bone shows an open tubular network. By comparison, walrus ivory has two distinct layers-a dense outer layer and a mottled inner core.

2. The composition of ivory subjects it to the following factors that cause deterioration:

   a. Ivory is anisotropic. That is, like wood, ivory absorbs and gives off moisture (depending upon the relative humidity of the environment) at different rates in different directions. In addition, the inner core of walrus ivory absorbs moisture (and gives it off) more readily, causing the ivory to swell or contract at different rates between the two layers. When the relative humidity in the museum environment decreases, ivory cracks. Studies by Lafontaine and Wood[11] indicate that this effect is more dependent upon moisture than on temperature variations.

   b. Bone and ivory, because they are light in color and porous, absorb oils and other materials that readily cause staining.

   c. The inorganic framework is disintegrated by acids.[12]

   d. Ivory loses its natural coloring when exposed to daylight.[13]

   e. When burned, ivory becomes gray or blue-black (two well-known pigments).[14]

   f. Ivory may also become fossilized. In this case the organic content gradually disappears and the remaining calcareous matter becomes associated with silica in the form of quartz and with mineral salts derived from the ground.[15]

Recommendations for care:

1. Avoid water, heat, strong and unfiltered lighting. Avoid changes in relative humidity, and avoid low humidity, especially less than 30%.

2. Bone, ivory or teeth excavated from a waterlogged or damp site in a dampened state, should be kept cool. Do not allow the material to dry out, or it may warp and crack. Contact a conservation laboratory.

3. When writing catalog numbers on bone, ivory, or teeth, first apply a thin strip of clear adhesive (Acryloid® B-72) or titanium white acrylic paint. Write the catalog number on this strip with black India ink. If you write directly on the bone or ivory it will readily absorb the India ink making it difficult or impossible to ever change the catalog number or system (which in the course of the lifetime of the object may become desirable).

# BALEEN (HORN, HAIR AND FEATHERS)

1. Baleen comes from the mouths of whales called Mysticetes (i.e. humpback). It is usually dark in color, and hard to the touch. Baleen is fused hair and contains the protein keratin (as does hair, horn, wool, and feathers).[16] During the manufacture of baleen objects, the baleen is usually soaked in water and split, and may be sanded to a smooth, shiny surface. Some baleen objects are coated with varnishes or oils to make them shine.

2. The factors that cause deterioration of baleen are the same for hair, horn, wool, and feathers, and they are:

   a. Water softens and swells the fibers (making the baleen easier to split and weave).The higher the water temperature, the faster the rate of degradation.

   b. Heat induced oxidation; greater than 302° F causes bond cleavage.

   c. Acids less than pH4 and alkalies cause degradation.

   d. The alcohols methanol, ethanol and n-propanol cause swelling; isopropanol causes contraction. In both cases a chemical change (called esterification) occurs.

   e. Oxidizing agents (hydrogen peroxide) and reducing agents (used in permanent waves) cause degradation.

   f. Physical abrasion causes deterioration.

3. Protect baleen (and feathers, horn, hair, and wool) from intense light and heat, rough handling, wetting by water or alcohols, and acidic or alkaline solutions.

4. Mark baleen objects by first applying a strip of titanium white acrylic paint. Allow to dry and write the catalog number on the strip with India ink.

# TEXTILES

1. Textiles found in the collections throughout Alaska's museums are composed of a wide variety of materials including wool, silk, cotton, linen, flax, synthetic fibers or in combinations of these fibers. These objects may be undyed or dyed with natural or synthetic dyes, they may be sized or unsized, and their condition upon arrival at the museum results from the age of the piece and the amount of wear and tear it received in its past. In addition, textile fibers are used to make garments of many kinds, they may be found in furniture, the lining of paintings, in basketry decorations, in combinations with skins and furs, cedar bark, etc.

2. The factors that cause deterioration of textiles in the museum environment are:

   a. Light causes not only fading but also a weakening of the fibers. The more intense and the longer the duration of exposure, the more rapidly the fiber deteriorates. Some dyes are more fugitive than others and some fibers are more sensitive to light damage than others-especially silk.

   b. Textiles are easily abraded when handled roughly.

   c. Insect pests like the common clothes moth, carpet beetles, and silverfish can cause serious damage if introduced into the collection.

   d. Textiles are good dust collectors. Their surfaces are often large and textured. Dust, soot, and other airborne particulates are generally angular and easily catch on textured fibers.

3. Remember textiles on display should never be in direct sunlight or placed close to hot spotlights or unfiltered fluorescent lights (see section on Lighting).

4. Textiles should be stored flat. Folding a textile puts stress on the area folded, can result in creasing and bruising of fibers, making the textile more likely to tear. Creases also provide a good breeding ground for insects.

5. If folding cannot be avoided, folds should be padded, using materials described below. Textiles should be placed in contact with 'safe' materials such as washed cotton or muslin sheeting, acid-free or acid-free buffered papers or relatively inert plastics (polyethylene and polyester). Note: acid-free buffered tissue is not as soft as plain acid-free.

6. If a textile is too large to store flat it can be rolled.

   a. Roll the textile over a large (six inch) carpet tube (covered with polyester or polyethylene plastic) or an acid-free buffered rolling tube.

   b. Cover the textile with polyethylene or cotton fabric tied loosely with strips of plastic or cotton tape to protect it from dust and dirt.

   c. White textiles have been found to yellow if stored in plastic and should therefore be stored in acid-free papers or cotton sheeting.[17]

   d. For easy identification, mark the outside of this package with the catalog number.

7. Clothing should be stored flat, not hung, to reduce the strain on shoulder seams. If stored flat, pad any creases in the clothing with an acid-free or acid-free buffered paper approved plastics or cotton batting. If it is absolutely necessary to hang garments, pad the hangers to fit the shoulder angle to reduce the strain on any one point. The padding can be made of cotton batting and washed muslin or similar clean, natural fibers.

8. Catalog numbers are best applied to textiles by attaching a tag. Write the number with non-water-soluble ink on a piece of cotton tape. Make sure the ink is dry, and then sew the tape onto the textile with cotton/polyester thread. Use a thread similar in weight and color to the textile and sew on the tape, using a small, unobtrusive hemming stitch. Sew between the fibers of the textile rather than through them. It may be necessary to provide a coat of sizing (water-thinned Elmers® glue will do) to the side of the cotton tape on which the catalog number will be written in order to prevent the ink from running. This will also prevent the tape from unraveling.

# PHOTOGRAPHS

## BLACK AND WHITE

1. Most black-and-white photographs consist of a support upon which an emulsion layer is coated.[18] The photographic emulsion consists primarily of a suspension of light-sensitive silver salts, known as silver halides, in gelatin (collagen-see section on Skin and Skin Products). There are six principal materials of concern:

| SUPPORT MATERIAL | EMULSION LAYER |
|---|---|
| Glass | Gelatin |
| Paper | Silver |
| Film Base – nitrate | |
| – acetate | |
| – polyester | |

   A photograph made with these materials consists of an image or picture in the gelatin layer.

2. Major causes of deterioration to black and white photographs are:

   a. improper original processing methods;

   b. adverse storage conditions e.g.; excessive temperatures (above 70 °F); extremes in relative humidity (above 60% or below 15%).

   c. exposure to oxidizing gases such as hydrogen sulfide and sulfur dioxide from the atmosphere or to oxidizing gases from other storage materials that cause chemical deterioration. Materials generally used for storage known to be detrimental to photographs are wood and wood products, such as plywood, hardboard,

chipboard, low-grade paper, glassine, and cardboard. Also buffered papers, nitrated and formaldehyde-based plastics, polyvinylchloride, and acrylics, including acrylic lacquer and acrylic enamel are detrimental. These materials contain plasticizers, solvents, and residual catalysts that give off harmful vapors. Greatest damage to photographs occurs when they are in direct contact with these materials, but damage also occurs when the volatile elements contaminate the air in the immediate vicinity or in enclosed containers. Other sources of trouble in storage are rubber, rubber cement, and hygroscopic adhesives or those containing iron, copper, sulfur, or other impurities. Pressure-sensitive tapes and mounting materials, as well as acid inks and porous-tip marking pens that use water base dyes should also be avoided.

d. mishandling e.g.; rough handling, folding, the use of adhesive tapes and/or adhesives.

3. Recommended materials for storing and mounting photographs safely include:

   a. Storage; steel with baked-on synthetic enamel coating, anodized aluminum, and stainless steel for shelves, filing cabinets, and storage boxes. High quality papers *(not pH buffered papers),* polyethylene and polyester, plastics can be used for interleaving sheets and/or enclosures.

   b. Mounting; boards on which photographs are mounted should be made from acid-free *(not acid-free buffered)* mat board, and prints can be mounted with drymounting tissue.

4. Realistically an original photographic image has limited life. However, even partially deteriorated images can be copied and reprinted. Modern photographic materials, both black-and-white or color, make possible repeated duplication with very little loss of sharpness, detail, or tonal values. Copies should be prepared and mounted for exhibition and use, while the originals are stored under optimum conditions. Thus the life of an image and the visual information it carries can be extended indefinitely.

## COLOR

1. Unlike black-and-white photographs, which are made up of metallic silver densities, color images are made up of dyes. Like all dyes these change with time, depending on changes in density, color, or both. Aside from manufacture and processing conditions, the factors that a user can control and that affect color image stability are exposure to light, temperature, and relative humidity.

2. All dyes deteriorate when exposed to light, particularly when exposed to light of high intensity, or for a long period, or both at the same time. Color photographs are included in the Highly Light Sensitive group in the Lighting Section.

3. As with many other chemical reactions, dye fading proceeds at a reduced rate at low temperatures. However, storing photographs in a refrigerator, freezer, or other kind of refrigerated chamber with an associated high relative humidity requires special moisture proof packaging.

4. Optimum relative humdity for color photographs is 25 – 30%. Dye fading generally proceeds at a lower rate at lower relative humidity.

# PAINTINGS

1. Paintings are most commonly constructed of complex layers of diverse materials.

   a. The support is usually wood and canvas, made of fibrous plant materials (cellulose), and carries the design.

   b. The ground (or priming) is usually glue with white filler, serving as a sealer for the porous support and forming a smooth surface for painting.

c. The paint layers consist of colored particles (pigments) in a binder or medium such as oil, egg yolk (tempera), or synthetic resin (acrylic).

d. A surface coating of a clear varnish serves to heighten the colors and protect the paint.

2. Deterioration of paintings is caused by:[19]

   a. Supports: wood and canvas, no matter their age, continue to swell as humidity increases and shrink as it decreases. These movements of the support, if continued over a period of time, can make the paint and ground separate from the support (this defect is called cleavage) and even flake off. The more frequent, and the more extreme the fluctuations of temperature and relative humidity, the more damage to the painting.

      1. Excessive heat speeds the processes of deterioration and causes fibers of fabrics to become weak and brittle. Canvases can go slack and develop bulges and creases.

      2. Canvas can be torn or punctured.

      3. Wood may be attacked by insects and high humidity encourages mold growth.

   b. Paints and Grounds: paints and grounds become brittle as they age. Some oils yellow. Old paintings often develop a crackle pattern. Glue grounds may be attacked by mold growth. Rubbing or scraping action (abrasion) can also damage paint surfaces; abrasion often happens during improper cleaning.

   c. Surface coatings: traditional natural resin varnishes are subject to yellowing and sometimes cracking. Also, dust and dirt can accumulate on top of the varnish. Excessive light, especially daylight and unfiltered fluorescent lights, accelerates fading, yellowing, and embrittlement of paints, varnishes, and even supports. Watercolors are more sensitive than oil paintings.

3. Keep paintings vertical unless there is loose or flaking paint. Paintings with loose or flaking paints should be kept face up and flat. Do not cover these paintings with anything that can catch the flaking paint.

4. Do not touch the front or back of a painting, or allow anything else to touch them.

5. Do not carry a painting by the top of a frame or stretcher. One hand should support the bottom while the other merely steadies the top. Avoid grasping fragile decorated parts of the frame. If the picture has no frame, grasp the edges of the stretcher only; do not curl fingers around the stretcher between it and the canvas as this can crack the paint.

6. Avoid stacking pictures against each other.

7. Do not leave paintings standing on the floor where they can be kicked, knocked over, or stepped on.

8. Avoid nailing the stretcher bars of a painting to its frame. Brass mending plates, available at hardware stores, can be bent to shape and screwed into the frame to secure the picture. Do not screw the mending plate directly into the stretcher.

9. A protective backing for paintings protects them from dust and blows. Fome-Cor® backing is best. 'Gator-foam®' or, if necessary, corrugated cardboard, can be substituted. Allowing space at the corners for ventilation, screw the backing to the stretcher.

10. Never frame paintings directly against glass.

11. When hanging paintings use screw-eyes attached to the frame. Use two anchoring hooks in the wall rather than one, for greater stability. Better yet, use commercially available 'security' hangers. (Appendix 1)

12. Dusting; Do not dust any painting with loose paint. Never vacuum paintings, or use a vacuum cleaner brush attachment as a duster.

13. Put labels on the backing, or, second best, on the back of the frame. Never stick labels or write anything directly on the canvas.

1. The traditional metals of antiquity are gold, silver, copper, lead, tin, and iron and combinations thereof (alloys) mixed together intentionally or otherwise. The manufacture of steel is a comparatively modern process. Almost all metals are subject to corrosion, or to the formation of mineral incrustations and the loss of metallic properties. Corrosion is due to a series of chemical or electrochemical reactions, and disintegration may be slow or accelerated, depending on the nature of the metal and the conditions to which it is exposed. Some metals are limited in the number of elements they will react with; other metals will react with a wider range of readily available elements. In all cases, the presence of both oxygen and water are necessary for the process of corrosion to proceed.

2. The corrosion on an object can be analyzed to interpret what conditions the object has been exposed to in its past. Before attempting any form of treatment it is necessary to know about the nature of the metal in the object, the corrosion products present, and what conditions the object needs to be protected from. Though corrosion affects the appearance of an object and may indicate an active problem, some corrosion products are actually stable, providing protection to the base metal. Regardless of what specific metal the object is composed, the following preventive conservation conditions should be maintained.

   a. Heat and the presence of air pollutants or physical contact with materials with a high acid content (cardboard, unseasoned and unsealed wood) accelerate the problem as do the oils and sweat from hands. Handle all metal artifacts with clean gloves!

   b. Higher levels of relative humidity in combination with oxygen increase the potential for corrosion of metal objects. Keep these objects in an environment with a relative humidity near 35% (A compromise must be made if the metal artifact is also made with humidity sensitive materials like wood.)

   c. Metal objects may not be as strong as they appear. If there is a thick layer of corrosion the actual remaining metal may be quite fragile. Some metals are softer than others, and all metals scratch easily. Before handling, remove rings, necklaces, keys, etc. that may bang into the object.

   d. Cast metal is brittle. It may break if dropped.

   e. Catalog numbers should be applied to metal artifacts using India ink over a thin painted strip of clear, dry acrylic resin (Acryloid® B-72).

3. Metals excavated from a wet site must be kept wet and further treatment recommendations should be obtained from an experienced conservator. Metal objects intended for unprotected exhibition and/or outdoors will require special treatment considerations. Contact a conservation lab.

## GOLD

1. Gold is found in nature in the metallic condition as a rich yellow, soft metal, commonly associated with quartz and certain sands. Pure gold does not corrode and is not dissolved under natural conditions. In objects such as coins and jewelry, gold is often alloyed with baser metals, like silver and copper, giving these objects differing colors depending on the proportion of metals. It is the copper and silver of such gold alloys that corrode.

2. Golden artifacts should not be cleaned beyond dusting with a soft cloth. Do not attempt to reshape crusted or dented gold as it may be too brittle to handle and the metal might break.

# SILVER

1. Silver is a soft, white, lustrous metal that can be found in the metallic condition though it is more generally distributed in nature in mineral form. The pure metal is malleable and ductile and is capable of taking a high polish. Silver objects may be plated or alloyed with other metals such as copper.

2. Pure silver will tarnish in the presence of sulfur compounds in the atmosphere, producing silver sulfide. If the silver is alloyed with copper, the copper will corrode preferentially to the silver, giving rise to copper corrosion products. Silver objects should not, therefore, come in contact with sulfur containing materials such as Latex paints, plastic bubble pack, rubber goods, industrial pollutants, and detergents with phosphates.

3. In storage, wrap silver in tarnish resistant cloth (Appendix 1) and seal in a polyethylene bag. Remember also to attach the catalog number on the outside of the package so the object does not need unwrapping to be identified. On exhibit, silver objects can be placed in a closed case with activated charcoal, or tarnish preventive papers and cloths to inhibit corrosion.

4. Silver objects should not be cleaned often since excessive cleaning will actually wear down any surface stamps or decorations. Silver can be degreased (from previous handling) with a 50/50-reagent alcohol/acetone solution.[20] Plated silver should not be cleaned beyond this point. If the tarnish is particularly stubborn, use a soft cloth (diapers work well) and a paste made of precipitated chalk called whiting (obtainable from wholesale druggist) in a 65% alcohol solution. Be sure to clean all traces of the cleaner and dry the object immediately.

5. Under certain conditions such as when these objects are handled by large numbers of visitors or museum staff, silver may be coated to prevent tarnishing. Because most coatings will eventually yellow and/or become difficult to remove upon aging, the decision to coat or not to coat should not be made lightly.

   a. Before lacquering, clean and degrease the silver, but do not use a cleaner with a tarnish inhibitor, as this will prevent good bonding of the lacquer. Do not soil the surface of the silver by handling with bare hands.

   b. Choose a lacquer that can be easily applied and dries quickly (allowing ease of handling during the spray process), bonds to the metal well, is tough but resilient, reversible, and safe (from fire hazard) when sprayed in a thin coat. One initially clear lacquer (may yellow in 10 years depending upon environment) is a nitrocellulose lacquer (Appendix 1).

   c. Apply lacquer by spraying or dipping. If you brush it on, use a soft clean brush and make the lacquer thin enough to spread without leaving brush marks. Apply one or two thin coats rather than one thick coating. Do not allow the lacquer to collect in any crevices, as it will become noticeable. Note: The lacquers are dissolved in flammable and toxic substances that should be used in a proper working fume hood or with the protection of an organic vapor mask worn in a well ventilated place.

# COPPER

1. Copper occurs in nature in the metallic condition as well as in the form of many minerals. Metallic copper like silver is sensitive to sulfur, which causes a thin film of copper sulfide. It is also sensitive to oxygen; pure copper oxidizes very readily when exposed to moist air. The oxide film, which is dull in appearance, does not thicken appreciably with time and therefore may be regarded as an aesthetically pleasing or scientifically or historically significant protective patina for the underlying metal. Some bronzes were intentionally darkened with chemicals at the time they were made in order to give them the "antique" look or to provide a protective coating. Generally, copper and its alloys (gun metal, bronze, bell metal and brass) are relatively stable materials and should present few problems in the museum's environment. This is a warning or argument against cleaning copper artifacts that appear to have a stable patina. If unsure, do not touch!

2. If a copper artifact requires simple cleaning or dusting, use the appropriate dry, soft jeweler's cloth and rub gently. Note: reserve jeweler's cloths, cleaning agents and coating materials for the specific metals for which they are designed. Copper artifacts that are intended to be shiny in appearance can be polished using a commercial brass cleaner like "Brasso®". Follow instructions and be sure to remove all the polishing paste from hollows or crevices.

3. For the coating of copper artifacts follow the same instructions as for coating silver, only using a more yellowed nitrocellulose lacquer (Appendix 1).

## LEAD, TIN, AND PEWTER

1. Lead and tin are soft, white metals. Though similar in appearance they have very different densities. Lead is twice as heavy as tin. To easily identify the differences rub the metal on a piece of paper. Clean lead leaves a black mark and tin does not.[21] Traditionally, pewter is an alloy of tin and lead, the harder varieties containing a higher percentage of tin. Modern pewter replaces the lead with antimony and possibly copper so these alloys are much harder and less subject to oxidation.

2. Lead, while it is shiny when freshly cast or cut, shortly acquires a characteristic stable (protective), dark grey patina. However, lead is quite sensitive to any acid vapors, or to acid and moisture. Lead objects, in industrial atmospheres, handled by sweaty hands, or exhibited or stored in oak or cardboard cases (high in acid content) will soon acquire a powdery white surface, evidence of unstable lead carbonate. Tin is also relatively stable, though it will corrode by prolonged exposure to combinations of air and moisture and some acids. While tin is stable it is also soft and can scratch and dent easily.

3. The best course is prevention, keeping lead objects out of an acid-containing environment.

4. Cleaning lead, tin, or pewter should not be necessary if kept in a clean, stable environment. Minimal dusting with a soft, dry cloth is recommended.

## IRON AND STEEL

1. Iron occurs in the metallic condition in meteorites associated with small quantities of nickel, cobalt, copper, etc. Because iron is so readily oxidized and converted to the minerals distributed throughout the earth's crust, it is rarely found naturally. Iron corrodes easily in the presence of oxygen and moisture. The corrosion products are unsightly, and the swelling and deformation of the objects may be severe. However, in the museum environment with a relative humidity near 35%-40%, corrosion of iron artifacts will proceed slowly.

2. Unless you are skilled in metal treatment and certain that the surface corrosion layer should be removed, leave iron artifacts alone. Think first; was the original surface shiny or not? Many gunlocks and barrels for instance, were given a blue, brown, or case-hardened finish during their manufacture. Many forge-made tools still retain their dark carbide scale, the result of prolonged heating in a charcoal fire. This provides part of the aesthetic and documentary value of the object as well as a stable protective coating. Cleaning iron artifacts in the museum should not be necessary beyond gentle brushing with a soft camelhair brush into a screened vacuum nozzle and/or a gentle stream of compressed air.

# ARGILLITE

1. The term "argillite" refers to the rock mined by the Skidegate Band of the Haida on Graham Island, the largest of the Queen Charlotte Islands in British Columbia, Canada. Argillite is actually a compressed carbonaceous, kaolinite slate. About 60-

70% of argillite is composed of clay-sized particles of one or more clay minerals-mostly kaolinite.[22]

2. The clay minerals in argillite absorb and give off moisture. The cracking of argillite carvings is related to the fluctuations in water content and relative humidity. A low relative humidity and excessive heating may cause the argillite to dry out and crack due to stresses created within the clay minerals.[23] In addition, argillite is soft and easily scratched.
3. Do not expose argillite to excessive heat or low relative humidity.
4. Handle argillite carefully as it is extremely fragile and prone to accidental cracking, chipping and breaking.
5. Write catalog numbers on argillite with white ink over a clear strip of lacquer (Acryloid® B-72). Some white inks are water-soluble and easily chip off. Apply a second coat of clear lacquer over the number.
6. Dust argillite lightly using a soft hair brush.

## Endnotes:


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# GLOSSARY

**abraded:** to rub off or worn away by friction.

**acetone:** (CH3 COCH3) colorless liquid solvent, miscible with water, HIGHLY FLAMMABLE, handle with rubber gloves and goggles.

**acids:** a substance that yields hydrogen ions (H+) when dissolved in water and measures as less than 7 on a pH scale.

**Acryloid B-72:** an ethyl methacrylate, methyl acrylate copolymer manufactured by Rohm and Haas, Philadelphia, PA.

**active deterioration:** when the condition of an object is changing for the worse at an accelerated rate.

**agents of deterioration:** the factors that cause the condition of objects to worsen.

**airborne particulates:** very small particles that float in the air including dust, soot, etc.

**alkalies:** a substance that yields hydroxyl ions (OH-) when dissolved in water and measures greater than 7 on the pH scale.

**ambient light levels:** surrounding and reflected light from a variety of sources.

**anisotropic:** having properties that differ according to the direction of measurement.

**atmospheric pollutants:** airborne contaminants or impurities that cause accelerated damage to objects.

**biological attack:** deterioration caused by living organisms e.g., fungus, beetles, humans, etc.

**bond cleavage:** separation of the inter-molecular forces.

**buffer:** something that protects by counter-balancing or moderating negative influences.

**cellulose:** the main chemical constituent of all plant tissues and fibrous products, including paper and textiles.

**chemical constituents:** the atomic and molecular parts of something.

**cleaving:** to split or separate.

**collagen:** kind of fibrous protein.

**condense:** to reduce the volume of; to become more compact; the physical process by which a liquid is removed from a vapor or vapor mixture.

**corium layer:** the strongest layer of skins or hides containing fibrous protein.

**corrosion products:** the substances yielded when a metal chemically reacts with its surroundings such as ferric oxide (rust), and silver sulfide (tarnish), etc.

**decompose:** to break down into parts.

**degradation:** to decompose or break down into parts.

**deterioration:** changes in the physical and chemical structure of something towards a worsened condition.

**environment:** the surrounding elements.

**ester:** any class of organic compounds corresponding to the inorganic salts formed from an acid by the replacement of hydrogen by an alkyl radical.

**esterification:** the formation of an ester.

"**free**" **moisture:** water within the cells of wood as opposed to "bound" moisture (water from the cell walls).

**fugitive:** given to change or disappear, dissolve.

**fumigation:** to employ noxious poisonous gasses to kill bugs and other vermin.

**fungus:** any of numerous plants of the division or subkingdom Thallophyta, lacking chlorophyll ranging in form from a single cell to a body mass of branched filamentous hyphae that often produce specialized fruiting bodies, and including the yeasts, molds, smuts, and mushrooms.

**hygrometer:** an instrument that measures moisture in the air.

**hygroscopic:** something that absorbs and gives off moisture in reaction to moisture changes in the air.

**India Ink:** commercial name for a modern ink that is waterproof (available in black and other colors).

**infestation:** to be inhabited or overrun by numerous harmful bugs or other vermin.

**inorganic:** something that does not contain carbon; or a non-living thing; like metals and stone.

**mechanical stress:** applying physical force against something.

**microcrystalline wax:** a type of paraffin wax.

**micro-environment:** a smaller enclosed space.

**mold:** a variety of fungus.

**molecular bonds:** the forces that hold groupings of atoms together.

**organic:** containing carbon; of living organisms.

**Paraffin wax:** a refined petroleum product that is more inert than animal or vegetable waxes.

**Pentachlorophenol:** "PCP"; "Dowicide® 7"; light brown solid with phenolic odor; emits highly toxic chloride fumes at high temperature; avoid skin contact; do not breathe dust/vapors; wear gloves; goggles.

**pressure sensitive tapes:** mending strips that stick readily to most surfaces with only light pressure.

**preventive conservation:** activities associated with minimizing or stopping the deterioration of objects.

**psychrometer:** an instrument that measures moisture content of the air using the difference in readings between two thermometers, one having a wet bulb ventilated to cause evaporation and the other having a dry bulb.

**putrefaction:** the decaying of matter by microorganisms, producing foul-smelling matter.

**radiation:** the emission and transmission of waves or particles of light energy.

**recording hygrothermograph:** an instrument that records variations in temperature and relative humidity.

**relative humidity:** the ratio of the actual amount of water vapor in the air at a specific temperature to the maximum capacity of the air at that temperature, expressed in percent (%).

**relaxing:** to make permanently flexible.

**temperature:** the degree of hotness or coldness, measured on a standard scale.

**thermometer:** an instrument that measures temperature.

**veneer:** a thin finishing or surface layer of superior quality (of wood or other materials) bonded to an inferior underlying layer.

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# Appendix 1

# SUPPLIERS

Below is a list of suppliers for materials that are used in the conservation and preservation of collections. This list is not exhaustive, nor does it constitute an endorsement of the suppliers listed. We suggest that you obtain information from a number of vendors so that you can make comparisons of cost and assess the full range of available products. The Alaska State Museums (ASM), gives no endorsements for any products, materials or services mentioned in this appendix and is not responsible for problems from their use or misuse. ASM does not make any warranty, expressed or implied; does not assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed; nor represents that its use would not infringe privately owned rights. If any organizations or other pertinent information has been inadvertently excluded please contact the ASM.

In addition to the suppliers listed below it is important to remember that local sources often carry items that are useful in caring for collections. Check local art supply stores for soft brushes, acid-free paper and boards, Mylar®, wheat starch paste, Fomecor®, India ink, Sharpee® pens, air compressors and air brushes, framing supplies; local fabric stores for cotton twill tape, unbleached cotton muslin, polyester batting material, beading needles; local hardware stores for netting or screen, measuring tape, plastic buckets, protective goggles, latex gloves, dust masks, polyethylene sheeting; and photography stores for light meters, cotton gloves, photo corners, negative holders, and photograph sleeves.

**ACR Systems Inc.**
Unit 210-12960 84 Avenue
Surrey, British Columbia, Canada V3W-1K7
Telephone: (800) 663-7845; (604) 591-1128
Fax: (604) 591-2252
Email: acr@acrsystems.com
Website: www.acrsystems.com
Dataloggers.

**Archetype Books**
6 Fitzroy Square, London W1P6DX, Great Britain
Telephone: (011 44) 207-380-0800
Fax: (011 44) 207-380-0500
Email: info@archetype.co.uk
Conservation and preservation related books.

**Archivart (Heller & Usdan inc.)**
PO Box 428, 7 Caesar Place, Moonachie, NJ 07074
Telephone: (800) 804-8428; (201) 804-8986
Fax: (201) 935-5964
Website: www.archivart.com
Archival papers and boards for storage, exhibition and conservation.

**Art Preservation Services**
315 East 89th Street, New York, NY 10128
Telephone: (212) 722-6300
Fax: (212) 427-6726
Email: artengel@aol.com
Website: www.apsnyc.com
ARTEN: Environmental Products, thermohygrometers, laser pointers, silica gel systems, reconditioning boxes, recalibration kits, ultra violet light monitors, visible light meters, ISUZU hygrothermographs, along with other gallery and display case products.

**Benchmark**
PO Box 214, Cane Farm Building 7, Rosemont, NJ 08556
Telephone: (609) 397-1131
Fax: (609) 397-1159
Website: www.benchmarkcatalog.com
Conservation and preservation supplies for mounting and exhibits.

**Cole-Parmer**
625 East Bunker Court, Vernon Hills, IL 60061-1844
Telephone: (800) 323-4340; (847) 247-2929
Website: www.coleparmer.com
Scientific equipment and supplies.

**Conservation Resources International**
8000-H Forbes Place, Springfield, VA 22151
Telephone: (800) 634-6932; (703) 321-7730
Fax: (703) 321-0629
Website: www.conservationresources.com
Archival, conservation, technical equipment and supply materials, and a variety of filtering materials.

**Conservation Support Systems**
924 West Pedregosa Street, Santa Barbara, CA 93101-4622
OR: PO Box 91746, Santa Barbara, CA 93190-1746
Telephone: (800) 482-6299; (805) 682-9843
Fax: (805) 682-2064
Conservation, restoration and archival products.

**Conservator's Emporium**
100 Standing Rock Circle, Reno, NV 89511
Telephone: (702) 852-0404
Fax: (702) 852-3737
Website: www.consemp.com
Archival and conservation materials, tools, supplies, and hygrothermographs.

**Conservator's Products Co.**
PO Box 411, Chatham, NJ 07928
Telephone: (973) 927-4855
Beva products and other supplies.

**Consolidated Plastics Company, Inc**.
8181 Darrow Road, Twinsburg, OH 44087
Telephone: (800) 362-1000; (216) 425-3900
Fax: (216) 425-3333
Website: www.consolidatedplastics.com
Storage containers.

**Coroplast Inc.**
4501 Spring Valley Road, Dallas, TX 75244
Telephone: (800) 666-2241; (972) 392-2241
Fax: (972) 392-2242
Website: www.coroplast.com
Corrugated plastic boards.

**CSI: Crystalizations Systems, Inc.**
640 Broadway Avenue, Holbrook, NY 11741
Telephone: (516) 567-0888
Fax: (516) 567-4007
Email: csistorage@aol.com
Website: www.crystalizations.com
Storage systems.

**Daniel Smith Artist's Materials**
4150 First Avenue South
PO Box 84268, Seattle, WA 98124-5568
Telephone: (800) 426-6740 Orders
(800) 426-7923 Service
Fax: (800) 238-40065
Website: www.danielsmith.com
Artist supplies.

**Delta Designs Ltd**
PO Box 1733, Topeka, KS 66601
Telephone: (913) 234-2244
Fax: (913) 233-1021
Email: delta@cjnetworks.com
Website: www.deltaltd.com
Storage equipment.

**Dick Blick Art Materials**
PO Box 1267, Galesburg, IL 61402-1267
Telephone: (800) 447-8192
(800) 933-2542 Product Information
(309) 343-6181 International Calls
Fax: (800) 621-8293
Website: www.dickblick.com
Art materials.

**Edmund Scientific Company**
101 East Gloucester Pike, Barrington, NJ 08007
Telephone: (800)728-6999; (609) 573-6879
Fax: (856) 547-4826
Email: scientifics@edsci.com
Website: www.edmundscientific.com
UV blocking flexible polyester film.

**Emergency Supplies for Collections**
PO Box 3902, Seattle, WA 98124-3902
Telephone: (206) 322-4181
Fax: (206) 323-4153
Provides prepackaged emergency supply kits for disaster response and recovery.

**Fisher Scientific**
711 Forbes Avenue, Pittsburgh, PA 15291-4785
Telephone: (800) 388-8355
Website: www.fisher.com
Chemicals and lab supplies.

**Gallard-Schlesinger**
584 Mineola Avenue, Carle Place, NY 11514
Telephone: (516) 333-5600
Toll Free: (800) 645-3044
Website: www.gallard.com
Testing papers and pH indicators.

**Gaylord Bros.**
Box 4901, Syracuse, NY 13221-4901
Telephone: 800-448-6160
Fax: 800-272-3412
Website: www.gaylord.com
Helpline on Thursday and Friday
Conservation and archival supplies, hygrothermographs, and free brochures.

**Hanwell Instruments**
PO Box 229, Mill Neck, NY 11765
Telephone: (800) 800-0588; (516) 624-2900
Fax: (516) 624-9363
Data loggers.

**Herzog/Wheeler & Associates**
2183 Summit Avenue, St. Paul, MN 55105
Telephone: (612) 647-1035
Fax: (612) 647-1041
Email: june_wheeler@msn.com
Data loggers.

**Hollinger Corporation**
PO Box 8360, Fredericksburg, VA 22404
Telephone: (800) 634-0491
Fax: (800) 947-8814
Email: hollingercorp@intersurf.net
Website: www.hollingercorp.com
Acid-free paper products, folders, tissue, polypropylene, and Mylar® polyester film.

**Keepsafe Systems**
570 King Street West, Toronto, ON M5V 1M3, Canada
Telephone: (800) 683-4696; (416) 703-4696
Fax: (416) 703-5991
Email: keepsafe@interlog.com
Website: www.gowncare.com
Barrier films, anoxic packaging supplies, and related materials.

**Kremer Pigmente Conservation Supplies Inc.**
228 Elizabeth Street, New York, NY 10012
Telephone: (800) 995-5501; (212) 219-2394
Fax: (212) 219-2395
Email: kremer-pigmente@t-online.de
Website: www.kremer-pigmente.com
Conservation supplies.

**Lab Safety Supply**
PO Box 1368, Janesville, WI 53547-1368
Telephone: (800) 356-0783 Orders;
(800) 356-2501 Safety TechLine
Fax: (800) 543-9910
Website: www.labsafety.com
Personal and industrial safety supplies.

**Light Impressions Corporation**
PO Box 22708, Rochester, NY 14692-2708
Telephone: US & Canada (800) 828-6216
International Telephone: (716) 271-8960
US & Canada Fax: (800) 828-5539
International Fax: (716) 442-7318
Website: www.lightimpressionsdirect.com
Technical Information. Archival and conservation materials, framing, photographic storage materials, and free brochures.

**Metal Edge Inc.**
6340 Bandini Blvd., Commerce, CA 90040
Telephone: (800) 862-2228
Fax: (888) 82-BOXES
Email: mtledge@ix.netcom.com
Website: www.metaledgeinc.com
Archival storage products.

**Masterpak**
50 West 57th Street, 9th Floor, New York, NY 10019
Telephone: (800) 922-5522
Fax: (212) 586-6961
Website: www.masterpak-usa.com
Unique and archival materials for packing, crating, storing, shipping and display of objects.

**Museum Services Corporation**
1107 East Cliff Road, Burnsville, MN 55337-1514
Telephone: (800) 672-1107; (612) 895-5199
Fax: (612) 895-5298
Website: www.MuseumServicesCorporation.com
Conservation supplies and products for paper, paintings, textiles, and objects. Also provides archival acid-free supplies.

**Nilfisk of America, Inc**.
300 Technology Drive, Malvern, PA 19355
Telephone: 800-NILFISK
Website: www.nilfisk.com
HEPA vacuums.

**Peregrine Brushes & Tools**
2400 Kettner Bouldvard, Suite 231, San Diego, CA 92101
Telephone: (888) 389-5222; (619) 231-4019
Fax: (619) 231-4019
Email: PrgrnBrush@aol.com
Website: www.peregrinebrushesand21s.com
Art conservation and museum collections care tools and supplies.

**Plastic Suppliers**
1174 Hayes Industrial Blvd., Marietta, GA 30062
Telephone: 800-722-5577
Website: www.PlasticSuppliers.com
Mylar and other plastic supplies.

**Rohm and Haas**
Independence Mall West, Philadelphia, PA 19105
Telephone: (800) 523-7500; (215) 592-3000
Fax: (718) 271-0891
Website: www.rohmandhaas.com
Ultraviolet filters.

**Sigma Chemical Company**
PO Box 14508, St. Louis, MO 63178-9916
Telephone: (800) 325-5832
Website: www.sigma-aldrich.com
Chemicals and lab supplies.

**SmallCorp: The Small Corporation**
PO Box 948, Greenfield, MA 01302
Telephone: (800) 392-9500
Fax: (413) 773-7386
Website: www.smallcorp.com
Museum display cases.

**Spacesaver Corporation**
1450 Janesville Ave., Fort Atkinson, WI 53538
Telephone: (800) 492-3434; (920) 563-6362
Fax: (920) 563-2702
Email: ssc@spacesaver.com
Website: www.spacesaver.com
Information and materials storage systems.

**Steel Fixture Manufacturing Co.**
612 S.E. 7th Street, Topeka, KS 66607-1109
Telephone: (913) 233-8911
Fax: (913) 233-8477
Website: www.steelfixture.com
Storage cases.

**Superior FomeBords Corp.**
2700 West Grand Ave., Chicago, IL 60612
Telephone: (800) 362-6267; (773) 278-9200
Fax: (773) 278-9466
Website: www.fomebords.com
International distributor of foamboards.

**Talas (Division of Technical Library Services, Inc.)**
568 Broadway, New York, NY 10012
Telephone: (212) 219-0770
Fax: (212) 219-0735
Website: www.talas-nyc.com
Conservation supplies and tools.

**Testfabrics, Inc.**
PO Box 26, 415 Delaware Avenue, West Pittston, PA 18643
Telephone: (717) 603-0432
Fax: (717) 603-0433
Email: testfabrics@aol.com
Website: www.testfabrics.com
Conservation supplies for textiles.

**Thermoplastic Processes, Inc.**
1268 Valley Road, Stirling, NJ 07980
Telephone: (908) 647-1000
Fax: (800) 874-3291
Website: www.ThermoplasticProcesses.com
Ultraviolet filters.

**Thomas Scientific**
99 High Hill Road @ I-295
PO Box 99, Swedesboro, NJ 08085
Telephone: (800) 345-2100; (856) 467-2000
Fax: (856) 467-3087
Website: www.Thomassci.com
Laboratory equipment and supplies.

**Tri-Ess Sciences, Inc**
1020 West Chestnut Street, Burbank, CA 91506
Telephone: (800) 274-6910
Fax: (818) 848-3521
Website: www.Tri-Essciences.com
Chemicals and laboratory equipment.

**University Products**
PO Box 101, 517 Main Street, Holyoke, MA 01041-0101
Telephone: (800) 628-1912
Fax: (800) 532-9281
Email: info@universityproducts.com
Website: www.universityproducts.com
Archival and conservation materials, stamp storage, framing, and free brochures.

**Viking Metal Cabinet Company Inc.**
5321 West 65th Street, Chicago, IL 60638
Telephone: Sales (800) 776-7767; (708) 594-1111
Fax: (708) 594-1028
Website: www.vikingmetal.com
Specializing in museum cabinets, OEM and contract manufacturing.

**VIMCO**
9301 Old Staples Mill Road
Telephone: (800) 446-1503
Fax: (804) 262-7379
Website: www.solarscreen.com
Transparent plastic sun shades and allied products.

**VWR Scientific Products**
PO Box 1002, South Plainfield, NJ 07080
Telephone: (908) 757-4045
Fax: (908) 757-0313
E-mail: solutions@vwrsp.com
Website: www.vwrsp.com
Laboratory equipment and supplies.

## Appendix 2

# CONSERVATION RELATED ORGANIZATIONS

**Alaska State Museum**
**Conservation Department**
395 Whittier Street
Juneau, AK 99801
Telephone: (907) 465-4805
Fax: (907) 465-2976
Email: scott_carroll@eed.state.ak.us
Website: www.museums.state.ak.us
Information, and field services.

**American Institute for Conservation**
1717 K St., NW, Suite 310
Washington, DC 20006
Telephone: (202) 452-9545
Fax: (202) 452-9328
Email: info@aic-faic.org
Website: aic.stanford.edu
Conservation referral serviceand guidelines for selecting a conservator.

**Canadian Conservation Institute**
1030 Innes Road
Ottawa, ON K1A 0M5 Canada
Telephone: (613) 998-3721
Fax: (613) 998-4721
Email: cci-icc_services@pch.gc.ca
Website: www.cci-icc.gc.ca/

**The Getty Conservation Institute**
1200 Getty Center Drive, Suite 700
Los Angeles, CA 90049-1684
Telephone: (310) 440-7325
Fax: (310) 440-7702
Email: gciweb@getty.edu
Website: www.getty.edu/gci
Information.

**Library of Congress**
Preservation Directorate
Washington, DC 20540-4500
Telephone: (202) 707-5213
Fax: (202) 707-3434
Email: preserve@loc.gov
Website: www.lcweb.loc.gov/preserv/
Information.

**Western Association of Art Conservators**
c/o Holly Anderson
P.O. Box 98
Graton, CA 95444
Telephone: (707) 829-7085
Fax: (707) 829-7085
Email: handerson@pon.net
Website: palimpsest.stanford.edu/waac/
Information andpublications.

## Appendix 3

# CONSERVATION REPORT

Property of:
Proposed use:
Requested by:

Conservator's Priority 1 2 3 4
Curator's Priority 1 2 3 4

CAT. NUMBER: _____ ACC. NUMBER: _____

OBJECT/TITLE:

PROVENANCE/ARTIST:
DATE:

Location:

**DESCRIPTION**

Size:

Structure: (materials, weave, color, parts)

Surface or Decoration:

Mount or Storage Method:

**SUMMARY OF CONDITION/SPECIAL RECOMMENDATIONS**

- ☐ stable
- ☐ active deterioration
- ☐ unstable for travel
- ☐ unstable for exhibition
- ☐ stabilize before shipping
- ☐ regular inspection
- ☐ improve storage/display
- ☐ other:

**PREVIOUS TREATMENT**

- ☐ documented/dated
- ☐ stable
- ☐ unstable
- ☐ coating/dressing
- ☐ repairs
  - ☐ adhesives
  - ☐ sewn
- ☐ backing/support
- ☐ other:

**EXAMINED BY:**

**DATE:**
**PLACE:**

**TREATMENT NEEDED**

☐ no treatment needed
☐ needs professional exam ☐ urgent
☐ fumigation ☐ urgent
☐ other:

**CONDITION**

☐ shedding/unravelling ☐ other:
☐ dry/brittle/stiff
☐ loss ☐ major ☐ minor
☐ tear/break
☐ holes
☐ insects
☐ thin/weak
☐ distorted/warped
☐ creased/cracks

**SURFACE**

☐ yellowed ☐ other
☐ faded/bleach
☐ dyes run
☐ dust/dirt
☐ stains
☐ encrust.
☐ glue/labels

**RECORD OF TREATMENT AND OBSERVATIONS:**

Date of Completion: Signed:

**PHOTOGRAPHIC DOCUMENTATION**

# NOTES