

Effects of Environmental factors on preservation of library documents

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***Abstract** - Modern library is a workshop for the readers to accumulate knowledge and wisdom. Society has evolved a variety of libraries to meet varied needs of different segments of our contemporary society. The past is known by records, archives, books and other library materials which constitute the documentary source. Libraries are the collections of various documents from the earliest clay tablets to the micro documents magnetic and optical media. Library documents loss their permanency in the affect of various physical, chemical and biological factors and are prone to decay very fast if proper care and handling is not taken regularly. This paper deals only the deterioration of environmental factors and the preservation of library documents.*

Key words: *Library documents, deteriorating factors, preservation.*

Introduction

Library is a place where books and reading materials are kept in a systematic way that the library resources can be retrieved in a short time. Modern library is the conglomeration of printed as well as electronic resources where both physical and digital forms of documents are stored, and retrieved and delivered as and when necessary. Preservation is the process of keeping the present day resources for future use. Due to the effects of various factors library documents lost their permanency if proper care and handling are not taken.

Significance of the study

Although there has been a rapid advancement in the electronic storage of information, there is no doubt the paper based as well as digital all the documents need a great attention for their longevity. Present day literature is based on earlier literature and the future knowledge will be based on present and past knowledge. Therefore, preservation of library documents creates an environment to keep our past and present literature for our posterity. This paper attempts to focus on preservation of library documents from environmental factors.

Objectives

This study has been undertaken the following objectives:

- To know the different library documents
- To know the different environmental factors of deteriorating library documents
- To study the different methods of preservation for environmental factors.

Methodology

The study is conducted with literature search on various factors of preservation of library documents. This is a descriptive paper based on secondary and tertiary literature published on offline and online media.

Library documents

Library documents may be of physical documents, digital documents and archival documents. Physical documents consists of conventional books, non-conventional books like pamphlets, charts etc. Digital documents consists of online and offline e-resources, CDs/DVDs etc. Archival documents consist of manuscripts on sanchi pat, tula pat, numismatic collections like coins etc. Most of the libraries have paper based materials in different form of manuscripts, books, periodicals, paintings, drawings, charts, maps etc. These documents are includes under physical documents. The basic materials and constituents of the physical entity of these library materials are mostly organic in nature which is susceptible to natural decay and deterioration.

Different parts of the world used different materials for recording information and knowledge depending on the availability of these materials. Following are some writing materials of various times available in different parts of the world.

1. **Clay tablets:** - Clay tablets were the 1st used writing medium from 3100BC. At that time in the river plains of Mesopotamia clay was available commodity.
2. **Papyrus:** - Papyrus was a plant that grew wild all along the Nile river valley. Around 3000BC, the Egyptians created “sheets” of papyrus by harvesting, peeling and slicing the plant into strips.
3. **Bamboo books:** - In China, the bamboo plants were used as writing material like papyrus in Egypt.
4. **Parchment:** - In West Asia, people started switching to parchment around 150 BC. Parchment was made from animal skin.
5. **Paper:** - In 105 AD, paper was invented in China. For a longtime, the Chinese closely guarded the secret of paper manufacture to ensure a monopoly. But after, all over the world paper has become the universally accepted writing material.

Besides the conventional books, libraries are the collection of non-conventional books like filmstrips, slide collections pamphlets, news clippings files, drawings, paintings, audiotapes, videotapes, microfilms, microfiche etc. Microfilm is a continuous strip of film that is wound on a reel and viewed frame by frame. Microfiche is a single card that has images reproduced in rows and columns.

Digital documents of the library

Digital documents are those which can be access only the use of computers. Electronic journals, scientific data sets, Cartographic databases, Legal databases (including patents, trademark databases), Textual data, Image collection, News groups, list serves and mail archives, indexes and directories, Electronic search and display tools (including OPACs), Databases accessible through internet and other networks, Citation databases, FTP sites, General online services, Campus Wide Information Systems, Distributed files servers (Gopher, WALIS, WWW), Meta documents etc are come under digital documents.

Preservation

Every library has its own aims and objectives of its establishment. But the basic role of the library is to serve the society as a medium of communication. Library is a social organization that systematically acquires, organizes and preserve information in such ways as to enable any of it to be readily available to users in good usable condition. Preservation is a part of every librarian's responsibility to ensure that present and future generation will be able to access the documentary heritage available in the library. The art of preservation of library materials is as old as human civilization. Even before invention of paper, knowledge is recorded, preserved and made available in different formats and in different shapes. Preservation is the process of taking care of all the resources of the library to keep in a reasonably sound condition so that they can be used by our posterity. There are two aspects of preservation- (i) Preventive preservation and (ii) Curative preservation

1. **Preventive preservation:** These are the indirect actions aimed at increasing the life expectancy of undamaged or yet to damage resources of the library. It comprises all the methods of good housekeeping, cleaning and dusting, periodical supervision and prevention of any possibility of damage by physical, chemical, biological and other factors.
2. **Curative Preservation:** Curative preservation consists of all forms of direct actions aimed at increasing the life expectancy of undamaged or damaged documents available in the library.

Causes of deterioration of library documents

We know that paper based materials occupy a major part of library materials. Deterioration changes the originality of library documents, at the time of origin the paper has a strong cellulose bond and passes of time this bond become loose and paper become yellowed. The causes of deterioration can be grouped broadly under three categories- Natural Ageing, Intrinsic or inherent factors, External conditions.

Natural Ageing: Natural ageing affects the durability of the materials by gradual degradation or deterioration.

Intrinsic or inherent factors: Inherent factor refers to the basic ingredients used in the manufacture of physical entity of library materials as well as manufacturing processes.

External Conditions: External conditions include different environmental, chemical, biological and human factors that cause damage to various library documents.

This paper deals with the environmental factors only along with way of preservation.

Environmental factors of deterioration of library documents

Environment is made up of living organism (like plants, animals, and human beings), physical surroundings like air, water and land and third part environment is composed of the meteorological factors like temperature, sunlight, humidity, wind speed and average rainfall. Constituents of physical surroundings are basically responsible for defining the climatic factor of a region.

Assam is a state where occurs heavy summer rainfall, winter draught, high humidity and relatively low temperature during the year. Due to its location and physiographic condition, the state shows marked spatial variation in the climatic pattern. So, the climatic condition of Assam has great influence on the library documents. A vast difference in day and night temperature in tropical and sub-tropical regions induces the rapid decay of organic materials of books and other reading materials. The main environmental factors affect physical deterioration of paper based library materials are - light, heat, humidity and moisture and pollutants like dust, dirt, smoke etc.

Light: Light is a factor which causes damage to the paper and allied materials of light. Natural light and artificial light, both are responsible for deterioration of paper. Light may destroy the strength of organic material of information resources and can fades up the ink and colours. Light is a form of energy, radiated form every illuminant source, which propagates in wave form.

The ultra -violet Region: This region is divided into two regions called near and far ad whole region lies between wave lengths 136A^0 to 4000A^0 .

Visible region: A range between wavelengths 4000A^0 to 8000A^0 , which is also known as white light region. This region is composed of seven colours namely: Violet, Indigo, Blue, Green, Yellow, Orange and red.

The Infra- Red Region: This region is also known as Heat-Ray region. This region is located between the wave lengths 8000A^0 to $4 \times 10^6\text{A}^0$. Ultra violet rays are generally treated as the destructive sources of library materials. On prolonged exposure to light, writing may disappear completely.

Heat: Heat adversely affects the fibers of cloth, paper and other allied materials that are organic in nature. Usually the source of heat is high atmospheric temperature. Heat is measured in terms of temperature either in Centigrade scale or Fahrenheit scale. High heat with low humidity causes dehydration of cellulose fibers and the paper becomes brittle. The climatic factor heat place a dangerous role in weakening the life of paper, books and allied materials. To protect the library materials from decay, they should be provided with suitable temperature.

Humidity & moisture: - Humidity is the amount of moisture the atmospheric air. The moisture is measured in terms of relative humidity. Because of the absorbency property of organic object, absorbs more moisture when the humidity is high. High humidity causes growth of insects whereas low humidity cause materials to lose their flexibility. A temperature of 20^0c - 24^0c and relative humidity of 55% are most effective for preservation of paper records.

Pollutants: Man-made chemicals released in air like sulphur-di-oxide, fumes, dust, dirt, smoke hazardous to cellulose and can cause deterioration of library materials. Fine dry particles of any matter present in the air are known as dust. Dust 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.

Water: Water acts as a physical agent of deterioration by causing hygroscopic materials to undergo dimensional changes. Water may come from sources like natural calamities, human

negligence etc. Excess water usually manifested as growth of biological agents. Like fungus or mildew etc. The effects of water are stained paper, rotted leather, and smeared ink, weaken adhesive, sustained fungi. Water also damages steel furniture due to rusting.

Natural disaster: Natural disaster can be included under environmental factors. Natural disaster is an unexpected event, which puts collections of libraries or archives at risk. Natural calamities like flood, fire, earthquakes, building collapse etc cause damage to library materials. Disaster planning is a matter of basic security for libraries and archives, their staff and their collections. Natural disasters include rain and wind storms, floods, earthquakes, Fires, water, liquid chemical spills. After floods, mould rapidly begins to form in damp conditions. Audio-visual materials, photographs, microforms, magnetic media and other disks are vulnerable to water; the damage depends on the type of the material, the length of exposure to water, its temperature etc. Damage caused through effects of disasters on library collections can be controlled by taking appropriate preventive measures at the time of library building is being constructed.

Methods of Preservation for environmental factors

The process of keeping an object safe from harm or loss, damage, destruction or decay, and maintaining it in a reasonably sound condition for present and future use is called preservation. Preservation includes stabilizing, maintaining and monitoring temperature, humidity, light exposure, air pollution, dirt, dust and mold etc. Methods of preservation can be studied by two ways: Preventive Preservation, Curative preservation.

Preventive Preservation: Preventive preservation denotes those specific policies and practices involved in protecting library and archival materials from deterioration, decay and damage. It is the minimization of deterioration by taking preventive measures. Preventive preservation constitutes use of good quality paper and ink, proper handling, storage and servicing, Ensuring proper environmental climate and Neutralization of acidity.

Preventive Measure for Environmental Condition: Environmental condition or storage condition should be controlled scientifically to preserve the library materials properly. Scientific building with sufficient light, proper ranges of temperature, humidity and use of proper furniture etc are some factors of environmental control. Environmental controls are necessary to facilitate the preservation of organic library materials. Dampness accelerates decay of organic materials and propagates mildew and pests like silverfish, termites, white ants etc. Key environmental factors include temperature relative humidity, pests, pollutants and light. Books and other materials take up and given off making them sensitive to relative humidity. High humidity encourages mold growth and inside infestations. Low humidity causes materials lose their flexibility. Relative humidity refers specifically to the amount of water vapour contained in the air at a given temperature.

Temperature can be defined as a measure of how quickly molecules are moving within materials. Molecules move more rapidly at higher so heat accelerates the chemical reactions that cause deterioration. A lower temperature slower rate of deterioration.

For preserving library documents from deterioration, cleaning of library materials, buildings as well as furniture are very much essential. Atmospheric pollutant like dust and acidic gases on record materials create unhygienic condition and favour the growth of mildew. Cleaning prevents chemical reaction with the accumulation of dust, dirt, shoot, stains etc. on the cellulosic materials and other materials used for bindings.

Conclusion

Libraries are the collection of materials from earliest clay tablets to the micro documents. Modern library is a collection of both digital and physical documents. While discussing the library documents and their preservation, there are numbers of issues involved. Different documents need different attention according to their physical appearance and components. The main function of a library is the collection and preservation of knowledge for dissemination to its users. But due to various physical, chemical and biological deteriorating factors, library documents lost their permanency. So, we have the sole responsibility to preserve the valuable library documents for future use. To preserve the library documents various methods are available. Based on deteriorating agents and environmental and economic condition, we can use different methods to preserve the published knowledge to our next generation.

The concept of preservation is changing due to the change of working environment as well as the change of library collections, but the commitment to preserve information for future generations will remain same. We must continue to save as much information as possible regardless their types and formats.

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