Factsheet:
Caring for paintings and frames in museums

SCOTTISH MUSEUMS COUNCIL

Introduction

This factsheet aims to give a basic introduction to the care and preservation of easel paintings and frames held in museum collections. The term 'easel paintings' describes portable images, as opposed to murals or wall paintings. It therefore encompasses a vast range, from medieval altarpieces through to contemporary works. And, of course, everything in between which makes up the bulk of most museums' paintings collections.

Whilst paintings have traditionally been held in high regard, the same has not always been true of many frames. There is now, however, a much wider appreciation of their history, design and manufacture thanks to recent research and scholarship.

Whether curator, museum assistant or volunteer, it is important to have an understanding of the nature and range of materials that make up both paintings and frames and this factsheet provides a summary of the range of materials typically used in their creation. This knowledge will help informed decisions to be made regarding the care of your collection.

If the situation for your collection appears at times overwhelming in terms of achieving ideal practice, remember that even small improvements can make a significant difference for the long-term well-being of paintings and frames in your collection.

How to use this factsheet

It's a good idea to have this factsheet to hand whilst you examine paintings and frames in your collection in order to understand how they were made. Don't underestimate the amount of information which may be gleaned from a close and careful examination using the minimum of equipment: the naked eye, aided by a suitable light (especially when shone at a low angle to the surface) and a magnifying lens being the most obvious.

Throughout this factsheet, the symbol ► indicates signs of deterioration typical of the material described. The environmental or human threats typically causing such problems are then shown within the symbols **< >**. Words which are underlined are defined in the Glossary at the end.

In the course of your own routine examinations of paintings and frames, you will probably notice a number of problem indicators marked ►: simply keep a list, plan and budget ahead for a conservator to visit, double-check and agree a treatment timetable. If you have had a condition survey of paintings and frames in your collection carried out, then compare your observations against those condition reports.

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Easel paintings: materials and signs of deterioration

Paintings are complex three-dimensional structures made of hygroscopic materials, whether they are intricate gilded medieval altarpieces painted in oil or egg tempera or large deceptively simple contemporary works in acrylic. Each material used by the artist has the potential to deteriorate at a different rate and in a different manner and physical change begins the moment a painting is completed. The main categories of material and typical trouble spots are listed here:

Auxiliary or secondary supports
These are the terms used to describe the wooden structures to which a canvas is attached. The canvas, or other fabric support, is typically attached with tacks or staples to a wooden stretcher or strainer.

► *Look out for:* woodworm frass, splits in the wood, warping, dropped/missing stretcher keys, rusting and/or missing tacks
< biological, RH/temperature, handling **>**

Fabric supports
Artists' canvases were traditionally made of flax and good quality 100% linen canvas is an astonishingly durable fabric. However, from the mid-19th century onwards, the quality of canvas became more variable with the introduction of inferior fibres and mechanised production methods. It is increasingly uncommon to find an unlined mid-19th century painting as many 100+-year-old paintings are now lined. You might also, occasionally, come across a loose lining.

► *Look out for:* splitting tacking margins, planar deformations, delamination between original and lining canvases, canvas distortions caused by dropped stretcher keys trapped at the back of a painting, mould, punctures, tears
< RH/temperature, biological, handling **>**

Rigid primary supports
Paintings on wood panels are known throughout history, the earliest being 2nd century Egyptian Fayum portraits. Panel supports continued in use because of their proven stability but, in the 19th century, artists' colourmen introduced millboard panels together with other mass-produced rigid supports (e.g. primed canvas laid on board). As new materials were developed, the 20th century saw the use by artists of hardboard, plywood and other reconstituted materials. Other rigid supports include glass, metal and ivory.

► *Look out for:* movement along wooden panel joins, splits within panels, woodworm, distortions caused by cradles, weak or delaminating corners on manufactured boards
< RH/temperature, handling **>**

Preparatory layers
Size is applied to a canvas, either by the artist or colourmen, in order to reduce the absorption of subsequent layers (priming, paint, varnish) into the fabric. It is not readily visible to the naked eye.

► *Look out for:* problems in the event of direct water damage or even high RH levels, priming and paint may delaminate clean away from the canvas.

Priming or ground layers. The priming or ground serves two functions: firstly, to provide a suitable surface on which to apply the paint (whether rigid support or canvas) and secondly, to provide a tonal base for the composition. It is generally a stable layer within the structure but problems can occur, particularly if the artist applied the priming and was experimental with his or her use of materials.

► *Look out for:* flaking or tenting paint, paint loss
< RH/temperature, handling **>**

Paint layers

Paint is, at its simplest, the mixture of pigment and medium. Oil paint is pigment bound in linseed oil, watercolour is pigment bound in gum arabic, acrylic is pigment bound in a synthetic resin. The stability of a paint layer depends as much on its method of application and/ or adulteration with additives (a popular 19th century development), as it does on environmental considerations. There is a bewildering vocabulary conservators use to describe an aged and/or unstable paint film and the description of different types of cracking is complex and subtle.

► *Look out for:* flaking, stretcher marks, cupping, tenting, blistering, cleavage, drying cracks, alligator cracks, craquelure
< RH/temperature, light **>**

Varnish layers

Traditionally, a layer of varnish was applied to saturate the paint layer, in order to increase its tonal depth and subtlety, as well as to provide a protective layer. Traditional varnishes are made from natural resins, e.g. dammar and mastic, but synthetic resin varnishes were developed in the mid-20th century and their use is now widespread. Varnishes are usually clear when applied but most discolour with age. Natural resin varnish will yellow significantly, altering the tonal values of paintings and distorting the appearance of colours. From the late 19th century onwards, some artists preferred to leave paint surfaces unvarnished.

► *Look out for:* discolouration, bloom, blanch, degradation, craquelure
< RH/temperature, light **>**

Frames: materials and signs of deterioration

An original frame is an integral and historical part of the work of art and its function is to isolate the painting visually from its immediate surroundings, to enhance the painting through its design and decorative finish and to provide protection. Traditionally, the making of a frame was a partnership between joiner, carver and gilder and, up until the mid-16th century, frames were usually engaged or integral to the wooden panel picture surface. Wood was carved to create ornamentation but from the late 18th century onwards, composition became widely used and was estimated to be at least 80% cheaper than carving. Its use had a considerable impact on frame design as it allowed for larger and more richly ornamented designs. By the 20th century, polished, painted or stained wood frames became popular.

Substrate or base
The substrate, or base, of a frame and its ornamentation can be made from a large range of materials, though most commonly of wood, composition or papier-mâché. The deterioration of these base materials is a likely cause of problems.
► *Look out for:* open mitre joints, splits in the frame, woodworm
< RH/temperature, biological, handling **>**

Gesso
Gesso is applied to the substrate and creates a smooth surface on which gold leaf can be applied. Often several coats of gesso will need to be applied, traditionally, each coat being thinned slightly from the previous one until the correct thickness has been built up. Once dry, the gesso takes on a plaster-like appearance and it is then smoothed until it achieves a silky surface suitable for gilding. Gesso is particularly susceptible to changes in RH.
► *Look out for:* flaking
< RH/temperature **>**

Bole
Bole is applied on top of the gesso. It comes in a range of colours, principally yellow, red and black, and the choice considerably affects the final appearance of the gilding. Yellow bole is usually associated with oil gilding, and yellow, red and black bole with water gilding. In itself, bole is usually stable but this stability depends on the condition of the gesso beneath.
► *Look out for:* raised or flaking gesso and bole layers
< RH/temperature **>**

Gilding
Gold leaf is usually applied by water gilding or oil gilding. The essential differences between the two are in technique and appearance. Both require the use of a gold size to serve as an adhesive for the gold leaf: in oil gilding the size is oil-based, in water gilding the bole is wetted immediately before gilding. It is not always easy to differentiate between the two, though oil gilding is usually left matt and found on composition frames. Water gilding is frequently burnished and the gold is often laid over coloured boles.
► *Look out for:* flaking leaf, scratched or worn gold leaf
< RH/temperature, handling **>**

Toning layers
Layers of toning or glazes may be applied over gold leaf and are extremely delicate. Toning layers may be made from a solution of size with the addition of a little pigment and are very easily damaged. Toning layers should not be confused with a coating, typically linseed oil-based, applied many years later to revive aged or dirty gilding. These 'reviving' coats often cause gold leaf to curl and flake.
► *Look out for:* patchy surfaces on gilding, fine curling and flaking gold leaf
< handling **>**

Environmental threats

Paintings can suffer damage from all the environmental threats listed below. Frames, however, are generally less susceptible to such threats but, as wood and gesso are such hygroscopic materials, frames are particularly vulnerable to damage caused by fluctuations in relative humidity. Frames are also susceptible to damage caused by woodworm infestation and abrasion from dusting.

Light

Materials used in paintings vary in their sensitivities and reactions to light. For example, some pigments are stable, or lightfast, whilst others fade at low light levels. The effects of such light damage are cumulative and cannot be reversed, and even low levels will cause the most sensitive colours to fade over a period of decades. Light levels should therefore be as low as tolerable in order to slow the rate at which sensitive colours fade. Higher levels will cause more rapid colour loss. Frames generally remain stable in light levels that would be considered damaging to paintings.

Minimising the effects of light: action list with dos, don'ts and warnings

- ✓ aim to keep light levels for paintings at or below the recommended 200 lux
- ✓ apply UV-absorbing film to windows to reduce the UV light
- ✓ fit window blinds, and use them, to reduce both UV and visible light
- ✓ fit low-UV emitting tubes where fluorescent lighting is used
- ✓ use track lighting systems as they produce a cooler and more diffuse system than the heat and intense beam of spotlights

- **x** do not expose paintings to unfiltered UV-emitting fluorescent lamps
- **x** do not use individual picture lights because they produce 'hot spots' on the surfaces of paintings and frames
- **x** do not light paintings, or other objects in your collection, for any longer than is necessary

- **!** UV from incandescent lights is negligible but they produce heat

Relative humidity

Relative humidity is the measure of how close the air is to saturation point, that is, how 'wet' or 'dry' the air is at any given temperature. Paintings and frames are both extremely susceptible to damage caused by fluctuations in RH. High and low levels in RH, and variations in between, can cause damage due to the expansion and contraction of several components. Wood, gesso and fabric readily absorb moisture which causes them to swell when the RH is higher and, conversely, shrink when it is lower. Paint, however, is not as resilient and can crack and flake off as a result of expansion and contraction of the underlying wood and fabric structure. These dimensional changes can cause canvases to become slack and sag, the mitred joints of frames to open, gesso and gilding to flake, priming and paint to flake, and for panel paintings to split and joins to open.

Temperature
It is generally an acceptable rule of thumb for paintings and frames to aim for a 'human comfort' figure of around 20ºC. Remember that slow and gentle fluctuations around that figure are less damaging than sudden shifts up or down.

Minimising the effects of RH and temperature: action list with dos, don'ts and warnings

- ✓ aim for RH of between 50% and 60% for stores as well as display areas
- ✓ aim for 20ºC temperature, plus or minus 5ºC is considered acceptable but remember sudden fluctuations within that range can cause problems
- ✓ aim for minimal or gentle fluctuations within the range 20ºC ± 5ºC
- ✓ adjust conditions by using low-level 'conservation' heating
- ✓ adjust conditions by using humidifiers or dehumidifiers
- ✓ use blinds to help reduce solar gain, as well as heat loss, through windows

- **x** do not hang paintings above heat sources, they will attract more grime than others in the room as hot air rises and carries dirt

- **!** mould typically develops at an RH of approximately 65% and above
- **!** low RH levels cause paintings to dry out and become brittle, and more susceptible to damage
- **!** low RH levels cause frame joints to dry out and open up
- **!** sub-zero temperatures can cause acrylic paintings to become brittle and crack
- **!** high ambient temperatures can soften paint and other constituent materials
- **!** softened paint, especially acrylics, enables dirt to stick and become absorbed
- **!** excessive heat dries out paintings, speeding up the process of natural ageing

Air quality

Gaseous pollution is a universal problem, the result not only of industrial processes and the burning of fuels, but also emanating from common building and decorating materials as well as furnishings and display cases. Paintings do not however fall into the category of artefacts as affected by gaseous pollutants as, say, metal objects or photographs. Frames too are generally less affected. Pure gold leaf is not affected by gaseous pollutants but many metal leaves are not pure and may be tarnished by sulphur products and other pollutants, e.g. fumigation chemicals. Silver leaf is particularly susceptible.

Dust can be a greater problem for paintings and frames and is currently the focus of research regarding patterns of deposition and methods of control. Dust contains a mixture of particles, e.g. clothing and carpet fibres, soil, skin, soot, ash, mould spores and pollen. Because of its hygroscopic nature, dust attracts moisture and pollutant gases in the atmosphere and can cause accelerated deterioration. The major cause of dust deposition in display areas is high visitor numbers together with poor housekeeping practices.

Minimising the effects of poor air quality: action list with dos, don'ts and warnings

- ✓ reduce dust levels in stores and display areas through good housekeeping, especially regular vacuum cleaning
- ✓ check door seals and install dust trap mats at entrances
- ✓ fit glass in frames to protect particularly vulnerable unvarnished paintings
- ✓ when cleaning glass in frames, always hold a piece of card against the gilded edges to protect against abrasion

- **x** never clean the surface of a painting, even to remove dust; unstable, raised areas of ground, paint and varnish can be readily removed; seek expert advice
- **x** do not dust frames, particularly with cloths, as dust contains abrasive particles and will abrade fragile gilded surfaces

- **!** oil gilding is damaged by organic solvents, e.g. turpentine, white spirit
- **!** water gilding is easily damaged by moisture, never touch with a damp cloth
- **!** unvarnished paint surfaces attract and absorb dust, becoming engrained
- **!** unvarnished acrylic paint films are the most susceptible to attract and absorb dirt and can become irreversibly discoloured

Biological threats

Woodworm
The wooden stretchers and strainers of paintings on canvas, as well panel paintings and frames, are readily vulnerable to infestation by woodworm. Adult beetles are usually active in late spring and early summer. The female lays eggs and larvae develop inside the timber, burrowing in and feeding upon the wood. It usually takes more than two years for the adult to emerge and it is the emergence of adult beetles that creates the familiar round exit holes indicating an infestation. Factors affecting infestation include the species and age of the timber as well as any covering or preparation layers it may have.

Mould
Mould can readily develop on paintings and frames in certain conditions, most typically an RH of about 65% and above. Mould spores feed on protein and are usually found on the reverse of canvases attracted by dust, the size coating, etc. However, glazed paintings can create a 'microclimate' between the glass and the surface of the painting and a raised RH can create optimum conditions for mould growth on the surface of the painting or even, if there is enough dust for it to feed on, on the inside of the glass.

Minimising the effects biological threats: action list with dos, don't's and warnings

- ✓ isolate a painting or frame with active woodworm, wrap it and remove if possible to a 'quarantine' storage area for further assessment by a conservator
- ✓ isolate a painting affected by mould to be further assessed by a conservator, but leave in a well-ventilated space as wrapping the painting (and leaving it wrapped) could encourage the growth
- ✓ arrest the development of mould by reducing RH to below 65%

- **x** do not treat paintings or frames showing signs of woodworm yourself, this should be left to a conservator
- **x** do not treat paintings or frames with mould, this should be left to a conservator

- **!** insects can leave very acidic material, e.g. excrement such as 'fly specks'
- **!** worm activity is most obvious because of the flight holes left after the insects have matured and eaten their way out
- **!** recent worm activity is indicated in or around the holes by fine sawdust-like powder, called 'frass'
- **!** avoid ingesting mould spores and wash hands after handling

Summary
Although the tolerance for temperature and light is greater for frames than it is for paintings, the recommendations listed in the table below are as per the painting's requirements because paintings and frames are usually displayed and stored together. (Further information about environmental monitoring and control is available on separate SMC factsheets.)

Threats	Recommendations for paintings and frames
RH	• 50%-60% RH • minimal fluctuations
temperature	• 20ºC ± 5ºC • minimal fluctuations
light	• storage: the minimum necessary • display: maximum of 200 lux (visible light), 75 microwatts per lumen (UV)
air quality	• reduced particulate pollution
pests	• pest control established, especially woodworm
mould	• RH maintained below 65%

Human threats

Paintings and frames are just as susceptible to damage caused by human actions. The effects of storage, handling, packing and transport are discussed in the following pages and unless otherwise stated, painting and frame are treated as a single object.

Storage

Paintings and frames should always be stored vertically. If a paint layer is unstable, i.e. flaking or blistering, store the painting horizontally and seek expert advice.

Storage: action list with dos, don'ts and warnings

If you have a sliding rack system:

✓ fit 'S' hooks to the backs of frames and not stretchers or strainers (unless a painting is unframed and you have no alternative)

If you have vertical sectioned 'pigeon hole' storage:

✓ ensure storage sections are not overfilled
✓ store paintings according to size
✓ put a rigid interleaf, e.g. stiff cardboard, hardboard, Correx®, between paintings

x do not store unframed and framed paintings in the same section

! weigh up the risk caused by protruding hooks, nails, chains; remove if necessary

If paintings have to be stored on the floor against a wall:

✓ raise them at least 20cms off the floor on non-slip high density foam blocks, or similar
✓ stack in descending order of size
✓ stack paintings front to front and back to back, with an interleaf between each
✓ make Bubblewrap® or Jiffyfoam® corners for all vulnerable frames

x avoid stacking under windows, near radiators or doors

Handling

The principal cause of human damage to paintings and frames is through unsafe handling practices. Daily life in museums involves the movement of collections to and from stores, installing and dismantling exhibitions, rehanging galleries, photographing for catalogues or marketing, preparing for loans and transport, etc. These are the most likely situations when accidents can – and do – happen.

Handling: action list of dos, don't's and warnings

✓ plan ahead and take your time
✓ clear the route of obstacles, e.g. furniture, people
✓ prepare the location to receive the painting
✓ aim for smooth movements

! avoid shock and vibration

Examine the painting and frame:
✓ assess existing damage or weakness
✓ weigh up risks of moving
✓ check the painting fits securely in its frame
✓ check for loose stretcher keys

Hands on: smaller paintings/frames:
✓ only small paintings to be handled by one person
✓ carry one painting at a time
✓ have clean and dry hands, cotton gloves are advised but ensure you can get a good grip
✓ place one hand at the bottom edge and the other at the vertical

x hot and sweaty hands leave greasy deposits on frames and can damage gilding
x never carry a painting by the top of its frame nor the stretcher bars
x never touch the surface of the painting nor the back of the canvas or panel

Hands on: larger paintings/frames – as above plus:
✓ weigh up additional risks in moving because of size and excessive weight
✓ use the blocks fitted at the back of larger frames, it's what they're there for
✓ if carried by 2 or more people, agree in advance who leads and gives instructions
✓ use webbing straps or trolleys if appropriate

If a painting with loose paint has to be moved and is small enough:
✓ carry it flat to prevent flakes falling off
✓ move to flat storage space (plan chest or shelf)
✓ call a conservator to secure the paint

If a frame with a loose section of moulding has to be moved:
✓ temporarily secure the section by protecting with acid free tissue, Bubblewrap® or Jiffyfoam® and attach with masking tape at the back of the frame

x never let tape come in contact with gilded or decorative surfaces

Finally, if damage does occur:
✓ collect and save the pieces no matter how small
✓ identify where, on the painting or frame, the pieces came from

Packing
Guidance here is for 'softwrap' only; specialist firms can advise on crates and cases. Make sure you have stocks of suitable materials which might include: Bubblewrap®, Jiffyfoam®, acid free tissue, polyester film (12 micron Melinex®), polythene, low tack tape, parcel tape, cotton tape. Remember that, if a correctly sealed outer layer of medium weight polythene is also used, the RH within the package can be maintained for approximately 24 hours from the time of packing.

Underlying principles in wrapping the painting and frame are to:
- protect vulnerable surfaces
- make the painting and frame moisture and water resistant
- guard against changes in RH
- make it puncture and dent resistant both front and back
- insulate against cold or extreme heat
- buffer against sudden changes in temperature

Packing and labelling:
action list of dos, don'ts and warnings

✓ use an interleaf, e.g. acid free tissue, around the gilding of a frame
✓ lay an interleaf of acid free tissue or Melinex® over the paint surface of an unframed painting before using Bubblewrap®, Jiffyfoam®
✓ use Bubblewrap® or Jiffyfoam® to make protective corners
✓ cut a section of board to provide protection at reverse during transport if no backboard is fitted
✓ cut a section of board to provide protection at front during transport if no glass is fitted
✓ protect glass with low-tack tape
✓ if possible attach new labels to backboards, otherwise to the back of the frame
✓ label the painting front and back on the finished package
✓ always retain existing labels, even fragments can provide valuable information

x do not use Bubblewrap® directly against painting or gilded frame surfaces
x do not let tape, low-tack or otherwise, touch gilded surfaces of frames
x never stick labels directly to the back of canvas or panels

! don't be tempted to remove labels yourself from the back of a canvas or panel

If in doubt, ask a conservator for advice

Transport
In an ideal world, all paintings would be moved in climate-controlled, 'air ride' vehicles. In the real world, few museum collections have their own vehicle or trained staff and rely on trade carriers, but good practice can still be achieved.

Transport: action list of do's, don'ts and warnings

- ✓ ask around for recommended carriers, conservators and curators who regularly handle incoming and outgoing loans and know who does the job well
- ✓ look for a local carrier with a clean and well-equipped van, e.g. no loose items on the floor and well-supplied with padding, webbing, blankets, etc
- ✓ build up a relationship with the carrier, explain how you want things secured and handled – and why
- ✓ ensure paintings are secured to the side of vans with flat webbing, using additional padding where webbing presses against the wrapped painting/frame
- ✓ ensure paintings are supported and buffered from vibration on the floor of vans by resting on padding

x do not allow paintings/ frames to travel that are inadequately packed
x do not allow paintings/ frames to travel in unheated vans in cold weather

! note that in sub-zero temperatures acrylic paint surfaces will become brittle

Preventive conservation framing

Correct framing can contribute significantly to the preservation of a painting. Optimum protection for collections would be provided by enclosing all paintings in rigid well-sealed frames but however compelling the technical arguments, this clearly is not a realistic option.

The reality is, perhaps, that a painting is poorly fitted or not secure in its frame or that a painting is unprotected at the back and vulnerable to damage. The implementation of some simple preventive conservation techniques is achievable, but what impact might making such modifications have on a frame?

Even the most straightforward refitting of a painting in its frame involves an interventive treatment, for example, making screw holes to attach the metal brackets or mirror plates with which to secure the painting. If the screws used are too long or the holes drilled are too deep, then damage to the surface, for instance the gesso or gilding, might occur. Even the most apparently straightforward procedures carry some risk.

Materials and techniques therefore need to be properly understood and it is recommended that refitting should be carried out by conservators or frame technicians. After carefully assessing the requirements for each painting and its frame, a refitting specification could be drawn up to include:

- rebates to be padded to prevent friction of the face of the painting against the untreated wooden rebate surface
- spaces around the sides of the painting within the frame, to be packed with suitable material to avoid movement of the painting within the frame
- metal brackets or plates only to be used to secure paintings within frames; serious vibration can result from using hammers and nails or heavy-duty staplers

- plates to be secured by being screwed into the back of the frame and never attached directly to the painting
    - the painting is thus held in by pressure alone with provision for expansion and contraction of the support
    - the extent and location of applied pressure needs to be particularly carefully judged for panels constructed of two or more sections
- backboard in suitable material fitted, e.g. Correx®, Fome-cor®, hardboard, to:
    - protect against mechanical damage to the reverse
    - prevent dirt and debris falling behind the lower stretcher bar and canvas
    - buffer fluctuations in RH by enclosing the reverse
    - reduce vibrations in transit
    - decrease the painting's sensitivity to shock
    - discourage the practice of attaching labels to or writing on the back of canvases

N.B. fitting a backboard is not always straightforward as the frame may have to be adapted to provide secure fixtures onto which the board can be attached.

If glass is to be fitted several factors must be taken into account, including:

- is the frame sound and strong enough to carry the additional weight?
- if not can, or should, the structure of the frame be adapted to do so?
- if the weight of glass is an issue, would acrylic (Perspex®) be more suitable?
- how can checksticks or spacers be fitted to create the necessary space between the glass or Perspex® and the surface of the painting?
- what thickness of glass is required for the size of the frame?
- is laminated or toughened glass an option?
- is low-reflecting or UV-filtered glass an option?

Ask a Conservator

An accredited conservator has years of experience and training in his or her particular discipline, whether it be easel paintings, frames, paper, metals or textiles. In the case of paintings and frames, as with most artefacts in a museum's collection, the best advice is that, if you have a concern, store the painting or frame safely and seek expert advice.

Resist too the temptation to carry out what might to appear to be even the simplest treatment. How about keying out a stretcher to tighten up slack canvas tension? Be assured that, if this apparently straightforward procedure is incorrectly executed, serious damage could result, most commonly:

- over-expansion of stretcher joints, especially at the corners
- splitting of brittle tacking margins.

Ask a conservator.

Glossary

Acrylic resin is the medium for modern synthetic paint, used by artists since the 1950s.

Alligator cracks: a pattern of drying cracks that resemble alligator skin and are associated with different drying rates of paint layers.

Blanch(ing): an opaque whiteish discolouration on the surface of a painting, occurring in the binding medium or within the varnish film itself.

Blistering: a convex deformation of ground, paint and/or varnish.

Bloom: areas of blueish cloudiness in the varnish layer typically caused by contact with moisture, unlike blanching it only affects the varnish layer.

Bole: a fine clay mixed with size, used on frames to prepare a smooth surface for water gilding; applied on top of gesso and available in a wide variety of colours.

Buckling: rigid bulging distortions in the canvas support, often at the corners.

Burnishing: the process of polishing water gilding with an agate burnisher.

Cleavage: separation between layers of paint, paint and ground, or ground and support.

Cockling: rigid rippling distortions across or at the sides of the canvas support.

Colourmen: suppliers and manufacturers of artists' materials, e.g. Winsor & Newton.

Composition is a pliable mixture usually made of whiting, glue, resin and linseed oil from which moulded ornaments can be made, also known as compo.

Cradle: a grid of wooden bars running horizontally and vertically across the back of a panel painting fitted with the aim of preventing warping without restricting movement.

Craquelure: a network of random cracks over the surface of the painting, caused by drying, ageing or changes in RH.

Cupping: islands of aged paint, separated by cracks, with upward curving edges like shallow cups.

Degradation: used to describe the breaking down of a varnish layer so that it becomes opaque, typically in patches.

Dammar: a vegetable resin derived from trees that can be made into varnish.

Delamination describes separation of layers, e.g. of paint layers, ground or varnish layers, and also used to describe separation between original and lined canvases.

Drying cracks occur in the paint or vanish films during the drying process; typically these have rounded or sloping edges and no cleavage.

Engaged frame is one which is made from the same piece of wood as the panel, or which was attached when the panel was constructed.

Flaking: an unstable condition in which particles of paint, or paint and ground become detached.

Frass: fine sawdust-like debris produced by wood-boring insects, e.g. woodworm.

Gesso: a mixture of whiting and size used as ground for gilding.

Gilding is the application of gold leaf to a prepared surface.

Glaze: a transparent layer of paint, usually associated with oil painting.

Gold size: the adhesive used to fix gold leaf in place.

Ground: an opaque white or coloured coating applied to the support, the materials vary.

Gum Arabic: a water-soluble gum obtained from the acacia tree, with a variety of uses including as a binding medium with pigment for water-colour.

Hygroscopic describes a substance which readily absorbs moisture from the air.

Lining is the process of adhering a new fabric to the back of a painting on canvas.

Loose lining is a fabric stretched directly behind, but not adhered to, a painting on canvas.

Mastic: a vegetable resin derived from a tree and used as a varnish.

Medium: the film-forming material holding pigment particles together, e.g. a drying oil such as linseed, in oil paint.

Millboard: manufactured alternative to wooden panels introduced in the late 18th century, made of mill and paper waste; tend to be stable though corners soften.

Mitre joint: a diagonal joint used at the corner of frames with the adjacent sides abutting.

Moulding: a shaped projecting or recessed band running along a frame which may be plain or bear carved or moulded ornaments.

Oil gilding uses an oil-based gold size as adhesive and was the standard process for picture frames in the 17th century; unlike water gilding it is usually left matt.

Papier-mâché is material made of pulped paper soaked in a binder and used as a moulded ornament for frames.

Pigment: coloured particles in powder form that become paint when combined with a medium.

Planar deformations: used to describe surface distortions of the support.

Priming: now often used synonymously with ground, historically used to describe the layer following the ground providing modified colour or texture on which to paint.

Rebate: recess beneath the sight edge of a frame designed to take the picture.

Relative Humidity (RH): the measurement of the amount of water vapour present in the air.

Resin: natural resins are secreted or excreted by certain plants; synthetic resins are produced by chemical synthesis and are widely used in conservation.

Size, when used for paintings, is a solution or gel applied to seal raw canvas and traditionally made from rabbit-skin glue or gelatine; for frames, an adhesive used to make gesso and also used to protect unburnished water gilding, traditionally made from animal skins or parchment clippings.

Strainer: a wooden frame with fixed, non-expandable corners over which a canvas is stretched.

Stretcher: a wooden frame with expandable corners over which a canvas is stretched.

Stretcher keys are small wooden wedges that fit into slots on the inner corner joints and in cross-bars of the stretcher; they are used to adjust the size of the stretcher.

Stretcher marks: a line of cracks or deformation in the painting surface that follows the line of the inside edges of the stretcher or strainer.

Tacking margins: the part of a canvas that wraps around the edges of the stretcher or strainer.

Tempera is an aqueous binding medium, traditionally used to describe paint made of pigment mixed with egg as the medium.

Tenting: a type of cleavage where the paint, or paint and ground, layers are cracked and are forced upward in a tent shape.

Unlined describes a canvas which has not been through the lining process.

Varnish: a clear solution of resin dissolved in oil or solvent which dries to form a transparent film.

Water gilding is gilding using a water-based gold size as adhesive which came into fashion at the end of the 17th century and can be burnished to a high sheen.

Whiting is an essential component of gesso and composition, made from natural chalk (calcium carbonate) in Northern Europe or gypsum (calcium sulphate) in Italy.

Further information and advice

This is one of a series of factsheets, advice sheets and guidance notes produced by SMC on common collections care and preventive conservation issues. For more details, signposting to further sources of advice or information on how to contact a conservator, see the website www.scottishmuseums.org.uk

Selected reading

The Care of Pictures
Stout, G L
Dover Publications Inc, 1975
ISBN 0 4 86 23165 8

The Artist's Handbook of Methods and Materials
Mayer, R
Viking Press, 5th edition, 1991
ISBN 0 6 70 83701 6

Conservation of Paintings (Pocket Guide)
Bomford, D
National Gallery Publications Ltd, 1997
ISBN 1 85709 164 7

Learn to Frame
Fairbrass, S
William Collins and Sons Ltd, 1990
ISBN 0 00 412402 2

The Art of the Picture Frame
Simon, J
National Portrait Gallery Publications, 1996
ISBN 1 85514 171 X

Frameworks
Mitchell, P & Roberts, L
Merrell Holberton Publishers Ltd, 1996
ISBN 1 85894 037 0

The National Trust Manual of Housekeeping
Sandwith, H & Stainton, S
Butterworth-Heinemann, revised 2006
ISBN 0 7506 5529 1

Ours for Keeps?
Ed. Rogers, L
Museum and Galleries Commission,1997
ISBN 09486 30 55 8

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