

reCollections

Caring for Collections Across Australia

HANDLING, TRANSPORTATION, STORAGE AND DISPLAY



**HERITAGE
COLLECTIONS
COUNCIL**

Foreword	page iii
A Note to Readers	page iv
Introduction	page v
Handling	page 1
Transportation	page 15
Storage and Display	page 29
Acknowledgments	page 35

© Commonwealth of Australia 1998 on behalf of the Heritage Collections Council

ISBN 0 642 37384 1 (boxed set)

ISBN 0 642 37385 X (this volume)

Information presented in this book may be reproduced in whole or in part for study or training purposes, subject to the inclusion of acknowledgment of source and provided no commercial usage or sale of material occurs. Reproduction for purposes other than those given above requires the written permission of the Heritage Collections Council. Requests for permission should be sent to the HCC Secretariat at the address given below.

One copy of this publication is available to Australian institutions on application. Multiple copies to Australian institutions, copies to overseas institutions and copies to individuals will be charged at A\$100 plus postage and handling. Copies may be obtained by writing to:

Heritage Collections Council Secretariat

GPO Box 2154

Canberra ACT 2601

Australia

Phone (02) 6271 1094

Fax (02) 6271 1079

Email hcc@dcita.gov.au

This publication will be available online at the Australian Museums On Line website—
<http://amol.org.au>

Produced by the Commonwealth Department of Communications, Information Technology and the Arts.

Cover images (from left):

Detail of photograph courtesy of Museum of Western Australia.

Detail of bark painting, *Lightning Snake Story*, Douglas (Nawurapu) Wununmurra.
Photograph courtesy of Karen Coote, Australian Museum.

Detail of photograph courtesy of Artlab Australia.

Detail of hand-coloured 19th century children's book. Photograph courtesy of Vicki Humphrey.



HERITAGE
COLLECTIONS
COUNCIL

There are an estimated 41 million objects held in Australian museums, art galleries and historical collections. Collectively they tell the story of our history and our country and contribute to our sense of identity and national pride. Increasing the conservation skills of people who care for these collections is an important factor in protecting this heritage, and is a key goal of the Heritage Collections Council.

reCollections: Caring for Collections Across Australia has been developed with this goal in mind. This set of practical guidebooks is designed by the Council for use principally by non-conservators who are working with Australia's cultural heritage. The guidebooks are also a teacher-friendly resource which can be used in professional development workshops.

Many of Australia's most experienced conservators have been involved in researching, writing and editing **reCollections**, through the Conservation Training Australia consortium, led by Artlab Australia, which first developed the package, and through the Collections Management and Conservation Working Party of the Council.

The Heritage Collections Council's mission is to promote excellence in the management, care and provision of access to Australia's heritage collections so that together, they reflect Australia's cultural and natural diversity. The Council is a collaboration between the Commonwealth, State and Territory governments and the museums sector, and comprises people working in a wide range of cultural heritage institutions across the breadth of urban and regional Australia. **reCollections** is an important component of the Council's National Conservation and Preservation Strategy for Australia's Heritage Collections.

Rob Palfreyman
Chair
Heritage Collections Council

Heritage Collections Council

GPO Box 2154, Canberra ACT 2601, AUSTRALIA
Phone: (02) 6271 1094 Fax: (02) 6271 1079 Email: hcc@dcita.gov.au

A note to readers

reCollections: Caring for Collections Across Australia has been written by practicing conservators and is intended to provide a sound guide for the preventive care of cultural items. Active conservation treatment of cultural material should only be undertaken by, or on the advice of, a trained conservator. Before relying on any of the material in this guide, users should check its accuracy, currency, completeness and relevance for their purposes and should obtain appropriate professional advice.

***If in doubt,
consult a
conservator***

To obtain the names of accredited practicing conservators who are in a position to meet your particular conservation requirements contact the **Australian Institute for the Conservation of Cultural Material (Inc.)** a national organisation for conservators and people interested in the preservation of cultural material.

AICCM
GPO Box 1638
Canberra ACT 2601
National Secretary Phone: (02) 6254 8695
<http://home.vicnet.net.au/~conserv/aiccmhc.htm>

reCollections

Caring for Collections Across Australia

Our heritage is represented by a vast array of cultural material, from established national icons holding pride of place in major museums and galleries, to everyday items such as household appliances or newspapers which carry meaning for local communities or families. Yet so often the links to our heritage are tenuous because the objects which represent our culture are in danger of decay. However, there is a lot we can do to protect valued objects and collections and so prolong the life of our cultural heritage. ***reCollections: Caring for Collections Across Australia*** provides practical advice and guidance designed to help the reader care for their heritage.

reCollections explains how to apply preventive conservation techniques to cultural objects and collections. Preventive conservation optimises the environmental conditions in which objects and collections are housed. Controlling light and ultraviolet radiation, humidity and temperature, biological pests, and dust and pollutants helps to prevent damage and decay to cultural material. Preventive conservation also means ensuring that good handling, transportation, storage and display techniques are used at all times. Applying preventive methods to the care of cultural artefacts and collections can prolong and protect their life for current and future generations of Australians.

While ***reCollections*** provides conservation information about the care of cultural objects and collections, it is important to recognise that all except the simplest conservation treatments should be undertaken by trained conservators. Active conservation treatment is a response to the damage of cultural artefacts, a highly skilled field which often involves the use of chemicals and complicated technical procedures. Unless performed with a thorough knowledge of appropriate techniques and with the right equipment and materials, conservation treatments can do more harm than good to the objects being worked upon, and can be hazardous to the people performing the work. Conservation treatments should only be conducted by, or on the explicit advice of, a trained conservator.

To complement the preventive conservation advice contained in the volumes *Damage and Decay* and *Handling, Transportation, Storage and Display*, ***reCollections*** supplies detailed information concerning the care of some of the most common cultural materials. These range from the paper and other materials on which so much of Australia's cultural history may be seen, to special considerations in caring for Aboriginal and Torres Strait Islander cultural artefacts. In addition, modern practices concerning the management of collections and of the people who look after those collections are outlined.

HANDLING

Objectives	page 3
Introduction	page 3
General rules for handling objects	page 3
Handling art on paper and documents	page 6
Handling books	page 7
Handling photographs	page 7
Handling stretched paintings and framed works	page 8
Handling unstretched paintings	page 9
Handling electronic media	page 10
Handling textiles	page 11
Handling ethnographic or composite objects	page 11
Handling metal objects	page 11
Handling outdoor sculpture and machinery	page 12
Handling furniture	page 12
Handling ceramics, glass and enamelware	page 13
Self-evaluation quiz	page 13
Answers to self-evaluation quiz	page 14

Objectives

At the end of this chapter you should:

- be aware of how vulnerable objects are when they are being handled; and
- have an appreciation of the need for careful handling.

Introduction

Objects are most vulnerable to damage when they are being moved—even over short distances.

Although it seems unlikely that damage could occur when an object is being moved only a short distance, there are many examples of it happening. Try carrying a single sheet of paper from one room to another. If you hold it by one corner, it can very easily crease while you are walking. This irreversible damage may be acceptable on a sheet of blank paper, but would be disastrous on a valuable print or watercolour. Think about what can happen if someone rushes out of a door right into your path while you are carrying a glass bowl.

Accidents do occur so it is important to:

- handle objects with care;
- provide adequate support to objects;
- plan your movements;
- ensure the route is clear; and
- ensure there is a space to place the items when you arrive.

Planning and care minimises risk and reduces the chance of accidents happening.

This section summarises the do's and don'ts of handling for a range of objects.

General rules for handling objects

Objects are most likely to be damaged when they are being handled or moved—no matter what the distance.

Don't rush

Never rush when handling objects—even when you're under pressure or working to a deadline. Accidents are more likely to happen when you're hurrying.



Always:

- use both hands when carrying an object, so that you can properly support it; and
- make sure you have enough people to lift your object safely. If you don't have enough people, get help or wait until help is available.

Don't:

- try to carry too many things at a time. You won't be able to support each object properly and you might drop things and hurt yourself;
- try to save time by overloading trolleys or by stacking things on top of each other once you have moved them; or
- speed with trolleys, trucks and boxes. Always avoid abrupt stops and jerks.



Be organised and plan ahead

Eliminate unnecessary movement of objects. Be organised and know where you're going to put each object before you pick it up. Reducing the number of movements reduces the risk of damage.

Plan coordinated action in advance. Make sure you have enough people to lift your object safely. When more than one person is needed, for example, when moving a large piece of machinery, appoint someone to coordinate the activity.

Make sure you have the equipment you need to do the job properly.

Plan your route and think ahead when you are moving an object. If you do this you are less likely to have accidents or encounter obstructions.

If you are moving items on a trolley, plan your route to avoid uneven floor surfaces. In this way you can avoid shock and vibration damaging the object.

Provide support and protection to your objects

Examine the object you're going to handle or move, and note its weakness or any damage; then ensure that you support it so that handling and movement don't make the object weaker.

Never put both light-weight and heavy objects in the same carrying-box or container. The heavy object could fall over and severely damage the lighter ones.

Always use separation battens, foam padding or some kind of cushioning material between pieces when you have more than one object in a single box. All padding must be resilient and capable of absorbing and dissipating shock.

When you have finished the move, never discard any packing material until it has been thoroughly searched. It would be awful to throw away a small item or part of an item which was caught up in the packing.

For more information

For more information on some simple examination techniques, please see the chapter on Collection Surveys and Condition Reporting in *Managing Collections*.

Note any damage that occurs during the move

Remember, no matter how small a broken or rough edge is, it may be sharp enough to damage an item nearby.

All accidents should be recorded. When reporting a damage, describe it briefly, noting the nature, location and severity of the damage and record the date of your report. A sample report form follows.

Remember that fine arts insurance policies do not cover loss or damage caused by unskilled handling. Don't ask volunteers to handle valuable objects without first giving them some instructions. They need to read this information, and be helped and supervised.

You can't replace a unique object, even if your insurance claim is successful.

Report on damaged object

Item: _____

Title: _____

Accession No: _____

Artist/Manufacturer: _____

Brief Description of Damage: _____

Location of Damage: _____

How did the damage occur? _____

Does the damage require urgent attention? Yes No

If yes, remember that you will need to seek permission from the owner before proceeding with any treatment.

Signature: _____ Date: _____

Please return a copy of this form with the object.

Handling art on paper and documents

Handle paper as little as possible because it is highly susceptible to physical damage such as creasing and tearing. When you have to handle paper, make sure your hands are clean. Wearing gloves provides added protection. Cotton gloves are often recommended, but they are not always appropriate because they can make it much harder to pick up individual sheets of paper. Clean, close-fitting, surgical gloves are a good alternative to cotton gloves.

Use commonsense when handling fragile paper. Remember that old paper can be very brittle, and all paper is vulnerable to damage. So it is important to provide proper support.

If you have to pick up paper to examine it closely, it is better to place it on a rigid support, like a piece of cardboard, and lift the board. Holding it in your hand increases the risk of damage.

If you must carry paper over any distance, it should be carried horizontally on a rigid support, and with a covering material to stop the paper being picked up by the breeze. Sandwiching paper between two pieces of acid-free board will protect it well.

Even if your documents or works of art are mounted already, don't tuck them under your arm to carry them. They should be supported as described above.

Placing them in folders, Mylar pockets, Copysafe sleeves or polyethylene bags provides extra protection—with the exception of pastels and chalks, (see below).

Remember, the safest way to carry prints, drawings, watercolours and documents over long distances is in specially designed portfolios or Solander boxes.

If you're handling more than one paper item, separate each one with a sheet of tissue paper or good-quality paper—preferably acid-free.

If chalks, pastels, watercolours or pencil are abraded or smudged, the damage is permanent. Never allow rough paper or board to come into contact with these media. Do not place plastics such as Mylar, polyethylene or Perspex near chalks or pastels as the static attracts the loosely bound pigment. Don't allow anything to rub them. It is

best not to stack these types of works.

Never allow newsprint, wrapping paper or any printed matter to come into contact with prints, drawings, watercolours or documents. The inks may off-set onto your valued object.

Remember that mounts on works are visible when the works are on display, so take steps to avoid soiling the mounts. Direct handling of mounts can lead to soiling, so it is advisable to wear clean, cotton gloves when handling mounted works.

Don't mend paper using self-adhesive 'sticky' tapes of any kind. These tapes go through a number of stages when they deteriorate:

- firstly, the adhesive becomes very sticky and will be easily absorbed into the paper; and
- in the next stage, the adhesive changes chemically and begins to yellow and eventually turns a dark orange. At this stage the adhesive is almost totally insoluble and, therefore, the stains cannot be removed.

Never use rubber cement or wood glue with works on paper. These adhesives can discolour badly as they age.

Large works which require two people to carry them should be placed between two pieces of mount board. The route to be followed should be cleared of obstacles; and if there are doors that need to be opened, make sure there is a third person available to open them.

Don't use ink or markers near works on paper and documents—use pencil only.

Paper clips, even plastic ones, can damage fragile paper. Avoid them.

Rolled plans and works on paper should not be secured with rubber bands, because these will perish over time. Use cotton tape.

If you are rolling large paper items, roll them onto a tube to support them—rather than placing them inside the tube—this way you avoid damage by creasing.

For more information

For more information about caring for paper, please see the chapter on Paper in *Caring for Cultural Material 1*.

Handling books

When removing a book from the shelf don't pull it by the top of the spine, because you can cause a great deal of damage this way. Pulling a book from a shelf by the top of the spine will eventually break the spine at the joint. This can lead to the joint splitting along the full length of the spine.

The correct way to take a book from a shelf is to push the books on either side of it further into the shelf and hold the book firmly with your hand around the spine and your fingers on one cover and your thumb on the other.

For this reason, it is wise to leave some space between your books and the back of the shelf when you first set them up on a shelf.

When you have to handle books, make sure your hands are clean, otherwise you can leave dirty marks on the bindings and the pages. You can wear gloves for added protection—cotton gloves are often recommended, but they are not always appropriate because they can make it much harder to turn the pages. Close-fitting surgical gloves are a good alternative to cotton gloves. But cotton gloves should be worn when handling books with gold leaf decorations on the covers or on the fore-edge of the textblock.

Books should be opened gently: the spine and the sewing can be broken if the book is forced open. If you're using a book which cannot open flat, give it some support so that you don't strain its structure.

When opening new or newly bound books, don't open them from the centre. Start from the front and then the back, and open them gradually, section by section, until you reach the middle. This gradually eases them open and flexes the new structure gently. Opening them at the middle and forcing them to open flat can break the structure.

It is always best to turn pages slowly and with care. It is very easy to tear the paper if you are flicking through the pages quickly.

Don't lick your fingers to turn the pages: the moisture can set dirt into the paper. You can also transfer dirt and germs from the paper to your mouth. If the book has been fumigated against insects or mould, you may be putting yourself at risk.

If you are carrying valuable books, put them in a sturdy box. Don't try to carry lots of books at once. You could hurt yourself, and if you drop the books you will damage them.

The covers of books can be severely disfigured by abrasion and scratching. This is especially noticeable with very smooth, calf-leather bindings. Don't stack valuable or delicate books, or carry them in such a way that they will rub against each other.

If books do get damaged, be aware that some repairs can cause further damage. For this reason it is recommended that you do not use sticky tapes of any kind.

These tapes go through a number of stages when they deteriorate. Firstly, the adhesive becomes very sticky and will be easily absorbed into paper, bookcloths and leather. In the next stage, the adhesive changes chemically and begins to yellow and eventually turns a dark orange. At this stage, the adhesive is almost totally insoluble and, therefore, the stains cannot be removed. Once the adhesive become insoluble, the tape usually falls away: so the repair has failed and you still have the damage. In addition to the original damage, the paper is now badly stained as well.

Paper clips, even plastic ones, can damage and distort paper. They should not be used for attaching labels or marking your place. Metal paper clips rust over time and stain paper.

For more information

For more information on caring for books, please see the chapter on Books in *Caring for Cultural Materials 1*.

Handling photographs

Because photographs are highly susceptible to physical damage from improper and frequent handling they should be handled as little as possible.

When you must handle them, make sure your hands are clean. You can wear gloves for added protection—cotton gloves are often recommended, but they are not always appropriate because they can make it much harder to pick up individual photographs. Clean, close-fitting surgical gloves are a good alternative to cotton gloves.

Old photographs can be very brittle, particularly if they already have tears and creases. So it is important to support them properly when you handle them. New photographs also need support, so that they are not damaged.

If you must pick up a photograph to examine it closely, it is better to place it on a rigid support, like a piece of cardboard, and lift the board. Holding it in your hand may cause it to curl and increases the risk of damage.

If photographs are carried over any distance, carry them horizontally and supported on a rigid support, like a piece of cardboard. Place a board over the top of the photograph to prevent it being picked up by the breeze.

Even if photographs are mounted on cardboard already, don't tuck them under your arm to carry them. They should be supported as described above. Many old photographs were mounted on board which becomes very brittle over time. If these boards break, the photographs attached will break as well. Placing them in folders, Mylar pockets, Copysafe sleeves or polyethylene bags provides extra protection.

Photographic emulsions are easily scratched and need to be protected when you are handling more than one photograph at a time. You can protect them by separating them or interleaving them—ideally with archival materials such as photographic storage paper, Mylar or acid-free glassine. For short-term interleaving, silicon release paper or other papers with a very smooth surface can be used.

CAUTION

Papers which are very opaque, white and with a very smooth almost shiny surface are not suitable for interleaving. These papers are called 'coated papers' and have a finely ground mineral coating. When they are wet they become very sticky.

Photographs which are used frequently should be photographically copied. The copy prints can be used as the working records, instead of the originals.

Paper clips, even plastic ones, damage and distort photographs. They should not be used for attaching labels, even temporary ones, to photographs. If you need to place a temporary label with a photograph, write it in pencil on a piece of paper large enough to fold around the whole photograph.

Don't mend photographs using self-adhesive sticky tapes of any kind. These tapes go through a number of stages when they deteriorate.

- Firstly, the adhesive becomes very sticky and will be absorbed easily into paper and emulsions.
- In the next stage, the adhesive changes chemically, and begins to yellow and eventually turns a dark orange. At this stage the adhesive is almost totally insoluble and the stains cannot be removed.

If you have a damaged photograph, place it in a protective sleeve or wrapper to prevent further damage until you can get advice from a conservator.

For more information

For more information on caring for photographs, please see the chapter on Photographs in *Caring for Cultural Materials 1*.

Handling stretched paintings and framed works

To properly support and protect your paintings, it is better to never carry more than one painting at a time.

Before moving any painting, make sure that there is no flaking paint and that the work is secure in its frame. If there is flaking paint on the painting, leave it face-up while making sure that there are no loose pieces on the frame, and consult a conservator.



Paintings can range in size from quite small to extremely large. Whether large or small, paintings need to be given adequate support when they are being handled and moved.

Photograph courtesy of Artlab Australia, reproduced with permission of the Art Gallery of South Australia

If you have to move it yourself, carry it flat and face-up, so that you don't lose any paint while you are moving. Don't touch the canvas or the paint surface directly.

If your canvas painting does not have a backboard, check that the stretcher wedges are secured: they can do a lot of damage if they fall between the canvas and the stretcher.

It is advisable to wear white, cotton gloves while handling paintings and frames, particularly when handling gilded frames. Perspiration and skin oils can leave permanent marks on gilt surfaces.

Always hold paintings at points where the frame is strong. Ornate frames are especially vulnerable to damage. Never grip them by any of the ornate areas of the frame, because they may not be very strong and could break.

Never carry a painting by the top of its frame or stretcher—carry it with one hand underneath and one hand at the side, or if small, one hand on each side.

If the work is unframed, it is better to move it using handling straps or a travelling frame. Both of these allow you to carry paintings without touching the paint surface. If neither of these are available, then carry unframed, stretched paintings on the outer edges without touching either the front or back of the canvas. Never allow fingers to touch the paint surface.

For more information

For more information about handling straps, please see the chapter on Paintings in *Caring for Cultural Material 1*.

Don't put your fingers around the stretcher bars, or between the stretcher and the canvas because you could cause the paint to crack and flake in that area.

Remember to carry wrapped paintings with extra care, because you cannot see what you are touching.

Before putting a painting down on the floor, ensure that there are padded, wooden blocks or foam blocks in place. These blocks provide a softer surface than the floor, and keep paintings off the ground.

When you put the painting down, don't set it down on one corner—always set it down along one complete edge.

A large painting must be moved by two people, regardless of the weight involved. Never attempt to move a large painting alone.

If you are moving paintings on a trolley, it is wise to have two people to accompany the loaded trolley. With two people, one can hold the paintings in place, while the other can open doors. Accidents are more likely if one person tries to do everything.

Trolleys should be padded to prevent damage to frames.

If any damage does occur during the move, carefully collect and save any pieces, no matter how small—even tiny paint flakes—and document the damage.

Glazed artworks should be carried with care. Acrylic glazing such as Perspex is easily scratched, and glass can break if dropped or knocked.

If you are transporting paintings which are glazed with glass, tape the glass with masking tape. This will hold the pieces of glass together if it breaks, reducing the risk of damage to the work.

Make sure that you put tape on the glass only. If it gets onto the frame it can damage paint or finishes when it is removed.

For small frames, one strip of tape vertically in the centre of the glass, one horizontal strip and one strip on each diagonal will be sufficient. Larger frames will need more.

If you fold the tape back on itself at one end of each strip, it will be easier to remove. Remove the tape as soon as possible after the move. Pull the tape off at a very low angle and pull gently.

There is no need to tape Perspex or Plexiglas, and the tape can be difficult to remove—so don't tape these glazing materials.

Handling unstretched paintings

Unstretched paintings can be difficult to handle. If they are allowed to flop or move too much, the paint can begin to come away from the surface of the canvas. It is very important that unstretched paintings are well supported.

If the paintings are small enough to be moved flat, put a rigid support under them so that they

can be handled easily without flopping and distorting. A sheet of Foam-Cor or a strong mount board would be suitable.

Larger unstretched paintings may need to be rolled to be carried.

The roller should be as large in diameter as possible, preferably at least 200mm. The larger the painting, the larger the diameter of the roller should be.

Rollers can be specially made of light-weight materials, such as:

- Ribloc—ask the manufacturer to make the roller with the ribs on the inside, if possible;
- PVC pipe, a 300mm diameter pipe is a good size for most works.

Rollers should be covered with a layer of padding, either polyethylene foam, such as Plastazote, or Dacron wadding covered with clean, white, cotton fabric, to compensate for any irregularities in the painting's thickness.

It is very important that paintings are rolled the right way, painted-side out, and that they are properly interleaved and the roller properly padded. If the paint layer is on the inside when the painting is rolled, the paint will become compressed and will develop creases that will remain in the painting after it has been unrolled.

It is best to roll the painting with an interleaving layer of Tyvek to prevent any transfer of pigment. The Tyvek should be larger in length and width than the painting.

When rolled, the painting should be tied firmly, but not tightly, with cotton tape in several places along the roll.

If more than one painting is to be rolled on a roller, the paintings should be laid out flat and interleaved with Protecta Foam, as for flat storage. Once this is done, the paintings should be rolled onto the roller all at the same time. Remember, all the paintings should be painted-side out.

For more information

For more information about caring for paintings, please refer see the chapter on Paintings in *Caring for Cultural Material 1*.

Handling electronic media

Audio-recordings, video-recordings, floppy disks and CD-ROMs need to be handled carefully to avoid physical damage and contamination.

Even when your hands appear clean, traces of sweat and oil are present. If these are deposited on a recording they can attract dust or promote mould growth. To keep electronic media in the best working condition, it is recommended that you:

- handle magnetic and digital media carefully, avoiding skin-contact with magnetic or optical surfaces. Handle only the cassette of audio and video recordings, and only the edges of floppy disks and CD-ROMs;
- prohibit eating, drinking and smoking in all areas where magnetic and/or digital media are used or stored;
- carry reel-to-reel tapes by the hub or centre;
- don't carry your video camera or video tapes in a bag with liquids or food that could damage the video materials;
- secure digital media in storage boxes so that they cannot flex; and
- put digital media away as soon as it has been used.

If the materials are being used outside the museum, gallery or library, give users the above instructions.

For more information

For more information on caring for electronic media, please see the chapter on Electronic Information and Media in *Caring for Cultural Material 1*.

Handling textiles

The most important rule for handling textiles is: do not handle textiles unless you must. Always keep handling to a minimum.

Whenever possible wear clean, cotton gloves when handling textiles. Sometimes this is not practical, so make sure your hands are clean. Always wash them before handling a textile. This will prevent the transfer of body-oil and dirt to the textiles.

Keeping your hands clean is particularly important with textiles incorporating metal thread, because the metal will tarnish in reaction to acids from the skin.

It is important to remove jewellery such as rings, bracelets and necklaces when handling textiles. They might catch on the textiles and pull threads or tear the textiles.

When you do handle textiles, they should always be properly supported. Textiles that appear strong may, in fact, have areas of weakness which are not immediately visible. As a rule, all historic textiles should be regarded as fragile.

When handling flat textiles:

- never pick them up by one corner. Always support the weight of the textile evenly;
- small textiles should be carried either on a tray, in a box or on a board;
- larger textiles should be rolled, and carried on the roller. Hold onto the part of the roller extending beyond the textile; and
- never try to move a textile by yourself, if the size and weight of the textile indicate that you need two people. Carrying large textiles incorrectly can damage them, and the person carrying them could be injured.

When handling costumes, remember:

- costumes should never be picked up by the shoulders;
- always slide your arms under the costume and then lift;
- ideally costumes should be moved in boxes or on a board; and
- don't carry items on a hanger without using your arms for additional support.

When handling accessories:

- generally accessories should be transported on boards or in boxes. However, there are exceptions to this rule. Use your commonsense to decide the most appropriate way to handle them; and
- remember, accessories should always be evenly supported. For example, don't pick up a bag by its handle: use two hands to support it.

For more information

For more information about caring for textiles and costumes, please see the chapter on Textiles in *Caring for Cultural Material 2*.

Handling ethnographic or composite objects

Handle ethnographic material as little as possible.

If the object is made up of different materials, examine it carefully to find the strongest, most stable part, so that you can handle it there.

Do NOT wear cotton gloves for objects with flaking or powdery pigment surfaces, for example, Aboriginal bark paintings. The cotton gloves can pick up the pigment. If you must touch pigmented areas, wear disposable surgical gloves.

Remember that feathers are fragile and, if possible, should not be handled. If you must pick up single feathers, handle them at the rachis, that is, the vein portion.

For more information

For more information on caring for ethnographic materials, please see the chapter on Aboriginal and Torres Strait Islander Heritage Cultural Material in *Caring for Cultural Material 2*.

Handling metal objects

The most important point to remember when you are handling metal items—from silverware to iron tools—is to wear clean, cotton gloves. This is essential, because perspiration from hands contains chlorides and other salts which corrode metal objects.

Always weigh a metal object before trying to lift it. You may need two people or the use of a trolley for the move. It is better to find this out before you lift the object. Problems arise when you lift an object that is too heavy or too awkward to carry.

Never lift or carry objects by the handles, rims or any projecting part. Often handles and rims are damaged and can be weak or partially detached. Although handles may have been originally designed for carrying, no museum object should be carried by its handles.

Be careful of sharp corners and edges—they could damage other objects or hurt you.

Secure and support any moving parts on an object before you attempt to move it. This way, you minimise the risk of damage to the object and to other objects; and reduce the risk of injuring yourself.

For more information

For more information about caring for metal objects, please see the chapter on Metals in *Caring for Cultural Material 2*.

Handling outdoor sculpture and machinery

Always devise an action plan before moving large outdoor objects; the plan should outline the steps of the move, the equipment needed and the number of people required.

When planning a move, it is important to consider the size, weight and shape of the object, and to make sure that the object can be moved without damage and without injury to people.

If it is a valuable or significant object, you may need to get advice from a conservator on how best to move the item. This is particularly important with items of sculpture that may have parts which cannot bear the weight of the whole.

Check the load-bearing capacities of all the equipment to be used, and the floor loadings if relevant, and make sure equipment is in good working order.

For more information

For more information about caring for outdoor sculpture, please see the chapter on Outdoor Collections in *Caring for Cultural Material 2*.

Handling furniture

Carefully examine each piece of furniture before moving it. The feet and bases of cabinets, legs of tables, and legs and arms of chairs generally cannot withstand strain.

Only move one piece of furniture at a time, otherwise you put yourself and the item at risk. Never slide furniture along the floor—all furniture must be carried.

Never lift a piece of furniture by any projecting part. The decorative parts of furniture were not intended to bear the entire weight of the whole piece.

Never lift a chair by the arms or the back. Chairs should always be lifted by the seat rails.

Don't lift a table by its top. Tables should be lifted by their legs if at all possible: this supports the top from below and avoids straining the joints.

Never turn a piece of furniture with its top side down, because only the legs or base were designed to carry its weight.

Tie unlocked drawers and doors in place with cotton tape, so they cannot open during the move. Don't use ropes as they can scratch the furniture.

Don't touch the upholstered parts of the furniture because the acids and sweat on your hands may stain and degrade fragile or aged fabrics and leathers. Wear gloves if you must handle upholstery.

Always cover upholstered areas with clean cloth, Tyvek, tissue or polyethylene sheet before moving or storing.

Don't wrap lacquered furniture with plastic. Moisture can build up underneath plastic and this can cause the lacquer to develop white blanching. Tyvek can be used because it breathes.

Remove marble tops and protective glass from tables and cabinets before moving them. These are usually not fixed securely, and can fall off during the move. Move them separately because they are heavy and need support.

Don't expose furniture to draughts and direct sunlight—even for short periods of time.

Remember to be especially careful of decorative and ornamental areas when handling and padding them. These areas are particularly susceptible to damage from applied pressure or impact.

Before moving a piece of furniture, take off any turned finials or other removable parts. Turned finials are usually fitted loose, and will fall off easily. If they fall, they could be damaged or could damage another part of the object.

Two people should always accompany furniture loaded on a trolley. One person can steady the items, while the other can open doors and press elevator buttons. If you try to do everything by yourself you might have problems.

Handling ceramics, glass and enamelware

Never lift or carry fragile glass, ceramic or other objects by the handles, rims or any projecting part.

Although handles were designed originally for carrying, they have often been repaired or restored, so no museum object should be carried by its handles.

Wear gloves if you're handling objects with glazed, polished or highly finished surfaces. Cotton gloves are often recommended, but they are not always appropriate because they can make it harder to hold onto slippery glass surfaces. Clean, close-fitting surgical gloves are a good alternative to cotton gloves.

Carry small objects with two hands. One hand should support the bottom of the object, and the other hand should be placed at the side or the top to steady the object. Never carry more than one object at a time.

Always move light, fragile objects in a carrying box. Plastic cube crates are ideal for this. Separate each

piece within the box with a safe packing material. This prevents abrasions, chipping and breakage.

Never allow a piece to project beyond the edges of a carrying-box, trolley or storage area.

CAUTION:

There can be hazards involved with handling objects. Some natural history and mineral specimens can be toxic. You must be very careful when handling mouldy items also. Please see the Health and Safety chapter in *Managing People* for information on avoiding injury when you are lifting objects.

For more information

For more information on references about handling cultural material, please see the chapter on Transportation in this volume.

If you have questions about handling objects, contact a conservator. They can offer advice and practical solutions.

Self-evaluation quiz

Question 1.

When handling objects, you should:

- a) give them adequate support;
- b) protect them against the oils, acids and salts in your skin;
- c) think about what you are doing and plan ahead;
- d) use commonsense and take steps to reduce the risks of accidents;
- e) all of the above.

Question 2.

Which of the following statements are true?

- a) Accidents are more likely to happen when you are hurrying.
- b) You should keep one hand free when carrying objects, so that you can open doors.

- c) Placing your fingers between the stretcher and the canvas cannot damage the painting.
- d) A large painting should be moved by at least two people.

Question 3.

Paper:

- a) is vulnerable to damage and so it needs to be supported when it is being carried;
- b) is best carried by one corner and allowed to move with the breeze;
- c) is best repaired with sticky tape;
- d) can be handled in Mylar or Copysafe sleeves for added protection.

Question 4.

Which of the following statements are false?

- a) The covers of books can be damaged by abrasion and scratching.
- b) It is always best to turn pages slowly and with care.
- c) Books should be opened gently.
- d) Sticky tape should not be used to repair books.
- e) None of the above.

Question 5.

Cotton gloves can be worn when:

- a) handling photographs, as they protect the photographs from the dirt, oils and acids which are on your hands;
- b) handling textiles, particularly those with metal threads;
- c) handling metal objects because they are particularly susceptible to corrosion caused by chlorides—chlorides can be transferred from our skin to the metal surface;
- d) handling flaking and powdery pigment surfaces on ethnographic material.

Answers to self-evaluation quiz

Question 1.

Answer: e).

Question 2.

Answer: a) and d). b) and c) are false. You cannot safely and properly support an object with only one hand. If you place your fingers between the stretchers and the canvas you could crack the paint.

Question 3.

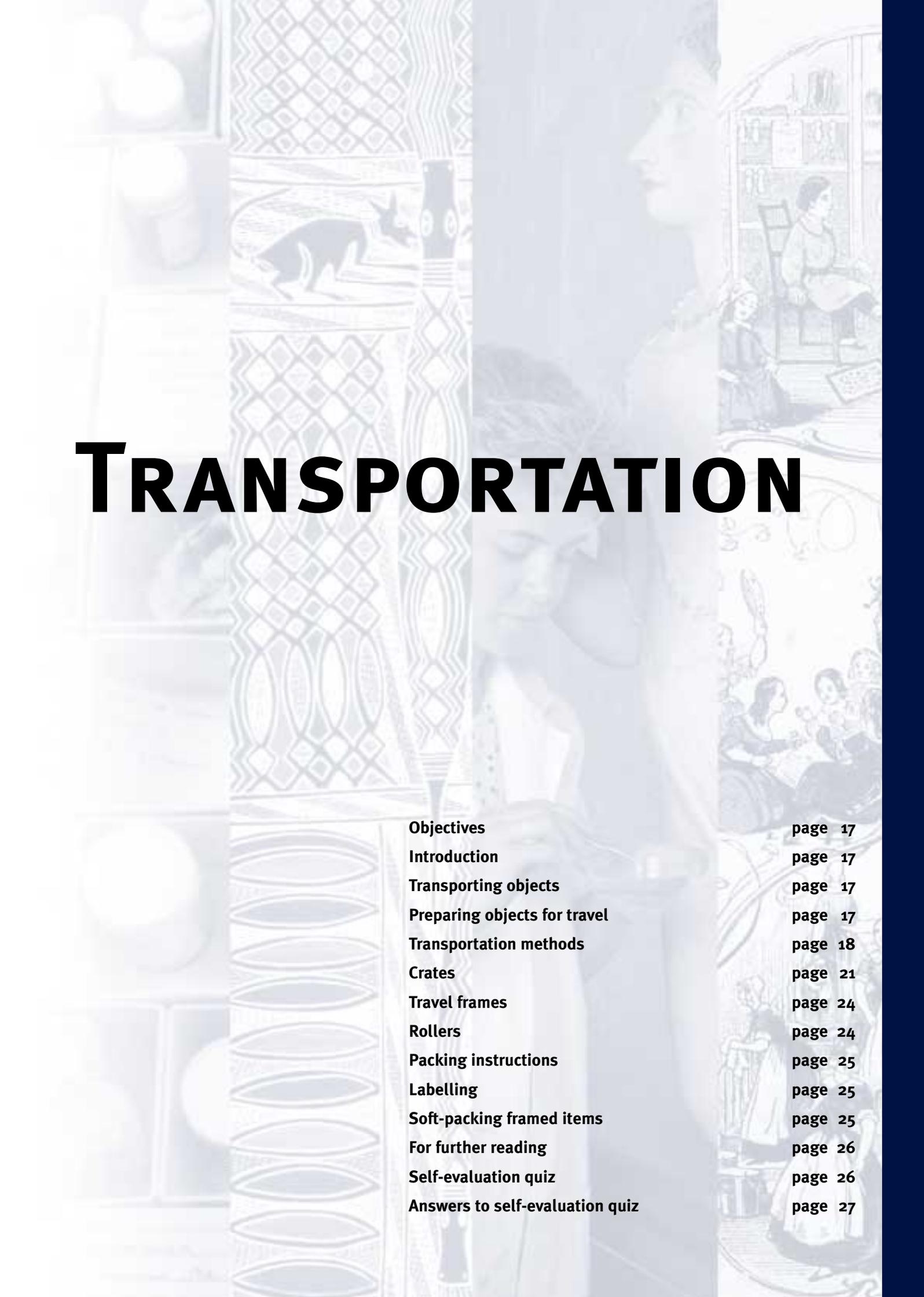
Answer: a) and d).

Question 4.

Answer: e).

Question 5.

Answer: a), b) and c). Cotton gloves should not be worn when handling flaking and powdery pigment surfaces on ethnographic material.



TRANSPORTATION

Objectives	page 17
Introduction	page 17
Transporting objects	page 17
Preparing objects for travel	page 17
Transportation methods	page 18
Crates	page 21
Travel frames	page 24
Rollers	page 24
Packing instructions	page 25
Labelling	page 25
Soft-packing framed items	page 25
For further reading	page 26
Self-evaluation quiz	page 26
Answers to self-evaluation quiz	page 27

Objectives

At the end of this chapter you should:

- be aware of how vulnerable objects are when they are being transported;
- have an appreciation for providing support for objects when they are travelling;
- have a basic knowledge of suitable materials to be used for packing objects for travel;
- understand the need to protect objects from fluctuations in environmental conditions when moving them from one climatic zone to another; and
- have some knowledge of the advantages and disadvantages of different transport methods.

Introduction

The chapter on handling objects explained how objects are most vulnerable to damage when being moved—even over short distances.

The risk of damage increases when objects are moved over long distances. Objects moved interstate or overseas are susceptible to damage from:

- vibration;
- fluctuations and extremes of relative humidity and temperature;
- repeated handling;
- vibration and impact during loading and unloading from trucks and planes;
- light and UV radiation; and
- pollutants.

When moving objects over long distances, it is important to provide adequate support for them and to take steps to minimise the risk of damage.

This chapter outlines the steps that can be taken to protect objects which are being transported.

For more information

For more information about adverse environmental effects, please see *Damage and Decay*.

Transporting objects

If you are going to transport objects, it is important to provide:

- full support for each object;
- protection from vibration and impact;
- protection from environmental and climatic extremes; and
- protection from light and UV radiation.

There are ways of protecting objects, whichever way you're transporting them—whether by truck and forklift, plane, or in your car.

Preparing objects for travel

Before an object travels, it is important to determine whether it is fit to withstand the rigours of the journey. Access to collections is a high priority and it is sometimes difficult to turn down requests for loans. But if an object is too fragile to travel, it should not go. Remember, if it is irreparably damaged, no-one will have access to it.

Once you have decided that the object can travel, make sure you know:

- where it is going and when;
- who will take responsibility for it while it is there;
- what the environmental conditions are like at the destination/s: if your object is fragile and likely to be damaged by adverse conditions, specify that the borrower meets your requirements;
- how it is travelling, which may affect the way you pack it and the size of the crates or packages;
- whether insurance has been arranged; and
- who is paying for packing, transport and replacement if necessary.

Loan agreements are often drawn up between lenders and borrowers, to cover these and other issues.

For more information

For an example of a loan policy, please see the chapters Purpose and Policies and Aquisitions and Significance in *Managing Collections*.

When you are happy with arrangements and the object is being prepared for travel, it is strongly recommended that you document its condition before it leaves your care. No-one anticipates a confrontation over responsibility for damage, but it does occur and it is important to have accurate records of the object's existing condition, including damages and repairs, before the item leaves.

If the item is going to a number of venues, it is wise to have condition reporting documents that travel with it, and which are filled out on arrival and departure from each venue.

For more information

For more information about documenting the condition of objects, please see the chapter Collection Surveys and Condition Reporting in *Managing Collections*.

When objects must travel, it is important to protect them from, among other things:

- fluctuations and extremes of temperature and relative humidity;
- vibration and shock;
- impact;
- getting wet;
- theft; and
- getting lost.

For more information

For more information about adverse environmental effects, please see the chapter on Humidity and Temperature in *Damage and Decay*.

There are a number of ways of protecting objects for travel and they will be outlined in the following sections.

The choice between the various methods will be determined to a large degree by:

- the number of items travelling;
- their weight;
- how they are travelling;
- their uniformity of shape and size;
- your preferences for the protection of items from your collection.

Transportation methods

There are four possible options for transport—air, road, rail and sea.

Air, rail and sea will involve some road transport as well, because the crates will have to travel to and from the airport, railway station or sea port.

In Australia, sea transport is rarely a possibility and is certainly not recommended for valued works; it is very slow and it is difficult to protect works from climatic fluctuations and from salt.

Rail transport is not recommended either. It is difficult to supervise and generally involves items travelling for longer periods and over longer distances than road journeys between the same towns.

The other two options, air and road, have advantages and disadvantages that are important to assess when arranging transport for your collection.

If you are arranging to send objects overseas, it is also important to develop a good working relationship with a reputable international freighting agent, preferably one with experience in shipping museum objects and artworks.

Transporting your collection successfully requires effective communication between all parties. Always document all discussions—personal and telephone. Also make sure that you confirm with the company what was discussed, and any agreed procedures and outcomes.

Air transport

For items which have to travel interstate, air transport is a viable option. The speed of air transport makes it very convenient—a crate can be loaded on an aircraft in Perth and unloaded in Sydney on the same day. This greatly reduces many risks—including security, vibration and changes in humidity and temperature—provided safe handling can be ensured.

The speed and convenience of air transport are greatest between major cities. Air transport between regional areas is not so easy, especially if the area is serviced only by small aircraft.

If you are considering air transport, please note the following points.

It is important that valuable objects travel in pressurised compartments. This always happens on domestic passenger flights and on freight flights.

Insist that the crate travels the right way up in the aircraft. This can be difficult to ensure unless you actually supervise the loading of the aircraft. Crates for paintings should always travel in the direction of flight to minimise vibration. If crates are loaded so that the canvasses are perpendicular to the direction of flight, the canvasses are likely to flex considerably during take-off and landing.

Supervising the loading of valuable cargo is not difficult to arrange at Australian airports, especially if the cargo is to be accompanied by a courier; but it can be very time-consuming. Most cargo is loaded about 5 hours before flight departure.

Air transport involves many levels of handling. The crate has to be trucked to the air cargo depot, then loaded onto a pallet or container, then loaded into the aircraft. This is then repeated in reverse at the destination. So much handling provides many opportunities for accidents, especially if the crate is so large that it requires a forklift.

It is difficult to control where the crate is stored between connecting flights; so there is always the possibility that your valued objects will be left on the tarmac in the rain or the blazing sunshine for several hours.

Airline schedules are always changing, especially in the allocation of aircraft. You will need to keep up-to-date with the schedule changes if your crate will fit on only one type of aircraft.

International shipments

If international shipments were easy and safe, there would be no need for couriers. If you are the courier, you're there to deal with the things that go wrong, so don't be surprised when they do.

The one overriding thought to keep in mind if you are involved in arranging this sort of transport is that something will go wrong: so expect it and plan for it.

Good freighting agents invariably have good relationships with airport staff and may be able to achieve results that you can't.

Make sure that the freighting agent understands your requirements and that you know the full details of how the shipment will be handled and cleared through Customs.

Make sure your freighting agent knows when there are public holidays in the countries through which your shipment is travelling.

Road transport

Road transport is the most common form of transport used in Australia.

The options available include:

- packing up your objects and putting them in your car;
- placing a parcel with the local express courier service; and
- arranging for a dedicated air-ride truck to carry your freight door-to-door.

Remember that double-handling will occur if you use a regular transport service. The items will be collected by the freight company, then taken back to their depot and placed in a larger vehicle with other freight. This will happen even with specialised art shipment companies, unless you make special arrangements for a dedicated vehicle. Additional unsupervised handling involves additional risks.

A dedicated vehicle is the best option for large shipments, but this can be very expensive. A dedicated vehicle will carry only your freight and should travel directly from pick-up to set-down, with no depot handling.

Most interstate road transport vehicles stop during the trip for rest breaks. If your shipment is particularly valuable, make sure that there is adequate security during these breaks. Some freight companies have arrangements with country police stations for secure lock-up overnight.



Photograph courtesy of Artlab Australia

There are many different types of trucks in use for freight handling. Make sure that the truck being used is covered, even for local trips. If there is a gust of wind, a sudden shower or you drive past a garden sprinkler, your objects could be badly damaged if they are on a flat-bed truck or in a ute.

If the objects or the packing are large or heavy, a truck with a platform lift—sometimes called a tail gate or tail lift—will be necessary. Alternatively, you will need to arrange for a forklift and a qualified driver to be available at both ends of the journey.



Photograph courtesy of Artlab Australia

Some freight companies, especially those that handle artworks or computers regularly, have air-ride vehicles. These trucks have special suspension systems which greatly reduce vibration. Some researchers suggest that transport in a dedicated air-ride truck is safer than air transport. For large touring exhibitions this is certainly true.

Valuable objects are sometimes transported locally uncrated and unpacked or soft-packed.

This is recommended only when an experienced, reputable, art-handling company is used, and only for short journeys where there is no additional handling or changing of vehicles.

When travelling like this, the objects should be sitting on vibration-absorbing padding, and firmly tied with padded straps to one wall of the truck.

The objects should be packaged so that nothing can touch them directly. For the safety of your objects and your driver, don't travel with unsecured items, such as trolleys, blankets or parcels, in the truck.

Sometimes it is possible to arrange last pick-up, first set-down transport with a company. Accurate crate dimensions have to be given to the freight company. They load their semi-trailer for the trip, then collect your crate last, before setting out.

This avoids the depot handling phase, but can be hard to organise and, even if agreed to, may not always happen.

Small objects travelling in your car

Even if you are transporting small items over small distances in your car, it is important to protect them. You need to provide:

- adequate support;
- protection against vibration and impact; and
- protection against climatic extremes and fluctuations.

Pack the items well. When you place the packaged items in your car, make sure they cannot move around.

Three-dimensional objects, including framed works, should be wrapped with protective packaging material such as Cellaire foam padding.

Unmounted, small- to medium-sized paper items should be sandwiched between acid-free boards and then wrapped.

If packing more than one piece of paper, interleave each one with acid-free paper or tissue. If the items are different sizes, interleave them with acid-free board cut larger than the largest item. Large, flat items can be rolled.

Small, three-dimensional objects, once wrapped, can be placed in a box.

Packing material should be placed around the objects so they don't move around. The packaging materials will absorb some vibration.

Small, flat items and rolls can be placed on the seat; but they should be held in place or secured in some way, so that they can't move around or fall off the seat.

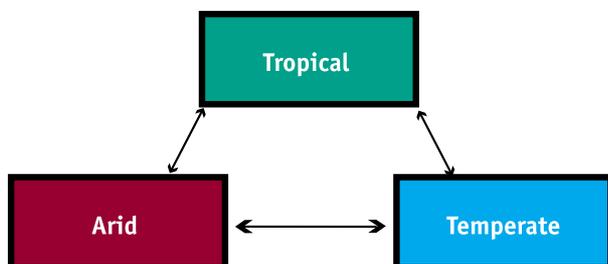
Ensure that there are no other things in the car which can move around and damage your objects.

Don't carry valuable items on flat-bed trucks or in the back of utes.

For more information

For more information on rolling flat items, please see the notes under the heading Rollers in this chapter.

When transporting items to and from different climatic zones:



- Provide them with adequate protection to buffer them against the climatic change.
- It is important that they are not forced to adjust to a different climate quickly.
- On arrival at their destination they should be allowed to gradually condition to their new environment. The crates should remain

unopened at the destination for a full 24 hours. This allows the local climate within the crate to **gradually** adjust to outside conditions.

- This should also be done on the return journey.
- If the objects are travelling from one extreme to the another, for example from a tropical to an arid climate, it may be advisable to allow more than 24 hours for conditioning at each end.

Crates

The safest way to transport an object is in a properly built and suitably padded crate.

There are many different crate designs and numerous competent crate builders. It is generally more cost-effective to use an established crate builder than to build your own crates.



Packing crates for a travelling exhibition.

Photograph courtesy of Artlab Australia

When designing a crate, it is important to remember that it has to travel. It is very easy to get carried away designing a crate to fit, for example, all fifteen paintings in an exhibition, and finish up with a huge box which does not fit through any doors and cannot be lifted except by crane.

Remember to take into account the size of the doors at your museum, gallery or library and at the destinations: you don't want to have your precious objects being loaded and unloaded on the footpath or in the car park because they are too large to get inside.

Do take into account the floor loading capacity of the building if you need to use a forklift or scaffold.

When calculating the capacity of the crates, remember it is always easier to find two people to lift a crate than three. Think about the final weight of the crate. Building a crate which is just a little too heavy for two people to carry safely will place the people and the objects at risk.

If you need to air-freight the crate, there will be additional limitations on the crate's size—sometimes these are surprisingly restrictive.

What makes a crate?

Most crates consist of:

- an outside shell of timber forming a box;
- a waterproof lining, which can be plastic sheeting, tar-paper or a waterproof insulation layer such as sisalation: the better the insulating properties of the crate, the better it is for the objects being transported; and
- a lid which is well sealed—this seal is usually a foam or rubber gasket;



The interior of this crate has been designed to take a range of objects.

Photograph courtesy of Artlab Australia

Painting the exterior of a crate is important because it provides an additional waterproofing layer. Also, if you paint it white, it will reflect light and keep the interior cooler. White has a curious psychological effect—people handling a

white-painted crate consider it to be more fragile and so handle it more carefully than other crates.

Crates usually open at the top if they are small, or at one side or end if they are large. The lid can be fixed with either screws or bolts set in threads.

Threaded bolts are better than screws, because they can be opened and closed many times without compromising the security of the fixing. Once screws have been removed and replaced several times, they become loose and can work free during transport.

Don't use nails to fix the lid—the objects in the crate will suffer the vibration of hammering when the lid is being fitted.

The interior of the crate will vary depending on the nature of the items to be transported, but must always contain foam padding to absorb vibration. The padding is put in strategic positions to ensure that maximum vibration absorption is achieved. The best padding consists of foam blocks made of layers of foam with different densities, so that different levels of vibration are absorbed.



Small, three-dimensional objects packed ready for travel. The items have been placed in drawers in the crate. The objects are well padded for protection.

Photograph courtesy of Artlab Australia

Good-quality, dense foam forms the base of the block, with softer, more compressible foams on top. Using only low-density, soft foam will result in small vibrations being absorbed, but not sudden shocks such as when a crate is dropped.

Foams such as Plastazote and Evazote polyethylene foams are good foams to use; they have good densities and are relatively inert materials which won't deteriorate or give off harmful gases. They are relatively expensive to buy by the sheet; but remember that you don't need to pad the whole surface of your crate, only the strategic points.



A travel frame slides into the slots in the crate. This allows the paintings to travel vertically. Note that the travel frame is clearly labelled.

Photograph courtesy of Artlab Australia



Small, three-dimensional items are placed carefully in the positions prepared for them in the foam padding.

Photograph courtesy of Artlab Australia

It is important that paintings and framed works on paper travel vertically. Crates for these types of objects are generally designed to take several works in slots made to fit the individual works. The slots keep the works separate and minimise movement.

Packing three-dimensional objects is a much more complex procedure. Each object must be assessed carefully to determine the appropriate crating system and the type and amount of padding and support that will be required.



A bark painting being packed in its compartment in preparation for travel.

Photograph courtesy of Artlab Australia, reproduced with permission of the South Australian Museum

When you are ready to pack

It is critical that crates are packed indoors if at all possible, so that the objects are exposed to minimal changes in temperature and humidity.

Crates must be labelled, either with stickers or painted symbols on the crate, to indicate which way up they are to travel. 'Rain' and 'sun' protection symbols and 'fragile' signs should also be applied. There are standard international symbols for these things: arrows, umbrella, broken glass.

Sophisticated monitoring of artworks in transit is possible. There are numerous digital recording devices available which can be placed in the crate to record temperature and humidity changes or vibration extremes.

Simple stick-on devices called 'Shockwatch' can also be used to record whether a shock above a certain level has been sustained by the crate. Sometimes simply labelling a crate stating that a Shockwatch indicator is enclosed is enough to encourage more careful handling.

Travel frames

Paintings which are unframed or have frames with delicate gilded surfaces or ornate mouldings should always travel in travel frames. This may seem like an unnecessary expense, but in the long run it provides many savings.

It is much easier to crate several works in the same crate if they are in travel frames of similar size. The travel frame can be much larger than the painting, or you can put several small paintings on one large travel frame.



A number of small paintings were transported together on a large travel frame.

Photograph courtesy of Artlab Australia, reproduced with permission of the Flinders University Art Museum

Travel frames make it much easier to pad the crate, and greatly reduce the risk of damage to fragile or gilded surfaces.



Unframed paintings can be handled easily once they are attached to travel frames.

Photograph courtesy of Artlab Australia, reproduced with permission of the South Australian Museum

An unframed painting can also be stored in its travel frame until it actually goes on the wall, preventing damage from handling fragile edges.

Basically, the rule for travel frames is that you use them whenever you don't want any part of the painting or frame to touch the crate.

When paintings are fitted in travel frames, special fittings are used. These are either Ozclips or 'doovers', both Australian inventions. Ozclips can also be used to hang the painting on the wall in the exhibition.

Paintings fitted in travel frames should rest on layered foam blocks, so that additional vibration absorption is provided. When the painting is fitted into the crate, the blocks of foam should be slightly compressed.

Rollers

Very large, unstretched paintings, textiles and large maps or works of art on paper should be transported rolled. Some unmounted works on paper are also transported rolled.

It is very important that paintings are rolled the right way, painted side out, and that they are properly interleaved and the roller properly padded. If the paint layer is rolled inside, the paint compresses and develops creases which remain in the painting after it is unrolled.

The roller should be as large in diameter as possible, because you want the item to uncurl easily when it arrives at its destination. A very large Aboriginal acrylic painting which travelled to the USA in the South Australian Museum's *Dreamings* exhibition was rolled on a roller more than one metre in diameter. This size roller is not always possible or practical; but a good rule is to make the roller as large as will fit in a crate of reasonable size.

Rollers can be specially made of light-weight materials, such as Ribloc, or you can buy PVC pipe. A 300mm diameter pipe is a good size for most works.

If you are using a cardboard tube as the roller, pad it out to as large a diameter as possible.

Rollers should be covered with a layer of padding, either polyethylene foam such as Plastazote or Cellair, or Dacron wadding covered with clean,

white, cotton fabric, to compensate for any irregularities in the painting's thickness.

It is best to roll the object with an interleaving layer of Tyvek for added protection, especially if there is more than one item on the roller.

To transport works on paper using a cardboard tube, roll the paper around the outside of the tube. DO NOT roll the paper and place it inside the tube. It is extremely difficult to remove from the tube and the edges of the paper often get damaged in the attempt.

Before rolling the paper around the tube, cover the cardboard tube with acid-free paper. Another layer of acid-free paper should be rolled onto the tube with the work. Several protective layers of paper, padding and Tyvek should be added to the outside of the roll.

When rolled, the object should be tied firmly, but not tightly, with cotton tape in several places along the roll.

Packing instructions

It is always important to include unpacking and repacking instructions and an inventory in each crate. If possible, these documents should also be posted or faxed to the receiver before the crate leaves your museum, gallery or library.

Even if the packing and unpacking seems obvious to you, it is still worth spending the time writing instructions and a contents list. The person opening the crate at the other end may never have seen a crate like yours.

Labelling

Labelling is critical whichever transport system is selected. No matter how many forms have been filled out, make sure that there are labels firmly fixed to at least two sides of each crate, stating the originating and destination addresses, as well as contact names and telephone numbers.

Appropriate labels should be attached to indicate, for example, that items are fragile and that they need to be kept upright. If you don't provide these labels, the people handling the objects and crates will not know that they have to be careful.

It is important to label individual parcels and packages within crates as well. If many items are arriving at the destination at the same time, proper labelling makes it much easier to keep track of individual objects.

Use strong, sturdy labels that are securely fixed. Post-It notes are not good enough—they will fall off.

Soft-packing framed items

Framed items can be shipped with a reasonable degree of safety if they are packed well.

It is important to include a solid barrier on each side of the work, to provide some protection against impact. Various materials can be used, including cardboard, Foam-cor, Gator Foam, Masonite, Artcor and Perspex, depending on the level of protection desired. These materials should not be in direct contact with the work, because some of them are acidic and/or could stain the work. They have been selected for their resistance to impact, not for their archival qualities.

Before shipping a framed work, exchange the glass for Perspex or Plexiglas—except for chalks and pastels because the static electricity generated by plastics such as Perspex and Plexiglas attracts the loosely bound pigment. Glass can break and damage the item in the frame. If this is not possible, tape the glass with masking tape, so that if it breaks it does not fall into the work and cause damage.

The tape should be on the glass only. For small frames, one strip of tape vertically in the centre of the glass, one horizontal strip and one strip on each diagonal will be sufficient. Larger frames will need more.

Remove the screw-eyes and hanging wire from the back of the frame, because they can damage other items and prevent the packing materials from being in contact with the frame.

Cut two panels of solid, barrier material equal to the outside dimensions of the frame. Using a soft-packing material such as Cellair, pad the area above the glass or Perspex until it is flush with the top of the frame.

Wrap the frame in brown paper to protect it from abrasion. Place the frame between the two solid panels.

Wrap Cellair around the frame and panels, and seal the ends with masking tape. Cellair is a suitable packing material—it absorbs shock and provides a waterproof barrier. It should not be used for long-term storage as it can seal in moisture.

Wrap the whole package in brown paper and tape the ends. Finally, seal the package securely with masking tape and apply labels.

To protect ornate, fancy-cornered or fragile frames, place sponges or other soft packing materials on solid areas of the frame. The top solid panel will rest on the sponges, rather than on the fragile or ornate part of the frame.

CAUTION:

If you are using bubble wrap to pack your items, put the bubbles on the outside. Bubble wrap can transfer a pattern to paint layers and gilding.

If you have questions about transporting objects, contact a conservator. They can offer advice and practical solutions.

For further reading

Kelly, Sara, 1994, *Travelling Exhibitions—A Practical Handbook for Non-State Metropolitan and Regional Galleries and Museums*, National Exhibitions Touring Support for Victoria, Melbourne.

Rennie, Sarah, 1997, 'Concerning Works of Art' in *Australian Registrars Committee Newsletter*, Sept 1997, Australian Registrars Committee, Canberra.

Richard, Mervin, Mecklenburg, Marion F., Merrill, Ross M. (eds.), 1991, *Art in Transit—Handbook for Packing and Transporting Paintings*, National Gallery of Art, Washington DC.

Stolow, Nathan, 1987, *Conservation and Exhibitions: Packing, transport, storage and environmental considerations*, Butterworths, London.

Self-evaluation quiz

Question 1.

Which of the following statements are true?

- a) Sea transport is not a favoured option because it is slow and exposes objects to climatic fluctuations and salts.
- b) Air transport is quick and convenient for everyone in Australia.
- c) It is wise to check to see if aircraft schedules or the allocation of aircraft have changed if your crate of objects will only fit one type of aircraft.
- d) Valuable objects should travel in a pressurised compartment.

Question 2.

When transporting objects by road:

- a) put them in the back of the ute;
- b) provide them with support and protection from vibration;
- c) you must have a dedicated air-ride truck;
- d) make sure there is enough security during the driver's work breaks.

Question 3.

When transporting objects from one climatic extreme to another:

- a) it is important to buffer them against rapid climate changes;
- b) you should get them out into the new conditions as soon as possible so they are ready to display sooner;
- c) they should be left in their crate for at least 24 hours to gradually adjust to the new conditions;
- d) check the condition of your object before departure and on arrival.

Question 4.

Which of the following statements are false?

- a) Crates should be well sealed.
- b) Crates should be waterproofed.
- c) There is no need for a contents list or packing instructions for crates because its usually obvious what goes where.
- d) Crates should be padded well to protect objects from vibration and impact.
- e) All of the above.

Answers to self-evaluation quiz

Question 1.

Answer: a), c) and d) are true. b) is false. Air transport is quick and convenient if you are situated in a major city or regional centre. It is not convenient for everyone.

Question 2.

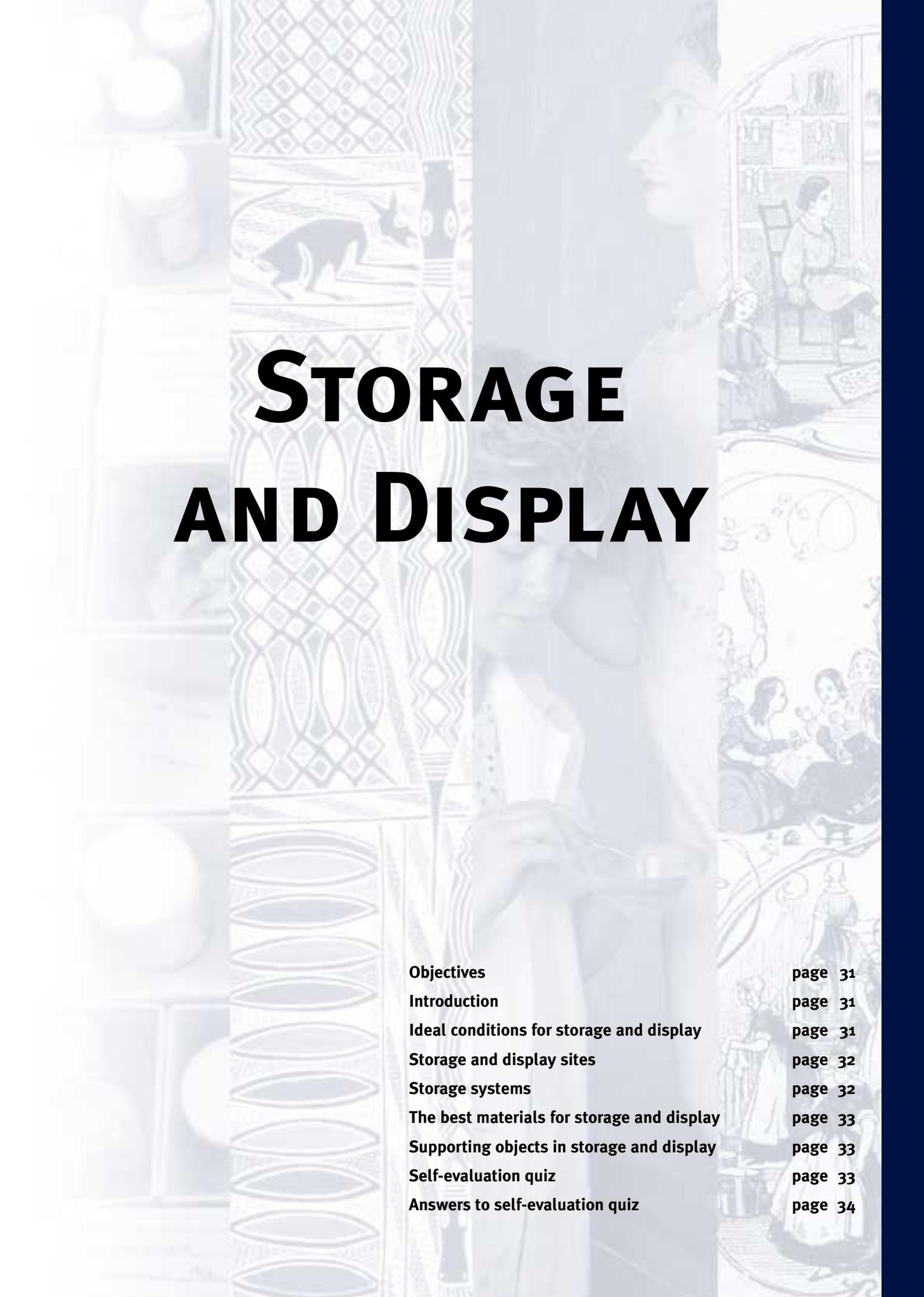
Answer: b) and d). Putting items in the back of the ute is not a good idea because they will not be protected from sudden showers, garden sprinklers and wind gusts. It is not absolutely necessary to have a dedicated air-ride truck, especially if you are transporting only a few items.

Question 3.

Answer: a), c) and d). If you follow b), you will almost certainly cause damage.

Question 4.

Answer: c). A contents list and packing instructions should be included in the crate. The method of repacking the crate is not always obvious.



STORAGE AND DISPLAY

Objectives	page 31
Introduction	page 31
Ideal conditions for storage and display	page 31
Storage and display sites	page 32
Storage systems	page 32
The best materials for storage and display	page 33
Supporting objects in storage and display	page 33
Self-evaluation quiz	page 33
Answers to self-evaluation quiz	page 34

Objectives

At the end of this chapter you should:

- know the ideal conditions for storing and displaying mixed collections of objects;
- be aware of some basic principles that will help you store and display your collections;
- be aware of the best materials to use for storing and displaying mixed collections of objects; and
- understand the need for adequate support of objects in storage.

Introduction

Objects in collections are generally either in storage or on display; and while they are in storage or on display, they can deteriorate. The rate at which they deteriorate and the extent of the damage will depend greatly on the conditions in the storage and display areas.

This section provides general information on (i) the ideal conditions for storage and display; (ii) storage guidelines; (iii) the best materials for storage and display; (iv) the need to support objects in storage and on display.

This information relates to mixed collections of different types of objects, and should be used as a guide only. Specific information relating to the storage and display of particular types of items is contained in the *Caring for Cultural Material* volumes.

Ideal conditions for storage and display

The following conditions outline the best long-term storage and display environment for most materials; but please note carefully that if the ideals for temperature and relative humidity cannot be met, or are inappropriate, the emphasis should be on providing a stable environment.

Ideally, mixed collections should be stored and displayed in environments where:

- temperature is constant and moderate: in the range 18–22°C;

- relative humidity is constant and in the range 45–55%; and
- light is kept to the minimum necessary for the activity.

Ideally, items should be stored in the dark. Light is really necessary only when items are being accessed, examined or displayed.

For display, it is necessary to have light. But the lighting levels need to be appropriate for the materials, as some materials are more light-sensitive than others.

For more information

For more information about specific lighting levels, please see the Light and Ultraviolet Radiation chapter in *Damage and Decay*.

Objects which are not particularly sensitive to light such as sculpture made from metals, earthenware and ceramics should still be protected. Do not expose them unnecessarily to very high lighting or UV levels and never expose them to direct sunlight. Remember also that many objects are made from composite materials and may contain small amounts of sensitive materials.

As light can be so damaging to many objects, it is important to consider carefully the lighting of your display. The following hints help to minimise damage:

- tungsten incandescent bulbs are one of the best lighting for display because they give out very little UV radiation. But, if you are using tungsten incandescent bulbs, make sure they are not too close to your objects, because they get very hot and can damage the objects. Similarly, avoid placing tungsten incandescent bulbs inside display cases, because they will raise the temperature to unacceptable levels unless the display cases have air-conditioning or mechanical ventilation;
- fluorescent tubes give out UV radiation and should not be used unless you are using low UV-emitting fluorescent tubes; and
- light-sensitive items should not be left on display indefinitely. Remember to rotate your exhibitions.

Steps should be taken to protect objects from dust, pollutants, mould and insect attack.

Objects should be protected from direct handling, excessive use and intentional damage.

For more information

For more information about adverse environmental effects and the steps you can take to minimise these effects, please see *Damage and Decay*.

Information on how to protect your collections from direct handling and intentional damage is given in the chapter Access to Collections in *Managing People*.

Storage and display sites

Careful consideration should be given to storage and display sites and systems. Ideal conditions, including a good storage system in an appropriate site, will give added protection to your collection. If the available facilities or the local climate make it difficult to achieve ideal conditions, then the selection of the site and the maintenance of good storage and display systems are even more critical in preventing damage to the collections.

The following notes are guidelines for selecting storage and display sites; they outline the principles to be followed for protecting your collections.

Wherever possible the sites should be in a central area of the building, where they are buffered from the extremes of climatic fluctuations which can be experienced near external walls or in basements and attics. Basements should be avoided because of the risk of flooding.

The sites should not contain any water, drain or steam pipes, particularly at ceiling level. Heating pipes can cause a lot of damage.

There should be reasonable ventilation. This helps reduce the risk of insect and mould infestation.

Inspect and clean the storage and display areas regularly. Thorough and regular cleaning and vigilance will help greatly in the controlling of insects and mould, and will allow you to take action early if a problem arises.

In order to detect insect infestations early, check objects regularly for signs of infestation: signs such as holes and frass that is, wood powder left by boring insects.

Don't store items in sheds, or directly on the floor.

Storage Systems

Provide layers of storage by wrapping objects in tissue paper and/or putting them in boxes. This approach gives maximum protection from:

- fluctuations in relative humidity and temperature. This is especially important in areas where ideal temperature and relative humidity cannot be achieved. The multiple layers of storage act as a buffer zone between the objects and the extreme or fluctuating conditions;
- dust, pollutants and insects; and
- the damaging effects of light.

Storage and housing systems should have their contents labelled on the outside, so that items can be located easily without searching through and inspecting every similar item.

If stored objects are not in drawers, boxes or wrappers, cover them with cotton or Tyvek covers. These provide protection from dust and unnecessary exposure to light. These covers also provide some buffering against fluctuations in environmental conditions.

Give all objects adequate support, and try to reduce the physical stresses which can cause damage.

Provide easy access. This contributes greatly to the care of objects. Remember—difficult access can often lead to awkward handling as people try to lift too much weight at one time, risking injury to themselves and damage to the objects.

Take care not to stack too many storage boxes on top of each other—this can make access difficult, and can damage collections and cause injury.

CAUTION:

Cleaning materials containing bleaches or ammonia should not be used near your objects. Nor should naphthalene, insecticides and fungicides.

These are active chemicals which could cause damage, especially in an enclosed storage environment.

The best materials for storage and display

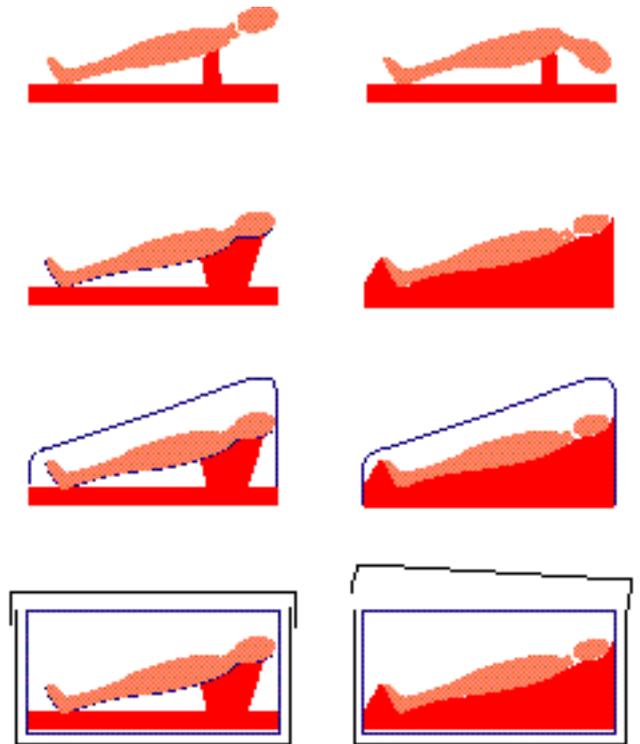
Objects that are placed within a sealed, secure environment are at risk if that environment contains active chemicals which can affect the object.

Many objects can be affected by other materials in their immediate environment. The following list of good and bad materials—from a preservation viewpoint—can help you choose your storage and display furniture; or to choose the materials to use when making them yourself.

GOOD	BAD
enamelled metal	chipboard, Customwood, unsealed woods, especially hardwoods
glass	PVA glue
ceramic	protein-based glues, for example, animal glue
acrylic paints and varnishes	uncured paint
inorganic pigments	cellulose nitrate
polystyrene, but preferably not in direct contact with objects	polyurethanes
polyester film	PVC
cotton and linen	wool and felt

Supporting objects in storage and on display

The following diagrams illustrate broad principles. For information on storage and display support systems for specific types of objects and materials, please refer to the *Caring for Cultural Material* volumes.



Self-evaluation quiz

Question 1.

Which of the following statements are true?

- Ideally, items should be stored and displayed in an area where the temperature is constant and in the range 25–30°C.
- Ideally, items should be stored and displayed in an area where the relative humidity is constant and in the range 45–55%.
- Ideally, items should be stored in the dark.

Question 2.

When choosing a storage site for your collections, you should look for:

- a shed;
- a basement with water, drain and steam pipes to ensure that objects do not dry out and become brittle;
- an area with good ventilation;

- d) an area in a central area of the building, where it would be buffered from the extremes of climatic fluctuations which can be experienced near external walls or in basements and attics.

Question 3.

Of the following materials, which are good for use in the construction of storage and display furniture for books?

glass, uncured paint, PVA glue, enamelled metal, protein-based glues—for example, animal glue—inorganic pigments, chipboard, ceramic, cellulose nitrate, wool, polyester film, polystyrene, felt, polyurethanes, cotton, linen, PVC, unsealed woods especially hardwoods, acrylic polymers.

Answers to self-evaluation quiz

Question 1.

Answer: b) and c) are true.

a) is false. Ideally, items should be stored and displayed in an area where the temperature is constant and in the range 18–22°C.

Question 2.

Answer: c) and d).

Question 3.

Answer: Glass, enamelled metal, inorganic pigments, ceramic, polyester film, polystyrene, cotton, linen, acrylic polymers.

Acknowledgments

Collection Management and Conservation Working Party of the Heritage Collections Council

Margaret Anderson (Chair)
Ian Cook (Deputy Chair)
Karen Coote
Tamara Lavrencic
Jan Lyall
Chris Tassell
Ian MacLeod
Phil Gordon
Robyn Sloggett
John Stanton
Viv Szekeres
Ian Stephenson

Major Contributors

Karen Coote	James Dexter
Keith Fernandez	David Gilroy
Rosie Freemantle	Ian Godfrey
Alan Howell	Vicki Humphrey
Georgia Koronis	Tamara Lavrencic
Ian MacLeod	Joy Noble
Sarah-Jane Rennie	Marion Roubos-Bennet
Robyn Sloggett	Michell Smith
Geoff Speirs	Greg Wallace
Helen Weidenhofer	Margie West

Contributors

Phil Alderslade	Marie Boland
Peter Cahalan	Glenn Cole
Sarah Feijen	Fred Francisco
Helen Halley	Charlotte Jenkin
Gillian Leahy	Sophie Lussier
Holly McGowan-Jackson	Elizabeth Murphy
Kristin Phillips	Alex Roach
Jennifer Ross	Sue Valis
Sandra Yee	

Kimba and Gawler Ranges Historical Society
Migration Museum
National Motor Museum
South Australian Telstra Historical Collection

Other

Stuart Anderson	Simone Cordeauz
Sandra Flischer	Michelle Koford
Jacki Kossatz	Linda Marlin
Simon Prince	Carly Romiero
Slade Smith	Robyn Thomas
Di Virgil	Guthrie Watson

Prototype Development Consortium Conservation Training Australia

Artlab Australia
History Trust of South Australia
Museum and Art Gallery of the Northern Territory
State Library of New South Wales
University of Melbourne Conservation Service
Western Australian Museum

Project Manager: Keith Fernandez
Technical Editor: Vicki Humphrey

Field Trial Participants

Bob Alford	Elizabeth Anya-Petrivna
Denise Davis	Luan Dunaan
Christine Ewings	Jude Fraser
Ann Gibson	Ken Hodge
Jean Johnson	Narayan Khadekar
Lindsay Knowles	Heather Kriesl
Nicole Livermore	Zoe McKenzie-Smith
John Reid	Pauline Ross
Glen Smith	

Sunshine and District Historical Society

Marketing Research

Environmetrics

Editing and Publishing

Communication Partners
Cyranet