

Preservation of Library Materials

The library collection is a priceless heritage of mankind as they preserve facts, ideas, thoughts, accomplishments and evidences of human development in multifarious areas, ages & directions. The past records of literature constitute a natural resource and are indispensable to the present generation as well as to the generations to come. Any loss to such materials is not replaceable. Therefore, preserving this intellectual, cultural heritage becomes not only the academic commitment but also the moral responsibility of the librarians, who are in charge of these repositories. Any librarian responsible for the preservation of these documentary heritages should know the various causes of deterioration of the library materials and the possible methods for their preservation. Most of the libraries have paper based reading materials in the form of manuscripts, books, periodicals, paintings, drawings, charts, maps etc.. The basic materials and constituents of the physical entity of these library materials are mostly organic in nature, which are susceptible to natural decay and deterioration. In books, apart from paper the other materials used are board, cloth, leather, thread, ink, adhesive etc. All these materials used are nutrition to some living organisms. So the library materials need protection from factors of deterioration.

The different types of deterioration of the paper based materials are reflected in wear and tear, shrinkage, cracks, brittleness, warping, bioinfestation, discoloration, abrasion, hole, dust and dirt accumulation etc. Generally library materials are susceptible to deterioration by the following factors:-

1. Environmental / Climatic Factors
2. Biological factors: - Microorganisms, insects and rodents
3. Chemical factors
4. Human factors and
5. Disasters

1. ENVIROMENTAL FACTORS

Light

Paper gets deteriorated when it is exposed to natural light or artificial light. Sun light has a serious damaging effect on written or printed paper materials. The ultraviolet radiation of light are mainly responsible for photochemical degradation of paper which takes place rapidly when paper is exposed to sun light in presence of air (oxygen). Some portion of cellulose is oxidized to oxycellulose. Fading of ink and dye of the coloured paper and yellowing of white paper takes place due to the formation of oxycellulose. Artificial light like fluorescent tube light also radiates a high percentage of ultraviolet rays which cause deterioration by yellowing the paper. However the amount of damage by light depends upon the Intensity of light, Duration of exposure, Distance from the source of light.

Heat

Usually the source of heat is high atmospheric temperature. High heat with low humidity causes dehydration of cellulose fibers and the paper becomes brittle. If electric bulbs are used for lighting purpose, they increase room temperature as high powerful bulbs generate more heat. Extreme variation in temperature, affects the physical condition of the library materials.

Humidity and Moisture

Humidity is the amount of moisture in the atmospheric air. The moisture is measured in terms of relative humidity. All organic objects absorb water to a greater or lower extent and the water goes inside the object through surrounding air. The paper absorbs more moisture when there is high humidity. In high humid condition, paper becomes soggy and the moisture weakens the fibers of paper. Moisture is the root cause of various types of physical, chemical and biological deterioration of library materials. It weakens the adhesive and makes the book binding loose. It also weakens the sizing elements of paper and causes spreading of ink. Moistened pages of book often stick together. Moisture also promotes the growth of fungus, which cause damage to paper and book binding materials.

Dust and Dirt

Dry particles of any matter present in the air are known as dust. Dust is highly dangerous for the library and archival collection, composed of soil, tar, metallic substances, fungus spores and moisture among other things. Dust and dirt are sources of both physical and chemical degradation of the library collection. Dust acts as a nucleus around which moisture collects and this moisture provides the necessary humidity for the growth of fungus and for chemical reaction, which lead to the formation of acids.

Water

Water acts as a physical agent of deterioration by causing hygroscopic materials to undergo dimensional changes. Water, which is harmful for the library collection may come from sources like natural calamities, human negligence, from leaking roofs, defective plumbing and through open windows at the time of raining. Excessive water brings about biological attack on paper, which is usually manifested as the growth of fungus or yeast. The effects of water are stained paper, rotted leather, weaken adhesive, sustained fungi etc. Water also does injury to the steel furniture due to rusting.

PREVENTIVE MEASURES FOR ENVIRONMENTAL FACTORS

- The planning and the construction of the library building and also the soil on which it will be constructed , have greater impact over the environmental control inside the library building.
- It is very important to choose the best architectural design for the library having cross ventilation facilities for free air circulation within the building.
- If there is a need to use wooden materials, the wood selected should be well seasoned and must be treated chemically to avoid insects.
- Growth of plants near the building must be avoided, as the roots will damage the building foundation.
- It is always better to construct the building away from traffic to avoid dust and dirt.
- Provision of adequate number of electric fans and few exhaust fans will facilitate air circulation inside the library.

- Sunlight should be prevented from falling directly on papers because the sun is a great emitter of ultraviolet rays. . Lemon yellow or green coloured glass panes should be fitted in window panes as these are more effective in blocking ultraviolet rays. The windows must be provided with colored curtains, which will prevent falling of direct light as well as absorb ultraviolet rays.
- As high humidity and high temperature are more hazardous for library materials it is advisable to maintain ideal room temperature (20 -25 c) and relative humidity of (RH45- 55%) for preservation of documents.
- Air conditioning of the stack area round the clock is an ideal example of maintaining optimum temperature & humidity for the storage of documents.
- Floors can be cleaned by wet dusters. As accumulation of dust and dirt accelerate the physical damage of books. A cleaning schedule should be made considering the sequence of operations following daily and weekly routines. The best way is to use a vacuum cleaner because it sucks the dust and cannot resettle on the surfaces.

2. BIOLOGICAL FACTORS

The deterioration caused by biological agents such as micro-organisms, insects and rodents is generally known as bio-deterioration. Almost all book components such as paper, leather, textiles or straw board used for binding are prone to attacks by these biological agents. The climatic condition accelerates the growth and multiplication of living organisms. These biological agents can be categorized as Micro-organisms, Insects and Rodent

Micro- organisms

Fungus are a large heterogenous group of plant organisms. The fungal spores are present in the earth, water and air and remain in a dormat state for long periods. These spores sprout and grow when they have the required moisture and heat.Fungus consume cellulose and also thrive on nutrients in leather, glues, pastes, binding threads etc. they weaken and stain the paper and can cause discoloration. Besides fungus, bacteria also decompose cellulose in paper and binding textiles.

Insects

Even though there are thousands of insects, only certain insects badly damage the library materials. They are silverfish, cockroaches, booklice, bookworms and termites.

Silverfish – The main source of these insects are food materials like starch, glue and gelatin which are used in paper as sizing materials. Dust and dirt also attract these insects. They're fond of dark places and are active at night only. Silverfish do not have wings and are silvery or pearl gray in colour and about 8 to 10 mm. in length. They eat the surface of the paper and also eat gum from postage stamps, envelopes etc. They grow holes in paper, prints, photographs, catalogue cards and cardboard boxes. The dark spaces on the library racks, catalogue cabinets, drawers are the places for their egg laying

Book worms or Book beetles- Bookworms affect very much books and manuscripts. As the name itself suggests they feed on paper and damage the paper extensively. In libraries the bookworms lay their eggs on the edges of the books and on the surface of the bookbinding. They make tunnels in the pages and boards of the books.

Book lice: - Dark dusty areas filled with unused books, dampness and warmth are essential requirements for the growth of booklice. They are gray or white in colour. They injure the bindings of books by eating paste and glue and also eat the fungus formed in between the edges of inner cover of the books

Cockroaches – cockroaches are common all over the world which are brown or blackish brown in colour. They eat paper leaves, bookbinding, fabrics and other organic materials. They are frequently found in libraries, archives and museums and are very active during the night. They live in corners which are damp, cleavages in walls and floors, behind and beneath almirhas, shelves and in wooden cupboards. They excrete a dark brown liquid, which leaves stains on the paper and become difficult to remove.

Termites or White Ants – In the tropical climate the damages to the library materials due to termites are much. Wet or damp conditions are most suitable places for termites. They eat wood and paper and can attack any type of material containing cellulose. If once they start destroying

the books they can do irreparable damage in no time. They leave mud encrustation on the attacked materials.

Rodents

Rodents include mice, rats, squirrels and many other species. Mice and rats are mainly found in libraries and they find their way into buildings through dry drains and openings in doors and windows. In libraries they eat and destroy materials made up of paper, cloth, leather, glue, etc. These animals are very swift to move and hide in dark corners.

PREVENTIVE MEASURES FOR BIOLOGICAL FACTORS

- Good housekeeping and maintenance of optimum storage condition is necessary to control the spread of the insects. Because stagnant air, dampness, dark and dingy places in a library facilitate the growth of biological pests.
- Ensure provision of cross windows, ventilators, exhaust fans ensures good circulation of air and it is necessary to circulate the air inside the room with electric fans.
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- Avoid contact of book racks with walls (at least 15 cm away from the walls) to eliminate dampness.
- Attending to cracks, crevices and loose joints in floors and walls eliminate the possibility of insect hiding in these places.
- Use of edibles inside the library should not be allowed.
- Periodic use of insecticidal powder or solution like lindane at the dark corner walls, beneath the racks and almirahs is a good precautionary measure to prevent insects.
- It is safe to use paradichloro-benzene as it acts both as an insect repellent and insecticide. A simple practice is to keep naphthalene bricks on the shelves as it repels the insects from coming to the book racks.
- Dry neem leaves, neem seed powder and camphor tablets tied in muslin bags should be kept inside the racks for keeping the pests away.
- The foundation of all the new library buildings should be given anti-insect treatment.

3. CHEMICAL FACTORS

Because of the absorption of the chemicals by the moisture absorbed by the paper, the library materials get affected. The notable deleterious substances for the library materials are sulphur dioxides, oxides of nitrogen and ozone. Sulphur dioxide is a hazard to cellulose materials like paper and cloth. The most familiar effect in libraries is the brown and brittle edges of books caused by sulphur dioxide. The nitrogen dioxide comes from automobile exhausts combines with oxygen and water turns into nitric acid. This nitric acid has strong acidic effects and attacks the dyes in ink, cloth, paper and leather. Ozone acts as a powerful destroyer of organic materials. It makes the colours of fabric book covers fade and the book binding materials such as leather, gelatin, glue and paste are also susceptible to deterioration by ozone in humid atmosphere.

PREVENTIVE MEASURES FOR CHEMICAL FACTORS

- One of the best ways of controlling atmospheric pollutants is filtering of the air intake in to storage areas, which can be attained by air conditioning system operating for 24 hours throughout the year.
- Without Air Conditioning facility simple measures like wrapping the books and manuscripts in cloth or placing them in book containers reduces the effects of pollution to a great extent.
- Proper care should be taken to save books and documents from dust.
- It is preferable to use vacuum cleaner and fine brushes for dusting of shelves and books.
- No chemical formulations should be directly applied on to the book covers, since these may have an adverse effect on the books as well as users of the books and staff of the library.
- Wooden storage should be avoided as it gives off volatile acidic vapours. If it is to be used it must be covered with coats of acrylic emulsion paint.
- Good quality materials should be used for repair and restoration of documents

4. HUMAN FACTORS

Librarians in charge of the documentary heritage are directly responsible for the overall conservation and preservation of their collections. But they are not always aware how to handle, store and use collections carefully to minimize damage and help preservation. The standard of

care and handling of books by their custodians and users is often pretty low. Improper storage, faulty repairment, rough handling, deliberate abuse, folding the fore-edges of pages as a mark of reading, marking by ball pen, mutilation, vandalism are all examples of deterioration of books by human beings.

PREVENTIVE MESURES FOR HUMAN FACTORS

To increase the longevity of the library resources, certain do's and don'ts which the library staff and the users should follow these are

- Important books and manuscripts should kept in specially prepared containers.
- For carrying a large number of books trolleys should be used. Utmost care should be taken while transporting rare, valuable and delicate books.
- Care should be taken while photocopying the books as at that time considerable stress is imposed on the material and the bindings suffer most and also the spine damages.
- Use bookends to support books when shelves are not full. Books should not be shelved too tightly or too loosely
- It must be always ensured while opening the books, pages are not torn or covers are not damaged. To turn a page lift the top corner and lightly slip the finger tips down the fore-edge supporting the page.
- Pages should never be folded otherwise creases will be formed and they may be torn at the folds. Corner of pages should not be folded to mark pages.
- Avoid licking of fingers as an aid to turn pages.
- Underlining must be avoided.
- Books should not be left open on the reading table, face downwards.
- Rodents on an open book should be avoided since this can damage the spine and binding.
- Never allow a book to stand on its fore edge.
- When a book is displayed open, never use metal clips or pins to hold book pages open.

5. DISASTERS

Libraries are not exempted to the destructions that can occur as a result of natural or man made disasters. In libraries, archives and museums there is a likely-hood of fire as the collections are mostly organic in nature. Once fire starts, it is difficult to save those materials which get fire. Items not directly engulfed in flames can be charred by soot and smoke. Heat emitted from fire causes bindings to shrink and warp and plastic base materials to melt. Water used for fighting fire can cause enormous damage. Besides fire, floods, high winds, cyclones, earth quakes are also agents of deterioration for the library collections. These will lead documents to absorb water, swell, warp and become extremely vulnerable to physical damage. Dyes and ink may bleed and book pages stick together. Leather bindings seriously warp and change shape. Effects of disasters on library collections are too obvious to comprehend.

DISASTER VIGILANCE

- Disasters are generally unexpected events with destructive consequences to a collection. Therefore it is vital for any library to take every possible precaution to prevent the occurrence of an unavoidable disaster.
- A disaster planning is an essential element of preventive conservation. It is necessary to identify any external and internal threats that might cause problems for the collection and measures to meet those threats.
- Without an existing disaster preparedness plan or crisis management plan, the librarians will be unable to act quickly to organise a disaster management process.
- It should be mandatory for every library to have a written disaster preparedness and response plan containing description of emergency procedures, emergency supplies list, disaster response outline, conservation experts, list of staff volunteers, list of external contacts and names, addresses, home and work telephone numbers of personnel with emergency responsibilities.
- Libraries should be provided with fire and smoke detection system and automatic fire extinguishing system.
- Use of match stick or open flame and smoking should strictly prohibited inside the library.
- Inflammable materials and chemicals should not be stored inside the stacks.

- The telephone number of the fire office should be visibly and clearly exhibited. Location of emergency gate must be clearly indicated. The electrical defects and faults should be set right in time.

