



**From Caves to Crayons**

**The Story of Writing**

## Cave Paintings

It would seem that as soon as humans developed tools to hunt, they embarked on the journey that led to the forms of written communication that are taken for granted by humanity today. Early humans developed two tools for hunting. Firstly, a club or rounded object for killing the animal and a secondary sharper tool for skinning and cutting the meat.

It was this sharper tool that became the first rudimentary writing implement etching at the walls of caves which were the centre of the early hunter gatherer communities. To begin with simple patterns were formed or hands were used as stencils to create murals. The first inks were made by mixing either berries or soot with animal fats or human saliva. There is also evidence that some prehistoric artists used airbrushing techniques by blowing inks through hollow bones as well as making paint brushes by attaching straw or animal hair to sticks.

One of the most famous collections of cave paintings is located in Lascaux, France. It is estimated that this vast collection could be up to 20,000 years old. They were



discovered in September 1940 and contain nearly 2,000 figures in several separate sections. Animals, human figures and abstract signs were made mostly by mineral based inks with some patterns etched into the stone.

There are many theories as to the purpose of cave paintings. The fact that multiple disparate cultures over thousands of years adopted the pastime suggests that creativity is inherent in human nature. Cave paintings of animal scenes often told a story and were commonly found in the part of the cave where the best acoustics were to be found. A University of Paris researcher also discovered flutes made from animal bones in one cave supporting the theory of an early theatre setting.<sup>1</sup>



Further evidence of cave paintings as an interactive story telling medium has been suggested by archaeologist Marc Azema and artist Florent Rivère who concluded that some of the animals painted at Lascaux have been given the appearance of movement by using cartoon-like techniques;

“Lascaux .. is the cave with the greatest number of cases of split-action movement by super imposition of successive images”<sup>ii</sup>

It has also been suggested that some cave paintings could also be evidence of early shaman religious practice where certain holy individuals have recorded visions experienced during religious rituals <sup>iii</sup>

As breath-taking as these Palaeolithic portraits might be, their lack of portability meant that they would not serve any practical purpose for the development of humanity until several millennia later with the discovery of clay. Around 10,000 BC, mark making became moveable.

## Clay Tokens and Tablets

In addition to enabling the development of cooking vessels, the discovery of clay also meant that the rapidly evolving collection of abstract symbols used to communicate important ideas could now also be transported on clay tokens. Such tokens date back to 8,500 BC. Initially, these provided a means of recording quantities of materials or goods that were being exchanged or shipped by traders and these quantities were represented as pictographs.

This would have been a time consuming process and therefore traders began using abstract symbols to signify the spoken word. This shift from pictures to representations of speech could be seen as the birth of handwriting.

## Alphabets

The developmental transition from pictures to words is divided into three stages beginning with system that uses glyphs (carved symbols of characters) to represent objects and ideas, followed by a transitional phase where glyphs additionally represent the name of the object or idea. Finally, a phonetic system evolves where glyphs represent the sounds or spoken symbols. This last stage is further divided into glyphs representing whole words and then syllables and eventually elementary sounds. It is this final stage where the alphabet is born.



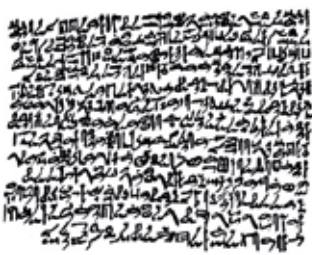
In the Siniatic world (the Sinai Peninsula linking North Africa to the Middle East) the first alphabet was developed between 1700 and 1500BC, followed by the current Hebrew alphabet and writing in approximately 600BC. 200 years later the Greek alphabet followed and this was the first alphabet that was written left to right. The Latin alphabet as it is known today was developed in 300BC but only contained

upper case letters as the writing instruments were not sophisticated enough for the small detail required to form lower case letters. Additionally, all of the letters were formed using straight lines.

## Putting Pen to Paper

Clay tokens and tablets evolved into wax-coated, hinged tablets often made from wood that could be closed to protect the writer's marks. These marks were made with a stylus made from bone, metal or ivory. In addition to a pointed end, a flattened end allowed the scribe to smooth out any errors comparable to an early form of the pencil eraser.

The transition from clay or wooden tablets to papyrus is evident in the 3000 year old Prisse Papyrus which was obtained at Thebes, Greece in 1856 by a French Orientalist, Achille Constant Théodore Émile Prisse D'Avennes. It is purported to be the earliest known example of a written document on papyrus. The text found on the papyrus, which originates from Egypt's middle kingdom is the final portion of a 'compilation of moral maxims and admonitions on the practice of virtue'.<sup>iv</sup>



The use of papyrus was a great leap forward for writing and despite rivalry from parchment made from animal skins, continued as a writing surface until the 11th Century AD. Early Romans, Greeks, Egyptians and Hebrews were all advocates of papyrus. It was also very popular amongst early Christian writers who crafted pages into codices, a very simple bookmaking technique. This was necessary as papyrus could not be folded without cracking.

## Ink

It would seem that pen and paper were created in parallel. A Chinese philosopher, Tien-Lcheu (2697 BC) is credited with the invention of Indian ink. The ink consisted of soot from pine smoke mixed with lamp oil and gelatine made from donkey skins.



This formula was commonly used by 1200 BC by which time different natural colorants were being added to create a range of inks that could be used to highlight different significances in written text. By 400 AD, the ink recipe had changed to a composite of gum, iron-salts and nutgalls (a growth caused by a type of wasp on oak trees). This stable form of ink continued to be used for many centuries. The colour of the ink turned from a bluish-black to a dull brown colour that can be observed on many old documents.

The Romans developed an ingenious method for delivering the ink to the page with the invention of a primitive fountain pen. A piece of reed from marsh grasses or bamboo was cut to form a nib at one end and the stem was filled with ink. The writer could dispense the ink to the nib of the reed pen by squeezing the reed.

## Paper

The move from papyrus to paper took more than a millennium for a number of reasons. It is believed that the Chinese invented paper made from wood fibres in 105 AD but this invention remained secret until it reached Japan in the 8th Century.



Wood fibre paper slowly made its journey to Europe with the arrival to Spain of the Arabs shortly after this in 711 AD. The use of paper remained sporadic throughout Europe however until the building of paper mills in the late 1300s and the invention of the printing press by Gutenberg in 1436.

## The Quill Pen

At around the same time that paper made its journey to Europe for the first time, quill feathers became the most popular writing instrument and remained so for a thousand years. The word pen derives from the Latin penna meaning 'feather'. Each quill would last for a week and took considerable preparation. It required sharpening with a pen knife and the drying of ink was hastened by a small coal stove under the table.



The strongest quills come from living birds and are most commonly goose feathers. Additionally, the feathers of swans, turkeys, crows, owls, eagles and hawks can be used. Jane Austen favoured a crow's feather as it produced the finest work. The quill feathers came from the left wing of the bird so that the shaft would curve most naturally for a right-handed person. Each bird has between two and twelve suitable feathers for quills and so the supply of quills to Britain relied upon imported feathers from Europe. American president Thomas Jefferson who was a prolific letter writer solved the problem of quill feather supply by breeding geese himself.

## Cursive Script

As writing implements evolved and improved, so too did the Latin alphabet and its appearance. By 600 AD, lower case letters began to be used. At this time however, letters were still printed in a singular form and it was only with the widespread use



of both paper and quill together that cursive script or italic style fonts became popular. Its development is credited to Aldus Manutius of Venice at the end of the 15th Century.

Manutius published an extensive collection of classical Greek works with his Aldine Press which was founded in 1490. His press was also responsible for the first portable book and developing typefaces that looked less like simple imitations of hand drawn characters. The advantages for quill users of 'joined up' writing were not only speed but also a reduction in splatters as the quill would leave the page with less frequency.

## Fountain Pen

After more than ten thousand years of feather-driven script, the first pens that held their own ink supply were invented. The earliest surviving examples of fountain pens date from the start of the eighteenth century. The exact origins of the first fountain pen remain unclear and although the French royal instrument maker, Nicholas Bion (1652-1733) makes reference to them in a treatise written by him in 1709, he was neither the inventor nor the patent holder for them.

These early prototypes still made use of a quill nib until gold tipped nibs became more popular. Whilst it was beneficial for the writer to be spared from constantly having to dip the nib for ink, the first models were dogged with design flaws which invariably led to the ink leaking from the reserve. Early patents were issued to Baltimore shoemaker, Peregrin Williamson in 1809 followed by John Scheffer in Britain in 1819. The first self-filling fountain pen was patented in 1813 by John Jacob Parker in 1813.

The fountain pen design flaws were finally addressed and resolved by Lewis Waterman in 1884 when he modified the design to include three grooves within the feed mechanism as well as an air hole in the nib. Waterman's journey to successfully patenting the design for the first modern fountain pen was born out of frustration at the inadequacies of the pens available at the time. Waterman was a salesman and

lost a valuable new customer when a sales contract was ruined by a leaking fountain pen.



Waterman began selling his fountain pens from a cigar shop in New York and he offered a five year guarantee with each pen. These early models were sold for two dollars, approximately fifty dollars in today's market. A factory was opened in 1899 and by 1901 Waterman's company was selling 350,000 pens a year. Waterman's



greatest legacy must be the solid gold Waterman fountain pen that was used to sign the Treaty of Versailles in June 1919.

Over the next fifty years, a number of other large manufacturers emerged including Parker, Schaeffler and Eversharp-Wahl. Owners of fountain pens would rarely lend their pen to another writer as the nib would wear down in accordance with the individual writing style of the pen's owner. It would take about four months for the nib to be 'broken in' by flexing as pressure was applied by the writer.

The 1950s saw the invention of the disposable ink cartridge. These were constructed of either plastic or glass and allowed the writer an easy and clean insertion. Whilst they were an instant success, their arrival was overshadowed to an extent by the invention of the ballpoint pen.

## Ballpoint Pen

It was frustration once again that led to the next evolution in pen design. Like Lewis Waterman, Lazlo Biro wanted more from his writing implement. The Hungarian journalist noted that newspaper ink dried very quickly as well as being resistant to smudges. In 1938, along with his brother George, Lazlo set out to develop a pen that could carry thicker ink, like that of the printing world and thus the ballpoint pen was invented. As the ink was that much thicker than the conventional ink used in fountain pens, a new nib was also necessary and a ball bearing was perfect for a smooth and even delivery of ink to page.



The Lazlo brothers applied for patents for their designs in 1938 and 1940. Their pens were sold through the Eterpen Company in Argentina where the press praised its longevity, writing for up to a year without running out of ink. Interest in the



ballpoint pen came from far afield as news of this invention reached the Royal Air Force in Britain who were seeking an ink pen that could write at high altitudes. The British government bought the licensing rights for the pen as part of the war effort.

Meanwhile across the Atlantic, two companies joined forces to gain rights to bring the Biro pen to North America. The Biro brothers had failed to secure a U.S. patent for their design and therefore the 'Eversharp CA' pen, manufactured by Eversharp and Eberhard-Faber was launched in the United States in May 1945.

Just a month later, Milton Reynolds, a Chicago businessman stumbled upon the original Biro pens whilst on a business trip to Buenos Aires. He immediately saw the



great potential of the product and returned to North America swiftly establishing the Reynolds International Pen Company. Within four months Reynolds version of the ballpoint went on sale in Gimble's Department Store in New York City. The Reynolds Rocket retailed at \$12.50, the equivalent of \$120.00 today. On its first day of sales, 8000 pens were sold bringing in \$100,000 for Reynolds' Company (close to one million dollars today).

The ballpoint bubble began to burst in 1950 with increasing design flaws for both Reynolds and Eversharp. The selling price of ballpoint pens fell to fifty cents each and by 1951 Reynolds' company had disappeared from the market completely. It was at this time in Europe that two companies developed their own versions on the ballpoint pen with great sales success. In England, the Parker Pen Company introduced the Jotter ballpoint pen in 1954. Unlike its American counterparts, the Jotter was reliable and lasted five times longer. It is said that the Jotter contains enough ink for 28,000 feet of writing or five miles of text. The first models retailed between £2.95 and £8.75 each (£25-£75 today).



A French baron, Marcel Bich, began selling pens in 1950 and by the end of the decade, his company which he established as Bic, held seventy percent of the



European market. They began selling the Bic pen in the United States in the 1960s at a more attainable price of 29 cents. At this time the minimum wage was \$1.29 an hour. The growth and prominence of the Bic Corporation in the ballpoint market is incontestable. The daily worldwide sales figure for the Bic Cristal

ballpoint pen is 14 million pieces. This amounts to a new pen for every man, woman and child on earth every 16 months!

### Dealing with mistakes

For as long as there has been writing there have been errors and the need to erase them. Logically, the erasure of ink can be done in one of three ways; namely the removal of the ink from the page, the hiding of the ink on the page and lastly the covering of the ink on the page.

A fine pointed and very sharp metal tool was originally used to carefully scrape the ink from the page when mistakes were made. These tools, like the pen knife before them, often became impromptu weapons as they would be carried about the person just as the quill or fountain pen might be. In 1909 a young office worker from





New York was killed on his fifteenth birthday as he tried to escape the kisses of some female stenographers and fell onto his ink scraper.<sup>v</sup>

The modern ink eraser originated in Germany in the 1930s but only found popularity in the 1970s when it was marketed as Tintinkiller or ink killer. Rather than removing the ink from the page, it renders it invisible due to a chemical reaction. This process can be reversed when a different form of ink is applied over the same section of text.

The concept of covering up mistakes made in ink began with the typewriter. A German company in the late 1950s developed a correcting tape for the typewriter which could be placed over the incorrect letter and in front of the ribbon. By retyping this letter, it would be covered in a dry white substance that obscured the letter. Despite being a laborious process, Tipp-Ex (from the German and Latin meaning 'type no more') was an instant success.

Meanwhile, in the United States, Bette Graham, a secretary and artist created a thin white paint that could be applied with a fine watercolour brush to errors on a typed page. Her colleagues were amazed by its results and in 1955 she began to market her liquid as 'Mistake Out', a typewriter correction fluid.



By 1965 a correcting fluid was created by the Tipp-Ex Company allowing handwritten as well as typed errors to be covered over. The last stage in this evolutionary process was the development of the Tipp-Ex mouse in 1995. This was a small dispenser containing a dry tape that could be placed across written text in need of correction. The advantage of this was its accuracy and the fact that it could be written over instantly. Whilst several companies manufactured correctional fluids, Tipp Ex remained the brand leader and is now part of the Bic Corporation.

Early pencil marks were erased using breadcrumbs until the French scientist and explorer, Charles Marie de la Condamine brought 'Indian' rubber back from his explorations in South America where it was used by tribes as an adhesive. Small cubes of this rubber began to be used to erase pencil marks to great effect; "I have seen a substance excellently adapted to the purpose of wiping from paper the mark of black lead pencil", observed the famous scientist and discoverer of oxygen, Sir Joseph Priestley in 1770.<sup>vi</sup>

Whilst rubber proved effective at removing pencil marks it rotted easily and so it was not until Charles Goodyear discovered the process for vulcanising rubber, that erasers became popular. A patent was issued in 1858 to a Philadelphia man,



Hyman Lipman who attached an eraser to the end of a pencil. This patent was not long lasting however as it was decided that this was not a new product but a combination of two existing ones. The sharpening of pencils moved from the pen knife to a manual pencil sharpener after its development by Therry des Estwaux in 1847.

## THE REST OF THE PENCIL CASE.....

### Pencils

It is commonly known that the 'lead' in a pencil is made of graphite, a natural element first discovered in Keswick in the Lake District of England in 1564. It is suggested that the origin of the term 'lead pencil' stems from the metal stylus pen popular in Roman times.<sup>vii</sup> The local community in Keswick, who first found graphite clinging to the roots of an upturned tree, soon realised its mark making potential. Initially, it was wrapped in string as it was apparent that it needed a holder to prevent the writer's hands from being blackened. The wood pencil took shape once the graphite was placed into hollow wooden tubes.

Nicholas Conte, a French chemist later developed and patented a process for the manufacture of pencils. He discovered that a mixture of clay and graphite could be fired in a kiln to strengthen the 'lead' of his cylindrical pencils. Consequently, different quantities of clay and graphite resulted in a harder or softer pencil mark which is seen today in the range of pencils available graded using the HB scale. This scale grades pencils according to their Hardness (H) and Blackness (B). The origin of the name 'pencil' stems from the Latin word *penicillus* meaning 'painter's brush' or 'little tail'. The first coloured pencils were developed by the Staedtler Company in 1834 but these did not become popular amongst artists until the 1930s.



### Chalk

The history of chalk runs in parallel with the history of writing. As a naturally occurring substance found in the earth's crust throughout the world, it was the preferred medium for many cave painters just as it has been for generations of teachers all



over the world. Chalk was primarily used as an artist's tool but became popular in the classroom in the 1800s when an increase in class sizes meant that teachers needed to communicate to a larger number of pupils at the same time and thus the chalkboard was developed. As paper was very expensive, pupils would only be allowed to write using chalk and a board until they could be 'trusted' to use paper efficiently. Whilst chalk is found naturally in a range of colours, includ-



ing red and black, powdered pigments were added to the manufacturing of pressed chalk sticks to create the spectrum of colours available today.

## Crayons

The first crayons, developed by Binney and Smith Company were used for marking a variety of surfaces but were not suitable for everyday use by children due to their toxicity. It took a further forty years before the first crayon sets suitable for children were to arrive on the market in 1903. The first box contained eight sticks in red, purple, brown, black, yellow, green, orange and blue and sold for five cents. The name 'Crayola' was coined by Edwin Binney's wife, Alice who took the French word for chalk, craie and 'ola' from 'oleaginous' meaning oily or greasy. Over the next ninety years more than 100 billion crayons were made at the Crayola factory in Pennsylvania. Crayola continues to dominate the crayon market with 99% recognition of the brand in United States households.

## Felt tip pens

The origins of the first felt tip or fibre-tipped pens lay with Magic Markers in the United States. Originally used for marking large items, a Magic Marker was a glass bottle that held a wool felt wick and ink and gained popularity during the 1950s. In



Japan in 1962, Yukio Horie of the Tokyo Stationery Company invented the modern fibre tip pen. These are made from a porous felt nib soaked in ink from a reservoir held within the plastic pen casing. Binney and Smith Company purchased the rights to the Magic Marker name and launched its own range of coloured pens and markers in 1991. Modern adaptations of the original felt tipped pens include highlighters which appeared first in the 1970s and gel pens which were another invention from a Japanese company, Sakura in the 1980s.

There can be no doubt that the emergence of email and text messaging has generated enormous change in the nature of communication. Whilst it is estimated that 294 billion emails are sent each day<sup>viii</sup> the hand written word and particularly the signature are still required to ensure the validity of all important documents. This is seen in everyday actions such as signing for parcels and those that are once in a lifetime, such as the signing of the Marriage Register. In Great Britain, not only does the Certificate of Marriage require completion using the Registrar's pen filled with specialist archival ink, but no photographs are permitted at the actual moment of signing.



When American Presidents sign important legislation bills, often twenty or more pens are used so that the moment of signature is captured repeatedly. Afterwards, each pen is usually given as a gift to those who have worked towards the creation and passing of the bill. This tradition began with President Truman who it is believed used simple Bic ballpoint pens to sign his bills. 114 pens were used for the signing of the Civil Rights Act by President Lyndon B Johnson in 1964 and all were purchased by the President himself.



From the first crayon scrawls of a toddler to the registrar's signature on a death certificate there is no replacement for a writing instrument. As Samuel Johnson once said;

“No man was more foolish when he had not a pen in his hand, or more wise when he had”

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<sup>i</sup> Report from Science Daily referenced on

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<sup>ii</sup> M. Azema – original report for [www.antiquity.ac.uk](http://www.antiquity.ac.uk) referenced on

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<sup>iv</sup> Jeremy Norton from <http://www.historyofinformation.com/expanded.php?id=2410>

<sup>v</sup> Stabbed to death in office frolic – February 16th 1909

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<sup>vi</sup> Quotation cited in Pencil and Eraser Trivia M. Bellis <http://inventors.about.com/library/inventors/blpen.htm>

<sup>vii</sup> Pencil Myths: The Unleaded pencil from <http://www.pencils.com/blog/the-unleaded-pencil/>

<sup>viii</sup> <http://www.radicati.com/wp/wp-content/uploads/2011/05/Email-Statistics-Report-2011-2015-Executive-Summary.pdf>

Pencil Paper

A large, stylized feather graphic is positioned on the right side of the page, partially overlapping the vertical text 'Pencil Paper'. The feather is light blue and grey, with a soft, ethereal appearance.

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