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National Preservation Office

Managing the Preservation of Library and Archive Collections in Historic Buildings



NPO Preservation Guidance
Occasional Papers

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ISBN 0 7123 4800 X

Design The British Library Design Office

This leaflet has been funded by Resource: the Council for Museums, Libraries and Archives

November 2002

Background note

This leaflet is based on the findings of a research project carried out between 1999 and 2001. Its aim was to identify problems of preservation management in UK library and archive collections housed in historic buildings. Through a survey of almost 50 British libraries and archives, the project examined the preservation issues that arise when collections are housed in pre-1900 buildings. Solutions found to be effective by the librarians and archivists interviewed during the survey were recorded, with a view to wider dissemination of good practice.

The survey found many examples of collections whose preservation needs had been neglected over the years. The condition of 40% of the library and archive collections seen was rated by their curators as poor or very poor (at or below 5 on a scale of 1-10). Even in libraries rated as in generally good condition, parts of the collections gave serious cause for concern.

The project was carried out in the School of Library, Archive and Information Studies, University College London and funded by Resource: The Council for Museums, Archives and Libraries.

Managing the preservation of library and archive collections in historic buildings

1. Introducing the issues

This leaflet aims to help librarians and archivists working in a historic setting to manage preservation projects and achieve results. It focuses mainly on the environmental problems common in historic buildings and outlines ways of tackling these which have been distilled from research into the library, archive and museum preservation literature. Many of the suggestions for action, while not exhaustive, reflect recommendations made by those with daily experience of conditions within historic buildings.

Preservation is an especially complex task when collections are housed in historic buildings. Some collections have been well-preserved over many years in their traditional surroundings. However, it is more usual to find that both the environment within the building and the condition of the collections need radical improvement. Librarians and archivists with many other pressing concerns can find that getting a preservation project off the ground is an uphill struggle. Governing bodies of historic institutions may believe that preserving the intellectual content of material is the main priority. Funds are more likely to be forthcoming for digitisation or electronic cataloguing projects than for preservation of original materials.

Many factors need to be taken into account in making a case for a preservation project. If the building is listed, measures that cause unacceptable damage to its architectural or historic significance cannot be considered. It can take a great deal of time, effort and expense to draw up proposals and reach agreement with heritage and planning bodies on improvements to environmental conditions. The layout or other structural features of the building may make it difficult to care for the collections in accordance with good practice. In addition, the need to preserve the aesthetic appearance of reading-rooms regarded as part of the heritage can be a further constraint. Meanwhile, the historic collections are often visibly deteriorating and need extensive conservation work to make them accessible.

It is often easier to recognise that action is needed than to know where to

start. Assigning priorities to improve conditions requires careful planning, especially when funds are limited and demands expanding. However, despite the obstacles that often seem to block the path to progress, there are encouraging examples of recent preservation projects carried out in historic buildings which have succeeded in providing a cleaner, safer and more stable environment for the collections housed within them.

Preservation management includes many activities not covered here - for example, disaster planning, fire prevention, security, handling routines, choice of shelving and pest control all need to be part of the thinking regardless of the age of the building. Much useful advice on these aspects is already available. This leaflet aims to give help and guidance on some of the particular issues you may encounter in managing preservation in a historic building. It is in two main sections: Section 2 outlines the main environmental and other problems and suggests a range of possible solutions; Section 3 sets out some of the key points to be considered in planning and managing a major preservation project in a historic building.

Sources of further information and advice, including useful websites, can be found at the end of the leaflet.

2. Environmental problems and solutions

2.1 The historic building

Many libraries and archives are housed within historic buildings. The libraries and archives of cathedrals, university colleges, country houses, museums and old-established learned and professional societies, in particular, often occupy buildings dating back before 1900 – “a historic building” for the purposes of this leaflet. Some have been in situ for hundreds of years. Many of these buildings were designed primarily for religious, domestic or scholarly purposes, with storage for books or documents a secondary consideration.

The essential requirements for a building used to house library and archive collections are that it should be soundly constructed, watertight and well-ventilated. It should also have a stable internal climate with temperatures and relative humidity (RH) levels varying only gradually over the seasons. Historic buildings that have been well-maintained may meet these requirements, especially if they are massively constructed and have good natural ventilation and high windows.

Often, however, they have suffered from inadequate maintenance over the years or have never provided a suitable environment. Many collections have outgrown their original surroundings and overflowed into areas with poor environmental conditions that have seriously affected the material stored there. Libraries and archives with extensively damaged collections are often caught in a downward spiral of accelerating deterioration due to physical causes and compounded by historic neglect, inadequate management and under-funding over the years.

2.2 Constraints on change

A major constraint in making improvements to benefit the collections in a historic building is that it is likely to be a Grade 1 or 2* (A or B in Scotland) listed building subject to stringent controls which are enforced by the heritage bodies and planning authorities. The Annex sets out details of the statutory and planning policy framework protecting historic buildings.

Aesthetic considerations can also restrict the choice of options. The archive, or more commonly, the library may be part of a visitor route on a historic site where tourism is an essential source of income. It may be seen as a valued asset by the institution more for its prestigious architecture and fittings than for its contents. The appearance of the rooms may be so important that any preservation or conservation measures which might be visible cannot be implemented. Many historic libraries are regularly used for functions or hired out to film or television companies. These activities are often detrimental to the collections.

Other problems may include:

- lack of space
- a layout unsuited to modern library or archive needs
- heavy use over many years.

2.3 Common environmental problems

In historic buildings where library and archive collections are in a poor condition, the most common environmental problems are:

- high temperatures with low RH in centrally-heated buildings
- low temperatures with high RH in unheated buildings
- a lack of ventilation

- major daily or seasonal fluctuations in temperature and RH
- high light levels, often coupled with unsuitable forms of artificial lighting
- air pollution
- serious damp problems.

The rest of this section gives key points and guidelines on each of these problems, and suggests possible solutions.

2.3.1. Temperature, relative humidity and ventilation

It is common to find collections stored at extremes of both temperature and RH in libraries and archives in historic buildings. Where materials are kept in warm reading-rooms with old heating systems plus, in some cases, heat radiating through unshaded windows in summer, the effects of the hot, dry conditions – shrunken bindings, warped boards, fragile book structures and desiccated paper – are usually only too evident. The over-use of dehumidifiers in stores can also lead to excessive dryness. Low temperatures and high RH levels can be a serious problem in stack areas or old unheated stores, especially where the fabric of the building has been poorly maintained. Cold, damp conditions can quickly lead to outbreaks of mould. Getting the balance right where there are mixed collections with different requirements for temperature and RH can be problematic. The needs of users and staff, who require a higher ambient temperature to be comfortable, must also be taken into account.

Even where conditions are clearly unsuitable, caution is needed before taking steps to alter the environment, as the collections are likely to have acclimatised to it over the years. Recent experience has shown that previously stable collections will deteriorate sharply if the heating system is removed. Materials can be well-preserved in environments where conditions change only slowly and steadily over the seasons, even though the temperature and RH levels range outside those recommended in published guidance. The existence of microclimates, inside for example, historic wooden cupboards, glazed bookcases and protective boxes, also helps to slow the rate of deterioration. However, these may also conceal problems such as mould, which can flourish unless regular checks are carried out.

Environmental continuity

Many materials housed in historic buildings have acclimatised over many years to the local environmental conditions. It is important to ensure environmental continuity by making changes as slowly as possible so as to avoid sudden fluctuations, which can cause greater damage than sustained high or low levels.

Key points: temperature and RH

- Temperature and RH act interdependently to cause changes in the internal structure of paper and other library and archive materials, but in different ways according to the chemical composition of those materials and of other organic components including the glue and type of ink used.
- Because the speed of these changes is affected by the movement of air, ventilation has to be considered alongside temperature and RH. RH fluctuates in response to changes in temperature, but good ventilation mitigates the effect of these fluctuations whereas poor ventilation heightens it.
- Organic materials such as paper, vellum and parchment are hygroscopic, that is, their moisture content changes as the amount of water vapour in the air changes. They are therefore more sensitive to RH than to temperature.

Guidance: temperature and RH

- Paper benefits from a constant, low storage temperature (below 10°C/ 50°F) and low RH (30–40%).
- Parchment, vellum and leather require RH higher than 50% if they are to retain their flexibility.
- Some guidance recommends RH of 55-65%, or 60% where ventilation is poor. However, a lower RH will slow the rate of deterioration of acidic paper.
- 20°- 22°C. is the usual comfort level for people engaged in sedentary activities.
- For frequently handled material, temperatures should be maintained at a fixed point between 16° and 19°C. ± 1° and RH at a fixed point between 45% and 60% (replacing the previous higher limit of 65%) ± 5% (BS 5454:2000).
- For infrequently handled material, the recommended levels are temperatures of 13° to 16°C. ± 1° and RH of 40% (BS 5454:2000).

PROBLEM	SOLUTIONS
Temperature and RH levels over or below recommended limits/poor ventilation	<p>High-tech</p> <p>Air-conditioning or air-handling systems installed in reading-rooms</p> <p>Full heating, ventilation and air-conditioning (HVAC) systems installed in stores and strongrooms</p> <p>Low-tech</p> <p>New central heating controllable within library or archive</p> <p>Conservation heating systems</p> <p>Passive climate control in sealed areas</p> <p>Dehumidifiers or humidifiers, as appropriate</p> <p>Small, wall-mounted air-conditioning units</p> <p>Use of enclosures to create a microclimate</p> <p>Installation of ceiling fans</p> <p>Holes drilled in backs of some bookcases may improve ventilation</p>

In looking at options for improving unsatisfactory temperature, RH and ventilation levels, there are two alternatives: high-tech/high-cost solutions, which may be virtually impossible to apply in a historic setting, and may only be achievable through a move to a new building; or a low-tech/lower-cost solution, which presents far fewer difficulties of installation, maintenance and operation. Section 3.8 examines these options in more detail.

Case-study

Borthwick Institute, York

The Borthwick, which holds a vast collection of archives dating back to the 13th century, is housed in a Grade 1-listed timber-framed building. The environmental conditions are unsatisfactory but cannot be altered because of the risk of condensation in the wooden structure. There are major preservation problems caused by fluctuating temperature and RH, damp, excessive light and dust and dirt. Maintenance costs are high. The building is overcrowded and because of its exceptional historic character cannot be extended.

Data-loggers were used to record environmental conditions, providing evidence for the case for moving to a new building to safeguard the collections and solve problems of access and storage. A successful application was made in 2002 for a Heritage Lottery Fund grant to build a purpose-built repository with facilities to BS 5454:2000 standards.

2.3.2 Light

Light is a more acute preservation problem in libraries than in archives since books, unlike archival material, are rarely stored in enclosures and kept in the dark. Many library collections in historic buildings have extensive light damage. In buildings constructed before the invention of artificial lighting, libraries were often designed to admit as much light as possible to enable readers to make the most of daylight. Academic libraries, where the books were often chained to the shelves, were typically arranged with bookcases at right angles to the windows and study-desks or tables between the cases, with light falling directly on the bindings of shelved books or the pages of open books.

Libraries in 19th-century buildings often have particularly large windows which allow high levels of ultra-violet (UV) light to fall on bindings, many of which have become bleached and desiccated over the years. Even well-lit libraries can have dark areas where artificial lighting is needed during the day, and the needs of modern readers require many libraries to be lit for evening, even all-night, use. The problems caused by daylight have been compounded in many libraries by the introduction of forms of artificial lighting which are themselves harmful to library materials.

All guidelines emphasise the damage which can be caused to library and archive materials by exposure to light. The intensity and type of light in

reading-rooms and storage areas need to be controlled in line with recommended levels. UV filters, which are available in a variety of forms, are the most common method of reducing light damage. Regular checks are needed to ensure that they are still effective. It should be noted that some conservators do not recommend UV film for historic glass as it can cause damage when removed.

In planning alterations to old lighting, it can be difficult to meet both the needs of readers and the sometimes conflicting preservation requirements of the collections, while respecting important historic and architectural features. Compromises may need to be reached, in consultation with users, to reduce the amount of harmful light falling on the books.

Key points: light

- All wavelengths of light – visible, infra-red and UV – promote chemical reactions leading to weakening and embrittlement of the components of books and documents.
- Light damage is irreversible and cumulative.
- A strong light falling on library and archive material for a short time causes as much damage as a weak light for a long time.
- Daylight has a higher proportion of UV light, the most harmful form, than artificial light sources.

Guidance: light

- There are no universally accepted guidelines on control of light: institutions should consider both the sensitivities of the materials in their collections and the needs of readers and visitors for comfortable light levels, in setting an upper limit of so many lux hours per year as a framework for light control measures.
- BS 5454:2000 recommends 100-300 lux at floor level and the exclusion of daylight in storage areas.
- *The IFLA Principles for the care and handling of library materials* recommend 200-300 lux for reading-rooms and 50-200 lux for storage areas.

PROBLEM	SOLUTIONS
Excessive UV gain	Panes or sheets of UV filtering material on windows or on sources of light emitting UV above 50-75mw per lumen UV varnish applied to window glass Roller blinds made from UV film Solar-treated glass Venetian or roller blinds with UV filters Thick, dark curtains drawn across shelves at risk Notices on blinds with reminder of need to protect collections Display cases fitted with light-proof covers
Difficulty in monitoring light levels	Use of light meter Checks carried out regularly by building managers Checks as part of a building assessment
Finding artificial lighting suitable for collections while in keeping with historic interiors	Fibre-optic lighting (used by the National Trust) Lighting designed by specialist architects based on old photographs
Keeping materials in darkness	Timed “off” switches except by entrances to stores Strongrooms designed for the purpose

2.3.3 Air pollution

Air pollution can be a serious problem in institutions near city centres, causing dust, dirt and chemical substances to be deposited on library and archive material. In historic buildings, there is often a need to deal with the results of old as well as recent pollution. The majority of libraries and archives housed in historic buildings experience problems of dust, dirt and soot.

The main causes are:

- the materials and construction methods used in the building
- ill-fitting parts of the building such as windows, door-frames, skylights and glass roofs, which allow particles to blow in
- a build-up of dust and dirt over the years, sometimes mixed with soot from old heating systems and made worse by neglect of proper cleaning routines
- building and maintenance work, giving rise to concentrations of stone and plaster dust in the air.

Many collections have suffered damage to bindings associated with gaseous pollution, mainly from traffic on nearby roads. Internal sources of pollution include coal-fires, smoking, cooking and gas lighting, which leaves sulphur deposits on bindings. Even where the sources themselves have been eliminated long ago, a legacy often remains that continues to affect the condition of collections.

A vital step in providing a clean environment for collections is to seal the building so that particulates cannot enter from outside. Work to secure the building, especially ill-fitting window-frames, will make a significant difference to the amount of pollution entering a library or archive. Where it has been possible to install air-filters, for example in new buildings or strongrooms, great improvements in cleanliness have been noted.

Where books and documents have been stored for many years unprotected from dust, the task of cleaning them is likely to be a specialist one best carried out by a conservator using equipment such as a clean-air work-station. Once cleaned, it is important to store archival and other suitable material in acid-free enclosures to prevent further dirt falling on it. Only the enclosures will need to be cleaned in future, an easier and cheaper job than cleaning individual items.

Especially when collections are stored on open shelves, it is important not to overlook the important part which mundane, low-tech methods can play in preservation. As many historic buildings are dusty because of the materials and methods used in their construction, frequent and regular cleaning routines are essential. All staff should receive appropriate training, preferably from a conservator.

Key points: air pollution

Common air pollutants include:

- particulate pollutants such as soot, dust and dirt, which can stain and abrade library and archive materials, aid mould growth, deposit acidic substances or become sites for damaging chemical reactions.
- gaseous pollutants produced by car engines and industrial processes (such as sulphur dioxide and nitrogen dioxide, which accelerate the photodegradation of cellulose), smoking, cooking and off-gassing of unstable materials, certain woods and vulcanized rubber. Ozone is another harmful gaseous pollutant.

Guidance: air pollution

- Air should be kept free of acidic and oxidizing gases and dust.
- Air quality should be monitored regularly across the seasons.
- Sealing the building is the essential first step in controlling the entry of pollutants.
- Filters which block particulates or absorb harmful pollutants are the most effective way of controlling air pollution. BS 5454:2000 gives detailed advice on the use of filters.
- Good housekeeping measures, including regular cleaning, help to protect collections against particulate pollutants.

Recent research suggests that pollutant concentrations can be reduced through the process of surface deposition, either to existing surfaces, or to purposely-introduced absorbing materials if the ventilation rate is low.

PROBLEM	SOLUTIONS
Pollutants entering from outside	Seal the building to secure doors, windows, skylights etc. Install air-filters where possible
Collections badly affected by pollution	Refurbish building to eliminate old dust and dirt and bring to good state of repair Clean collections and rehouse in accommodation with air-conditioning or air-filtering systems if possible Clean collections and reshelve behind glass (with suitable ventilation) Institute regular cleaning routines for building and collections
No suitable cleaning equipment	Portable conservation vacuum-cleaner with filters Clean-air work-station (“dust-box”)

2.3.4 Damp

Damp is a serious preservation issue in some libraries and archives. Damp problems that are so severe as to pose a threat to the stability of a collection are not only caused by floods and accidents but can stem from inadequate maintenance of a historic building. Common problems include poorly-maintained fabric, allowing rainwater to penetrate the walls or enter through the roof or through window or door-frames, and undiscovered accidents such as the blockage of guttering or downpipes. Leaks from pipework can also cause problems. Although it is unlikely that any new library or archive building would be designed with pipework running through storage areas or over shelving, in historic buildings this is a relatively common hazard. Thorough and regular maintenance is the key to averting problems in this as in many other aspects of preservation.

Guidance: damp

- The building should be made watertight to reduce moisture within the structure and bring down RH levels.
- Apart from automatic fire-suppression equipment, water-borne services should not pass through storage areas.

PROBLEM	SOLUTIONS
Persistent damp in building fabric leading to outbreaks of mould and damage to collections	Long-term monitoring of the area affected to inform treatment options Better maintenance of historic fabric
Pipework running through or above storage areas	Relocation of pipe-runs
Periodic flooding	Moisture alarms wrapped around pipes or placed on floors in stores at risk of flooding
High RH because of damp	Introduction of dehumidifiers and/or additional heating

3. Managing a preservation project

3.1 Setting a framework

In planning a project to improve the condition of collections, a number of questions need to be considered at the outset, including:

- how suitable is the building for storing library and archive materials?
- how stable are the environmental conditions in storage and reading-room areas?
- what is the condition of the collections?
- how important are aesthetic factors within the institution?
- what are the realistic options for improvements to the building?
- what are the likely costs of improvements?
- what criteria should be used in setting priorities for conservation work?
- what conservation treatments are needed, and how much will they cost?

- how can funding be found?
- what other internal and external resources will be needed?

It is also worth exploring whether improvements can be made within current resources, for example to cleaning or handling routines, or better training for staff and users.

3.2 Approach to the task

Where there are many problems to be tackled, it is helpful to break down the task into its components and approach it in manageable stages. The use of benchmarks to set achievable goals and record progress is recommended (see Further Information).

While institutions will be starting from different points according to local circumstances, it is likely that you will need to do some or all of the following:

- assess the suitability of the building
- assess the condition of the collections
- apply for funding
- take measures to improve the environment
- commission conservation work on the collections.

3.3 Where to start

The need for action on preservation often becomes evident when problems within the collection are noticed for the first time: mould is found on books shelved against an outside wall or insects emerge from rarely handled documents. It is important to recognise that these problems are symptoms of environmental conditions that are damaging to the collections. The aim first and foremost must be to improve these conditions. It is a waste of scarce resources to clean and conserve a book or document only to return it to an overheated, damp or polluted environment.

Case-study

Chetham's Library, Manchester

Chetham's Library is part of a late-mediaeval complex of buildings in the centre of Manchester. By the mid-1990s, the future of its large historic collections was under threat from unsuitable environmental conditions in some storage areas and a severe lack of space. A preservation survey was commissioned from a conservator which highlighted a long list of serious problems. The survey report was the basis for an application for a grant from the Heritage Lottery Fund and a successful public appeal. Refurbishment of the building was set as the top priority, followed by thorough cleaning and conservation of the collections. The collections have been now brought together within the historic buildings, with major improvements to the environment that maximise the natural features of the massive structure, with its cool, dark and well-ventilated conditions. Low-tech equipment is used to combat particular problems.

3.4 Assessing the building

The first step is to carry out as thorough a review of preservation needs as possible within the resources available. It is essential to start by looking at the building itself by carrying out a building assessment. Information needs to be brought together on as many of the following factors as possible:

- the site and layout of the building
- the internal climate, monitored over the seasons
- external weather conditions
- any climate control mechanisms in use and their effects
- light levels
- pollution levels
- problem areas where collections are in a worse condition than elsewhere.

Few librarians and archivists are responsible for the building in which they work, and still fewer are likely to have the training necessary to carry out an assessment of this kind themselves. Close working with the site or building manager and a conservator is needed to ensure that relevant information is available to support preservation decisions and applications for funding.

The internal environment

The environment within a building is the product of a number of external and internal factors, including:

- the location, size and layout of the building
- the building materials
- external climatic conditions
- levels of temperature and RH
- rates of ventilation
- heat and light input
- the numbers of people within the building, and
- the way in which the building is used.

3.5 Use of guidance and standards

It can be helpful to use published guidance and standards in evaluating the effects of the local environment on the collections. The standard most often referred to is BS 5454, updated in 2000, which sets environmental standards for archives, but is also widely consulted by libraries. A guide to the new British Standard explaining the changes has been produced. Other guidance, including useful publications written for museum curators but containing sound advice for all types of collections, is listed in the Further Information section.

3.6 Monitoring

Environmental monitoring is essential if the building assessment is to produce useful quantified information which can be used to support a case for funding. Routine monitoring of environmental conditions is much less common practice in libraries than in archives housed in historic buildings. Many libraries do no more than carry out a minimal amount of monitoring with basic equipment. Monitoring is often of low priority: monitoring devices are checked and calibrated infrequently, and rarely used to produce data over time. If this is the case in your institution, the help and advice of the building or site manager will be needed.

Monitoring: guide to best practice

- Temperature, RH and UV and visible light levels should be monitored, preferably for a complete year to track seasonal variations

- Environmental conditions in all areas should be adequately recorded with reliable and regularly maintained thermohygrographic or digital recording equipment.
- Monitoring devices for temperature and RH should be provided and used whatever the method of environmental control.
- All equipment should be regularly checked and calibrated.
- It is important to monitor spots which may have a distinct microclimate because of proximity to outside walls or heaters.
- It is important to monitor behind books on shelves as the microclimates at the back and the front can vary.
- Light levels in areas where collections are at risk should be monitored at different times of day and different seasons.

Monitoring: key points

- Modern monitoring equipment is unobtrusive and can be used even in sensitive heritage environments.
- Some digital hand-held monitors record temperature, RH and both UV and visible light levels, others temperature and RH only, enabling comparative data to be produced over time.
- Digital monitors are generally more reliable than thermohygrographs, but also require calibrating to perform effectively.
- “Humbug” data-loggers, about the same size as a 35mm roll of film, can be placed inside bookpresses or cupboards to record the microclimate. Graphs and charts in different formats can be printed off for different audiences.
- Radiotelemetry systems, which require no wiring and are regarded as more accurate and reliable than data-loggers if properly positioned, are in use in a few libraries and archives, but their cost is prohibitive for most institutions.

Monitoring is useful to a library or archive because it:

- provides hard information about existing environmental conditions
- supports requests for measures to improve the environment
- indicates whether any equipment installed is operating properly.

3.7 Assessing the collections

A preservation survey of the collections will also be needed to gather information about their condition, and to assess whether they are stable or deteriorating - and, if they are deteriorating, whether quickly or slowly. Libraries and archives housed in historic buildings often, though not always, contain special collections of rare and valuable items that may need extensive cleaning and conservation work to preserve them for continuing use and enjoyment.

The nature and scale of the problems affecting the collections may be obvious to anyone looking at the shelves. However, a preservation survey will provide objective evidence on the state of the collections and causes of damage, and make recommendations on conservation solutions. An in-depth survey report can be an invaluable source of information when making funding applications. It will:

- quantify the problems as a basis for costing
- include an assessment of risk as a basis for priority-setting, and
- help the library or archive to be clear about the work to be specified.

It is recommended that a professional conservator should be engaged to carry out a preservation survey if at all possible.

Reviewing preservation needs: guide to best practice

- Monitor environmental conditions for as long as possible, preferably a year
- Carry out assessment of building, using results of monitoring
- Commission preservation survey from conservator.

3.8 Examining the options

The next step is to collate and analyse the information commissioned from the building manager and the conservator. Two key questions at this stage are:

- whether the collections are stable within their traditional environment and
- if not, how far the natural environmental conditions of the building can and should be modified to extend the life of the collections

The previous section indicated some of the guidelines and standards that can be used to gauge how far the conditions within your building meet these ideals. If they fall short, a range of possible methods of controlling the environment

exists, although in practice the options open to those working in historic buildings are limited. The choice is essentially between high- and low-tech solutions.

- A building which is used to house library or archive collections should ideally have:
- a stable environment with temperature and RH levels maintained within defined limits
- good ventilation and air circulation
- a clean atmosphere, free as far as possible from particulate and gaseous pollution
- restricted light levels in areas where books and manuscripts are at risk of light damage.

3.8.1 High-tech/high-cost solutions

A high-tech approach (generally, a full heating, ventilation and air-conditioning or HVAC system) is increasingly seen by both archivists and librarians as the best way of solving environmental problems. Guidelines such as BS 5454:2000 suggest ideal conditions which can rarely be achieved without a full HVAC system. However, there are a number of reasons why such systems have not been installed in most historic buildings in British Isles:

- the threat to the historic fabric through humidification
- restrictions on alterations to the fabric
- lack of suitable space
- aesthetic considerations
- high cost of installation and maintenance.

Experience in some historic buildings used as museums in the USA shows that HVAC can be successfully installed, but only with careful prior monitoring and planning to ensure that the building is not damaged by excessive condensation in the process. HVAC systems require bulky air-handling plant and long duct-runs which cannot easily be concealed within a historic building. Some US installations use underground vaults or existing cavities within the building such as attics, basements, cupboards or unused chimneys to conceal equipment.

In historic buildings, temperature and RH levels cannot be controlled within narrow limits except in sealed areas or through the use of HVAC equipment. RH is particularly difficult to control without special equipment. Solutions which many libraries and archives in the UK and Ireland have adopted involve the installation of HVAC systems into basements, sealed strongrooms or non-listed buildings either on- or off-site. This enables BS 5454:2000 standards to be achieved provided the equipment is reliable and well-maintained. However, there is a risk that if the running costs or replacement costs of the equipment are found to be too high, the institution will decide to turn off the system, resulting in storage conditions that are worse than before.

Air-conditioning: key points

- installation and maintenance can be costly
- systems need to be in operation 24 hours a day, every day, to avoid sudden changes in temperature and RH
- equipment has to be reliable
- equipment needs to be checked and maintained regularly
- library and archive staff need training to keep the system running from day to day.

Case-study

Hereford Cathedral Library

At Hereford, collections of early and rare books, formerly housed in the Cathedral and in a 19th-century building, were moved in 1996 into a massively constructed, climate-controlled building on the cathedral site shared with the Mappa Mundi exhibition. The move of the collections from less than ideal environmental conditions in the historic buildings, where they were nevertheless stable, led to unforeseen problems. Problems with the operation and maintenance of the new HVAC system had led to a rise in RH and mould was found on some historic volumes for the first time. Contributory factors included the speed at which the move was made, before the new system was fully tested, and a lack of information and training for staff.

3.8.2 A low-tech/lower-cost approach

Low-tech solutions rely mainly on the thermal properties of the building itself, backed up by the use of portable equipment such as heaters, fans, humidifiers or dehumidifiers. A low-tech approach is often preferable in terms of practicality and affordability. Recent research suggests that temperature and RH may be safely allowed to vary across the seasons within these broader limits, provided that action is taken to limit extremes. This advice is in line with current thinking on the sustainable use of resources, especially the need to keep down energy usage and costs. However, proposals to use portable equipment must be looked at in the light of the fire prevention strategy for the building as a whole, bearing in mind the BS 5454:2000 recommendation that electrical cabling should be excluded from storage areas.

Case-study

York Minster Library

York Minster Library is the largest cathedral library in Britain, containing important collections of early printed books and other rare items. These are mainly housed in a mediaeval building within the Minster precinct, a particularly sensitive heritage site. Some valuable items have been moved to a refurbished room leading off a new extension, the Alcuin Wing, which was designed on low-tech principles to maintain stable conditions with the help of portable humidifiers/dehumidifiers if required. An air-exchange system with brushless input/output fans has been installed.

Conservation heating is a pioneering low-tech approach which has been developed by the National Trust to safeguard its properties and collections without significantly altering the natural environment. Heating is controlled through the use of humidistats and climate controls applied room-by-room, maintaining RH between 50% and 60% all year round. A specially-designed electronic controller for heaters, humidifiers or dehumidifiers is used, with a built-in lower temperature limit for frost-protection and a facility for setting an upper temperature limit. Conservation heating systems have been introduced into some libraries and archives with guidance from National Trust advisers.

Measures that can be taken to improve conditions within a historic building with minimum disruption include:

- zoning so that higher levels of humidification in the interior of a building are buffered by lower RH in the areas close to the exterior, thus reducing vapour pressure on the historic walls
- conservation heating
- use of climate-controlled basements or strongrooms
- use of micro-environments such as display cases to protect delicate objects
- use of historic elements already present in the building such as skylights and shutters.

Measures like these are used in many National Trust buildings.

3.8.3 Specialist advice

It is important that advice on feasible options is sought at an early stage from architects and engineers who are specialists in historic buildings. They will understand the issues involved in updating the services in such buildings without damaging the fabric of the buildings. It is also crucial that they should be aware of the special factors affecting the storage of books and documents. Librarians and archivists should ensure that they themselves are consulted at all stages of the planning process, as, in any building project, there will be key stages at which decisions once made cannot be reversed. The Further Information section includes selected publications on technology and historic buildings.

3.9 Applying for listed building consent and planning permission

The listed building and planning control systems place major constraints on change. The controls on alterations to listed buildings are comprehensive and apply to the interior as well as the exterior. Listed building consent is required before a listed building or its interior can be altered in any way which might affect its character. If external alterations are proposed, planning permission may also be needed. An application must be made to the local planning authority setting out the work proposed, supported by information such as maps, detailed drawings, engineers' reports and schedules of works.

Detailed guidance on alterations specifies that interior plans and individual features of interest, including internal "spaces, staircases, panelling, window shutters, doors and doorcases, mouldings, decorated ceilings, stucco-work and wall-decorations" should be respected and "left unaltered as far as possible". (Annex C to PPG 15)

Librarians and archivists involved in major projects to refurbish or repair historic buildings often find that a great deal of time and personal research is required to ensure a successful outcome. It can take many months to devise a scheme acceptable to the heritage body, which can be put forward for planning consent. A Conservation Plan is the key document, which needs to be developed at the outset by a specialist. This provides the evidence for local authority conservation officers and heritage bodies that the proposals have been integrated with the historic environment. It is essential that the local authority's conservation officer and representatives of the heritage bodies (English Heritage, Historic Scotland, Cadw Welsh Historic Monuments, the Environment and Heritage Service in Northern Ireland and the Heritage Council in the Republic) are consulted in developing the Conservation Plan.

Case-study

The Wren Library, Lincoln Cathedral

The removal of an old heating system during renovations led to excessively high levels of RH in the 17th-century library. Mildew was subsequently detected on some early printed books. Part of the collection had to be removed. It was not easy to identify a solution sympathetic to the historic surroundings, but after careful monitoring and research, eventual agreement was reached with English Heritage on a historically appropriate scheme. A Heritage Lottery Fund grant was secured in 1999 for a heating and dehumidifying system that was part of a scheme to restore the probable original layout of the library by placing readers' tables in the window niches. The equipment will be concealed in the niches.

Librarians and archivists working in historic buildings often face conflicts on two fronts:

- between the needs of the collections and the requirement to preserve the historic character of the building, and
- between their responsibilities to staff and readers and their responsibilities as occupants of buildings with a wider significance.

Where a listed building contains a library or archive which is in constant use, other parts of the local authority as well as the planning department may be involved in the approval of an application for consent, for example those responsible for the Building Regulations, which cover health and safety issues such as fire prevention and promote energy efficiency in buildings. Their advice may differ from the advice given by the heritage bodies. Problems can arise over historic doors and ceilings, which often do not conform to fire regulations; while staircases, galleries, handrails and high bookshelves, which are part of the institution's heritage, may present safety hazards to staff and users.

The Building Regulations do contain provisions for relaxing some of their prescriptive demands for fire safety in the case of heritage buildings, advising that a range of fire safety measures should be set against an assessment of the hazards in particular instances. On energy efficiency, factors to be taken into account include the risk of long-term deterioration of the building fabric or fittings. In Scotland, a Building Regulation Note has been issued advising local authorities that "what should be achieved may not always be achievable in older property" and that the aim should be to obtain a balance between building control standards and the protection and preservation of the architectural and historic quality and character of the building...". In the Republic of Ireland, the recently revised Part L Conservation of Fuel and Energy has included an exemption for protected structures and proposed protected structures.

Particular issues relating to work in historic buildings that would warrant sympathetic treatment include:

- restoring the historic character of a building that had been subject to previous inappropriate alteration, eg. replacement windows, doors or rooflights

- rebuilding a former historic building (eg. following a fire or filling in a gap site in a terrace)
- making provisions enabling the fabric of the historic buildings to "breathe" to control moisture and prevent potential long-term problems.

It is important for libraries and archives to work closely with the local authority conservation officer and to have access to specialist advice on these matters if problems arise. The Further Information section includes useful publications on building issues.

3.10 Commissioning conservation work

Library and archive collections in historic buildings are often themselves of great historic value and interest. Where they have been damaged by an unfavourable environment or other factors, conservation and repair will be needed. A major part of any preservation project for many librarians and archivists working in historic buildings is the management of sizeable backlogs of conservation work. With many valuable items deteriorating over time, it can be difficult to make the right decisions either about priorities or the best use of limited budgets.

Conservation: key points

- minimal intervention in original book-structures
- need to reconcile a range of factors including frequency of use, intrinsic value, condition and options for treatment with the availability of resources
- fragile volumes or manuscripts may be placed in a supportive enclosure
- use acid-free enclosures
- book-shoes protect and support fragile volumes, while remaining virtually invisible.

Where to get help

- The Institute of Paper Conservation
- The Oxford and Cambridge Conservation Consortia
- University libraries and archives, museums, large record offices or larger libraries.

Case-study

The Queen's College Library, Oxford

The library at Queen's College is an academic library with an unusually large collection of historic and rare books as well as a loan collection. The 17th-century library building is Grade 1 listed, as are both the Upper and Lower Libraries. The listed status and importance of the building greatly limit the scope for changes to the interior or exterior. Over the years, much of the historic collection has been moved out of the library building into unsuitable storage conditions in basements and underground tunnels. Many books have deteriorated through exposure to extremes of temperature and RH, damp, dust and dirt. As a result, much of a potentially valuable research collection is becoming less and less accessible. There are also many environmental problems in the library itself. The Oxford Colleges Conservation Consortium has assessed the condition of the collections, instituted monitoring and advised on temporary measures such as vacuum-packing of the damaged material in the tunnels. The College is now examining the need for expansion space for the library.

3.11 Applying for funding

Many libraries and archives housed in historic buildings face problems in financing preservation measures because the scale of refurbishment of both buildings and collections is often very substantial. Some institutions had a period of relatively generous spending on preservation in the 1980s or 1990s, but the focus of interest has now passed to other areas, particularly work on electronic access. Others have only rarely had resources to spare for preservation. The library or archive is just one priority among many.

Some institutions appear reluctant to fund preservation measures rather than new initiatives. You may find that you need to turn to external sources such as the Heritage Lottery Fund or charitable trusts to fund your project. It can also be helpful to raise the profile of the archive or library within the institution by arranging exhibitions, offering services to members and drawing attention in a positive way to the benefits of preservation and conservation. Whether external and internal funding is sought, it is important to find out well in advance what information will be needed to support your application.

Where to get help

- The Heritage Lottery Fund
- Charitable trusts
- The Society of Archivists Lottery Adviser
- The NPO website

Annex

Protection of historic buildings in the UK and the Republic of Ireland

Listed buildings

Historic buildings with recognisably original features are protected through the system of listing, which is organised in different ways in the four parts of the UK. A listed building is one that is included in the statutory "list of buildings of special architectural interest". In England and Wales, all pre-1700 buildings which are substantially intact, most of those built between 1700 and 1840, and selected buildings from 1840 to the present day, are eligible for listing. In Scotland, all pre-1840 buildings "the character of which is substantially unimpaired" are also included. No specific dates apply in Northern Ireland or in the Republic of Ireland.

The statutory list for England and Wales is compiled by the Department of Culture, Media and Sport, with advice from English Heritage. Properties in England and Wales are scheduled Grade 1, Grade 2* or Grade 2, in Scotland the Grades are A, B and C. Local area lists are held by planning authorities. The national list can be consulted at the National Monuments Record Office in Swindon, or the Listed Building Information Service. From late 2002, planning authorities will have access to the digitised list.

In Scotland, the statutory list is maintained by Historic Scotland on behalf of Scottish Ministers. Area lists are available for inspection in the relevant local authority offices, and the full lists can be consulted at the Royal Commission

on the Ancient and Historical Monuments.

In Northern Ireland, the Environment and Heritage Service of the Department of the Environment compiles the lists of buildings of special architectural or historic interest. The Northern Ireland Buildings Database can be searched online at: www.ehsni.gov.uk/buildings/proview.asp

Listed buildings are protected by legislation which makes it a criminal offence to alter or demolish a listed building without the appropriate consent. Alterations to the fabric of a historic building may require planning permission from the local authority. The listing system is enforced by inspectorial teams within English Heritage, Historic Scotland, Cadw and the Environment and Heritage Service of the Department of the Environment Northern Ireland.

Planning policy in the UK

Planning policy affecting historic buildings is contained in a number of guidance documents, which explain the arrangements for seeking consent to building works and set out criteria against which proposals for change will be assessed.

Listed building consent

Listed building consent (LBC) is required to carry out any works to a listed building of any grade of listing which may affect the character of the building. LBC must be sought for all major works, many minor works and even repairs, repainting and maintenance. In England, Scotland and Wales, applications for listed building consent are made to local planning authorities, many of whom employ specialist Conservation Officers. In Wales, Cadw has a small team of conservation architects who advise local planning authorities. In Northern Ireland, the Department of the Environment Planning Service deals with applications.

Under the legislation, special regard must be paid to “the desirability of preserving the building or its setting or any feature of special architectural or historic interest which it possesses” in considering whether to grant listed building consent. Institutions seeking to alter their listed buildings usually need to work both with the planning department of the local authority and with conservation advisers from English Heritage, Historic Scotland, Cadw or the Environment and Heritage Service of the Department of the Environment and Local Government in Northern Ireland.

Church and chapel buildings in England and Wales belonging to six principal denominations are exempt from listed building controls under “ecclesiastical exemption”. In Scotland, ecclesiastical exemption applies only to the interior. Any plans for alterations to the exterior of a listed church or chapel must be approved by both the local authority and Historic Scotland. In Northern Ireland, places of worship that are in use are exempt from listed building controls. Anglican cathedrals in England are subject to internal systems of control by Fabric Advisory Committees overseen by the Fabric Commission for England.

Protection of the architectural heritage in the Republic of Ireland

In the Republic of Ireland, planning authorities are responsible at local level for protection of the architectural heritage through the Record of Protected Structures (RPS), which replaces a system of listing which was in operation until 1 January 2000. At national level, responsibility rests with the Minister for the Environment and Local Government, who has the power to make recommendations for structures to be included in the RPS.

The system of protection for the architectural heritage has recently been strengthened by the Local Government (Planning and Development) Act 1999, now incorporated in the Planning and Development Act 2000. This enhanced the powers of Irish planning authorities and increased the obligations on owners and occupiers of protected structures. Under the Act, development plans must contain objectives for the protection of buildings and other structures which form part of the architectural heritage, and all such structures must be included in the RPS in the development plan. The criteria for including a building or other structure in the RPS are wide and include special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. The Planning and Development Act 2000 also gives planning authorities the powers to designate Architectural Conservation Areas (ACAs).

Dúchas, the Heritage Service of the Department for the Environment and Local Government, has a number of functions, including provision of an architectural conservation advisory service for planning authorities and the compilation of a National Inventory of Architectural Heritage. Based on the results of National Inventory surveys, recommendations are made to planning authorities for the inclusion of structures in the RPS. The Minister for the Environment and Local Government has direct powers to protect the

architectural heritage through the National Monuments Acts 1930-1994. These Acts allow for the protection of monuments and places. All monuments in existence before 1700 are automatically designated 'historic monuments' but monuments dating from after that date may also come within the scope of the term. Two months notice in writing must be given to the Minister of any proposal to carry out works to such a monument or place. The Minister, through Dúchas the Heritage Service, maintains a Record of Monuments and Places, a Register of Historic Monuments and may undertake the preservation of a monument or place by means of a Preservation Order or a Temporary Preservation Order. In addition, there are approximately five hundred monuments in state ownership and over two hundred further monuments in state guardianship. A structure may be both a monument and a protected structure and as such protected under two different sets of legislation.

The Heritage Council, set up by the Heritage Act 1995, has functions akin to those of English Heritage, including the provision of advice to the Minister about historic buildings not in state ownership. It has to be consulted by public authorities about works affecting heritage buildings they own. The Act provides a means to protect heritage buildings from damaging development, which the Heritage Council hopes to use to provide the same level of protection for heritage buildings as the 2000 Act provides for protected structures.

Planning policy in the Republic of Ireland

Planning authorities are obliged to protect the architectural heritage by taking care of it and preventing its deterioration, loss or damage. Their functions include identifying structures for protection, designating Architectural Conservation Areas (ACAs), controlling development that could alter the character of protected structures and ACAs, monitoring the condition of protected structures to identify endangered buildings and preventing protected structures in their ownership from becoming endangered. Grant aid for architectural conservation made available from the Department of the Environment and Local Government is disbursed through the planning authorities.

There are a number of prescribed authorities under the Planning and Development Act 2000 who must be notified by planning authorities of development applications affecting the architectural heritage. These include

the Minister for the Environment and Local Government, the Heritage Council, the Arts Council, Bórd Fáilte Éireann (the Tourist Board) and a non-governmental organisation, An Taisce – the National Trust for Ireland.

The enactment of the Planning and Development Act 2000 Act has led to the issuing of draft guidelines for planning authorities, *Architectural Heritage Protection*, which brings together a detailed explanation of the new planning procedures with guidance on conservation principles and alterations to elements of historic buildings and their surroundings. These draft guidelines were published jointly by the (now defunct) Department of Arts, Heritage, Gaeltacht and the Islands and the Department of the Environment and Local Government in December 2001, and will shortly be published in their final form. The aim is to “achieve a consistency of approach to the conservation and protection of the architectural heritage and to reflect the standards of architectural conservation supported by the ... Minister for the Environment and Local Government.” The guidance is intended to help planning authorities to identify structures which may be included in the Record of Protected Structures and to carry out other functions under the Act effectively.

A review of responsibilities in relation to the built environment has recently been commissioned by the Irish Government.

Further sources of information and advice

Protection of historic buildings

Acts of Parliament and Regulations - UK

- United Kingdom. *The Building Act 1984* London: HMSO, 1984.
- United Kingdom. *The Building Regulations 2000* London: HMSO, 2000.
- United Kingdom. *Care of Cathedrals Measure 1990 (No. 2)*. London: HMSO, 1990.
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All Acts of Parliament and Regulations passed in the UK since 1988 are available on-line at www.legislation.hmso.gov.uk

Guidance - UK

- Department of the Environment/Department of National Heritage. *Planning Policy Guidance 15: planning and the historic environment. (PPG 15)*. London: DOE/DNH, 1994.
- Department of Environment, Northern Ireland. *Planning, archaeology and the built heritage*. Belfast: DOE Environment and Heritage Service, 1999.
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- English Heritage. *Building regulations and historic and historic buildings. Balancing the needs for energy conservation with those of building conservation: an Interim Guidance Note on the application of Part L*. London: English Heritage, 2002.
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Acts and Regulations of the Irish Parliament - Republic of Ireland

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- Ireland. *Planning and Development Regulations, 2001*. Dublin: Stationery Office, 2001.
- Ireland. *Local Government (Planning and Development) Regulations 1994-1999*. Dublin: Stationery Office, 1994-1999.
- Ireland. *National Monuments Acts, 1930-1994*. Dublin: Stationery Office.

All Acts and Regulations of the Irish Parliament passed since 1997 are available on-line at www.gov.ie/oireachtas/frame.htm; those passed between 1922 and 1998 are at <http://193.120.124.98/front.html>

Guidance – Republic of Ireland

- Department of Arts, Culture and the Gaeltacht. *Strengthening the protection of the architectural heritage*. Dublin: Dept. of the Arts, Culture and the Gaeltacht, 1996.
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Standards and guidelines

- BSI. *BS 5454:2000. Recommendations for storage and exhibition of archival documents*. London: British Standards Institution, 2000 (supersedes *BS 5454:1989*).
- BSI. *BS 7913. The principles of the conservation of historic buildings*. London: British Standards Institution, 1998.
- Cassar, M. *Environmental management: guidelines for museums and galleries*. London: Routledge, 1995.
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- Wilson, W. K. *Environmental guidelines for the storage of paper records*. Bethesda, MD: NISO Press, 1995.

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- Bell, N. and Lindsay, H. *Benchmarks in collections care for UK libraries*. London: LIC, 2000. (LIC research report 55)
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Preservation surveys and risk assessment

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Useful websites

- Cadw www.cadw.wales.gov.uk
- Department of the Environment and Local Government, Republic of Ireland www.environ.ie/
- Dúchas – The Heritage Service, Republic of Ireland (heritage data website) www.heritagedata.ie/en/index.html

- English Heritage www.english-heritage.org.uk/
- Environment and Heritage Service, Department of the Environment, Northern Ireland www.ehsni.gov.uk
- The Heritage Council, Republic of Ireland www.heritagecouncil.ie
- Historical Manuscripts Commission www.hmc.gov.uk/
- Historic Scotland www.historic-scotland.gov.uk
- Institute for Paper Conservation <http://palimpsest.stanford.edu/ipc/>
- National Park Service/Historic Preservation Services www2.cr.nps.gov/
- National Preservation Office www.bl.uk/npo/
(Many of the NPO's leaflets are available for downloading)
- Northeast Document Conservation Center (NEDCC) www.nedcc.org/
- Public Record Office www.pro.gov.uk/
- Royal Commission on the Ancient and Historical Monuments of Scotland www.rcahms.gov.uk/
- Society of Archivists www.archives.org.uk/

All URLs were correct at September 2002.