Library Progress International
Vol.44, No.5, Jul-Dec 2024: P. 280-293

Print version ISSN 0970 1052
Online version ISSN 2320 317X

Original Article

Available online at www.bpasjournals.com

The Evolution of Writing Materials and Their Preservation: Stone to Digital Era

Sakhawat Hussain[1] and Dr. Rajesh Kumar Diwakar[2]

[1,2] Department of Library and Information Science
Mangalayatan University, Aligarh, U.P
202146
Email:
sakhawathuss@gmail.com
drrajeshkdiwakar@gmail.com

How to cite this article: Sakhawat Hussain and Dr. Rajesh Kumar Diwakar (2024). The Evolution of Writing Materials and Their Preservation: Stone to Digital Era. *Library Progress International,* 44(5), 396-411

Abstract

The evolution of writing materials has significantly influenced our communication, record-keeping, and cultural development. This paper examines the history of writing tools, tracing their journey from ancient times to the present. It explores their features, uses, and preservation methods. By gaining insight into these materials, we can better appreciate their cultural importance and their role in shaping contemporary archival practices. The paper highlights important milestones in the development of writing materials, the techniques employed to preserve them.

Purpose

This study aims to explore the evolution of writing materials throughout history and the methods used to preserve them. From ancient clay tablets to modern digital formats, each shift in writing materials reflects broader changes in communication and culture. By looking at how these tools have changed over time, we can understand their effects on society and why it's important to keep them for future generations.

Objective

The main goal is to study different types of writing materials used over the years, understand their characteristics and purposes, and assess modern methods for preserving them to ensure they last longer.

Methodology

This study uses a qualitative approach, reviewing existing literature like books, academic journals, and archival resources. It looks at the major developments in writing materials throughout history and examines how preservation techniques are applied in museums and libraries today.

Keywords

Writing materials; Manuscripts; Clay Tablets; Papyrus; Parchment; Birch bark; palm leaf; Conservation; Digital preservation

Introduction

Writing has been a big part of human history. Even with all our new technology, writing and printing are still very important for communication and help us make progress as a society. Scholars, suggest that our ancient ancestors began communicating through

symbols and signs, using pictograms and ideograms drawn in sand millions of years ago. However, sand is not a durable medium; it doesn't preserve written messages well and cannot transport them. This led humans to seek better writing materials and develop effective writing systems, each influencing the other over time. This change shows how writing materials have evolved, going from using sand to make marks to creating paper, and from early pictures to the phonetic alphabets we use today.

However, piecing together this history in its entirety is challenging. It's difficult to determine how quickly books emerged after writing was invented, primarily due to the perish ability of the materials used. Archaeological discoveries and old texts reveal that early Greeks and Romans used waxed wooden tablets for writing, while the Chinese wrote on wooden tablets, bamboo strips, silk, and cotton. Unfortunately, not many of these items have survived over the years.

Evolution of Writing Materials with review of Literature

1. Stone and Metal

a. Evolution of Stone and Metal

Stone inscriptions are the oldest examples of writing we have that have survived through the years, even though they've faced wear from the elements. More fragile writing materials used in the past have not endured, and what we know about them mostly comes from literary references, which can be inconclusive (Hans, 1968). Writing on stone required significant effort, using chisels or sharp tools, but once inscribed, these messages could last for centuries. Many inscriptions can still be found on stone slabs, cliffs, and pillars around the world. The Rosetta stone from Egypt, dating back over 5,000 years, is a notable example (Rodriguez, 2024).

Limestone tablet from Kish (Sumer) with pictographic writing, c. 3500 BC – Ashmolean Museum

Metal plates were likely introduced for writing at a later stage, but still early in history. Stone inscriptions often contained texts of great importance, such as royal records and religious codes, while metal plates were typically used for more practical documents like land grants and legal agreements (Hawkes, 1963). Many of these can be found in museums worldwide (Harris, 2002). But neither stone tablets nor metal plates ever served as "books" for sharing knowledge and information the way books do today (Cartwright, 2014).

b. Conservation of Stone and Metal Inscriptions

Store manuscripts in a cool, stable environment, ideally around 18-22°C (64-72°F) with low humidity (30-50%). Sudden changes can lead to deterioration.Minimize light exposure, especially UV light, which can cause fading and damage. Use UV-filtering glass when displaying. Always use clean, dry hands or wear gloves when handling to keep oils and dirt from getting on the items. Support manuscripts from underneath when moving them to prevent breakage or stress on the material. For the storage use acid-free boxes or padded containers designed for stone and metal, avoiding materials that might cause chemical reactions.Store manuscripts flat whenever possible to reduce stress (Mason, 2018). If storing vertically, ensure proper support. For cleaning and maintenance gently dust with a soft brush or cloth. Avoid water or cleaning agents that can damage surfaces.Consult a professional conservator for significant damage. For digital preservation create high-quality digital scans or photographs to access content without risking damage to originals.Keep detailed records for each manuscript, including its history, condition, and conservation work. Create awareness by educating staff and community members about proper handling and preservation techniques. Engage local communities in preservation efforts; they often have valuable insights and support to offer (Jones, 2021).

2. Clay tablets

a. Evolution of Clay Tablets

The idea of something like modern books began with the Sumerians, Babylonians, Assyrians, and Hittites. They made tablets from wet clay. While the clay was soft, writers used a stylus to carve their messages. Once they were done, the tablets were either dried in the sun or baked in kilns to make them stronger. These tablets were about five inches long and looked like bricks; after baking, they became very hard and nearly unbreakable. Many of these tablets were found buried for thousands of years in ancient city ruins during 19th-century digs. The oldest tablets discovered so far are Babylonian and date back to the fifth millennium B.C (Mingren, 2019). The practice of using clay tablets appears to have spread from Babylonia to Assyria and even to Egypt through trade and conquests. Writers could make the most of the available space by carving tiny characters on every side of a tablet, which let them fit a lot of text onto one piece. For longer texts, they used several tablets that were linked by numbers and keywords, much like how modern books are arranged (Mingren, 2019).

Archaeological excavations have revealed hundreds of thousands of these tablets. The Babylonians and Assyrians had extensive libraries filled with clay tablets. In 1833, British archaeologist Sir Henry Layard found a significant public library in Nineveh, near modern-day Mosul, Iraq, which housed about 10,000 clay tablets (Layard, 2024). This library is believed to have been created by Ashurbanipal, an Assyrian king, around 600 B.C. Other ancient cities, such as Ur, Nippur, and Kish, also had their own collections of clay tablets,

featuring texts on history, mythology, mathematics, and legal and commercial matters (Foster, 2006).

Babylonian map of the World. This partially broken clay tablet contains both cuneiform inscriptions and a unique map of the Mesopotamian world. Probably from Sippar, Mesopotamia, Iraq. 700-500 BCE. The British Museum, London.

The large number of records indicates that reading and writing were likely taught in schools connected to temples, and the practice of copying texts was common (Layard, 2024).

Clay tablets featured a writing style known as cuneiform. The wedge-shaped stylus used to inscribe the soft clay left behind distinctive wedge-shaped marks, forming the hallmark of cuneiform writing. By the 6th century B.C., the rise of the Aramaic language and alphabet led to a decrease in the use of clay tablets (Foster, 2006). This shift probably happened because clay wasn't as suitable for writing Aramaic characters as papyrus, which people wrote on using quill pens or brushes (Layard, 2024).

b. Conservation of Clay tablets

Store clay tablets in a stable environment, ideally around 18-22°C (64-72°F) with low humidity (30-50%). Sudden changes in temperature and moisture can lead to cracking or warping.Keep light exposure to a minimum, especially UV light, which can cause fading. It's best to use low-light conditions for both storage and display. Always use clean, dry hands or wear gloves when handling to keep oils and dirt from getting on the items. Support the tablets from underneath when you move them, and avoid applying pressure on the surfaces to prevent damage. For storage always use acid-free boxes or trays for storage, and make sure they're padded with soft materials to avoid scratching.Store the tablets flat whenever possible. If you need to store them vertically, ensure they're supported to prevent tipping (Tamm et al., 2014).For cleaning and maintenance gently dust the tablets with a soft brush. Avoid using water or cleaning agents, as these can damage the clay.If a tablet is significantly damaged, it's best to consult a professional conservator who specializes in clay preservation. For digital preservation create high-resolution digital images or 3D scans so people can access the content without risking damage to the originals. Keep detailed records for each tablet, including its history, condition, and any conservation work that's been done.Teach staff and community members about proper handling and preservation techniques to foster a culture of care. Get local communities involved in preservation efforts, as they often have valuable insights and support to offer (Cohen, 2012).

3. Papyrus

a. Evolution of Papyrus

If clay tablets are like our modern books, then papyrus rolls are even more similar to their earlier versions. Both are very old, but papyrus rolls are directly related to what came before. While the Babylonians were making cuneiform tablets, the Egyptians were creating a smooth writing material from the papyrus plant. This reed-like plant, from which the term "paper" is derived, thrived in the shallow waters of the Nile Delta (Capua, 2000).The papyrus plant, with stems ranging from 3 to 10 feet long and triangular in shape, was used by the Egyptians for various purposes, including making baskets and weaving mats and sails. The most important impact of papyrus on history was its role as a writing material. Because it had so many applications, the Egyptians carefully cultivated papyrus to keep up with the growing need for writing supplies (Kamrin, 2015).

Papyrus plant

To make the writing material, the stems were sliced into long strips and arranged side by side, overlapping slightly. Then, a layer of shorter strips was placed on top at a right angle. These layers were soaked in water, glued together, hammered down, and left to dry in the sun. The surface was polished with a smooth shell to create a finished sheet. To form a roll, multiple sheets were pasted together (Kamrin, 2015). The typical size for these sheets was about 5 to 6 inches wide, with a roll usually containing no more than 20 sheets (Parker, 1995).

While papyrus is more fragile than clay tablets, some Egyptian papyrus examples dating back to 2500 B.C have survived (Capua, 2000). This preservation is largely due to Egypt's dry climate.

Papyrus served various purposes, including religious, ritual, hieratic, civil, and literary texts. Egyptian scribes employed both black and colored inks similar to what we use today. The black ink was made from soot mixed with vegetable gum, while the colored inks were created from finely ground powders (Capua, 2000; Laukens, 2015).

Papyrus 66 *(also referred to as* $\mathfrak{P}^{66}$*) is a near complete codex of the Gospel of John, and part of the collection known as the Bodmer Papyri.*

Papyrus became a common writing material that spread from Egypt to Assyria, Greece, and Italy, eventually becoming the main writing choice in the Mediterranean. Early evidence shows that the Greeks started using papyrus around 900 B.C. and later passed it on to the Romans. They built libraries filled with papyrus scrolls in their cities, from Sicily to the Black Sea. Alexander the Great is well-known for starting the famous library of papyrus scrolls in Alexandria in 332 B.C. Under his successors, this library became a hallmark of the Hellenistic world, believed to contain over 500,000 scrolls representing literature from across the known world, even reaching as far as India (Capua, 2000; Laukens, 2015).

b. Conservation of Papyrus

Store papyrus in a cool, stable place, ideally around 18-20°C (64-68°F) with about 45-55% humidity. Try to avoid sudden changes in temperature and moisture, as they can make the papyrus brittle or encourage mold growth.Limit how much light, especially UV light, the manuscripts are exposed to. Too much light can fade and damage them, so using UV-filtering glass in display cases is a good idea. Always use clean, dry hands or wear gloves when handling to keep oils and dirt from getting on the items. Support the manuscript when moving it to avoid creasing or tearing. It's best not to fold or bend the papyrus. For storage, store papyrus in acid-free folders or boxes to protect it (Kessler, 2010). Avoid plastic sleeves, as they can trap moisture and cause deterioration.Keep the manuscripts flat whenever possible. If you need to roll them, use a wider diameter to reduce stress on the material. For cleaning gently remove dust using a soft brush or cloth. It's best to avoid water or solvents, as these can damage the papyrus.If there's significant damage, consult a professional conservator who knows how to care for papyrus. For digital preservation make high-quality digital copies so people can access the content without handling the originals.Keep detailed records of each manuscript, including its history, condition, and any conservation work that's been done.Educate staff and community members about proper handling and preservation techniques to encourage a culture of care.Involve local communities in preservation efforts, as they often have valuable knowledge and support to offer (Crisp, 2014).

4. Animal skin

For many years, people have used animal skins to write on. The most common skins came from sheep, goats, and baby cows.

a. Evolution of Parchment

Parchment refers to animal skins that are used for writing. To make it, the hair or wool is taken off the skin, then it's soaked in lime to get rid of any fat, and finally, the skin is stretched over a frame. Afterward, it is shaved with knives and scrapers to create a smooth surface (Reed, 1972).

The use of parchment as a writing medium dates back to the time of Alexander the Great's successors, who founded the city of Pergamum near present-day Istanbul as a hub for education. As the library in Pergamum began to compete with the renowned Library of Alexandria, the Pharaoh stopped supplying the city with papyrus. Around 190 B.C., when the flow of papyrus from Egypt was halted, Eumenes II, the king of Pergamum, started experimenting with animal skins to find an alternative. This new material was named pergamentum, which eventually led to the word parchment. It quickly spread from Asia Minor to the Western regions, becoming popular among both Greeks and Romans (Coppens, 2012). The many old manuscripts from ancient and medieval times that we still have help us understand the different kinds of parchment used in various periods and places (Reed, 1972).

Seventh-century Quran manuscript held by the University of Birmingham.

Initially, only one side of the skin (the flesh side) was treated, which sufficed since manuscripts were typically in roll form with writing on the inside. Over time, both sides began to be dressed, allowing for writing on both surfaces. This advancement resulted in the codex, a book format where pages written on both sides were sewn together, replacing the older scroll style. (Coppens, 2012).

b. Conservation of Parchment

It's best to store parchment in a cool place, ideally around 18-20°C (64-68°F), with humidity levels between 40-60%. Try to avoid big fluctuations in temperature and moisture, as these can cause damage.Limit how much light, especially UV light, the parchment gets. Too much light can fade and weaken it. If you're displaying it, use UV-filtering glass in the display case. Always use clean, dry hands or wear gloves when handling to keep oils and dirt from getting on the items. Support the parchment when moving it to prevent any creasing or tearing. Avoid folding it at all (Gleason, 2020). For the storage, store parchment in acid-free folders or boxes. Steer clear of plastic sleeves, as they can trap moisture and cause deterioration.Keep the parchment flat to avoid damage. If you need to roll it, use a wider diameter to minimize stress. For cleaning use a soft brush or cloth to gently remove dust.

Avoid using water or solvents, as these can harm the material.If there's significant damage, it's best to consult a professional conservator who knows how to care for parchment. For digital preservation make high-quality digital scans or photographs to provide access to the content without risking damage to the original.Keep detailed records about each piece, including its history, condition, and any conservation work that's been done.Teach staff and community members about proper handling and preservation techniques to encourage a culture of care.Engage local communities in preservation efforts, as they often have valuable insights and support to offer (Smith, 2021).

Early writing materials in India

In India, as in many other parts of the world, some of the oldest writing materials that have survived are stone and metal plates. Stone was commonly used for inscribing texts, whether in the form of rough blocks or polished pillars, known as Silasthamba. Copper plates (tamra) were commonly used for engraving sacred texts and legal documents. Numerous archaeological findings of stone inscriptions and copper plate engravings can be found throughout the country. Evidence of literacy also indicates that wooden boards (phalaka - Samputa) inscribed with chalk were used for recording information. In the 11th and 12th centuries A.D., people often wrote on cotton fabrics treated with tamarisk resin, called pats, and even on silk. Unlike stone and metal plates, the remains of these writing materials have mostly worn away, so we mainly learn about them from old texts. In India, birch-bark and palm-leaf emerged as typical writing materials. Although these materials are not as ancient as stone or metal, their extensive use over several centuries—eventually leading to their replacement by paper—has given them significant importance that warrants special attention (Singh, 2016).

1. **Birch- bark**
    a. **Evolution of Birch bark**

The exact time when birch-bark (bhurja) began to be used as a writing material in India is not known. The birch tree originates from the Himalayas, which limited its availability mainly toNorthern India, particularly in Kashmir and surrounding regions. Birch-bark sheets are made from multiple layers taken from the inner bark. Although these sheets are thin and delicate, they are surprisingly strong and durable (Ahmad, 2023). Before writing on them, the sheets are peeled and dried, typically being inscribed with black carbon ink or vegetable pigments. After writing on the sheets, they are stacked between two thin wooden boards to keep them safe.

A birch bark manuscript from Kashmir of the Rupavatara, a grammatical textbook based on the Sanskrit grammar of Pānini (dated 1663)

Birch-bark was used as a writing material for a long time before it was gradually replaced by paper, which the Arabs brought to India in the early 13th century A.D. Many birch-bark manuscripts are well-preserved and can be found in various museum collections in Northern India, particularly at the State Museum in Kashmir (Sutherland, 2014).

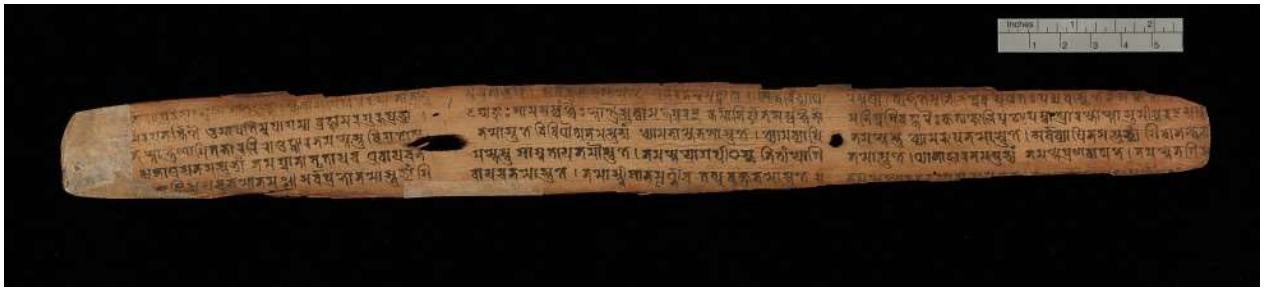
b. Conservation of Birch bark

It's best to store these manuscripts in a cool, dry place—ideally around 18-20°C (64-68°F) and with 40-60% humidity. Try to limit their exposure to light, especially UV light, which can fade and damage them. If you're displaying them, use UV-filtering glass. Always use clean, dry hands or wear gloves when handling to keep oils and dirt from getting on the items. Use supports or cushions when you handle them to prevent bending or tearing. For storage of birch bark manuscripts store these manuscripts in acid-free folders or boxes made from archival materials. Avoid plastic sleeves since they can trap moisture (Koller et al., 2020).Keep them flat to avoid creases and damage. If you need to roll them, use a wider diameter to minimize stress on the bark. For cleaning and maintenance use a soft brush or cloth to gently remove dust. It's best to avoid water or solvents, as these can harm the bark. If a manuscript is significantly damaged, it's wise to consult a professional conservator who specializes in paper or bark materials. For digital preservation create high-quality digital copies so that more people can access them without needing to handle the originals.Keep detailed records of each manuscript, including where it came from, its condition, and any conservation work done. To create awareness, teach staff and community members about proper handling and preservation techniques.Get local communities involved in preservation efforts, as they often have valuable knowledge and support to offer (Hoffmann et al., 2019).

2. Palm-leaf

a. Evolution of Palm-Leaf

Palm trees grow abundantly in many parts of India, especially in South India, Bihar, Orissa, and Bengal. Because of this, palm leaves have been used more often as a writing material than birch-bark (Satyendra ,1978).Rajasekhara describes two types of palm leaves: one called tadipatra, used for writing with pen and ink in Northern India, and the other called talada, which is typically used for incising with a metal stylus in Southern India (Nair, 2010).



One of the oldest known dated Sanskrit manuscripts from South Asia (Cambridge University Library)

In everyday terms, the first type of palm leaf is called sritala, and the second is called tala. Sritala leaves are thin, flexible, and nice-looking, making them easy to use like paper. They soak up ink well and can be written on with ink made from powdered charcoal. In contrast, tala leaves are thicker and rougher, which makes them harder to use. They don't absorb ink, so you have to use a stylus to carve the letters into the surface, and then darken them with soot or charcoal. Sometimes, like in Madras, people rub a dark, juicy leaf on them

to enhance the writing (Sharma, 1979). Palm-leaf manuscripts are often punched in the middle or in two spots. Threads are then passed through these holes to hold the leaves together between two thin wooden boards (Nair, 2010).

b. Conservation of Palm leaf

Keep manuscripts in a stable, cool, and dry environment. High humidity can lead to mold growth, while extreme temperatures can cause brittleness.For storageuse acid-free boxes or containers to store the manuscripts flat, avoiding folding or rolling. Ensure they are protected from direct sunlight and pests. Always handle manuscripts with clean, dry hands or wear cotton gloves. Minimize direct contact to prevent oils and dirt from transferring. For cleaningdust, the manuscripts gently with a soft brush or cloth (Bhattacharya & Dutta, 2018). Avoid using water or cleaning agents that can damage the leaves.Use traditional methods for repairing damaged manuscripts, such as applying a thin layer of rice paste or using fine threads for stitching, ensuring that materials are archival-safe. For the digital preservation create digital copies of the manuscripts to ensure their content is preserved and accessible, reducing the need for physical handling.Train staff in proper handling and preservation techniques to ensure best practices is followed and engage local communities in preservation efforts, fostering a sense of ownership and cultural pride (Mohan & Kumari, 2021).

3. Paper

a. Evolution of Paper

Paper is made from cellulose fibers found in plants. The main sources for making paper are trees like fir, poplar, and pine, as well as cotton plants, rice and wheat straw, grasses, hemp, and jute. Today, most paper comes from wood by extracting cellulose, but high-quality writing paper is still often made from cotton rags (Ainsworth, 1958).

The word "paper" comes from the Egyptian papyrus. The type of paper we use today was invented in China around A.D. 105. The Chinese method of making paper spread to other areas after some Chinese paper makers were captured during conflicts between the Arabs and the Chinese in Russian Turkestan. The Moors in Samarkand learned this technique from them, and by A.D. 795, a paper industry was established in Baghdad. Later, the knowledge of making paper spread to Europe due to the Crusades and the Moorish conquests in Northern Africa and Spain. In India, paper was introduced by the Muslims; with the oldest known Indian paper manuscript dating back to 1223-24 A.D. Paper eventually replaced birch-bark and later took over from palm-leaf as well (Rosenberg, 2011).

Old Paper Manuscript (Illustrated Paper Ms Mandu Kalpa Sutra) National Museum. New Delhi

For many centuries, handmade art paper was made from rag pulp. This type of paper was very strong, but the production process was slow. In 1750, a machine was developed in Holland that greatly sped up the breakdown of rags into fibers. Then, in 1798, a continuous roll paper-making machine was invented in France, which the Fourdrinier brothers improved in 1803. In 1840, a German inventor created a method for grinding logs into a fibrous pulp, and in 1867, an American introduced a chemical process to separate fibers from wood using a solution of sulphurous acid. This method quickly spread in Europe, and by 1882, wood pulp was being produced using techniques similar to those in modern paper mills (Rosenberg, 2011).

b. **Conservation of paper**

Keep storage areas cool (ideally 65-70°F) and maintain humidity levels between 30-50%. Use hygrometers to monitor conditions.Minimize light exposure, especially UV light, which can cause fading and deterioration. Use archival-quality lighting. For storage store manuscripts in acid-free, archival-quality boxes or folders to protect them from dust and physical damage.Keep documents flat whenever possible to prevent creasing and curling. Use interleaving tissue for fragile items.Always handle manuscripts with clean, dry hands or wear cotton gloves to prevent oils and dirt from damaging the paper.Use supports like book cradles when handling large or fragile documents (Woods, 2007). For digital preservation digitize manuscripts to create electronic copies, which can reduce handling of the originals and make access easier.Properly catalog digital files with metadata for easy retrieval and reference.For damaged manuscripts, consider professional conservation treatments, such as mending tears or reattaching loose pages.Carefully remove dirt and dust, but avoid invasive cleaning methods that could harm the paper.Train staff and volunteers in proper handling and preservation techniques.Educate the public about the importance of preservation and encourage responsible usage of archives (Davis, 2013).

4. Modern World Writing materials

Writing materials have changed a lot over time, moving from typewriters to modern tools like computers and smartphones. This shift shows how technology has advanced, how people communicate differently now, and what users need has evolved.

a. The Typewriter Era

The typewriter, which was invented in the 19th century, brought a significant change in how people wrote. In 1868, Christopher Latham Sholes created the first commercially successful typewriter, making it easier and faster to write compared to doing it by hand (Moss, 2015). The introduction of the QWERTY keyboard layout and features like the ribbon system greatly improved typing efficiency (Morrison, 2016) this invention not only changed how individuals communicated with one another but also transformed business communication, allowing for quicker and more streamlined document creation.

A 19th-century Remington Standard typewriter owned by Frederick Douglass. (*Britannica)*

b. Computers

The arrival of computers in the mid-20th century marked a major change in writing. Early word processors, like the IBM 5100, made it much easier for users to edit text, which was a big improvement over typewriters (Kahney, 2006). In the 1980s, the introduction of graphical user interfaces (GUIs), particularly with Apple's Macintosh, made writing technology more accessible to everyone (Rheingold, 1991). During this time, software applications such as Microsoft Word were developed, offering robust editing features and formatting options that allowed users to create professional-looking documents with ease. (Ziman, 2014).

IBM Personal Computer (PC) (computer history museum)

c. Mobile devices and the Internet

The shift from desktop computers to mobile devices represented another important change in how we write. With the rise of smartphones in the late 2000s, people could write whenever and wherever they wanted. Mobile apps like Google Docs and Evernote made it easy to collaborate in real time and store work in the cloud, increasing accessibility and flexibility. The Internet has changed writing from a solitary task into a collaborative and interactive experience, allowing users to share their content instantly and connect with audiences around the world (Baker et al., 2017).

Modern writing materials (HP Tech)

d. Social media and online platforms

The rise of social media platforms has changed the way we think about writing and how it's consumed. Sites like Twitter and Facebook have popularized new styles of concise, impactful writing that emphasize brevity and engagement (Burgess & Green, 2009). These platforms encourage a participatory culture, allowing users to take part in discussions and making content creation more accessible to everyone. As a result, the lines between writers and readers have blurred, leading to a more interactive writing environment (Jenkins, 2006).

Preservation of digital modern writing materials

Turning printed materials into stable digital formats can help keep the content safe and ensure it works well with modern technologies. For instance, PDF/A is a format created specifically for long-term preservation and can be used for this purpose (Kohler, 2021).Next, digital repositories and archives are very important. Organizations like the Internet Archive and national libraries are working hard to save digital content so that future generations can access it (Boyle, 2023). Additionally, community efforts allow people and groups to help preserve digital writings (Jones, 2020).Finally, it’s important to raise awareness about digital preservation. Educational programs and workshops can teach writers, educators, and policymakers how to effectively preserve digital content (Thompson, 2021).

Conclusion

In summary, the journey of writing materials, from ancient clay tablets to today's digital formats, shows how technology and communication have changed over time. Each material—like clay, papyrus, and paper—has played an important role in sharing knowledge and culture. Preserving these materials is crucial for our collective memory. As we moved from physical to digital writing, our preservation methods adapted to new challenges, like keeping data safe from becoming out dated or corrupted. This evolution also shows how the choice of writing material affects content, accessibility, and how long it lasts. In our digital age, it's vital to think about how our current practices will influence future histories. Digital tools offer great chances for sharing and interacting, but they also bring challenges in making sure our work remains permanent.

As we move forward, we should keep innovating while respecting the legacies of past materials, ensuring future generations can access our rich history. This not only protects our past but also enriches what it means to be human in a changing world.

REFERENCES

1) Ancient Origins, 2020. *Ashurbanipal: The Oldest Surviving Royal Library in the World with Over 30,000 Clay Tablets*. Available at: https://www.ancient-origins.net/news-history-archaeology/ashurbanipal-library-0013527.
2) Ainsworth, J.H. (1958) *Paper, the Fifth Wonder*. Kaukauna: Wisconsin.
3) Ahmad, I. (2023) 'Kashmiri Burzha: Manuscripts from India and Central Asia', *Greater Kashmir*. Available at: https://www.greaterkashmir.com
4) Baker, R., Johnson, M., & Smith, L. (2017). *The Impact of Mobile Technology on Writing Practices*. Journal of Digital Communication, 12(3), 45-60.
5) Bhattacharya, S. & Dutta, A. (2018). *Preservation of Palm Leaf Manuscripts: Challenges and Strategies*. Journal of Cultural Heritage, 29, pp. 134-142.
6) Burgess, J., & Green, J. (2009). *YouTube: Online Video and Participatory Culture*. Polity.
7) Britannica, 2024. *Sir Austen Henry Layard | Middle East, Assyrian Art & Archaeology*. Available at: https://www.britannica.com/biography/Austen-Henry-Layard .
8) Britannica, 2024. *Rosetta stone*. [online] Available at: https://www.britannica.com/topic/Rosetta-Stone [Accessed 17 Oct. 2024].
9) Boyle, A. (2023). *Digital Archiving: The Role of Libraries and Community Initiatives*. Journal of Digital Preservation, 5(1), pp. 25-38.
10) Capua, R. (2000). *Papyrus-Making in Egypt*. Heilbrunn Timeline of Art History, The Metropolitan Museum of Art. Available at: https://www.metmuseum.org/toah/hd/papy/hd_papy.htm
11) Coppens, J. (2012). *The Conservation of Manuscripts: Parchment and Paper*. London: Archetype Publications.
12) Cohen, A. (2012) *Conservation of Clay Tablets: Challenges and Strategies*. Journal of Archaeological Science, 39(4), pp. 1021-1030.
13) Crisp, J. (2014) 'The Preservation of Papyrus', *Journal of Conservation and Museum Studies*, 12(1), pp. 45-58
14) Davis, R. (2013). *Preserving Historical Manuscripts: Techniques and Best Practices*. London: Bloomsbury.
15) Foster, B. R. (2006). The Ancient Mesopotamian World. Oxford: Oxford University Press
16) Gleason, K. (2020). *Environmental Factors in Parchment Conservation*. Conservation Journal, 15(4), 67-73.
17) Hans, K. Jensen (1958) *Sign, Symbol and Script*. London: George Allen and Unwin.
18) Hawkes, J. and Wooley, (Sir) L. (1963) *History of Mankind: Culture and Scientific Development*. Paris: UNESCO.
19) Harris, R. (2002). *Stone and Metal Inscriptions: A Conservation Guide*. New York: Routledge.
20) Hoffmann, M., Müller, R., & Schmidt, S. (2019). Innovative Approaches to the Conservation of Organic Materials. *Materials and Conservation*, 14(2), 112-125.
21) Jenkins, H. (2006). *Convergence Culture: Where Old and New Media Collide*. New York University Press.

22) Jones, L. (2020). *Community-Driven Digital Preservation: Strategies for Success*. Library and Information Science, 12(3), pp. 45-57.
23) Jones, R. (2021). 'Cleaning Techniques for Stone Artifacts: A Review', *Journal of Archaeological Conservation*, 15(3), pp. 45-60.
24) Kahney, L. (2006). *The Cult of Mac*. No Starch Press.
25) Kessler, R. (2010) 'Conservation Challenges in the Preservation of Papyrus', *Museum Management and Curatorship*, 25(3), pp. 231-245.
26) Kohler, J. (2021). *Choosing the Right Format for Digital Preservation: A Guide to PDF/A and Beyond*. Archival Science, 21(2), pp. 123-134.
27) Koller, A., Verhoeven, C., & Andrist, C. (2020). Environmental Control for the Preservation of Organic Artifacts. *Conservation Science in Cultural Heritage*, 10(1), 67-79.
28) Mason, L. (2018). 'Environmental Factors in the Preservation of Cultural Heritage', *Heritage Science*, 6(1), pp. 1-10.
29) Morrison, R. (2016). *Typewriter: A History of the Mechanical Writing Machine*. Green Books.
30) Mohan, P. & Kumari, L. (2021). *Handling and Storage of Palm Leaf Manuscripts: Best Practices*. Conservation Journal, 6(3), pp. 24-32.
31) Moss, R. (2015). *The Typewriter Revolution: A Typist's Companion*. The New Press.
32) Nair, P. (2010). *Palm Leaf Manuscripts: Preservation and Digitization*. New Delhi: National Mission for Manuscripts.
33) Parker, R. (1995). *The Papyrus: A History of Writing on Papyrus*. Chicago: University of Chicago Press.
34) Prajapati, C.L. (1997) *Archivo-Library Materials – Their Enemies and Need of First Phase Conservation*. New Delhi: Mittal Publications.
35) Rheingold, H. (1991). *Virtual Reality*. Summit Books.
36) Reed, R. (1972) *Ancient Skins, Parchments and Leather*.
37) Rosenberg, L. (2011). *Preserving Paper: Techniques and Materials*. San Francisco: Chronicle Books.
38) Singh, R., and Sharma, P. (2016) *Early Writing Materials in India*, Indian Journal of History, 45(2), pp. 123-145.
39) Satyendra (1978) *Pandulipi Vijnan*. Jaipur: Hindi Granth Academy.
40) Sharma, R.G. (1979) *Pandulipi Sampadan Kala*. Delhi: Prabhat Prakashan.
41) Sutherland, C. (2014). *Birch Bark Manuscripts: Tradition and Preservation*. Toronto: University of Toronto Press.
42) Smith, A. (2021). *Best Practices for Storing Historical Documents*. Archival Science, 14(1), 85-92.
43) Tsuen-Hsuin, Tsien (1962) *Written on Bamboo and Silk; the Beginnings of Chinese Books and Inscriptions*. Chicago: University of Chicago Press.
44) Thompson, A. (2021). *Educating for the Future: The Role of Awareness in Digital Preservation Efforts*. Journal of Education for Information, 29(4), pp. 215-228.

45) Tamm, A., Mehl, M. and Ohlau, R. (2014) *Environmental Factors in the Conservation of Archaeological Artifacts*. Journal of Cultural Heritage, 15(2), pp. 156-164.
46) Woods, R. (2007). *Climate Control for Paper Preservation*. Toronto: University of Toronto Press.