

A Brief History of the Making of Paper

Essentially, paper is made of cellulose pulp. Wasps were the first paper-makers. They chew wood into a pulpy paste that they then extrude in thin layers to make the chamber walls of their nests. Humans, in their quest for something more convenient to write and draw on than stone and pottery, tried a number of materials.

In Egypt, around 3000 BC, people discovered that if they took the tall reeds (called Papyrus by the Romans) growing along the banks of the Nile, stripped out the fibrous centers, beat and soaked them, and then laid the fibers crosswise in a press to dry, they could create a thin, flexible sheet of material suitable for absorbing ink and pigments. The Romans and Greeks, seeing a good thing, were quick to adopt "papyrus", and its use became widespread.

The process of beating or pressing fibers from the inner bark of plants was used by people in many parts of the world. "Tapa" cloth or paper is still made from fig tree bark in South-East Asia and in the South Pacific. The technique of making tapa includes cooking the fiber, flattening it with a wooden hammer, and dissolving it to make a pulp. It is then spread on a screen and dried.

In some places, perhaps due to the kind and amount of vegetation, people made writing material from animal skins, usually sheep or goat, by cleaning, pounding, and stretching them. This "parchment", as it is called, was first used in the ancient Greek kingdom of Pergamum as a substitute for papyrus.

The first record of "real paper" being made from pulp is from the AD 105 chronicle of Ts'ai Lun, a Chinese court official. He recounts the making of paper out of rags, mulberry tree bark, hemp, and fishnets. The Chinese later used bamboo, treating the fibers by cooking them in lye. To protect the paper from being eaten by insects, they developed the processes of sizing, coating, and dyeing it.

By the Seventh Century Chinese paper-making techniques had spread to Japan, Korea, Central Asia and Tibet, and into India. The Arabs, as they traveled to these places, learned the process and set up "paper mills" in Baghdad, Damascus, and Cairo. Because vegetation was sparse in these areas, the paper was made almost entirely of rags. The Arabs coated the thin sheets of paper with starch paste, which made it shiny and easy to write on.

In medieval Europe, merchants trading with the Arabs were fascinated by the paper being used for recording transactions. The secrets of paper production reached Italy and Spain. The first European paper mill was built in Xativa, Spain, in 1151 AD.

In Amalfi and Fabriano, Italy, papermakers used linen and cotton rags, as the Spanish did, but they speeded up the process by using water power, making the mold of wire mesh, using a screw press to feed in the pulp, and drying the sheets on ropes. They also sized the paper by dipping it rather than painting the sizing on.

Paper mills spread throughout Europe in the 15th and 16th centuries. As they became more efficient, a division of labor became entrenched. There was a team of four people involved in the operation of a paper press: the apprentice, who fed raw material into the vat and kept the vat hot; the vatman, who got the pulp onto the mold by dipping it into the vat; the couch squirt, who then placed the sheet on felt; and the layman, who took off the moist sheets from the felt after pressing. Operating the press in this way, in a working day of thirteen hours, up to nine reams of paper could be made.

After the invention of movable type by Gutenberg in the mid 1400's, (or reinvention, since the Chinese in 1050 had made movable type using baked clay tablets), the demand for paper increased greatly. A shortage of raw materials led to regulations governing the rag trade. Straw was tried, but made paper of poor quality. Not until early 1800 was the method of making paper from sawdust and bark introduced by Matthew Lyon of Vermont. In the 1840's the use of ground wood pulp began.

In 1799 in England, the Fourdrinier brothers patented a "paper machine" which produced paper on a rolling felt, making an "endless" roll of paper. This machine was a predecessor to modern paper-making technology.

Today most paper is still made from trees. One ton of paper takes 17 adult trees. Most paper mills use at least some recycled paper. They could use more!