

History of Papermaking

1. Pre-Historic Times – Humans have always had the need to communicate and record their thoughts.

In pre-historic times, they carved pictures and symbols into the walls of caves and on rock and bone. As human civilizations developed, people found surfaces that were easier to write on, such as waxed boards, palm leaves, bronze, silk, parchment made from animal skins, and clay tablets.

2. 4000 B.C. – The ancient Egyptians invented the first paper-like material. They used papyrus, a reed plant that grows along waterways. The reed was cross-woven into sheets and pounded together into a hard, thin sheet. The word “paper” comes from the word “papyrus.”

3. 105 A.D. – The first true paper was invented in 105 A.D. by a Chinese court official named Ts'ai Lun under the Chinese Emperor Ho Ti. He made paper by mixing hemp, old cloth, and mulberry bark with water, mashing it into a pulp, pressing out the liquid, and allowing the sheet to dry in the sun. Literature and the arts began to flourish in China and papermaking began to spread to other parts of Asia.

4. 751 A.D. – Arab traders in Asia became acquainted with papermaking methods, and Arabs eventually set up paper mills in Baghdad, Damascus, and Cairo. Because of the lack of fresh plant materials in these areas, Arabian paper was made almost entirely of cloth rags. The rags were ground into a lumpy pulp and then made into thin sheets that were coated on both sides with starch paste.

5. 1000-1400 A.D. – It took hundreds of years for papermaking techniques to make their way across the Arab world to Europe. The first paper mill was built in Spain in 1151. In the 1200s, Italy became a major paper

producer, and improved on the Arab technique by using water-powered mills. The raw material was still cloth rags (worn-out clothing), which were mostly made from flax and cotton fibers. French monks began producing paper for holy texts, and the process spread to Germany. At this time, few people could read and books were owned only by royalty, monasteries, and scholars.

6. 1453 A.D. – Johann Gutenberg invented the moveable-type printing press, which started a radical change in how people communicated. Books could now be produced more quickly and cheaply as they no longer needed to be hand-written. For the first time, the average person had access to books, and more people learned to read. The demand for books—and paper—increased.

7. 1719 A.D. – The demand for paper continued to rise and there were simply not enough old clothes and rags to keep up. People searched for substitute materials. A French scientist, Rene de Reaumur, who had observed wasps using tiny slivers of wood to make their papery nests, introduced the idea of making paper from wood. But, people didn't know yet how to process the wood to make useable paper.

8. 1770-1790 – During the American Revolutionary War, the demand for paper was so great that soldiers had to tear up old books to make wadding for their muzzle-loading guns. By the end of the Revolutionary War, the new nation had nearly 100 paper mills. People still used the ancient process of hand dipping a mould (a screen with a wooden frame) into a vat of watery pulp, and lifting it out to drain the water away. The wet sheets of paper were turned off the mould and layered with felt. Then they were pressed and separated for drying.

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History of Papermaking (continued)

9. 1798 – Louis Robert, a clerk at a papermaking mill in France, invented the paper-making machine. It was a large hand-cranked machine that made paper on a continuous wire screen. Two English papermakers, the Fourdrinier brothers, improved his design and produced the machines for sale. Paper could now be made by rollers that squeezed out the excess water from the pulp on the screens, while the damp paper was rolled up at one end of the machine.

10. 1850-1880 – People continued to search for an alternative to cloth rags for paper. They tried everything from tree bark to sugar cane waste to straw. A German, Friedrich Gottlob Keller, invented a machine for turning wood into pulp by grinding it with a revolving grindstone. But, this ground wood made only poor quality paper. Englishman Hugh Burgess found that better paper could be made by putting the ground wood into a chemical solution to “digest” the wood. Later, a Swede chemist discovered that the best chemical solution to use included sulfate. At that time, America’s papermaking mills were located mostly in New York and the New England states, and the spruce trees in those areas made excellent ground wood and sulfate pulp—and good-quality paper.

11. 1889-1900 – The age of mass-produced paper was launched in the United States, and paper was plentiful and low-cost. Newspapers and magazines began to appear on stands. Paper made its way into schools and replaced writing slates. Five-and-ten-cent novels rolled off the presses. The U.S.’s paper industry expanded to Wisconsin, Michigan, and Minnesota where there were spruce and balsam trees; to Washington, Oregon, and California where there were hemlock, fir, and pine; and to Georgia, Mississippi, and Alabama, which had mostly pine.

12. 20th Century – Although the basic processes for making paper remained the same, this century saw vast changes in the technologies used to make it. The paper-making process became more and more automated, allowing for faster working speeds and more consistent quality. In addition to chemically processed wood pulp, a mechanical process also began to be used. In this process, huge grindstones reduced wood logs or chips to suitable paper fibers. Recovered paper became another important source of paper fiber. The paper was shredded and mixed with water to create paper pulp, and then made into recycled paper products. By the end of the century—thanks to curbside recycling programs in many communities—more than 45 percent of the U.S.’s used paper was recovered for recycling and reuse.

13. The 21st Century – The papermaking process continues to improve thanks to the efficiencies provided by modern technology, resulting in paper that is brighter and lighter in weight. Further, 50 percent of the paper consumed in the U.S. was recovered for recycling in 2003 - a significant milestone for the industry. Thanks to increasing demand for recovered fiber both domestically and globally, the industry has set a goal to increase that number to 55 percent by the year 2012. The global market, changing consumer demands, new products, alternative fibers, sustainable use of resources, and new technologies are all part of the complex future for papermaking.