Chapter – 2

Review of Literature

2.1. Introduction

Preservation and organization of manuscripts are the thrust areas of research and as a result, a good number of publications are seen in this area of study. But digitization has brought other problems such as standardization of bibliographic description, choice of appropriate subject headings and its limitation in long term access to information. Simultaneously, proper care and preservation are to be adopted for the original documents. However, a review of literature of manuscripts shows that maximum emphasis has been given on the following:

➢ Types of manuscripts;
➢ Processing of manuscripts;
➢ Organisation of manuscripts;
➢ Preservation and conservation of manuscripts; and
➢ Digitization of manuscripts.

This chapter is divided into five sections: Section – 2.1 provides the review of literature relating to the types of manuscripts; Section – 2.2 presents the review of literature concerning the processing of manuscripts; Section – 2.3 presents the review of literature with reference to the organisation of manuscripts; Section – 2.4 depicts the review of literature regarding the Preservation and Conservation of manuscripts; and finally, Section – 2.5 portray
the review of literature regarding the Digitization of Manuscripts. The details of each section are as follows:

2.2. Types of manuscripts

The review of literature under this category starts with a valid definition of a manuscript. Manuscript is an Antiquity.

*Government of India (1972)¹* defined the Manuscript, in the Antiquities and Art Treasures Act–1972, as any manuscript, record or other document which is of scientific, historical, literary or aesthetic value and which has been in existence for not less than seventy-five years. If this definition is taken into consideration in phase value, a manuscript means:

1. a hand written document
2. which has scientific, historical, literary or aesthetic value and
3. which is at least seventy-five year old.

According to *Agarwal (1982)²*, Palm-leaf manuscripts are produced from two main types of palms: palmyra, and talipot. The palmyra leaf is rather thick and inflexible, inclined towards brittleness over time. The talipot is thinner and more flexible, with excellent lasting qualities, reportedly for as long as 600 years.

*Agarwal (1984)³*, expressed that although there is often some variation in size in different areas, palm-leaf manuscripts seem to average 48 centimeters in length and 4 centimeters in width. There is a considerable range of "book" thicknesses, and he has treated single works of over 40 centimeters in thickness. Each "book" or bundle of leaves is usually fastened together with braided cords
threaded through two holes pierced through the entire body of the manuscripts about 4 centimeters from each end or by the insertion of bamboo splints. The resultant "binding" is finished by the addition of heavy wooden covers at the front and the back, also tied by the braided cords or wrapped with webbing. There are generally two techniques used for writing on the manuscripts: through incisions with a pointed stylus, and by writing directly with a pen or brush. Most of the manuscripts that he encountered in Burma, Cambodia, and Thailand, have been incised, with occasional additions or emendations written by pen on the surface. Incised writing is made visible by the application of a mixture of lampblack and oil, although sometimes other materials have been used, notably mixtures of bean plant juice, tumeric, and oil.

Datta, Amaresh (2005) stated that Meckenzie, a civil servant of the East India Company 1783-1821, collected copies of numerous inscriptions and kept a permanent record of them in Telugu. The Meckenzie Manuscripts are a mine of information on the conditions of the southern India and the Andhra Pradesh from ancient times to the beginning of the 19th century. Datta, Amaresh also stated that Jain Grantha Bhandars (Rajasthani) remained literary centres for many centuries. Rulers as also the educated masses took great interest in literature. Grantha Bhandars were established in temples and upasaras. The collection of manuscripts in Jain Grantha Bhandars of Jaisalmer, Nagaur, Jaipur, Ajmir and Bikener is, perhaps, the largest existing collection in India. There are about three to four laks manuscripts available in these manuscripts in the Grantha Bhandars. The manuscripts collected there are in Prackrit, Sanskrit, Apabramsha and old
western Rajasthani, from which Gujarati and Rajasthani languages emerged in around 13th century. Under the Sahitya Shodh Vibhag of the Digambar Jain Atishaya Kshetra, Shri Mahavirji, has so far published five volumes of catalogues covering about fifty thousand manuscripts. Many more remain to be catalogued and the work is in progress.

According to Dean (1997), the parabaiks are usually made up into accordion-folded books, often lacking covers. The white parabaiks were sometimes richly illustrated in quite sumptuous colors, and are obviously intended to be permanent works. The black parabaiks were not intended to be permanent works, as the writing may be easily erased, and research has found that black parabaiks were sometimes used to produce early drafts of palm leaf manuscripts. He found parabaiks to be extremely robust and stable, even when stored in the most adverse environment, where the most serious enemies seem to be fungus and insects. Repair is sometimes necessary when insects and/or rodents have eaten the edges of the manuscripts, leaving multiple losses on the folds. These are repaired through the use of Japanese tissue with rice starch paste or the mixture described above. When work on both palm leaf and parabaik manuscripts has been completed, they should be placed in protective enclosures and boxed with a small amount of insect repellant.

According to Hassel (1974) Types of Manuscript available in SORI are as follows:

(a) Palm leaf Manuscript: In India maximum manuscripts of ancient period are written on palm leaves. Palm leaves are usually 37 inch in length and
3 inch in width. The palm leaves were boiled and then were rubbed by couch shell for smoothness. Then with the help of iron pen, letters were scratched and ink was pasted on them simultaneously. This method was popular in South India. Hot atmosphere is harmful for palm leaves. The palm leaf manuscripts if kept in paper or cloth, is mutilated. In SORI only 3 palm leaf manuscripts are available.

(b) Birch Barks Manuscripts: Birch tree is found in Himachal Pradesh. Its inner bark is just like papers which were used for writing. Sometimes its length is found to be 60'. These were cut into pieces as per requirement and then were written with different inks. The manuscripts written on birch barks are generally found in Kashmir and north India. In SORI only 3 manuscripts of this type are available.

(c) Paper Manuscripts: It is said, that first of all, the paper was made by Chinese peoples. In ancient India also the paper was made. In our country, many types of papers are famous for writing, like Kashmiri, Moghulai, Ahmadabedi, Daulatabadi, etc. The paper used, was prepared by hand using different raw material like bamboo, cotton, etc. In SORI most of the manuscripts available are on paper. Leather, Cloth and Wooden manuscripts are not available at SORI.

**Indira Gandhi National Centre for the Arts (IGNCA)** has been working for the digital preservation of manuscripts in Assam. The news report ‘Conservation of 6,548 sanchipats completed’ published in the Assam Tribune, dated 17th September, 2008, informed that Cultural Informatics, a branch of the
IGNCA has successfully completed the identification, conservation and digitization of 6,548 numbers of rare and valuable manuscripts of Assam. These manuscripts are available in different media like sanchipat, palm leaf, paper etc. Out of these manuscripts, 4,396 were on sanchipat, 259 on paper pulp, 1,892 on modern paper and 1 on palm leaf, collected from 126 sources of the State, including the Satra institutes scattered in different places of Assam.

According to Khine, Myat (1986)⁸, a common form of manuscript is the parabaik, a manuscript constructed from crude, but very strong, paper made of bamboo, bark, straw, or leaf fiber, sometimes referred to as "sa." Parabaiks are generally made up of two types: "white" parabaiks, written in black ink on the uncolored surface; "black" parabaiks, written with a limestone or chalk pencil on a black surface.

National Mission for Manuscripts (NMM, 2003)⁹ was created in the year 2003 with a view to preserving and conserving this knowledge base as well as disseminating the content of manuscripts to scholars and people at large. It has come a long way since then and has fruitfully contributed to creating a database of more than 30 lakh manuscripts, training conservators all over the country, creating a resource pool of manuscriptologists and palaeographists and providing support to institutions for preparing descriptive catalogues. It has also helped in creating awareness about manuscripts through outreach programmes like lectures and seminars. By publishing the lectures and proceedings of seminars, the contents have been rendered accessible to a much larger audience than would have been otherwise possible. During the history extending over 5000
years, India has produced a large wealth of literature. This vast knowledge
treasure was written on different kinds of material like birch bark, palm leaf, cloth,
wood, stone and paper. India perhaps has one of the oldest and largest
collections of manuscripts in the world. They are in the custody of different
institutions like libraries, museums, monasteries, mosque and individuals. Many
of them have disappeared and a large number are in a state of damage/decay.
India has lost huge manuscript collection in Buddhist monasteries like Nalanda,
Taxila & Vikramshila. Taxila at the North West front of India was destroyed by
foreign aggression. Nalanda library known as Dharmganj had 3 sections
Ratnadodhi, Ratnasagar and Ratna Rajak. Ratnadodhi was a 9 storied library.
First Hun king Michirkul damage the library in 450-470 AD. In 1205 AD Bakhtiyar
Khilji destroyed it completely and his soldiers use the manuscripts for boiling
water.

Ramesh and Chakraborty (2009)\textsuperscript{10} stated that the glorious past of Indian
culture lies in the ancient manuscripts. These are the basic historical evidence
and have great research value. It is estimated that India possesses more than
five million manuscripts, making her the largest repository of manuscript wealth in
the world. Though our ancestors had tried to preserve these manuscripts,
thousands of such valued unpublished Indian manuscripts on varied subjects are
lying scattered or fragmented in India and foreign collections and some of these
are no longer accessible to research scholars. This invaluable and unique pool of
knowledge is under threat and manuscripts are disappearing at an alarming rate.
2.3. Processing of manuscripts

Agarwal (1977)\textsuperscript{11} mentioned that the most important constituent of paper is fibre cellulose and the other constituents are starch, sugar, lignin and some other carbohydrates. Lignin, which is present in large quantities in wood, is most vulnerable to destructive agencies than cellulose. For this reason all cellulose paper, for example all rag papers are considered safer for preservation. Agarwal studied the effect of environment on the preservation aspect of paper. The study is confined to the effect of climate i.e., humidity, heat, light and atmospheric pollution. He is of the view that paper, being hygroscopic material, absorbs water when the environment is humid; and giving off water in dry conditions and give rise to microbiological growth in excess humid conditions. Like wise exposure of paper to high temperature makes the paper brittle, gradually they become yellow and get charred. So also light, natural as well as artificial, poses great danger to paper materials. Besides some common atmospheric pollutants that are harmful to paper documents are water vapour, dust, carbon dioxide, sulphur dioxide and nitrogen oxide.

Agarwal (1984)\textsuperscript{12} mentioned the process of seasoning of the palm leaves that are prevalent at South Asian countries namely India, Sri Lanka and Thailand. According to customs prevailing in South India, fresh palm leaves are dried in the shade and then gingili oil is applied over their surface to make them smooth. In some parts of South India, tender palm leaves are hung for several days in kitchen where smoke is emitted. Afterwards they are cleaned and used for writing. In Sri Lanka, the usual practice is first to boil fresh young palm leaves in
water or sometime in lime water for a few hours, and then the leaves are dried in shade and the leaves are cut as to the required size. In Thailand, the method of processing palm leaves (known as bai-larn in the Thai language, the palm-tree being called larn) is considerably different. After being cut from the tree, the leaves are dried in shade. Their stiff ribs are removed with sharp knife, and then cut to a uniform size. For processing a kiln is heated by wood or rice-husk. The leaves are fastened together in heavy wooden frames and kept inside the upper compartment of the kiln for nearly 24 hours, as a result of which, a kind of black oil exudes from the leaves and is deposited on the side of the bundles which later rubbed off with a cloth and the bundles are opened. Each leaf is wiped free of exudation with a cloth followed by exposed to open fire for few minutes and finally the leaves are polished.

Bouche, Anne-Marie (2003)\textsuperscript{13} states that the exhibition documented in the handsome volume, Leaves of Gold, brings together rarely-exhibited treasures from eleven Philadelphia-area museums and libraries, some eighty items, mostly codices, rolls, detached leaves and individual illuminations cut from manuscripts. The majority represent the collecting activities of art-lovers and bibliophiles active in and around Philadelphia over the course of almost two centuries, from the late 1700s to the 1940s. The catalog combines beautifully-reproduced images, general essays and original scholarship. It thus envisions two audiences: the non-specialist will find here an attractive access to the subject of medieval illumination, while specialists will profit from the new research available in these catalog entries.
Chandrakar, Rajesh (2002)\textsuperscript{14} states that in this Internet era, when everything is going on the Web, character encoding becomes an issue for developers and facilitators. This matter also concerns India, as a country with rich diversity in languages, cultures, customs and religions, which are stored in print media as manuscripts, monographs, pamphlet, tamra-patras (copper plates), palm leaves etc. Library and information networks in India hold the responsibility to digitise all those valuable resources stored in print media and make them accessible to users through the Web. However, due to technology limitations, so far it has not been practical to do so. This paper tries to explain the limitations and problems being faced in this regard, highlights the issues involved with multi-script database creation and the required state-of-the-art technology. Finally, Unicode is considered as a solution as it is a Universal Character Set for character encoding.

Dean (1997)\textsuperscript{15} expressed that the related research on neem (maragosa) at Cornell has demonstrated its insect repellent qualities, thus all future treatment by Cornell will involve neem oil. If oiling alone is done, the oil can be lightly applied by laying the leaf onto a piece of glass or polyester film, and laid onto the leaf with a soft brush. Leaves should be air-dried in a constant flow of air to avoid molding. Although sometimes lampblack is mixed with the oil and applied to the leaf to help clarify the writing after treatment, my experience has indicated that minute amounts of surface oil and soil, washed from the leaf surface during cleaning, lodge in the incisions and provide ample clarity of the lettering against the clean surface of the leaf. If detergent is used to remove the old oil however, it
may be necessary to mix a small amount of fine powdered lampblack with the oil, and apply it with a soft cloth or cotton wool. The dark residue can be cleaned off with ethyl alcohol. Similarly, it is sometimes the practice to color repair pieces (tissue, palm-leaf fragments, wood veneer), but he found that final oiling alone helps the repairs to blend into the leaf without this added coloring. After cleaning, repair, and oiling, the manuscript should be lightly polished with a soft dry cloth, restrung with cord, cased, and boxed, together with a small amount of insect repellent.

Gilbert, B, Denoël, S, Weber, G and Allart, D (2003) have stated that the majority of the literature describing green colored materials used on ancient painting layers (15th or 16th century), two copper greens are mainly cited: malachite $[\text{Cu} \text{CO}_3 \cdot \text{Cu(OH)}_2]$ and verdigris $[\text{Cu} \text{(CH}_3\text{COO})_2 \cdot [\text{Cu(OH)}_3]_2 \cdot 2\text{H}_2\text{O}]$. It is shown, by micro-Raman spectroscopy, that the artists were actually employing more than these two copper greens, in particular various copper sulfates, among which the most common pigment found is posnjakite $[\text{CuSO}_4 \cdot 3\text{Cu(OH)}_2 \cdot 2\text{H}_2\text{O}]$. In contrast to the PIXE (particle induced X-ray emission) technique, Raman spectroscopy is a technique of choice, able to distinguish not only a copper sulfate from a carbonate or acetate but also the different sulfates themselves; in this respect, we found that the high wavenumber region (2800–4000 cm$^{-1}$), characteristic of H$_2$O vibrations, is of particular interest. It is also shown that numerous green areas were created with mixtures of a copper sulfate mixed with other pigments, for instance to enhance the colour depth. Finally, in some cases, no green pigment is actually employed but the colour is obtained by intimately
mixing yellow and blue pigments. All these results led to a new look at the pigments which were in use on the palettes of the ancient artists.

Jimerson, Randall C (2002)\textsuperscript{17}, states that the archives and manuscripts require special techniques based on their distinctive nature as the byproducts of transactions rather than the result of delivery or creative endeavors. They are natural, organic, impartial, authentic and unique materials that acquire significance from the context of their creation rather than from their subject matter. Archival principles of provenance, original order and collective description ensure the preservation of these important qualities. Understanding the nature of archives and manuscripts forms the basis for the archival theory and practices that anyone responsible for such collections should know.

Pagel, Ulrich (2003)\textsuperscript{18} presents a technique for estimating the spatially-varying reflectance properties of a surface based on its appearance during a single pass of a linear light source. By using a linear light rather than a point light source as the illuminant, we are able to reliably observe and estimate the diffuse color, specular color, and specular roughness of each point of the surface. The reflectometry apparatus we use is simple and inexpensive to build, requiring a single direction of motion for the light source and a fixed camera viewpoint. Our model fitting technique first renders a reflectance table of how diffuse and specular reflectance lobes would appear under moving linear light source illumination. Then, for each pixel we compare its series of intensity values to the tabulated reflectance lobes to determine which reflectance model parameters most closely produce the observed reflectance values. Using two passes of the
linear light source at different angles, we can also estimate per-pixel surface normals as well as the reflectance parameters. Additionally our system records a per-pixel height map for the object and estimates its per-pixel translucency. We produce real-time renderings of the captured objects using a custom hardware shading algorithm. We apply the technique to a test object exhibiting a variety of materials as well as to an illuminated manuscript with gold lettering. To demonstrate the technique's accuracy, we compare renderings of the captured models to real photographs of the original objects.

Richardin, Pascale and others (2010) in order to develop their restoration, a material study was undertaken on two Chinese manuscripts, shaped like binded codex (Chinese Pelliot 2547 and 2490), supposed to be dated from 8th and 10th centuries, and belonging to the Pelliot collection of the National Library of France in Paris. It allowed a better knowledge of the making technique of their bindings together with some of their components. They undertook the identification of the inks, and pigments used for calligraphy, and the dating of the wood and of the binding of the documents. Micro samples of inks were characterised by scanning electron microscopy (SEM) and the results of the x-ray microanalysis of particular interest are the presence of hematite and ochre in red samples, and carbon black and traces of bone black in the black inks. The taxon of wood has been identified on thin strips by the classical techniques used in xylology: the two scrolls were identified as Tamarix sp. (Tamaricaceae). The AMS radiocarbon dating of the manuscripts was also carried out on the wooden sticks which hold the paper sheets. Comparison of the
potential calendar age distributions indicates probability distributions in the region between 662-781 cal AD and 862-994 cal AD for CP2547 and CP2490 respectively, which corresponds to the expected values. These results allowed to bring wider knowledge on the inks and the paintings and, in particular, have led to propose a date for the making of the binding of the CP2547, which confirms ideas proposed by book historians.

Smith, Gregory D. and Clark, Robin J. H. (2002)\textsuperscript{20} have stated that the effects of hydrogen sulphide gas (H\textsubscript{2}S) on copper and lead carbonates, oxides, hydroxides and sulphates have been examined in order better to clarify the role of this pollutant in the degradation of pigments on illuminated manuscripts and watercolours. Sample pigments containing copper were all found to react rapidly to form blue-black covellite (CuS) in response to exposure to H\textsubscript{2}S. Those containing lead reacted quickly, with only a few notable exceptions, to form black galena (PbS). The indiscriminate tendency of these sample copper and lead pigments to react to form dark degradation products when exposed to H\textsubscript{2}S is in contrast to the observation of largely selective blackening of lead white (2PbCO\textsubscript{3}·Pb(OH)\textsubscript{2}) on manuscripts bearing numerous other copper and lead pigments. It is possible that lead white on many artefacts reacts via a selective degradation pathway, possibly facilitated by microbial diagenesis, rather than by a simple reaction with H\textsubscript{2}S in the atmosphere.
2.4. Organisation of manuscripts

Documentation by individual scholars and institutions such as universities, Indological institutions and archives have helped recover a considerable number of manuscripts, but a large part of our precious heritage has remained unknown in religious institutions, ancestral houses and personal collections of scholars. There were several cataloguing efforts by several museums and libraries, the most significant being the New Catalogus Catalogorum by the University of Madras. Institutions like the National Archives of India and the National Museum have significant collections of rare manuscripts, and several on-going programmes on their preservation. The pioneering efforts of Indira Gandhi National Centre for the Arts (IGNCA) for the documentation and preservation of manuscripts have led the way for the Mission.

Collecting manuscripts from various regions and traditions and collating them for the purpose of fixing a particular text or writing commentaries were not unknown in ancient and medieval India. Since the late medieval period, the emperors of Delhi and rulers of different states all over India took keen interest in collecting and preserving manuscripts.

Arora, Anurag (2007)\textsuperscript{21}, in his paper entitled “Online Catalogue of One Million Manuscripts – Kritisampada” expressed that the National Mission for Manuscripts took up the task of preparing Kritisampada, in order to document the wealth of Indian manuscripts lying scattered in different organizational and private collections in India and abroad. On 14 February 2007, the National Mission for Manuscripts launched Kritisampada, the National Database of
Manuscripts that contain information about over a million Indian manuscripts. According to him, the database represents a considerable step forward in the location and documentation of hand-written texts in our country. Kept in repositories ranging from university libraries, research institutes, temples, bhandara-s, mutts, madrasa-s and private homes, Indian manuscripts are estimated to number over five million – possibly the largest collection of manuscripts in any one country. Therefore, it is not an exaggeration to say that the preparation of this database, currently containing data from a million manuscripts with that of a million more being checked for inclusion in Kritisampada, was and remains a task of Herculean proportions. According to him the documentation of manuscripts was carried out through various means by the National Mission for Manuscripts. The four most important ones are as follows:

1. **Survey and Post-Survey**: The Mission locates manuscripts in a house-to-house exercise through the National Survey of Manuscripts, carried out separately in each State. These manuscripts, once located, are documented in the follow-up Post-Survey exercise wherein scholars are engaged to visit the repositories mapped in the Survey. The Post-Survey data accounts for the greatest percentage of data in the Kritisampada.

2. **Manuscript Resource Centres (MRCs)**: Established repositories of manuscripts such as Oriental Research Institutes and university libraries partner with the Mission to collect data about manuscripts in the large public and private collections in each of their vicinities. Spread across the
country, these centres engage scholars specifically for documentation of manuscripts in the Mission's format.

3. **Manuscript Partner Centres (MPCs):** The Mission partners with institutes or private collections that have a very large number of manuscripts or a very significant set of manuscripts to document each text in their ownership in the Mission's format.

4. **National Informatics Centre and Indira Gandhi National Centre for the Arts:** IGNCA has contributed information about 1,07,359 manuscripts that were documented by the organization earlier and the Mission has received 2,66,447 data on Jain Manuscripts from the National Informatics Centre.

According to him, the software used by the Mission, developed by National Informatics Centre (NIC), is Manus Granthavali. It is updated frequently and has undergone several modifications with the addition of new fields and the possibility of multiple subject entries for a single manuscript. Manus Granthavali is based on the Dublin Core Metadata Standards that are globally accepted and used in libraries everywhere. He further opined that the creation of a National Database for Manuscripts is the first major attempt to bring together basic information about the manuscript wealth of India. It is hoped that the availability of a consolidated database will provide a significant impetus to new fields of research across the country that have hitherto not been attempted or are still in their infancy because of the difficulties in accessing sources of information. The access to accumulated wisdom on subjects like astronomy, traditional medicine,
philosophy, politics, civil society and governance that may be gained through this database will supplement contemporary research and add to the dimensions of the debates.

Brimmer, Judith (2005) identified the major issues in the management of music manuscripts within the UK. With knowledge of current practice gained through the investigation of five case study repositories, from both archive and library domains, aspects of management are explored and considered within an archival context. Three major aspects of management are identified—collecting (collecting policies, storage and preservation), describing (finding aids, standards) and providing (access, outreach)—and each of the five case studies is tailored to fit these key areas. Exploration of these issues facilitates the ultimate aim of producing an approach to better, more consistent methods in this neglected area. Suggestions for improvement include the development of specific standards or guidelines for preservation and description, and the establishment of a specialist, cross-domain working group, prompting formal networking between the music library professional body, the International Association of Music Libraries, and representatives from other domains. The continued development of collaborative music resources such as Cecilia is also found to be key to the unified provision of user access.

Charles, Stewart (1809) stated that among the independent rulers, Tippu Sultan of Mysore (18th century C.E.) built up a library of oriental manuscripts in Arabic, Persian and Hindustani languages. After his defeat and death, while fighting with the British forces, his library was taken over by the
Britishers. The manuscripts from Tippu's library were studied and catalogued by General Charles Stewart.

Harinarayana and Gangdharesha (2005)\textsuperscript{24} have attempted to examine the issues dealt with cataloguing of manuscripts. They have stated that cataloguing of manuscripts is one of the areas, which have scant attention by the Indian cataloguers. They opined that information technology has enabled not only to provide better opportunity to preserve the content of manuscripts for posterity but also helped to provide efficient access from remote areas to these manuscripts.

Hochner, N (2001)\textsuperscript{25} stated that Louis XII, king of France (r. 1498-1515), inherited the emblem of the porcupine from his grandfather and maintained its symbolism of invincibility to particular effect in the circumstances of the Italian wars and the reconquest of the Milanese. However, the bellicose role of the porcupine within royal propaganda became increasingly less adequate to the image of a 'père du peuple' that Louis XII adopted in 1506. This study argues through detailed analysis of medals, royal entries, illuminated manuscripts, and other resource material that a certain disenchantment was felt towards the aggressive porcupine leading to its relative neglect in royal pageantry and iconography by the second half of Louis‟s reign. This shift is indicative of a deeper hesitancy between the image of paternal care - faithful to the duty of the Most Christian King - and the image of glorious triumph - more suited to a
bellicose warrior. The transformations undergone by the porcupine reveal the desire to redefine the very notion of the duty of kingship.

**Hourihane, Colum P. (2003)**\(^{26}\) found that Ireland's insular manuscript tradition is best known for such treasures as the Book of Kells, Book of Durrow or Book of Dimma to name just three which have received considerable attention. Not least of these is the recent publication of an electronic introduction to the first of these (The Book of Kells, Trinity College Library Dublin, London, Thames and Hudson, 2002). Slightly excluded from popular appeal, but certainly not from serious scholarship, is the manuscript now known as The Cathach (Royal Irish Academy MS. 12 R 33) which is Ireland's oldest surviving illuminated manuscript, dating roughly to the late sixth-early seventh century (560-630). Written in Latin on vellum (27cm x 19cm), some fifty-eight leaves now survive of an original one hundred and ten, all of which are in a damaged state.

**Ji Lu (2005)**\(^{27}\) addresses the issue of special literature database resources in the creation of Chinese database groups, and it holds that the extremely rich Chinese literature resources should naturally become an indispensable part of global information resource networks. Nevertheless, the digitization foundation for Chinese literature resources, having been subject to various factors, is still very weak. Among other things, there is yet no relevant scientific awareness for guiding macro policy stipulations, and from a micro-perspective there are no complete technical solutions available for realizing the digitized project goals. The national program for Western China development currently has provided with an opportunity to establish a paradigm. The rational
development and digitization of the local literatures, rare copies of ancient Chinese manuscripts, and those cultural resources indigenous to the minority nationalities and ethnic groups in Western China, will greatly enrich Chinese digital resources on the Internet and enhance the position of the Chinese literature resource database groups on the global information resource platform.

Jimerson, Randall C (2003a) states that the archives are repositories of memory, providing reliable evidence for examining the past. The four types of memory - personal, collective, historical, and archival - interact in complex and sometimes baffling ways to enable one to understand the past and to draw lessons from it. Archival memory is a social construct reflecting power relationships in society. Archivists and manuscripts curators play the important role of mediator in selecting records for preservation and providing research access to such collections. By recognizing and overcoming the bias toward records of powerful groups in society, archivists can provide a more balanced perspective on the past, and enable future generations to examine and evaluate the activities and contributions of all voices in one's culture. Archives thus serve an important role in identifying and preserving the documentation that forms one's historical memory.

Jorge, Hidalgo L (2009) presented that the "Description of Tarapacá" written by O'Brien in 1765 and to analyze the enlightenment policies of the Bourbon monarchs in Spain and their repercussions in the new world. The ideas of reconquering America, civilizing the indigenous population, and fostering the economy especially mining activities, in order to increase fiscal revenue.
permeate the mind of political authorities. In this context, arose an interest in the silver mine of Huantajaya located on the coast of Tarapacá. This mine was well-known for its wealth but did not yield the expected results. Hence, the political authorities needed to obtain reliable information about it and how production could be improved. This was Antonio O'Brien's mission, whose biographical data together with references from his intellectual legacy -manuscripts, maps, and plans- are given. Such data and references constitute indispensable sources for the study of the province of Tarapacá in the XVIII century. Of all the O'Brien texts, the most comprehensive is the "Description of Tarapacá", which is published with name, place, and subject matter indices.

Majumdar, S (2005) expressed that the Indian culture and civilization dates back to 2300-1750 B.C. when the Indus Valley civilization, also known as the Harappan culture, was discovered in modern-day Punjab, Sind and areas of Rajasthan and Kathiawar. Over a period of time this cultural heritage has undergone massive changes; in the modern context, its preservation and conservation has gained utmost importance. The cultural depiction in the Indian literature has its own importance with uniform terminology used by different Indian languages. The past literary heritage of India is in the form of manuscripts available in palm leaves, cotton, silk, wood, bamboo, and copper plates. The initiative taken by the Indian Government in introducing the National Mission for Manuscripts is the right step towards preserving these culturally significant works. The Indian libraries that have these precious collections have suddenly gained importance and are benefiting financially. The ultimate aim of the Mission
is to identify such rich heritage, register them wherever available, preserve them and provide the surrogates for worldwide dissemination. This article attempts to provide details on the entire gamut of issue.

Marrow, James (2003)\textsuperscript{31} provides an "Introduction" to the edited volume, Leaves of Gold, which is a rewarding meditation on the meaning and functions of books in medieval culture, and on what one can learn by studying them.

Mukhopadhyaya, Satkari (2007)\textsuperscript{32} in his paper on "History of Survey and Cataloguing of Manuscripts in India" expressed that though the systematic survey of manuscripts, their collection and preservation, and also cataloguing has been going on since the establishment of the East India Company's rule in India, the importance of manuscripts, their storing and listing were not totally unknown in classical and medieval India. Since manuscripts were the sole medium for the transmission of knowledge, the house of every teacher was a veritable library of manuscripts. The architects and masters of music also had their own collections. Manuscripts were collected by the rulers of different states, including the Mughal emperors, and religious institutions, including monasteries (\textit{mathas}) of different sects and the Jain \textit{bhandaras}. The Jain munis played a significant role in the area of collecting and preserving the manuscripts of various \textit{shastras} – Jain, Brahmanical and Buddhist. He has reviewed the efforts of Indians in the cataloguing of manuscripts starting from the earliest catalogue of manuscripts which was compiled under the title, \textit{Brihattipanika}, as early as Vikrama Samvat 1440 (1383 C.E.) by a Jain monk, whose name is unfortunately not known. According to him an extensive survey of and searches for
manuscripts were carried on by Indian and European experts in various regions of the country, particularly in Bengal, western, central and northern regions. He looks forward to an opportunity to describe the history of survey and cataloguing of manuscripts in other places, particularly Jain Bhandaras, Libraries of Arabic, Persian and Urdu manuscripts, and the microfilm projects of Indira Gandhi National Centre for the Arts covering important manuscript collections in India and abroad.

Neha Paliwal (2007)\textsuperscript{33}, in her paper entitled "Vijnananidhi: Manuscript Treasures of India" opined that India is the producer and keeper of an astounding wealth of manuscripts. The country's large collections of manuscripts are characterized by great variety and richness in terms of content, theme, language, illustrations, scripts and materials. The National Mission for Manuscripts, with its mandate to preserve and disseminate India's rich cultural heritage contained in manuscripts, seeks to pay homage to the landmarks in Indian intellectual history by identifying manuscripts with unique heritage value and designating them as "Vijnananidhi: Manuscript Treasures of India". It aims to recognize as treasures such pioneering manuscripts that contain insights and discoveries and that have, at different points of time, broken new ground in India's knowledge systems. Through the recognition of texts that record attainments in disciplines such as the sciences, philosophy, scripture, history and the arts, the Mission hopes to highlight their value and unique contribution to India's life and history.

According to her, the most important consequence of Vijnananidhi would be that these manuscripts would be given special protective measures including:

- Providing adequate space and infrastructure for their storage
- Taking up preventive and curative conservation
- Protecting the knowledge content through digitization
- Transcribing for more copies in the case of rare manuscripts
- Taking up critical editions, research and publication based on these manuscripts

According to her, a total of forty-five manuscripts from across twenty-one repositories in the country were selected as 'Vijnananidhi – Manuscript Treasures of India'.

Panda, G.P. (2007) in his paper entitled "Kritisampada: The National Database of Manuscripts" explained that the database is intended to provide information covering various aspects of each manuscript, such as its title, commentary, language, script, subject, place of availability, number of pages, illustrations, date of writing etc. For documentation, information is directly collected from the libraries and private repositories by the trained surveyors and scholars. Thereafter, it is integrated into the database through the egranthavali software already instituted in the Manuscript Resource Centres-s or MPC-s and finally comes for editing. The first cache of information contained in the Database is expected to be web-launched in February 2007. Availability of this information will provide impetus to new fields of research across the country that have hitherto not been attempted or are still in infancy. Better documentation and
accessibility of material on ayurveda, for instance, would provide an impetus to institutions engaged in this field. It is expected that the use and access to accumulated knowledge in texts spread across India on subjects like the sciences, philosophy, scripture, arts, politics, governance and several such areas would supplement future research and enhance academic debate.

Quandt, Abigail B. and Noel, William G. (2003)\textsuperscript{35} provides a rapid yet reasonably detailed account of the various processes that go into the making of manuscript books, written in a breezy, entertaining style as a series of recipes.

Rath, Sarayu (2007)\textsuperscript{36} on the "Production, Distribution and Collection of Sanskrit Manuscripts in Ancient South India" Report of a Conference in Leiden, the Netherlands, brought out that it is great importance to study not only the manuscripts themselves as text sources, but also the production, distribution and collection of manuscripts, both in early pre-modern times and in the late 19th and early 20th century when the then Government of India took an active interest and allocated funds for the search and collection of manuscripts. Rath, Sarayu dealt with the distinct styles of Grantha script in manuscripts which have so far not been properly described in currently available studies and handbooks. With the help of test-characters it can be shown that these distinct styles are linked with different periods and regions. This correlation can be used as one of the crucial factors for the determination of the date and place of origin of a manuscript.

Sastri, K. S and Sastri, K. M (1938)\textsuperscript{37} have stated that native rulers under the paramountcy of the East India Company and subsequently of the British Royal Government, collected manuscripts and built up libraries. Enlightened
rulers of Travancore, Cochin and Mysore are celebrated names in this field. The Travancore Palace Library collection was started by Maharaja Vishakham Tirunal (1880-1885). The manuscripts collected and preserved in this Library were subsequently catalogued by eminent traditional Sanskrit scholars, such as K. Sambasiva Sastri and K. Mahadeva Sastri.

Slowik, Amy J.W. (2009)\textsuperscript{38} attempted to explore the basics of the collection of medieval manuscripts by institutions by outlining some of the basic principles, challenges, and innovations in the realm of medieval manuscript collection. Medieval manuscripts involve both curation and librarianship in every step of collection management. Few fields of librarianship involve such fragmented history. This paper explores this fragmentation and demonstrates the intricacies and diversity involved in the collection process. Finally, it examines some collaborative options for institutions to effectively collect together. The paper found that institutions can effectively collaborate in medieval manuscript acquisition. Practical implications of the paper are Institutions may be able to institute similar programs as those used in the case studies. Originality/value – It is more important than ever to maintain quality collections on smaller budgets. These findings can assist institutions in acquiring high quality pieces without premium funding.

Tanis, James R. (2003)\textsuperscript{39} offers an intriguing perspective on an important phenomenon, the role played by the collection of Old World art in the creation of a cultural identity by (newly) wealthy classes in late nineteenth- and early twentieth-century America.
Thorpe (2005) examined the use of multivariate statistics for the analysis and classification of New Testament manuscripts. He stated that appropriateness of statistical technique depends on the kind of data. He considered the problem of coding the manuscript for statistical analysis and presented various coding schemes. He discussed the operation and suitability of a number of statistical techniques for manuscript classification.

Weber, Jutta (2005) Manuscripts and their creators are subject to the conditions of history. The history of the Alexander von Humboldt Collection in Berlin is a history of the migration of manuscripts, the separation of parts of the collection, and their reunification. This leads to some more general observations. What if the original location of a manuscript is not a safe one? How can we guarantee safe preservation of the manuscript in another location? There are good reasons to build an alliance of institutions willing to cooperate with respect to these questions. Since we cannot turn back the wheels of history, we must act together now and in the future.

2.5. Preservation and conservation of manuscripts

Awakened by the alarming rate of destruction of manuscripts, modern devices and techniques are being developed and utilized. In IGNCA, for example, there is a conservation wing to provide preventive and curative conservation treatment to original manuscript or source. Again, IGNCA resorts to microfilming to preserve the content of a manuscript. For access, digitized copy of a manuscript is more convenient, and the NMM has launched digitization.
project in a massive way; the culmination of which can be seen in the establishment of the National Digital Library in IGNCA. It may be relevant here to mention that as the microfilm ensures durability, it is better than the digital copy so far as the preservation aspect is concerned. On the other hand, digital copy proves to be handy to provide efficient access. Therefore it can be followed that to ensure the preservation and access to manuscripts techniques and devises like preventive and curative treatment of original manuscript, microfilming and digitization are resorted to. Besides these, publication of the facsimile copy of the manuscript, with or without translation and transliteration is another important medium that ensures preservation and access. Realizing the need of publication, many an institute such as IGNCA is coming forward to publish the unpublished manuscripts. With increasing popularity of printed books the interest for collecting and preserving of manuscripts gained ground in India. Some famous bibliophiles and institutions built up their collections and as a result large repositories of manuscripts emerged and have played a significant role in preservation and access to manuscripts in India.

Abid, A (1997) in his study on the “Memory of the World: preserving our documentary heritage”, gave a broad sketch of the UNESCO Memory of the World programme, launched to preserve and raise awareness of important documents and distribute material related to them. He described the criteria for registration and selection of such documents and outlines the technical and legal framework. He examines several projects including those concerning manuscripts in Prague, St Petersburg, Istanbul, Cairo and a collection of 3,000
African postcards from the colonial period.

According to Agarwal, O.P. (2006), since much importance is not attached to manuscripts, funds allotted by the Government for conservation activities are also very much limited. According to general thinking in administrative and political circles, subjects like agriculture, health, transport are important subjects, needing greater attention. On the other hand cultural heritage and manuscripts are almost always are the last priority. To some extent it is also true if some manuscripts are lost now, they will be lost forever. Quite often so much ancient wisdom is buried inside them that their decipherment can bring about phenomenal changes in the lives of the people. First need is their preservation and for this funds are required. Constant dialogue with the politician, administrators and the people is perhaps the only way out.

Alan, Day (1997) highlights the activities and services of the British Library, which issues a number of authoritative newsletters to inform the library and information community of the latest developments in the Library's services departments. He provides a brief outline of four recent newsletters, including starting dates and a glimpse of content and purpose, along with a list of contact names and addresses. Together, they cover a wide variety of topics from the preservation of eleventh-century Buddhist manuscripts to the specialist collection of traditional, ethnic and folk music.

Bazyler, Michael J. and Gerber, Seth M. (2010) have stated that the displaced and nationalized cultural property remains hidden in the vast holdings of museums, libraries, and archives around the world. Some governments
holding these "trophies" of war and conquest refuse to return such cultural treasures to their rightful owners even when their provenance has been identified. They assert that the collections were obtained through expropriation and nationalization, and that divestiture of a museum, library, or archive would jeopardize the existence of these institutions and cause societal discord. This article discusses the struggle of an orthodox Jewish organization to recover from the Russian Federation a collection of sacred, irreplaceable books and manuscripts seized in the aftermath of the Bolshevik Revolution and during World War II. The story of Agudas Chasidei Chabad's efforts to recover these core religious texts of its spiritual leaders has involved appeals by U.S. presidents, congress, and the U.S. Helsinki Commission, as well as lawsuits in the Soviet Union/Russia and United States. After prolonged litigation in the United States, a federal court of appeals in Washington DC ruled in 2008 that American courts have jurisdiction over Chabad's suit against the Russian Federation to recover its religious texts. This ruling may pave the way for the resolution of this dispute and also lead to the filing of other suits in American courts seeking to recover looted cultural property, even if that property is located outside U.S. borders.

Biswal (2005)\textsuperscript{46}, in his paper on "Manuscript Wealth: Creation and Preservation", explained that manuscripts and holographs are invaluable sources for the creation and preservation of the art, history and culture of any land. Our ancient tradition was also well aware of the possible causes of the decay of the manuscripts from which they should be protected. The principal causes of
destruction of the manuscripts are water, fire, fungus, germs etc. A number of up-to-date scientific techniques have been developed in the past few years for the durable preservation of the manuscripts. However, it should be a matter of great concern for us that most museums in India are not in a position to afford them. It is needless to say that the traditional knowledge, remarkably existing in the manuscripts, is an important part of our heritage, history, art and culture. It is a matter of regret that the importance of manuscripts is being overshadowed by the spread of a lifestyle dominated by modern science and technology. Quite often, the gradual disappearance of traditional knowledge is caused mainly due to the misconception that the traditional knowledge recorded in manuscripts is outdated and hence it is not relevant for the modern style of living. However, it may yet be argued that it is high time now not only to know and recognize the knowledge imparted in our manuscript heritage but also to utilize it and therefore it should be preserved properly.

Brown (2010)\textsuperscript{47}, in his paper on “Integrated Approach to the Preservation of Manuscripts”, stated that the interconnected web offers an approach to managing preservation that is both holistic and interconnected. The preservation strategies are like interconnected threads with actions which send ripples across a web that spans space and time – past, present and future. As the stands become more closely linked, strengthened and intertwined, the preservation benefits are maximized. Furthermore, for India, the preservation web aligns with the same pattern of India’s ancient philosophical traditions that acknowledge the interconnectedness of all things. This strand interconnects all others. Policy
direction aligns the strategies for preserving the manuscripts and applies resources where they are most needed. Preservation policies are plans of action for safekeeping. They explain what should be preserved and why, and why certain actions are taken. Without this high level commitment, the strands of the web will break and the preservation of manuscript heritage will flounder. India is currently developing policies in the area of digital preservation. To maximize their effectiveness, they should similarly be part of an integrated preservation policy framework. For India with its extraordinary manuscript heritage, there is an opportunity to maximize its preservation initiatives with its manuscript collections being prioritized, conserved, copied and protected as an integrated program. For India especially there is the potential to lead internationally with this approach as the interconnected twining threads are embedded in its heritage, right from the beginning of its ancient traditions. Effective preservation management for India and the whole world requires an holistic understanding of each and every strategy or thread. It requires the ability to maximize the ripples of interconnections, informed by a risk management perspective.

According to Dean (1997)⁴⁸, before treating manuscripts, it is important to kill any insects that may be infesting them. There are a variety of methods used, ranging from formaldehyde to phosgene gas and ethylene oxide, but great care should be taken to use methods that are safe for the materials and the staff. The safest and least damaging method of killing insects is by freezing, ensuring that the manuscript is protected by polyethylene film during its stay in the freezer. Temperatures should be reduced to minus 30 degrees centigrade for this method.
to be effective. Another method that is quite effective and relatively safe is through the use of paradichlorobenzene or naphthalene. Both chemicals can be found in moth balls or similar household products. A group of manuscripts can be placed in an airtight container, such as a plastic garbage can with a tight-fitting lid sealed with a broad adhesive tape, with a quantity of mothballs exposed at the bottom. The manuscripts can be placed on bricks or similar to raise them above the level of the chemical. The manuscripts should be left in the container a minimum of ten days, after which they should be removed and carefully examined for live insects. If there is no evidence of insects, the leaves should be gently brushed with a soft brush to remove dust and insect parts.

Gupta and Haider (1995)\textsuperscript{49} have cited some indigenous method of safeguarding manuscripts. Much emphasis has given on preventive conservation using substances of plant origin and animal origin that can be used to eradicate insects and microorganisms. The potential properties of all substances of plant origin and animal origin to repel insects have been explained by them in detail.

Handa (2006)\textsuperscript{50}, in his paper on “Preservation of Traditional Knowledge Systems in Himachal Pradesh” stated that the rural and underprivileged communities in the country have preserved the key aspects of the traditional knowledge system related to the popular sciences, such as house-building, medicinal plants, farming, forestry, arts and crafts, etc. Much of that ‘folk wisdom’ is preserved in the oral traditions and the customary practices of the people, and some of it is also available in the handwritten records, the manuscripts. By restoring legitimacy to that treasure of the traditional knowledge, we not only

58
encourage and empower the local cultures, lifestyles, economy and encourage the hereditary artisans, but also at the same time enrich and strengthen the dossier of the so-called modern knowledge system. Therefore, it is imperative that all the available scriptural material, which may be neglected in private homes, is documented, researched and rendered into modern languages for greater access. Majority of the manuscripts found in Himachal Pradesh are on handmade thick paper, popularly known as Syalkoti kagaz, but in the interiors manuscripts on bhojpatra (birch bark) are also quite numerous. In fact, bhojpatra was a popular medium of writing in the Himalayan interiors, where it was plentifully available. While manuscripts preserve the folklore of different communities and regions in the standardized scriptural format for posterity, they also rob it of the element of informal romance. The innate creative impulse, the subtle flexibility, and uniqueness, hallmarks of folk creativeness cannot be witnessed in manuscripts. That paradoxical situation has afflicted the folktales and folksongs rather severely. Because the folktales and folksongs transmit best orally form person to person and generation to generation, leaving enough scope for an individual to modify, change and add contexts, imageries, and couplets under the individual aesthetic impulses, unmindful of its authorship. Thus, one may find several versions of one particular folktale or folksong. Thus, such folk expressions have always remained fresh and contemporary, irrespective of the spacio-temporal limitations. Rendering the creative folklore to writing has made it fixed and inflexible. But, that may be a small price that we have to pay to bequeath to the next generation what we have inherited from our forefathers by
way of oral tradition. More so, as under the pressure of globalization, and market forces, the nuances of the oral traditions that evoke nostalgia ought to be valued highly and preserved in any form possible.

Jimerson, Randall C (2003b)\textsuperscript{51} states that archival appraisal is the process of determining which manuscripts and archives acquired by a repository are worthy of long-term preservation. The abundance of modern records prevents saving everything, so archivists must make difficult choices. Records have value as evidence of organizations' functions and activities, or for their informational content. Appraisal criteria include analysis of functions, context, content, future uses, and cost-benefit of retention. Decisions to discard manuscripts are irreversible, so choices must be carefully weighed. Reappraisal and de-accessioning may also be applied to legacy holdings. The challenging task of appraisal also contributes to the preservation of institutional evidence, cultural heritage, and social memory.

Joshi (1995)\textsuperscript{52} cited various methods of seasoning, which differed from place to place. He described that in some parts of South India the Palm Leaves are dried and boiled in water, any abnormal growth then paired off with a knife and gingili oil is rubbed to smoothen the surface. He has also given the writing procedures for Sritala and Tala variety of leaves. Since Sritala leaves are thin, soft and absorbent the writing is done in carbonaceous ink. The characters are inscribed by moving the leaf beneath and keeping the stylus fixed. Tala leaves being coarse, thick and non-absorbent in nature the writing is done by inscribing the characters using a pointed metal stylus.
Jyothi, Mishra (2002) depicted that maintenance of cool, dry atmosphere and avoidance of too frequent changes in temperature and humidity should be achieved as far as possible to preserve the manuscripts for a longer period. He pointed out that low humidity (below 40%) will cause paper to dry out and paper becomes brittle. He suggests that temperature of 20-25°C and RH of 55% are most effective for the preservation of paper records. It is suggested that humidification of storage area in summer and de-humidification in rainy season and winter are to be deployed. Damp air should be circulated out of the room and water accumulation should be avoided near the collection. Buffers or moisture absorbent materials around the collection should be used.

Kastaly (1999), in his study on “How Hungary has tackled the brittle paper issue”, stated that since 1969, the National Library of Hungary has been microfilming all the Hungarian language or Hungary-related newspapers in its holdings. Before microfilming, old newspapers are conserved through light or heavy treatment and if the paper is too brittle and crumbles, it is de-acidified and strengthened by laminating it with polyethylene and Japanese tissues. Microfilming of valuable manuscripts, incunabula and brittle books has also been undertaken. His paper examines the rate of conversion to acid-free production of printing papers in Hungary since 1984. He urges libraries and library organizations to ensure that the quality and permanence of paper be indicated by paper mills in the product descriptions to enable the life expectancy of each publication to be known.
According to *Kishore, Ranbir (1961)*\(^{55}\), damage and deterioration to palm-leaves are usually the result of insect damage, staining, splitting, and cleavage (i.e., separation of the upper from the lower surface), and mechanical damage. Some of the mechanical damage is caused by a traditional binding method that incorporates the threaded cord in a winding system around the edges of the manuscript causing breakage to leaf edges. Although he has seen leaves damaged by fungus, palm leaves seem to be fairly resistant, and are certainly much less subject to this form of damage than is paper.

*Mahapatra (1988)*\(^{56}\) discussed the need for preservation of documents and outlined methods of preservation in modern libraries. He has drawn attention to the effects of air pollution on reading materials in the library.

*Naik and Faleiro (1989)*\(^{57}\) found out that in the State Archives of Goa the documents that had been repaired 50 to 60 years ago using the conservation techniques then available have developed acidity and brittleness. Conservation of such documents required the removal of the starch paste used earlier. They have mentioned that during their experiment it was observed, if the documents are soaked in calcium hydrate solution (0.15%), the first bath in Barrow's deacidification process, then the repairs can be more easily removed within 15 to 20 minutes.

*Neeraja Gopi (2006)*\(^{58}\), in her paper on "Conservation of Manuscripts: Efforts Taken Up by the National Mission for Manuscripts" stated that Conservation of manuscripts is one of the most important fields of activity that the National Mission for Manuscripts has been engaged in over the last three years.
Aware that the rich treasure of manuscripts is facing a threat of survival, NMM has devised conservation programs for both institutional and private collections and has set new benchmarks in the field in India. The NMM’s first step in this direction has been to set up Manuscript Conservation Centres (MCCs) across the country to protect manuscripts from further decay, damage and destruction by providing support and manpower for conservation activities. Institutions have been selected to become MCCs on the basis of their existing conservation capabilities and their future potential. The network of MCCs, spread across the country, forms the core of NMM’s conservation activities. The tasks of each MCC are as follows:

➢ To facilitate training in conservation
➢ To arrange workshops on preventive conservation
➢ To conduct curative conservation of manuscripts in different institutions and private repositories
➢ To organise awareness campaigns amongst the public
➢ To network with repositories and labs engaged in conservation work to research and popularize indigenous technologies
➢ To introduce emerging appropriate technologies in the field of manuscript conservation.

When the NMM began in 2003 with just 15 MCCs, the task of coordinating the conservation of manuscripts appeared daunting. Each MCC now has an equipped, well-stocked conservation laboratory, trained personnel and a degree of curative conservation expertise. Care has also been taken to ensure that these
MCCs are geographically located in a manner as to best serve every region of the country. The activities of each MCC are administered by a project coordinator who, apart from his or her regular duties at the repository, also directs the functioning of the MCC. In order to facilitate and provide assistance to institutions with large holdings of manuscripts, which do not have any need or the facilities to develop as MCCs, NMM has developed a programme to nominate them as Manuscripts Conservation Partner Centre (MCPC-s). Under this programme each MCC nominates some institutions as MCPC-s. The MCPC-s, in turn, are given advice on maintenance and the upkeep of their collection. At present, the Mission has designated 220 institutions as its MCPCs. The Mission has also equipped them with conservation materials such as acid-free mount boards and handmade papers for addressing their in-house conservation needs.

According to her, Conservation of manuscripts, as of any other objects of antiquity, may be of two kinds - preventive and curative. During the first two years, NMM's conservation efforts have been focused upon preventive conservation of manuscripts since it ensures care of manuscripts that may otherwise fall into a state of irreversible disrepair, and it is easier as well as more cost-effective to implement than curative conservation. In this regard, NMM took the following steps:

➢ Organized workshops to train conservators in the methods of instructing repository holders to practice preventive conservation. More than 30 repository holders were trained by each MCC.
Sponsored MCC programs to implement preventive conservation practices in repositories of the region.

- Facilitated the appointment of trained manuscript conservators to private repositories that required urgent assistance in preventive conservation

She expressed that creating a Resource Pool of Conservators is necessary. Given the scope of NMM's conservation activities, a concerted effort has also been made to train a number of individuals in the specific task of preventive manuscript conservation. These free-lance individuals, already trained in the science of antiquity preservation, are trained by NMM with respect to manuscripts so that MCCs may call upon them, as and when necessary, to carry out preventive conservation at repositories. She further stated that from 2006 onwards, NMM has also increased its focus on and activities in the field of curative conservation of manuscripts. Curative conservation, requiring more rigour and proficiency, has been undertaken with great care and professional conservators have been trained to deal with each manuscript support material (paper, palm leaf, cloth, birch bark) distinctively. NMM's efforts in this field may be summed up as follows:

- 5 curative conservation workshops conducted by NMM and 25 by the MCCs
- 100 personnel trained in curative conservation methods
- Curative conservation provided to more than 40,000 manuscripts consisting of approximately 32,00,000 folios
Neeraja Gopi (2007)\textsuperscript{59}, in her paper on "Conservation of Rare Support Materials of Manuscripts" opined that a wide range of support materials for manuscripts were used at different periods in different regions across the sub-continent. Consequently, the variations in the natural composition of these materials determined, and continue to determine, the differences in the problems faced by manuscript repository owners. According to her, rare materials are defined as those materials that are used infrequently across the country or those that are found only in a small geographical region. Therefore, parchment (made of calf, goat or sheep skin stretched, scraped, and dried under tension) is considered a rare material because in India few manuscripts were written on parchment, even though it was used quite profusely across Europe and the Middle East in medieval times. Most, if not all, of these Indian manuscripts on parchment were written by members of the Jewish and Islamic communities. Ivory is another rare material since, given the expense of acquiring it, it was used only by members of the royalty and the nobility. At present, ivory manuscripts are largely found in Orissa. Another rare material used for writing was metal, usually only copper and its alloys and occasionally gold and silver. Metal was, however, used largely to convey royal administrative orders and grants. Occasionally, metal sheets were used for other texts too – for instance, there are some Holy Quran manuscripts on copper sheets as well.

Nelson, Josephus (2010)\textsuperscript{60} states that in the 1940s Library of Congress managers began an effort to bring order to the Library's historic records, and in 1946 the chief of the Manuscripts Division wrote that many years ago there was
sent to the Division, material of an archival nature, representing old records of the Librarian's office ... and he have consistently upheld as wise the establishment of an archival unit in the Library and have noted the advantages that would be derived from the accumulation of such records in one place and he recommend that the care and management of archival holdings be made the duty of one high grade position in the Division of Manuscripts.

Raval, V. H. (2006)§1, in his paper on “Methodology of Preventive Conservation: Integrated Pest Management” stated that most of the available manuscripts in India are written on paper, palm leaf, birch bark, parchment, leather, and textile etc. All of these writing materials have organic origins, and are therefore, most susceptible to attack by biological agents, especially insects. Although an unavoidable part of our ecological system, insects and other pests can be very harmful if they breed in manuscript storehouses, archives, libraries, galleries and museums. If an infestation occurs, many objects in a collection could be chewed, torn or soiled, thus reducing their value and their potential for research and making them unsuitable for reading or display. Many of our most valuable manuscripts have been damaged partially or fully in this manner. Thus pest damage to any manuscript or collection is irreversible; it is therefore essential that manuscript collections be preserved through effective strategies and management planning like Integrated Pest Management (IPM).
He explained clearly the manner in which pests affect manuscripts and based on this he stated the pests may be roughly grouped as below:

(i) General pests: Any household pest that may cause problems to all kinds of manuscripts, viz. cockroach (Americana periplanata spc.), cricket (Acheta domesticus spc.), silverfish (Lapisma Saccharina spc.) et al. These are all pests which eat protein and cellulose material, including paper, sizing material, binding media, adhesives etc. Ants, mice, rats, birds and bats may also be included in this category.

(ii) Stored Product Pests: If manuscripts are kept in close proximity to edible items, some common insects known as 'stored product pests' or 'pantry insects' get attracted towards them. Two of these are the cigarette beetle (Lasioderma serricorne spc.) and the drug store beetle (Siegobium paniceum spc.)

(iii) Moisture Pests: When the relative humidity (RH) of the storage area increases to more than 65% many biological agents like mold and fungus start germinating. Many insects also start their activity in conditions of high humidity, the most common of these being the book lice (family Psocoptera).

(iv) Wood Pests: These pests generally attack wooden material but since many manuscripts use wood for their covers, they may suffer permanent and irreversible damage due to these pests. Examples of such pests are wood boring beetles; amobiid, furniture and deathwatch beetles (family
Anobiidae); true powderpost beetles (family Lyctidae); false powderpost Beetles (family Bostrichidae); termites (family Isoptera) etc.

(v) Fabric Pests: These pests are protein eaters and they damage a manuscript collection directly as well as indirectly. Examples are carpet beetles (family Dermestidae) and cloth moths (family Tineidae).

He stated that IPM is a decision making process that helps to determine the ‘if’, ‘when’ and ‘where’ of pest suppression. It helps to develop a strategy to keep pests away from attacking a collection. IPM uses a variety of techniques to prevent and solve the pest problems, using insecticides only as the last resource.

An effective IPM policy has two main goals:

i) To protect the store / manuscript collection from pests

ii) To reduce the amount of insecticidal chemical in the repository

He also explained different stages of IPM. An effective IPM programme involves the following six stages:

1. Avoid attracting insects

2. Restrain the access points for insects

3. Locating the insect activities

4. Isolate the infected material

5. Terminate the insects

6. Documentation and evaluation

However, he opined that by implementing the first four stages effectively, the repository can be protected from insects without engaging extra man power, incurring extra expenses or by using health hazardous insecticidal chemicals.
Sangeetha Menon; Williams, George M (1999) expressed that the physical preservation of manuscripts is a difficult task, even under the best of conditions. Indian paper manuscripts may last four hundred years while palm leaf manuscripts may, under the best of conditions, last seven hundred years. And many of India's ancient manuscripts are now in a bad condition. In the past, scribes would have been called in and would have meticulously copied them (perhaps adding scribal mistakes to those that might already be there).

Sharma (1992) given his experiences of eradicating infestation caused by insects and microorganisms by the use of old Indian herbal pesticides as well as modern chemical pesticides and repellents.

Subbaraman, S (2007), in his paper "Conservation of Illustrated Manuscripts" expressed that all natural materials such as palm leaves, as well as manufactured materials like paper, are invariably given to deterioration, regardless of the conditions of maintenance and their surrounding environments. However, it is equally widely acknowledged that some conditions are likely to be more effective in maintaining these materials than other, more careless ones. He explained the Causes and Modes of Deterioration of Palm Leaf and Paper Manuscripts. In the case of palm leaf manuscripts, conditions of high humidity act as a literal invitation to attacks by moulds and fungi. Being essentially organic in nature, they are also liable to insect attacks. On the other hand, it may be noted that extremely dry conditions are also not suitable for this material since they contribute to the palm leaves' loss of pliability and a marked increase in brittleness. Handling them in this condition may result in cracking, splitting and
other types of damages. When an illustrated palm leaf manuscript is exposed to prolonged dryness, the binding medium of the pigments used in illustrations may lose their strength and the illustrated layer may become friable and powdery. While illustrated paper manuscripts are subject to all the factors, inherent and environmental, that can cause the deterioration of paper documents in general; they also partake of the limitations of paintings on paper. This makes their conservation problems still more complicated. The role played by light, heat and moisture in causing the deterioration of celluloid material is well known. While photochemical processes, in which the ultraviolet range of the spectrum (below 350 mu) plays an important part, are a potent factor in several phenomena of decay such as the weakening of celluloid fibers, fading of pigments and dyes, etc. it is probably the combined action of light and heat that is the main cause of the breakdown of cellulose. The results are discolouration and brittleness in the paper. In tropical countries like India, where there is plenty of both light and heat practically throughout the year, this problem is constantly encountered. Excessive moisture in the paper leads to rapid disintegration of the cellulose and relative humidity of 70% or above at a temperature in the range of 25 to 30 degrees Celsius provides ideal conditions for the growth of moulds and fungi. There are also regions of excessively dry climate in India. High desiccation, the result of dryness, is not good for cellulose-based materials like paper. Such conditions can also cause the binding medium of the pigments to become brittle, resulting in the pigments becoming powdery and flaky, as in the case of palm leaf manuscripts. Apart from climatic reasons, there are a variety of insect species
such as silver fish (Thyasenura), book-lics (Psocoptera), beetles (Coleoptera), termites (Isoptera), cockroaches (Dictyoptera), etc. which feed on paper and constant vigilance is needed to ward off their attacks. Further, as is well known, acidity is one of the main causes of the decay of paper material. This may be caused either by inherent defects introduced at the time of manufacture of the paper itself or by external factors such as sulphur gases in the atmosphere. Sulphur dioxide is rapidly oxidized to sulphur trioxide, which in the presence of moisture forms sulphuric acid, which is absorbed by the paper. Increased acidity makes the paper extremely brittle, occasionally leading to breaks in it at a mere touch. However, the paper used for the illustrated manuscripts is usually of a high grade and any increase in acidity is likely to be not on account of its composition but because of environmental factors. The ink, based as it usually is on carbon, is not a significant source of acidity. In some cases where pigments like verdigris (copper acetate, used to obtain a green colour) have been used, the pigment itself becomes a source of trouble. Due to the release of free acetic acid from the pigment, the paper is sometimes found to be charred. Subbaraman also suggested various methods of conservation of Palm Leaf Manuscripts as well as Paper Manuscripts. They were summarised in the following paragraphs.

(a) Conservation of Illustrated Palm Leaf Manuscripts

(ii) In case of fungal growth occurring in illustrated manuscripts (palm leaf or paper), the standard practice of fumigation with thymol for the elimination of fungus cannot be adopted because the thymol fumes can attack the colours. In such a case, physical removal of the fluffy
fungal patches by careful brushing, followed by the use of ethanol to remove any remnants, is the only possible method. For killing the spores and to prevent further fungal attack, a 2% to 3% solution of orthophenyl phenol may be applied to the back of the folio (if the writing and illustrations are only on one side). In case they are on both sides, strips of filter paper impregnated with a 5% solution of thymol in ethanol and dried, can be placed alongside the manuscripts, without actually touching them, to afford protection.

(iii) In case of insect attack, however, illustrated manuscripts (both palm leaf and paper) can be fumigated with paradichloro benzene (PDCB) in a fumigation chamber. (The recommended period is three weeks in order to eliminate even larvae and eggs apart from the full-grown insects). PDCB fumes have no effect on the pigments.

(iv) Cleaning, whenever necessary, for removal of dust, dirt, oily stains, etc., has to be effected by a combination of mechanical means like careful brushing and the use of organic solvents like petroleum ether, ethanol, isopropyl alcohol, carbon tetrachloride, etc. Aqueous solutions cannot be used because the binding medium of the illustrations is usually water-soluble. The use of organic solvents also has to be very limited because they tend to leach out the essential oils in the palm leaf.

(v) Repairs to illustrated palm leaf manuscripts such as filling of cracks or filling of holes and gaps with seasoned palm leaf etc, may be effected
with polyvinyl acetate (PVA) as an adhesive, using a solution of the required consistency (usually 10-20% solution). Experience has shown that PVA is a good adhesive and is completely reversible.

(vi) Lamination with tissue paper or chiffon silk is sometimes used for strengthening fragile palm leaf folios. Obviously this method cannot be used in the case of an illustrated palm leaf because the clarity of the illustration will suffer. Encapsulation with polyester film is a satisfactory method in such cases.

(vii) When a palm leaf manuscript has become brittle due to ageing, the popular practice is to apply citronella or any other recommended oil for restoring the flexibility of the leaf. This method is not applicable to illustrated palm leaf manuscripts. Pliability of the leaf in this case may be restored as much as possible by exposing the manuscript to humid conditions inside a humid chamber for a minimum period of time.

(b) Conservation of Illustrated Paper Manuscripts

(i) The treatments recommended above for illustrated palm leaf manuscripts against fungal and insect attacks are applicable in the case of illustrated paper manuscripts as well.

(ii) A problem sometimes confronted in the treatment of paper manuscripts (including illustrated ones) is the removal of fox marks and other spots. As already explained above in the case of illustrated palm leaf manuscripts, aqueous methods are ruled out. An alcoholic solution of chloramines-T has been used in the past with some success. This,
however, is a slow process and immersion in the solution for long periods may be necessary. This is not desirable because recent research has shown that chloramines-T, contrary to the belief when its use was first introduced, continued to react with the paper even after it is taken out of the solution and thorough washing may be necessary to remove chloramines-T completely. Spot treatment with either chloramines-T or hydrogen peroxide (in an alcoholic medium) may be used. General cleaning may sometimes be carried out, when necessary, by first fixing the illustration and writing with a 2% solution of Paraloid B 72, laying the manuscript face-down on melinex on a glass sheet, and flooding the back of the manuscript with a jet of water.

(iii) Repairs and lining of illustrated paper manuscripts (when the writing is only on one side) are very much like the procedures adopted for water colour paintings. Japanese paper and pure starch paste as adhesive (with a small quantity of insecticide like phenyl mercuric acetate added) may be used.

(iv) Illustrated paper manuscripts may also be mounted on acid free mount boards for display purposes as well as for safe storage. When the writing and illustrations are on both the sides, a window-mount for both sides has to be employed.

(v) The paper used in old paper manuscripts is usually rag paper, which remains in sound condition even after the passage of a few hundred years. However, there may occur instances of lesser quality paper
having been used and the same developing problems such as acidity. Increasing acidity makes the paper more and more brittle. In such cases the acidity has to be removed from the paper and the paper has to be maintained at neutral PH o 7 or slightly higher. The process of removing acidity is called de-acidification. For the de-acidification of illustrated paper manuscripts, non-aqueous methods only have to be employed. Immersion of the manuscript in a 5% solution of crystalline barium hydroxide in methanol for 20 to 30 minutes has been found to be effective as well as safe.

Subbaraman also explained the methods for display and maintenance of manuscripts. Paper being a hygroscopic material, high humidity has to be strictly avoided. Secondly, it is also well-known that a relative humidity of 75% or above in the atmosphere is conducive to fungal growth. At the same time, very low humidity causes desiccation and brittleness in the paper. It would be ideal to maintain display galleries and storage spaces where paper materials are kept, at a temperature of 20 to 22 degree C and a relative humidity of 50 to 55%. This can be achieved through air-conditioning, which is expensive and may not always be practicable. Besides, if air conditioning is provided, it has to be constant through the day, everyday, else it may cause more harm than good. Without air-conditioning, one may achieve temperature and relative humidity conditions as near the optimum level as possible by ensuring proper ventilation and using air-coolers in dry summers and de-humidifiers in the rainy season. For illustrated manuscripts, light is another important factor. The colours used for the
illustrations are susceptible to fading through the effect of light, particularly through the ultraviolet part of the spectrum. The intensity of illumination on the surface of the manuscripts should not exceed 50lux. Fluorescent light, which is rich in ultraviolet light, should be avoided. Provision of lights inside the showcase should also be avoided. There should be only general lighting of the galleries, with the light sources well away from the manuscripts.

According to Suryawanshi and others (1992)\textsuperscript{65}, there are a number of different techniques used for the removal of surface soil from palm leaves, including some solvents that may have a desiccating effect and cause leaching of some of the important leaf constituents. He prefers to use water, providing that pre-treatment tests indicate that the writing is incised, and the leaf is not saturated with oil. If the leaf is saturated with old, dried oil, it is very difficult to remove, but he has had some success with soaking the leaf in a non-bleach detergent and warm water. The old oil must be removed if effective repairs are to be carried out, as water-soluble adhesives will not adhere to an oily surface. If the leaf has surface writing, he uses ethyl alcohol to clean the surface, taking care that the water content of the solvent does not move the image in any way.

According to Suryawanshi and others (1994)\textsuperscript{66}, following repair, the leaves are oiled to impart flexibility. Various oils have been used for this process, and he used cedar wood oil in the past with some success. However, recent research on camphor, citronella, castor, lemon grass, cedar wood, mustard, neem, eucalyptus, clove, and sesame, indicates that cedar wood oil has a slower absorption rate than some of the other oils.
Tiwari (1991) explained the need for conservation and preservation of reading materials and reasons for the change in preservation techniques. He discussed the causes of deterioration in the library reading materials, considers preventive preservation measures and list general preservation rules and current technology such as microfilming which have had an impact on preservation.

To meet the twin objective of preservation and access, Indians resorted to a comprehensive policy of preparing manuscript, starting with seasoning and processing of the material and treating the material with eco-friendly insecticides to careful storage. It may be followed that the life of a palm leaf manuscript is far longer than a modern day device like CD or microfilm. The tradition of manuscript preparation, preservation and coping continued in full strength till the end of the 19th Century. The downfall started since the beginning of the 20th Century when printed books started to gain popularity. After Independence, i.e. the second half of the 20th Century, the old tradition ceased to be practiced and it took a long time to adopt and utilize a new practice to preserve manuscripts. It is primarily because of this vacuum or otherwise in this transitory period after Independence that the half of the manuscript reserves in the country was lost.

2.6. Digitization of Manuscripts

In the present age, the rapid development of information technology and communication systems has brought revolutionary changes in the organization and management of information. The advanced application of information technology has touched each and every activity of library and information
centers. Now the information technology brings a unique opportunity to the field of preservation with the digital preservation facility of the non-digital documents. Digital preservation of manuscripts is now given proper importance. Manuscripts are the first hand written documents which reflect our glorious past and tell the story of our forefathers. These manuscripts are the basic and primary source of information for the researchers. Due to different reasons, these manuscripts are now in poor and fragile physical conditions and for their proper preservation in present form for the future, many foundations, universities and other institutions are now taking initiatives for digital preservation.

Ali, A (2005) expressed that the process of maintaining, in a condition suitable for use, materials produced in digital formats. Problems of physical preservation are compounded by the obsolescence of computer equipment, software, and storage media. Also refers to the practice of digitizing materials originally produced in non-digital formats (print, film, etc.) to prevent permanent loss due to deterioration of the physical medium. Digital preservation has the two dimensions i.e. preservation of materials that are born in digital form and another is digitization for preservation of the printed documents and manuscripts which are touched by the hand of deterioration. Digital preservation facilitates the global accessibility of any form of documents. For the digital preservation, two processes generally are followed; one is creating image file of the documents and second is scanning the documents and then using the OCR process for making the text file error free. These files are then stored in different secondary storage devices.
Arora, Anurag (2006)⁶⁹, in his paper on "Digital Restoration" expressed that while it is heartening to note that interest in old manuscripts and their aesthetic and scientific value is growing by the day, it is also worth stressing that public access to old manuscripts and archive holdings causes a substantially quicker disintegration of these originals. The solution is to limit or discontinue public access to the originals and offer an alternative way of accessing them. One of the tried and tested ways of doing this is through the use of computer technology that enables the digitization of manuscripts. The need to increase accessibility and prevent the disintegration of manuscripts clearly makes for the digitization of manuscripts an urgent case. The next step would be to understand the process of digitization. He stated that digitization is a process that tries to replace the original manuscript with a facsimile. In order to make this facsimile acceptable and to decrease the use of originals in a radical manner, it is necessary to comply with the following basic conditions:

1. **Quality of digitization**: High-quality digitization of basic image data is the most significant requirement. Clear visuals and readability of the data must be ensured.

2. **Applicability**: Data must be made available in a reasonable amount of time and the hardware and software enabling the work with the digital facsimile must be easily accessible. The hardware should be affordable so as to require minimum funds from the budgets of libraries.

3. **User-friendliness**: Users must be able and willing to accept the digital facsimile. The software should be easy to use and must include multiple
options to ensure that the data can be viewed in every way that the users
would want to view it in.

He also stated the reasons for implementing a digitization project, or more
precisely for digital conversion of non-digital source material, are varied. The
decision to digitize may be in order to:

- Increase access: this is the most obvious and primary reason, where there
  is a high demand from users and the library or source has the desire to
  improve access to a specific collection.

- Improve services to an expanding users group by providing enhanced
  access to the institution’s resources with respect to education.

- Reduce the handling and use of fragile or heavily used original material
  and create a backup copy of endangered material.

However, it should be emphasized once again that the originals are
irreplaceable, and therefore access to them should be limited as quickly and in
as many sources as possible. With regard to the selection of manuscripts for
digitization, he expressed that given that a good facsimile requires high quality
and user-friendliness, the process itself is quite costly - in both manpower and
monetary terms. It is inevitable therefore that it be a selective process. In India
alone, NMM has estimated that there are more than five million manuscripts.
Since the digitization of each of these is almost impossible, there is a need to
limit the focus to a few very significant collections that are threatened by
disintegration. The nature of digital information is independent of the original
media on which it is found and can be stored with certain redundancy enabling its
full and exact reconstruction even when the original media has been partly damaged. Further, the material that the manuscript is composed on is itself a carrier of interesting and vital information. Even very little damage caused to that material results in an irrecoverable loss of information. The matter contained in the manuscript needs to be understood and defined. This is the information that the scribe wanted to communicate to the reader of the manuscript. Today we could say that it is the basic image data but when the manuscript was written the scribe wanted to transmit certain information by underlining or embellishing it. The importance and relevance of the information needs to be realised and the manuscript accordingly selected for digitization. He further stated that Technologies associated with digital conversion, storage, retrieval and delivery to remote users is subject to rapid change. Nevertheless, it is fair to say that some of the preliminary criteria have emerged through the digitization project that is helping to shape the Mission's direction. Apart from the aesthetic advantages of a digital image, especially a colour one, over microfilm or a photocopy, the Mission sees scholarly benefit to be gained from comprehensive scanning of the more heavily used collections. A number of important factors need to be considered – the up-front cost of scanning, the practical realities of managing thousands of digital files and the various delivery issues for digital images made accessible over the web. However, these issues will not deter us from taking up digitization projects in the future and helping the cultural community preserve the artistic heritage of the country. The encouraging response we continue to receive from the world community regarding our digitization programme has
strengthened our resolve as well as our confidence and we are committed to making it more effective and efficient.

Arot, D (1999)\textsuperscript{70}, in his paper on "Towards a new scholarship: digitization and research in the history of the book" stated that the importance to researchers of access to original manuscripts; professional training in skills relevant to historic materials; technological tools for studying old materials and the possibilities for research during Digitization procedures; the image data bank of the textile museum in Lyon; distinctions in formats and purposes in Digitization and the multidisciplinary nature of projects in this area; and, the HyperNietzsche project and the concept of contextualisation. Papers were also given on the history of the book and on various aspects of Digitization projects which are being undertaken in Quebec.

Ashling, Jim (2008)\textsuperscript{71} stated that the Organization of American States (OAS) agreed to join and to contribute material to the World Digital Library during September. The project, planned by the Library of Congress, has more than 20 partners who have made a commitment to add material to the Internet, free of charge, including manuscripts, maps, rare books, musical scores, recordings, films, prints, photos, architectural drawings, and other significant cultural materials. The OAS' Columbus Memorial Library, which holds content from the 35 member states, will be the contributing partner. The library houses the world's most complete collection of unique photos, maps, commemorative stamps, archives, and records documenting the history of the organization and its predecessor agencies dating from 1889. The Wellcome Library in London holds
the world's leading collection of books, manuscripts, archives, films, and pictures on the history of medicine from the earliest times to the present day.

**Bansode, Sadanand (2008)** highlighted the Digitization Activities Undertaken by Shivaji University Library to Preserve Rare Materials. He attempted to calculate the costs incurred in the Digitization Process. He found that Digitization is the Solution for the Preservation of and access to the Rare Manuscripts. His paper Provides the Complete Budget Required for the Digitization of Manuscripts and also Suggest best Possible Preservation and Access Strategy according to the Local Needs of the Users. The Paper Provides Valuable Insight into the Development of Digital Libraries in India. It is useful for setting the Infrastructure Required for Digitization and a Guideline for Preservation and access to the Rare Materials.

**Ceynowa, Klaus (2009)**, opined that the Bavarian State Library is one of the largest European research libraries. The Library’s unique collection profile is characterized by extremely precious manuscripts, rare printed books and comprehensive special collections from thousands of years of cultural heritage. Responding to the challenges of the digital age, it is a primary strategic objective of the Bavarian State Library to digitize as soon as possible its unique collections, which are a good part of written cultural heritage, and to make them usable for the world. Aiming for this strategic objective, the library undertakes several large-scale digitization projects, which will bring more than 1.2 million books online during the next few years. The deployment of state-of-the-art robotic scanners as well as a public-private partnership with Google, which are
part of this digitization strategy, is described in detail. The implication for the future role of libraries in the rapidly changing information landscape is also briefly discussed.

Dumitrescu, Gabriela, Filip, F. G., Ionita, Angela and Lepadatu, Cornel (2010)\cite{Dumitrescu2010}, described a practical digitization project which was carried out by the Manuscripts Department and the Information Technology (IT) Department of the Romanian Academy Library (BAR) under the coordination of the Romanian Academy and with the support the Romanian Ministry of Culture. Mihai Eminescu is the greatest Romanian poet and his manuscript collection consists of 48 notebooks, over 14,000 folios, without a strict chronological order and related topics. Main objectives of the project were a) creating digital collections of Mihai Eminescu's manuscripts in order to preserve the original and prepare a facsimile edition; b) allowing users to users through special collections available online for the research, publications on CD-ROM or DVD-ROM, and the WWW.

Fujinaga, Ichiro (2005)\cite{Fujinaga2005} expressed that the main goal of his research program is to develop and evaluate practices, frameworks, and tools for the design and construction of worldwide distributed digital music archives and libraries. Over the last few millennia, humans have amassed an enormous amount of musical information that is scattered around the world. It is becoming abundantly clear that the optimal path for acquisition is to distribute the task of digitizing the wealth of historical and cultural heritage material that exists in analogue formats, which may include books and manuscripts related to music, music scores, photographs, videos, audio tapes, and phonograph records. In
order to achieve this goal, libraries, museums, and archives throughout the world, large or small, need well-researched policies, proper guidance, and efficient tools to digitize their collections and to make them available economically. The research conducted within the program addresses unique and imminent challenges posed by the digitization and dissemination of music media. There are four major research projects in progress: development and evaluation of digitization methods for preservation of analogue recordings; optical music recognition using microfilms; design of workflow management system with automatic metadata extraction; and formulation of interlibrary communication strategies.

Hazem Hiary; Kia Ng (2007) presents a framework for the Digitization, extraction, and graphical representation of paper-based watermark designs embedded in paper texture: there is a growing need for this among librarians and antiquarians to aid with classification and preservation. The system is designed to handle manuscripts with foreground interference and defects; it uses a backlighting scanning technique combined with image processing operations rather than radioactive techniques. Hence, it is faster, cheaper, safer, and easy to use. The system prototype includes a set of image processing operations which enhance, filter, and extract the watermark shape, and automatically convert it into a graphical representation. The paper focuses also on automated processes which determine the configuration of parameters in order to allow optimal content processing, in addition to the detection of watermark chainlines. With a machine readable graphical representation of the watermark, cataloguing and indexing of
these heritage resources can be enhanced with the ease of digital content retrieval functionalities exploiting the advantages of digital technologies such as distribution and preservation.

Jha, Pratapanand (2007), in his paper on "Digitization and Documentation of Manuscripts and Other Cultural Heritage at the IGNCA", stated that 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 collection includes manuscripts, slides, rare books, photographs, audio and video material along with highly researched publications. The manuscripts collection at IGNCA features over 20 million microfilmed folios of unpublished Sanskrit, Pali, Persian and Arabic manuscripts on different aspects of Indian arts and culture. Recognizing the need to encompass and preserve the many aspects of Indian art and culture, and to serve as a major resource centre for art heritage, 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. According to him, 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, rare photographs, audio and video material along with highly researched publications of the IGNCA, from a single window of access. It has made use of multi-media computer technology for the development of a software package that offers many kinds of cultural information.
all at once through a walk-through model. The Kalasampada 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. Digital corpus includes over 70 lakh folios of manuscript, over one lakh slides, 4000 photographs, IGNCA published books, Kalakalp a (IGNCA's Journal), Vihangama (IGNCA's Newsletter), over 400 hours of audio and video and approximately 50 walkthroughs. He further opined that digitization, post digitization editing and integration are continued to encompass all such materials available in the IGNCA.

Kowalska, Malgorzata (2002), in his Article on "Retrospective digitization in the Munich Digitization Centre" reflects on the fact that computers and information networks are the reason for changes in the functional organisation of libraries. He compares the impact of digitization of information in today's world to the changes that followed at the time of discovery of print. He discussed about the issue of retrospective digitization of manuscripts and other old materials and steps undertaken by some German libraries and other organisations in order to achieve that goal.

According to Kumar and Leena (2004), every digitization program of manuscripts should be feasible. The technical requirements need hardware, software, storage and staff. The digital capture, metadata, access should meet international and national standards. The budget is very important. Digitization need huge amount to purchase high quality hardware and software, lighting
equipments. Software for data capturing of high quality are also costly. The
digitization should also be very clear. It is never need based but value added.
India's most valuable and precious gift to humanity is its profound and timeless
heritage. This heritage encompasses almost every aspect of human enquiry.
Today, this heritage is scattered in libraries and in individual possessions. Much
of India's heritage, in its physical form, has unfortunately got mutilated and
destroyed through successive invasions, some of which is still being stolen;
books manuscripts are decaying. The preservation of "Indian Heritage" presents
a great challenge. Fortunately indeed, the merging information technology can
offer a solution not only for preservation, but also for enhancement and for its
wide scale access. One of the greatest contributions of Indian libraries could be
to bring the precious, oriental and timeless Indian Heritage on the Internet.

Landon, George V. (2009) expressed that the large-scale book
scanning projects are delivering unprecedented access to the majority of library
holdings by giving users unparalleled access to vast collections of books.
However, these efforts have focused on typical bound books, which leave many
forms of documentation out of the digitization framework. There are many
techniques that have developed to digitize numerous other forms of
documentation, including deteriorated manuscripts and photography. These
technologies are engineered in conjunction with budgetary and physical
constraints often placed on digitization projects.

According to Mazumdar, Nirmal Ranjan (2009), Information technology
has facilitated preservation of the documents, i.e. digital preservation.
Manuscripts are the primary sources of historic information. With the deterioration of the Law of Nature, manuscripts are also deteriorating along with the time. Digital preservation of manuscripts restores it from loss, theft and decay. This paper highlights some of the initiatives taken in Assam for the digital preservation of manuscripts.

Naoko Takagi; Yoriko Chudo; Reiko Maeda (2005)\textsuperscript{82} expressed that during the summer of 2005, the conservation and Digitization of 400 rolled palm leaf manuscripts with clay seals housed at the Asa Archives in Kathmandu was carried out over a period of 6 weeks. The Asha Archives is a public library in Kathmandu, Nepal named after the late Mr Asha Man Singha Kansakar, father of the late Mr. Prem Bahadur Kansakar (1917-1991), a prominent activist, social worker, educationist and Newar writer who had founded several social, cultural, literary and educational institutions.

Naoko Takagi; Yoriko Chudo; Reiko Maeda (2008)\textsuperscript{83} opined that the Asa Archives is one of the very few institutions in Nepal to have digitised nearly its entire collection of manuscripts. The one exception was the collection of the rolled palm leaf manuscripts which were not digitised because of the difficulty of even opening them without causing damage. An important matter for consideration was in what form the objects should be housed after the conservation. From the conservator's point of view, ideally they should retain the original form. However, for easier access to the text and to avoid further damage during the unrolling and rolling, keeping the objects flat was also considered. This problem was solved by digital photography which was to be carried out as soon
as the conservation treatment of each roll was finished in order to prevent unnecessary unrolling more than once. According to a news-report titled 'Digitalization of manuscripts under way at Kalakshetra' published in *The Assam Tribune*, the leading English Daily of North East India, dated April 9, 2008, forty four thousand (44,000) manuscripts were selected by a survey carried out by SSK for digital preservation. The private collectors or libraries may also contact the SSK authority for necessary assistance.

Ramesh and Chakraborty (2009)\(^84\) opined that to meet the twin objective of preservation and access, Indians resorted to a comprehensive policy of preparing manuscript, starting with seasoning and processing of the material and treating the material with eco-friendly insecticides to careful storage. It may be followed that the life of a palm leaf manuscript is far longer than a modern day device like CD or microfilm. The tradition of manuscript preparation, preservation and coping continued in full strength till the end of the 19th Century. The downfall started since the beginning of the 20th Century when printed books started to gain popularity. After Independence, i.e. the second half of the 20th Century, the old tradition ceased to be practiced and it took a long time to adopt and utilize a new practice to preserve manuscripts. It is primarily because of this vacuum or otherwise in this transitory period after Independence that the half of the manuscript reserves in the country was lost.

Rebelo, A; Capela, G; and Cardoso, Jaime S, (2010)\(^85\), have found that many musical works produced in the past are still currently available only as original manuscripts or as photocopies. The preservation of these works requires
their digitalization and transformation into a machine-readable format. However, and despite the many research activities on optical music recognition (OMR), the results for handwritten musical scores are far from ideal. Each of the proposed methods lays the emphasis on different properties and therefore makes it difficult to evaluate the efficiency of a proposed method. They have presented a comparative study of several recognition algorithms of music symbols. After a review of the most common procedures used in this context, their respective performances are compared using both real and synthetic scores. The database of scores was augmented with replicas of the existing patterns, transformed according to an elastic deformation technique. Such transformations aim to introduce in-variances in the prediction with respect to the known variability in the symbols, particularly relevant on handwritten works.

Reidlmayer (1996), in his paper on “Libraries are not for burning: international librarianship and the recovery of the destroyed heritage of Bosnia and Herzegovina” reported on the destruction of the cultural heritage of Bosnia-Herzegovina in terms of damage to historic architecture, including 1200 mosques, 150 churches, 4 synagogues and over 1000 other monuments, works of art, and cultural institutions; such as museums, libraries, archives and manuscript collections. Losses include not only the works of art, but also crucial documentation that might aid in their reconstruction. He calls for the assistance of the international library community to help recover and restore some of what has been lost and to rebuild the buildings and institutions that embody the country's cultural heritage. He concludes that librarians outside of Bosnia through
their home institutions and professional organizations can assist by providing material, technical assistance, training and documentation.

Satyabati Devi, Thiyam (2008)\textsuperscript{87} expressed that Manuscripts are one of the precious materials of our cultural heritage, acting as a valuable source of history and knowledge and offering perspective on contemporary society. In Manipur, we are losing our manuscripts through decay and improper handling. Current progress in the field of information and communication technology offers a potential solution to the problem. Through large scale digitization projects, manuscripts can not only be stored and preserved, but also made available to the public. This paper highlights the importance of the Manipur Manuscripts collection and the necessity to preserve the collection for future generations.

Scout Report (2002)\textsuperscript{88} spell out that the online exhibits and digitization projects of the British Library are some of the finest in the world, and the Turning the Pages exhibit may be one of their best thus far. Utilizing the most contemporary advances in interactive display, visitors to the site can virtually turn the pages of the nine currently available original manuscripts located in the British Library. The nine manuscripts represent some of the most important printed pieces of material in the Library's collection, and in a few cases, some of the most important documents in the world history. Currently, their number includes the Sherborne Missal, the greatest English illuminated manuscript of the late Middle Ages; the Diamond Sutra, the world's earliest dated printed book; and Sultan Baybar's Quran, one of the most exquisite copies of the Quran in the British Library.
Srivastava, Praveen and Kanungo, Purbi dey (2010)\textsuperscript{89} have expressed that the Libraries maintain large volumes of documentary sources such as records, manuscripts, books, films and other materials. These materials with the passage of time deteriorate and decay and need to be preserved in good condition for use. This paper examines various types of preservation of traditional documents as well as preservation of digitized forms of documents using related technologies.

Zainab, A. N., Abrizah, A. and Hilmi, M. R. (2009)\textsuperscript{90} described an exploratory needs analysis for a digital library of Malay manuscripts. The manuscripts are facing several problems, including (a) the lack of trained manuscript librarians; (b) budgetary constraints in manual and digital preservation initiatives; (c) the problems in storage and maintenance of the collection; (d) restricted access for users, (e) the need to preserve the fragile manuscripts, (e) the difficulty of undertaking collaborative transliteration work because of the access problems; (f) the dispersal of titles at several repositories which exacerbates the access issue; and (g) a lack of detail in the description in the manuscript library catalogues. The objectives of this study are: (a) to find out the current state of manuscript collection management and practices in selected libraries; (b) to identify the problems faced by manuscript repositories; (c) to study the meta data schema used by repositories to describe their manuscript collections, and (d) to identify a suitable open source digital library software to support a digital library of manuscripts. The study gathers qualitative data from an open-ended questionnaire distributed to five manuscript librarians in Malaysia.
Cataloguing practices in manuscript repositories were observed and the open-source digital library software Green stone was studied for its suitability. The information gathered and observed which helped determine the requirements of a digital library that empowers repositories in building, storing, preserving and disseminating information about manuscript collections is presented. The design and modules of the digital library are described.

2.7. The gaps identified in the literature

The literature reviewed above indicates that the studies on conservation, digitization and preservation of manuscripts in the manuscript libraries are scanty in general and the studies on conservation, digitization and preservation of manuscripts in the manuscript libraries of Andhra Pradesh are negligible in particular. The methods of conservation, digitization and preservation of manuscripts differ from one climatic condition to another climatic condition. The technical knowledge of the staff in the library, the budget support from the government and other organizations also decides the methods of conservation, digitization and preservation of manuscripts to be adopted. Further, there is no single study on the comparison of manuscript libraries in the adoption of the methods of conservation, digitization and preservation of manuscripts. In this context, the present study entitled “Preservation and Organisation of Manuscripts in the Libraries of Andhra Pradesh: A Study” assumes importance.
References:

4. Datta, Amaresh (2005), The Encyclopaedia of Indian Literature (Volume Two) (Devraj To Jyoti), Volume 2, Sahitya Akademi, Rabindra Bhavan, 35, Firozeshah Raod, New Delhi, pp.989-1875
Department of Culture, Government of India, P.36.


19. Richardin, Pascale; Cuisance, Françoise; Buisson, Nathalie; Asensi-Amoros, Victoria; Lavier, Catherine (2010), AMS Radiocarbon Dating and


80. Landon, George V. (2009), *Toward Digitizing All Forms of Documentation*, *D-Lib Magazine*, Vol.15, No.3/4, April


83. Naoko Takagi, Yoriko Chudo, Reiko Maeda (2008), ‘Digitalization of manuscripts under way at Kalakshetra’ published in *The Assam Tribune*, dated April 9, 2008,


