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Preservation Advisory Centre

Cleaning

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Esmée Fairbairn FOUNDATION

Authors Caroline Bendix, ACR, Accredited Library Conservator,
Alison Walker

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Cleaning books and documents

Introduction

The aim of this booklet is to provide guidance on simple dry cleaning methods for removing surface dirt from bound volumes and unbound papers. Surface dirt is defined as loose material which can be removed without rubbing and without the use of equipment other than brushes, vacuum cleaners, dusters and cloths. This can normally be undertaken by library/archive staff and volunteers who are not professional conservators. However, some of the techniques described should only be undertaken after training by an accredited conservator[1], or under their supervision, and these are indicated in the text.

Dust found in libraries and archives has many components. It is likely to contain pollens, mould spores, pest detritus, textile fibres, degraded leather, skin cells and other organic matter as well as inorganic materials. Dust is easily transferred to shelves, other items and internal pages during use. Handling dirty books or papers is unpleasant and may present a danger to health, either by triggering existing allergies or by sensitising the user. If conditions are suitable, mould spores will germinate and grow on the material. Insect pests may feed on mould as well as dust. Keeping material clean prolongs its useful life.

Surface dirt is evidence that crucial aspects of collection management are not being carried out effectively. Accumulated dirt may be attributable to defects in the building structure. External dust may enter through windows and doors, and the effect may be intensified by proximity to roads with heavy traffic. Material may be added to the collection without prior cleaning or quarantine. Low use and lack of regular housekeeping may allow dust from internal sources to accumulate. Such evidence may be taken as a sign that the collection is little used and little valued, and therefore of little significance to the organisation and its user constituency. The librarian or archivist may be well aware of the collection's significance, but if this is not evident to others there is a risk that it may be considered a disposable asset. It is vital that appropriate collection care measures are taken and are seen to be taken.

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[1] A conservator accredited by Icon, the Institute of Conservation or the Archives and Records Association. For more information refer to *Guidelines for choosing and working with a conservator* at **www.conservationregister.com/picon-workingwithaconservator.asp**

Planning a cleaning project

How often should a collection be cleaned?

The objective should be to ensure that the collection is cleaned regularly enough to avoid the build-up of dirt to levels which cause nuisance to users or damage to the books or documents. The frequency with which a collection needs cleaning will depend on a number of factors. Recent research indicates that parts of a collection close to humans or access points, i.e. doors and windows, need more frequent cleaning than those further away[2]. An urban environment may create more dust than a country location. Instituting a regular annual or biennial programme will ensure that dust levels are kept low. However, the organisation may need to catch up on years of housekeeping neglect, in which case a comprehensive cleaning project must be undertaken, followed by a regular maintenance programme. In areas where frequent cleaning is unnecessary, shelves should still be inspected annually for mould and pest activity. Cleaning can be combined with other projects, such as the assessment of conservation requirements, monitoring for pests and mould, or stock audit.

Who should do the cleaning?

Cleaning can be carried out by permanent library or archive staff, temporary recruits, students, volunteers, professional cleaning companies or conservators. The deciding factor may be cost, the availability of local staff or other assistance, and how much time can be given to the task. Volunteers and students may be used to help with cleaning books and archives, but only after training, and ideally under supervision. Much damage can be caused by a lack of sufficient knowledge to carry out what may be perceived as a straightforward task. In order to minimise risk and misunderstanding, training by a conservator should, if possible, take place on site. Some methods may be acceptable in one collection but not in another. It is essential that written guidelines are provided for staff and volunteers after the initial training. The guidelines should make very clear what methods may be used and on which types of material.

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[2] Lloyd, H. et al., 'The effects of visitor activity on dust in historic collections', *The Conservator*, no. 26, 2002, pp 72-84

What should be cleaned?

The purpose of this booklet is to indicate simple dry cleaning methods for removing loose surface dirt. It applies principally to books and bound archives. Dust on loose documents can be brushed off, but greater care is needed, especially if inks and pigments are friable or if dirt is greasy, as it may become ingrained. It is recommended that a conservator is consulted before cleaning such material. Herbaria may contain poisons which have been used in the preservation of plant material and should only be cleaned internally after consultation with a conservator. Bindings which suffer from 'red rot' (degraded leather which generates red dust) can be cleaned but this will not stop the degradation process. In order to protect neighbouring books, staff and users, the volume may be wrapped or boxed pending inspection by a conservator.

Cleaning storage areas

If the collection is dirty, the storage area is probably dirty as well, so it must be cleaned before the material is returned. Storage areas may be cleaned in parallel with the material, or separately if space allows a complete removal of the collection. Stack cleaning may be undertaken in-house or by external contractors. It may be necessary to clean not only the shelves but also the ducts, ceilings, conduits and pipes. If so, an industrial cleaning firm may be needed. When cleaning shelves and floors it is important to avoid the use of harmful cleaning agents and to ensure that liquid does not come into contact with collection items. If cleaning liquids are used, the shelves must be completely dry before collection material is replaced. A damp (not wet) cloth may be sufficient. If wooden shelves are polished, natural wax should be used in tiny amounts and thoroughly buffed up.

Commissioning external companies

If it is impossible to undertake cleaning of the collection and/or storage areas in-house, the work can be outsourced. A full specification of activities and materials should be drawn up, and provision made for quality control. References should be sought and followed up. Experience in handling library and archive material is

essential, and even with experienced companies the library's good handling practices should be insisted upon and contractors monitored[3]. You may have to provide training for the contractors if you hold unusual or specialised materials.

Preparation

Before the project starts, the vulnerability and age of material and the type and amount of dust should be investigated. These factors will affect the tools and equipment used. Material with mould causes particular problems. If inhaled or absorbed through damaged skin, mould can cause permanent damage to the immune system, sometimes after only minimum levels of exposure, so cleaning of affected materials should be done with particular care[4]. You should decide where the material is to be cleaned, in the storage area or in a decant area. Cleaning should generally take place in a well-lit area. However, mould visibility is reduced in bright light, so inspecting shelves with a torch to provide raking light is a sensible precaution if the presence of mould is suspected. Mould may be distinguished from dust by its shape. The initial stages of mould growth are usually small, circular, grey, slightly fibrous patches, whereas dust is a smooth coating of grey/white/brown/black. On books, mould often appears along the square (the area of the inside cover between the edges of the cover and the text block). Skin and cloth bindings are favoured over paper, unless conditions are very damp.

Cleaning a collection is repetitive and hard work. It is important to change tasks to avoid strain caused by repetitive movements, such as brushing or reaching to one side to pick up material from a trolley. Tables should be strong, stable and high enough for those cleaning the books to stand straight. Most trestle and collapsible tables are designed for people to sit at, so tables may need to be raised. The Health and Safety Officer must be consulted to ensure that tables are safe to work on and that any adaptations fall within health and safety regulations. Tables should be covered with padding of some kind, e.g. a folded cloth, with heavy-duty plastic sheeting on top. This creates an easily-cleaned, smooth but forgiving surface on which to work. Woven cloth tends to be abrasive and

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[3] Refer to the Preservation Advisory Centre booklet, *Using library and archive collections* **www.bl.uk/blpac/pdf/handling.pdf**

[4] Refer to the Preservation Advisory Centre booklet, *Prevention and treatment of mould outbreaks in collections* **www.bl.uk/blpac/pdf/mould.pdf**

should not come into direct contact with material being cleaned. It should not be used alone as a table covering.

Equipment

Cleaning equipment may consist of simple brushes, vacuum cleaners or sophisticated machinery. The machines described below are examples of the latter, but are not the only models available.

If books are robust and in good condition, an automatic machine such as the **Depulvera® book cleaning machine** may be used. Books are loaded into the machine at one end and pass along brushes on a series of rollers. The machine works well within its scope and cleans approximately five books per minute. However, it does not cope with all sizes of book – very small, thin or large books may not be suitable. The timing given does not include any fetching and carrying or time spent cleaning filters at the end of each day. For maximum efficiency, it needs two operatives.

Using a **Bassaire mobile work station**, books and documents are cleaned by hand, and dust and mould spores are sucked away through a pre-filter (95% efficient @ 5 microns) and a HEPA filter, (99.997% efficient @ 0.3 microns). Air is extracted from around the work surface, via low-level gullies situated on either side, and by three air suction walls. Less robust material and almost all book sizes can be accommodated. For large collections it may well be worth the expenditure of a few thousand pounds on the above (they can also be hired). However, many organisations cannot afford them or have more modest requirements, and must rely on simpler tools and methods.

Natural bristle brushes have traditionally been used for cleaning. If they have a metal ferrule, it should be wrapped in tape to prevent scratching or discolouration should it come into contact with material being cleaned. Coated papers are especially vulnerable. Different brushes should be used for external and internal cleaning to reduce the transfer of dirt into the text block. Wrap different coloured tape around the ferrules to distinguish them. If the books are very dirty, a hog's bristle shaving brush or a hog's bristle brush with a 15cm handle may be used for the outside, and a 5cm bristle varnish brush for the text block. If books are fragile, pony hair brushes with 15cm handles can be used for both the binding and text block.

Variable-suction or low-suction vacuum cleaners may be used. Models fitted with a HEPA filter are recommended. It may be better to choose a cleaner with an industrial engine, which can be used for long periods at a time, e.g. a Nilfisk or Museumvac, but

the size of the brushes and power of suction may be of greater importance. The selection should be based on the material to be cleaned and the speed at which this should be accomplished. Some types may be worn around the waist or on a strap across the shoulder, which can be useful if items are cleaned in situ.

Dusters and cloths may be used for cleaning bindings, but only on smooth and completely unblemished surfaces. Dusters and cloths are very abrasive to damaged leather, bookcloth and paper in particular and should not be used on textile, suede or paper bindings. Parchment/vellum bindings with any splits are also at risk because dusters may snag causing material to snap off. Historically, milk has been used for cleaning vellum/parchment. This should never be used, as it will cause discolouration and can roughen the skin, making it more prone to abrasion and the collection of dirt. No moisture of any kind should be used to clean vellum/parchment except by a conservator.

Smoke sponges or certain erasers may be used if the material is in good condition and has no writing or image of any kind on it but, in general, it is better just to use a brush. Sponges and erasers should only be used after training by a conservator.

Dusting boxes and trays are a simple but effective way of reducing the amount of dirt spread around during a cleaning programme. Boxes and trays can be made on-site from simple, cheap materials. A dusting tray can be made from a sheet of board at least 650 microns thick such as archival folding boxboard. The sheet should be creased to create a 20-30cm border on three sides, and the border folded to provide a three-sided tray. The corners should be folded around the back of the tray and fastened with masking tape or with cotton tape slotted through the folded corner. A simple dusting box can be made from a large cardboard box, by cutting a circular hole, the diameter of the nozzle of the vacuum cleaner, in the centre of the bottom. Lay the box on its side, so that the hole is now at the rear. Cover the vacuum cleaner nozzle with muslin and push into the hole until secure. Dusting boxes may be made more permanent and effective by using hardboard or mdf and perspex.

Personal protection

When cleaning mouldy books or archives, staff should wear masks with an FFP2 or FFP3 rating, e.g. 3M 8810 or 3M 8822 disposable dust/mist respirators. The 8822 has a valve which prevents spectacles from steaming up, but as the valve drips care

should be taken to dry it at regular intervals so that no moisture touches the material being cleaned. Masks should be fitted to the contours of the face to provide effective protection[5]. Close-fitting vinyl or nitrile gloves should be worn if you have a skin condition e.g. eczema, or any kind of open wound or scab.

Surface cleaning techniques

It should be emphasised that the cleaning techniques described here are those used by conservators. Other staff who are to undertake this work should be trained by a conservator. If training or supervision cannot be provided, it is recommended that the cleaning is limited to surface brushing. Ideally, dust should be contained as it is removed. The Depulvera® and Bassaire machines have suction units built-in. It is possible to create a basic suction unit by attaching a vacuum cleaner (with a HEPA filter) to a dusting box or dusting tray.

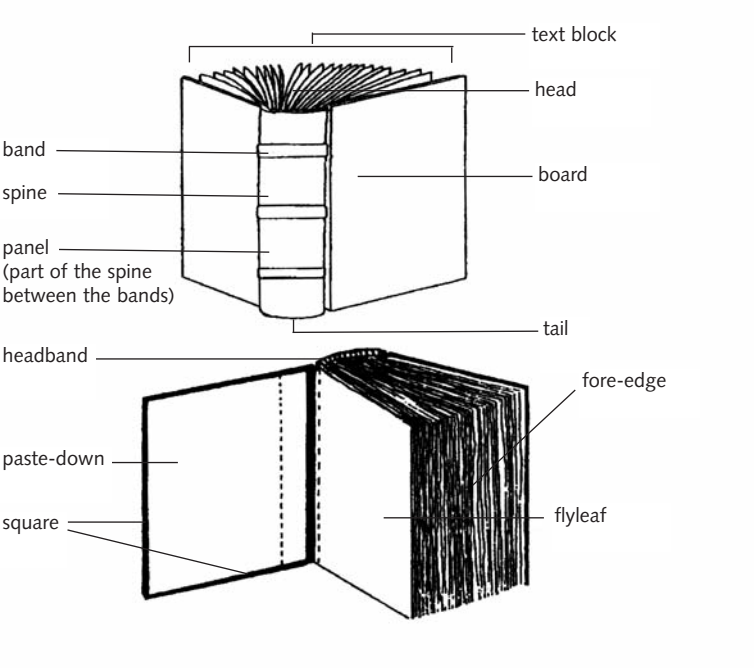
Books and bound archives

It is important to keep books in sequence during cleaning. Remove a shelf of books at a time. Placing them in shelf order on a trolley is a good system, but placing them in piles on a table is not foolproof. Shelf positions can be identified using coloured slips of paper or card about 2cm x 15cm in size. Count the number of books on the longest shelf and create enough slips for each book. Number the slips and place them sequentially in the books. The left-hand book on any shelf is the first and has the slip numbered 1, the one to its right is the second book and has slip 2, and so on. The slips relate to the position of the books on the shelf which may not necessarily be the order in which they are removed or replaced. This ensures that the books are replaced in the proper order.

First clean each volume externally, holding the book firmly closed and brushing away from the spine along the head first, then fore-edge and tail, and then the boards and spine. Be aware of damaged areas, and if necessary use a softer brush

[5] The HSE recommends the use of face fit testing equipment for masks.

over them. When brushing the boards, fan the brush strokes out from a central point rather than brushing along the edges of the boards, as these are most likely to contain vulnerable areas. If the spine has raised bands, brush across it rather than up and down. If using a dusting box, hold the book inside the box and brush dust towards the vacuum cleaner nozzle to prevent dirt escaping. Not all books will require internal cleaning, and even if dust has found its way inside the covers it may be confined to the first and last sections of the text block.



For internal cleaning, place the book in the dusting tray or box on foam book supports or wedges and open the front cover. Using a different brush from the one used for the binding, clean the endpapers (pastedown and flyleaf), beginning all brush strokes at the centre of the joint and fanning them out. Avoid brushing along the edges of the text block. This is important because if any pages are torn, the brush will be less likely to cause damage if the stroke begins in the centre of the joint. Clean the first few leaves, then turn the book over and do the final few leaves.

Gently turn the pages and brush off any visible dirt. Some books need to have every page cleaned but most only require the first and last few leaves and occasional ones within the text block. Dog-ears collect dirt, as do folding plates and maps, so particular attention should be paid to these areas. Dog-ears may be gently flattened if strong enough but do not unfold them if they would protrude beyond the edges of the binding when flat.

At the end of each session, clean all brushes with water and a non-biological/mild soap, rinse thoroughly and leave to dry completely before using again. Check and, if necessary, replace filters in machinery. Wipe the plastic sheet clean and vacuum out the inside of the dusting box or tray.

Unbound material

Much of the information on cleaning bound material is relevant, but unbound material has specific features and requires extra care. Problems include curling material, unstable inks or colouring media, torn edges, self-adhesive tape, rusting staples/clips, attached seals and brittle and stiff vellum/parchment items. Dry cleaning may be carried out by library staff and trained volunteers, but there are a number of techniques for which the professional skills of a conservator are required. All wet cleaning processes should be carried out by a conservator. Before cleaning, make sure you have a large, clean workspace and that your hands are clean. You may need to wash your hands frequently if cleaning a lot of material, especially if there is carbon-based dirt. Do not clean your hands with wet wipes, as they are often impregnated with chemicals which may cause damage to paper-based materials.

Using a soft brush, such as a pony hair, gently brush surface dirt from the material, working from the centre outwards, being careful not to snag the edges of any torn or missing areas. Material which is crumpled, creased or folded should be cleaned in tandem with gentle flattening. Flattening without cleaning will press dirt into the paper, but without some flattening, it is impossible to clean some material. If corners or edges are folded over, brush what is visible, then gently open them out and clean again. If paper is brittle or discolouring, do not attempt to flatten it. Do not try to flatten parchment or vellum.

Vulnerable material

There are many types of vulnerable material that should only be cleaned by a conservator. Some of the most common are detailed below:

- Paper or parchment documents and drawings made with iron-gall inks. These are often weak and prone to text loss[6].
- Coloured material, especially material with friable media e.g. watercolours, charcoal drawings or pastels.
- Photographic material[7].
- Anything written in pencil.
- Any material with seals attached should be handled with particular care to prevent damage to both seal and document. Wax seals should be supported when the document is being moved or turned over. You may need help from a colleague.
- Lead seals may corrode and become powdery, so should be inspected and, if necessary, treated by a conservator.
- Self-adhesive tape may be lifting from the surface of the archive material and will be prone to snagging. It is possible to trim off anything which is dry and has lifted away from the surface, so long as none of the material has adhered to the tape, but if in doubt, the tape should be left as it is. The complete removal of adhesive tape is a job for a conservator.
- Single-section pamphlets may have rusting staples, and documents are often held together by rusting paper-clips. Fragments of corroded metal which have broken away will themselves cause discolouration and weakness. Particular vigilance must be employed when cleaning anything with rusting metal attached to it, to guarantee that all particles have been brushed away. It is best practice in archive conservation to remove rusting attachments. This should be done by a conservator.

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[6] Iron gall ink was the most common type of ink in Europe from the 11th Century to the early 20th Century.

[7] Refer to the Preservation Advisory Centre booklet, *Preservation of photographic material* **www.bl.uk/blpac/pdf/photographic.pdf**

Protection from dust

Some dust deposition is inevitable in most libraries and archives, but it can be minimised. No matter how carefully it is done, cleaning causes some abrasion, and once a collection has been cleaned it is vital to protect it from dirt. Unbound papers and archive material are normally stored in archive boxes, and thus protected from dust deposition, but bound material is often shelved without further protection. Phase boxes of archival board provide inexpensive protection for books and can be made to measure for each volume. If bound archives are boxed, care should be taken to ensure that the enclosure fits them or that added packaging is used to prevent damage[8].

In historic interiors, it is normally a prerequisite that books are visible. Shelves in storage areas and above head height in historic interiors may have pieces of archival board or melinex placed across the tops of books to prevent dust falling on them. Dust falls or flaps can reduce dust deposition, but in order to be effective must be positioned so that the bottom edge, often scalloped, is below the tops of spines. This reduces ventilation and when books are accessed, both they and the falls may become damaged, so, whilst decorative, they are neither safe nor efficient. Storage in cupboards reduces the amount of dust deposited but can reduce air circulation, and few are well-enough sealed to keep their contents completely clean. Material stored in cupboards or glazed cases does need to be monitored for dust and cleaned regularly, if less frequently than material on open shelves. The reduced air circulation may favour mould growth if the relative humidity is high. The material should be regularly inspected for pests and mould. Shelving in storage areas should always have a covered top shelf, but if this is not present, tall static shelving units may be covered with board protruding 30cm all round, so long as this does not interfere with access or the use of ladders. This has the added advantage of helping to divert water should there be a flood from above.

[8] More information on protective enclosures can be found in the Preservation Advisory Centre booklet, *Damaged books* **www.bl.uk/blpac/pdf/damaged.pdf**

Online resources

'Cleaning books and shelves', Northeast Document Conservation Center
www.nedcc.org/resources/leaflets/4Storage_and_Handling/03CleaningBooksAndShelves.php

'Stacks cleaning procedures', University of Washington Libraries
www.lib.washington.edu/preservation/clean.html

Preservation guidance booklets

The following booklets can be downloaded free of charge at **www.bl.uk/blpac/publicationsleaf.html**.

Free printed copies are also available.

Basic preservation for library and archive collections

Building blocks for a preservation policy

Cleaning books and documents

Damaged books

Guidance for exhibiting library and archive materials

Managing the digitisation of library and archive materials

Managing the library and archive environment

Managing the preservation of library and archive collections in historic buildings

Packing and moving library and archive collections

Photocopying of library and archive materials

Preparing funding applications for preservation and conservation projects

Prevention and treatment of mould outbreaks in collections

Preservation of photographic material

Specifying library and archive storage

Understanding and caring for bookbindings

Using library and archive collections

The Preservation Advisory Centre promotes the benefit of good preservation practice and provides support in the form of information services, training and preservation management tools.

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Preservation Advisory Centre
The British Library
96 Euston Road
London
NW1 2DB

T +44 (0)20 7412 7612
blpac@bl.uk
www.bl.uk/blpac