MANAGING PUBLIC SECTOR RECORDS

A Training Programme

Preserving Records





INTERNATIONAL

COUNCIL ON ARCHIVES

International Records

Management Trust

PRESERVING RECORDS

MANAGING PUBLIC SECTOR RECORDS

A STUDY PROGRAMME

General Editor, Michael Roper; Managing Editor, Laura Millar

PRESERVING RECORDS

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Preserving Records

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INTRODUCTION

INTRODUCTION TO PRESERVING RECORDS

Preservation is a crucial element in the whole operation of a records programme. The aim of archival preservation is to prolong the usable life of useful research information in two ways. First, preventive preservation seeks to reduce risks of damage and to slow down the rate of deterioration. This aim is usually accomplished by selecting good quality materials and by providing suitable storage environments and safe handling procedures. Secondly, prescriptive preservation is a means of identifying and treating or copying damaged materials to restore useful access to the information.

In the course of their work, record-keeping staff and researchers handle books, documents and records that collectively form a significant proportion of the nation's cultural heritage. It is important to recognize the fragility of much of this material, especially of paper-based records created since the 1830s. Around this time ground wood pulp and alum-rosin size started to be added during paper manufacture, factors that resulted in a legacy of built-in deterioration. Today, we face new challenges in managing an ever greater variety of electronic materials, all of which must be protected from alteration, damage and technical obsolescence.

A variety of methods exist to protect records physically and ensure their stability and security. Environmental controls, the use of quality storage containers and good handling practices will help extend the life of archival materials. Some of the preservation measures discussed in this module are easily undertaken; others are more expensive or time consuming. Some require little training, while others should be done only under the supervision or with the assistance of a trained conservator. Naturally, the steps available to protect and preserve records and archives will vary depending on the availability of resources in different institutions.

This module discusses the physical preservation issues related to the protection of records and archives. The subject of preservation can be highly technical, and most trained conservators have a background in the science of chemistry. It is important to remember that remedial item-by-item conservation is an expensive service, requiring the participation of skilled and trained conservation specialists. Staff responsible for preservation should obtain professional qualifications and specialist training, a fact to be considered when planning for staff needs. Conservation and reprographic staff must be given parallel recognition with archives staff, since their duties and responsibilities are equally important.

However, it is possible for everyone working in the record-keeping environment to participate in planning, to ensure proper storage and handling, to learn how to assess risks and to know how to monitor activities so that the need for conservation or repairs is minimised. Preventive measures are critical to good records care; they are a

sound investment in time and money. The essential principles involved with ensuring the physical protection of records and archives need not be overly complex.

This module does not attempt to address the more sophisticated technical or chemical concepts affecting the preservation of archival materials. Rather, it offers key principles and 'best practice' actions for archivists and records managers, so that they may be better informed about preservation issues and may undertake important but simple steps to protect records and archives.

When working through this module, it is important for you to recognise that this module introduces important preservation issues but does not attempt to teach you to be a trained conservator. Conservation is as different from archival management as librarianship is from museum curatorship. It is not possible within the scope of this lesson to turn you into a qualified conservator. However, it is possible to introduce you to key ideas and provide the important information you need to take steps to preserve records and archives and, more importantly, to plan and manage preservation and conservation programmes. The module also helps you understand what you may need to get a conservator to do and how you can ensure that preservation and conservation work is suitable for the needs of your institution.

Preserving Records outlines the key concepts involved with the physical preservation and protection of records and archives, particularly those materials housed in archival repositories. The module discusses the importance of environmental protection and high-quality storage and handling practices. It examines the reasons for the degradation of archival materials and discusses methods to slow or stop deterioration. The module also reviews the role of reprography in preservation management and discusses the importance of security in protecting records and archives.

Avoiding and recovering from emergencies is dealt with in more detail in Emergency Planning for Records and Archives Services.

The information presented in this module can be used in government, corporate, organisational or personal settings. Many examples, including the fictitious 'Erewhon National Archives', are based on government situations, but the concepts illustrated should be easily applied to non-government archival institutions, local or regional government offices or private corporations or associations.

Remember, all of the points outlined here about preservation management can be applied at any point in the records' life cycle. A continuum approach to records care requires that issues such as preservation are not left to the end of the life cycle. The most cost-effective and efficient preservation processes are those performed by creators and users of records before the materials even pass into archival custody.

If records and archives managers can encourage good records care in the office, records will be in much better condition when they reach records centres or archival institutions. Thus while this module discusses many specific activities that appear most directly relevant to the archival stage of the life cycle, it is critical to consider the value of these activities at any point, from creation of records in the office and even before.

In order to protect records and archives, no matter where in the life cycle they are, the record keeper must

- understand how records and archives deteriorate and the environmental and physical causes of their deterioration
- know how to develop a well-planned preservation programme
- know how to care for materials in all media, from paper to photographic to electronic
- understand the value of reproduction as a preservation tool
- understand the importance of security
- know where to go for more information.

This module addresses these issues in the following lessons:

Lesson 1: Records and Archives: Causes of Deterioration and Methods of Control

Lesson 2: Planning a Preservation Programme

Lesson 3: Storage and Handling of Materials in Different Media

Lesson 4: Reprography

Lesson 5: Security

Lesson 6: What to Do Next?.

AIMS AND OUTCOMES

Aims

This module has six primary aims. These are

- 1. to explain the causes of deterioration of archival materials
- 2. to outline the key steps that can be taken to prevent or reduce harm to archives
- 3. to outline the central steps involved in managing materials in different media
- 4. to outline the issues involved with choosing reprography methods for preservation
- 5. to outline the main steps involved in ensuring the security of records and archives
- 6. to identify where to go for more information on this topic.

Outcomes

When you have completed this module, you will be able to

1. explain the causes of deterioration of archival materials

- 2. identify the key steps taken to reduce harm to archives
- 3. identify the central steps involved in managing media materials
- 4. understand various reprography options
- 5. understand security issues and options
- 6. know how to find additional information.

METHOD OF STUDY AND ASSESSMENT

This module of six lessons should occupy about 70 hours of your time. You should plan to spend about:

- 15 hours on Lesson 1
- hours on Lesson 2
- 15 hours on Lesson 3
- 10 hours on Lesson 4
- 10 hours on Lesson 5
- 8 hours on Lesson 6.

This includes time spent doing the reading and considering the study questions.

At the end of each lesson there is a summary of the major points. Sources for additional information are provided in Lesson 6.

Throughout each lesson, activities have been included to help you think about the information provided. Each activity is a 'self-assessed' project; there is no 'right' or 'wrong' answer. Rather, the activity is designed to encourage you to explore the ideas presented and relate them to the environment in which you are studying or working. If you are studying these modules independently and are not part of a records or archives management organisation, you should try to complete the activities with a hypothetical situation if possible. If the activity suggests writing something, you should keep this brief and to the point; this is not a marked or graded exercise and you should only spend as much time on the activity as you feel necessary to understand the information being taught. At the end of each lesson are comments on the activities that will help you assess your work.

Following the summary at the end of each lesson are a number of self-study questions. Note that these self-study questions are designed to help you review the material in this module. They are not intended to be graded or marked exercises. You should complete as many of the questions as you feel will help you to understand the concepts presented. External assessments, such as assignments or exams, will be

included separately when this module becomes part of a graded educational programme.

ADDITIONAL RESOURCES

Students working through this module should have access to a preservation office, if possible. Does your archival institution have a preservation manager? Does your records office or records centre have close links with the archival institution, so you can study the situation in records and archives environments? Whenever possible, it is ideal to draw on real examples, particularly in a module such as this one, which focuses specifically on the physical condition of records and archives.

Case Studies

The following case studies may offer useful additional information.

Case Study:

- 8: Pitt Kuan Wah, Singapore, 'Preserving Electronic Records at the National Archives of Singapore: A Balancing Archival Act and a Shared Responsibility'
- 13: Musila Musembi, Kenya, 'Development of Conservation Facilities in the Kenya National Archives and Documentation Services: A Case Study'
- 23: Ann Pederson, Australia, 'Storage/Preservation Case Study: Responding Effectively to a Disaster'

Examples

This module is best studied if you have access to actual examples of preservation equipment or supplies or can look at damaged records or archives. Included below is a list of suggested items that you should try to examine, either by looking at the actual item or by examining an illustration or photographic image of it. Instructors or coordinators using this module for teaching purposes may want to use this list to compile a group of photographic images, illustrations or actual samples to show to students. The list is organised by lesson.

Lesson 1: Records and Archives: Causes of Deterioration and Methods of Control

Topic	Suggested Illustrations/Images	
acidity	image of a standard pH chart.	
testing the pH of paper	Images of process of testing paper using pH pen	
acidity in paper	Images of cotton fibres and wood fibres	
temperature and relative humidity	Images of mouldy records or materials affected by high heat and relative humidity	
monitoring temperature and relative humidity	Images of various monitoring equipment, such as thermohygrograph, whirling hygrometer, thermometers	
light	Images of records, newspapers or other materials damaged by excessive light	
controlling light	Images of well-stored records, in containers that keep light out	
controlling light	Images of ways to reduce light levels, such as lighting with bulbs removed or filters over lights	
monitoring light	Images of using a camera to measure light levels	
air pollution	Images of materials faded or dirtied by pollutants	
controlling pollution	Images of air filter systems	
water	Images of materials damaged by water, either flooding or other water damage	
mould	Images of materials damaged by mould or mildew	
insects	Images of materials damaged by insects, such as bookworms, silverfish and so on	
rodents	Images of materials damaged by rodents	

Lesson 2: Planning a Preservation Programme

Topic	Suggested Illustrations/Images		
general storage principles	Images of a range of recommended storage methods, such as those listed below		
	archival quality enclosures		
	appropriate sized storage containers		
	separation of acidic materials from others		
	• archival quality shelving, showing flexible shelves and appropriate material (steel)		
	wide storage aisles		
	storage of non-archival materials separately		
	• materials 10-15 centimetres off the floor		
	quality equipment such as trolleys or ladders		
	adequate space for arrangement and description		
	storage of oversized materials		
	separate receiving area for new materials		
shelving	Images of quality shelving with clear labelling		
paper enclosures	Images of good quality paper enclosures		
plastic enclosures	Images of good quality plastic enclosures		
lamination and encapsulation	Images of laminated and encapsulated documents		
encapsulation	Images of equipment needed for encapsulation		
	Images of showing the process of encapsulation		
removing staples or paper fasteners	Images of materials damaged by staples or fasteners.		
	Images of safe and gentle removal of fasteners		
	Images of records in folders or numbered		
labelling	Images of good quality labelling materials or clear handwritten information instead of a label		
	Images of sample labels on folders or boxes		
labelling closed records	Images of labels on closed records, showing how such records can be identified		

Lesson 3: Storage and Handling of Materials in Different Media

Topic	Suggested Illustrations/Images	
paper records, including cartographic materials	Images of storage of paper materials in folders	
	Images of storage of paper archives in boxes	
	Images of storage of oversized paper records	
books	Images of well stored books	
	Images of damaged books	
parchment, vellum and seals	images of parchment document	
	images of vellum document	
	images of seals	
newspapers	Images of faded newspapers	
	Images of good storage of newspapers	
works of art on paper	Images of hanging a work of art	
	Images of storage of a work of art on the floor	
	Images of storage of a work of art in a rack	
photographic prints	images of a photograph showing the layering of base and binder	
	Images of case photographs	
	Images of labelled photographs	
photographic negatives	Images of storage of negatives	
cellulose nitrate film	Images of cellulose nitrate film	
photograph albums	Images of adhesive pages of photograph albums	
	Images of photograph albums in good storage	
motion picture film	Images of different types and sizes of motion picture film	
sound recordings	image of good handling of sound recording discs	
electronic media	images of various electronic media	
microforms	images of various microforms	
artefacts	image of artefacts common in an archival environment	

Lesson 4: Reprography

Topic	Suggested Illustration/Images
reprography	images of preparing materials for filming
	images of microfilm, microfiche, microfilm readers
	images of microfilm, microfiche and aperture cards
	images of different types of microfilm cameras
	images of checking film once completed
	images of high quality and poor quality microfilms
	Images of first, second, and third generation films to show change in quality
	Images of good storage of microfilms
	images of readers, reader-printer, rewind bench, splicer
photocopying	Images of photocopy machines
	images of originals and copies to show difference in quality and clarity
digital reproduction	images of digital equipment used for digital reproduction
	images of digital media, such as optical disks, diskettes, CD-ROM disks and so on

Lesson 5: Security

Topic	Suggested Illustrations/Images	
security	images of various security devices, including locks, bars on windows, alarms, and so on	

RECORDS AND ARCHIVES: CAUSES OF DETERIORATION AND METHODS OF CONTROL

There are many different reasons why records and archives deteriorate. Perhaps the most significant factor is the nature of archival materials themselves: many records and archives are composed of materials that are acidic, which means they are inherently fragile and prone to degradation. Other factors in the degradation of archival materials are fluctuations in or excessive levels of temperature and relative humidity; excessive exposure to light; air pollution; water damage; destruction from biological agents such as mould or insects; or abuse and mishandling.

This lesson examines the causes of deterioration of archival materials, including documents, photographs, maps, plans and other records. This lesson introduces basic measures that can be taken to protect records and archives. The information provided in this lesson may apply more directly to the care of materials already deposited in an archival repository, but the principles outlined apply regardless of whether the records in question are in their current, semi-current or archival phase of use.

This lesson considers the following questions.

- Why are records and archives often inherently acidic, and how can acidity be controlled?
- What is the effect of temperature and relative humidity on records and archives?
- How can temperature and relative humidity be monitored and controlled?
- How does light damage records and archives and how can it be monitored and controlled?
- What is the effect on records and archives of air pollution and biological agents?
- How can institutions protect their holdings against air pollution and biological agents?
- What is the effect of mishandling on records and archives?
- How can institutions protect their holdings against mishandling?

This lesson focuses mainly on those universal issues that affect the care of records and archives; Lesson 2 focuses on specific activities that can and should be taken to develop a planned preservation programme.

ACIDITY

Acidity is the quality of being acid, or 'sour.' Acidity is the opposite of alkalinity, which is the quality of being alkaline or, in effect, 'sweet.' Acids contain high levels of positively charged hydrogen ions that can, if introduced to paper, make it fragile and prone to deterioration. These ions can be introduced during the paper manufacturing process, from writing inks used or because of poor storage.

The level of acidity or alkalinity in something is measured on a pH scale, an arbitrary numerical scale ranging from 0 to 14. Neutrality – a state neither too acid nor too alkaline – is found at 7.0. All numbers above 7.0 represent increasing alkalinity; all numbers below 7.0 indicate increasing acidity. The scale is logarithmic, with each number representing a tenfold change in acidity or alkalinity. Thus a pH of 5 is 10 times more acidic than a pH of 6, and a pH of 4 is 100 times more acidic than a pH of 6. Both high acidity and high alkalinity are destructive to materials, but acid is considered the most damaging of the two in the archival environment.

Many archival materials, particularly paper-based materials, are of inherently poor quality because they contain high quantities of acid, which can weaken and deteriorate the structure of the paper itself, causing it to degrade.

Acids can weaken paper-based and other records and archives.

Acid can also be found in ink, adhesives and the chemicals used to process photographs. When archival materials are acidic to begin with, poor environmental conditions can easily affect their stability and longevity.

Activity 1

Identify three different substances you find every day that are acidic and three that are alkaline. What qualities do you see that distinguish acidic and alkaline substances?

Testing the pH of Paper

It can be useful to test the pH of paper records or archives, if there are concerns about high acidity. It is also possible to test the pH of archival storage materials, to ensure they are as stable and neutral or alkaline as they are supposed to be.

There are a variety of methods available for testing the pH of paper. Unfortunately, some require the use of expensive equipment, such as a pH meter, while others leave a permanent mark on the object being tested and so should not be used when testing original archival materials. One safe method for testing archival materials is the use of a pH indicator stick or indicator paper. The paper registers the pH range of the item being tested. The following steps should be taken.

1. Place a small piece of polyester under the areas to be tested, to protect the item and contain the moisture.

- 2. Place a drop of distilled water on the area to be tested (do not test near ink, as the ink may be fugitive, that is, it may be soluble in water).
- 3. Lay one end of the pH indicator in the drop of water and move it around to wet the entire end of the indicator.
- 4. Place a second piece of polyeste on top of the pH stick and cover with a light weight to provide even pressure.
- 5. After about five minutes, remove the top layer of polyester and the pH stick and check the colours on the stick against the colour chart provided by the manufacturer of the pH indicator.
- 6. Gently blot any remaining water on the paper then place the paper between dry blotters under a light weight to allow it to dry completely without warping (water stains may remain from the test).

To get best results, test the paper in several spots and compare results. If the indicator shows a reading below 7.0, the paper is acidic, if the reading is above 7.0 the paper is alkaline. Any paper below 6.0 is highly acidic and should be isolated from adjacent non-acidic papers by wrapping it in archival quality paper or storing it separately. Generally speaking, if some records within a group are acidic all the records are likely to be acidic. If only some records are acidic it is less expensive and easier to isolate the acidic materials from the non-acidic and store them separately.

Testing the acidity of paper should be done only if there is a suspicion that large quantities of material are acidic or if there is a possibility that materials may be deacidified. While testing the pH of paper can be a valuable way to identify acidic materials, the process can be time consuming and costly. In an institution without established preservation facilities, it is important to decide if the time and effort is warranted; safe storage of materials may be an appropriate solution until professional assistance is available

For information on how to obtain pH testing materials, contact the appropriate conservation associations listed in Lesson 6.

Acidity in Paper

The quality of any specific piece of paper depends greatly on the techniques used to make that particular paper product. When people first began to make paper, they used cotton, flax, straw or other plant fibres. The primary ingredient in these fibres is cellulose, composed of hydrogen, carbon and oxygen, with small quantities of other plant constituents such as lignin, which may be considered an impurity in paper. The fibres were mashed into a pulp then sieved onto screens and dried. The resulting papers were quite strong. Cotton produced the purest form of cellulose and flax the strongest form; thus both fibres are long and stringy and bond or link together in long strands to form the sheets.

Today, paper making is mechanised, and paper is often made from wood pulp. The fibres in wood pulp are by nature much shorter than those in cotton and are further broken down by the mechanical or chemical techniques used in paper production, resulting in fibres that do not hold together over great distances. This difference in fibre length is one of the reasons many modern papers are not as strong and long-lasting as older papers made from cotton.

Many papers made from wood pulp also deteriorate faster because they contain considerably more lignin than those made from plant fibres. Ligin is an organic substance forming the essential part of the woody fibre that gives the plant its structural strength. If it is not chemically removed during processing, lignin will breakdown through oxidation to produce substantial quantities of harmful acidic products. Modern papers may also contain dyes and sizing that can be acidic and contribute to the short life span of the paper.

Papers made from wood pulp can be highly acidic.

Newsprint is a particularly poor quality paper, evidenced by the speed with which it deteriorates, especially if left in hot areas or under bright lights. This is because newsprint is made from ground wood pulp that has had none of the lignin chemically removed. Newspapers, especially newspaper clippings, are often not worth keeping at all in their original form, as they deteriorate too quickly and generate acid and dust that can damage other materials. If it is necessary to keep newsclippings in the archival institution, it is best to photocopy them onto acid-free bond paper and destroy the original. In the office environment, original newsclippings should not be inserted into files at all but should be copied first and the copy kept instead of the original.

Activity 2

Take an old piece of newspaper and a paper document (one you would normally destroy, such as a draft of a letter). Place both outside in direct sunlight, but out of direct rain or wind, and cover half of each with another sheet of paper or cardboard. Leave the sheets of paper outside for two or three days. (Keep working on this module in the meantime.)

After a couple of days, compare the sheets. Have they faded? Did the newspaper fade more than the paper document? Was there a difference in fading between the covered parts of each piece of paper and the uncovered parts?

Acidity in Sizes

To strengthen paper and make it less absorbent, paper manufactures use a product called 'size'. Initially this size was in the form of hot animal gelatin. Later however it was discovered that the surface could be further hardened, to improve its ability to accept writing and printing inks, by dipping the gelatin-sized sheets in a solution of alum (aluminium sulphate). It is this alum treatment that is one of the causes for the dark brown staining in paper.

In 1830, alum-rosin sizing was introduced to the paper-making process to speed production; the chemicals are added prior to the manufacture of the paper sheets. Unfortunately, during this process sulphuric acid is formed, and this acid attacks the cellulose fibres. The acid damages longer cotton fibres but has an even more devastating effect on the shorter more vulnerable softwood fibres, which have been the main source of cellulose from the 1840s. Primarily it is alum-rosin sizing that causes the greatest acid deterioration of paper (other than newsprint) manufactured since the 1850s.

In order to address the problems of acidity in papers and sizes, the International Standards Organisation (ISO) has issued standards for the permanence of paper. The standard identifies the ideal composition of paper in order to ensure it will last as long as possible with minimal deterioration.

For more information on the ISO and on standards for paper, see Lesson 6.

Acidity in Inks

Inks can also contain high levels of acid. Iron gall ink, popular in the seventeenth and eighteenth centuries, was highly acidic, burning through paper and fading over time. Carbon inks are more stable; contemporary inks are often made from synthetic dyes. While they do not harm paper, they are not permanent and will fade over time, especially when exposed to light.

Acidity in Adhesives

The adhesives used on paper and on books can be highly acidic. Adhesives can consist of animal glues, vegetable pastes, waxes and resins, epoxys and tapes such as cellophane or masking tape. Many adhesives contain high levels of acid. While it is usually impossible to remove completely adhesives that were originally placed on archival materials, it is important not to mend records or archives with any adhesives except those considered archivally sound, such as wheat starch paste or methyl cellulose adhesive. Such mending is best done with the assistance or training of a professional conservator. It is never appropriate to use adhesive tapes to repair materials.

Lesson 6 provides information on how to find out more about making and using archival quality adhesives.

Acidity in Photographic Materials

The paper on which photographs are printed is usually of quite a high quality, better than regular paper or newsprint. But the chemicals used to process photographs can contain pollutants and acids and so can be hazardous to the photographs themselves and, to some extent, to other materials stored in the vicinity.

TEMPERATURE AND RELATIVE HUMIDITY

Temperature: The level of heat or cold in a substance, body or environment.

It is a general rule that the higher a temperature, the more quickly archival materials will deteriorate. This is because higher temperatures speed up the chemical processes that cause deterioration. Ideally, archives should be stored in an environment with a lower, rather than higher, temperature. Office environments, of course, must be comfortable for people to work.

Relative humidity: The ratio of the amount of water vapour in the air to the amount that would be present at the same temperature were the atmosphere to be fully saturated. Relative humidity is expressed as a percentage.

In an archival environment, changes in relative humidity can have a negative effect on records and archives. High relative humidity, particularly when coupled with high temperatures, accelerates the chemical deterioration of materials. High relative humidity can also cause some inks to feather: that is, to spread, sometimes well across the page, damaging the material.

If relative humidity is too low, and therefore the air is too dry, materials will become brittle and may crack or split. If the relative humidity is too high, materials can absorb the moisture and so swell and warp. High relative humidity can also promote mould growth, which is highly dangerous to records and archives.

Fluctuations in temperature and relative humidity can be highly damaging to records and archives.

Changes in relative humidity will cause materials to expand or contract, causing stress and weakening the physical structure of the items. Indeed, fluctuations in temperature and relative humidity are more damaging than consistently high or consistently low levels. For example, if air conditioners are turned on during the day but turned off at night, the fluctuations can negate any benefits brought by the air conditioners; the repeated increase and decrease in temperature and relative humidity will likely make the situation worse.

Appropriate Levels of Temperature and Relative Humidity

Temperature and relative humidity work together to affect the state of archival materials. High temperatures and high relative humidity form a humid environment, promoting mould growth, warping and deterioration. High temperatures and low relative humidity result in a dry environment, causing materials to become brittle. Low temperatures and high relative humidity can also lead to a humid environment and the formation of condensation.

The ideal combination is a low temperature and relatively low relative humidity: ideal levels are temperature at 18-20° C and relative humidity at 35% to 40%. Temperature should not exceed 20° C and relative humidity should not exceed 50%.

Temperature	=	Ideal: 18-20° C Not above 20° C
Relative humidity	=	Ideal: 35-40% Not above 50%

Some materials, such as photographs, microfilms and magnetic tapes, are best stored with a lower relative humidity and temperature, as they are particularly susceptible to the effects of heat and moisture.

Specific storage requirements for different media are discussed later in Lesson 3.

It can be extremely difficult to achieve a consistently stable environment, particularly in tropical environments where outside temperatures and relative humidity can be very high or in the extreme north or south where outside temperatures and relative humidity can be very low. However, this should not discourage you from learning more about the importance of monitoring and controlling temperature and relative humidity and recognising the importance of consistent environmental controls.

It can be difficult to maintain a stable environment but it is important to understand how to monitor temperature and relative humidity.

It is also difficult to monitor or stabilise temperature and relative humidity if the building itself is not designed to house records or archives. In many instances, records centre or archival institutions may be in buildings originally used for another purpose; consequently, air circulation may not be adequate. Further, the temperature or other environmental systems might be under the control of some authority outside of the records office, records centre or archival institution. In such instances, it is best simply to be aware of the environmental conditions of the facility and seek ways to improve those conditions whenever possible.

Monitoring Temperature and Relative Humidity

In an ideal environment, the temperature and relative humidity in the archival institution, records centre, or records office may be monitored regularly, even daily if possible (particularly in archival storage areas). The findings should be noted in a log or chart, which should also note the outside weather conditions for the day, so that it is possible to compare the external environment with internal conditions. The chart should record the following:

- day/month/year
- time of day
- temperature
- relative humidity
- outside weather conditions.

One way to monitor temperature and relative humidity is to use a thermohygrograph: an instrument that records the fluctuations in temperature and relative humidity by means of internal sensing instruments. Thermohygrographs are widely used, but unless they are constantly recalibrated they can give false results. Thus, if the equipment is not regularly maintained by trained professionals, the expense may not be justifiable.

Another method is to use newly available electronic testing equipment, such as a data logger. Such equipment requires a dedicated computer and special software, which means power supplies must be reliable. Electronic testing equipment is growing in popularity but can be expensive and again may not be justified.

A whirling hygrometer is a more cost-effective option for monitoring temperature and relative humidity. This equipment is usually sufficiently accurate and it is less expensive than the items mentioned above. Also available are relative humidity indicators: strips of paper treated with a moisture-sensitive chemical, which changes colour when exposed to different levels of relative humidity. The strips can be read against a chart to determine approximate relative humidity readings.

Temperature can be monitored with a thermometer. To monitor the temperature, simply install thermometers in appropriate places in the repository; ideally somewhere out of direct sunlight so that the readings better reflect the rooms as a whole. It is best to take regular readings of both the temperature and relative humidity in different locations throughout the facility; again, daily readings are ideal. The results should be logged, with an indication of day, date and time, temperature, relative humidity, location of reading, comments, and initials of the person taking the reading.

In the archival facility, daily temperature readings can help the staff monitor the conditions in which archives are kept.

Controlling Temperature and Relative Humidity

A number of steps can be taken to control temperature and relative humidity. Please remember that many of these steps are not complicated and can be done even in institutions with limited resources.

Even if temperature and relative humidity cannot be controlled at ideal levels, every effort should be made to keep the levels consistent. Cycling or changing temperature and relative humidity can cause more damage than consistently high or consistently low levels.

- Ensure good ventilation throughout the facility, so that air, particularly hot air, does not build up under the roof and raise temperatures and relative humidity.
- Store materials away from outside walls to allow air circulation, to control temperature and to reduce the effects of external environmental changes.
- Do not store records in basements or areas of high relative humidity or poor air circulation.
- Do not pack documents too tightly into boxes, on shelves or in cabinets.
- When using air conditioners, be sure to monitor the temperature and relative humidity regularly to check for fluctuations.
- If possible, store particularly fragile materials (such as photographs or magnetic tapes) in one area where the temperature and relative humidity can be controlled.

Activity 3

If possible, purchase or borrow a thermometer and take careful readings of at least one storage area for two weeks, documenting the temperature recorded, the date and time of day and the weather conditions outside. After two weeks, chart the temperatures recorded. Were there noticeable fluctuations? When did they happen? On weekdays? On weekends? Did any particular environmental conditions influence the temperature?

LIGHT

Light speeds up the oxidation of paper, causing materials to deteriorate faster.

Oxidation: The combination of oxygen with another element to promote deterioration, such as rusting of metal or disintegration of paper.

Light also has a bleaching action, causing coloured papers and inks to whiten or fade. At the same time, light can increase the chemical activity in paper, causing changes in colour; consider the effect of sunlight on a newspaper. Light also generates heat and, as discussed above, heat can speed up the process of degradation of materials.

Ultraviolet light is the most harmful light, because the particular wavelength of ultraviolet light is very active, generating more radiation. High levels of radiation can increase chemical deterioration. Ultraviolet light is found in sunlight and fluorescent light, so both these types of light need to be controlled in the archival institution.

All light can damage records and archives.

Controlling Light

Ideally, records and archives should not be exposed to any light, as long as they are in an environment with controlled temperature and relative humidity. Of course, this principle is impossible in practice; however, it is possible to reduce exposure to light significantly. While materials cannot always be kept in the dark, it is possible to reduce the effects of light by keeping all materials covered or boxed when not in use and by providing only the minimum amount of light necessary for any required task involving archival materials. Note, though, that if the environment is humid, it is useful to keep some lights on. A completely dark and humid environment is a breeding ground for mould, insets and rodents. Some light will help raise the temperature and perhaps reduce the level of relative humidity.

Materials in the archives storage area should be stored in boxes or containers whenever possible, to keep out light. In the office or records centre, records should be returned to filing cabinets, shelves or boxes when not in use; in particular, materials should not be left exposed on tables or counters, particularly near windows or areas of strong light.

Natural light can be controlled by placing curtains or blinds over windows and by installing awnings over the outside of windows, particularly in areas receiving direct sunlight. If light levels are extremely high, try to move the archives storage areas to a shadier side of the building or to rooms away from direct light. Filters can be purchased to place over windows; these come as plexiglass or plastic screens or blinds. They can be expensive, however, and poor quality versions will lose their filtering properties after a few years.

To control artificial light, a good first step is to identify all fluorescent lights in the building and determine whether they are close to archives storage or reading areas. Ideally, fluorescent lights should be replaced with incandescent lights, which do not generate the same level of radiation. Both types of light do generate heat, however, and so it is important to try to keep lights off whenever possible. Another less expensive alternative is to remove some fluorescent bulbs and so reduce the total amount of light used, or to cover fluorescent bulbs with UV-filtering sleeves, which can be ordered from conservation suppliers. In office environments, it may not be desirable to reduce light levels greatly, but it is still advisable to limit light in records storage areas and to ensure records are refiled after use.

Keeping records stored when not in use will reduce their exposure to light.

Monitoring Light Levels

It is possible to monitor the level of light in an area. This step should be considered if there is a serious concern about the level of light, particularly in an archival repository. However, the process of measuring light, while not overly complicated, does require some specialised equipment. Therefore, while information is included here about how to measure light levels, it is recognised that this procedure may not be easily done in many institutions.

Light is measured in 'lux', a unit of light intensity. A 150 watt light bulb produces a light intensity of about 50 lux at a distance of one metre. Ideal levels for archives are as follows:

- less than 100 lux in storage areas, with lights off when the rooms are empty
- no more than 100 lux in a reading room or reference area
- up to 50 lux when displaying materials

If light levels are too high, then removing light bulbs or placing curtains over windows may reduce levels. The levels should be checked again once steps have been taken to reduce light levels.

Light levels can be monitored using specialised light meters, which take readings of the level of light in a room. If a light meter is not available, it is possible to use the light meter in a single lens reflex camera to monitor levels. To use a camera to monitor light levels, follow these steps.

- Place a sheet of white cardboard, approximately 1 ft. X 1 ft. Large in the place where the light level is to be measured.
- Set the camera's ASA/ISO rating at 800. (The ASA/ISO rating is the American Standards Association/International Standards Association scale of film speed rating. The camera will have markings on it showing the film speed scale.)
- Set the camera's shutter speed at 1/60 second.
- Aim the camera at the white board and position it so that the entire field of view of the camera is filled with the board.
- Adjust the aperture (the 'f stops') until the light meter indicates a correct exposure for taking a picture.
- The approximate level of light (in lux) in the area can be determined from the aperture setting identified.

F4 = 50 lux f5.6 = 100 lux f8 = 200 lux f11 = 400 lux f16 = 800 lux.

PRESERVING RECORDS

Photocopying and Light Levels

Photocopying generates intense exposure to light and heat and can be highly damaging to materials. More importantly, the physical damage caused by repeatedly handling materials and flattening them onto the photocopy glass can be severe. If a particular archival item is requested frequently, the best action is to make a master copy of the original document and use that copy to make additional copies, instead of copying the original repeatedly.

The physical handling of materials during repeated photocopying can be highly damaging.

Laser copying, which is increasingly popular with the use of new scanning equipment, can also damage materials, as it also emits high levels of light. It also involves handling materials, which weakens them over time. When possible, items should be laser copied only once. Before scanning particularly fragile materials, consideration should be given to whether the materials are better scanned or left alone.

AIR POLLUTION

Air pollution can be a serious hazard to records and archives, particularly in urbanised or industrialised areas. Industrial gases, chemicals, car exhaust and other toxins generate pollution. Gaseous pollutants include sulphur dioxide, nitrogen dioxide and hydrogen sulphide. Ozone also causes oxidation, which is damaging to materials by promoting their deterioration. Air pollution can also appear within a building; photocopiers, cleaning supplies, paints, untreated wood and certain plastics and adhesives all contain gases that can pollute. Pollution can also be found in water, such as tap water, or even sea water for areas close to the ocean. These pollutants can also damage equipment and materials.

Pollutants can promote the deterioration of records and archives.

Dirt, dust and other particles are also pollutants, and they can absorb gaseous pollutants, which then penetrate materials and promote chemical and physical deterioration. Pollutants can also come from paper products themselves, especially those made with poor quality materials, such as newspapers. As these types of materials age they generate dust particles that damage not only the items themselves but also any materials in the vicinity.

How do pollutants affect records and archives? Gases, exhaust, dirt, dust and other pollutants come in the form of particles that float in the air. They are acidic and abrasive, and when they come in contact with materials they can 'eat' through the item causing it to deteriorate. Pollutants can cause metals to rust or wood products to chip

and break. With paper-based materials, films or tapes, or other items found in archives, the particles become imbedded in the surface of the materials; since they are abrasive and acidic they weaken the materials through physical and chemical action. If particles settle on an item and then become moist through high relative humidity or water damage, they can leave permanent stains.

Controlling Pollution

It is difficult to control pollution, particularly if an archival institution is in an urban area, as most national or state institutions are. Ideally, the institution will install filter systems to filter out polluting air particles. This is often not possible, as it is quite expensive and requires high maintenance.

Alternative strategies for controlling the effects of pollution include

- storing poor quality paper products, such as newspapers, separately from archives, so that the pollutants generated when the newspapers deteriorate are not transferred to valuable materials
- storing records in boxes, containers or file cabinet to keep out dust and dirt
- sealing untreated wood such as shelving with an interior latex paint, not an oil based paint, to keep wood particles from adhering to records (note that painted objects should not be returned to the archival or records storage area for at least thirty days after painting, to allow the gases in the paint to wear away)
- placing photocopiers in well-ventilated areas away from record storage
- storing records and archives away from engines, machinery, exhaust fans or other pollution-generating equipment
- prohibiting smoking, eating or cooking near records or archives.
- dusting and cleaning regularly and thoroughly to keep dust particles at a minimum.

Activity 4

Identify five pollutants that could affect the quality of the air in or around your archival institution, records centre, or records office. What steps could you take to reduce the effect of each of these five pollutants?

FIRE AND WATER

Fire is, of course, a serious threat to archival materials. If lost in a fire, records are lost forever. Equally, water -100% relative humidity! - can cause great damage to records and archives. Ironically, the best way to reduce the damage from fire is to put the fire out, and that is usually done with water. Consequently, the damage caused from a fire is usually water damage.

Protection against fire and water damage is only introduced here and is discussed in considerable detail in Emergency Planning for Records and Archives Services.

Paper-based materials in particular absorb water very quickly; when damaged by water, inks can run or dissolve, mould can grow and stains can appear. Papers may stick together and glues will soften and run. Water also raises relative humidity in an environment, leading to mildewing and warping. Water damage can come not only from putting out a fire but also from leaks, floods or heavy rains.

Steps can be taken to reduce the threat of fire.

Every effort should be made to reduce the threat of fire. Hazardous materials such as chemicals, paints and solvents should be removed from records storage areas. Archival materials should not be stored on the floor, in corners or in such a way that fire could jump from one box or bundle to another quickly. Be sure to do the following.

- Remove all materials from the floor and store them at least 15 to 25 centimetres (6 to 8 inches) off the floor.
- Do not store materials in attics or basements if possible, as both areas are highly susceptible to fires and to water damage from flooding by rain water.
- Store highly valuable items away from windows, floors, pipes, heating systems or any areas where fires could begin or water could leak in.
- Install fire alarms throughout the facility and make sure they are always operational.
- If there is any doubt about the strength of the building's roof, plastic sheets can be placed on the top shelf of a records storage area to deflect water into the aisles, in the event of a leak or flood.

People should not be allowed to smoke or use matches or other lighters near records storage areas. It would be wise to have the local fire department inspect the facility and advise on specific steps that could be taken to improve conditions.

It is hard to reduce the effects of a fire, except by putting the fire out as soon as possible. However, it is possible to take steps to protect records from water damage or reduce its effects. A first step is to survey the building: look for leaks, soft spots in walls or the roof, weak pipes, or any other sign of potential or actual water damage. Repairs should be made as soon as possible to improve the structure. In addition, the following actions can be taken:

- do not store materials under or near water pipes; if this is not possible, cover storage areas with a waterproof covering such as a plastic sheet or tarpaulin
- if storing materials under a plastic sheet or tarpaulin, check them regularly for temperature, relative humidity and ventilation, as the sheet or tarpaulin may increase temperature and relative humidity and promote mould growth or insect infestation

- install pumps in rooms subject to regular flooding or water damage, and do not store valuable materials in those areas
- monitor any air conditioners, dehumidifiers or other environmental equipment; these can generate water vapour and, if they break down, can leak and cause damage
- install water alarms in areas subject to water leakage or flooding.

Activity 5

Take two or three sheets of paper, such as an draft document that you would otherwise destroy, and immerse half of the paper in water. Once it is soaked, leave it out to dry. Check the paper every few hours and note how long the sheets took to dry.

Write down what happened to the paper. Did the ink run? Did the paper stick together? Did it warp or wrinkle?

BIOLOGICAL AGENTS

Mould, insects and rodents can all damage records and archives. Their presence can be encouraged by high relative humidity, high temperatures, a complete absence of light and the availability of nutrients.

Mould

Mould: A woolly or furry growth consisting of minute fungi that forms on substances found in moist, warm air.

The spores or seeds that cause mould to grow are always present in the atmosphere and can never be eliminated completely from the environment. However, mould needs nutrients to grow, such as paper, leather, glues and adhesives, dust and moisture to enable it to absorb the nutrient. As access to the nutrients cannot be restricted, the growth must be inhibited by controlling the environment. Mould grows best in an environment with high relative humidity. When the relative humidity exceeds 70% and the temperature reaches 25° C or more, mould growth speeds up considerably. Mould growth is exacerbated when the air is still; non-ventilated areas may be more susceptible than areas with ceiling fans or ventilators.

Mould grows in dark, damp, hot environments.

Prevention is the best means of controlling mould. Whenever possible, records and archives should not be stored in hot, damp, dark environments where the air does not circulate. Temperature and relative humidity should be controlled as close to ideal levels as possible, and air circulation should be good. While it is best to limit light levels, some lights should be kept on in environments with high relative humidity. In these instances, the lights can dry out the air somewhat, reducing relative humidity and inhibiting mould growth. Mould also feeds on dust and food particles. Records and archives areas should be cleaned and dusted regularly, and food should be prohibited in storage or work areas.

When new materials are brought into the archival facility, they should be held in the receiving area and examined closely for any sign of mould or insect damage. If moist or active mould is present, the materials should be isolated from other records and left to dry. Once the mould is dry dried or 'dormant', the records can be cleaned.

If the material is strong enough, cleaning is ideally carried out using a low-suction vacuum, which will prevent the spores from being dispersed through the air. A light-weight gauze should be placed over the nozzle to avoid any accidental loss of items. If such a vacuum is not available a soft paintbrush can be used to brush off the dried mould, but this work must be carried out in an area isolated from other records as high concentrations of mould spores could land on clean material and cause fresh mould outbreaks

This operation should also be carried out in a well-ventilated area as some people can be highly allergic to the inhalation of large quantities of mould spores. It is important that no attempt is made to brush off mould from wet material as this could worsen the situation by embedding spores into the material, resulting in discolouration and staining.

If mouldy materials are not salvageable, they can be photocopied or microfilmed and the originals destroyed. When copying mouldy materials it is important to clean the equipment thoroughly afterwards to ensure that the mould is not transferred to other original materials. It is strongly advised that a professional conservator be consulted in cases of extreme mould growth, if at all possible, to get advice on the best course of action.

Details of emergency treatment methods are included in Emergency Planning for Records and Archives Services.

Fumigation

One way to remove insects or mould is to fumigate documents. Fumigation is the process of exposing documents and records to a toxic chemical, in a gaseous form, to kill the insects and mould. This procedure usually requires special equipment, chemicals, and a level of preservation expertise; it is not advisable to try fumigation

without receiving specific training in the techniques. Commercial companies will undertake the work but it is important to understand the risks any treatment involves.

Fumigation is a controversial process, as the chemicals used can sometimes damage the archival materials themselves or may be harmful to humans. Fumigation is also a process under continuous review by national archival repositories in many countries. New methods and techniques using non-toxic methods, such as low oxygen treatments, are being developed and investigated.

This lesson does not recommend fumigating without further investigation or a better understanding of the process. It is not possible to provide such detailed information in this lesson, but the Additional Resources section at the end cites valuable readings on the topics.

Fumigation is a complex process that should only be undertaken by people with specialist knowledge and skill.

Lesson 6 contains information about how to contact a professional conservator and obtain advice about fumigation.

Insects

Insects are attracted to the nutrients found in paper-based products, particularly adhesives and starches. Insects are also attracted to damp, dark and dirty locations. While the occasional insect in a repository is common, a large number can mean an infestation, which may require extermination.

One or two insects in a building is common; large quantities of insects may suggest an infestation.

In order to prevent insects entering storage areas or coming close to valuable materials, all new materials should be inspected before they are brought in to the building. If insects are found, or the records have come from suspect areas, the materials should be cleaned thoroughly, watching not only for the insects themselves but also for signs of larvae. The best course of action to take with any new paper records, where infestation is suspected, is to freeze them for a period of 72 hours prior to placing them with other original material. Freezing can be done by wrapping the records in plastic and placing them in an ordinary chest freezer, which has been modified to sustain a low temperature. This technique will kill the insects, the larvae and the insect eggs, it cannot however be used to kill mould as many spore forms will survive deep freezing.

For information on freezing techniques, contact the appropriate associations identified in Lesson 6.

To prevent insects fostering in records or archives storage areas, food and drink should be prohibited and the temperature and relative humidity should be controlled. Screens could be placed on windows and exterior doors and, where possible, all cracks along floors and walls and holes around pipes plugged to limit the entrance of insects from outside. Ideally, there should be no live plants or flowers in the archival institution, particularly near storage areas, as plants can carry in insects, which can nest in storage areas and lead to infestations. It is essential that storage areas be cleaned on a regular basis particularly behind shelves and in dark areas.

Insect traps can be used to catch bugs, especially flying insects such as flies or wasps. If insects are an ongoing concern, senior management may consider treating the building with insecticides. However, some insecticides can be damaging to health, and treating materials with insecticides sometimes just delays a problem, since the pests may return once the insecticides have worn off. Such a decision should be made in consultation with experts in preservation management and so ought not to be considered an immediate solution.

See Lesson 6 for information on contacting a professional conservator.

Rodents

Rodents such as rats and mice can eat archival materials and use papers to build nests. They also chew electrical insulation, which can result in short circuits and fires.

Rodents are attracted to warm, dark environments; they also gain easy access if there are passageways to the outside, such as cracks or holes in walls. The presence of rodents is indicated if papers or boxes appear chewed or damaged; rodent feces may be found in corners; and sometimes noises can be heard from rodents nesting or moving about.

It is wise to inspect the building and storage areas thoroughly for possible entrance points and close these off if possible. Screens should be placed over windows and doors, if possible, to reduce points of entry.

If rodents are in the building, they are best caught using traps. Poisons will kill rodents, but if the dead rodent cannot be found, the rotting carcass can attract other rodents, making the problem worse.

Rodents are best caught using traps.

ABUSE AND MISHANDLING

Sadly, people can in fact pose the most serious hazard to archival materials. Intentional and accidental abuse can damage records and archives and lead to the loss of valuable information.

Damaging activities include

- rough handling of paper
- excessive pressure on bindings or folders
- poor photocopying practices
- placing materials on permanent exhibit, perhaps exposing them to extreme conditions
- poor retrieval and filing practices, causing materials to be torn, misfolded or damaged
- inappropriate storage of oversized materials
- faulty or inappropriate equipment for transporting materials from place to place
- excessive use of materials
- writing on documents, particularly archival materials
- spilling food or drink on records and archives
- spilling ashes on materials
- inappropriate mending or repair work
- tearing or folding papers
- handling fingers with dirty hands
- licking or wetting fingers before turning pages
- poor cleaning or housekeeping
- deliberate acts of vandalism
- theft of materials
- inappropriate stacking or boxing of records
- inadequate security.

Steps should be taken not only to protect materials in archival storage but also to ensure staff, researchers and office personnel understand the need to handle records and archives carefully, particularly materials with ongoing value. This practice is especially important in the archival repository but is not to be forgotten in the care of current records, as a small but important percentage of those will be transferred to archives for their continuing value and must be transferred intact and in good condition

It is important to ensure staff and researchers handle records and archives carefully.

Specifically, it is important to consider the following.

- Make security copies of valuable materials, particularly if originals are being used a great deal or are being placed on display.
- If possible, do not put original materials on display at all but use copies or surrogates.
- Store fragile or oversized materials appropriately.
- Ensure there is close supervision of the research area.
- Screen potential users of records for security concerns.
- Issue guidelines for the appropriate use of materials.

These issues are discussed in more detail in Lesson 5. See also Managing Archives for information on storage and display issues.

Activity 6

Can you identify four ways that archival materials are stored or handled in your institution that may pose a hazard to the materials? What steps could you take to reduce the danger?

DISASTERS

Even when all precautions are taken to reduce the risk of hazards, earthquakes, fires, floods, hurricanes and other natural disasters can cause severe damage, including damage to records and archives. The risk of loss from disasters is great, and it can be difficult if not impossible to protect against all emergencies. An entire module in this study programme discusses the issues of disaster management in detail.

For more information on disaster management, see Emergency Planning for Records and Archives Services.

SUMMARY

Lesson 1 has introduced the most significant factors affecting the physical quality and stability of archival materials. These factors include

- acidity
- fluctuating or excessively high or low temperature and relative humidity
- excessive exposure to light
- air pollution
- fire and water damage
- biological agents such as mould, insects or rodents
- abuse and mishandling
- disasters.

Various general measures to protect archives have been introduced, including

- monitoring and controlling temperature and relative humidity
- limiting light
- filtering air to reduce air pollution and removing pollutants from archives storage areas
- protecting archives from water damage
- inhibiting mould growth
- reducing attractions for insects or rodents
- protecting records from mishandling or abuse.

STUDY QUESTIONS

- 1. What is the concept of acidity and why are acidic materials prone to deterioration?
- 2. How do temperature and relative humidity affect archival materials?
- 3. What is a thermohygrograph?
- 4. Explain the reasons for monitoring temperature and relative humidity and the options available for such monitoring.
- 5. Why should the pH of paper be tested? What does such a test tell us?
- 6. What attracts insects and rodents to archival materials?
- 7. How does pollution affect records and archives?
- 8. What steps can be taken to reduce the effects of acidity?
- 9. Name four steps that should be taken to protect archives from deterioration.
- 10. What actions can be taken to reduce the danger of damage to records from mishandling or abuse?

ACTIVITIES: COMMENTS

Activity 1

Many substances found around the home or office are acidic or alkaline. For example, lemons, limes and other citrus fruits are acidic. Bleach, sulphur dioxide and some inks and metals can also produce acidic reactions. Alkaline materials might include baking soda and calcium products. Lye (sodium hydroxide) is also alkaline. It is important to remember that a very high alkalinity can be equally as destructive to records and archives as high acidity.

Activity 2

Did you find that the part of the paper covered by another sheet of paper faded less than the part exposed to sunlight? Light will speed up the chemical processes in paper, and fading is one sign of that deterioration. Because newsprint is more acidic and not as strong as bond paper, it will deteriorate more quickly.

Activity 3

Were you surprised at the findings? Were there more or fewer fluctuations than you expected to find? What environmental conditions may have contributed to the temperatures noted (heat wave, rain storm, sunlight on the windows)?

Activity 4

There are many pollutants found everywhere, from chemicals in the air to cleaning solutions in the storage areas. Simple steps that can be taken to reduce pollution include removing solutions from storage areas, closing doors to reduce the intake of air from outside, putting filters on air conditioners and cleaning the filters regularly.

Activity 5

Did the ink run? Did the paper stick together? Did it warp or wrinkle? Water will normally cause paper to warp and, if the ink is soluble in water, it will run and make it extremely difficult to read the document. Papers may also stick together and separating them can be almost impossible. If materials are damaged by water, immediate steps should be taken to protect them. These steps are discussed in detail in *Emergency Planning for Records and Archives Services*.

Activity 6

Just monitoring the use of records and archives, not allowing people to eat or drink in reading areas, or asking people to wear white cotton gloves when handling fragile materials can reduce the damage done to archival materials.

PLANNING A PRESERVATION PROGRAMME

Lesson 2 outlines the steps necessary to establish a preservation management programme. This lesson focuses on the care of archival materials but the overarching principles apply regardless of whether records have been transferred to archival custody or remain in use in offices or records centres.

This lesson expands on the general preservation procedures outlined in Lesson 1 and incorporates them into an integrated preservation programme. In general, the procedures outlined here refer to the care of archival materials, which have ongoing research and administrative value, rather than to the care of records in offices.

But whether in the records office, records centre or archival institution, valuable holdings need to be stored adequately and handled carefully. Archival materials will naturally require more stringent care than do records that are ultimately destined for destruction, but good records care begins with the management of records in the office, regardless of their ultimate destination. Significant materials should be identified at the time of creation and use in the office, so that steps can be taken to protect them from damage or loss.

Ideally, most preservation work will be preventive in nature. It is better to protect the records and control their environment than to spend resources and time repairing damage. The best preservation practices may seem 'passive' in nature but are in fact the most important activities that can be done, particularly if resources are limited.

This lesson begins by defining the concepts of preservation and conservation; then it examines the importance of preservation management and the steps involved in developing a preservation management programme. A first task in establishing a preservation management programme is for the archival institution to conduct a preservation survey, in order to understand the current physical environment and the condition of materials. Once such a survey is completed, priorities can be established for the care of archives, particularly in relation to physical facilities and storage equipment and conditions.

Topics discussed in this lesson include

- definitions of preservation and conservation
- principles of preservation
- the importance of preservation management
- steps in preservation planning
- conducting a preservation survey and assessing preservation priorities

- managing the archival institution's physical facilities and storage and handling procedures
- considering the implementation of standards for record keeping work
- evaluating the preservation programme, including conducting annual stocktaking, in order to assess the status of the programme.

WHAT IS PRESERVATION?

Preservation: A term referring to the passive protection of archival material in which no physical or chemical treatment to the item occurs.

From an archival perspective, preservation may be viewed as the totality of processes and operations involved in the protection of records and archives against damage or deterioration. Preservation may involve four related activities.

Maintenance: The daily care of records and archives, particularly in the current and semi-current records environment, when they are housed in offices or records centres; maintenance ensures the general protection of records against environmental hazards or other physical dangers.

Examination: The preliminary procedure taken to determine the original materials and structure of an item and to determine the extent of its deterioration, alteration or loss.

Conservation: The intrusive protection of archival material, by the minimal physical and chemical treatments necessary to resist further deterioration, which will not adversely affect the integrity of the original.

Restoration: The repair of an item when aesthetics and reproduction of the original appearance is more important than the preservation of the integrity of the item. Restoration is not generally viewed as an archival activity.

The chart below highlights the various concepts in their typical order of execution in an organisation.

Preservation	\rightarrow	policy-level actions and overall management
Maintenance	\rightarrow	day-to-day care of records, whether in offices, records centres or archival institution
Conservation	\rightarrow	specific work to protect materials and improve the environment
Examination	\rightarrow	ongoing or on demand, to monitor the status of records or to determine if conservation work is needed
Restoration	\rightarrow	for selected items only, to return an item to its original appearance.

Preservation planning is essential to good records and archives management. It is better to focus on preventive preservation measures and ensure adequate environmental and physical controls than to focus on conservation treatments for one object to the exclusion of others in the institution. Further, preservation should operate as part of the overall management of the institution. Preservation policies and plans need to be coordinated with other organisational requirements.

PRINCIPLES OF PRESERVATION

When determining what preservation work to undertake, the following core principles must be respected. It is essential NOT to undertake any treatment that

- cannot be reversed if necessary
- cannot be done properly or according to instructions
- will not last a sufficiently long time
- is harmful to people, either during the treatment itself or from the residue left on the materials treated
- changes the physical characteristics of the materials treated, such as changing colour or shape
- damages the archival material in any way.

Any preservation work done to records and archives must not damage the items in any way.

The following general guidelines should be respected by anyone involved with preservation work.

- Undertake preservation work on a macro scale: that is, begin with actions that will affect large volumes of material or institution-wide problems.
- Focus on preventive rather than prescriptive work.
- Establish a base line of care for all holdings, not just a few precious items.
- Stress the critical importance of accurate problem diagnosis and solution analysis to programme effectiveness. In particular, treatments to original materials should be carefully thought through and planned to match (not exceed) and solve a specific problem or series of related problems, not to create others.
- Ensure that storage methods and facilities do not endanger the integrity or authenticity of documentary materials.
- Document all treatments fully both before and after work is done.
- Interfere with originals as little as possible.
- Validate new techniques or technologies by careful and authoritative testing before use
- Use no processes or materials that can weaken the material of which the record is made
- Choose repair materials and methods of the same type as, or sympathetic to, those used in making the original record under treatment.
- Make sure all repairs or treatments are detectable and reversible.

Any preservation work done to records and archives must be detectable and reversible.

THE IMPORTANCE OF PRESERVATION MANAGEMENT

The best and most cost-effective way to protect records and archives is to ensure the good and orderly physical and administrative management of the entire organisation. All staff should be trained to handle materials, particularly archives, properly. Good preservation practice is required throughout the institution. The selection of good quality equipment in offices or repositories (boxes, trolleys, ladders or steps) will result in a good service, which not only assists the users but also minimises the damage done to the records or archives as a result of their being used. Preservation to a good standard is not inexpensive, but it is much less costly than having to send large proportions of the material for repair. Repair of damaged materials should be a last resort, after the potential for microfilming or copying has been considered.

The most cost-effective preservation measures are good and orderly management of the organisation.

Any matter that has a bearing on the physical condition of the archival materials should be in the area of responsibility of the person or people in charge of preservation management. The preservation manager should be part of the organisation's senior management team, so that physical protection of materials is considered in the overall planning process. In particular, the person in charge of preservation should be consulted in the development of policies that contain any element of preservation, such as copying original materials (where it is important to determine which types of records may or may not be strong enough for photocopying), or the rules for handling original material by staff or researchers. He or she should also set standards for a whole range of activities within the archival institution.

This person should also have an advisory role within the larger organisation or government on the physical care and protection of records and archives. For example, he or she should have input into decisions about types of paper or folders used, on the construction or adaptation of records storage areas, particularly archival buildings or records centres, and on the way in which files are stored throughout the organisation.

Activity 7

Identify who in your organisation is presently responsible for the physical care and protection of records and archives. What is their job title? Do you feel this is the best place in the organisation to place responsibility for records preservation? Where else might this responsibility be placed? Write a brief description of your findings and ideas.

Priorities in Preservation Management

When developing a preservation plan, it is important to establish clear priorities. Not all materials require special storage facilities or containers. Environmental controls can be critical for the management of electronic archives, for example, but they will be less important for the management of records destined for destruction.

Especially when funds are limited, priorities need to be established to ensure that records with high enduring value are protected. Those materials of limited value may not need to be accorded such detailed attention. For example, temperature and relative humidity controls may be considered essential in an archival storage vault, and the cost deemed appropriate. Such controls may not be affordable in the office environment, where a large portion of the records will not be kept beyond a few years. In the latter instance, it may be logical to store materials with archival value carefully so that they are protected but not to store all records that way.

Senior Management Support

Like all aspects of records and archives management, preservation planning will not be successful without senior management support. Steps should be taken to ensure key officials in the organisation are aware of preservation issues and understand the priorities identified. Accurate record keeping is critical; if it is not possible to demonstrate the need for preservation management, senior management will be less likely to accept the need for change. Thus, for example, it is important to monitor environmental conditions such as temperature and relative humidity even if it is not possible to make changes in the short term. By monitoring and documenting the temperature regularly, records and archives staff will have factual evidence to support any requests for environmental controls. Records should also be kept of all inspections of records, identifying when materials were examined and their condition.

STEPS IN PRESERVATION PLANNING

Preservation encompasses many activities, including

- conducting a preservation survey to assess the present state of care of records and archives
- transferring and accessioning selected records
- storing material properly
- maintaining environmental conditions suitable to the material stored
- providing accurate and detailed means of access to avoid overhandling of archival materials
- handling material carefully
- maintaining good housekeeping
- deciding whether damaged material should be copied in some way or sent to conservation
- maintaining disaster control plans.

CONDUCTING A PRESERVATION SURVEY

One of the first tasks in establishing a new preservation programme is to conduct a preservation survey.

The preservation survey examines all facilities, programmes and materials to determine needs and establish priorities.

The survey should ask questions about

- the archives building
- storage conditions and materials
- maintenance procedures
- the holdings themselves.

Surveying the Building

The level of attention given to the physical facilities may vary. The archival institution should of course be as environmentally secure and stable as possible, but records centres and offices should also be physically secure, even though many of the records held there do not have ongoing archival value. Protection of records begins at the start of their life, and any damage done to records in registries or offices cannot be undone in the archival institution.

Archival institutions, records centres and records offices should all be physically and environmentally secure and stable.

It is important to examine the physical surroundings and the structure of the building and storage locations within it. If problems or dangers are identified, these should be identified so that steps can be taken to correct or minimise the problems and protect the facility and its irreplaceable holdings. Consider the following questions.

- Where does the water in gutters flow? If the flow is close to the building, the gutters should be modified to ensure water flows away.
- Are the gutters or drain pipes blocked or damaged? Gutters should be cleaned regularly.
- Is the roof leaking or damaged? Repairs should be made as soon as needed.
- What are the temperature and relative humidity? Can they be controlled in any way, or at least monitored regularly?
- Are there air leaks? Can they be blocked?
- Are the doors or windows warped or damaged? Can they be repaired?
- Are the floors sound and strong? If not, can they be repaired or strengthened?
- Are the floors covered or coated? Bare concrete floors can generate concrete dust, which is both alkaline and abrasive and so can be damaging to materials; ideally, floors should be covered with vinyl floor tiles.
- Are the walls insulated?

- If the facility must share space with another agency, is there a fire wall between their joint walls to reduce the risk of damage from fire?
- Are the windows covered to keep out excess light?

When surveying the building, it is important to consider the surrounding area. The neighbouring building can cause as much damage to records and archives as the institution's own facility! For example, a neighbouring building can house flammable liquids, posing a fire hazard, or it can hold food, which might attract pests or rodents. It is also important to find out what events take place in the vicinity at night. Is the building secure from damage or theft? Are dangerous goods transported through the area regularly?

Surveying Storage Conditions and Materials

Archival storage conditions should be of the highest quality possible.

Good quality enclosures, boxes, containers and shelves should be used. If open shelving is used it should be sturdy and the files housed neatly and not too tightly. Filing cabinets may be used to keep dust and dirt off records, but they must be strong and should not be overfilled. Consider the following questions.

- Are there temperature and relative humidity controls and do they work properly?
- Are the temperature and relative humidity fluctuating or steady, too high or too low?
- Does the air circulate well throughout the building, particularly in storage areas?
- Are the windows shaded or curtained to reduce ambient light, prevent illegal entry and protect against pests?
- Are there air conditioners in place? Do they work adequately?
- Is the light controllable? Is it excessive or adequate?
- What kind of storage containers are in place? Are they adequate? Are they acid-free, chemically stable and of adequate size and shape for the purpose?
- Are the shelves metal or wooden? If wooden, have they been treated with latex paint or are they bare? Are they of adequate size and are there enough to allow for good storage of all records or archives without crowding?
- Do record keepers use acid-free folders and boxes?
- Do record keepers use plastic clips rather than metal clips or staples?
- Are there sufficient quantities of all supplies?

Surveying Maintenance Procedures

Among the most important preservation tasks are cleaning facilities and monitoring environmental conditions. Cleaning helps keep dust and mould spores from accumulating and discourages insects or rodents from entering the facility. Monitoring provides the objective data needed when the archival institution seeks to improve its facilities. Government officials may be more sympathetic to requests for environmental equipment if presented with six months' of accumulated data, rather than simply a request for equipment without solid proof of need. Consider the following questions.

Regular cleaning and monitoring are essential to good preservation.

- Are all storage, reference and office areas cleaned and dusted regularly and thoroughly and the dust removed from the premises?
- Are collections monitored regularly and checked for physical changes?
- Are the temperature and relative humidity checked regularly and the findings documented on charts or logs?
- What type of monitoring equipment is used, and is it adequate?

The following sample survey report form may be useful for standardising the process of monitoring the conditions in the office or archival institution. The aim of the report is to document the existing physical and environmental conditions under which records and archives are kept in the institution. The purpose is to provide a general status report of any situations or problems that could put the holdings or facility at risk and to determine what sorts of materials are held. If the organisation stores records in several different areas or buildings, a separate report should be completed for each storage area.

Physical and Environmental Monitoring Survey Report Form

Name of Person Reporting
Date of Report
STORAGE BUILDING AND AREAS Name and Street Address of Building
Building Site Describe any problems with your building site or location that could cause damage to your collections.
Building Materials and Construction Describe any features of year building that cause you problems in preserving your
Describe any features of your building that cause you problems in preserving your records, and also describe the problems they cause. Identify any realistic actions that could be taken to remedy or minimise these problems.

Power Supply
Does the building have sufficient, reliable power to operate equipment such as fans dehumidifiers, or air conditioners? Does the building have a backup system that operates in case of emergencies?
Building Maintenance
Is the building regularly checked for damage from weather or insects? Are needed repairs made quickly and competently? Do you and your staff have authority to order and check repair work? Is there a regular fumigation service to control insects?
STORAGE AREAS
Shelving and Storage Equipment What are the usual kinds of shelving and cabinets used in your institution? Does the equipment cause any problems or damage to the records? If yes, explain what kinds and what actions are being taken to remedy the problems or damage.
Climate Control Systems
What sorts of equipment (fans, dehumidifiers, air-conditioning) does your repository use to control temperature and humidity? What problems do you have in maintaining this equipment in good working order?
Fire Detection and Extinguishing Equipment
What sorts of equipment do you have for detecting and putting out fires? What problems have you experienced in maintaining this equipment?

Photocopying Equipment
What sorts of copies do you make of materials in your institution? Does your programme have its own photocopying equipment or does it send materials to another place for copying? What problems does the programme experience with photocopying?
Computing Equipment
How are computers used in your programme? What problems are you experiencing with your computers? If you do not use computers at present, will you be using them in the near future? If yes, how will you use them?
RECORDS AND ARCHIVES
Paper-based Records and Files, including Surveys, Maps and Plans
What kinds of papers or other materials are they made of?
What percentage are bound? What are the usual materials and methods used for binding?
What kinds of fasteners hold the pages together?
How are each of the different types of materials stored? Are they stored flat, rolled, in drawers, on shelves? Are they protected from dust?

Figure 1: Physical and Environmental Monitoring Survey Report Form

What types of damage do you notice most often?
If you try to repair damaged papers, files, maps and plans, what sorts of repairs do you make?
Is there a special repair section of the repository? If yes, how many people work there? If no, who usually does the repairs?
Do you often try to copy damaged items rather than repair them? If copying is difficult, please explain difficulties.
Audiovisual Materials: Films, Tape Recordings, Phonograph Records, Videos Estimate how many audiovisual items you have in your repository. How do you store them?
What sorts of damage do you find with these materials?
What do you do with damaged audiovisual items?

Figure 1: Physical and Environmental Monitoring Survey Report Form

If the items are damaged beyond repair, are you generally able to replace them?
Photographs and Microforms
Estimate how many photographic items you have in your repository. What percentage of them are very large, that is, larger than A4? How do you store photographs?
What sorts of damage do you find with these materials?
What do you do with damaged photographic items?
Published Books, Serials, Journals and Reports on Paper What kinds of papers or other materials are they made of?
What percentage are bound? What are the usual materials and methods used for binding?
What types of damage do you notice most often?

Figure 1: Physical and Environmental Monitoring Survey Report Form PRESERVING RECORDS

If you try to repair damaged books, publications, what sorts of repairs do you make?
Do you often try to replace or copy damaged items rather than repair them? If copying or replacement is difficult, explain the difficulties encountered.
Electronic Media What kinds of electronic records do you create or store?
What kinds of electronic computer equipment is available to read and use these records?
How are the records stored at present? How are they accessed and used?
What types of damage or loss do you notice?
Can you replace or copy damaged items? If copying or replacement is difficult explain the difficulties encountered.

Figure 1: Physical and Environmental Monitoring Survey Report Form PRESERVING RECORDS

Does your repository have other archival materials or works in its collection? Whatkinds?
How do you store and protect such works from damage?
What kinds of damage do you find and how do you repair it?
OTHER ISSUES
Preservation Work
Is there a particular staff person responsible for preservation management? If yes please describe the kinds of work carried out.
Emergency Response or Disaster Recovery Procedures
Do you have a plan for the management of emergencies or disasters? Is it regularly updated and rehearsed to ensure that staff know what to do when a problem occurs If not, do you plan to develop one?
<u>Insurance</u>
Do you insure your buildings? Do you insure your record collections so that they ca be replaced if lost or damaged? If not, do you think you might insure your collection in future?

Figure 1: Physical and Environmental Monitoring Survey Report Form

Activity 8

Using the sample preservation survey form attached, prepare a status report on the physical facilities and conditions in your institution.

This exercise may take some time and not all of the questions may be easily answered; do as much as possible but if you are not able to answer every question do not worry about it.

Surveying Holdings

The next step in developing a preservation programme is to conduct a conservation assessment of the records or archives themselves. This survey will be more or less complex, depending on whether the materials being evaluated are current records, records in records centres or archives. It is important that, whatever the survey technique, the methodology is documented and repeatable. This will allow for the records to be surveyed again at a later date and the rate of deterioration assessed.

A conservation assessment identifies the physical condition of specific records and archives.

Such a survey is important because it is not possible to provide complete conservation treatments for all materials in an archival institution. Copying and repair of archival materials is expensive. One of the questions that must be considered is what should be preserved. The establishment of standards helps ensure the materials used to create records and archives are of the best quality possible. But in situation where there are no such standards, or where decisions must be made about older materials, the task of preservation can be challenging. It is important to recognise that decisions will have to be made about what to spend resources on and what will receive more passive care.

Some materials may not receive any conservation treatment beyond good storage. Indeed, some materials may not require any more complex treatment. However, if a series of records appears to require some particular conservation attention, the first step is to conduct a conservation assessment for those records to determine the needs and concerns. This assessment can then form the basis for determining conservation priorities. A sample conservation questionnaire is shown below.

Completed questionnaires establish a firm basis for setting priorities and for projecting funding requirements for replacement, repair and copying work over the long term. Preservation Evaluation Questionnaires can be filled in as part of shelf-by-shelf surveys or during ongoing activities such as accessioning new materials or checking items following copying or reference use. Once completed, questionnaires should be copied, with a copy of the questionnaire kept with the material and the original used for preservation program planning and administration.

Preservation Evaluation Questionnaire

Propage ONE avaluation for each item or each archivel series
Prepare ONE evaluation for each item or each archival series.
DESCRIPTION OF MATERIAL
Retrieval Code
Author/Creator_
Item/Series Title
Physical Characteristics
Physical Characteristics
Inclusive Dates
Notes

USE OF MATERIAL

Circle either 1 (high) 2 (medium) 3 (low) 4 (none). In the notes, explain the basis of rating for each category if necessary.

1 2 3 4	1. Frequency of use per year	
Notes:		
S	ummary Score for Use	

RESEARCH VALUE

Circle either 1 (high) 2 (medium) 3 (low) 4 (none). In the notes, explain the basis of rating for each category if necessary.

1 2 3 4	relationship of item/series to overall holdings
1 2 3 4	uniqueness or degree of rarity (including location of other copies)
1 2 3 4	significance of author/creator
1 2 3 4	significance or quality of content
1 2 3 4	significance of subject for research in the field
1 2 3 4	place/circumstances of creation
1 2 3 4	completeness of material
1 2 3 4	intrinsic value or artefactual interest

_____ Summary Score for Research Value (average score from above numbers)

PRESERVATION PRIORITY RATING

Add summary score for use and summary score for research value.

Overall	Numerical	Score
Overan	Numerical	Score

Numerical Score	Preservation Priority
0 - 2	ONE - immediate action
2.1 - 4	TWO - make special effort to do
4.1 - 5.4	THREE - part of scheduled work
5.5 - 6.9	FOUR - minimal - whenever
7.0 - 8+	NO ACTION - DISCARD

Figure 2: Preservation Evaluation Questionnaire

Availability/cost of replacement_____ Cooperative arrangement with others to preserve or film it to suitable standard_____ Physical condition/type of damage/rate of deterioration_____ Suitability for copying (physical and legally i.e. copyright or donor restrictions), type and estimated costs_____ Type and extent of preservation treatment recommended and estimated cost OTHER(specify) SUMMARY OF RECOMMENDED PRESERVATION ACTIONS (CHOOSE AS MANY AS APPLY) Tick [] and make explanatory notes beside relevant item numbers from 1-12 below. [] 1. Discard immediately (deteriorated duplicate published material only) [] 2. Continue use until deteriorated, then discard [] 3. Put in climate controlled storage [] 4. Purchase replacement_ [] a. Microfilm/microfiche_____ b. Hard Copy c. Other (please specify)

ADMINISTRATIVE/MANAGEMENT CONSIDERATIONS (DESCRIBE WITH BRIEF NOTES)

Figure 2: Preservation Evaluation Questionnaire

[] 5. Put in protective enclosure(specify)			
[] 6. Clean_			
[] 7. Deacidify_			
[] 8. Repair			
[] a Minanta atabilia			
[] a. Minor to stabilise			
[] b. Full treatment			
[] 9. Re-bind			
[] a. Ordinary commercial			
[] b. Custom			
[] 10.Copy			
[] a. Photocopy			
[] b. Microfilm			
[] c. Photograph			
[] 11. Refresh/migrate to new platform(specify)			
[] II. Reflesh/inigrate to flew platform(specify)			
[] 12. OTHER(specify in sufficient detail			

PROPOSED PLAN/SCHEDULE

(for completion of work recommended above and name/title of person to be responsible for it)

Date to start	Activity	Person responsible	Date to be finished	Date completed	Initials

ADDITIONAL NOTES				
Name of Evaluator	Date of Evaluation			

Figure 2: Preservation Evaluation Questionnaire

Establishing Priorities

Once various materials have been assessed, it is possible to establish conservation priorities. These priorities will relate not only to the physical state of the material but also to its relative importance to the archival institution, its age, legal values and other concerns.

As the preservation evaluation questionnaire indicates, there are a wide variety of possible actions that can be taken to preserve records and archives. Some actions require minimal effort and expense, such as replacement through purchase or photocopying. Other actions demand considerable resources, such as extensive treatment of originals or microfilming. Remember, microfilm copying is particularly expensive and should only be done as part of a well-planned preservation programme.

Responsible care usually requires a combination of copying and treatment since many archival materials must be retained in original form. It is also irresponsible to repair materials and then return them to the same environment that seriously damaged them in the first place.

When considering preservation priorities, the following questions should be asked.

- What is the general condition of the records and archives?
- Are the items badly damaged or deteriorating?
- Are the documents unique and irreplaceable?
- Do the items have valuable intrinsic value: in other words, is the item itself as important as the information in it?
- Will the items be heavily used?
- What items require major conservation work?
- What is their priority or level of use in the office, records centre, or archival institution?
- Which materials have the highest value to the organisation? (For example, audited financial statements, charters or current contracts may need to be well protected; copies of invoices kept in the event of a review may have a lower value and require less stringent care.)
- Are there signs of mould, insects, rodents or acid damage?
- Are materials stored adequately, with acidic items such as newspaper clippings removed or stored separately from original archives?
- Have metallic staples, pins, paperclips and tags been removed?
- Are photographic materials stored separately from other archival items?
- Are materials labelled clearly? Are archives folders labelled in permanent ink, which is more stable, or water-soluble ink, which can run onto documents if the folders get wet?
- Should or can the items be copied instead of being treated? Or can they be copied first and treatment delayed? Or do they need some treatment before it is safe to copy them?

• Do the items present any hazard to other materials in the archival institution if they are not cleaned or treated?

Decisions will need to be made based on the questions asked above, and other questions relevant to the archival institution itself. Some materials may be in poor shape but may not warrant treatment; for example, poor quality photocopies of records available in the original may not be worth conserving. On the other hand, original constitutional documents may be worthy of extensive preservation work. The decisions made will depend on the particular circumstances and needs of the archival institution and its sponsor agency; each institution will have a different set of factors for evaluating and treating materials.

Activity 9

Select three archival items from your institution's holdings. Using the sample preservation evaluation questionnaire above, answer the questions listed.

Based on the results of your survey, what priorities would you assign to preservation of each of the items you chose? Why? What steps might be taken by the institution to ensure these and other materials are well protected?

Once priorities have been set, actual treatments can be undertaken as appropriate. Regardless of the treatments undertaken, records should be kept of the work done. A conservation worksheet can be completed indicating the work done and any special remarks for future reference. Such a record can be filed with the accession or administrative records for the series in question, along with the conservation assessment worksheet completed at the time records were accessioned.

Name of Conservator	Date Form Completed
Item title:	Item reference number:
Item description:	
Original condition:	
Historical information:	
Treatment performed:	
Fumigant/insecticide:	
Fixative:	
Deacidifying chemical:	
Adhesive:	
Final pH:	
Materials used:	
Notes and comments:	

Figure 3: Treatment Worksheet

MAINTAINING THE PHYSICAL ENVIRONMENT

One of the most important actions in providing physical care for records and, particularly, for archives is to house materials in the best environment possible. If the physical environment is not adequate, it is not likely that the defect can be made up by other means. The institution needs to ensure its basic storage facilities are acceptable.

Ensuring the environment is stable is one of the most important preservation actions an institution can take.

Key Rules

There are four absolute rules which must be followed to ensure physical facilities are adequate.

- The storage areas must be secure. They must be kept locked at all times so that users and other unauthorised people cannot gain access to them. Entry must be by key or pass, and the issue of keys or passes must be strictly controlled, for authorised members of staff only.
- Once records or archives have been placed in storage, materials must be removed only if approved procedures are followed. Materials should be out of the repositories for the shortest time possible.
- There must be no smoking, eating or drinking in any area where records are stored or used. Smoking is a fire hazard, while food and drink can damage the materials both directly and indirectly through the encouragement of rats and other predators.
- All staff must follow prescribed procedures at all times; exceptions cannot be made. Procedures must be respected and followed or else they may soon become neglected and the materials will again be at risk.

Activity 10

Survey your institution and answer the following questions.

Are the storage areas physically secure? If not, how could security be improved? Do you have established procedures for removing materials from storage? How might these be improved? Does the institution permit smoking, eating or drinking in records or archives storage areas? If so, how might people be deterred from smoking, eating or drinking in these areas?

ENVIRONMENTAL REQUIREMENTS

In order to monitor the archival institution's physical facilities and ensure they are well maintained, the following general storage requirements should be followed.

- Ensure air circulates well in the building, particularly in storage areas, so that heat and humidity have less chance of building up and causing damage to materials.
- If using air conditioning, ensure it is well maintained and kept at consistent levels.
- Cover windows with curtains or blinds to reduce light levels, protect against illegal entry and reduce the chance that pests will enter.
- Add weatherstripping around doors and windows to prevent air leaks and reduce water leakage from rains.
- Do not open or close windows or doors unnecessarily, unless they can be used to control temperature and humidity.
- If windows or doors are kept open, cover them with screens to keep insects and rodents out.
- Install storm windows if necessary, particularly in climates with excessive rain or storms.
- Check the roof regularly and repair leaks or cracks to avoid water damage.
- Check all pipes in the building regularly and repair leaks or cracks right away.
- Check drainage around the building and clear drains as necessary to avoid water build up.
- Ensure the facility is well cleaned regularly, with floors swept or vacuumed and shelves and work surfaces dusted thoroughly, as well as cases and cabinets, light fixtures and any other areas where dust might gather. Cleaning staff should not use damaging materials such as bleach or detergent cleaners in areas where records or archives might be placed, as the residual chemicals can damage materials and leave pollutants in the environment.
- Effective fire-fighting equipment should be kept in the repositories at all times. This equipment must be inspected and tested annually. 'FIRE EXIT' signs should be placed at suitable points inside the repositories.

ARCHIVAL ENVIRONMENTAL CONTROLS

The best modern archival facilities are purpose-designed and built, providing a safe physical environment for the materials held within them by using the principle of thermal inertia: that is, the environmental conditions within purpose-built archival institutions are always within acceptable limits because of the insulation designed into the building and the construction materials used. The building's temperature and relative humidity are stable and within acceptable limits. Dust and pollution particles are at a minimum because of good quality filter systems. Lighting is suitable to the particular needs, whether they be storage, reference or office use. In successful

buildings of this kind, the basics of environmental preservation occur naturally. The main duty of archives staff in this situation is to monitor the building to see that no defects develop, and that there are no areas that do not conform to the general standard.

Controlling the environment can dramatically improve the state of records and archives.

In instances where such a building is not available, it is necessary either to provide an artificial environment by using air-conditioning and filter systems or to use natural means of ventilation to improve air circulation and control temperature and humidity levels. Backup systems are important; if the archival institution relies on air conditioners to control the temperature and humidity, it may be necessary to have emergency backup equipment, which can take over if the main equipment fails. Great changes in temperature and relative humidity may be caused when air conditioning equipment works for a few days then breaks down and then starts again, which can damage materials. If it is not possible to have emergency backup, a better option may be to choose natural ventilation and set up adequate environmental controls.

If the archival institution relies on natural ventilation for temperature and relative humidity control, there are some necessary safeguards, as discussed in the previous lesson. The building should have shades to prevent excessive heat gain from the sun's rays; direct light should not be allowed to enter the repository, or any room where archival items are exposed; the ventilation should be effective, reaching all parts of the building; there should be filters to prevent dust; and of course the building must be dry and free of insect or animal vermin.

STORAGE OF RECORDS AND ARCHIVES

Though perhaps more critical for archival repositories, much of what is said here is also relevant to file stores and records centres.

Records and archives should be stored securely and away from possible hazards such as light, heat, water or air pollution.

Proper management of the materials stored in the repository means that those most often asked for are stored closest to the search room. Those that are rarely used may be stored in relatively inaccessible parts of the repository, or in a secondary repository on another site, if there is one, provided that the correct environmental conditions are still maintained there.

The following steps should be taken to ensure the proper storage of archival materials.

• Use archival quality enclosures for materials whenever possible.

- Use appropriate sized storage materials; storage containers should suit the materials being stored, not vice versa. If a box is only half filled with records, the rest should be filled with tissue or cardboard so that the files stand up straight; do not fold materials or force them into containers.
- Separate highly acidic materials from other items in a group either by wrapping in a barrier paper or, if necessary, by removing and storing them separately.
- Archival materials should be stored in appropriate containers on archivally sound shelving.
- Storage areas should have aisles wide enough to allow people to pass through without pressing on or damaging shelves or boxes, and aisles should be kept clear at all times, not used for storage, even temporarily.
- Shelving used to store archives must be non-combustible and non-deteriorating, preferably made of rust-proof metal such as steel. The shelving should be adjustable to accommodate boxes and bundles in a variety of different sizes and to allow maximum use of the shelf space available.
- Shelves should not be placed against outside walls, as this limits the circulation of air and can leave materials exposed to leaking walls or external elements.
- Shelves should be kept away from water pipes, ventilation outlets and lighting fixtures.
- Nothing should be kept in the storage rooms except the archives and the equipment needed for their storage and use; repositories should not be used to store spare furniture, equipment or consumables.
- All archival materials, and storage materials, should be kept 15 to 25 centimetres (6 to 8 inches) off the floor at all times to ensure they are not damaged by water or flooding.
- Proper equipment, such as tables, trolleys and ladders, should be used for all
 archival tasks, in order to protect staff and ensure materials are appropriately
 managed.
- When arranging or describing archives, sufficient space should be provided to allow for adequate storage and filing, without placing archives at risk. Flat surfaces are required and covers may be useful to place over materials in between processing.
- Materials should be reorganised on shelves periodically to allow sufficient storage space and to ensure nothing has been damaged over time.
- Space should be set aside for oversized or odd-sized items, so that they may be stored flat without hanging over the edge of a shelf or table.
- Whenever possible it is best to have a separate receiving area for archival materials, so they may be inspected and cleaned before being stored with other archives. Materials that show signs of insect infestation must be treated before being placed in the repositories.

Activity 11

Referring to the questions listed above, and based on the preservation survey activity done earlier, consider the state of the storage facilities used for records or archives in your institution. Identify at least three actions you could take to improve the storage of records and archives.

Shelving

In order to ensure materials are safely stored on shelves, all shelving units in the repository should be identified and coded. Bays and shelves should be clearly labelled with the bay number and shelf letter, such as 43A, 43B and so on, referring to Bay 43, Shelf A, or Bay 43, Shelf B. At each end of each row of bays there should be a label showing the range of bay numbers there. All labels should be tamper-proof and securely attached to the shelves. When placing archives on shelves make sure that the label can be seen on each box or bundle.

It is wise to establish a formal process for shelving materials, to ensure materials are retrieved and replaced quickly and safely.

It is good practice to follow a consistent pattern for placing archives on shelves. For example, the rule might be to move from top to bottom and from left to right. Following this rule, one would begin at the left-hand side of the top shelf of the first (left-hand) bay, continue shelving to the right of the previous box until the end of the shelf, then move to the shelf below and fill it from left to right. Archives would be shelved in this order until the bottom shelf is reached. When the bottom shelf is full, shelving would move to the next bay to the right at the left-hand side of the top shelf, and so on until all archives have been shelved. Consistent shelving makes it easier and quicker to retrieve and replace archives.

Storage by series is the usual arrangement for archives. Under this arrangement the whole of each series is stored together, though not necessarily all the series in a group. It may not always be practicable to store the whole series in one location. It can be difficult to predict if there will be any future additions to a series or, if so, how bulky they will be.

If an accurate prediction can be made of possible accumulations, then space should be left for additions to the series. If estimates are not possible, then the series should be split between more than one location, with the range of item numbers at each location recorded carefully. Within the series archives are arranged in item number order. This makes retrieval and replacement of archives easier and quicker.

Activity 12

Describe the system used in your institution to shelve records or archives. How can it be improved?

Location Registers and Floor Plans

There should be a record of where archives are kept within the repository and which storage areas are free at any given time. Thus it is good practice to keep a location register and maintain up-to-date repository floor plans.

Location Register

The purpose of the location register is to enable any member of staff to find any document in the repositories quickly and easily. It is useful also in conducting the annual stocktaking (discussed below). For the location register to serve as a reliable source of information, it must be kept up to date. It is important that whenever accessions are placed in the repositories, or archives moved within the repository, all copies of the location register are amended.

Within the location register, a separate sheet of paper is used to refer to each separate archival group. The series in the group are listed in numerical order in the series number column, with the corresponding location (repository number, bay number, shelf letter) in the location column. Location information includes the shelf details of the first and last items. If the series is split between more than one location the item range at each location is specified as well as the series number, and the separate locations are given as set out above.

Information about archives not placed conventionally on shelves, such as maps or plans, should be entered in the location register in the same way, with the location expressed as repository number, map cabinet number, drawer letter.

The printed location register is best kept in a loose-leaf binder, for ease of updating. It should be clearly labelled, with instructions for making entries inside the front cover. If possible, the location register may be kept in computerised format, with a print backup.

At least two copies of the location register should be kept. One should be regarded as the master copy; this copy should be kept securely by the individual in charge of preservation and storage. A second copy should be kept where staff responsible for producing and replacing archives can refer to it easily. For security reasons, the location register must not be kept where members of the public could gain access to it. Out-of-date copies of the location register should be destroyed under conditions of confidentiality. There should be an appropriate entry in the disposal schedule. Ideally either a hard copy or computerised version of the register should be stored in a secure off-site storage location to guard against the information being lost in a fire or other disaster.

Repository Floor Plan

In order to use repository space efficiently, it is important to know what shelving has been allocated and what remains unused. One method is to keep a floor plan of each repository showing the layout and whereabouts of each bay of shelving. When all shelves in a bay are full the box for that bay can be marked with a cross (X). When some shelves in a bay are still empty the box can be marked with a half cross (/). A pencil should be used for these marks, so that updating is easy. (Note that in the storage areas nearest the search room some shelving should be reserved for overnight storage of archives to be used the next day. This reserved shelving should be marked as occupied on the floor plans.)

When an accession is ready to be moved into a repository, the floor plans can be used to discover where there is sufficient free shelving. When the accession is placed on the shelves the relevant floor plan can be updated. Similarly, when archives are moved within the repositories, the floor plans should be updated. It is important that this be done so that the floor plans always serve as a reliable source of information.

If the location register is kept in computerised format, updating floor plans may be done automatically.

Activity 13

Draw a floor plan for at least one room of your institution's records or archives storage area. Examine this floor plan and write down three ways you could improve the way materials are stored in this room.

Records Administration

Archives Location Register

Group Series Title			Series Number_		
Item	Bay	Shelf	Item	Bay	Shelf
Numbers	Number	Location	Numbers	Number	Number

Item Numbers	Bay Number	Shelf	Item Numbers	Bay Number	Shelf Number
numbers	Number	Location	numbers	Number	Number

Figure 4: Archives Location Register

ENCLOSURES

Enclosures are the paper folders, boxes or plastic sleeves used to hold records and archives.

Enclosures: Storage container, specifically archivalquality containers such as acid-free envelopes, folders or boxes, used to hold records or archives and protect them from hazardous elements.

The term 'enclosures' is commonly used by conservators to refer specifically to archival-quality containers, such as acid-free folders or boxes. While the term 'enclosures' is sometimes used more widely to refer to all types of file folders, in this module the term refers specifically to those high-quality containers used to protect records and archives from physical harm, exposure to light or dust or mould damage.

Professional conservators are always testing and reviewing archival enclosures to ensure they meet adequate environmental and archival requirements. Ideally, enclosures will provide good physical protection, absorb or neutralise harmful gaseous emissions, be free of deleterious chemicals or products and allow the removal and replacement of materials without any damage.

The highest-quality enclosures should be used whenever possible.

Paper Enclosures

Ideally, paper enclosures for archival materials will be acid free, with a pH level of at least 7.0. It is important to know that, although some manufacturers may advertise their products as 'acid free', permanent or archival, their materials may not have a pH of at least 7.0. When ordering materials it is worthwhile to test some of them with a pH tester to confirm that they are acceptable.

Some paper containers are also 'buffered', that is, the pH level is higher than 7.0 so that the material is somewhat alkaline. Buffered envelopes offer additional protection for paper materials, but they should not be used to store photographic materials. Buffered boxes may be used for photographs, however.

Regular wrapping paper may sometimes have to be used to wrap records. While this may be better than not wrapping or boxing records at all, it should be recognised that the paper may be acidic and could cause damage. Newspaper should never be used to wrap records or archives, nor should newspapers be stored with regular papers. The level of acid in newsprint is too high and the acid will migrate across to other materials, causing damage and deterioration.

Newsprint should never be used to wrap records or archives.

Plastic Enclosures

Plastic enclosures must be inert: that is, they must be stable with no chemical activity. If chemicals are active, they may migrate out from the original plastic and onto the archival materials, raising acidity and leading to damage. Only certain kinds of plastic are stable; clear, uncoated polyester film (mylar) is considered the most stable plastic product. Any plastic containing sulphur or polyvinylchloride (PVC) is damaging and should not be used. As a rule of thumb, if the plastic smells it is creating gases and should not be used.

Also, do not use a plastic enclosures to hold carbon copies or papers with loose ink, such as a poorly fused photocopy; there could be an electrostatic charge build up that causes the image to transfer to the plastic, leaving the document damaged and perhaps unreadable

Lamination

Any enclosure used should be easily removable; this is why lamination is now considered unacceptable for any archival purposes and should never be used. Lamination adheres plastic to original materials, and this plastic can be removed only with great difficulty and with a high risk of damage to the materials within. An alternative to lamination is encapsulation, which encloses materials in a plastic container, which can be cut away and removed if necessary.

Lamination is an unacceptable practice in archival institutions.

Encapsulation

Encapsulation involves containing a document or item within sheets of polyester, which are sealed or joined at the edges. Commercial 'pockets' are available in varying sizes with one, two, or three sides sealed, or single sheets may be used and joined on all four sides. This process provides a physical support for fragile or brittle materials and allows handling of items without danger of tearing or other damage. Unlike lamination, encapsulation is easily reversed, simply by cutting off the edge seal holding the polyester sheets together and removing the item. The most efficient way to seal the edges is with the use of a small polyester welding machine. Heat- and ultrasonic sealers may also be used for encapsulation, but this involves the purchase, maintenance and use of the necessary equipment. If these technologies are not available the edges can be joined by sewing or by using double-sided tape.

Encapsulation provides a physical support for fragile or brittle items.

Encapsulation protects materials but does not reverse the damage caused by acidity or degradation. As well, chemical deterioration will not be halted or slowed with encapsulation. In an ideal situation, a document would be deacidified before it was encapsulated. However, this is not always possible; if the document to be encapsulated has not been deacidified, it is important to ensure that the edges of the polyester are not completely sealed, as this would increase the acid concentrations within the 'pocket' and speed the deterioration of the item.

Because a static charge builds up on the document once encapsulated, no documents should be so treated that have loose or flaky ink or writing, are made of pastels, charcoals, watercolours, or crayons. Major tears should be mended before encapsulation; smaller tears or fraying will be held in place by the encapsulation and will not tear further. Damp or mouldy material should not be encapsulated as this will encourage mould growth and deterioration.

Encapsulation is not an inexpensive process and is best used for highly valuable items with great intrinsic value, or items that are handled in their original form on a regular basis. It is important not to see encapsulation as a solution to broader preservation problems. Rather than spend funds on encapsulation of large quantities of material, money might be better spent on environmental controls or monitoring equipment.

Following is a brief description of the process involved with encapsulation. To encapsulate materials, the following supplies are required:

- archival quality polyester sheets (no other materials should be used; the polyester used should contain no coatings, UV filters or other added chemicals)
- grid to layout and measure sheets
- double coated tape (ideally '3M Scotch' brand, which is the only tape recommended for this process)
- lint-free cotton cloth
- weights
- scissors
- roller to flatten polyester over document (called a brayer)
- sewing machine or needle and thread.

To encapsulate a document, place a piece of polyester on a grid, wiping it with the cotton cloth to remove any dirt and to set up the necessary static charge. Do not rub hard, as the surface of polyester scratches easily. Then align the document on the polyester, aligning it on the grid so there is a one-inch margin of polyester around all four sides of the document. Once aligned, place a clean weight on top of the document to keep it in position. The 'sandwich' may now be sewn on all four sides, 1/4" in from the edges using a sewing machine or needle and thread.

If double-sided tape is to be used apply the tape, apply the double-coated tape to the polyester, approximately .5 centimetre (1/8 inch) away from the edge; use the grid as a guideline. The tape is covered with strips of tape that cover the adhesive; do not remove the cover on the tape at this point, so that the tape can be adjusted before final sealing. Wipe a second piece of polyester with a cloth so it is clean and the static

charge is set up, then place it clean side down onto the document, aligning it with the piece of polyester on the bottom.

Then remove the weight and place it on top of the new sheet of polyester to hold the entire package in place. Roll out excess air with the brayer or cloth, then remove the strips of paper from the tape on two sides and gently press down so that the two sheets of polyester adhere to each other. Be absolutely sure the document itself remains well within the polyester and is not touched by the tape. Again remove air pockets and then remove the paper from the other two sides, pressing down and removing air bubbles until the document is completely sealed.

Finally, trim the package with a paper cutter or blade, leaving approximately 3 centimetres (1 inch) inch away from the tape on all four sides. It is wise to round the corners of the package so they are not sharp; rounding reduces the chance that the edges will tear or damage anything else they contact. As mentioned above, some experts recommend that corners should be cut off leaving a small unsealed area through which the document can 'breathe'.

Polyester can also be used as a folder, with only one side taped together and a document held inside the folder. This method is useful if the document is not too badly damaged or weakened. Photographs may also be encapsulated, but it is considerably less expensive to purchase already made plastic enclosures.

For more information on encapsulation, contact the appropriate associations identified in Lesson 6.

Storage Boxes

Whether or not archival-quality enclosures are used, all paper archives should be boxed to protect them against the usual causes of deterioration: water damage, light damage, predators and dirt. Boxes should be of sufficient quality and strength to withstand many years of use. Ideally, boxes should conform to archival standards, that is they should be made of materials which will not deteriorate or harm the archives. Regardless of whether or not it is of archival quality, the box should be clean, sturdy, and not acidic. Boxes used to store or transport food should not be used to house records or archives as there may be residual food particles in the boxes that might attract insects or rodents.

Archives should be in good-quality boxes whenever possible.

If it is not possible to box the archives, for example because the materials are of a non-standard size, they should be wrapped into bundles with a protective outer layer of good quality strong paper, secured by cotton tape. String should not be used. Maps and plans should be placed flat in chests if possible. If this is not possible, they should be rolled over the outside of a cardboard tube and secured with cotton tape. Reels of microfilm or cine film are kept on plastic spools, inside custom made archival quality card, plastic or rust-proof metal boxes. Photographs may be kept in albums, or in individual acid-free folders, and then in boxes. Photographs should not be glued in; corner slits or similar fastenings should be used. Albums should be

checked for acidity. Photographs can be protected by interleaving them with silversafe paper.

The care of specific media materials is discussed in more detail in Lesson 3.

HANDLING ARCHIVAL MATERIALS

When processing archives or providing them for research use, it is important to handle materials carefully. The following guidelines are important.

- Handle originals as infrequently and gently as possible.
- Always have clean hands, and wear cotton gloves whenever possible especially when handling photographic prints or negatives.
- Support fragile or heavy items when moving them to avoid damage or breakage.
- Do not attempt to move too many materials at once or to move large or bulky items without help.
- Never use pen or ink near archival materials; use soft pencil only.
- Whenever possible, remove pins, staples and paper clips from archives, replacing them with stainless steel, brass or plastic clips only, if necessary to keep related items together
- Replace metallic-ended tags with stainless steel, brass or plastic tags if possible
- Reshelve used materials as soon as possible after they have been returned, to avoid confusion or loss.
- Check all returned materials to make sure they have not been damaged or folded during use.
- Never use pressure-sensitive or adhesive tape on archives, even if the tape claims to be 'archival quality'. Check with a trained conservator first.
- Do not try to remove glues or tapes without guidance from a conservator or instructions from a conservation guidebook.
- Do not circulate fragile or deteriorating archives; make copies instead and use the copies to make more copies if required.

Records and archives must be handled carefully at all times.

Removing Staples or Paper Fasteners

Records are often stapled or otherwise fastened together in order to preserve their order. The unity of such groups of records must be recognised; however from a preservation perspective the fasteners used to affix records together can be highly

damaging. Many metal fasteners, such as straight pins, staples, paper clips and tags, rust over time, and they and other fasteners can cut or tear papers. Rubber bands harden and can become stuck to the surface of papers; they also can leave acids on the documents. Strings and ribbons can also be acidic and can cut into documents. If the ties are coloured the colours can run into the papers leaving permanent stains. Adhesives such as glues or tapes can leave acidic stains and will weaken papers eventually.

It is important to remove such fasteners carefully and to ensure the order of the records is not damaged or placed at risk. If metal fasteners can be removed by hand without causing damage, they should be taken off. Staple removers will damage papers and should not be used; instead it is best to use a thin dull knife or spatula to loosen the ends of the staples or slip paper clips off. If rust is left it can be chipped away with the knife or spatula as long as the chipping does not damage the objects themselves. Rubber bands may also be removed by hand, and if they are hardened they can be chipped away gently using a spatula or dull knife. Ribbons and strings can be removed and discarded. Adhesives are difficult to remove and require solvents. It is best not to attempt removal of adhesives without additional advice or guidance.

Once fasteners have been removed, it is possible to replace them with appropriate fasteners, if it is important to keep the records together. Staples of any kind, including rust-proof staples, are not recommended, as they leave holes and damage materials. Brittle or weak papers should not be attached with any fastener; instead they can be grouped together into separate folders if keeping them in order is critical. It is also possible to number the back corners of each sheet sequentially, using a soft lead pencil, so that the order may be maintained. Photographs should never be clipped together in any way, as the clips will damage the surface of the photograph, leaving permanent damage.

Activity 14

Using materials that are not of high value (such as duplicates or items destined for destruction), practice attaching and then removing staples, clips, and other fasteners, to see how the fasteners can affect the materials. Identify the types of fasteners used most often in your institution.

Alternatives to Handling Originals

If original materials are too fragile to handle, it may be possible to make reproductions and use those for reference. For example, photocopies may be made of paper records, as discussed in Lesson 1. If making copies, acid-free copy paper or high-quality bond paper should ideally be used. The copy should be saved as a 'master' for future copying, so that the original does not have to be copied more than once. Photographs can be taken of archival materials, particularly items such as blueprints, maps or oversized items. Photographic negatives and prints should be clearly labelled and filed so they can be reused; again this means the original is handled as little as possible. Microfilming or microfiching are useful ways to protect originals if the

archival institution has microfilm readers and printers available. Before filming any quantity of archives, it is essential that they be completely arranged and well described, so that they are usable and understandable once on film.

For details on reprography, see Lesson 4.

LABELLING

Labelling archival materials adequately is critical to their physical preservation and storage. Poorly labelled materials can be lost if not returned to their original location. But when labelling materials it is best to write as little as possible on the original materials themselves, while still ensuring they are adequately identified.

When possible, it is best to label the enclosure rather than the item itself. If the item must be labelled, write the information in pencil, not ink, and always in small print in a corner of the material, not in large print or in the centre or in a difficult-to-find place. Ideally, the archival institution should establish a policy of labelling materials in the same location (such as the top right hand corner) so that everyone knows to look in the same place each time.

Do not use adhesive labels on archival materials.

Do not use sticky labels or dots, 'post-it' notes, pressure-sensitive tape, masking tape or any other adhesive. These are acidic and can cause great damage to materials. Also, it is best to avoid using stamps on original materials; the ink may be acidic and the stamp itself defaces the document, detracting from the original appearance of the archival item. Further, stamping is highly labour intensive for minimal benefit. Stamping should be considered only in exceptional circumstances, such as where the precise order of materials is critical and stamping page numbers is essential to retaining that order. If stamping or otherwise permanently marking archives, it is advisable to document the action taken in a preservation file so that future users and archivists are aware of who placed the stamps on, when and why.

All boxes and bundles must be labelled clearly to show the group, the series and the range of item numbers inside. Printed labels should be used if they are available, and information should be marked on the label in clear black writing to an agreed layout.

It is wise not to identify on storage boxes the precise locations of records; it is better to use a coding system. This measure makes it more difficult for thieves or vandals to locate valuable documents if they break into the repository.

For more information on labelling and coding systems, see Managing Archives.

Labelling Closed Records

Special labels should be attached to boxes containing items closed to public inspection for longer than the normal access period specified in legislation (such as after thirty years). These special labels will alert staff to the presence in the box of items that should not be produced to the public. This label should be coloured, preferably red, and should be marked with the words 'CLOSED UNTIL' and the year in which the archives will become available. If the items will become available in different years the label should read 'CLOSED FOR VARIOUS YEARS UNTIL' and the latest year.

The administration of closed archives is discussed in Organising and Controlling Current Records and Managing Archives.

WRITING A PRESERVATION PLAN

Once all the issues discussed in this and other lessons have been considered, once a preservation survey has been conducted, and once the organisation has determined the appropriate course of action for developing a planned preservation programme, it is critical to create a written preservation plan. Such a plan outlines the general and specific actions that will be taken.

A preservation plan should include information about both policies and procedures.

Policies should be established for

- care and handling of materials (how will materials be stored, what are the minimum requirements for storage and handling)
- control of pests, insects or rodents
- conservation treatments (what can the institution reasonably do and what will not be attempted without professional assistance)
- access and reprography (what might or might not be copied, will researchers have access to unprocessed items)
- security (who will have keys, who will have access to storage areas)

These policies are included in a written preservation plan, which explains how the institution will ensure its policies are followed. The institution's policies will indicate its commitment to attempt to maintain stable environmental controls, adequate storage and good handling. The plan will prioritise the specific tasks that need attention. For example, the plan will identify what steps should be taken in the short term (cleaning storage areas regularly), what can be done in the medium term (acquire storage

containers and transfer fragile materials to more secure storage) and in the long term (lobbying the government for an improved environmental monitoring system).

The preservation plan should include the following elements:

- preservation objectives of the institution (what does it hope to achieve)
- current status (environmental conditions, strengths and weaknesses)
- immediate priorities for action
- short-term actions
- medium-term actions
- long-term actions
- who is responsible for what activities
- how the plan will be implemented
- how often the plan will be reviewed and revised.

For more information on planning, see Emergency Planning for Records and Archives Services and Strategic Planning for Records and Archives Services.

Activity 15

Based on the information you recorded during the preservation survey activity, draft a brief outline of the priorities and steps you would take to develop or to improve the preservation programme, if one exists. Also prepare a short outline for a written preservation plan based on your suggestions for a preservation programme. What information would you include in your preservation plan?

ESTABLISHING STANDARDS

Another action that can be taken to improve the physical care of records and archives is to establish institutional standards for records creation and care. The archival institution has an important role to play in the establishment of record-keeping standards, in order to protect valuable materials.

A range of standards can be implemented in the institution to improve the physical care of records and archives.

Consider these questions. Does your institution use a high quality paper for valuable records? Does your institution reuse paper once it has been used a first time? Do

your fax machines use thermal (heat sensitive) paper? What kinds of fasteners are used? What kind of file folders are used?

High quality paper is recommended for those records with long-term value, such as executive minutes, official reports and so on. It can be expensive to use only high quality paper, and it can be complicated to try to differentiate precisely between records of long-term value and those with minimal value and to enforce different paper uses. However, even considering such a question as the quality of paper used is an important way to raise awareness in the institution of the costs associated with records management and the issues involved with protecting records.

Standards that can be established include standards for

- the type of paper used for original documents and for photocopying
- the type of storage containers or shelving used (shelves should be large enough to hold archival boxes; library shelves are too narrow)
- the types of file folders used (they should hold paper easily without any documents overlapping the edges; for example, North American legal-size paper should not be folded to fit into a letter-sized file folder or foolscap paper to fit into an A4 folder)
- the types of staples or fasteners used (stainless steel staples are acceptable, plastic paper clips are ideal but expensive)
- the types of equipment purchased, such as fax machines, photocopiers and so on (for example, thermal fax paper fades very quickly; the image can disappear in a matter of weeks; such paper should not be used at all if that is possible; if thermal fax machines cannot be replaced the pages should be photocopied onto good quality paper and then the original fax destroyed and only the copy kept).

It can be difficult for an institution to establish standards for record keeping; this is a longterm process that is not accomplished quickly. It is wise, however, to begin considering standardisation as early as possible so that steps can be taken to implement necessary changes in the organisation's record keeping practices.

Activity 16

Does your institution have standards for any record-keeping work? Find out what they are, how they are documented and how they are applied.

If your institution does not have record-keeping standards, identify three areas where you would introduce standards if you could. Explain your reasons for choosing those particular areas.

Identifying International Standards

The International Standards Organisation (ISO) is a worldwide federation of national standards bodies from some 130 countries, one from each country. The ISO is a non-governmental organisation established in 1947; its mission is to promote the development of standardisation in order to help facilitate the international exchange of

goods and services as well as to help develop cooperation in intellectual, scientific, economic and technical activities. The ISO has established standards in such diverse areas as the format of telephone and banking cards; environmental management; quality management in the workplace; systems of measurement; paper sizes; automobile controls; and country names, currencies and languages.

The International Standards Organisation promotes standards in a range of areas, including records care.

The ISO has established many standards that affect the preservation of records and archives, particularly with regard to quality of microfilm, photographic equipment, paper quality and so on. ISO standards are identified by the term 'ISO' and a number, such as ISO 9706, which relates specifically to the standard for permanent paper.

See Lesson 6 for more information on ISO standards.

Activity 17

Does your institution adhere to any ISO standards? Which ones? If so, describe two standards that have been adopted and write a brief description of how they affect your institution

MONITORING A PRESERVATION PROGRAMME

The success of any preservation programme depends on consistent and regular monitoring. All preservation activities should be evaluated regularly to ensure they are appropriate and suitable. Monitoring is important not only to ensure the programme is working but also to ensure the institution remains accountable for its activities and expenditures.

Accountability and Reporting

The statistics of repository management are useful for the overall management of the service. Statistical data are useful not only in the archival institution but also in the records office and records centre. In each area, there should be a procedure for collecting the following types of information (as appropriate to the particular office):

• the number of records or archives in storage, removed or added over the year

- the size of accessions received during each year (particularly in the records centre and archival institution), measured in linear metres of shelving occupied
- the size of disposals made during each year (particularly in the records office and records centre), measured in linear metres of shelving released
- the total number of user requests for records or archives in the period
- the number of items produced from each series
- the physical extent of materials produced from each series.

These statistics should be completed annually so that they can be included in the annual report of the records office, records centre or archival institution. It may be useful to collect the figures monthly and add them together at the end of the year. The agencies will find this information valuable in taking strategic decisions concerning the allocation of resources. The information can also be useful when staff are deciding which records might be reformatted, such as microfilmed or photocopied, for office or research use.

Annual Stocktaking

In order to keep a check on misplaced or missing records or archives, and to check on the state of items in the repositories, there should be an annual stocktaking of the material held on the repository shelves. The annual stocktaking is a high-priority exercise. It may be necessary to suspend normal work programmes during it, and to limit access to records or close the search room for a period. Stocktaking should take place not just in the archival institution but also in the records office and records centre

Annual stocktaking is critical to ensuring the safe return and storage of records and archives.

Before the annual stocktaking each staff member in the entire organisation should be sent a list of records or archives that have been issued to them but have not yet been returned. Staff should be asked to return those records no longer needed. Any item still required by a member of staff should be inspected so that its whereabouts are confirmed. A new entry for the item should be made in the production register, with a cross-reference between the new and the original entries. The two copies of the production ticket should be annotated with the new date of production.

During the stocktaking, staff should assess the physical condition of the material, looking for signs of insect infestation or mould growth or identifying any physical deterioration or damage. It is particularly important to identify archives according to different categories, so that resources may be allocated appropriately to their care:

- in good condition: unlikely to need attention from conservators in the foreseeable future
- weak but serviceable: would be better for attention but not in urgent need
- unfit for production: must receive conservation treatment before consultation

• misplaced documents that need to be found and retrieved.

During the stocktaking, the following information should be noted on the stocktaking form:

- signs of mould growth
- signs of insect infestation
- documents not in place or in the wrong place
- labels missing from shelves or boxes
- boxes that need replacing
- shelving or other equipment in need of repair or replacement
- signs of damp or accumulations of dust in areas of the building
- materials in need of repair.

Discrepancies should be investigated, and action taken on problems immediately. For example, the location of each series should correspond to its entry in the location register, and the number of items for each series should correspond to the number of items identified in the archive series register.

Once the annual stocktaking is completed, the finished forms will form the basis for conservation planning for the next year.

Annual Stocktaking Report									
Archival Reference					Remarks				
Series	Number of units	(a)	(b)	(c)					
<u> </u>		Sories Number of	Series Number of (2)	Sories Number of (a) (b)	Series Number of (a) (b) (c)				

⁽a) = in good condition, and unlikely to need attention from conservation department within foreseeable time

Figure 9: Annual Stocktaking Report Form

⁽b) = weak but useable: should be considered for repair/conservation

⁽c) = unfit for production: must be repaired before consultation

Activity 18

What kind of review process is carried out presently to monitor the physical care of archival materials? Write down the process followed and indicate three ways in which it might be improved.

PLANNING FOR EXPANSION

All archival institutions, particularly national or other government archival facilities, will inevitably expand physically over time. Governments and organisations always create more records! The organisation's records administration is responsible for ensuring that all records are subject to retention scheduling and appraisal, which means that many records are destroyed before they reach the archival institution. However, a small portion is transferred to archival storage. While the quantity is often estimated at no more than one percent of total record production, this can result in many metres of archives transferred each year.

Planning the capacity of the repository is therefore crucial. On first start-up, an estimate of the size of storage needed can be made by making a survey of backlog accumulations in the ministries or offices. When the records administration is working fully, an estimate of annual expected intake can be made by using the statistical information compiled by the records centre.

It is wise to plan ahead for as many years as possible, at least into the medium term, four or five years into the future. Ideally, the archives building should be capable of accommodating expansion for at least four or five years. Unfortunately, it often happens that archival facility become nearly full and then find it difficult to expand. Funds may be restricted, or the site may be too small. In these circumstances, it is a temptation to accept a secondary repository situated at a distance. This may be an acceptable alternative provided the secondary repository meets the proper standards; but there will inevitably be a large increase in staffing, communication and transport costs. As well, the management of the sites can become complicated.

Activity 19

Imagine you have been put in charge of expansion for your records office, records centre or archival institution. Draw a plan for your institution showing where you might expand the building, or if expansion of your building is not possible, write a plan indicating how you would provide additional storage space.

SUMMARY

Lesson 2 has introduced the steps involved with protecting records and archives from physical harm or damage. It has emphasised the importance of preventive preservation work, noting that it is better to protect the records and control their environment than to spend resources and time repairing damage. The lesson has

- defined preservation and conservation
- explained the principles of preservation
- examined the importance of preservation management
- outlined the steps involved in establishing a preservation management programme
- described the tasks involved in conducting a preservation survey
- discussed establishing priorities for care of archives, particularly for the physical facilities, storage equipment and storage conditions
- determining policies and priorities and writing a preservation plan
- considered the implementation of standards for record keeping work
- discussed the importance of conducting annual stocktaking, in order to assess the status of the preservation programme.

STUDY QUESTIONS

- 1. Define preservation, conservation, maintenance, examination and restoration.
- 2. Explain the difference between preservation and conservation.
- 3. Explain the key principles of preservation
- 4. Outline the main steps involved with preservation planning.
- 5. What kinds of priorities need to be set for preservation management?
- 6. What steps are involved with conducting a preservation survey?
- 7. What is the purpose of a preservation survey?
- 8. What questions should be asked when examining preservation issues related to the archives building
- 9. What questions should be asked when examining preservation issues related to storage conditions and materials?
- 10. What questions should be asked when examining preservation issues related to maintenance procedures?
- 11. What questions should be asked when examining preservation issues related to the holdings themselves?
- 12. Explain the steps involved in conducting a conservation assessment. Why is such an assessment necessary before undertaking conservation work?
- 13. Discuss the priorities that should be considered when determining whether to undertake a conservation treatment.
- 14. What three key rules should be respected when ensuring the safe physical care of records and archives?
- 15. Name five general preservation principles that should be followed in an archival institution
- 16. What is the purpose of environmental controls?
- 17. How are archival materials best stored?
- 18. How are archival materials best shelved?
- 19. Explain the purpose and value of a location register for preservation management.

- 20. Explain the purpose and value of floor plans for preservation management.
- 21. What types of paper enclosures are best used to store archival materials?
- 22. What types of plastic enclosures are best used to store archival materials?
- 23. Explain the steps involved in removing staples or paper fasteners.
- 24. Why is lamination considered unacceptable for archival materials?
- 25. What is encapsulation?
- 26. What types of documents should be encapsulated? What types of documents should NOT be encapsulated?
- 27. What steps can be taken to ensure archival materials are handled safely?
- 28. Name three alternatives to handling original archival materials.
- 29. What is the importance of labelling archival materials?
- 30. How should photographs be labelled?
- 31. What information should be contained in a preservation plan?
- 32. What is the purpose of a written preservation plan?
- 33. What steps are involved with conducting and annual stocktaking?
- 34. Why should a preservation programme be monitored?
- 35. What factors should be taken into account when considering expansion of archival storage areas?

ACTIVITIES: COMMENTS

Activity 7

It is common to find that, in many records or archives institutions, no one person is given specific responsibility for preservation management. It is important, however, to assign this task to someone in a good position to ensure steps are taken to develop and maintain a preservation programme. When considering where such responsibilities are best assigned in your institution, be sure to think about the seniority of the position and consider the importance of continuous care for preservation.

Activity 8

Every institution's survey will be different; this survey form should not only show you what questions need to be considered but will also raise your awareness of areas within your institution that may require improvements to ensure the physical protection of records and archives.

Activity 9

Did you find that the materials needed conservation or repair? Does their value warrant such expensive work? Perhaps a better approach would be to stabilise the environment and ensure good storage and handling, so that materials are not damaged further.

Activity 10

You will want to strive for the highest quality physical conditions, including security against physical damage, theft, or mishandling. The institution should have established and documented procedures for transferring materials from place to place or providing them for research use. Further, institutions should not permit smoking, eating or drinking any place where archives are stored or used. How can you implement these changes if your institution has not established such conditions?

Activity 11

The appropriate storage of records and archives, as discussed in this lesson, includes

- using appropriate storage enclosures, containers, equipment and shelving whenever possible
- ensuring storage areas are large enough, physically secure, and house only archival materials or supplies, not furniture, equipment or consumables.
- Ensuring shelves are kept away from any source of leaks or water, such as pipes, ventilation units, or external walls and materials are kept at least 10 to 15 centimetres off the floor
- examining new materials carefully and not brought into the storage areas if they are not clean and free of infestation of any kind.

Activity 12

Shelving systems should be planned, with bays and shelves clearly labelled. A consistent pattern should be followed to place materials on shelves, so that it is easy to

find materials again. Whatever system is used should be documented so everyone knows how it works.

Activity 13

It is easy to forget how damaging clips or staples can be, especially if they are left in place for a long time. While removing staples and clips can be highly time consuming, it is a wise action to consider if the materials are highly valuable or fragile.

Activity 14

Every institution will have different planning documents. It is important that all documents be easy to understand, that they relate to each other clearly and that they be accessible to all appropriate staff. Staff should participate in the planning process as much as possible and should be trained to manage and maintain any plan developed.

Activity 15

Each institution's priorities will be different. However, it is important to focus first on environmental controls, then on storage facilities, before considering any specific work such as cleaning individual items.

Activity 16

Implementing standards can be difficult and will take a long time. It is best to begin with easy standards, such as the size or type of paper that will be used by the institution or the type of shelving or storage boxes that will be used in the repository. Once such standards are in place and accepted by all staff, it is easier to strive for more specific standards for records care, such as the type of photocopier or fax machine used, the types of staples or paper fasteners used, and so on.

Activity 17

Most national organisations do adhere to ISO standards, though not all people in the organisation may be aware of this. Remember to look beyond records and archives management to such areas as workplace safety or environmental conditions; the ISO has established standards in areas such as these.

Activity 18

Many institutions do not have formal review processes. The preservation programme should be reviewed annually, with recommendations for regular improvements.

Activity 19

You may find that even in your imaginary expansion, it is not possible to add an extension to your existing building, because of lack of space, the nature of the terrain, the climate, or other reasons. Further, you may find that if you need to build another building, it may be difficult to find a suitable location. How will records be transported from place to place? What kind of staffing needs must be considered if two storage areas are established? These are all questions that arise when considering possible expansion of records or archives storage areas.

STORAGE AND HANDLING OF MATERIALS IN DIFFERENT MEDIA

The variety of records, archives and information materials found in records offices, records centres and archival institutions is astounding. Materials include monographs, serials, newspapers, films, audio recordings, maps, videotapes, letters, diaries, account books, photographs, documents, slides, posters, leaflets/brochures. Many institutions will have records or archives in several different media; each of these media types requires particular storage and handling.

Of course, all information sources require a basic standard of care, but some require more attention and protection because they are difficult or impossible to replace. Records and archives, irrespective of medium and format, require protection throughout their life, but issues of storage and handling are most urgent in the archival environment, once records have been identified as having enduring value and their long-term protection is critical. Thus while the principles and practices outlined in this lesson are applicable across the spectrum of records care, the issues raised are particularly important in the archival environment.

It is recognised that many of the suggestions outlined here require sophisticated environmental controls and high-quality storage containers and facilities. Many institutions may find the recommendations beyond their abilities at the moment. However, it is important to know the ideal standards to seek, even if achieving them is more difficult. And it must always be remembered that good records storage in a risk-free environment is one of the most important actions that can be taken. If resources are limited, the best course of action is to make good storage a priority.

This lesson discusses the key steps involved with caring for the materials of which the following specific types of records and archives are composed:

- paper records, including cartographic records
- books
- parchment, vellum and seals
- newspapers
- works of art on paper
- framed items
- photographic materials
- motion picture film
- phonographic recordings

- magnetic media
- microforms
- artefacts
- regionally specific materials.

This lesson includes references to levels of temperature and relative humidity as well as levels of lighting, or 'lux'. For an introduction to these topics, see Lesson 1.

PAPER RECORDS, INCLUDING CARTOGRAPHIC RECORDS

Paper records include letters, reports, minutes: anything written or typed on a paper base. Also discussed here are cartographic records: maps and plans on paper backing. As discussed earlier in this module, most paper records suffer from problems with acidity. As paper ages, the acidity causes it to become weak. Environmental conditions are critical to stabilising paper archives and reducing the chance of deterioration.

Ideally, paper records should be kept in complete darkness. Since this is rarely achievable, it is best to try to limit any necessary exposure to light to the shortest time possible, bearing in mind the needs of researchers. Paper should be protected from strong artificial or natural light, especially ultraviolet light. When exhibiting paper records, light levels should be kept as low as possible, ideally no more than 50 lux. Ideal temperature and relative humidity levels are 18° C to 20° C maximum (cooler if possible) and 35-45%.

Particular care should be taken when handling large or awkward items, such as maps or plans. Folded papers should be flattened if possible; repeated folding will break down the strength of the paper, speeding up deterioration. Ideally, paper archives should be stored in acid-free file folders, with a thickness of no more than 1 to 2 centimetres of documents (½ to 1 inch) per folder. However, it is often the case that such folders are not within the budget of many archives. If paper archives cannot be stored in acid-free folders, then they should be flattened and cleaned and then kept in their original folders.

It is best to keep archives in acid-free boxes to keep out water, light, predators and dust. If acid-free boxes are not readily available, any boxes are better than none, but there should be a programme of replacing them with acid-free boxes as supplies become available. Boxes are an important means of protecting records in records offices and records centres also, but it is not so essential that such boxes should be acid-free.

Paper records should be kept in containers that keep out light, water and dust.

Boxes should not be over- or underpacked but should be full, with folders fitting snugly within the box. If such boxes are not available, archives can be wrapped in unbleached cotton cloth or tied with unbleached cotton tape. Paper records and archives should never be stored in containers that once held any kind of food products. Documents should not be folded or bent to accommodate storage containers or shelves; rather, enough space should be provided to allow them appropriate storage room. Boxes or bundles should not hang over the edge of shelves but should sit on shelves that support the entire box.

Large paper items like maps, plans or blueprints should be stored in cabinets with shallow drawers or on shelves sufficiently large to hold all the material without any hanging over the edge. Large items should not be stacked more than one inch high, as they can become damaged by excessive pressure or when items on top have to be lifted or moved to reach items below.

If particular paper records are in high demand, the institution should consider making copies and using these for reference or copying, rather than exposing originals to continued light and handling. Blueprints in particular are highly light sensitive. Blueprints should *always* be kept covered when not in use, and original blueprints should not be displayed in exhibits; copies should be used instead.

Activity 20

Does your institution have any policies or procedures for photocopying paper documents, for reference or preservation purposes? If so, examine those policies and procedures and write a short description of how they could be improved. If not, write a brief description of those policies or procedures you might wish to implement to manage the process of photocopying in your institution.

BOOKS AND OTHER PUBLICATIONS

Many archives house libraries of books, including rare books, and other publications, such as journals, magazines, newsletters and so on. Some books and publications are more easily replaceable, but other are rare and perhaps unique.

Locally significant formal or informal publications, for example, may have had limited circulation and may now be out of print; therefore they may warrant significant care in order to ensure they are protected as best as possible. Rare publications, such as first editions of books, may have a high monetary value and require careful care.

Books can be made of a variety of materials, including paper, leather, vellum, cloth, boards and adhesive. In general, the temperature recommended for paper materials applies equally to books, at 18° C to 20° C maximum. Books prefer a slightly higher

relative humidity than paper, 45-50%. However, books should be kept from excessive moisture or relative humidity. They are best kept in an environment as dark as possible and should be protected from strong light during use. Books on exhibit should be kept in light of 50 lux or less.

Books should be removed from shelves carefully; never pull on the spine. Two people should carry very large books. When opening a book, do not press it flat. If it does not flatten naturally it should not be forced. Books should be stored upright if possible, unless the book is particularly fragile, in which case it should be kept flat on a shelf, no more than two books high. A higher stack of books will just put pressure on the items at the bottom and will make the books harder to retrieve. Extremely fragile books can be stored in boxes or tied with cotton tape. Elastic bands should not be used to hold books together as the bands will damage books as they decompose. Damaged books should never be repaired using adhesive tapes or glues.

Books should be handled carefully to avoid damaging the spine or pages.

While copies of sections of books can be made to reduce wear on the original, care should be taken not to damage the book, especially the spine, during copying. Books may also be microfilmed.

For more information on reprography, see Lesson 4.

Other publications in the institution may include magazines, journals, or pamphlets or related ephemeral materials (leaflets, ticket stubs and so on). These materials are best stored in folders or boxes that suit their physical size and shape.

Activity 21

Write a brief description of how books are stored in your institution. Identify three steps you could take to improve the storage of books and published materials.

PARCHMENT, VELLUM AND SEALS

Parchment and vellum were used hundreds of years ago as a form of 'paper', for creating documents or, sometimes, for binding together other sheets of paper or parchment or vellum. In some parts of the world, parchment and vellum documents are common holdings in archival institution, if the institution has preserved such ancient materials

Parchment: The inner portion of the split skin of a sheep or goat, which is not tanned but cleaned of adhering flesh, hair, fat and muscle and preserved by soaking in a lime solution, then scraped and polished.

Vellum: The skin of a calf, usually not over six weeks old, cleaned of adhering flesh hair, fat and muscle, and preserved by soaking in a lime solution, then carefully dried, stretched, scraped, and polished.

Parchment and vellum are resistant to acid attack because of the nature of their manufacture, and they are very durable if stored correctly. They are, however, very susceptible to extremes and fluctuations of relative humidity. For example if allowed to become too dry a document could fracture if attempts are made to fold or unfold it, and rolled documents will be difficult to flatten out to study. If too much moisture is present in the document it will be flexible but mould growth could easily occur.

Parchment and vellum should be stored in the dark and exposed to as little light as possible during use. Parchment and vellum remain more flexible at a higher relative humidity; a temperature of 18° C to 20° C or cooler and a relative humidity between 50 and 55% are best. It is important to keep the temperature and relative humidity as constant as possible, as the stretching and shrinkage that occurs with these environmental changes causes distortions that may even loosen the ink text. When removing parchment or vellum from storage, care should be taken not to expose the materials to severe environmental changes quickly or they will deteriorate even faster.

Parchment and vellum documents should be stored in boxes, drawers or on shelves inside strong file folders. They should be unfolded, flat and under minimal pressure. However, if a parchment or vellum document is folded, it should not be unfolded without being humidified. It is not wise to encapsulate parchment or vellum, as they are susceptible to damage from the static charge found on the plastic used for encapsulation. Photocopies may be made for research use.

Parchment, vellum and seals should be stored in boxes if possible.

Parchment documents sometimes have seals attached. Seals were added to documents as a means of authentication, or as a means of sealing closed a letter or group of papers.

Seal (1): A die or matrix, usually of metal, engraved in intaglio with the device or design used to produce a seal (2) by the application of pressure.

Seal (2): A piece of wax, lead or other material, upon which an impression in relief from a seal (1) has been made, attached to or applied to the face of a document.

The original seal from which the impressions are made is usually made of metal; the seal attached to a document is usually made of wax but might also be made of shellac, paper or other materials.

Because of the unusual shape of seals, particularly the wax seals attached to documents, storage and handling can be difficult. It is important to store seals securely, particularly those attached to documents. Metal seals should be kept in boxes; wax or other seals attached to a document should be wrapped in acid-free paper and enclosed in the folder with the document itself.

Whenever possible, the seal should not be removed from the document, but if it has become detached it should be stored safely in acid-free paper and in a folder or box; a sheet should be inserted with both the document and the seal indicating in each case the location of the other item. If possible, it is wise to build a small acid-free box to hold the seal, so it is not exposed to excessive pressure or accidental damage.

Activity 22

Find out if your institution has any parchment or vellum documents or any documents with seals on them. If so, examine one or two documents carefully and write a brief description of how you would store them to protect them from damage.

NEWSPAPERS

Newspapers are often found in archival institutions, particularly if that institution has a responsibility to acquire and preserve such publications. Newspapers are physically very unstable, and an exceptionally poor medium for long-term preservation. The best course of action with newspapers is to microfilm each issue and preserve the original, if necessary, but not make it available for research use if at all possible.

If originals are to be kept, then they should be stored out of any light, as the highly acidic paper will deteriorate even more quickly when exposed to light, heat, or excessively dry air. Temperatures should not exceed 20° C and relative humidity should be at 40-45%. Ideally, newspapers should be boxed in made-to-measure acid-free boxes. Alternatively, they should be wrapped in acid-free paper and stored separately from other materials. If acid-free paper is not available, sturdy and good quality wrapping paper may be used. The box or wrapping should be clearly marked so that it is easy to retrieve the correct bundle when necessary. The practice of binding newspapers is to be discouraged as this makes future preservation work much more difficult and ultimately accelerates deterioration.

Original newsclippings should be photocopied and the copy only kept; the original will be acidic and may damage other materials.

Some archival institutions retain clippings of significant information found in newspapers. When keeping clippings, it is best to photocopy them onto acid-free bond paper or other high-quality paper and destroy the original. Even in an office environment, newspaper clippings should be photocopied and the original destroyed,

as the acid in newspapers is so destructive that a clipping might do serious damage to other materials in the file well before the materials are transferred to archival storage.

Activity 23

Write a brief description of how newspapers and newsclippings are stored in your institution. Identify three steps you could take to improve the storage of newspapers and newsclippings.

WORKS OF ART ON PAPER

Other paper-based materials found in archival institutions include works of art such as oil paintings, watercolours or other artistic items. These materials might come to the archival institution framed or unframed, perhaps as part of a collection of archives or as individual items of documentary art. Framed works of art are usually left within their frames, unless the frames are highly acidic or are causing damage and deterioration to the paper within.

Framed works of art can be hung on an interior wall, away from sunlight, direct light or any sources of heat. They should be hung securely, so that they are well supported on the wall, ideally by hanging from two points, not just one. Unframed items are best stored in a box or container that does not put extra pressure on the surface but protects the item from dust and light. Good quality storage racks should be constructed if the institution has large quantities of artwork.

If framed paintings cannot be hung, they should be stacked upright in a secure area, where there is little movement and so less chance someone might accidently hit or damage the items. They should be rested on a piece of cotton cloth or carpet and separated with good quality, heavy cardboard to protect the frames and glass. Alternately, a wooden storage rack can be built with slots in it to hold framed materials and keep them separate from other items. Unframed items can also be stacked, if necessary, again resting on a piece of cloth or carpet or placed inside a good quality box and separated by cardboard or high-quality paper. They should be covered with a cotton cloth to keep out dust.

Light levels for storage and display should be lower than 150 lux. Works of art are negatively affected by excessive heat or dryness, so the best temperature is 18° C to 20° C and the best relative humidity between 45 and 55%. Ideally, the conditions should remain as stable as possible; fluctuations can expand and contract the surface of the artwork, causing damage.

Never touch the surface of a work of art, unless dusting it gently with a soft brush.

When handling works of art, it is important never to touch the surface and never to attempt to clean items beyond a gentle dusting with a soft brush, which should only be done if the artwork shows no visible signs of flaking. When carrying a framed painting, it should be held with both hands and with its face toward the body, not away from it, to prevent damage. Large framed paintings should be carried by two people.

To make best reference use of paintings, a card index can be prepared describing the items, and perhaps even including a snapshot of the picture. Researchers can refer to the index card and snapshot in order to decide if the item is worth examining.

Activity 24

Write a brief description of how works of art on paper are stored in your institution. Identify three steps you could take to improve the storage of works of art on paper.

OTHER FRAMED ITEMS

In addition to works of art, which may or may not be framed, archival institutions also acquire other framed items, such as certificates, diplomas, photographs or posters. Framed materials are often unstable; the frames, mats and boards used in the framing process often contain high levels of acid and are damaging to the items they hold. Framed materials can be reframed if necessary, using acid-free materials. However, reframing is an expensive process and should only be done if truly warranted. Otherwise it is best either to leave the item in the original frame or, if necessary, to remove the item and store it appropriately. Sometimes the frame itself is an important part of the object, providing evidence or otherwise having special value or interest. If this is the case the item should be left in the frame; if not, it is best to remove the object from the frame and store it in a folder or appropriate plastic enclosure. Just as works of art can be indexed on cards, framed items can also be indexed, so that users can refer to the cards before deciding if they need to see the original items.

Indexes to works of art can include a small image of the item, so that users can refer to the cards before looking at the originals.

Activity 25

Write a brief description of how framed materials are stored in your institution. Identify three steps you could take to improve the storage of framed items.

PHOTOGRAPHIC MATERIALS

There are many types of photographic materials; each type has its own environmental and physical requirements. Two general categories are discussed below: photographic prints and photographic negatives, slides and transparencies.

Photographic Prints

Photographic prints consist of two parts: an image layer and a support layer. The support layer is usually composed of paper but it may also be made of glass, metal or other materials. The image layer is composed of a number of chemicals; the more chemicals, the more complex the photograph. Black and white photographic images consist of silver, embedded in a gelatin, albumen or collodion 'binder', also known as the emulsion layer. Colour images are composed of a number of organic dyes embedded in three layers of gelatin.

Because of their chemical composition, black and white photographs are fairly stable to light; colour photographs, on the other hand, are much more sensitive to light. As well, they can fade in the dark and are easily affected by temperature and humidity.

Another type of photographic print is called a 'case photograph' because it is stored in a protective case. Daguerreotypes, ambrotypes and tintypes are all 'case photographs'. These prints, common in the mid-1800s in many countries, are quite stable to light. However, because they are made with glass or metal or a combination of both, they are susceptible to physical damage such as denting, breaking or bending.

All photographic prints can be damaged by ultraviolet light and by pollutants and dust. But the most important factor in the preservation of photographic prints is the stability of temperature and relative humidity. Photographic materials are best kept at temperatures below 20° C; 15° C to 25 ° C is acceptable. The relative humidity is best as follows:

- 30-35% for black and white
- 25-30% for colour
- 20-30% for materials in cold storage.

The cooler the temperature the longer materials will last. Photographic materials can be stored as low as 0° C or below, but in such instances the relative humidity must be kept at 20 to 30% to ensure the materials do not dry out.

The stabilisation of relative humidity is the single most important element in the preservation of photographic prints.

The recommended levels are lower than those for paper materials. However, a relative humidity of below 20% will cause materials to dry and become brittle. Ideally, the relative humidity will not fluctuate, as sudden changes can be damaging. High humidity can lead to mould growth, and mould will grow quickly and spread on

a gelatin surface. Special care has to be taken when removing photographic materials from cold storage. They should be allowed to reacclimatise gradually to ambient environmental conditions

For more information on storing photographs, see the resources identified in Lesson 6 and contact the appropriate associations.

Photographic prints are best stored in total darkness, and exposure to light should be at the lowest intensity possible. A level of 50 lux is acceptable for exhibition, with a level of 100 lux for the display of photographic copies. Direct sunlight should always be avoided, as many prints are susceptible to fading.

Photographic prints should be handled with gloves at all times, and bare fingers should not touch the surface as the oils in fingers will leave prints and can damage the image. Prints should not be bend or folded, and paper clips, staples or other attachments should not be used. Storage areas should be free of dust and free of any cleaning materials that might give off polluting chemical fumes or acids.

Ideally, photographic prints will be stored in individual enclosures to shield them from dust, dirt, handling and the environment. Ideal containers are acid-free, non-buffered envelopes or folders, non-buffered photographic mats, mylar sleeves, or inert plastic holders. The following enclosures should not be used at all: glassine envelopes, coated plastics (such as plastics with anti-static coatings), nitrate or chlorinated plastics, such as polyvinylchloride (PVC) or any material containing sulphur or adhesives.

If individual enclosures are not available or affordable, photographs can be kept in a good quality storage box, separated by sheets of high-quality paper to protect them from each other and from dust. Whether in enclosures or not, photographic prints should be kept in acid-free or high-quality boxes, snugly packed but not too tight. Boxes are best kept on steel shelves; wooden shelves may release harmful vapours that are particularly damaging to photographs. Rolled photographs should be unrolled, but only if they unbend easily. If there is any resistance when unrolling them, they should be humidified first to soften them.

Photographs should be labelled with a location number or code on both the enclosure and the photograph itself; both should be written in soft pencil only on the corner of the enclosure and the back side of the image. Never write on the front of a photograph and when writing on the back always ensure that it is placed face down on a smooth, hard surface, such as a piece of glass, to prevent the pencil embossing the image surface.

High-use photographs can be copied and the copies used for reference or to make more copies. Display photographs should also be copied and the copy used for display, not the original. Black and white photographs can be photocopied and the photocopy used for reference, but care should be taken to copy originals as little as possible, as physical damage can occur and the high light levels in the photocopier can damage the image. The high light levels in a photocopier are extremely damaging to colour photographs, so these are best copied photographically for reference use.

Activity 26

Examine four or five photographic prints in your institution, both black and white and colour. If possible, choose some that are at least 50 years old, some that are 20 years old, and some that are less than 5 years old. Write a brief description of the physical condition of each photograph and an explanation of how it was stored. Can you determine if the storage of the photograph has affected its physical condition? Identify three steps you could take to improve the care of photographic prints in your institution.

Photographic Negatives, Slides and Transparencies

Photographic negatives consist of a support layer and an image layer. The support is generally made of polyester, cellulose acetate or cellulose nitrate film. Glass plates and translucent paper were used in the early years of photography but are not used today, though collections of old glass negatives and black and white slides are held by many archival institutions.

The image layer of a black and white negative is usually composed of silver particles embedded in gelatin. The image layer of colour negatives also contains silver particles but these particles are bleached during development; this bleaching affects the stability of colour negatives by adding an acidic element.

Slides are similar to negatives, with a support layer and an image layer. But slides are 'positive' images, not negative and their colours are formed from organic dyes. Thus they are more susceptible to deterioration and fading.

The image layer of a negative or a slide is similar to that of a photographic print. Negatives and slides are damaged by exposure to light and heat, to chemicals and pollutants and to high temperatures and humidity.

Photographic negatives are best kept in low light; total darkness is advisable for storage. The more exposure to light a negative receives, the faster it will fade. Unfortunately, it will also fade when stored in darkness, but the fading can be slowed.

As with photographic prints, the most important factor in the preservation of photographic negatives is storage with stable temperature and relative humidity.

Photographic negatives are best kept at temperatures below 20° C; 15° C to 25° C is acceptable but cooler is definitely preferred. As with prints, relative humidity is the single most important element in the preservation of photographic prints. Relative humidity is best as follows:

- 30-35% for films and slides
- 25-30% for glass plate negatives and glass slides.

Photographic negatives should be handled with gloves at all times, holding only the edges and never touching the surface of the image. Glass plate negatives and slides

should be handled very carefully as they are fragile. Negatives should not be bent or folded, and paper clips, staples or other attachments should not be used. Storage areas should be free of dust and free of any pollutants.

Ideally, photographic negatives will be stored in acid-free, non-buffered envelopes or folders, as described for prints. The same types of enclosures used for prints are acceptable for negatives. If such enclosures are not available, items can be separated by sheets of high-quality bond paper. Slides are best contained in archivally acceptable plastic holders. Again, the following enclosures should not be used at all for photographic negatives: glassine envelopes (a kind of coated paper envelope that contains unstable chemicals), coated plastics (such as plastics with anti-static coatings), nitrate or chlorinated plastics, such as polyvinylchloride (PVC) or any material containing sulphur or adhesives.

Once negatives or slides are in individual enclosures they should be stored in boxes or containers that keep out light and to shield them from dust, dirt, handling and the environment. If individual enclosures are not available or affordable, negatives can be kept in a good quality storage box, snugly packed. Remember that boxes are best kept on steel shelves. Rolled negatives are highly fragile and should not be unrolled without expert assistance. Only the enclosure holding the negative should be labelled; the negative itself should not be written on at all, as any sharp pressure will permanently damage the negative.

High use negatives can be copied onto contact sheets or microfilm. If negatives or slides are used repeatedly, it is wise to arrange to have them copied onto contact sheets or microfilm or to have copy negatives made so that the originals may be stored securely. Negatives should not be photocopied. If storing negatives on microfilm it may be necessary to modify the development process to retain the full range of tones of the original image.

Activity 27

Examine four or five different types of photographic negatives held by your institution. In particular, try to examine a photographic negative, a photographic transparency, and, if you have one, a glass plate negative. Write a brief description of the physical condition of each item and an explanation of how it was stored. Can you determine if the storage of the item has affected its physical condition? Identify three steps you could take to improve the care of photographic negatives in your institution.

Cellulose Nitrate Film

One particularly fragile type of film is cellulose nitrate-based film, which was first produced in the late 1800s and remained popular until the 1950s. Cellulose nitrate film deteriorates rapidly, giving off acidic fumes in the process. As nitrate films disintegrate, they damage other materials in the vicinity. Nitrate films are also highly flammable and may self ignite or even explode in very high temperatures.

Nitrate-based film can be hazardous to other holdings in the archival institution.

Nitrate-based film is sometimes labelled as such on the edge of the film. The film may also feel sticky or greasy or may appear brown and stained. The film can be identified by using the following tests.

- First, see if the edge of the film has the word 'nitrate' embossed on it; if so the film is clearly nitrate based. If the words 'safety film' are embossed on the edge the film is not nitrate based.
- If no words appear on the edge, examine the film to see if it is curling on the edges or if it appears thicker on both sides of the base. If the film were made from the late 1800s to early 1900s and appears to be curling or has a thicker base, it is likely nitrate film. The thicker base was an attempt by manufacturers to counter the curling by adding more gelatin emulsion.
- If the film has a sticky feeling to it, has brown stains or a fading image and perhaps also smells unpleasant, again it may be nitrate-based film.

When nitrate film is identified, it should be removed from the general holdings area immediately and stored in a separate, secure location. The best course of action is to copy the images and then destroy the nitrate negative. If possible, it is wise to seek the assistance of a professional conservator to determine the best way to dispose of these materials, which can be quite hazardous.

New techniques are being developed to store and preserve these materials, but these methods are still not widely acceptable, and it is generally felt that the dangers of nitrate materials far outweigh the benefits of keeping them. Copying the images and then destroying the originals is still the safest practice for most archival institutions.

Activity 28

Find out if your institution holds any cellulose nitrate materials. If so, determine how they have been stored and write a brief proposal explaining the dangers of cellulose nitrate and the steps your institution could take to preserve the image and remove the materials from the institution.

Photograph Albums

Photograph albums are a conservation concern in an archival institution. The way in which an album has been organised often provides valuable evidence of the life of the creator; the original order is demonstrated by how the pictures have been placed and what descriptive captions have been written. But a photograph album can be physically unstable, as the adhesives or plastics used may be damaging to the images inside. One of the key questions with the preservation of photograph albums is to decide whether to keep them intact or take them apart.

Photograph albums made of self-adhesive pages are highly damaging to the images they hold.

If the album is made of self-adhesive pages, then it is strongly advisable to remove the pictures and discard the album itself. The album is highly acidic and will only

damage the images. However, it may be very difficult to remove the pictures from such an album. In this instance it is best to photocopy the pages or describe the contents thoroughly, then wrap and store the album securely. Researchers can look at the photocopies or read the descriptions to determine if they wish to see the images. At such time as resources are available for specific conservation work, a conservator might undertake to remove the pictures from the album, if this is a high priority in the institution's conservation budget.

If the album pages are not self-adhesive, then the following questions need to be considered when determining whether to remove the images or leave the album intact.

- What is the physical condition of the album? If it is sturdy and in good shape, it may not be necessary to take it apart. On the other hand, if the pages are brittle, it may be best to remove the photographs.
- Does the organisation of the album offer considerable archival or historical information? Would this information be lost if the album were dismantled? For example, a heavily illustrated photograph album, with hand-written notations and captions, will have tremendous intrinsic value as an object. A simple album of photographs in enclosures, on the other hand, with no captions, may have little intrinsic value; the photographs can simply be numbered so users can see the order they were found in the album.
- Is it possible to store the album securely as it is? If acid-free papers or tissues are available, they can be interleaved with the album pages, reducing the transfer of acids.
- Is it possible to store the album's photographs securely if removed? If the album is dismantled but the photographs then have to be stored in a box or bag without proper enclosures, it might be best to leave the album intact.
- Is the album heavily used? If it is new, is it anticipated that it will be in high demand? If so, it will require good storage and preservation, and perhaps a copy will need to be made for reference use, to protect the original.

Before taking any album apart, it is wise to photocopy the entire contents, number the copied pages, and retain the copy as an illustration of how the album looked originally. (However, if the album is seriously deteriorating, photocopying must be done carefully as the light exposure and process of flattening the album on the surface of the copier may cause more damage.) When handling an album, particularly when preparing it for storage, copying or dismantling, it is important to watch for small or hidden items that may be detached or lost. Care must also be taken to ensure loose items do not dislodge and become lost or damaged.

Albums are best stored individually in boxes, if possible. If not, they can be stored on shelves; ideally, the pages will be interleaved with acid-free bond paper and the entire album tied with cotton tape to hold the contents together. Albums can be stored vertically, like books, as long as they are not too fragile or too heavy to bear the weight. It is best not to label the album directly but instead to insert a card (preferably acid free) into the album to identify it. If it is necessary to write on the album itself, this should be done with a soft pencil only. Albums can be kept in the same conditions as photographs, in total darkness if possible, with temperatures below 20° C and with relative humidity below 45%.

Examine a photographic album held by your institution. Write a brief description of the physical condition of the album and an explanation of how it was stored. Can you determine if the storage of the album has affected its physical condition? Identify three steps you could take to improve the care of that particular album.

MOTION PICTURE FILM

Moving image films, including film strips and reels, are composed of the same materials as photographic prints or negatives: a support layer of polyester, cellulose acetate or cellulose nitrate and an image layer of a gelatin emulsion. They should be handled according to the same recommendations for prints and negatives; temperature should be as cool as possible, and no more than 20° C; relative humidity should be at 35-45%. At high relative humidities, the gelatin can support mould growth, which is damaging to all materials in the archival institution. Films are best stored in light-tight containers such as film canisters. If metal canisters are used they should be clean, rust free and without dents or bends. Films should be kept in their canisters when not in use, stored vertically on metal shelves or in metal cabinets.

Motion picture film should be stored in clean, rust-free containers.

Films should be handled as little as possible, and cotton gloves should be worn at all times. Films should be handled gently so they are not pulled or torn. Original films or master copies should not be projected; instead, copies should be made and used for reference and exhibit. It is best to use only hand-operated winding equipment, rather than machine-driven, because the automatic equipment runs too quickly and can damage or break the film. Films should not be repaired with any kind of tape; repairing films requires particular conservation expertise. Advice should be sought from someone with conservation training. The film container should be labelled with as much information about the film as possible.

Does your institution house motion picture film? If so, where has the film come from (the local television station, the government, filmmakers)? Write a brief description of the storage conditions for film in your institution. Identify three steps you could take to improve the care of motion picture film in your institution.

SOUND RECORDINGS

Many archival institutions house sound recordings: on cylinders, discs, phonographic records, cassette tapes or increasingly on compact discs. Note that cassette tapes and compact discs, while classified as sound recordings, are actually a magnetic or electronic media, and their care is discussed later in this lesson. This section focuses on recordings such as phonographic records or cylinders.

Many archival institutions take possession of old wire, cylinder or wax recordings, which are very fragile. Often the equipment needed to play such recordings is no longer available. If the archival institution has older recordings on unusual media, it is best to find a way to copy these to another medium, such as cassette or reel-to-reel tape, as soon as possible. Phonograph records can be scratched easily and are damaged by the oils in fingers. Dust can also harm them. Even the stylus on a record player will damage the record over time.

Phonographic recordings should be copied to another medium for reference use.

Ideally, therefore, storage areas and listening areas will be very clean and free of dust. Light itself is not a major environmental factor, but the heat generated by light can warp or melt recordings. Therefore, light should be kept to a minimum. Temperatures should be below 18° C; relative humidity is best at 40-45%.

Discs should be handled as little as possible and always with lint-free cotton gloves. Discs should be dusted with a soft brush before and after playing and should be stored in acid-free sleeves if possible. The original covers should be used but, if possible, the records should be enclosed in plastic liners first. Since the liner notes – the information on the record cover – can be very valuable, the cover should not be destroyed even if it is no longer suitable as a storage container. Discs should be stored upright on shelves with vertical partitions to keep records from tipping or bending, but records should not be packed so tightly that it is not possible to remove them easily. If discs are popular or well worn, copies can be made and used for reference, with the original kept in safe storage.

Does your institution house sound recordings? Write a brief description of the types of sound recordings held by your institution and the storage conditions in which they are kept. Identify three steps you could take to improve the care of sound recordings in your institution.

MAGNETIC AND ELECTRONIC MEDIA

Records created using magnetic media include computer tapes and diskettes, audio cassettes, video cassettes and reel-to-reel audiotapes. Magnetic media are composed of metallic oxides applied to a carrier such as polyester, cellulose acetate or paper. The oxide surface holds magnetic particles that store information that can be read using appropriate equipment.

Electronic materials are those records produced and accessible only using electronic devices that manage data, text, images, sound and motion in complex relationships. Electronic data can be recorded in analogue or digital form and stored on magnetic or optical media such as tapes and diskettes. Electronic materials may be published for limited or wide distribution or may be unique images, sound, records and documents intended only for authorised corporate or government use.

Electronic records can be categorised into two groups: static entities and dynamic entities. Static entities are those electronic records that are intellectually discrete: that is, they can 'stand alone' as information or records and do not change often. Examples include electronic books, serial publications, reports, digital video productions or digital audio recordings. Dynamic entities are those bodies of data, documents or records that are meaningful and usable only if their electronic context and the structures defining their relationships (hierarchical or relational databases, information systems and networks) are also preserved. Examples include databases or data sets, records and archives and information events preserved in electronic form.

Magnetic and digital media have a life span of only 20 to 25 years, but they are completely inaccessible without the systems and software needed to read them.

Magnetic and digital media have a short life span, at present perhaps not more than 20 to 25 years, though even that may not be an issue if the systems and software to read them are unavailable. High-quality archival storage can prolong their physical life but will not make them last indefinitely. In particular, excessive temperatures and high humidity will cause magnetic materials to deteriorate rapidly and electronic data, in particular, will suffer permanent loss. Magnetic media are also highly susceptible to damage from abrasion caused by dust or from oils on fingers. Magnetic media can also be erased if brought into close contact with a magnetic field. Magnetic tapes or

diskettes should be kept away from magnetics, electrical equipment, vacuum cleaners and transformers.

Magnetic tapes and diskettes should be stored in their original containers, as long as these are clean and fire retardant; cardboard containers should not be used. Tapes and diskettes should be protected from direct light and from dust; a dust-proof cabinet is ideal. Items should be stored vertically, not horizontally. Temperatures should be kept at 18° C to 20° C and relative humidity between 40 and 50%. Sudden or dramatic temperature or humidity changes should be avoided whenever possible.

Anyone handling magnetic materials should wear clean, lint-free cotton gloves at all times, to keep oils and grease from fingers from damaging the tapes. All storage areas should be kept free of dust as much as possible. Whenever possible, only high-quality equipment should be used for copying or playing. Low-quality equipment may damage the tapes. Tapes need to be rewound every few years to ensure the tension does not cause the tape to 'bend' into one position. When winding or rewinding, it is best to avoid high speeds but use low speeds instead. High speeds can bend or break the tapes.

For long-term storage, back up copies should be made every five to ten years to ensure data is protected. Copies should also be made for public use, so that the originals can be safely stored and not placed at risk. Copying equipment should be of good quality, and high-quality tape (ideally polyester) should be used when making copies. However, it should be remembered that even ideal preservation will not guarantee stability of magnetic materials. One of the most important actions an institution can take is to back up, or copy, magnetic materials – most especially electronic records – and storing these copies in a safe location apart from the originals.

It is not possible to discuss the care of electronic media in detail here, for the issues reach beyond simple preservation techniques. For more information about the care of electronic records, see Managing Electronic Records.

Activity 32

Does your institution house magnetic media? Describe the types of magnetic media held by your institution. Also write a brief description of the storage conditions for magnetic media and identify three steps you could take to improve the care of magnetic media in your institution.

MICROFORMS

Microforms are often found in archival institutions as media for copying original materials such as documents or books. Microforms are also acquired or purchased by archival facilities, such as copies of foreign government documents relevant to a country's own history. Microfilm is like a small reel of moving picture film, without the sprocket holes on movie film; microfiche is a rectangular piece of film, like a transparency. In either case, the microform resembles film in its physical properties and storage requirements.

Microforms require the same storage conditions as other film materials; temperatures are best at 18-20° C; relative humidity at 35%. In repositories where microfilm, microfiche, sound tapes and film are stored it is particularly necessary to avoid fluctuations of temperature and humidity because these types of record are even more vulnerable than paper. The temperature should be the same as for paper but ideally the relative humidity should be lower: for silver halide (acetate base) it should be within the range 15%-20%; for silver halide (polyester base) it should be within the range 30%-40%; for diazo it should be within the range 15%-30%. At the very least the temperature and humidity should be within the range given for paper; if several types of film are to be stored in the same area, the recommended relative humidity is 30%.

Total darkness is ideal for storage. Microforms should be handled gently; always wear gloves and do not touch the surface. Microforms should be kept in a dust-free environment, in boxes or containers that keep out dust and light and, for microfiche, in acid-free paper enclosures or envelopes if possible. Even though microforms are often produced as copies of original records, they should be considered 'originals' when it comes to storage and protection. Copies should be made of regularly used materials and the original kept as the master.

Microforms should be kept in a dust-free environment, ideally in boxes or containers.

Whenever possible copies and originals should be stored separately so that one copy is safe in the event of an emergency in the other storage location. Microforms should be labelled on their storage containers; when films are produced the target frame (the frame at the beginning of filming) should also contain a description of the materials. Users should be provided with clear instructions and assistance with the use of microforms, to ensure they do not damage materials when loading or running microfilm or microfiche machines. Films should be inspected every two years, with a different sample of films checked each time. Any deterioration of films or damage to them should be noted and action taken to correct problems.

For more information on microforms and reprography, see Lesson 4.

Does your institution house microforms? If so, where have the microforms come from: for example, was it filmed by your institution, was it purchased from commercial microfilm agencies, was it part of a collection of records received from an office or agency of your government? Write a brief description of the storage conditions for microforms in your institution. Identify three steps you could take to improve the care of microforms in your institution.

ARTEFACTS

Archival institutions sometimes find they have acquired three-dimensional objects – artefacts – along with archival materials. Artefacts may include globes and relief maps, coins and medals, trophies and even animal specimens, tools or clothing. Because many of these items are made of organic and inorganic materials, they require a range of environmental conditions. Since the archival institution does not often have the facilities to care for three-dimensional materials, special storage is often not possible.

Artefacts should be transferred to a museum whenever possible.

The best course of action is to transfer artefacts to the appropriate museum. If they must be kept, even temporarily, they should be stored in a stable environment away from archival materials, and advice should be sought from museum professionals about their care or ultimate transfer to a more appropriate facility. Before storing them, label them with a tag attached to the object with string or cotton tape. Do not use adhesive stickers or tags to label materials. Be sure to identify where they came from and the archival materials to which they are related, so that it is possible to maintain information about their provenance once they are transferred to a museum.

Activity 34

Does your institution keep artefacts? If so, what are the reasons for keeping them? (For example, is there no appropriate museum nearby where they could be kept?) Write a brief proposal for how artefacts should be managed by your institution. For example, should they be kept by your institution or should they be transferred to a museum?

REGIONALLY SPECIFIC MATERIALS

Each country or region in the world will have its own special types of records, perhaps not found elsewhere. For example, archival facilities in tropical environments preserve records on palm leaves; institutions in northern climates preserve carvings done on the bones of whales. English repositories house 'tally sticks', which are wooden sticks with notches marked in them to record purchases, debts or other information

This lesson cannot address all the specific types of records found around the world, but it is recognised that record keepers need to understand how to manage such materials. The bibliography in Lesson 6 contains information about where to go to get more specific information about preservation issues. The local and international museum community is also a good source of information about records or archives that might have been handled as artefacts.

Again, whatever the material, records storage in a risk-free environment is one of the most important actions that can be taken. When in doubt, store the item securely, protected from light, dust and damage, and seek advice from colleagues or experts before taking further action.

Activity 35

Identify at least two types of archival materials that are specific to your region, such as palm leaf documents, carvings on bone and so on. Write down four or five preservation issues that need to be considered when storing and handling such materials.

SUMMARY

Lesson 3 has examined the physical properties and preservation issues surrounding the various media materials often found in an archival institution. An overview has been provided of the key principles involved with caring for records in different media, followed by specific suggestions for handling, where appropriate. The various media materials discussed included

- paper records, including cartographic records
- books and publications
- parchment, vellum and seals
- newspapers
- works of art on paper
- framed items
- photographic materials
- motion picture film
- phonographic recordings
- magnetic and electronic media
- microforms
- artefacts
- regionally specific materials.

STUDY QUESTIONS

- 1. Identify the one main quality inherent in paper records that makes them difficult to preserve in archival institution. What steps can be taken to reduce the chance of deterioration of paper records?
- 2. How should oversized or fragile books be stored in the archival institution?
- 3. What are the particular qualities of parchment and vellum that make them fragile?
- 4. What is inherent in newspapers that makes them deteriorate quickly?
- 5. What criteria should be considered when determining whether to remove frames from works of art on paper or other framed items in the archival institution?
- 6. Explain the difference between colour and black and white photography, from a preservation perspective.
- 7. Why is nitrate film particularly hazardous in archival institution?
- 8. How are photographic positives and photographic negatives best stored?
- 9. What are the main issues related to the preservation of motion picture film?
- 10. What types of phonographic recordings are found in the archival institution and how might they be stored?
- 11. Explain the main factors affecting the stability of magnetic media.
- 12. How should magnetic materials be stored to prolong their life?
- 13. Explain the best way to preserve microforms in the archival institution.
- 14. How are artefacts best managed by the archival institution?

ACTIVITIES: COMMENTS

Each of the activities in this lesson is designed to help you think about how different media materials are managed in your institution. There are no 'right' answers to questions about how media materials are stored or handled in your archival institution, records centre, or records office. Your descriptions of how media materials might be handled should include the key points raised in the appropriate section of the lesson. In the last activity, concerning regionally unique materials, you should have considered the central issues of records care – environmental controls, handling, protection from light, and so on – common to the care of all media materials.

LESSON 4

REPROGRAPHY

When archival materials are extremely fragile, heavily used, deteriorating or highly valuable, it is common for archival institutions to reproduce the materials and make the copies available for research use. The originals are then kept in safe storage or sent for conservation treatment. Facsimile copying of records and archives helps preserve materials in two ways. First, making one or more copies multiplies access to the information embodied within a book or document. Second, copying limits the use of the original work, saving it from wear and tear. Systematic copying of materials at risk is an essential element in preservation programmes.

There are a number of methods of reproduction or reprography, including microfilming, photocopying, photographic reproduction and digitisation. At present, four types of copying are considered suitable in an archival environment. These include microfilming, photocopying onto permanent paper, photography using archival quality black and white film, and imaging or scanning materials into an electronic form.

Lesson 4 considers the role of reprography as a preservation tool, particularly in the archival institution. Reprography is also valuable for the management of current records and for access and dissemination, but this lesson focuses on reproduction for preservation purposes. Therefore the bulk of discussion centres on the management of materials in archival institutions, rather than in creating agencies. However, the general principles presented here apply equally well in records centres or records offices.

Reprography is not only important in the archival institution; it is also valuable as a records management tool in creating agencies. Indeed, the standards required for reproduction, particularly for microfilming, ought to be applied in offices and not just in archival repositories, so that the final documents are of equally high quality regardless of when they were reproduced.

This lesson examines the major methods of reproduction and considers the main issues arising when an archival institution is deciding if reproduction is an appropriate preservation activity. Microfilming is discussed in more detail than other options because it is at present the means of copying most often used for large-scale work in developing countries. Included in the lesson are discussion of issues related to reproduction by

- microfilming
- photocopying
- photoreproduction
- digitisation.

DEVELOPING A REPROGRAPHY PROGRAMME

Whether it is photocopying, microfilming or digitisation, reprography should not be done as an ad hoc process. Rather, it should be part of a well-planned programme that addresses management as well as technical considerations. For example, if a decision has been made to microfilm fragile materials and store the originals safely, the institution should be able to support that decision by providing adequate storage and access facilities. If the archival institution or office cannot protect either the microfilms or the original records, then the decision to microfilm may be a poor use of resources. If the archival institution decides that digitisation of photographs is an appropriate preservation methodology, it will require the resources to provide computer equipment not only for the process of digitisation itself but also for public and research access.

Reprography should be part of a planned programme, not an ad hoc activity.

In an archival institution, the first step in developing a reprography programme is to conduct a conservation assessment, as discussed in Lesson 2. This assessment will evaluate the physical state and security of all holdings in the institution and allow staff to determine the best course of action. The results of the assessment must be considered carefully and structured into a project plan.

Once a conservation assessment has been conducted, decisions can be made about the purpose and scope of a reprography programme. At this point, a cost-benefit analysis and needs assessment should be conducted. Microfilming and other forms of copying can be very expensive. It is important to ensure that any reprography programme is appropriate and will actually ensure records and information are protected. Unfortunately, many people believe that it is easy to copy materials and that all preservation and access problems will be solved as a result. This is not true; in addition to the equipment and material costs, there is a huge amount of staff time required to prepare records for duplication, and there are storage costs to consider.

Project planning and needs assessments are discussed in Strategic Planning for Records and Archives Services.

If the decision is to proceed with a reprography programme, the next step is to identify appropriate materials for copying. If the materials in question are unique archival records, such as several series of government records, then the institution can decide priorities internally, based on the possible uses of the materials, its physical condition and so on.

However, if the institution is considering copying non-unique materials, such as books, newspapers, maps, reports or other types of multiple-copy items, it is important to consult with other institutions both nationally and internationally. The expense of reproduction, particularly by microfilm or digitisation, can be great. If another

institution has already made or plans to make a copy of the item(s) in question, the cost of copying that item twice is not necessarily justifiable.

As well, copies may be available for purchase elsewhere, such as through large internationally accessible institutions such as the British Library in the United Kingdom, the National Archives in Canada or the Library of Congress in the United States. In this case the cost of purchasing a copy will be considerably lower than duplicating the materials again. It is important to note that there are mechanisms in place around the world to identify microfilm materials available for purchase, including the National Register of Microform Masters in the United States and the Register of Preservation Microforms in the United Kingdom.

For more information about these organisations, see Lesson 6.

There may be instances where an institution wishes to copy materials in order to make them available for sale; the needs and priorities of such a programme will differ from those of a preservation reprography programme, but it may be possible to coordinate the work and resources, saving costs and time. It is important, however, to distinguish clearly between the preservation purposes of reprography and any other needs or benefits. For example, it is highly unwise to make copies, particularly microfilm copies, only of segments of materials, such as parts of a series of records or books. Such extract copying, as it is called, may result in a saleable reel of microfilm or bound photocopy but does not add to the preservation programme and leaves only a partial record.

Prior to copying by any method, records managers and archivists must ensure that the proposed copying meets the requirements set out in copyright and any other relevant laws or regulations, such as evidence acts, or that are embodied in administrative documents, such as donor/depositor agreements. While making one static preservation copy on paper or film is usually permitted, the production of more copies or easily duplicated electronic 'copies' could constitute infringement of copyright. Such would certainly be the case if the institution plans to post the material on the Internet or sell the copies to researchers or to other research institutions.

It is wise when considering a copying programme to contact appropriate legal experts on evidence and copyright for current advice on the viability of proposed copying projects. If donors or depositors have forbidden or restricted copying, try to amend the agreement with them or their heirs to permit duplication for preservation.

Activity 36

Write a brief description of the ways your institution reproduces records for preservation purposes. Does the institution photocopy records, make photographic reproductions, use microfilm, or use computerised copying?

Find out what laws might affect your institution's right to copy. For example. Does your jurisdiction have a copyright law and how does that law address the reproduction of materials for preservation purposes?

PREPARING MATERIALS FOR REPRODUCTION

Once material to be copied has been identified and priorities for reproduction have been determined, time must be spent preparing the materials for copying. Thorough preparation for copying is critical to ensure a good final product, and it is important to factor into the costs of copying the time and resources required to prepare materials.

Materials must be cleaned, repaired and organised before they are filmed.

Books, journals or other bound items should be checked for completeness. Unbound documents such as folders of papers should be arranged in proper order; if possible, the pages should be numbered by writing a page number in the upper right hand corner in soft lead pencil. This pagination will simplify identification of papers later, once they are copied or filmed, and will facilitate checking the completeness of the copy. Folded documents should be unfolded and flattened, with paper clips or staples removed. Minor repairs such as mending tears should be done before filming begins.

Finding aids to the records should be completed so they may be copied along with the records in order to make access to the information easier. It is important to ensure the correct order and physical condition of records to be microfilmed, since the microfilm images cannot be moved and any error will always appear in the filmed version.

Activity 37

Examine one collection or group of records in your instituion, such as one series of papers or a large quantity of correspondence. Write down five steps you would have to take to prepare those records for reproduction. Also write down at least three questions or concerns that would need to be addressed before reproduction began, such as the physical condition of the records, their size, the presence of pins or staples, and so on. What type of reproduction would you recommend for these records: photocopying, microfilming or other?

MICROFORMS

Microfilming is one of the major means of reproducing and preserving records and archives. Microfilming is also a valuable way to provide security or reference copies of recorded information, either in offices or in archival institutions.

Microfilming: The photographic process of creating miniaturised images of records on high-resolution film.

Microfilming concentrates information into a compact and relatively easy-to-use form, so that information from many records may be stored in a small space and read using microfilm or microfiche readers. Actual 'microfilm' is a long reel of film, much like moving picture film. While microfilm is a good way to store a large body of information, users must scroll through entire reels in order to reach documents toward the end. This process means it can be difficult to find information quickly on microfilm. 'Microfiche' is a sheet of film onto which images have been copied; it is easier to go directly to a particular document using microfiche but a sheet of microfiche film does not hold as many images as does a reel of microfilm. Both types of films are referred to collectively as 'microforms'.

As a preservation medium, microfilming has several advantages over photocopying and ordinary photography. First, it dramatically reduces (by up to 90%) the space required for keeping large collections of records, archives or information. Second, although it is not inexpensive to produce initially, microfilm is relatively low cost to duplicate and ship, making it an ideal medium for 'publishing' textual research materials. Third, a properly produced microfilm copy is recognised legally as an acceptable substitute for originals, protecting the records from unnecessary handling. However microfilming is a black and white medium, and it is difficult to copy colour originals effectively.

Microfilming can reduce the space required for storage by as much as 90%.

There are many other benefits to copying records and archives onto microforms. These benefits include

- providing multiple copies of records within or outside the archival institution without damaging or risking originals
- preserving the original order of records preventing disorder or loss of information
- ensuring the safe preservation of information through the provision of security copies of documents
- protecting original records by providing copies for research use
- saving money, particularly in an office environment, through reductions on storage space, increase in speed of retrieval and improved security.

There are drawbacks to microfilming, including the following.

- Poorly organised records will be more difficult to use on microfilm, as disorganised information is more difficult to retrieve.
- Microfilming is costly and so, if poorly planned, can be a heavy expense without adequate benefits.
- In many countries, microfilm copies of records may not be admissible in a court of law.
- The preservation of microfilm requires good quality environmental conditions, which can be difficult to achieve.

- Microfilming requires high technical standards; if these are not achieved the benefits of microfilming are outweighed by the drawbacks of poorly produced or rapidly deteriorating films.
- While it is possible to have commercial agencies undertake the filming itself, it will be necessary for the archival institution to have readers or printers available for public and staff use.
- Users often dislike microfilm as it can be difficult to use and can cause eyestrain and fatigue.

Given the benefits and drawbacks of microfilming, it is critical that any programme to film documents be well planned and organised. There are many reasons to microfilm materials, but the institution must consider carefully if the reasons warrant the expense and time involved. When investigating a microfilming programme, the following questions should be considered.

- What are the goals of the microfilming project? Preservation of originals? Dissemination of information? Efficient records management?
- Can the goals of microfilming be achieved better using other methods, such as conservation treatments, photocopying or other means of reproduction or improved records management?
- Is the information in the records of sufficient value to warrant microfilming? If records are to be destroyed in a few years and have limited legal or administrative value, microfilming may not be a cost-effective option. However, if the archives are rare, deteriorating and in high demand by researchers, microfilming may be the ideal course of action.
- How many records are there? Are there enough to warrant the expense of filming? If there are several hundred pages of documents, then microfilming may be a wise choice; if there are only twenty or thirty sheets, photocopying may be a better option.
- What are the physical characteristics or condition of the records? If they are faded
 or have hand colouring, the details on the sheets may be hard to capture on film,
 suggesting another preservation method such as encapsulation may be more
 suitable.
- Are the records well arranged and in original order? If they are not already organised, can they be sorted before filming? If not, the benefits of filming may be outweighed by the drawbacks of inaccessibility.
- How much time and effort will be required to remove staples, paper clips or other fasteners? Can this preparation time be factored into the work plan?
- Can the records be filmed by a commercial agency or should the archival institution or records office invest in its own microfilming equipment? If there is a perceived ongoing need for microfilming and the funds and resources to develop such a programme, and in-house operation may be ideal. However, if the institution is considering filming only rarely, it may be necessary to seek assistance from a well-qualified commercial agency.

Does your institution have a microfilming programme? If so, describe the programme briefly. When was it started? What types of records are filmed and why? Where are master films and copies stored? What is done with the original records once filming is complete?

If your institution does not have a microfilming programme, write a brief description of how you would develop such a programme. What priorities would you establish for filming? How might you fund such a programme? Where would you house the necessary equipment? How would you store master films and copies?

Types of Microform

Once a decision has been made to film materials, it is necessary to decide what type of microform will be used – film or fiche – and what format. Microfilm is manufactured in three widths, 16mm, 35mm, and 105mm. From these are produced standard roll film, 16mm cartridges, aperture cards, jackets and microfiche.

The selection of microform should be based on the needs of the organisation and the suitability of the type for the records in question.

Traditionally, standard roll film was the usual form selected by archival institutions. Primarily this was because fiche was of inferior quality, particularly relating to resolution. In recent years, however, technical advances in step and repeat camera production have made fiche a far more suitable medium when compared to film. The choice between 35mm microfilm or microfiche is one for debate and both systems have advantages and disadvantages.

The new microfiche systems allow formats to be altered when copying non-standard format originals, thus permitting contrast to be varied for each image and maximising usage of the film area. Selection of formats is dependent upon the size, shape and condition of the record. Depending on the size of the original document and reduction ratio, from 30 to 325 documents can be filmed on a single fiche. By dedicating fiche to a single collection or volume of records, eye legible titles may be used, allowing users to identify the fiche before they put it into the reader. Access to individual pages, via an index, may be accomplished by using an alphanumeric identifying mark beside each frame when filming.

In-house processing of fiche is quick and easy and the processing equipment is less expensive than that needed for roll film. By comparison, one of the advantages of a 35mm roll film system is that film is not handled as much. For documents consisting of continuous pages of standard size and requiring only one title and no indexing microfilm may be more suitable. From 800 to 1,000 images may be exposed before it is necessary to replace the film. Thus less titling and film loading and unloading will be needed, saving time. Also, the larger frame size available with 35mm roll film can

sometimes result in better resolution when filming oversize or large format documents.

It is also possible to use 35mm roll film to produce aperture cards. Some records such as maps and plans and particularly engineering or architectural drawings are best suited to an aperture card format, which allows printed data to be recorded with the individual image. To produce these formats it is necessary to film using 35mm roll film, from which individual frames are cut and fitted to the card.

As well as determining the type and format of microfilm, it is necessary to determine the type of film stock to be used. The type used most often is silver halide film, which is essentially the same type of film used in black and white photography. Because the film is processed with a limited number of chemicals (unlike colour films) it is quite stable and is certified as 'archival' by the ISO. Film of 'archival' quality will maintain its chemical and image stability for a long time, thus providing good physical protection for the information filmed. Silver halide film does scratch easily so should be handled with care. Ideally the original film will be stored as a master and copies will be made for reference use. Silver halide film will also deteriorate if stored under conditions of high temperatures or high humidity.

For more information on ISO standards, particularly for microfilming, see Lesson 6.

In any reprographic programme, irrespective of whether fiche or film has been chosen, the silver halide master or camera film should never be used as a working copy. The soft surface will soon become scratched and difficult to read. Ultimately, as the film becomes useless, the time and cost of filming will have been wasted. Therefore, it is important that working copies be made. Ideally a second generation film, a submaster, should first be produced. From this a working copy can be made.

Sub-masters are beneficial to the reprographic programme in a number of ways. Compared to the cost of refilming, sub-masters are relatively inexpensive to produce and so protect the investment in filming. They can be produced either in a negative form, identical to the camera film, or the polarity can be reversed giving black text on a white background, identical to the original document. The sub-master could be stored off-site as protection against loss of the original in a disaster, such as a fire.

The working copies will be produced from the sub-master. The copy film most commonly used is called Diazo. Diazo film uses light-sensitive diazonium salts to produce an image. Because the salts are within the film this type of film is highly durable, resistant to scratching and relatively immune to the effects of high temperature and humidity although the image will fade if exposed to light for long periods. It is also 'polarity retaining': that is, the black portion of the sub-master film remains black on the diazo film. A second copy film, vesicular film, is also sometimes used but is not recommended for archival work. Silver halide sub-master films and diazo film are available in both 35mm roll film and microfiche format.

Types of Cameras

The decision about the material to be filmed and type of microform to be used will determine the type of camera needed. The nature of archival material places certain constraints on the choice of equipment. Records are often in a fragile condition,

frequently bound into volumes, and in many cases lack contrast between the text and the paper, (because of fading, discolouration by acid, water damage and so on).

The small 16mm table-top planetary cameras, often used in office environments, are not suitable as they are designed for small, single sheet material. The lack of depth of field on these cameras generally makes it impossible to film bound volumes more than 2 centimetres (¾ inch) thick. The older floor models, such as the Kodak MRD with 16mm head, do not always comply with international standards on resolution. It is generally agreed that 16mm film, be it in standard roll film, cartridge or jacket format, is not acceptable as a preservation medium.

The fragility of the documents also rules out any type of camera with an automatic feed, such as a 'rotary' camera, which passes the original sheets of paper through a feeder and films them as they pass. Such cameras are not suitable for filming archival records as there is a risk the originals may be damaged as they pass through the feeder. However, such cameras may be used in a records management environment when bulk filming documents such as cancelled cheques or invoices, which have short-term administrative use but are too bulky to retain in the original.

Cameras that pass originals through a feeder can damage materials and should not be used for preservation microfilming.

The cameras used for archival filming are, for microfiche, the 'step and repeat' camera, and for 35 mm roll film, the 'planetary' or 'flat-bed' camera. The cameras are suspended on a column, above the base plate on which the item being filmed. By moving the camera up and down the column, different reduction ratios can be achieved, resulting in varying image sizes on the film. In the 'step and repeat' camera the camera moves the film plane so that the images appear in rows, one above the other on the sheet of film. The modern microfiche cameras allow for a wide range of reduction and can produce reduction ratios up to 50:1 or more. The 'planetary' camera offers a shorter reduction ratio range but at a lower reduction, with the images appearing side by side on the roll film.

The decision about which type of camera to use will depend on the choice of film, which itself will depend on the needs of the material and the probable use, as discussed above. When selecting a camera system it is very important to consult with an archival institution or conservation specialist familiar with the modern generation of cameras

Filming

One of the most important factors when microfilming is ensuring the quality of the filming process and product. Quality standards must be maintained to ensure the final film is readable, durable and archivally stable. In particular, standards must be set for the following.

• Preservation standards for handling and filming: The process of filming should not cause further damage to archival materials. At all times during

preparation and filming, staff should handle materials carefully and wear cotton gloves.

- Microfilm stock: The film must conform to standards set by the ISO.
- Completeness: All records should be filmed in the appropriate order, including blank pages, so that the finished product accurately reproduces all information in the originals.
- **Identification:** All films should include descriptive information (called 'targets) along with the actual records, so that all films are fully identified and authenticated as true copies of the originals; this identification is critical to ensuring the microfilm copies may be substituted for originals in legal or other proceedings.
- **Readability and reproducibility:** The film should be clear, sharp and legible, so that clear paper print copies can be made whenever needed
- **Density:** Density refers to the tonal contrast of the film; there must be a sharp and clear distinction between the information and the background.
- **Resolution:** Resolution refers to the sharpness of the images themselves; the images should be clear and well defined.
- **Minimal chemical residue:** Processing chemicals should be thoroughly washed from the film.
- **Duplication:** The master original of the film should be stored securely; a sub-master produced and ideally stored offsite and copies used for research or reference purposes.
- Storage: Original films should be stored in specially manufactured microfilm containers in secure, clean and dust-free surroundings, with controlled temperature and humidity; stored films should be inspected regularly to ensure their stability. (See below and Lesson 3 for a more detailed discussion of the care and preservation of microforms.)

Activity 39

If your institution has microfilms and a microfilm reader, select two or three films at random and view them on the microfilm reader. Write a brief description of the physical quality and condition of the microfilm. Is it blurry or clear? Is it too dark or too light? Can the images be seen easily or is it difficult? If you feel the film could be of higher quality; describe how you might wish to improve the filming process to ensure a better quality product. If you feel the film is of a high standard, describe what particular qualities impress you.

Testing and Checking Microforms

Once the films have been shot, they will be processed according to the highest standards, ideally ISO standards, so that the final products are of archival quality.

Whenever possible, ISO standards for microfilming should be followed to ensure a high-quality product.

Standard tests of processed film should be undertaken to confirm that the optimum density and resolution have been achieved and that chemical processing has been properly completed, leaving no residual chemicals on the image. Details about such tests are available in the references at the end of this module; students wishing to learn the specifics about microfilming will find the best training will come from actual involvement in a microfilming project.

As well as checking films for technical quality, each master negative should also be checked frame-by frame for the following:

- evenness of focus
- sharpness and clarity
- correct order of all items
- completeness of contents
- absence of mechanical or other damage.

An unsatisfactory master will have to be discarded and the materials filmed again. Since this is a costly procedure, it is again emphasised that good planning and organisation of materials before filming is critical to the success, and cost-effectiveness, of the filming programme.

Duplicating Microforms

Once the originals have been filmed and a master microform created, duplicates may be produced. The master negative microform created originally is known as the 'first generation' of the film. If that film is copied, the copy is known as the 'second generation.' If that copy is then reproduced, the new copy is known as the 'third generation' and so on. The original or 'first generation' film will generally be of the highest quality, with sharpness and resolution diminishing slightly but noticeably with each subsequent generation. Note that this concept of 'generations' applies to all types of copying, not just filming. It is an important concept to remember when determining a copying programme of any kind.

The master negative of a film should never be used for viewing.

The master negative, or first generation film, should never be used for viewing. Its sole purpose is to produce further copies. Using the master for viewing risks damage to the master and can negate the benefits of the entire microfilming programme by damaging the best quality copy produced. Copies should be made using high quality microform duplicators; the type of equipment needed will depend on whether the copies will be negative or positive, whether they will be on silver halide, diazo or vesicular stock and whether they will be microfiche or 16 mm or 35 mm microfilm.

All copies should be checked for quality, just as the master has been checked, but the copies will not usually require a frame-by-frame inspection if the original has been checked and approved. As copying proceeds, quality deteriorates. Therefore it is best not to keep making copies from copies but, if more than three generations of copies are necessary, to make an intermediate master. This intermediate master is a second generation copy used to make more copies.

Storage and Preservation of Microforms

The appropriate storage and preservation of microforms is critical to the success of a microfilming programme. Microfilms can also provide copies and so offer security against losses incurred through fire or theft. Therefore this section of the lesson expands on information about the storage and preservation of microforms originally provided in Lesson 3.

Microforms are often found in archival institutions as media for copying original materials, such as documents or books; microforms are also acquired or purchased by archival institutions, such as copies of foriegn government documents relevent to a country's own history. Microfilm is like a small reel of moving picture film, without the sprocket holes on movie film; microfiche is a rectangular piece of film, like a transparency. In either case, the microform resembles film in its physical properties and storage requirements.

Microforms should be stored at a temperature of between 18-20° C, with relative humidity at 35%; it is particularly important to avoid fluctuations of temperature and humidity. Ideally, the relative humidity should be lower: for silver halide (acetate) it should be within the range 15%-20%; for silver halide (polyester) it should be within the range 30%-40%; for diazo and vesicular it should be within the range 15%-30%. At the very least the temperature and humidity should be within the range given for paper; if several types of film are to be stored in the same area, the recommended relative humidity is 30%.

Total darkness is ideal for storage. Microforms should be handled gently, with gloves, and without touching the surface. Microforms should be kept in a dust-free environment, in boxes or containers that keep out dust and light and, for microfiche, in acid-free paper enclosures or envelopes if possible. Master microforms should be considered 'originals' when it comes to storage and protection; the storage containers should be labelled clearly with the title of the materials, other relevant descriptive information and whether the film is a master negative, master positive or copy.

Once films have been made, copies produced and originals stored, the master negative and intermediate masters should be handled as infrequently as possible and always carefully. The equipment on which they will be viewed or copied should be kept clean and well maintained. Viewing copies should also be handled carefully, but as they are reference copies and not masters they need not be handled with the same high standards needed for masters. Films should be inspected every two years, with a different sample of films checked each time. Any deterioration of films or damage to them should be noted and actions taken to correct problems.

If you have microfilms in your institution, describe how they are stored. Identify three steps you might take to improve storage condition.

If you do not have microfilms in your institution, describe the kind of storage environment you would create in order to store microfilms safely.

Access to Microforms

Microform equipment is necessary to allow users to read and print filmed materials. Any archival institution holding microforms should have at least two readers or reader-printers, one of which should be set aside for staff use only. Staff will also need a rewind bench to inspect roll film and a splicer for repairing damaged film. All microfilm-related equipment must be well maintained, with a stock of essential parts, especially light bulbs, held in the institution for ease of repair.

Institutions should have at least two microform readers available.

The choice of readers will depend on availability, preference and cost. There are two basic types of readers: front projection and back projection. Front projection readers project the images onto an opaque screen, usually at a fairly shallow angle at desk level, in a unit enclosed on three sides. Front projection readers are said to be easier to use and work better in situations where the ambient light in the room is high. They are reported to cause less eye strain. Back projection readers present the image on a translucent screen similar to a television picture presentation; back projection readers are often less expensive than front projection readers and are more easily available. Back projection readers also supposed to be better for viewing negative copies, which some users prefer for alphanumeric text. Microfiche readers are usually back projection machines, and they tend to be less expensive than roll film readers because they are less complicated.

Readers and printers may come equipped with manual or motorised drives to wind film or other more sophisticated options. While staff may find such options desirable, it is important to consider cost and the abilities of users to use such equipment comfortably. Many people are not familiar with microform machines and may find a simpler machine easier to use. As well, the costs of repairing less complex equipment will be lower, which is an important consideration as heavy public use can damage equipment.

Computer Output Microfilming

Microform systems can be enhanced by using computers. Computer output microfilming, or COM, systems convert computer-generated data directly from machine-readable form to eye-readable form on a microform, usually a microfiche. If an organisation wishes to make preservation copies of electronic information it may

choose COM microfiche as a cost-effective and useful solution. COM has several useful features, including the following.

- COM creates microfilm rather than bulky paper printouts.
- COM saves storage space and costs.
- COM can be easily indexed during the production process.
- COM units generate information faster than conventional computer systems linked to paper printers.
- Labour and supply costs for COM are lower than for conventional systems.

However, COM equipment is quite expensive and any decision to use such a system should be based on a well-planned assessment of its viability and value for the organisation. Often, only very large institutions with high output of computer records will find COM a logical option. COM may be particularly useful in office environments in large governments, where records management processes are enhanced through the use of the space-saving technology.

KEY ISSUES FOR MICROFILMING PROGRAMMES

When considering a microfilming programme, the following general recommendations may be considered relevant in most archival environments. This list summarises points raised throughout this lesson, emphasising those of critical importance.

- Master (first generation) negatives should always be produced on archival quality silver halide stock.
- Storage facilities for masters should meet or exceed archival standards.
- Master negatives should never be used for viewing; duplicate copies must be made on either silver halide, diazo or vesicular stock.
- Intermediate masters should not be stored in the same room as master negatives, in order to reduce the chance of loss through disaster or damage.
- If only one or two additional viewing copies are needed, they can be produced as second generation copies from the master negative, ensuring high quality.
- Viewing copies need not be stored in the same high archival conditions required for masters or intermediate masters, but they should be protected from extreme environmental conditions.
- If viewing copies are in heavy demand, they can be kept in the reference area for users to access themselves; if they are stored in reference or reading rooms, the temperature and humidity should be as stable as possible and not above 30°C and 45-50%.

• The combination of types of films and equipment used (microfilm versus microfiche and so on) should be kept to a minimum to reduce expense and allow for compatibility when needed.

PHOTOCOPYING

Another method of reprography is photocopying. Photocopying has become such a common practice in many archival institutions and offices that the need for policies and procedures is often ignored. However, it is important when developing a preservation reprography programme to consider photocopying and to establish appropriate guidelines to ensure the physical quality of the originals and the copies is protected.

Although photocopying is a daily practice, it is important to establish policies and procedures to protect both originals and copies.

A preservation photocopy is one that utilises a machine that produces a same size thermoplastic facsimile image by heat and pressure fusing through electrostatic charges onto acid-free permanent paper. The advantage of electrostatic copying is its relatively low cost and accessibility for smaller institutions. However, best results are obtained when copying textual records that are black and white and are not larger than the average piece of paper. It is effective to photocopy photographs to reduce the wear and tear of reference 'browsing'. The resulting copies are obviously poorer than the original photograph, although the new generation of digital copiers can produce some excellent results. However, for reference purposes, such copies may be adequate.

Just as a microfilming programme depends on a clear understanding of the purpose, scope and nature of the work to be done, a photocopying programme should be well thought out. Photocopying is an excellent way to protect originals and provide reference copies, although the high light levels generated from copiers must be considered when copying fragile items. Many of the key issues involved with developing photocopying policies are the same as those for developing other reprographic policies, and so only key points are raised here. Following is a list of main issues to consider when using photocopying as a preservation tool.

- Usually, only single items or small groups of records will be photocopied for preservation purposes. It is more cost effective to microfilm large series of records.
- Photographs can be photocopied but the quality will not be high unless expensive copying machines are used; photocopies may serve as useful reference tools but from a preservation perspective photographic reproduction of photographs is a better choice.

- If many copies might be needed of a popular or fragile item, a master copy should be made and stored near the original, so the copy can be used to make additional copies, reducing the need to expose the original to high light levels.
- Archival quality (acid-free) paper should ideally be used for preservation photocopies, so that the copy is as stable as possible.
- Newspaper clippings can be photographed and preserved in place of originals, but whole newspapers are better microfilmed. Since many national libraries have newspaper microfilming projects it is wise to investigate existing practices before beginning a newspaper microfilm project.
- When copying bound materials, extra care should be taken not to bend or damage
 the spine. Some photocopiers have a special cradle that allows for copying of
 books and bound items without damaging the spine. However, such equipment is
 very expensive and should not be purchased unless the institution has a regular
 and heavy need for such work.
- All copies made should be labelled 'copy' in order to distinguish them from originals.
- Black and white copies made of coloured items should clearly indicate that the copy does not present the full spectrum of colours found on the originals.
- Copies made for researchers should always be labelled 'reference copy only' and the researchers should be advised that any copyright clearance is their responsibility.
- It is important to remember that electrostatic copying does not actually reduce storage requirements.

Reproduction for reference purposes is discussed in more detail in Managing Archives.

Activity 41

Describe the process for photocopying in your institution. How many machines are there? Who is allowed to use them? What records are copied? Is there a process for examining records before copying to determine their physical condition?

PHOTOREPRODUCTION

Photography may also be used as a preservation tool, particularly for copying original photographs. Copy negative or prints can be made and used in place of originals, ensuring originals remain as secure and stable as possible. Photographic reproduction can also be used for documents and maps, although the benefits are sometimes outweighed by the costs of photography; in such instances, microfilming is often a

better alternative. When developing a preservation programme, it is important to consider photography and determine an appropriate role for such technologies.

Photographic reproduction is costly produces high-quality copies.

Photography is usually used to produce a security negative and a duplicating master negative for original or vintage black and white photographic prints. These negatives provide a backup for the original print and allow further copies to be made for reference, exhibit or publication without the risk of damage or loss. Photography is also used to create colour transparencies (slides) of graphic materials such as posters and works of art, to allow users to browse the collections without handling the originals. Traditional colour films still have stability problems, so it is important to consult experts in preservation photography about the best methods possible.

See Lesson 6 for information on preservation photography.

For best results, it is important to use professional photographic materials and copying equipment suited to the types of materials and the kinds of copies you will require. For example, copies made for private study generally require stringent quality control than those produced for exhibition or publication. Because successful presentation of photography requires a high degree of photographic skill and a range of specialist equipment, it is a service best contracted out to professional photographers. Again, it is important to consult preservation experts about methods and quality control.

DIGITISATION

Digitisation is NOT recommended without extensive consultation with experts in computer technologies, preservation and record keeping.

Digitisation, the transfer of records or information into electronic form, is an increasingly popular activity in archival institutions in many countries. Document image processing systems allow for the conversion of materials from paper or other form, to machine-readable form, which allows them to be stored and viewed electronically, saving space and increasing accessibility. The preservation benefits of digitisation have yet to be proved. While electronic images certainly take up less room, their long-term stability is not guaranteed, so regardless of whether an archival institution or records office makes use of digital technologies for copying, it is likely to wish to retain the originals in safe storage.

Many professional conservators recommend against digitisation at the present time. Although the concept of converting records to electronic form can seem appealing, many experts have argued that the long-term consequences of such work have not been determined yet and may be more expensive and complicated than simply storing the original records in a safe environment or copying them onto microfilm.

Digitising is also an extremely expensive process. Not only are there costs associated with purchasing and using the equipment, but there are also hidden expenses, such as the need to review or, for textual materials, proofread and edit all digitised items to ensure their accuracy. If digitised materials are not acceptable in a court of law, originals will still have to be retained, putting into question the purpose behind digitising. And it is necessary to consider the long-term consequences of digitising: will the technologies needed to read digitised materials be available in ten, twenty or more years?

Utilising new scanning and imaging technologies to make exact images of traditional records and archives is a very complex and fast changing area of study. There are many types of scanners and equipment for viewing and reproducing scanned images. However, like microforms, scanning projects must be well planned and the records carefully prepared, identified and authenticated to ensure a usable and legally admissible outcome. The important thing to remember is that, at present and for the next few years, there are no imaging or scanning technologies that offer the same extent of reliability, standardisation and quality assurance as micrographics. Records management professionals cannot yet trust the preservation of irreplacable documentary evidence to these technologies: scanned copies cannot 'faithfully reproduce' the integrity and full functionality of reliable and authentic source records.

Therefore, while it is important to understand that digital technologies are being used for preservation purposes, this study programme does not advocate developing a digitisation programme without extensive consultation with experts in computer technologies, preservation and record keeping. To gain the advantages of digital access, while ensuring long-term storage, records should first be microfilmed and then the microform scanned. Although this involves two processes, it is often more economical than scanning the original document because of the time factor.

While this study programme does not recommend digitisation, information about the process of digitisation is included here to help you understand the concepts involved.

A digitising system involves five components: an input subsystem, a control subsystem, a storage subsystem, a retrieval subsystem, and a communications subsystem. The control, retrieval and communications subsystems are no different in concept from those in any other computer system. The important features for copying documents are the input and storage subsystems.

Digitising systems capture the image of a document by means of a scanner; the scanner holds a range of semiconductors that convert light to electronic impulses. The scanner 'reads' each page and converts the information into a video image, then digitising the image and storing it. The image is composed of dots, known as pixels; the greater the number of pixels, the higher the resolution of the image and the greater the quantity of data the system has to store. For example, recording black and white documents requires only one binary digit (bit) of memory per pixel; recording a full grey scale required eight bits per pixel; and recording colour requires at least 24 bits per pixel.

Binary digit (bit): A digit within the binary number system. A bit is the smallest unit of information held in a computer.

Pixel: A 'dot' or mark of colour in the electronic representation of an image; the greater the number of pixels in a given space the higher the resolution or quality of the image produced.

The image created by scanning is not necessarily computer readable. An optical character recognition device (OCR), is needed to convert the characters of a document into standard computer character codes, making the information readable electronically. Thus while images may be scanned into and retrieved from a computer, they cannot be manipulated or searched electronically if they have not been fed through an OCR system.

It is possible to store digitised documents on magnetic media, but the quantity of data produced in digitising systems requires a compact medium. At present, optical storage is the medium of choice. Optical storage uses laser beams to record and read back data

Optical disk: A storage device that uses reflecting surfaces and laser technology to read and write data on a diskette. Also known as a laser disk.

The data is recorded on an optical disk by using a laser beam to burn a series of microscopic holes or pits onto a thin metallic film on the surface of a plastic diskette representing the data. The data is then read electronically when light is reflected off the holes or pits in the diskette. The size of the diskette determines the amount of data that can be stored on it, from 115 megabytes to over 6 gigabytes.

Digitising systems are most often used in office environments, where users need faster and more complex access to huge volumes of records than may be available through microfilm or other reproduction technologies. Where information is bulky, is used infrequently and need not be accessed quickly, microforms are still the best and most cost-effective technology.

With the advent of the digital electronic revolution, it now appears possible that the bulk of recorded evidence could be migrated into digital technology, leaving only a very small residue of materials of intrinsic value to be maintained in their 'original' form.

A new capability of the electronic regime is that records can be created as 'smart objects' which can automatically warn the system if they are intellectually or physically damaged or becoming unstable and refresh or migrate themselves into safety. Thus the new electronic storage regimes seem to offer record keepers the advantages of greater capacity, accessibility, security and flexibility, as well as self-preserving records, but some serious questions and uncertainties linger.

Electronic regimes and technologies are still relatively young in comparison to the older tried-and-true recording technologies. As such, they are subject to more rapid change and lack the degree of international standardisation and acceptability of those more 'mature' technologies such as paper, photography and microforms. Because there is no professional consensus at present, it is important to read the current literature and stay alert for new developments as they unfold.

For more information on automation, digital technologies and the management of electronic records, see Automating Records Services and Managing Electronic Records.

SUMMARY

This lesson has examined the issues surrounding the development of reprography programmes. The information presented is particularly applicable to archival institutions but may also be useful for records offices or records centres developing records management reprography programmes. The lesson has emphasised the importance of good preservation management planning prior to the adoption of any particular reproduction technology. The lesson has also discussed the technical and management issues surrounding various methods of reprography, including

- microfilming
- photocopying
- photoreproduction
- digitisation.

STUDY QUESTIONS

- 1. Explain the concept of preservation planning and outline the key steps that should be taken to consider whether to develop a reprography programme.
- 2. Why should a conservation assessment be conducted before developing a reprography programme?
- 3. Explain the different considerations involved with reprography programmes for archives and for published materials such as books or newspapers.
- 4. Outline the steps involved in preparing materials for reproduction.
- 5. What are the benefits and drawbacks of microfilming as a preservation tool?
- 6. What are the different qualities of microfilm and microfiche as preservation management tools for archival institutions?
- 7. What are the differences between 16 mm and 35 mm microfilm?
- 8. What type of microfilm is recommended for long-term storage? What types can be used for reference copies?
- 9. Identify five areas of quality control that should be checked to ensure the quality of microfilmed materials.
- 10. Define a master and an intermediate master and explain the concept of generations of images.
- 11. What are the best storage conditions for microforms?
- 12. What type of equipment will users need to access and use microforms?
- 13. What management issues need to be considered when determining a photocopying programme for the archival institution?
- 14. What management issues need to be considered when determining a photographic reproduction programme for the archival institution?
- 15. Explain the concept of digitisation and its role in reprography in an archival institution.
- 16. When should digital reproduction be considered and when is it not suitable in an archival institution or a records office?

ACTIVITIES: COMMENTS

Activity 36

Different institutions will have evolved different methods for reproducing records. It is important to consider how to standardise processes in order to protect records and identify priorities for management. Similarly, different countries will have different laws relating to copyright or reproduction. It is important to recognise the requirements of the law when developing any reproduction programme.

Activity 37

Depending on the type of records you examined, you may have found them well organised and ready for reproduction or perhaps in poor condition and requiring considerable work before they can be copied. This exercise should help you understand the considerable work involved in preparing records for reproduction.

Activity 38

It is common for microfilming programmes to develop in response to needs but perhaps without a great deal of preplanning. No matter how old the microfilming programme, a review can always help improve the processes.

Activity 39

This exercise should help you see the importance of good quality filming; if the final film is of poor quality, a great deal of time and energy has perhaps not been used well. It is important to strive for the highest standards possible when microfilming archival materials

Activity 40

Storage conditions should be as close as possible to those outlined in this lesson.

Activity 41

It is often the case that photocopiers are purchased and brought into an institution without a plan in place to manage their use or protect records during copying. It is important to strive for standards and establish processes that protect records and ensure good quality copies.

SECURITY

An important factor in protecting records and archives is the provision of adequate security measures, to protect the people working in the records office, records centre or archival institution and to protect the valuable records and archives housed in storage areas or repositories. A number of security measures can be implemented at little or no cost; other measures are more expensive or time consuming. The decision about what types of security measures are required and to what extent will depend on the particular needs of each institution. Regardless of the systems implemented, security measures should be based on good planning, to ensure budget and staff limitations are taken into consideration and the specific needs of the organisation are identified.

This lesson discusses the following security issues:

- conducting a security assessment
- security equipment and supplies
- actions to take in the event of a breach of security.

This lesson concludes with a checklist of actions that can be taken by an institution to improve its security. While this lesson focuses primarily on the security needs of an archival institution, the principles are equally applicable in a records centre or records office environment.

CONDUCTING A SECURITY ASSESSMENT

Before any security measures are put in place, it is important to assess the security needs of the institution and determine the possible effect of security procedures on staff, users, and archives. New security processes can be intrusive and disruptive and so need to be chosen with some consideration of how staff and users will accept the changes.

A security assessment identifies the current security needs of the institution.

A first step in security planning is to examine existing systems and processes and the role of staff in their management, to determine gaps and needs. The following

questions should be answered as part of a security assessment. These questions relate to the security of facilities and buildings and to the activities of staff and users. Many of the questions relate to security for archival institutions and records centres but are equally important to consider when ensuring the security of current and essential records.

Security Questions Relevant to Facilities and Buildings

When considering the security of office or archival records, the following questions should be considered.

- What security measures are already in place in the organisation?
- Have there been any breaches of security, thefts, losses, vandalism and so on? What were the precise circumstances?
- Does the institution have insurance against theft or damage?
- Does the insurance cover the loss of archival items or does it relate only to replacement of equipment or supplies?
- Is access to storage areas controlled by lock and key or is it easily accessible?
- Who controls the keys, and are there procedures in place for leaving keys in a central area so that people can gain access to rooms in the event of an emergency?
- Does the institution have an established procedure for opening and closing the building, so that all steps are followed routinely and there is little chance that someone will forget to open or lock a door?
- Has the institution discussed its security issues with the police?
- Do accession records or finding aids provide sufficient information about materials that they can be identified if lost or stolen?
- Are archival materials assigned a monetary value when they are processed?
- Are items of high intrinsic, legal or cultural value stored separately or placed in individual folders so that staff can find them more easily in an emergency?
- Do arrangements for handling security classified records conform to the relevant regulations?
- Are materials returned to storage promptly? What is the procedure for returning materials after they have been used? Are boxes and folders checked to ensure all materials are intact?
- Are document exhibit cases wired to an alarm system or otherwise protected from theft or damage?
- Do exterior doors have adequate locks and secure hinges?
- Are all exterior doors needed or could some be blocked off?
- Are there grills or screens around ground floor windows?

- Are doors and windows wired to a security alarm system?
- Are security guards on patrol 24 hours a day?
- Are there alarms installed? Are they tamper-proof?
- Does the repository have a secure door to close off entry?
- Is there an extra secure storage area or vault within the repository?
- Is outside lighting in place, needed or possible?
- Does the institution have a fire alarm and suppression system?
- Does the institution have fire extinguishers in accessible locations?
- Are archival materials stored away from areas that might be susceptible to fire damage, flood damage, theft or other harm?
- Does the institution have an emergency plan for preventing or reducing the effect of disasters?

For more information on disaster planning, see Managing Essential Records.

Activity 42

Using the list above as a guide, conduct a security assessment of one area of your institution, such as a storage area, reference area or reading room. Answer as many of the questions as possible.

What kind of security measures exist in your institution in relation to the management of facilities and buildings? Identify three actions you would take immediately to improve that particular security concern.

Questions about Staff and Users

Staff and users may pose security risks that should not be ignored.

The following questions should be answered when investigating the security of staff and users, especially in archival institutions.

- Is there a procedure for checking the background of potential employees to the records office, records centre or archival institution?
- How many staff members have easy access to record storage areas or restricted zones? Do all these people need this access?
- How long has it been since combinations or keys have been changed?
- Is there a staff member in the public or reference areas at all times?

- Have staff been trained in security management issues?
- Have staff been advised what actions to take in the event of thefts or damage?
- Are staff required to wear badges or identity tags? Are all persons without such identifiers challenged in order to ensure their presence on the site is legitimate?
- What type of identification is required of users?
- Are users, whether public or internal, interviewed before they gain access to records or archives?
- Are users advised of security concerns and reference rules?
- What are users allowed to bring into the reference areas of the archival facility?
 Are their personal belongings securely stored if they are not allowed in the reading room?
- What information is contained on retrieval documents in archival repositories or records centres? Do call slips include the names and signatures of users so their identity can be checked if necessary?
- How much material are users allowed to have at any one time?
- Are materials kept in public areas when not in use or are they kept behind the reference desk or in office or storage areas?
- Has the reading room of an archival institution been arranged so that users can be watched at all times?
- Do users have access to storage, staff or restricted areas?
- Are users in archival institutions allowed access to unprocessed materials?
- Are users' belongings searched when they leave the archival institution?

Activity 43

Using the list above as a guide, conduct a security assessment of the management of staff and users in your institution. Answer as many of the questions as possible.

What kind of security measures exist in your institution in relation to the management of staff and users? Identify three actions you would take immediately to improve that particular security concern.

IMPLEMENTING SECURITY MEASURES

Once a security assessment has been completed, the next task is to implement specific security measures, in order to reduce risk. The main risks to records and archives are fire, flood or other physical damage, as well as theft or vandalism. Any security programme should be developed in conjunction with an emergency plan, designed to

protect essential materials in the archival institution or records office from loss or damage.

For more information on emergency planning, see Emergency Planning for Records and Archives Services.

Staff need to be carefully selected and well trained in security issues.

Take the following steps to prepare staff.

- Screen new employees carefully to ensure they are trustworthy and that they understand the importance of protecting the materials in their care.
- Train staff on security procedures, including techniques of observation and appropriate methods of approaching patrons who may be mishandling or abusing materials.
- Ensure all staff and contractors wear appropriate identity tags and challenge anyone not holding appropriate identification.
- Consider identifying one or more individuals to serve as security officers, who will monitor the reference and storage areas and ensure that records, archives and individuals are safe and secure.

Security measures should also be applied to visitors to the institution. For example, all visitors should register upon arrival, and users of archival materials should read and sign a statement of rules and regulations. A sample statement is included below. The institution may also choose to ask for identification before allowing users into the research area.

For more information on reference procedures, see Managing Archives.

National Archives of the Republic of Erewhon

Reference Rules

These rules are issued under s. 12 (2) (b) of the Erewhon National Records and Archives Act 1999.

The Search Room of the National Archives is open to researchers on normal working days from 9 AM to 4 PM. Holders of reader's tickets are welcome to attend during those hours.

It is advisable to contact the National Archives in advance of your intended visit, indicating the nature of the archives you wish to consult. This will reduce delays and inconvenience. Users will appreciate that archival documents are kept in controlled storage under secure conditions. It therefore takes a little time to produce them. Every effort is made to reduce this delay to a minimum, but users should be aware that it is necessary to allow for it.

Archival documents are produced subject to the following rules.

General

- 1. You must have a valid reader's ticket.
- 2. You must sign the attendance register every day you visit the search room, regardless of whether you consult any documents or not.
- 3. You must maintain silence in the search room.
- 4. You must not smoke, drink or eat anything (including sweets) in the search room.
- 5. No persons under 16 years of age shall enter the search room except with the permission of an officer on duty. Educational visits by school parties or individual school students must be arranged in advance.
- 6. You must leave briefcases and large bags with the officer on duty while in the search room

Issue and return of archival documents

- 7. You must write out a separate production ticket for each item you require.
- 8. Except by special permission of the officer on duty, no more than three different items will be produced at the same time. Items are the standard unit of management within the National Archives; they may contain more than one document.
- 9. When you have finished with the items requested, you must return them immediately to the officer on duty. Until you have done this, you will be responsible for the items.
- 10. If you wish to continue work on items on the following days, you must complete a 'reservation' form.
- 11. Requests for archival documents must be handed in before 3 PM on the day of production. All archives must be returned to the officer on duty by 4 PM.

Handling archives

- 12. You must not write on or mark any original archival document in any way or take documents out of the search room.
- 13. You must not use liquid ink, fountain, ball-point or fibre tip pens, highlight pens, correcting fluid or India rubbers in the search room. To take your own notes, you should use pencils only, and these should be sharpened at the designated location in the search room.
- 14. You must be careful not to damage documents. You must not lean on them, fold them or place them with your own notes and papers.
- 15. You must keep unbound papers in the order in which they are delivered to you. If the papers are disordered, you should report this to the officer on duty immediately.
- 16. You must report to the officer on duty any defect in or accident to a document.
- 17. The officer on duty may require that certain fragile or especially valuable documents cannot be examined or must be examined under special conditions.

Copying documents

- 18. Tracing documents is not allowed.
- 19. You may not photocopy documents yourself. All requests for photocopies must be entered on the photocopying request form, which will be completed by an officer on duty. Requests may be refused if there is a risk of damage to the document.
- 20. Photographing documents is only permitted with the permission of the director.

Office equipment

- 21. The use of typewriters is not allowed.
- 22. The use of computers, including battery-operated computers, is permitted, with the permission of the officer on duty, providing they do not cause a disturbance in the search room.

Publication of material from the National Archives

- 23. Requests to publish copies of documents must be referred to the director.
- 24. When information or text derived from the holdings of the National Archives is published or cited in publications, users are requested to use the following form of acknowledgement:

 $National\ Archives\ of\ Erewhon\ /\ [Group\ code]\ /\ [series\ numbers]\ /\ [item\ number(s)].$

It is the duty of the staff of the National Archives to ensure compliance with these rules. Failure to observe the rules may result in the documents you are using being removed or, in extreme cases, the cancellation of your reader's ticket. Those found wilfully damaging the documents will be prosecuted.

Signed [Director of National Archives]

Date

Figure 6: Model Reference Rules

Activity 44

What kind of reference regulations are in place for your institution? Compare your institution's regulations with those in this lesson. Identify differences between the two and indicate four items you would change or add to your institution's regulations to strengthen them.

If your institution has no written regulations, use the document in this lesson as the basis for a proposed reference regulations document. Indicate what changes you would have to make to ensure the regulations suited your institution.

Protecting Valuable Archives

Steps can also be taken to protect the holdings. Some archival materials may have a high monetary value. For example, rare coins or stamps, documents signed by important officials or rare photographs or artwork may have a high monetary value. It is important to protect these records from theft.

Materials with monetary value should be separated and stored securely.

Is it possible to identify financially valuable materials and separate these from the rest of the materials in a collection or group? They could be replaced by photocopies if necessary, or separation sheets could be inserted indicating that the original is housed elsewhere. It is wise to maintain an inventory of materials that appear to be particularly valuable, indicating for each when it was received, where it came from, where it is stored and any additional information of value. A copy of the record may be maintained with the inventory as proof of possession by the institution.

In the past, it was common to mark original materials, by embossing, punching, labelling, stamping or perforating them. This practice is not considered acceptable today, as it leaves a permanent mark on the original materials and can increase deterioration or damage. Such processes can also be expensive. If a particular item is of very high value, it is better to store it separately and make security photocopies of it rather than damage the original by marking or stamping.

Activity 45

Does your institution mark documents in any way for security purposes? If so, explain how this is done. What recommendations would you make to senior staff to protect records without marking or stamping them in any way?

Selecting Security Equipment and Supplies

Break ins do not often occur in archival repositories; the greatest threat to records and archives is from thieves posing as users and vandalism by disgruntled staff. However, it is important to ensure institutions are secure, particularly during evenings or weekends or other times when staff are not present.

The installation of security equipment can help protect the institution from theft or damage.

The following security equipment should be installed if at all possible:

- good quality doorlocks, such as mortise locks, which have a dead bolt attached
- good quality door hinges, with fixed-pin hinges that cannot be easily removed, so
 that thieves cannot just bypass the locking system and remove the entire door by
 the hinges
- a separate, locked vault to hold particularly valuable items; such a vault should have at least one good quality lock, such as a mortise lock, or ideally a double locking system.

It is critical to remember to lock areas securely whenever necessary, even when people are leaving the room or building only for an hour or so. No locking system will protect against theft if it is not used. There must also be a system for key security that ensures that only authorised persons have access to keys.

In addition to good locking systems, the institution may wish to consider installing alarm systems. Alarms not only detect intruders but can also frighten off potential thieves or, at least, delay their entry into the premises, perhaps long enough for security officials or law enforcement officers to arrive on the scene. The simplest alarm system is an alarm bell that goes off if a door, window or other entrance is opened when it should not be. More sophisticated alarms include silent alarms, which are heard only in a police stations. The best advice offered to any institution considering an alarm system is to consult with at least three suppliers and also to discuss the situation with the local law enforcement office and with other agencies in the government or business, to determine what has been done elsewhere and what could be done in this situation

It is possible also to install surveillance equipment, such as closed circuit television cameras. Such equipment is very expensive and is usually only considered by agencies with extremely valuable materials or sufficient funds to warrant the cost. Not only is the equipment expensive, but it is also necessary to have someone on staff to monitor the television screens constantly, or else the cameras are of little value.

Activity 46

Examine the security equipment, such as door locks, hinges, alarms, and so on, in your institution. What kind of locks and hinges are in place? Are there trained security staff on the premises? Write a brief report outlining four or five key actions that your institution could take to improve its security equipment.

TAKING ACTION AGAINST THEFT OR DAMAGE

What can be done if something is stolen from the facility, or if someone commits wilful damage to archival materials? What should a staff member do if he or she sees someone abusing or taking records or archives?

The ideal situation is one where the country, region, state or province in which the institution resides has an effective law in place concerning theft of archival or other cultural materials. Such a law makes it a crime to damage, mutilate, remove or otherwise harm cultural property. If no such law is in place, senior management staff may wish to pursue establishing such a law in their jurisdiction.

Ideally, laws should be in place protecting archival and cultural materials from theft or damage.

As well as a law specifically related to protection of archives, thefts are also covered under the jurisdiction's existing criminal code. Theft of any property is usually considered a crime under the criminal code, and perpetrators can be prosecuted according to that law. The institution should keep a copy of the law on hand and those staff responsible for security should be familiar with its provisions.

Regardless of the nature of the law in place, archival staff should consider the following guidelines when considering how to respond to a situation of apparent theft or damage.

- Only detain someone if you have good cause to do so, such as if you have seen them take something and are in the process of leaving the building, or if you have seen them damage something. Just like shoplifting, if people are stopped with an item in the reference area they could argue they were only taking it from one part of the room to another; if you suspect someone, follow him or her to the door and, if the person then leave the premises, detain him or her.
- Do not rely solely on the word of one user that another has taken something or caused damage; investigate the situation yourself before taking action.
- Avoid confronting anyone in a public area; this can be embarrassing and the person
 accused may, if found to be innocent, protest against the embarrassment caused.
 Take the person to a secure and private area and call in a colleague to witness the

discussion. Then calmly indicate that you have a concern that the person has taken or damaged something and allow him or her an early opportunity to explain the situation or prove his or her innocence.

- Contact the police as soon as possible, so that both you and the user are guaranteed that the process followed is appropriate. Only conduct a search with a law enforcement official present; ideally, leave that task to the police.
- Remember that the rights of the accused person should be respected and he or she should be treated appropriately and respectfully throughout the discussion or investigation.

Finally, it is wise to maintain a register of lost or stolen items and circulate that register to book dealers, archivists and museum curators inside or outside your jurisdiction, so that they are aware of what materials are missing and, if they come across them, will know to contact you about their return.

It is useful to advise book dealers, archivists or museum curators of the loss of materials so they can watch to see if they appear on the open market.

Activity 47

Has your archives ever experienced a theft or damage to archival materials? If so, find out what happened and write a brief report on the experience. What steps would you recommend be taken to prevent such an occurrence happening again?

If your institution has been fortunate enough not to experience such a situation, find out what measures are in place to respond in the event of a theft. Are staff trained to monitor the staff room? Have they been given instructions on how to approach someone they suspect of stealing or damaging materials?

Activity 48

Find out what laws in your jurisdiction apply to the protection of archival materials against theft or damage. Review the laws and identify at least three areas where the laws might affect how you manage security measures in your institution.

CHECKLIST OF SECURITY ACTIONS

Following is a checklist of actions that might be taken by an institution to improve its security, based on the issues discussed earlier in this lesson.

- The organisation should have clearly written security policies and procedures.
- Records should be kept of any theft or damage and action taken to improve security as a result.
- The institution should investigate carrying insurance against theft or damage, bearing in mind that it is rarely possible to insure archival materials, only shelving, facilities, and supplies.
- Access to storage areas should be controlled by locks, with specific people
 assigned responsibility for opening and closing the doors and ensuring all areas are
 secure. The keys themselves should be kept in a central location, themselves
 protected by lock and key, so that in the event of an emergency people can gain
 access to storage areas and remove materials. No one should develop the habit of
 taking keys home, thus leaving the institution without a means of access into
 storage areas.
- The number of entrances to the storage areas should be limited.
- It is wise to invite the police to assess the building and discuss possible improvements to make it more secure.
- Records should be kept of the monetary value of materials received; accession records, which are usually for internal use only, can include a detailed description of particularly valuable materials. Copies should be kept of accession records for valuable items, but these records should not be made available to the general public or the information may fall into the hands of potential thieves.
- If possible, valuable items should be stored separately or placed in individual folders so that staff can find them more easily in an emergency. All materials used by researchers should be returned to storage promptly and following established procedures, including checking the contents to make sure all materials are intact.
- It is best not to mark documents themselves, but rather to keep a register or keep copies of accession records identifying valuable materials.
- It is ideal to have a 24-hour security patrol, but if this is not possible it is wise to investigate the installation of alarms or other security systems.
- The storage areas should be equipped with fire alarm and suppression systems and these should be checked regularly to make sure they work properly.
- The institution should have an emergency plan for preventing or reducing the effect of disasters; emergency planning is discussed in *Emergency Planning for Records and Archives Services*.
- New employees should be interviewed carefully, to ensure their integrity and suitability for the work of the records office, records centre or archival institution.
- Access to storage areas and restricted zones should be limited to key people.

- Keys and combination locks should be changed at least once every two years.
- Reference areas should be monitored by a member of staff during all public hours; ideally, these staff will be trained in security management, including knowledge of what to do in the event of an emergency or possible theft or damage.
- Users should be required to provide suitable identification before using materials, particularly in the archival institution. They should be provided with full reference information so they are well aware of the rules and regulations in place.
- Users should not be allowed to bring anything into the reference or reading area that is not necessary to their work.
- Reference documents should contain sufficient information about users to allow them to be identified and contacted in the event of any question about the documents they used.
- Only a small amount of material should be made available at any one time, to reduce possible confusion about records, and materials not used should be returned to storage as soon as possible or stored outside of the public areas.
- Users should not have access to storage, staff or restricted areas, nor should they be allowed to use unprocessed materials.
- If the institution has concerns about possible theft, it may wish to search bags or cases when users leave. However, it is important to remember that a user should not be treated inappropriately and should not be accused of theft or damage without strong evidence.

SUMMARY

This lesson has addressed the critical issue of providing adequate security measures in a records office, records centre or, particularly, archival institution. Good security is essential to protect valuable records and archives; a number of security measures can be implemented at little or no cost; other measures are more expensive or time consuming. This lesson has discussed the following security issues:

- conducting a security assessment
- security equipment and supplies
- actions to take in the event of theft or damage.

The lesson has concluded with a checklist of different actions that can be taken by the institution to improve its security. This checklist is not exhaustive but should serve as a good starting point for consideration of security matters.

STUDY QUESTIONS

- 1. Name at least five security issues that arise when considering the security in relation to the facilities or building.
- 2. Name at least five actions that can be taken to improve the security of the building or the facilities.
- 3. Name at least five security issues that arise when considering security in relation to staff and users
- 4. Name at least five actions that can be taken to ensure staff are aware of the importance of security issues.
- 5. Name at least three actions that can be taken to improve security in the reference or reading area.
- 6. Explain the value of reference regulations for security purposes.
- 7. Describe three actions that can be taken to protect archival materials with high monetary value.
- 8. What are the benefits and drawbacks of marking, stamping or embossing records or archives?
- 9. Identify three items of security equipment that could be installed to protect valuable records or archives.
- 10. What are the advantages and disadvantages of installing alarm systems?
- 11. What are the advantages and disadvantages of installing closed circuit television cameras?
- 12. What kind of law can protect an institution against theft or damage to valuable cultural property?
- 13. Outline the steps that should be taken when responding to a situation of apparent theft or damage.
- 14. Explain the reasons for maintaining a register of lost or stolen items.

ACTIVITIES: COMMENTS

Activity 42

It is important to assess all the security measures in place in the institution and determine exactly where changes or improvements might be made. This lesson outlines a number of suggestions for action beyond the questions in the list.

Activity 43

It is equally important to assess all the security measures in place with regard to staff and users and determine where changes or improvements might be made. This lesson outlines suggestions for action beyond the questions in the list.

Activity 44

Written regulations are very important to protecting the holdings of the institution. They ensure that policies and procedures can be implemented uniformly throughout the institution. *Managing Archives* discusses the importance of reference systems in more detail.

Activity 45

Marking is increasingly considered a poor procedure, since it cannot be reversed. The best course of action is to find another mechanism for protecting records without marking or stamping them.

Activity 46

Door locks, hinges, alarms, and so on can be critical to protecting archival materials. Especially important is the installation of good quality locks and hinges; no amount of expensive security equipment will make up for weak building construction.

Activity 47

Thefts can happen to any institution. The most important response is to learn lessons from the unfortunate occurrence and improve security so that such a situation does not happen again.

Activity 48

Most jurisdictions will have a law relating to criminal behaviour, often called the criminal code. However, it is still important to institute organisational policies and practices to protect against theft or damage.

LESSON 6

WHAT TO DO NEXT?

Preserving Records has focused on the physical preservation of records and archives. It has addressed the following issues:

- the environmental and physical causes of deterioration in records and archives
- the steps that can be taken to protect materials from deterioration and damage
- the steps involved with developing a preservation programme
- the storage and handling of materials in different media
- the value of reproduction as a preservation tool
- the importance of security.

Once you understand these principles, concepts and practices, the next step is for you to consider what to do next. It is necessary to establish priorities for preservation management, to understand the role of the professional conservator and to know where to go to find out more about records and archives preservation.

ESTABLISHING PRIORITIES FOR ACTION

This module has introduced key activities in records and archives preservation. But which tasks should you undertake first? Which are high priority and which are low? Each institution will make different decisions based on its physical environment, environmental conditions, needs and short- and long-term plans. However, it is possible to offer some recommendations for action, to help the institution manage its physical environment in a planned fashion. Complete the following activity then consider the suggestions offered below.

Activity 49

Based on the work you did in this module and your knowledge of the situation in your institution, review the preservation programme proposals you drafted in the activity in Lesson 2 and identify the priorities you would establish for a preservation programme.

Priority 1: Assess and Monitor the Environment

Conduct a preservation survey to determine the physical and environmental conditions under which records and archives are kept in your institution. Examine the physical surroundings and the structure of the building and storage locations within it. Identify and take steps to correct or minimise problems or dangers that could damage or destroy your facility and its irreplaceable holdings. If possible, install thermometers and relative humidity monitors and keep track of the environment. Document your findings so you can report to senior staff regularly and have factual data in hand when making recommendations for change.

Priority 2: Assess and Monitor the Holdings

Get to know what types of materials are held or are regularly being transferred into the custody of your institution. Are they mostly paper documents? Are there fragile items such as deteriorating maps or plans, ancient palm leaf records or fading photographic images? Does your institution house cellulose nitrate or triacetate film or photographic negatives which deteriorate dangerously? A survey of holdings is important to understanding what materials you have and how they can be cared for in the environment in which they are kept. If you have current records only in a fairly stable environment, you may not need to take elaborate action to develop a preservation system. However, if you have ancient and fragile materials and your building is leaking or weak, you will want to investigate actions for improving storage and environmental controls quickly. It is also important to issue standards and guidelines for agencies to follow in creating and caring for records in offices so that to ensure that archival records are constructed of long-lasting materials and maintained in top condition.

Priority 3: Stabilise the Environment

Once you know the physical condition of the holdings, the next most important action is to ensure the environment is safe and stable. Actions should be taken to ensure good air circulation, to regulate temperature and relative humidity, to keep work and storage areas clean, to eliminate insects and rodents, to reduce light or heat and to prevent and remove mould. As well, it is essential to establish a regular security regimes to prevent and detect risks and take appropriate actions in emergencies.

Priority 4: Store Materials Appropriately

Once steps have been taken to control the environment, it is wise to focus on providing proper storage conditions: records and archives should be in good quality, chemically safe storage containers, on shelves, off the floor and away from windows, doors and sources of light or heat.

Priority 5: Examine Options for Reprography

If records are in danger of loss or deterioration, or if materials are heavily used and might suffer as a result, a next priority is to consider arrangements for safe and efficient reprography. Do you have a regular programme of microfilming or photocopying important records? Does the programme need to be reviewed or improved? Are there policies and guidelines in place to guide decisions about what to copy and how? Setting and issuing standards for reprography is an important aspect of records and archives management. As new technologies evolve, it is also important to consider carefully the benefits and drawbacks of digital reproduction.

Priority 6: Plan Appropriate Treatments

The last priority in preservation management is to undertake actual treatments, such as repairs, fumigation, cleaning and so on. Such work is best done by or under the direction of a professionally qualified conservator. Many institutions may not have a conservator on staff or even within the region; but should still set priorities and develop a plan should the opportunity and expertise to act present themselves. Since conservation treatments are time consuming, expensive, and best done by an expert, the institution's resources are almost always best spent first on stabilising the environment and protecting the records in storage.

WORKING WITH A PROFESSIONAL CONSERVATOR

A conservator is someone involved with the preservation and treatment of objects of historical or artistic value. Qualified conservators will have received years of specialised training at a recognised institute, such as a college or university. Some conservators focus on particular types of materials, such as artwork, books, artefacts or works of art on paper. However, most conservators can easily offer advice on guidance on general conservation issues and on the care of different media materials, even if their area of speciality is somewhat different.

Different countries offer training programmes and professional associations for conservators. Most training is done in countries such as England, France, the United States, Canada or Australia. many countries, particularly those with limited resources, do not necessarily have easy access to trained conservators. However, it is possible to contact national, regional or international conservation associations, such as those identified above, to obtain information about conservators and preservation management.

When considering whether to engage a conservator, particularly as a consultant to help with preservation planning, consider the following.

- Does the conservator abide by a written code of ethics, put out by a professional conservation association or international body?
- Can the conservator show examples of previous work done, to confirm his or her abilities and knowledge?
- Can the conservator provide good references from other agencies or individuals who have used his or her services?
- Is the conservator a member of any national, regional or international association or group? (Note that such membership may not indicate competence, but does show an interest in the profession.)

Any conservator asked to undertake treatments should first prepare an examination report about the items in question, describing the work needed and offering recommendations for action. The report will also include a description of the expected results of the treatment, the potential risks, the time involved and the costs associated with the work.

Once the treatment is completed, the conservator should provide a treatment report, indicating exactly what was done and how the materials need to be managed to ensure their continued protection. Photographs of the work done may also be included with the report as evidence of work performed.

A conservator should not be expected to provide estimates of time or cost without examining the materials first. Nor should the conservator be expected to offer advice, appraisals or examinations without some charge for his or her services; the conservator is a professional too and his or her skills must be respected.

For more information on working with conservators, contact some of the agencies listed or review the literature identified in this lesson.

Activity 50

Has your organisation worked with a professional conservator before? Does it have a conservator on staff? Identify where in your country or region you might find information about or obtain the services of a professional conservator.

GETTING HELP

Many institutions, particularly in developing countries, have limited access to conservation resources or to professionally trained conservators. However, there are places you can go to get more information or to obtain assistance, particularly in an emergency. Following are names and addresses of agencies that could be contacted for assistance

See the Additional Resources document for information on other organisations and associations involved with records and archives management generally.

International Organisations

International Association of Conservators of Archival Material, Books and Graphic Art on Paper (IADA)

UB-Gottingen Papendiek 14 D-37073 Gottingen Denmark

Tel: +49 551 39 52 02 Fax: +49 551 39 52 88

Email: restaurierung@mail.sub.uni-goettingen.de Website: http://palimpsest.stanford.edu/iada

International Committee of the Blue Shield (ICBS)

The International Committee of the Blue Shield was established in 1996 by four non-governmental organisations: the International Council on Archives (ICA), the International Council of Museums (ICOM), the International Council on Monuments and Sites (ICOMOS), and the International Federation of Library Associations and Institutions (IFLA). The International Committee of the Blue Shield aims to advise on the protection of endangered heritage, to facilitate international response to emergencies, to encourage the protection f cultural property, to offer training at the national and regional level to manage and protect against disasters and to consult with other agencies on issues of preservation and protection. As a cooperative programme of several agencies, the ICBS can be reached through agencies such as the International Council on Archives, whose address is listed above.

International Council on Archives Committee on Archival Buildings and Equipment (ICA/CBQ)

60, rue des Francs-Bourgeois 75003 Paris, France

Tel: +33 0 1 40 27 63 06 Fax: +33 0 1 42 72 20 65

Email: 100640@compuserve.com

Website: http://www.archives.ca/ICA

This ICA committee studies and drafts guidelines and directives concerning the planning, construction, renovation and equipping of archival buildings; it also works to promote the exchange of views and experiences in this area. The ICA is the primary international agency for archival work around the world.

International Council on Archives Committee on Preservation of Archival Materials (ICA/CPR)

60, rue des Francs-Bourgeois

75003 Paris, France

Tel: +33 0 1 40 27 63 06 Fax: +33 0 1 42 72 20 65

Email: 100640@compuserve.com Website: http://www.archives.ca/ICA/

This ICA committee studies and drafts guidelines and directives concerning the preservation and conservation of all archival materials; it also works to promote the exchange of views and experiences in this area.

International Council on Archives Committee on Sigillography (ICA/CSG)

60, rue des Francs-Bourgeois

75003 Paris, France

Tel: +33 0 1 40 27 63 06 Fax: +33 0 1 42 72 20 65

Email: 100640@compuserve.com Website: http://www.archives.ca/ICA/

This ICA committee studies and drafts guidelines and directives concerning the preservation, conservation, description and use of seals; it also works to promote the exchange of views and experiences in this area.

International Council on Archives Project Group on Audio-Visual Archives

60, rue des Francs-Bourgeois

75003 Paris, France

Tel: +33 0 1 40 27 63 06 Fax: +33 0 1 42 72 20 65

Email: 100640@compuserve.com Website: http://www.archives.ca/ICA/

This ICA project group is studying strategies the ICA should develop to encourage the preservation and use of audiovisual records by archival institutions around the world.

International Council on Archives / International Federation of Library Associations African Preservation Committee (JICPA)

Obtain information through the ICA headquarters, at

60, rue des Francs-Bourgeois

75003 Paris, France

Tel: +33 0 1 40 27 63 06 Fax: +33 0 1 42 72 20 65

Email: 100640@compuserve.com

Website: http://www.archives.ca/ICA/

This joint ICA-IFLA committee, known as JICPA, has embarked on an ambitious programme of training trainers in Africa in preservation and conservation issues. JICPA works in all the languages of the continent and addresses practical preservation measures, with an emphasis on seeking African solutions to African problems, avoiding importing high technology approaches that may not fit local conditions.

International Federation of Library Associations Core Programme for Preservation and Conservation (PAC)

P.O. Box 95312 2509 CH The Hague Netherlands Tel. +31 70 3140884

Fax +31 70 3834827 Email: IFLA@ifla.org

Website: http://www.ifla.org

The IFLA Core Programme on Preservation and Conservation (PAC) was officially created during the IFLA annual conference in Nairobi in 1984 to focus efforts on issues of preservation and initiate worldwide cooperation for the preservation of library materials. PAC is a decentralised programme, with a central 'focal point' to manage activities and 'regional centres' responsible for their specific policies. The focal point (international centre) has been hosted by the Bibliothèque Nationale in Paris since 1992. The six regional centres respectively located in Washington (Library of Congress), Caracas (Biblioteca Nacional de Venezuela), Tokyo (National Diet Library), Canberra (National Library of Australia), and Moscow (Library of Foreign Literature). The International Centre in Paris (Bibliothèque nationale de France) acts as the Regional Centre for Western Europe, Middle East and Africa.

The international centre and the regional centres are linked by a network, the main working rules of which are defined in an agreement between IFLA and each centre. Each centre is independent and acts according to the priorities of its geographical area. Its main duty is to agree with the objectives of the PAC core programme and to maintain co-operation with other centres through specific activities, such as publications, seminars or conferences.

International Organization for Standardization (ISO)

Case postale 56

CH-1211 Geneva 20, Switzerland

Tel: +41 22 749 01 11 Fax: +44 22 733 34

Website: http://www.iso.ch

The International Standards Organisation (ISO) is a worldwide federation of national standards bodies from some 130 countries, one from each country. The ISO promotes the development of standardisation in order to help facilitate the international exchange of goods and services as well as to help develop cooperation in intellectual, scientific, economic and technical activities.

The ISO has established many standards that affect the preservation of records and archives, particularly with regard to quality of microfilm, photographic equipment, paper quality and so on. ISO standards are identified by the term 'ISO' and a number, such as ISO 9000, the standard for quality management and quality assurance, or the ISO 14000 series of standards for environmental management. ISO/TC46/SC10 refers to the physical protection of documents. ISO/TC171 refers to document imaging applications. ISO 9706 relates specifically to the standard for permanent paper. Copies of ISO standards are available through national standards organisations.

A number of ISO standards have been developed in relation to microfilming, including the following. (This list is not exhaustive; contact the ISO for more information.)

- ISO 3272-1:1983 Microfilming of technical drawings and other drawing office documents Part 1: Operating procedures.
- ISO 3272-2:1994 Microfilming of technical drawings and other drawing office documents – Part 2: Quality criteria and control of 35 mm silver gelatin microfilms.
- ISO/DIS 3272-3 Microfilming of technical drawings and other drawing office documents Part 3: Unitized aperture card for 35 mm microfilm.
- ISO 3272-4:1994 Microfilming of technical drawings and other drawing office documents – Part 4: Microfilming of drawings of special and exceptional elongated sizes
- ISO/FDIS 3272-5 Microfilming of technical drawings and other drawing office documents Part 5: Test procedures for diazo duplicating of microfilm images in aperture cards.
- ISO/DIS 3272-6 Microfilming of technical drawings and other drawing office documents Part 6: Enlargement from 35 mm microfilm, quality criteria and control.
- ISO 4087:1991 Micrographics Microfilming of newspapers for archival purposes on 35 mm microfilm.
- ISO 6197-1:1980 Microfilming of press cuttings Part 1: 16 mm Silver-gelatin type roll microfilm.
- ISO 6197-2:1985 Microfilming of press cuttings Part 2: A6 size microfiche.
- ISO 6199:1991 Micrographics Microfilming of documents on 16 mm and 35 mm silver-gelatin type microfilm Operating procedures.
- ISO 9878:1990 Micrographics Graphical symbols for use in microfilming.
- ISO/DIS 11906 Micrographics Microfilming of serials Operating procedures.
- ISO/DIS 12650 Document imaging applications Microfilming of achromatic maps on 35 mm microfilm.
- ISO 6198: 1993 Micrographics Readers for transparent microforms Performance

- ISO 7565: 1993 Micrographics Readers for transparent microforms Measurement of characteristics.
- ISO 10197: 1993 Micrographics Reader-printers for transparent microforms Characteristics.
- ISO/FDIS 6200: 1999 Micrographics First generation silver-gelatin microforms of source documents Density specifications and method of measurement.

National or Regional Organisations

Association for Preservation Technology (APT)

PO Box 3511 Williamsburg, Virginia 23187 USA

Tel: +1 540 373 1621

Fax: (toll free in North America) 888 723 4242

Website: http://www.apt.org

Canadian Conservation Institute (CCI)

Department of Communications 1030 Innes Ottawa, Ontario, K1A 0C8 Canada

Tel: +1 613 998 3721 Fax: +1 613 998 4721

Website: http://www.pch.gc.ca/cci-icc/

The Canadian Conservation Institute, or CCI, was established in 1972 to promote the proper care and preservation of Canada's cultural heritage. The CCI's programmes include education, publications, research, internships, and emergency assistance. The institute works closely with international organisations such as the International Institute for conservation.

Association of Research Libraries (ARL)

21 DuPont Circle, Suite 800 Washington, CD, USA 20036

Tel: +1 202 296 2296 Fax: +1 202 872 0884 Email: arlhg@arl.org

Website: http://www.arl.org/

The Association of Research Libraries conducts research into library and information issues. It is a not-for-profit membership organisation consisting of libraries in North American research institutions. The ARL preservation programme works to preserve research collections; activities undertaken include research into digital preservation issues, studies of preservation planning and the maintenance of databases of information about preservation and conservation.

European Commission on Preservation and Access (ECPA)

PO Box 19121 1000 GC Amsterdam The Netherlands

Tel: +31 20 551 08 39 Fax: +31 20 620 49 41

Email: ecpa@bureau.knaw.nl Website: http://www.knaw.nl/ecpa

The European Commission on Preservation and Access was established in 1994 to 'foster, develop and support in Europe collaboration among libraries, archives and allied organisations, in order to ensure the preservation of the published and documentary record in all formats and to provide enhanced access to the cultural and intellectual heritage.' One of the ECPA's main objectives is to 'collect, record and disseminate specialised information relating to new developments in access and preservation.' The ECPA has an active publications programme and produces catalogues regularly, which can be obtained through the address above.

Image Permanence Institute

Rochester Institute of Technology 70 Lomb Memorial Drive Rochester, New York 14623-5604, USA

Tel: +1 716 475 5199 Fax: +1 716 475 7230

This American agency conducts research particularly into the care of photographic materials. It produces a number of valuable publications.

Georgia Department of Archives and History

http://www.sos.state.ga.us/archives/ps/gps.htm

This website includes a range of technical leaflets and preservation information, on topics such as preservation basics, storage environments, reformatting records and disaster preparedness.

National Preservation Office (NPO)

National Preservation Office The British Library Great Russell Street London WC1B 3DG UK

Tel: +44 20 7412 7612 Fax: +44 20 7412 7796 Email: npo@bl.uk

Website: http://www.bl.uk/services/preservation

Northeast Document Conservation Center

100 Brickstone Square Andover, Mass 01810 USA

Tel: +1 978 470 1010 Fax: +1 978 475 6021 Email: nedcc@nedcc.org Website: http://www.nedcc.org

The Northeast Document Conservation Center is a regional conservation centre specialising in the preservation and conservation treatment of paper-based materials. NEDCC also offers microfilming and photographic duplication services as well as disaster assistance and educational programmes.

Public Record Office (PRO)

Kew, Richmond Surrey TW9 4DU, UK Tel: +44 208 876 3444 Fax: +44 208 878 8905

Website: http://www.pro.gov/uk/preservation/

The Public Record Office in the United Kingdom seeks to ensure that public records are preserved for present and future access and to raise awareness of the importance of caring for records and archives. The PRO conducts a variety of preservation-related activities, including preservation coordination and training, preservation copying, preservation cataloguing and conservation work.

Online Sources

British Library National Bibliographic Service: Register of Preservation Microforms

http://www.bl.uk/services/bsds/nbs/blaise/content.html

The British Library's Register of Preservation Microforms includes information about microform records from the national libraries of the United Kingdom, Ireland and elsewhere. The register provides the location of original or other copies and locations for the microform.

Conservation OnLine (CoOL)

Website: http://www.arl.org/preserv/index.html

This website provides a full text library of conservation information, including news, contacts, author and publication information and the names and addresses of preservation-related organisations around the world. It is accessible through the ARL website.

Online National Register of Microform Masters

http://www.arl.org/prserv/nrmm.html

The Online National Register of Microform Masters contains more than 500,000 online records describing microfilm masters available for copying. These masters were made by libraries, historical societies and publishers, many in the United States, of records and archives in a wide range of languages. By reviewing this register, users can identify if records are available in microfilm. Users can then order copies or can decide, if no copies are available, if they need to film materials themselves.

Preserve/Net

Website: http://preservenet.cornell.edu/pnetman3.htm

Preserve/Net is an American-based online source of information about preservation issues. It includes information about preservation products and services, preservation-related organisations, conferences and events, educational offerings, and employment and internship opportunities.

Research Libraries Group Preservation Program (PRESERV)

Website: http://www.rlg.org/preserv/

PRESERV is a preservation programme managed by the Research Libraries Group that serves the American and international communities. PRESERV seeks collaborative and cooperative solutions to preservation concerns; it conducts research, publishes findings, communicates information and shares resources.

Activity 51

Find out if your institution has any information about any of the agencies listed above. Does your organisation receive publications, participate in conferences or meetings or otherwise work with any of these groups?

In your opinion, which groups should your institution consider communicating with first, if any, and what would you expect to achieve by doing so? How would you go about building a productive relationship?

ADDITIONAL RESOURCES

There are many publications available about preservation and conservation. Some are more easily obtained than others, and some more up-to-date than others. However, older publications also contain valuable information and may be more easily found in libraries in your particular country or region than new publications that have not yet circulated around the world. Core publications are identified with an asterisk (*).

Core publications are also identified in the Additional Resources document; refer to that document for information on more general publications on records and archives management.

Introduction to Preservation Issues

Arnoult, Jean-Marie, et al. *Proceedings of the Pan-African Conference on the Preservation and Conservation of Library and Archival Materials. Nairobi, Kenya: 21-25 June 1993.* The Hague, NT: IFLA, 1995.

Canadian Conservation Institute. *CCI Notes*. Ottawa, ON: Canadian Conservation Institute, various years.

* Canadian Council of Archives. *Basic Conservation of Archival Materials: A Guide*. Ottawa, ON: Canadian Council of Archives, 1990.

Dalley, Jane. *The Conservation Assessment Guide for Archives*. Ottawa, ON: Canadian Council of Archives, 1995.

Harvey, Ross, *Preservation in Libraries: A Reader*. Melbourne, AUS: Bowker-Saur, 1993.

Lull, William P, with the assistance of Paul N Banks. Conservation Environment Guidelines for Libraries and Archives. Ottawa, ON: Canadian Council of Archives, 1995.

Marrelli, Nancy. *Implementing Preservation Management: a How-to Manual for Archives*. Ottawa, ON: Réseau des archives du Québec, 1996.

Morrow, Carolyn Clark and Carole Dyal. *Conservation Treatment Procedures: A Manual of Step-by-Step Procedures For The Maintenance and Repair of Library Materials*. Littleton, CO: Libraries Unlimited, 1986.

Pickford, Chris, et al. *Preservation and Conservation: A Guide to Policy and Practices in the Preservation of Archives*. Best Practice Guideline 4. London, UK: Society of Archivists, 1997.

- * Ritzenthaler, Mary Lynn. Archives and Manuscripts: Conservation: A Manual on Physical Care and Management. Chicago, IL: Society of American Archivists, 1983.
- * Ritzenthaler, Mary Lynn. *Preserving Archives and Manuscripts*. Chicago, IL: Society of American Archivists, 1993.
- * Ritzenthaler, Mary Lynn, Munoff, Gerald J and Long, Margery S. Archives and Manuscripts: Administration of Photographic Collections. Chicago, IL: Society of American Archivists, 1984.

UNESCO RAMP Studies in Preservation

Benoit, Gerard. and Daniéle Neirinck. [The Most Cost-effective Methods of Conservation in Archival Repositories in Industrial and Tropical Countries]. Paris, FR: UNESCO, 1987.

Chapman, Patricia. *Guidelines on Preservation and Conservation Policies on the Archives and Libraries Heritage*. (RAMP Study PGI-90/WS/7). Paris, FR: UNESCO, 1990. Available electronically through the UNESCO website.

Clements, DWG. Preservation and Conservation of Library and Archival Documents: A UNESCO/IFLA/ICA Inquiry into the Current State of the World's

Patrimony. (RAMP Study PGI-87/WS/15). Paris, FR: UNESCO, 1987. Available electronically through the UNESCO website.

Clements, DWG, JH Mcllwaine, Anne Thurston and SA Rudd. *Review of Training Needs in Preservation and Conservation: A RAMP Study.* (RAMP Study PGI-89/WS/15). Paris, FR: UNESCO, 1989. Available electronically through the UNESCO website.

Crespo, Carmen and Vicente Viñas. *The Preservation and Restoration of Paper Documents and Books: A RAMP Study with Guidelines.* (RAMP Study PGI-84/WS/25). Paris, FR: UNESCO, 1984.

Cunha, George M. Methods of Evaluation to Determine the Preservation Needs in Libraries and Archives: A RAMP Study with Guidelines. (RAMP Study PGI-88/WS/16). Paris, FR: UNESCO, 1988. Available electronically through the UNESCO website.

Forde, Helen. *The Education of Staff and Users for the Proper Handling of Archival Materials: A RAMP Study with Guidelines.* (RAMP Study PGI-91/WS/17). Paris, FR: UNESCO, 1991. Available electronically through the UNESCO website.

Hendriks, Klaus B. *The Preservation and Restoration of Photographic Materials in Archives and Libraries: A RAMP Study with Guidelines.* (RAMP Study PGI-84/WS/1). Paris, FR: UNESCO, 1984.

Kathpalia, Yash P. A Model Curriculum for the Training of Specialists in Document Preservation and Restoration: A RAMP Study with Guidelines. (RAMP Study PGI-84/WS/2). Paris, FR: UNESCO, 1984.

Keene, James A and Michael Roper. *Planning, Equipping and Staffing a Document Reprographic Service: A RAMP Study with Guidelines.* (RAMP Study PGI-84/WS/8). Paris, FR: UNESCO, 1984.

McCleary, John M. Vaccum Freeze-Drying. A Method Used to Salvage Water-Damaged Archival and Library Materials: A RAMP Study. (RAMP Study PGI-87/WS/7). Paris, FR: UNESCO, 1987. Available electronically through the UNESCO website.

Parker, Thomas. A. Study on Integrated Pest Management for Libraries and Archives. (RAMP Study PGI-88/WS/20). Paris, FR: UNESCO, 1988. Available electronically through the UNESCO website.

Pascoe, MW. *Impact of Environmental Pollution on the Preservation of Archives and Records: A RAMP Study.* (RAMP Study PGI-88/WS/18). Paris, FR: UNESCO, 1988. Available electronically through the UNESCO website.

Roper, Michael. *Democratic Republic of the Sudan: Establishment of a Technical Training Centre in Archival Restoration and Reprography.* (RAMP Study FMR/PGI/80/180). Paris, FR: UNESCO, 1980.

Roper Michael. *Planning, Equipping and Staffing an Archival Preservation and Conservation Service: A RAMP Study with Guidelines.* (RAMP Study PGI-89/WS/4). Paris, FR: UNESCO, 1989. Available electronically through the UNESCO website.

Serrano Rivas, Andres, and Pedro Barbochano San Millan. [Preservation, Restoration and Reproduction of Maps and Plans: A RAMP Study.] Paris, FR: UNESCO, 1987. Published only in Spanish.

Thomas, DL. Study in Control of Security and Storage of Holdings: A RAMP Study. (RAMP Study PGI-86/WS/23). Paris, FR: UNESCO, 1986.

Thomas, DL. Survey on National Standards on Papers and Ink to be Used by the Administration for Records Creation: A RAMP Study with Guidelines. (RAMP Study PGI-86/WS/22). Paris, FR: UNESCO, 1986.

Viñas, Vicente, and Ruth Viñas. *Traditional Restoration Techniques: A RAMP Study*. (RAMP Study PGI-88/WS/17). Paris, FR: UNESCO, 1988. Available electronically through the UNESCO website.

Wächter, Wolfgang, ed. Study on Mass Conservation Techniques for Treatment of Library and Archives Material: A RAMP Study. (RAMP Study PGI-89/WS/14). Paris, FR: UNESCO, 1989. Available electronically through the UNESCO website.

Weill, Georges. *The Admissibility of Microforms as Evidence: A RAMP Study*. (RAMP Study PGI-81/WS/25). Paris, FR: UNESCO, 1982.

Wood Lee, Mary. *Prevention and Treatment of Mold in Library Collections with an Emphasis on Tropical Climates: A RAMP Study*. (RAMP Study PGI-88/WS/9). Paris, FR: UNESCO, 1988. Available electronically through the UNESCO website.

Storage and Handling of Different Media

Eastman Kodak Company. *Conservation of Photographs*. Rochester, NY: Kodak Publication F-40, 1985.

Kulka, Edward. *Archival Enclosures: A Guide*. Ottawa, ON: Canadian Council of Archives, 1995.

McWilliams, Jerry. *The Preservation and Restoration of Sound Recordings*. Nashville, Tennessee: American Association for State and Local History, 1979.

Ogden, Sherelyn, ed. *Preservation of Library and Archival Materials: A Manual*. Andover, MA: Northeast Document Conservation Center, 1992.

Reilly, James M. Care and Identification of 19th Century Photographic Prints, Rochester, NY: Kodak Publication No. G-2S, 1986.

Reilly, James M. *Storage Guide for Color Photographic Materials*. New York, NY: University of the State of New York, 1998.

Rempel, Siegried. *The Care of Photographs*. New York, NY: Nick Lyons Books, 1987.

Ritzenthaler, Mary Lynn. *Administration of Photographic Collections*. Chicago, IL: Society of American Archivists, 1984.

Swartzburg, Susan G. *Preserving Library Materials: A Manual*. Metchuen, NJ: Scarecrow Press, 1980.

Weinstein, Robert A and Booth, Larry. *Collection, Use, and Care of historical photographs*. Nashville, TN: American Association for State and Local History, 1977.

Reprography

- * Justrell, Börje, et al. *Guidelines for the Preservation of Microfilms*. Studies/Etudes 2. Rev. ed. Paris, FR: International Council on Archives, 1996.
 - Gwinn, Nancy, ed. *Preservation Microfilming: A Guide For Librarians and Archivists* Chicago, IL: American Library Association, 1987.
- * Kormendy, Lajos, ed. *Manual of Archival Reprography*. ICA Handbooks Series, Vol. 5. Munchen, GER: KG Saur, 1989.

Digitisation

Commission on Preservation and Access and The Research Libraries Group. *Report of the Task Force on Archiving of Digital Information.* Washington, DC: Commission on Preservation and Access, 1 May 1996.

Conway, Paul. *Preservation in the Digital World*. Washington, DC: Commission on Preservation and Access, 1996.

Elkington, Nancy E, ed. *Digital Imaging Technology for Preservation: Proceedings from an RLG Symposium held March 17 and 18, 1994* Mountain View, CA: Research Libraries Group, 1994.

Security

Dunn, FI. Security: A Guide for Use in Appraising and Implementing Security Systems and Procedures in Archives Operations, covering Buildings, Staff, the Public, and Repository Management. London, UK: Society of Archivists, 1994.

Ling, Ted. Solid, Safe, Secure: Building Archives Repositories in Australia. Dickson, ACT, AUS: National Archives of Australia, 1998.

Trinkaus-Randall, Gregor. *Protecting Your Collections: A Manual of Archival Security*. Chicago, IL: Society of American Archivists, 1995.

Walch, Timothy. Archives and Manuscripts: Security. Chicago, IL: Society of American Archivists, 1977.

Activity 52

Check your institution's library or resource centre. What books or other resources do you have about preservation issues? Are any of the publications listed above available in your institution? If so, examine two or three of them and assess their currency and value to your institution. If not, identify two or three publications you think would be most useful to help develop or expand your preservation library. Devise a plan outlining how you could realistically obtain copies of these.

SUMMARY

This lesson has provided an overview of the entire module, *Preserving Records*. This lesson has then discussed how to establish priorities for action and suggested that the main priorities for action are often as follows:

- Priority 1: Assess and monitor the environment
- Priority 2: Assess and monitor the holdings
- Priority 3: Stabilise the environment
- Priority 4: Store materials appropriately
- Priority 5: Examine options for reprography
- Priority 6: Plan appropriate treatments

The lesson then outlined ways to find out more information or get help with preservation issues. It also discussed how to identify and work with a professional conservator.

The lesson concluded with a discussion of valuable information resources relevant to preservation.

STUDY QUESTIONS

- 1. In your own words, explain the reason why the priorities proposed in this lesson are offered in the order they are in.
- 2. Outline three question you would ask a conservator to ensure he or she had appropriate qualifications?
- 3. Indicate two of the organisations listed in this lesson that you would choose to contact first and explain why.
- 4. Indicate two of the publications listed in this lesson that you would choose to purchase first and explain why.

ACTIVITIES: COMMENTS

Activity 49

Every institution will find itself at a different stage of development in terms of preservation management. The priorities established will have to take into account the particular needs of that institution, the region and the country. However, it is always wise to focus on planning and management first, to emphasise controlling the environment, and only then turning to conservation treatments. In particular, it is important to consider all the issues outlined in this module, from environmental controls to reprography to security to conservation treatments, before determining which course of action is best for your institution.

Activity 50

It may not be easy to obtain the services of a professional conservator; it is wise to communicate with other similar agencies, including museums and libraries, in your country or region to determine how they have managed their preservation programmes.

Activity 51

If resources are limited, it is wise to communicate with international organisations first, as they often obtain and filter information from national or regional associations. Thus valuable information is passed on to your organisation through the international group, which can save resources for all. It is also advisable to focus on general preservation information before obtaining specialised publications or information.

Activity 52

As mentioned in relation to the previous activity, it is important to begin with general information and ensure you have a good resource library of introductory and overview publications before developing a more specialised library.