

PRESERVATION AND CONSERVATION OF LIBRARY MATERIALS: THE SITUATION IN THE NATIONAL LIBRARY OF NIGERIA

By

U.N MUHAMMAD
NATIONAL LIBRARY OF NIGERIA

ABSTRACT

The paper attempts to explain preservation and conservation as measures for achieving sustainability of library materials as long as possible in their original format. And in order to achieve this, causes of deterioration and knowledge of disaster occurrence, control and prevention have been examined.

Considering the National Library of Nigeria's situation, preservation and conservation of its information sources are highly imperative. Therefore, recommendations are made and directed at the National Library Management for consideration.

INTRODUCTION

Preservation and conservation is one of the most urgent issues to be tackled by libraries all over the world. The preservation and conservation issue is complicated by the diverse nature of library materials, both in composition and structure. Fortunately, librarians, manufacturers, conservators and publishers are becoming more cognisant of preservation and conservation issue and as such, they are gradually resolving them.

The concept, preservation in this paper is used to refer to all necessary strategies, measures and steps invested into prolonging the lives of library information resources. As supported by Lasisi (1999), preservation is used to denote all those activities and measures intended at conserving library materials for posterity.

Alegbeleye (2002) on the other hand, clearly states that there are few misconceptions on the use of preservation and conservation. He explains that the terms preservation and conservation are used interchangeably. But strictly speaking experts in the field draw a distinction between the two words. Preservation includes all the managerial and financial considerations, including storage and accommodation provisions, staffing

levels, policies, techniques and methods involved in preserving library and archival materials and information contained in them. Conservation on the other hand, refers to specific practices taken to slow deterioration and prolong the life of an object by directly intervening in its physical or chemical make-up. Examples of the latter are the repair of damaged binding or the deacidification of paper.

From the above explanation, one would deduce that preservation of library materials refers to the activities associated with maintaining library materials for use, either in their original physical format or in some other format. This includes a number of procedures from control of the environment to conservation treatment. Conservation therefore, is the treatment of library materials to stabilize their physical structure in order to sustain their survival as long as possible in their original format.

Preservation and conservation therefore have to do with all the steps taken in the acquisition, organization and distribution of resources to prevent and stop deterioration of library materials.

DETERIORATION OF LIBRARY MATERIALS

The deterioration of library materials, especially the paper-based records is not a discovery of our time, nor is the identification of its cause new. It has been noticed since libraries began, but has accelerated to an alarming proportion from 1969 to the 21st century. As Williams puts it, everything in the library collections is deteriorating today, was deteriorating yesterday, and will continue to deteriorate tomorrow, although we ought to retard the process.

Researchers have predicted that all paper-based records of this century, as well as those of earlier years, face imminent deterioration. It is therefore observed that not only paper is involved, similar dangers of destruction confront other cellulose products, such as films, photographic negatives, etc, which serve as substitute for paper-based records.

Therefore, libraries should not only concentrate on acquisition of materials, but also on how to preserve the acquired materials in a usable condition for generations yet unborn.

CAUSES OF DETERIORATION OF LIBRARY MATERIALS

The problem of deterioration has several inter-related causes among which are:

- i. Inherent chemical instability of the components of the library materials;
- ii. Unstable environmental conditions in areas where collections are stored;
- iii. Inappropriate storage and handling practice;
- iv. Disasters

CHEMICAL INSTABILITY OF THE COMPONENTS OF THE LIBRARY MATERIALS

A very high proportion of our library materials are printed matter on papers that are acid-based. Before 1850, paper was made from rags and linen and these were of good quality. However, from about the 1850s, the quality of paper began to decline as a result of the introduction of acid into papermaking process – ground wood pulp, alum rosin, sizing, and bleaching with chlorine.

During the process of papermaking, the internal chemical structure inevitably interacts with one or more chemicals and may also have external interactions with moisture, oxygen, atmospheric pollutants or micro-organisms. Products such as sulphuric acid are formed when metallic impurities in the paper interact with sulphur dioxide and nitric acid is formed when nitrogen dioxide interacts with oxygen and water. These chemical interactions if not adequately checked condition the paper products to be acidic, thereby placing the paper in a low pH condition.

pH usually, is the negative logarithm of hydrogen ion concentration or the degree of acidity and alkalinity of any organic material. It has a scale of 1 to 14. Therefore, pH 1 to below pH 7 is the acid range, pH 7 is neutral range while above pH 7 to 14 is the alkaline range.

UNSUITABLE ENVIRONMENTAL CONDITIONS:

a. Temperature and Relative Humidity:

Exposure of paper to high temperature, even for a short period, causes yellowing and brittleness. Embrittlement of paper (along with many other

forms of decay in such organic materials as leather, textiles, and magnetic tape) is an indication of chemical deterioration and the conditions that govern the chemical reaction processes are influenced by temperature and relative humidity. Temperature increases the speed of the chemical reactions that cause acidic deterioration, while Relative Humidity provides moisture to fuel these reactions, the higher the relative humidity, the more quickly deterioration proceeds.

Relative humidity expresses the ratio of the actual water vapour content of the air to its total capacity at a given temperature. The warmer the air, the greater the amount of water it is capable of holding. In such an atmosphere, water reacts with carbon dioxide and sulphates to form the compound carbonic acid and sulphuric acid. This gives rise to production of hydrogen ions which is responsible for the acidic properties of library materials.

Excess water may cause some materials to act as adhesives, causing pages of paper to stick together almost beyond separation. It may also bring about the problem of biological attack, which is the growth of fungi or mildew. This is often accompanied by the characteristic musty odour, but more importantly by staining of paper, leather and other materials. Weakening or even destruction of materials results if the organisms are permitted to progress too far.

b. Exposure to Light:

Sunlight or solar radiation and certain sources of artificial lighting are important in photochemical and photosensitized reactions, because they are the sources of radiant energy which makes the reactions possible. Sunlight probably accounts for the most wide spread destruction of materials outdoors. Most parts of the materials mainly used indoors, are protected from the powerful effects of solar radiation. Nonetheless, they are subject to damage by the radiant energy of natural light entering the building via windows, skylights, and doors and by artificial sources of illumination.

Ultraviolet (UV) radiation and visible light accelerates deterioration of library materials. It leads to weakening and embrittlement of cellulose fibres and can bleach paper yellow, or dark. It causes media and dyes to fade or change colour, altering the legibility and appearance of documents, photographs, artworks, and bindings.

Any exposure to light, even for a brief time, is damaging, and such damage can be cumulative and irreversible. Although all wave-lengths of lights are damaging, UV radiation or energy being emitted from quartz lamps, mercury or metal halide high intensity discharge lamps, and fluorescent lamps are some of the most damaging sources of light to library materials.

c. Atmospheric Pollutants:

Pollutants are important to the Librarian not only because of their physiological effects on himself and his clients but because of their deteriorating effects on the materials in his collections and the great effort and cost required to protect them.

Pollutants contribute heavily to the deterioration of library materials and are found in gaseous and particulate states.

Sulfur dioxide, nitrogen oxide, carbon dioxide and ozone are the gaseous contaminants that catalyse harmful chemical reactions, which eventually lead to acid formation in library materials thus subjecting paper and leather to serious acid damage. Paper becomes discolored and brittle, while leather becomes weak and powdery.

Particulates such as soot, industrial emitters (chimneys and stacks), common dust, dirt, sand and other finely divided particulates are caught up from streets, buildings, fields, and other sources. These particulates are easily blown about by winds and when blown inward to the storage and collections apartment, they settle on book pages and bindings. If moist conditions are available, the particulates can stain the materials and can be difficult to remove. It can also result in the growth of mildew with consequent staining and discoloration of papers or other materials.

d. Biological Agents:

It is of great importance to be aware of invasion of library materials by certain microbiological and macro-biological agents. When newly discovered on materials, such should immediately be treated to destroy the agents before they occupy the entire collection.

Fungi, bacteria, and actinomycetes are the micro-biological agents (micro-organisms) found in libraries. They are called micro-organisms

because they are usually too small to be seen with the naked eyes. They grow rapidly under temperatures, humidity, light, nutrients and especially in badly ventilated and damp areas. They thrive on the nutrients in leather, glues, pastes and other adhesives, or on binding threads. Some not only consume books' constituents but stain books' surfaces.

Macro-biological agents (insects) enter into the library as a result of poor sanitation of the library premises, and by careless patrons. Careless library users leave insect attractants, such as food particles, candy wrappers and similar materials in the library. Insect could also be introduced into the library through the acquisition of old collections from poorly kept quarters.

The hot humid tropical conditions of Nigeria provide a conducive atmosphere for the rapid growth and reproduction of insects such as termites, cockroaches, bookworms, silver fish, bristletails, fishmoths, firebrats, booklice, furniture beetle, death-watch beetle, longhorned beetle and clothes moths. These insects attack starchy materials, photographs, book bindings, labels, paper sizing, cellophane, wax paper, books, leather, paste board, blue prints, documents, cardboard boxes, fabrics, cover, etc. They eat up starch in library materials, excrete dark liquids that discolour paper and inks as well as bore holes on the pages of books.

DISASTER OCCURRENCE:

Disaster, according to the Concise Oxford Dictionary (1999), is a sudden accidental or a natural catastrophe that causes great damage or loss of life. Disaster in the library context however, results in the sudden removal of records and documents from accessibility and use. Disaster could be broadly classified as natural and man-made.

NATURAL DISASTERS

These are disasters that occur without direct human influence. They are disasters not caused by man. These include flooding, volcanic eruption, earthquake, lightening.

MAN-MADE DISASTERS

These occur as a result of man's carelessness, negligence and other activities. These include fire outbreak, vandalism, civil unrest, wars, explosions, water leakages, broken pipes, power failure, chemical spillage, terrorism, etc.

PRESERVATIVE MEASURES:

Basically, preservative measures towards preventing or retarding deterioration of library materials should be properly carried out. These include:

ENVIRONMENTAL PRESERVATIVE MEASURES

A conducive environment that would prevent, protect, and retard library materials from deterioration should be created. This would include control of temperature, relative humidity, light and good air quality (air free from aerosols and noxious gases). Low temperature is regarded as preservative to paper. A combination of moderate to high temperature and low humidity will cause paper to dry out and become brittle. Since Relative Humidity (RH) expresses the ratio of the actual water vapour content of the air to its total capacity at given temperature, therefore moisture content which is in equilibrium with 30% RH is safe for paper. If humidity is held above 75% RH for long periods mildewing will occur. Generally, it is recommended that for effective preservation of paper materials, the temperature should be 70 – 80 degree Fahrenheit and RH about 45 – 55%. Efforts should be made to maintain constant temperature and RH. Fluctuations in temperature and RH on library materials should be avoided. This will guard against chemical deterioration. Absolute control of the climate is recommended by using any of the following instruments to measure temperature and relative humidity:

- Thermometers – for temperature
- Simple dial-type hygrometers – for checking Relative Humidity
- Humidity indicator strips or colour cards – for checking RH
- Sling psychrometers – for checking RH
- Battery-operated (motor-blower) psychrometers – for checking RH
- An electric temperature / humidity meter – for checking temperature and RH

- Min / Max digital thermohygrometer – for checking temperature and RH
- Recording hygrothermograph – for checking temperature and RH
- Dataloggers – for temperature and RH

Illumination should be kept as low as possible. Ideally, materials should be exposed to light only while in use. When not in use, materials should be stored in a light-tight container. When materials are being used, illumination should be from incandescent bulbs. It is important to note, however, that light from incandescent source generated heat and should be kept a distance apart from materials. Shades, blinds, drape or shutters that will completely block out the light from the sun should cover windows. This will aid in temperature control by minimizing heat loss and heat generated by sunlight during the day. Filters made of special plastics help control UV radiation. It is important to also use special low UV fluorescent tubes. Materials should not be displayed where the sun shines directly on them, even if for only a short time. Permanent exposure is destructive and should be avoided because slight exposure to light is damaging.

Particulates can be controlled through cleaning up by dusting or use of vacuum cleaners. Also, high-efficiency filters can be used to prevent particulates from entering into the buildings.

Cleanliness and removal of dust and dirt reduces the population of both micro and macro-biological agents. Maintenance of constant temperature and relative humidity and fumigating with fungicides, bactericides at frequent intervals are surer ways of effective solutions to microbiological attack on library materials. Old collections acquired from poorly kept quarters should be sterilized before introducing them into the library so as to guard against insect infestation.

Rodents such as mice, rats, and squirrels can be combated through cleanliness of collection areas or storage areas of the library stock.

STORAGE AND HANDLING PRACTICES:

Poor quality storage enclosures accelerate the deterioration of library materials they are intended to protect. Slovenly, haphazard and overcrowded conditions soon result, which eventually damage collections.

Similarly, poor handling or rough handling of library materials however, quickly leads to serious irreparable harm.

The long life-span of collections will be significantly extended by observing the following basic guidelines:

BOOKS:

In general, good air circulation should be maintained in storage areas. Books should never be stored directly against walls. The wall should, at least, be 3 inches away from the books to facilitate air movement around the books and to avoid the occurrence of pockets of damp air. Books stored in a closed cabinet should be shelved a distance from the back wall of the cabinet, while the cabinet should be approximately 3 inches away from the wall. Care should be taken to ensure that humidity and stagnant air do not build up in close cabinets, especially those against walls.

Books should be held upright on shelves. They should not be shelved too tightly in order to avoid damage when they are being removed from the shelf. They should not be leaned to one side or the other, because this causes strain on their spines. If shelves are not full, bookends or book supports should be used to hold books upright. Book supports should be non-damaging, with smooth surfaces and broad edges to prevent book covers from being abraded or leaves from being torn or creased. Books should not extend beyond the edges of shelves into aisles because they may be bumped or otherwise be damaged. Instead, adequate oversized shelves should be provided so that large books can be stored on such shelves without extending beyond the edges. If books are too tall to stand upright, the books should either be removed or shelves be readjusted so that the books can stand uprightly on the shelves.

Shelving a book spine down rather than spine up will prevent the text from pulling out of the binding due to its weight. Large books should not be stored next to small ones because they will not be adequately supported by such small books. When possible, books should be shelved by size to prevent this. Some books are so large that they should be shelved lying down, especially if upright storage could allow heavy textbooks to sag away from their bindings. As a rule, books should not be stacked in piles on shelves. Small structurally sound books should be shelved upright.

Books should not be pulled off the shelves by the headcap, a practice that causes the headcap to fail, tearing the spine of the binding. Instead, books on either side of the desired book should be pushed in, while the desired book is pulled out gently by grasping it both sides with the thumb and fingers. The remaining books on the shelf and the bookends should then be readjusted. When replacing the book, the bookend should be loosened and books on the shelf moved to make space for reinsertion and readjustment. When oversized books are to be removed, the upper volumes should be transferred to an empty shelf or book trolley. The desired volume should then be lifted with both hands, while the removed volumes are then returned to the shelf. Replacing the book on the shelf is done the same way.

Books are often unnecessarily damaged during photocopying. Photocopying machines with flat copy platens necessitate jamming the binding flat in order to get a good image and this causes damage to the spine. Better machines are those with edge platens or other features that allow a book page to be copied with the book open only to 90 degrees instead of 180 degrees. The spine of the book should never be pressed with the hand or the cover of the copier. If a book is too brittle or tightly bound to photocopy, it should be microfilmed and a photocopy made from the film copy.

Books should not be carelessly dropped on the floor so as to prevent accidental damage to them. The habit of dog-earing of pages or folding of half pages to mark where a reader stopped or inserting pens, pencils or any instrument inside books should be avoided. Similarly, using pencils, pens or colour pencils to underline or shade works, sentences or paragraphs should be avoided as this will deface pages of books.

OVERSIZED MATERIALS:

Oversized materials like blue prints, maps, wall paper sample, architectural drawings, and large prints are best stored flat in the drawers of map cases or in large covered boxes of acceptable quality. The materials should be placed in acid-free buffered folders. There should be adequate room where oversized materials are stored so that they can be safely removed from drawers. There should also be a place to put them down once they are removed.

Oversized materials, if they are not brittle or fragile, can be rolled into a scroll when flat storage is not possible. It is important to make sure the materials are not too brittle or fragile to sustain rolling and unrolling. A tube several inches longer than the material being rolled should be used, at least 4 inches in diameter (larger diameters are preferable) depending on the size of the material. If the tube is not made of low lignin, pH-neutral materials, it should be wrapped in neutral or buffered paper or polyester film.

NEWSPRINT:

Most newsprints are made of paper pulp that contains lignin and other impurities, especially the newsprint produced after the mid-nineteenth century. Despite its yielding possibility to alkalization (deacidification), it still deteriorates, due to its components. For this reason, photocopying and microfilming are the most practical preservation options for materials published with newsprint.

PAMPHLETS:

Pamphlets can be stored in boxes or in folders. If stored in folders, pamphlets should be stored spine down. If pamphlets must be shelved between books, they should be in boxes. Pamphlet binders are also used. The binders must be of acceptable quality throughout and should be attached to pamphlets in such a way as to be non-damaging to them. Consult an experienced professional about the advantages and disadvantages of various commercially available binders.

PHOTOGRAPHS:

Acceptable storage materials for photographs can be made of either paper or plastic. Because paper enclosures are opaque, the photograph must be removed from the enclosure when it is viewed. Clear plastic enclosures have the advantage of allowing researchers to view the image without handling it, thus reducing the possibility of scratching or abrasion. Paper enclosures should be acid free and lignin free. Plastic suitable for photographic storage are polyester, polypropylene, and polyethylene.

Photographs should be housed in folders, sleeves, or envelopes and they should usually be stored flat in drop-front boxes of archival quality.

Glass plate negatives should be stored vertically in order to prevent breakage of plates when stored on the bottom of a pile. The boxes should be housed on metal shelves or in metal cabinets. Where possible, items of similar size should be stored together. The mixing of different sizes can cause abrasion and breakage, and can increase the risk of misplacing smaller items.

Horizontal storage of photographs is usually preferable to vertical storage, since it provides overall support and avoids mechanical damage such as bending. Vertical storage, however, may make access to the collection easier and decrease handling. Overcrowding should be avoided. Then, always place photographs in acid-free folders or envelopes.

PROTECTING PAPER AND BOOK COLLECTION DURING EXHIBITION

Exhibition is an important part of the educational mission of many institutions. It is also an effective way of attracting the attention and support of the public. However, materials to be exhibited should be protected from light, air, temperature, and relative humidity. The materials should be carefully handled by staff of the organization and the public.

Similarly, if you are displaying artifacts on paper, the following five simple rules should be followed:

1. Use copies whenever possible
2. Do not display a valuable paper artifact permanently
3. Keep light levels as low as possible
4. Minimize exposure to ultraviolet light with appropriate filters
5. Ensure that cases and frame are enclosed, sealed and made of materials that will not damage their contents.

REFORMATTING

Another preservation technique is the production of copies in place of the original. It serves as the best option where books and journals are too weak or brittle to be deacidified. Methods currently employed in reformatting original copies of library materials are:

MICROFILMING

Microfilming according to Alegbeleye (2002) is the most common format for preservation copying, and it is likely to remain so far into the future despite the stiff challenge from digitization. Microfilming has a long history of use in national libraries and many national libraries all over the world are committed to microfilming.

Dalton (1999) in comparing preservation microfilming and preservation digitization said that:

The enduring popularity of preservation microfilm is because of its practicality. Unlike its digital counterpart, microfilm is the product of nearly static, tested technology that is governed by carefully crafted national standards. When created and stored according to these standards, microfilm boasts a life expectancy of 500+ years. It is also worth noting that, while digital data requires use of a sophisticated retrieval system to access their treasures, microform (i.e microfilm and microfiche) can be read by the naked eye using only light and magnification. The access potential of microforms can enhance access to information that would otherwise be unavailable because the original item is at a distant site or is vulnerable to damage and/or loss through handling. Also, microforms are relatively inexpensive to produce and copy.

On the whole, preservation microfilming quietly maintains its status as highly valued and widely practiced reformatting strategy. It maintains the continuing relevance and ongoing support at the national level.

DIGITIZATION

This is the process of transforming an object or idea (an analog signal or code) into a numerical code (a digital signal or code). The base line of digital technology is coding system with only two numbers – 1 and 0 – hence the term binary. Each numerical place in the system is one bit. In the digital world bits are things; they take up space; they take time to move from one place to another. A collection of bits can be described and counted in a system by "byte" or eight bits. A more simple understanding is as follows:

- Digital: using number to represent variable
- Digitize: to translate an analog measurement into numerical description
- Binary: a number system in which each number is expressed in power of two by using two digits, specifically 0 and 1.
- Bit: binary digit
- Byte: eight bits

Digitization in libraries is relatively recent having started in the last seven to eight years. Materials at their elementary stage (a book, a manuscript, a photographic negative, or reel of microfilm) are straight forward and linear. Before conversion, they are selected and prepared for scanning, and conversion occurs via scanning technology that transforms reflected light signals to digital data. Access to the digital data is through display of the stored digital data.

The digital conversion is intensive, expensive and labour intensive. At present, the quality and accessibility of the digital product largely depends upon the skills and talents that people bring to bear on the process of inspection, scanning, indexing, and data – file management.

In conversion of source materials, equipment configurations are complex and rapidly evolving in capability. This consists of hardware, firmware (chip-based software), and storage systems. It is therefore advisable to “test-drive” equipment configurations before purchasing or leasing them. A visit to other organizations that have similar operational systems is a good way to learn how conversion systems work.

One advantage of digitization in the field of preservation however, is that it deflects demand away from handling the original.

PHOTOCOPYING

Photocopying is suitable for heavily used items in situations where microfilming is less appropriate. Since microfilm requires reading equipment and encounters user resistance, photocopying may be the cheapest method of all the three, because the cost per unit of photocopy is the lowest.

However, the obvious disadvantages are:

- i. Photocopy process may damage fragile materials

- ii. Unlike microfilming, it does not provide a master copy
- iii. The cost may be high when there are many pages involved and binding is included.

DEACIDIFICATION

One major technique for preserving books and records is deacidification. It is a technique reserved for books that are acidic and at risk of loss if no action is taken. Mass deacidification is usually limited to major research and national libraries. Here, a vacuum or sealed chamber is introduced after materials to be deacidified have been stacked. The buffering agents in gas or liquid form penetrate through the materials and react with the paper to neutralize the acid in it and leave an alkaline residue. Deacidification, if effectively carried out on acid paper:

- a. Raises the pH level of treated paper to the acceptable range of 6.8-10.4pH
- b. Achieves minimum alkaline reserves
- c. Extends the useful life of the paper

It should be noted that deacidification does not strengthen paper already embrittled by acid hydrolysis. Therefore, for absolute preservation strategy, acid-free paper should be used for it brings long term benefits.

CONSERVATION TREATMENT:

LIBRARY BINDING

Library binding is one type of re-binding probably recommended for books more than any other type of information sources. It is important to select an appropriate type of re-binding when they become damaged. Books that have artifactual or associational importance in addition to information value should be sent to a professional conservator for treatment.

Jan Merrill-Oldham (1993) identified the following desirable characteristics of a library binding:

- i. The binding should be as conservative as possible, altering the text block minimally;
- ii. The binding should be as non-damaging to the textbook as possible and should not shorten its useful life;

- iii. The bound volume should open easily to 180 degree position to facilitate non-damaging photocopying; and
- iv. The bound volume should stay open when resting face up on a flat surface so that the reader has both hands free and can take notes easily.

The primary goals of library binding today, is good openability and minimal intervention, as well as durability and low cost. Therefore in selecting a binder, choose one who is certified by the Library Binding Institute, in case there is one in Nigeria. That way there will be an assurance that the binder is familiar with the following procedures as well as with current trends and new techniques:

- a. The binder should not trim the edges of the book unless they are damaged or pages are uncut. The preservation of margins is important, and a no-trim policy ensures that folded plates as well as images and text that extend to edges of pages will not be trimmed.
- b. Original signatures and sewing should be preserved in all fragile and special volumes. The volumes may be recased whenever possible. Where original sewing is badly deteriorated in an important book, ask to have the book re sewn through the folds by using the original sewing stations if possible.
- c. For paper repairs, a paper-based pressure-sensitive tape with acrylic adhesive should be used rather than a household-type plastic-based tape.
- d. Materials that are chemically stable and durable should be used throughout binding process.
- e. The binder should be instructed to consult the librarian whenever questions arise with regard to the materials or procedures.

SURFACE CLEANING OF PAPER

Surface cleaning is used on book pages, manuscripts, maps, and other documents, to remove all dirt or discolouration and substances that could eventually be detrimental to the paper of these materials. The simplest procedure of surface cleaning is surface or dry cleaning with a soft brush or an erasing compound. Other procedures such as bleaching, cleaning with water and chemicals, etc are also used.

However, in embarking on surface cleaning of library materials, the activities should be left to a professional conservator.

REPAIRING PAPER

The generally accepted method of repairing torn paper or reinforcing weak areas in a sheet, is by using strips of strong, almost transparent, acid-free paper, adhered with a strong, colourless water-based adhesive that is acid-free and easily reversed.

The adhesive should be strong enough to hold to the object for an indefinite length of time. It should not yellow, darken, or stain the paper and should allow the paper to be easily removed with minimal effort and no damage to the object, even after many years.

Starch-based paste and quick wheat paste are used by conservators as suitable adhesives.

RELAXING AND FLATTENING OF PAPER

Paper objects such as posters, maps, and documents can be difficult to access if they have been rolled or folded for many years. Some papers remain flexible, hence they can be easily and safely unrolled, but others become stiff and brittle as they age.

If brittle papers are humidified, they relax and become more flexible, at least temporarily, while unrolling is less risky. Humidification is also helpful for flattening documents that are not brittle but resistant to unfolding or unrolling.

The safest way to relax a paper is to leave it for several hours in an environment where relative humidity approaches 100%. Although exposing paper to high humidity for prolonged period is definitely not recommended, a few hours will do no harm if the object is allowed to dry soon after it has been unrolled.

ENCAPSULATION AND LAMINATION

Encapsulation is a simple technique designed to protect documents from physical wear and tear and from grime. The document is enclosed between two sheets of clear polyester film, the edges of which are sealed

with double-sided pressure-sensitive tape. After encapsulation, even a brittle document can usually be safely handled between the tape and document.

Lamination involves placing the original document together with back-up sheet impregnated with adhesive in a hot press. The heat and pressure activate the adhesive, which eventually fixes or laminates the back-up to the original.

For all major jobs, professional conservators are required. Unfortunately, professional conservators are in short supply in Nigeria.

DISASTER PREVENTION AND MITIGATION

Providing the best protection for collections from the most common causes of loss is a basic principle of preventive maintenance. It is highly important to identify risks or hazards, which serve as a preliminary and essential step to uncovering defects and weakness in libraries.

The best way of identifying risks or hazards is conducting a survey. The survey will identify defects in the following areas:

1. External features of the building

- is the building in a flood prone area?
- is the building near sewage area?
- Is the building near an earthquake, volcanic eruption or landslide zone

2. Internal features of the building

- Report the condition of the collection and note disaster-preparedness of the staff.
- Identify the extent of water and fire hazards.
 - i. Water hazards
 - is the roof leaking?
 - are there burst pipes?
 - are there blocked sinks?
 - are water lines over stack areas?
 - are there faulty air-conditioners and are they checked for possible leakages?
 - ii. Fire hazards
 - are electrical extension cords worn out?

- are there multiple plugs?
- are there fire detection systems?
- are these regularly tested?
- are there fire suppressed systems?
- are these regularly tested?
- are these sufficiently visible?
- is the flooring made of non – combustible or slow burning materials?

MITIGATIVE MEASURES TO DISASTER

These are measures taken in an attempt to prevent a minor problem from escalating and getting out of control. It is a second step of the pre-disaster preparedness phase. Some examples of mitigative measures are:

a) Fire protection system

- Good housekeeping in the library will eliminate all sources that may initiate fire as well as combustible materials which may feed fires.
- Invest in efficient fire detection and extinguishing systems

b) In addition to fire detection systems and fire extinguishing systems, guards and security personnel should be used and be well trained to understand the seriousness of reporting the out break of fire early enough.

On the whole, in order to achieve effective disaster aversion, or react to a disaster or even recover from it, there should be a policy guideline or plan that would ensure the undertaking of these phases – disaster preparedness, response and recovery. In addition, a disaster control team should be established and the team will be charged with the following duties:

- i. Liaise with the public and the media;
- ii. Take charge of equipment and supplies;
- iii. Take inventory of damaged and salvaged materials; and
- iv. Assess the disaster – the kind and scale

With adequate disaster control plan, the library will be in a stage of alertness and vigilance so that when a disaster does occur, the library is not caught napping but is indeed, in a position to react responsively, maturely and rationally.

EFFORTS OF THE NATIONAL LIBRARY OF NIGERIA IN THE PRESERVATION AND CONSERVATION OF ITS MATERIALS

In spite of the fact that the National Library of Nigeria has no preservation and conservation policy in place, it has over the years embarked on some preservation and conservation practices as highlighted below:

Despite the inadequate storage facilities, information sources especially monographs and serials are properly arranged on the shelves using book supports to hold them in upright position.

As a measure towards combating micro and macro-biological attacks of the information sources, the library has embarked on fumigation of the reading areas on periodic basis.

Since the National Library is a depository library, it is empowered by the National Library decree of 1970 to collect legal deposit materials from Nigerian Publishers. A copy of each publication deposited is sent to the University of Ibadan library as a measure against any disaster.

In order to preserve the serials in the library's collection, efforts are being made to bind them. In addition, torn and damaged books were handled by the National Library Press before its closure. In order to complement the services of the National Library Press, it had in the past and present used the services of commercial binders to ensure that all materials needed to be conserved are promptly attended to.

The National Library has recently started digitization of its newspapers. This is a welcome development especially in this age of Information Technology.

However, the National Library has a lot of challenges in the field of preservation and conservation. This is due to the prevailing problems it is facing, such as lack of enough storage facilities, information sources are deteriorating, the books and serials are becoming acidic and no efforts are being made to deacidify them. Non-book materials like microforms, tapes, photographic negatives and slides have gone bad and there are no disaster detection facilities as a measure towards disaster control.

RECOMMENDATIONS

In order to ensure effective preservation and conservation of information sources in the National Library of Nigeria, the following should be considered.

- i. Seeing that deterioration of information sources in the National Library of Nigeria has reached an advanced stage, it is highly imperative for an urgent action to be taken towards preservation and conservation of these materials.
- ii. There should be a routine practice of checking the pH conditions of the library materials. Efforts should be made to always check low pH condition through deacidification of these materials.
- iii. Books and non – print media have not been adequately stored, these materials are subjected to high temperature and high relative humidity due to long periods of non-availability of electricity, uncontrolled lighting, pest attack, etc. It is therefore recommended that adequate stores and storage facilities should be provided so as to curb the prevailing storage problems.
- iv. The National Library of Nigeria should be thinking of how to come up with a comprehensive preservation policy towards a well-planned preservation and conservation programme.
- v. The National Library has a vital role to play, by offering reasonable ideas to the Federal Government to ensure that paper manufacturing industries in the country produce acid-free papers, alkaline papers or permanent papers which are durable for production of books and other library materials.
- vi. A disaster control plan should be established to form part of the preservation and conservation programme. This would enable the National Library of Nigeria create an emergency response policy to salvage library materials in case of any disaster.
- vii. A preservation and conservation Department, Division or Section, (if not possible a committee) on preservation and conservation should be established by the National Library of Nigeria. This will be responsible for formulating preservation and conservation policies, surveying and coming out with the organization's preservation needs, organize training, work-shops/seminars/conferences, and also carry out awareness programmes on preservation and conservation of library materials.

- viii. In terms of information capturing and preservation, microfilming of documents, especially newspapers should be preferred for the fact that microfilms can last up to 500 years and over. It is therefore recommended that the National Library should revive her microfilming activities. In this case the library should be encouraged to follow the international standards. For example, the ISO standard in the microfilming of newspapers and order library materials.
- ix. A great deal is happening on preservation and conservation in overseas countries, which the National Library of Nigeria should benefit from. Librarians of the national Library or the preservation and conservation committee members, if established, should visit other national libraries of the world such as the British Museum, Library of Congress, the National Library of Australia, National Library of Canada and the National Library of South Africa, etc on industrial attachment.
- x. A condition survey of the collections of the library should be carried out to provide data on which to base decisions and policy making for preservation and conservation.
- xi. National Library of Nigeria should bring back to life the press, in order to allow bindery section of the press to always undergo training on current techniques of binding especially of newspapers.
- xii. In recognition of the fact that the National Library of Nigeria has lost valuable resources and desirous of building up rare collections, it is advisable to re-activate the idea of the "Friends of the Library" with a view to acquiring personal collections and gifts from spirited individuals.
- xiii. The National Library of Nigeria should also serve as one of the supportive bodies towards strengthening the preservation and conservation section of the Nigerian Library Association (NLA) in order to promote or create awareness on the need for preservation and conservation of library materials in Nigerian libraries.

CONCLUSION

It is no gainsaying that information is as old as the age of humanity, hence it is highly vital that the information sources should be adequately preserved and conserved for all spheres of human development – intellectual, political, social, cultural development, etc, and for posterity.

Since libraries are charged with the responsibility of collecting, interpreting and exhibiting significant materials that are historical documents, there should be a strategic plan for long term preservation and conservation as well as security and accessibility to such materials. That is, collections in their custody should be protected, secured, unencumbered, cared for and preserved.

The National Library of Nigeria, therefore, should not only strive to acquire materials but should ensure that the materials acquired are preserved and conserved in a usable condition for generations of users. On the whole, the National Library of Nigeria should, as a matter of urgency embark on preservation and conservation programmes, so as to salvage its deteriorating information sources.

REFERENCES

1. Alegbeleye, Bunmi (1999): Disaster control planning for libraries, archives and electronic data processing centres in Africa. Pp. 31 – 35.
2. Alegbeleye, Bunmi (2002): "preservation and conservation: rationale, procedure, trends and benefits for research and scholarship". Being paper presented at the seminar on preservation for posterity. Organised by the National Library of Nigeria and UNESCO 4th – 5th June, p.10 – 11.
3. The Concise Oxford Dictionary 10th ed./edited by Judy Pearsall, 1999. p. 407.
4. Council on Library and Information Resources (CLIR). Building and sustaining digital collections: Model for libraries and museums, August 2001. p. 14.
5. Dalton, Steve (1999): "Microfilm and microfiche". Article published in preservation of library and archival materials: A MANUAL. NEDCC. p.315
6. Jan, Merril-oldham and Jutta Read-Scott, eds. (1993): preservation planning program: An Assisted self-study Manual for libraries.
7. Lasisi, J. (1999): "Handling and care of library materials". Being paper presented at the workshop on Repositioning the National Library for Effective performance in the next millen-nium. Organised by the Department of Administration, National Library of Nigeria, on 20th– 24th September, 1999. Pp. 2 – 4.
8. Lull, William P. (1995): Conservation environment, guidelines for libraries and archives. Ottawa, ON: Canada Council of Archives, p. 3.
9. Muhammad, U.N. (2002): report on seminar on the preservation of paper and photographs in museums, archives and libraries held at Albany Museum, Grahamstown, South Africa, April 8 – 12. p.10.
10. Ogden, Sherelyn (1999): Protection from loss: Water and fire damage, biological agents, theft, and vandalism. Preservation of Library and Archival materials: A MANNUAL. NEDCC technical leaflets, p. 125 – 127.
11. Ogden, Sherelyn (1999): Temperature, relative humidity, light and air quality: Basic guidelines for preservation. Preservation of Library and Archival materials: A MANUAL. NEDCC, Pp. 69 – 71.