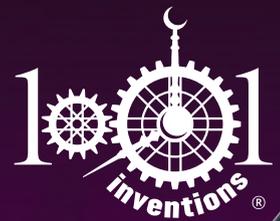


# Paper and pen



Why do you write texts or e-mails? Or keep a diary? Or report on science experiments?

People write things down to communicate with others and to record things. Of course, you can only write if you have the tools and materials you need.



## Ink

People have used ink for centuries. More than a thousand years ago, Muslims improved ink making techniques. They developed new types of ink, too. Jabir ibn Hayyan made an ink that showed up in the dark. By 1100 CE Ibn Badis was making silver ink by grinding silver filings with distilled wine. He also described making coloured inks... and secret writing!

Professional scribes used lampblack ink. They made it like this:

- Burn linseed oil in a lamp, without much air. The equation shows the products of the reaction.

**linseed oil + oxygen → water + carbon dioxide + carbon monoxide + carbon**  
(from air)

The carbon is a black powder – soot.

- Hold paper or sheepskin above the flame to collect the soot.
- Mix the soot with water and gum arabic (sap from an *Acacia senegal* tree). The soot does not dissolve. Instead, it mixes with the liquids to make a suspension.

When you write with this ink, the carbon stays on the surface of the paper. So the writing looks very smooth, and you can wipe it off if you make a mistake. Lampblack ink never fades. Its quality is as good as some modern inks.



The first chapter of the Quran in Jali Diwani style

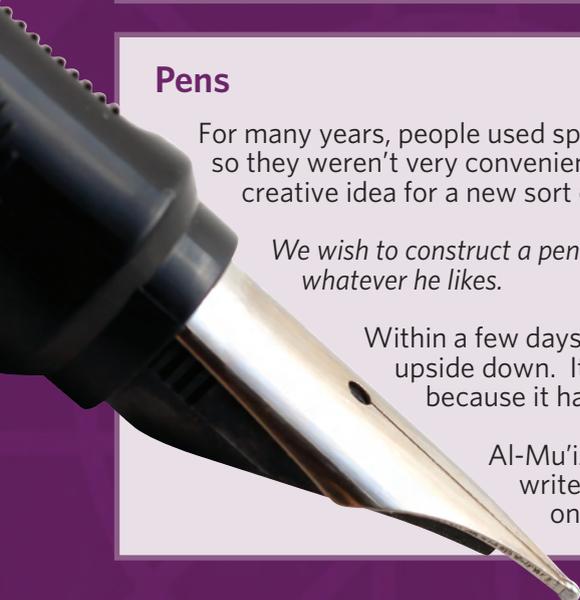
## Pens

For many years, people used specially cut reeds as pens. But there was nowhere to store ink in them, so they weren't very convenient. In 953 an Egyptian sultan recorded how his friend, al-Mu'izz, had a creative idea for a new sort of pen:

*We wish to construct a pen ... whose ink will be contained inside it. A person can fill it with ink and write whatever he likes.*

Within a few days, a craftsman had made a pen just like this. It didn't spill ink – even when upside down. It didn't leave stains on hands or clothes. And it didn't need an ink pot because it had its own, hidden away.

Al-Mu'izz's clever idea, and the craftsman's careful work, meant that people could write with pens containing their own ink, wherever they were. Fountain pens only became common in Europe 900 years later.



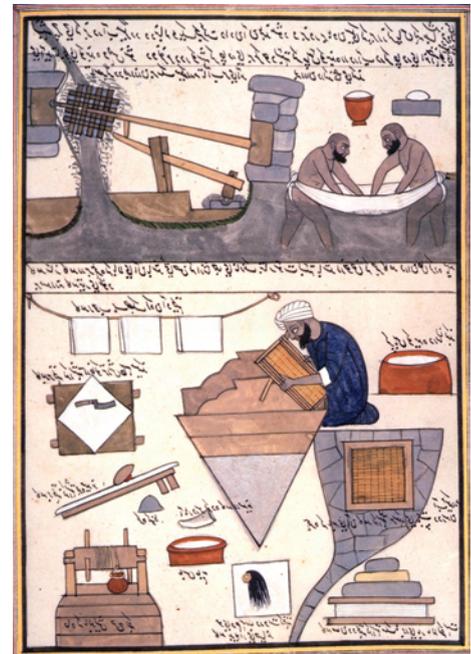
## Paper

Eleven hundred years ago Muslims started making paper in Baghdad. They learnt to make it from some Chinese prisoners:

- Make a pulp from the raw material and water. This separates the fibres of the raw material.
- Collect the fibres on a mesh. This makes a paper web.
- Press the paper web and dry it in air.

The Chinese made their paper from mulberry tree bark. The Muslims experimented with other raw materials, including hemp and cotton. Hemp paper was particularly good. The Muslims also made paper from linen rags – an early example of recycling!

Soon, huge amounts of paper were being made all over the Islamic world. Muslims took their paper-making techniques to many other parts of the world, too. More paper led to cheaper books, so ideas and knowledge spread quickly.



19th century manuscript showing paper making process

Images from *Muslim Heritage in our World*, FSTC (2006), pages 84 (calligraphy) and 136 (paper making).