PART 1

1. What is Manuscripts?

The word manuscript is derived from the medieval Latin usage 'manu' meaning 'by hand' and 'scribere' meaning 'to write'. Thus, any book or document written by hand is called manuscript.

Manuscript is a document of any kind which is written by hand or text of a music or literary composition in hand written or typed script form and which in that form has not been reproduced in multiple copies.

Manuscripts are original sources of human history available on various kinds of media like stones, clay tablets, palm leaves, metal leaves, barks, animal skin, cloth, paper, etc.

2. Type of manuscripts

i) Tal-patra Manuscripts (Plamleaf): Tal-patra manuscripts are usually seen in the form of bundles of 50 to 100 neatly shaped leaves of even size strung together with a cord and pressed between two wooden boards. Some collections also have metre-long uncut leaves, with midribs intact, rolled like a carpet. Tal-patra manuscripts are found mainly in the coastal states of India, where the Palmyra palm tree generally grew, though collections of these manuscripts are dispersed all over India in peoples'homes, matha, granthagar, libraries, research institutions, archives and museums.

ii) **Bhoja-patra Manuscripts (Brich bark):** Bhoja-patra manuscripts are usually seen in the form of a sheaf of paper thin 'folios' cut to an even size. These are sometimes bound together with cord on the sides, though usually they are kept piled up together between two wooden boards and then wrapped in cloth. Bhoja-patra trees and manuscripts are found mainly in the temperate and alpine climatic zone in the Himalayan belt, though collections are dispersed all over India.

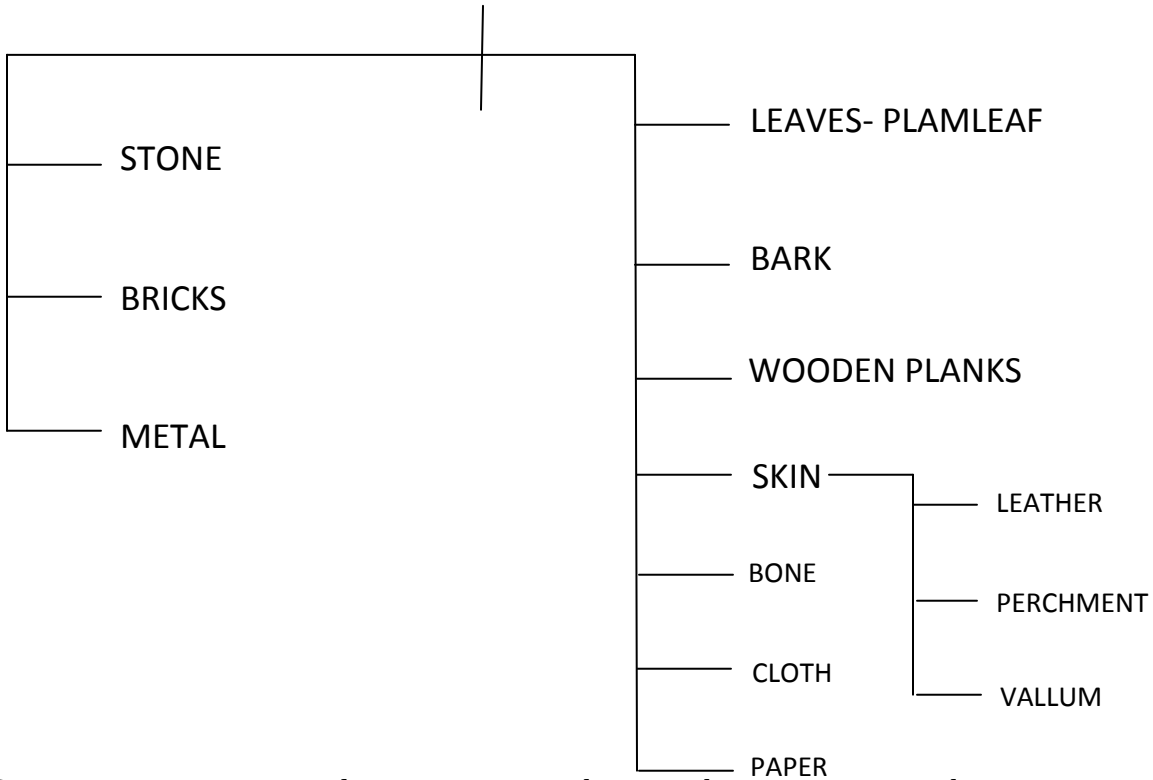
iii) **Hansi-pata Manuscripts:** Hansi-pata manuscripts, also made from bast of the Agaru tree, are usually seen in the form of a sheaf of **'folios**' cut to an even size. These are rarely bound together and are usually kept piled up together between wooden boards and covered with cloth. Hansi-pata manuscripts are found mainly in the North- Eastern State of Assam. Other than in that region, dispersion of hansi-pata manuscripts in other parts of India is very limited.

iv) **Handmade Paper Manuscripts:** Manuscripts made of handmade paper can be found either as bundles and sheaf of folios kept between wooden boards and wrapped in cloth, or they are often also bound as books. Manuscripts on handmade paper are found all over the country.

v) **Manuscripts on manufactured paper:** A large number of manuscripts are also found on folios of modern manufactured paper. These again are either kept loose or bound together. Manuscripts on machine-made paper are found in all parts of India, especially in the various archives and museums related to modern litterateurs and other historic personalities.

3. Writing material of manuscripts

Writing materials



Stone:

Stone engravings were made on coves, smooth or rough , caskets, etc writing on stones. There dealt with official and private records, royal prodomations, land grands evlogies and memorials.

Metals:

The metals used for writing involves gold, sliver, brass, bronze, iron, tin and copper.

Birch-Bark, Earthen ware:

In ancient times bricks, earthenware, etc were also used as writing materials. There are generally scratched before being dried or baked.

Palm leaves:

Palm leaves are used for writing purpose after processing leaves are first dried and boiled and then again dried under sunlight they are then cut into proper sizes and the surface rubbed with conch shell or stone. After these process are complete the palm leaf is ready for use for writing. Actual writing is done by the ink pen or metal stylus.

Cloth:

Smooth and non porous cotton cloth was also used as writing material in ancient India. Nearchos (4* century BC), and admiral of Alexander's fleet, was the first to mention that the Indian's used to unite letters on velt-beaten cotton cloth.

Wooden Board:-

The wooden board was used for purpose; writing on it could be with a piece of chalk. This method was used for teaching.

Paper:

Paper as a writing material was hardly known in India before the 11^{th} century A.D. Paper was first manufactured in China by Chinese prisoners and then introduce the fabrication of paper in Samarkand, and there upon it was made in various places. From 13^{th} century onwards papers was used regularly in India for writing.

Papyrus :

This writing material made from the marrow of the papyrus plant was smooth enough when new to the written on with the Egyptions's revealed fibre brush pen. It took their this carbon black ink and red iron oxide ink well and retained the pigments for long periods of time.

Metals:-

Metals have been used by man for recording as well as decoration. Metals used for vmting involves brass, copper, bronze and lead. Lead is soft and soon tarnishes when exposed to air, but suffers less than most metals from age and weather.

Parchment and Vellum:-

The terms parchment and vellum are often them used interchangeable, which is an error. True vellum is the skin of a young, usually not over six weeks old calf which has been cleaned adhering flesh, hair, fat and muscle, preserved by soaking in a lime solution and carefully scraped and polished.

Parchment is and ordinary made from the skins of sheep, ewes, or lambs, but the skin of other animals are sometimes used. Vellum has always been the choice of craftsmen for luxurious manuscripts and for expensive bindings. Parchment was used for bindings and Manuscripts of lesser quality.

Leather:

Until the 19^{th} century the most common covering for barks was animal skin preserved by tanning after the hair and flesh were removed. For two thousand years or more Vegetable tanned' leather was made by infusing skins with extracts of the barks of trees usually oak, sumac or hemlock. The chemicals in the bark solutions combined with the protein fibres of the skins, replacing the water and modifying the complete process consisted of washing the hides, loosening the hair in lime pits, scraping off the epidermis, hairs and flesh, soaking in bark solutions, and finally drying and finishing, colouring, polishing and graining etc.

4. DETERIORATION OF MANUSCRIPTS

- **Factors of deterioration**

Deterioration is an alteration in an object produced by interaction between the object and factor of destruction. Objects of organic origin are relatively more susceptible and subject to irreversible and inevitable decay in due course of time. The different types of deterioration are reflected in the form of wear and tear, cracks, shrinkage, brittleness, softening, staining, warping, bio-infestation, discoloration, dust and dirt accumulation, abrasions, holes, missing pieces, internal stress.

Manuscripts are susceptible to deterioration by physical factors, biological factors, chemical factors and human factors.

1. **Physical factor:** Light, moisture, water, heat, fire and particulates. These are also called environmental agents.

2. **Biological factor**: Fungus, Insect and Rodents

3. **Chemical factors:** Dust, Pollution, Acidy, oxidation etc.

4. **Human factor**: Innocence and negligence, Mishandling, Improper cleaning, improper storage, writing with ink.

A. Physical factor:

Light:

It can be broadly classified into natural light and artificial light. The natural light consist of cosmic rays, gamma rays, X-rays, ultra violet rays, infra-red rays, visible light rays. The ultra violet rays coming from the sun and other sources affect the cellulose bond of the paper and damage the leaves. The writing inks are also faded away by the ultra-violet rays. Light indirectly activates chemical deterioration. The extend of deterioration of manuscripts due to light depends upon nature of light, intensity of light and time of exposure. Shorter the wavelength, the greater is the proportion of ultraviolet radiation in light, the higher the damage. The more is the intensity and time of exposure the more is the damage.

Heat:

Heat is also and environmental factor. Heat also has and ageing effect on paper and over a long period can do considerable damage to it. In general, it can be stated that exposure to high temperature, even for short periods, will cause paper to become yellow and brittle, and low temperature will generally retard the process of ageing.

Heat (along with food and moisture) is one of the three conditions necessary for mold growth. Insects and rodents thrive in warm buildings. The temperature of the repository must be maintained within the limit of at least up to 40oC. If temperature is too low, then it will leads to the growth of

Micro-organism similarly if the temperature is too high, then it results in the cracks in the organic material.

Moisture:

As do heat and light, moisture works both for and against the preservation of library materials. A certain amount of moisture is necessary for flexibility in paper and vellum. Excessive moisture in paper encourages mold growth and too little makes paper brittle. Water in vapour form has a great influence on the deterioration of paper objects. Paper is a hygroscopic materials, it absorbs water when the environment is humid and releases water when the conditions are dry. In humid condition it become limp and 1 oses its rigidness. High humidity also encourages the growth of micro-organisms.

A temperature of 20-24oC and relative humidity of 55% arc most effective for the preservation of paper records. However, this type of climate must be maintained for all 24 hours, throughout the year. Even poor quality paper may survive long if kept in controlled climate.

Humidity:

It is the amount of moisture in the atmospheric air. Humidity shoud be constant in the stack room. Because of the absorbency property, the paper absorbs more moisture when humidity increases. By absorbing moisture it expands which causes the strength of the paper. The increase of Humidity accelerates bio deterioration, weakens the adhesives and sizing materials. It also makes to stick the paper on author. So the relative humidity to the stock should be 50% - 60% R.H.

B. <u>Biological factors</u>

Fungus:

Fungus damage the material on which they grow. Fungus degrades and causes stains on paper, leather and textiles. Moisture content above 75% in the air, even for short time encourages the growth of mould.

Insects:

More than seventy varieties of insects have been identified as enemies of library materials. Most common of these are cockroaches, silverfish and firebrats, termites, book-lice, book worms mud wasps, moths and bedbugs. Brief accounts of their characteristics are given below:

Silver Fish

Silver fish tend to feed on the products high in carbohydrates and proteins. Such materials as paper, glue, and gelatin are favourite of silverfish. They are fond of dark places. They gnaw holes in paper, manuscripts and photographs.

Cockroaches

Cockroaches are common household pests frequently found in libraries and museums. These brown or brownish black Shiny insects damage different kinds for material including paper leaves, book bindings, leather fabrics and other organic materials. They eat away paste flue from the back of book cover through the covering cloth of paper and leather binding. Their excreta, which is black in colour, also gets deposited on the books and manuscripts and discolours them, thus changing of their appearance.

Book Warms:-

Book warms are regarded as serious pest of paper records books, archival materials, etc. As their name suggests, they feed on paper and damage it profusely. The larva and beetles of these book worms are generally seen in the dark places. These beetles lay their eggs on the edges of book. The larva eats the book making tunnel in pages through the book or manuscript.

Book Lice

Booklice are small grey or pale yellow insects with soft bodies and jaws well developed for the purpose of chewing. They injure the binding of the books by eating the paste or glue. They are very common during late summer when temperature and relative humidity are high.

Termites:-

Termites thrive in tropical and subtropical climates. Although superficially resembling ants and sometimes called "white ants". They attack from the back of the cupboards and book cases and eat their way through wooden shelves, including architectural parts of buildings, cabinets, doors, etc If book and manuscripts get infested by termites, they can be destroyed and damaged in no time. They can attack any type of material containing cellulose.

Rodents

Rodents cause extensive damage to anything made of paper, leather, vellum, glue, paste, gelatin, etc. They destroy manuscripts by cutting them into pieces and they cannot be repaired and restored in their original condition.

C. Chemical Factors

Acidity:

The most insidious form of deterioration is caused by acid. The sourceof acidity in paper can be either intrinsic or extrinsic. Intrinsic acid is introduced during manufacture, for instance bleaching agents left in because of inadequate washing. The most common extrinsic source of acidity is Sulphur dioxide in the atmosphere.

Dust:

Dust act as an abrasive cutting down the fibres and reduce the strength of paper. Dust also act as a nucleus for condensation of acidic gases present in contaminated atmosphere.

Atmospheric Pollution:

The atmospheric contaminants that cause degradation of the manuscripts, books, etc., are smoke, industrial and exhaust effluents present in the form of solid particulates, gas pollutants and liquid aerosols. These can cause irremovable stains. The gasses like Sulphur dioxide(S02), Carbon

dioxide (CO2),Hydrogen sulphide (H2S), along with the dust and dirt particles which are in a suspended state in polluted air have adverse effect on paper.

D. Human factor:

Mishandling of the manuscripts while carrying them from one place to other can cause damage to manuscripts. Secondly, faulty conservation treatment of manuscripts can cause irreparable damage to manuscripts. Improper cleaning of manuscripts is also risky as damage to the manuscripts can be caused even by friction.

E. Accidental factor: -

Accidental factors include floods, fire etc. they are briefly explained below:

Flood:

Flood and other agents cause water damage. In and emergency such as floods, heavy rain splashing into the building, leakage of the roof, bursting of drainage pipes or water from fire fighting operations, the paper objects should be removed to drier surroundings; ideally where heat and humidity could be controlled. The conservator would then have to tackle three problems simultaneously; drying, fungal treatment and restoration.

Fire:

Fire can do the greatest damage to damage to museum objects especially those of paper, in a very short time. It is therefore, imperative that precautions and prevention against fire must be taken.

Electric wiring should be checked periodically. Inflammable products such as paints, varnishes, polishes, oil, organic solvents as well as cleaning fluid should be preferably stored outside the museum building, smoking must be prohibited in exhibition galleries, storage and packing areas. Automatic alarm should be installed at strategically places to detect fire. Their function must be checked by regular tests. Fire extinguishers must be kept in conspicuous place.

5. Conservation of manuscripts

Conservation is a concept, which includes two aspect viz., preservation and conservation. Preservation means any action taken to; prevent or stop retard deterioration. Restoration means any

action taken to treat objects for the purpose of correcting any alterations they have undergone. It is obvious that preservation makes an attempt to maintain the object in a physical and chemical condition. It is therefore an unending process. For better conservation we should know basic constituents of the materials, its character, method of preparation, factors of deterioration, proper storage preservation and restoration techniques. So Archivists, Librarians and other documents lovers should have the knowledge of paper and factors of deterioration for popper preservation.

The following conservation involves the following aspects:-

1. Preservation or Preventive Conservation.
2. Conservation treatment on Curative Conservation.
3. Restoration.

Preservation or Preventive Conservation

Preventive conservation is process in which we take all the measures to prevent the happening of damages. Creating and environment which is conductive to longevity of the documents/manuscripts and which makes the life the deteriorating factors impossible can do this. Preservation makes and attempts to maintain the object in a sound physical and chemical condition. It is therefore and unending process.

In order to prevent manuscripts from deterioration, preventive measures are taken to create and environment in which the deteriorating agents cannot act on the manuscripts. This includes protection of manuscripts from atmospheric pollutants from light, from insects, from temperature and relative humidity and proper storage and good housekeeping.

- **Preventive Conservation = Cleaning (General & Solvents), Guarding, Proper thread for Binding , Covering with cloth, Boxing, Oiling**

Protection of manuscripts from dust and atmospheric pollution:

1. The collection should not be kept in a dusty or polluted area.
2. The area around the building should be made dust free by planting grass and board leafed trees.
3. Important collections should be in inner rooms.

4. A series of door mats should be placed along the way to the collection room.
5. Manuscripts should be kept in closed showcases or boxes
6. Room furniture should be cleaned with a damp cloth or vacuum cleaner.
7. The air intake in air conditioner plants should be high up and should be in the least polluted side of the building e.g. the side not facing the traffic
8. Manuscripts should be covered when not being used or viewed.

Protection of manuscripts from light:

1. Light bulbs should not be used inside the showcases because they hat and dry up the air causing the manuscript to become brittle and break easily.

2. The intensity of light suitable for a manuscript is 40 lux. If the intensity is higher than 40 lux, bring it down to 40 lux by switching off extra lights or dimming them by dimmer switch.

3. Intensity of light can also be decreased by increasing the distance between the light source and the manuscripts on display.

4. Tube lights and sunlight have UV rays that damage manuscripts. Sunlight can be blocked by putting curtains on windows or on manuscripts

5. UV filters can be also be put on windows panes and tube lights to cut off these harmful rays.

6. Zinc oxide or titanium dioxide have a tendency of absorbing UV rays, so walls and ceiling can be painted with them.

7. When not in use, the manuscripts should be covered, the lights should be switched off when no visitors are seeing the manuscripts.

Protection of manuscripts from damage due to temperature and relative humidity:

1. Keep temperature and relative humidity constant as much as possible by keeping the manuscripts wrapped in de-starched cotton cloth in and inner room and keep moisture absorbent materials such as

cotton curtains and wooden furniture around collections. These materials act as buffers and absorb or release moisture slowly thus decreasing harmful effects of fluctuations.

2. The conditioning if used should be functioned 24 hrs a day, 365 days a year. Constant switching air conditioners on and off causes sharp fluctuation which damage manuscripts more than when they all stored without air conditioning.

3. The humidity level should be maintained at 55 to 60 % and temperature 21 to 250 C.

4. Keep tissues paper between manuscripts which have paintings on them to avoid damage due to abrasion and also act as buffer.

5. Avoid water accuraiulation near collection.

6. Relative humidity can be controlled by placing silica gel in the show cases.

7. Damp air, if present, should be circulated out of room using exhaust fans.

8. If manuscripts get wet, do not dry then in the sun, dry inside a shaded room with a fan gently blowing and press unpainted manuscripts between blotters.

Insecticides and Fungicides

Archival materials are treated with fungicide and insecticide by fumigation method to control fungus and insect. Fumigation is a process to treat the affected documents in airtight chamber with wire mesh support by using evaporating chemicals of fungicide or insecticide. Mostly thymol is used as fungicide and para di-chloro benzene is used as insecticide as well as fungicide. Some oyher chemicals like Naphthalene balls; Naphthalene bricks are used as insect repellent.

CURATIVE CONSERVATION OF MANUSCRIPT

The procedures of different steps of curative conservation depend on several considerations which include the condition of the manuscript, its future use, its aesthetic importance, inevitability, and, the financial resources of the repository. Some of the principal operations which could be carried out for curative conservation of manuscript are

I. Cleaning- Dry cleaning

II. Removal of previous repaired material (if any)

III. Fixing of ink and pigments (if ink and pigments are water soluble or soluble in other solvents used during conservation work.)

IV. Aqueous cleaning

V. Solvent cleaning

VI. Bleaching

VII. **De-acidification**

VIII. Repair

IX. Strengthening of manuscript (in case of brittle manuscript)

X. Lamination

XI. Encapsulation

PART 2

SARASWATI MAHAL LIBRARY---The Manuscript of this library represent:

1. The collection of works on art, science and literature of Tamils from time immemorial.

2. The collection of the works of the vijayanagara renaissance brought under the Nayak rulers of Tanjore between 1535 to 1673 A.D.

3. The collection of works brought to Tanjore by the Maratha rulers.

4. The collection made by Maharaja Serfoji from all over India.

5. The collection of works, written by scholars in the country of the Nayak and Maratha kings of Tanjore between 1535 to 1855, and

6. The later collection from the families of great scholars.

SANSKRIT MANUSCRIPT COLLECTION

A major part of the manuscript of this library is in Sanskrit language. A total number of 39,000 (approximately) manuscripts out of 49,000 belonging to this language. The Sanskrit manuscripts collection of this library has a unique value in that it preserves the literary works of authors spread over 400 years.

The scripts used in Palm leaves are Grantha, Devanagari, Nandinagari, Telegu and few in Malayalam, Kannada, Oriya etc. The paper manuscripts are in Devanagari script. This collection covers almost all branches of Sanskrit literature viz. Kavya, Nataka, Kosa, Chandas, Alankara, Vyakarana, Nyaya, Vaiseshika, Sankhya, Yoga, Vedic literature such as Samhitas, Brahmanas, Aranyakas, Upanishads, Art literature like Natya, Sangita, Kamasastra, Vaidya, Jothisha etc., are available.

Dr. A.C.Burnell prepared a list for the Sanskrit manuscripts of this library and described this collection as, "it may perhaps be asked of the library is worth the labour spent on it. I can answer unhesitatingly that it is, it is now a recognized fact that nearly all Sanskrit works of importance exist in different recensions. The library is unrivalled in this respect. It contains several good manuscripts of all the most important ones known as yet including a few that are now. Sanskrit manuscripts have long been very clear and cost of making paper transcript is now heavy. As for as I can judge it would not be possible to form a collection like that at Tanjore at a less cost than £ 50,000 but many manuscripts are unquestionably unique."

TAMIL MANUSCRIPTS

The total number of Tamil manuscripts is roughly about 3500 which comprising 7000 titles on Literature and medicine. Mostly they are in palm leaves and they belong to the following categories.

1. Rare commentaries on Sangam works.

2. Unpublished portions of classics.

3. Saiva, Vaishnava and Jain works.

4. Later poetry of all description and

5. Medical works of exceptional value.

The medical manuscripts are very unique and valuable. Many of them are based on the medical records which were practiced in Dhanvantri Mahal (A hospital was run by the Raja Serfoji) and written by famous Tamil scholars like Kottaiyur Sivakkolundu Desikar etc., The range of literature is extended to grammar, mathematics, ethics, lyrics, epic, medicine, the philosophical treatise the religious literature on Saivism, Vaishnavism, Jainism, Architecture, Astrology, Mantras etc., These manuscripts were catalogued and published in 18 volumes in descriptive form.

BURMESE SCRIPT

A palm leaf manuscript of Sanskrit language in Burmese script dealing with Buddhistic philosophy.

Along with the above manuscripts, Sanskrit manuscripts and Oriya scripts. Mantra Sastra manuscripts with diagram and scrolled manuscripts are exhibited.

VALMIKI RAMAYANAM

A bundle of palm leaf manuscripts in grantha script kept in the show case contain 24 thousand slokas of Valmiki Ramayana. It is a unique feature to the skill of the ancient scribers. Each palm leaf measures 3" × 9". Both sides of all these leaves bear thirty lines with miniature grantha letters, impossible to read with naked eyes.

KAMBA RAMAYANAM

Tamil literature would be incomplete without Kamba Ramayanam. It is a classic and often celebrated poem. Though Kambar borrowed the plot for the epic from Valmiki, he excelled the original. This is one of the biggest palm leaf manuscripts bundles in this library society (size 19" × 11" × 1.5") written in Tamil by Vasudeva Pillai (A.D.1719). It contains of seven kandas in 537 leaves.

PANCHAPAKSHI SASTRAM

This is one of the smallest palm leaf manuscripts available in this Library. It is a pocket size edition of a palm leaf work dealing with Astrological facts predictable through five birds. Now a days astrology is considered to be a Vedic Science. It is not a superstition.

PALM LEAF MANUSCRIPTS

Most of the early manuscripts are in palm leaf form. The method of writing i.e. incising with metal pen (stylus) and Blackening with vegetable juice and lamp black was followed. Some palm leaf manuscripts like oldest, largest, smallest, illustrated and other interested manuscripts are exhibited.

PART 3

DIGITIZATION AND DOCUMENTATION OF MANUSCRIPTS AND OTHER CULTURAL HERITAGE OF THE IGNCA

The Indira Gandhi National Centre For The Arts (IGNCA) promotes interdisciplinary research in arts . The Centre became a major repository of reference materials on Indian art and its outstanding collections include manuscripts , slides, rare books, photographs etc. The manuscripts collection at IGNCA features over 20 million microfilmed folios of unpublished Sanskrit, Pali, Persian, and Arabic manuscripts on different aspects of

Indian art and culture. Manuscripts are acquired from major institutions across the country like Khuda Baksh Oriental library, Saraswati Bhawan library, National Museum etc. The IGNCA has over 1 lakh slides on Indian arts and architecture from India and foreign collections. Audiovisual collection of IGNCA includes over ten thousand hours of visual materials pertaining to the field of art.

The IGNCA in collaboration with the Ministry of Communication and Information Technology initiated a project KALASAMPADA (Digital Library : Resources of Indian Cultural Heritage)for the development of a databank on cultural heritage.

KALASAMPADA aims at facilitating the access to these considerable materials including over a couple of lakhs of manuscript folios, over a lakh slides, thousands of rare books etc. It has made use of multimedia computer technology for the development of a software package that offers many kinds of cultural information all at once through a walk-through model. This project aims at building a digital repository of content and information with a user-friendly interface. The knowledge base

thus created, it is certain , will help scholars to explore and visualize the information stored at multiple levels. Digitization , post digitization editing and integration are continued to encompass al such materials available in the IGNCA.

A retrieval application has been developed and the majority of these materials are available for online access on the IGNCA intranet. User interface of the application is simple and many institutions have approached the IGNCA for a copy of the same. The search opotion is available both in English and Hindi . Users have the option to select the material of their interest either from a specific type of collection like books, manuscripts, slides, audio, video etc. or from the collective database. The Kalasampada Project received the prestigious GOLDEN ICON AWARD for exemplary implementation for e-Governance Initiative under the category of BEST DOCUMENTED KNOWLEDGE AND CASE STUDY for the year 2004 from the Dept. of Administrative Reforms and Public Grievances , Govt. of India.

PART 4

Audio study material, S.B. 1.mp3

PART 5

Audio Study material, S.B. 2.mp3

PART 6

PREVENTIVE CONSERVATION OF MANUSCRIPTS

Conservation of human experience and knowledge are the base for the development of Culture and Civilization. In early dates face-to-face communication was done through body gestures, symbols and sounds. Later it was systematically developed as language. Necessity arouse to record human experience and knowledge for the benefit of others and future generation. At first, the material used for writing was Rock. The Cultural developments are the reason for urge to write and lead to search new writing materials, such as clay tablets, metal sheets, wooden planks, barks and leaves of trees, papyrus, leather, parchment, vellum, cloth and paper. After invention of paper it replaced all other writing materials.

In view of rarity and its importance, the writing materials were preserved in the Temples, Palaces and Houses of learned scholars, only in twentieth century; various libraries and Archives were formed in National level for public, Academicians and Technical peoples. Most of the Archival materials are in the form of Palm leaf and Paper. The paper-based materials are organic nature, which are subject to deterioration by some living organisms, Atmospheric change and other factors of deterioration. The art of preservation is not new. It was known from the inception of writing materials. In ancient days people used some indigenous materials for preservation. The development of science and Technology pave the way for better conservation techniques for the Archival materials and other cultural properties.

Conservation

Conservation is a concept, which includes two aspects viz., Preservation and Restoration. Preservation means any action taken to; prevent or stop or retard deterioration. Restoration means any action taken to treat objects for the purpose of correcting any alterations they have undergone. It is obvious that preservation makes an attempt to maintain the object in a physical and chemical condition. It is therefore an unending process. For better conservation we should know basic constituents of the materials, its Character, method

of preparation, factors of deterioration, proper storage preservation and restoration techniques. So Archivists, Librarians and other documents lovers should have the knowledge of paper and factors of deterioration for proper preservation.

CONSERVATION OF PALM LEAF MANUSCRIPTS

The Leaves of palm trees were used as a writing material because the palm trees were grown abundantly in India and South Asian countries. The palm leaves were the cheapest and most easily available material. If well treated and carefully maintained, it has a reasonably long life and highly durability. Since India and South Asian Countries are in tropical region, the hot and humid climate conditions had an adverse effect on palm leaves. It is very difficult to preserve palm leaf manuscripts more 500 years in an ordinary condition. We can preserve more than 500 years, if we have special arrangements to keep constant temperature and humidity.

TYPES OF PALM LEAVES

There are various types of palm trees available. But only the following three types were used commonly for writing purpose.

1. Corypha Umbraculifera
2. Borassus flabellifer
3. Corypha Utan

The palm tree Corypha Umbraculifera is known as Shritala or Talipot, which grows in humid coastal areas of South India, Ceylon, Malaysia, Andaman and Thailand. It is also called as Talapana, Coondapana or Talipanai. The leaves are broad and lengthy. Surface is smooth and thin; the leaves are more flexible than other types. The Tree produces huge dark green spiked leaves about five meters wide supported on stalks three meters long. The surface is smooth and thin. The leaves are more flexible than other types.

The Borassus flabellifer is known as Palmyra grows in comparatively dry climate, which is abundantly available in South India. These leaves are thick and length and they are not more than 2 feet. The size and thickness of the leaves are varied according to the fertility and water sources of the area. The leaves of Palmyra palm are less resistant than Shritala to decay.

The third variety Corypha Utan known as Lontar was mostly available in Burma and Thailand. The leaves have mixed character of the Talipot and Palmyra palm leaves. The Lontar leaves are lengthy, broad and thick. Most of the Burmese manuscripts are in these leaves.

SEASONING OF PALM LEAVES

For writing on palm leaves, five to six month old leaves were collected, separated, removed the edge ribs and dried in the shadow. After drying, edges of the leaves were cut into convenient length for writing and burnished the surfaces. Two small holes were made for passing thread to tie. The holes were put in such a way that they divide the leaves more or less in three equal parts. The burnished leaves can be used for writing on surface. But incising method the leaves were need seasoning. Seasoning of palm leaves means softening the surface of palm leaves. The process of seasoning of palm leaves was varied from place to place. Some of the seasoning methods are,

1. The leaves were boiled in water or milk.
2. The leaves were boiled in steam, after boiling they were buried in wet sand to keep their softness.
3. The leaves were buried in wet sand to obtain considerable Softness.
4. The leaves were frequently applied with gingili oil to make them smooth.
5. In South India the leaves were kept along with the wet rice straw for seasoning.
6. In Thailand, leaves were placed between two wooden planks and kept in a special kiln

The seasoning process gives softening the surface for writing and extraction of lignin. After seasoning the soft surface were burnished with conch shells or polished stone to make it further polished and smoothened.

WRITING ON PALM LEAVES

Writing on palm leaves were done in two ways, one was to incise on the leaves with stylus and other one was to write with ink on leaves using bamboo pen or brush. The stylus or salaka, made up of iron, steel, brass, bone, ivory with pointed tip were used for writing. Some of the metal stylus had pointed tip at one end and sharp knife on the other end.

For writing this method the seasoned leaves with good support must be carried on the left hand fingers and the stylus in the right hand. While writing, the left hand thumb would support the pointed tip of stylus for movement. The incised leaves were treated in two ways to give clarity of the letters. Turmeric water was applied over the surface of the leaves that were kept in pooja. Mostly Ramayana and Mahabharata manuscripts were applied turmeric paste for keeping them in pooja. Other manuscripts were applied with a mixture of vegetable juice (Cocina indica) and lamp shoot (prepared using castor oil) for clarity of letters. Now-a-days lamp shoot mixed with some volatile vegetable oils like citronella oil is used for this purpose. After writing, the leaves were arranged and string with two wooden planks of soft wood like mango or bamboo. Some times, teak wood was also used to avoid insect damage. One end of the thread used for string was tied with a parrot beak shaped palm leaf with its rib. If the manuscript has more than 200 leaves, the thread cannot hold the leaves. It causes damage to the holes of the leaves. Hence a small rod made up of copper or bamboo strip was pierced into the other hole of the manuscripts. In North India palm leaves were written with ink using pen or soft brush, because the scripts are not circular form for writing.

DETERIORATION AND TREATMENT OF PALM LEAVES

Palm leaves are cellulose fiber content materials, though which are having very good tensile strength compared to paper; it becomes very brittle due to dryness. Lignin present in palm leaves is susceptible to oxidation and hydrolysis, yielding acidic derivatives, which affect the fiber bond of the leaves. Like paper the palm leaf manuscripts have some special problems.

In South India, palm leaf manuscripts were preserved in the houses of Pandits, Temple treasures, Religious mutts and Royal Palaces. In the learned people's houses, the palm leaf manuscripts were kept in the kitchen (Those days they used fire wood) to preserve from fungus and insects. In Ancient days mostly thatched houses were built with mud walls. Due to heavy rain most of manuscripts were affected with fungus and insects. To avoid fungus and insect attacks the palm leaf manuscripts were kept in hanging position. Mostly the kitchen would be warm and smoke deposit over bundles keeps away the insects. Every year after rainy season the manuscripts were cleaned, dried and verified the condition.

ANCIENT PRESERVATION TECHNIQUE

The knowledge of preservation is not new to Indians. From ancient days several indigenous materials were used for preservation. They understood the four basic factors for deterioration i.e. dust accumulation, direct sun light, heat and humidity. To Overcome these problems manuscripts were covered with mostly red colour silk or cotton cloths. The cloth will control dust, light, heat and humidity. They used red colour cloth because "Red colour" itself acts as repellent to insects. That was the reason that in ancient South Indian houses were drawn with red lines in front of the houses in the month of December - January. The reason was to avoid insects entering into houses after rainy season. This is the reason, the spine of the Back volumes were bound with red colour cloth or leather in most of the Indian Libraries. Since Turmeric has germicidal power. Turmeric paste or water was applied over the leaves to avoid fungal attack. Most of the paper manuseripts in the Sarasvati Mahal Library were treated with turmeric paste.

Some of the indigenous vegetable materials used to keep away insects are :-.

Margosa Leaves (Neem Leaves) (Azadirachta indica): It has a bitter taste and an oily compound present in the leaves. Not only the leaves, the powder of the neem seed also used to keep away the insects from the storage. So, dried neem leaves were kept in the bundles. Tobacco, Camphor, Black cumin, Sweet flag, Snake slough, Peacock feathers was also used as insect repellent. Even now these indigenous processes are followed in some Libraries and Museums in India.

The Thanjavur Maharaja Serfoji's Sarasvati Mahal Library, at Thanjavur use a mixture of the following spices in powder form:

Black cumin	4 parts
Sweet flag	4 parts
Cloves	1 part
Pepper	1 part
Bark of cinnamon	4 parts

20 grams of camphor is to be added with this powder mixture and wrapped in a small cloth as bundle. These bundles are kept in the cupboards as insect repellent. This is effective for six months.

FACTORS OF DETERIORATION: of PLAM LEAVES MANUSCRIPTS

STAINS AND SPOTS: Stains of insects' excreta, dust accumulation, lamp shoot, fungus etc., could be occur on the surface of the palm leaves. These stains can be removed by mechanically or water with Alcohol or solvents like Acetone or Citronella oil or Camphor oil or Lemon grass oil. Cotton or Soft cotton cloth may be used for cleaning the leaves.

DISCOLOURATION OF THE SURFACE: Discoloration of the palm leaf may be due to presence of lignin, which reacts with light and other atmospheric gases to form acidity. Some time discoloration may be formed due to frequent application of oil with dust or smoke deposit or fungus stains. The appearance of the incised leaves can be improved by cleaning with distilled water and dilute neutral detergent solution.

FUNGAL EFFECT: In a humid condition the palm leaves and the dust accumulated on the manuscripts absorbs water. In a suitable climate the fungus may grow over the leaves. The fungus makes stains and spoiled the glazy layers. Due to the growth of fungus, the leaves stick one another and make the leaves soften. When the affected leaves dried it is very difficult to separate the leaves, which leads to cleavage and crumbling.

SPLITTING AND CLEAVAGE OF THE SURFACE LAYERS:

The main cause of splitting in the surface of the leaf is variations in the climatic conditions. The splitting on the edges are due to rough handling and storage. Due to the fungus affect the irregular surface softness make cleavage of surface layer from the main body of the leaf. This problem is mostly found in the shritala manuscript. A solution of ethanol and water can be used to soften the separated portion and can be fixed using PVA emulsion adhesive.

INSECT DAMAGE:

Palm leaves are soft organic materials. Insects were attracted, when palm leaves absorbs more moisture or at the time of fungal attack. By experience it is found that the most common insect, which affect palm leaves are cockroaches, termites and worms (Gastrallus indicus). The first two destruct very fastly. They start from the surface of the bundles, but they eat surface of the leaves and fix the leaves one another.

BRITTLENESS AND WEAKENING OF THE LEAVES:

The aged and dried palm leaves loose its water and oil content and become brittle. The acidic materials in the atmosphere affect the fiber bond of the leaf and it becomes very brittle. The edges flake and crumbled with slight touch. Several methods are followed to make the leaves flexible. Any volatile vegetable oils such as citronella oil, camphor oil, lemon grass oil, sandal wood oil, clove oil, cedar wood oil etc., are used in different parts of India. The usage of these oils gives not only flexibility to the leaves but also it acts as an insect repellent.

REPAIRING:

Repairing was done in many ways for the damaged or broken leaves. In ancient days, stitching method used to join the broken palm leaves, later cello tapes and other papers with adhesives were used to join the broken leaves. Difficulties and problems lead for new techniques. Now broken palm leaves are joined using Gesso (the new palm leaf powder with PVA Emulsion) to join the leaves.

In foreign countries Encapsulation method is followed. In this method after cleaning the leaves, each leaf is kept in between chemically inert polyester film and sealed the edges. For sealing cello tape used. Some institutions ultra sonic sealing method is used. Since less number of manuscripts available in western countries they took much care for their preservation.

Most of the fields in India are followed the development and techniques of other countries. The field of conservation is not exception, due to the influence of western culture and techniques, we lost our own techniques. But to-day Japanese Conservation technique influenced all over the world, which makes to use less usage of chemicals for conservation of cultural properties. Now the modern trend is chemical less conservation. In General, conservation process for a country would not suitable for other countries with different climatic conditions. Hence we have to find out our conservation process and materials for conservation of cultural materials flourished in India.