



National Preservation Office

Cleaning Books and Documents



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Authors

Caroline Bendix
Accredited freelance library conservator
Alison Walker
Head, National Preservation Office

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Introduction

The aim of this leaflet 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, dusters and vacuum cleaners. This treatment can normally be undertaken, after training, by library and archive staff and volunteers who are not professional conservators. However, some of the techniques described should only be undertaken after training by a conservator, or under their supervision, and these are indicated in the text.

Surface dirt on collections presents dangers to the material itself. Dirt and dust on the covers can transfer to the text when the volume or document is used; pests may feed on the dust; the dust may contain mould spores which can germinate and grow on the material. Keeping material clean prolongs its useful life.

Handling dirty books or papers is unpleasant and may present a danger to health either by triggering existing allergies or sensitising the user. Dust found in libraries and archives has many components, and it is likely to contain pollens, mould and spores, pest detritus, textile fibres, degraded leather, skin cells and other organic matter as well as inorganic materials. Dust from degraded leather ('red rot') is easily transferred to shelves, other books and the internal pages of volumes.

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 which admit external dust through windows and doors – 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 institution and its user constituency. The librarian or archivist may be well aware of the collection's significance, despite its apparent neglect, 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.

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. For example, proximity to human movement has an impact on dust deposition. Recent research¹ 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, because much of the visible dirt deposited over a few years is clothing fibres. 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 institution may be in the position of catching up on years of housekeeping neglect, in which case a comprehensive cleaning project must be designed, followed by a regular maintenance programme. In areas for which frequent cleaning is not necessary, shelves should still have an annual random inspection for mould and pest activity.

Cleaning can be a useful opportunity to audit a collection and can therefore be combined with a project to assess conservation requirements, monitor for the presence of pests and mould, or simply to audit stock.

Who should do the cleaning?

Cleaning may be done by permanent library or archive staff, temporary recruits, students, volunteers, or professional cleaning or conservation companies. The deciding factors in the short term 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 the lack of sufficient knowledge to carry out what may be perceived as a straightforward task. In order to minimise risk and misunderstanding, training

¹Lloyd, H. et al., 'The effects of visitor activity on dust in historic collections', *The Conservator*, no. 26, 2002, pp 72-84

by a conservator should, if possible, take place on site, as 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.

What should be cleaned?

The purpose of this leaflet is to indicate simple dry cleaning methods for removing loose surface dirt. It applies principally to books and bound volumes of 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 because it may become ingrained if brushed. It is recommended that a conservator is consulted before cleaning such material.

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 volumes, staff and users from the dirt, the volume may be wrapped or boxed pending inspection by a conservator.

Cleaning the 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 material. 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. 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 spores causes particular problems. If inhaled or absorbed through damaged skin, mould spores 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.

You should decide where the material is to be cleaned, whether 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/mildew may be distinguished from dust by its shape; generally the initial stages of mould growth are small, circular, grey, slightly fibrous patches, whereas dust is usually more of a smooth coating of grey/white/brown/black. On books, mould often appears initially along the square (the area of the inside cover between the edges of the cover and the textblock) and tends to favour skin and cloth bindings over paper unless conditions are very damp.

Cleaning a collection is repetitive and hard work. It is important to change tasks if cleaning all day long to avoid strain caused by repetitive movements, such as brushing or reaching to one side to get material from a trolley.

If you are cleaning the material on tables, they should be strong, stable and high enough for individuals cleaning books to be able to stand straight. Most trestle and

collapsible tables are designed for people to sit at, so tables may therefore 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 should not come into direct contact with material being cleaned, as it tends to cause abrasion, and should not be used alone as a table covering.

Equipment and methods

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[®] may be used. Books are loaded into the machine at one end and pass through it across a series of rollers, passing along brushes until clean. 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.

In the 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 (manufacturer's figures). 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 rented) but many libraries, museums and archives cannot afford them or have more modest requirements, and rely on simpler tools and methods. Natural bristle brushes have traditionally been used. 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 textblock. If the books are very dirty, a hog's bristle shaving brush or a hog's bristle brush with a 6" handle may be used for the outside, and a 50mm bristle varnish brush for the textblock. If books are fragile, pony hair brushes with 6" handles are best used for both the binding and textblock. Different coloured tape around the ferrule can be used to distinguish between external and internal cleaning tools.

Variable-suction or low-suction vacuum cleaners may be used, some of which have HEPA filters. It may be better to choose one with an industrial engine so that it may 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, so 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 and pieces of binding may be snapped off.

Historically, milk has been used for cleaning vellum/parchment. This should **never** be used, as it will, in time, 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 rubbers should only be used after training by a conservator.

Herbaria should only be cleaned internally after consultation with a conservator, as they may contain poisons which have been used in the preservation of plant material.

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. 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.

Dusting boxes and trays

Dusting boxes and trays are a simple but effective way of reducing the amount of dirt spread around the room and into the atmosphere during a programme of cleaning books and archives. Boxes and trays can be made on-site from simple materials. Dusting trays cost about £3.50 to make and dusting boxes, at their simplest, about 50p (for the muslin). A dusting tray is best 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 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. These require wood-cutting equipment, so should be made by someone able and qualified to use it.

Organisation

It is important to keep books in sequence during cleaning. Remove a shelf of books at a time. Placing them on a trolley in order is generally a good system. If using a table, however, placing them in piles is not foolproof. A system of identifying shelf positions, using coloured slips of paper or card about 2cm x 15cm in size, is advisable. Count the number of books on the longest shelf and create enough slips for each book to have one. Number the slips and then place sequentially into the books. The left-hand book in 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.

Surface cleaning techniques

Books and bound archives

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.

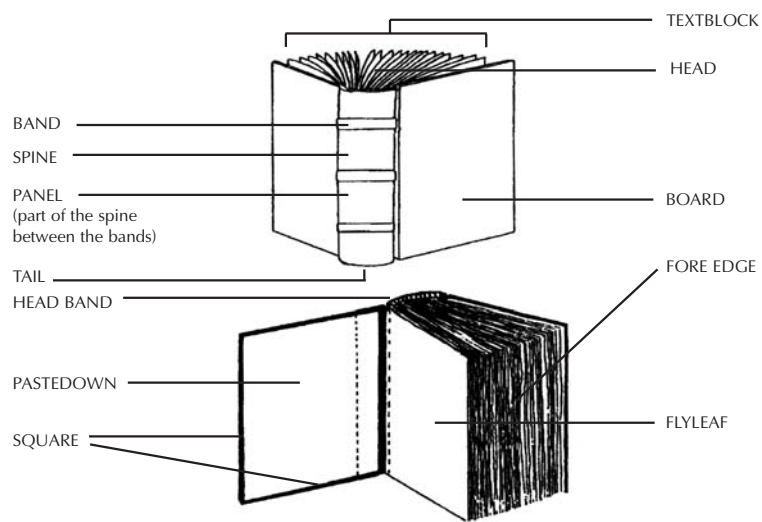
Ideally, dust should be contained as it is removed. The Depulvera[®] and Bassaire machines mentioned before have suction units built-in but it may not be possible to use such equipment because of financial or space constraints. Dusting trays and boxes can be made from board, such as cardboard or boxboard, and it is possible to create a basic suction unit by attaching a vacuum cleaner (with a HEPA filter) to the box.

Surface brushing

Each volume should be cleaned externally first, 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 over them. When brushing the boards, fan the brush strokes out from a central point rather than brush 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 into the room.

Not all volumes 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. 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, avoiding brushing along the edges of the textblock. This is important because

SOME PARTS OF A BOOK



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 require the first and last few leaves and occasional ones within the textblock. 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.

Unbound material

Much of the information on cleaning bound material is relevant but unbound material has its own characteristics 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. Some of these are indicated below. All wet cleaning processes should be carried out by a conservator.

Before cleaning, make sure that 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 brush, 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 grime into the surface and substrate of paper and other materials 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 necessary, flatten by gently rubbing a bonefolder across the surface through silicon paper. Too much pressure will damage the surface permanently, so it is better to use this technique after the material has been inspected by a conservator. If paper is brittle or discolouring, do not attempt to flatten it. Do not try to flatten parchment or vellum.

At the end of the 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 and trays.

Vulnerable material

Paper or parchment documents with iron-gall inks, and coloured material, especially where the media are not firmly attached to the surface of the archive material, e.g. watercolours, charcoal drawings or pastels, and anything written in pencil, should be handled with caution and should be cleaned only by a conservator. Lead seals may corrode and become powdery, so should be inspected and treated if necessary by a conservator. 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. 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 from the source 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.

Protection from dust

Some dust deposition is inevitable in most libraries and archives, but can be minimised. However 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.

In historic interiors, it is normally a prerequisite that volumes 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, historically used in libraries, 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.

Sources of information

Ogden, Shereilyn, 'Cleaning books and shelves', Northeast Document Conservation Center Technical Leaflet section 4, leaflet 3, www.nedcc.org/plam3/tleaf43.htm

Cloonan, Micehele V., 'Cleaning the Newberry's Collections', *Abbey Newsletter*, vol 6, no.4, August 1982
<http://palimpsest.stanford.edu/byorg/abbey/an/an06/an06-4/an06-410.html>

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

Zachary, Shannon, 'Managing a stacks cleaning project' *Abbey Newsletter*, vol 22, no. 3, 1998
<http://palimpsest.stanford.edu/byorg/abbey/an/an22/an22-3/an22-305.html>

List of products and suppliers

The suppliers listed below are not specifically endorsed by the NPO. Other suppliers may be identified through the internet or local directories. The NPO and the Society of Archivists both maintain lists of suppliers of conservation/preservation materials and equipment.

Bassaire mobile workstation

- **Conservation By Design**
Timecare Works, 5 Singer Way
Kempston, Bedford MK42 7AW
T 01234 853555
www.conservation-by-design.co.uk

Book supports

- **Conservation By Design**
Timecare Works, 5 Singer Way
Kempston, Bedford MK42 7AW
T 01234 853555
www.conservation-by-design.co.uk

Boxboard

- **John Purcell Paper**
15 Rumsey Road
London SW9 0TR
T 020 7737 5199
www.johnpurcell.net

Brushes

- **Edward Mason Ltd**
14 Brownfields
Welwyn Garden City
Herts AL7 1BB
T 01707 331911

Depulvera® book-cleaning machine

- **TiGiEmme srl**
Via Michelino, 113,
40127 Bologna,
Italy
www.depulvera.com
*Available in the UK through
Conservation By Design*

Masks and gloves

- **Arco Ltd**
Head Office
PO Box 21
Waverly Street
Hull
HU1 2SJ
T 01482 222522
www.arco.co.uk

■ **Preservation Equipment Ltd**

Vinces Road
Diss
Norfolk IP22 4HQ
T 01379 647400
www.preservationequipment.co.uk

Plastic sheeting

- Hardware shops, garden centres etc.

Smoke sponges**■ Conservation By Design**

Timecare Works
5 Singer Way
Kempston
Bedford
MK42 7AW
T 01234 853555
www.conservation-by-design.co.uk

■ Conservation Resources

Unit 2
Ashville Way
Off Watlington Road
Cowley
Oxford
OX4 2RD
T 01865 747755
www.conservationresources.com

Vacuum cleaner: Conservac or Museumvac**■ Conservation By Design**

Timecare Works
5 Singer Way
Kempston, Bedford MK42 7AW
T 01234 853555
www.conservation-by-design.co.uk

■ Preservation Equipment Ltd

Vinces Road,
Diss, Norfolk IP22 4HQ
T 01379 647400
www.preservationequipment.co.uk

Vacuum cleaner: Nilfisk**■ Nilfisk-Advance Ltd**

Newmarket Road
Bury St. Edmunds
Suffolk
IP33 3SR
T 01284 763163



National Preservation Office

The British Library
96 Euston Road
London NW1 2DB
Tel: 020 7412 7612
Fax: 020 7412 7796
Email: npo@bl.uk
www.bl.uk/npo

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University Libraries (CONUL)
The Society of College, National
and University Libraries
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