Printing.

Written in Crescent Beach Hotel June 2013

In any worldview, printing has to be second only to the creation of writing in the top ten of humanities pivotal cultural milestones.

Can we possibly imagine a world without printing? Even in this day of instant media, e books, i pads and smart phones, could our culture have developed to the point where these innovations would have been possible without books? I doubt it; certainly our World would be a very different place without the printed word.

Printing, as we know it, with a movable metal type was perfected in Mainz around the year 1450. Of course no one man can be credited with the refinement of the technique, but three names have become synonymous with it. Johann Gutenberg (1395-1498) Johann Fust (1400-1465) and Peter Schoffer (1525-1502) these three innovators built upon a system that had come to Europe from China, probably during the hundred years between 1250 and 1350 when contact between Europe and China was particularly close.

The Chinese had invented printing or more correctly Xylography (block printing) around the 8th Century CE and had refined it to an art form before it escaped to the greater world centuries later.

In Xylography, the printer draws the text or figure that he wishes to reproduce in reverse on a block of wood; he then carves the wood so that the graphic pattern stands out in relief. It is then a relatively simple matter to ink the block and transfer the pattern to paper. This type of printing lends itself particularly well to Chinese symbols but further refinement was necessary to accommodate the Roman alphabet and its intricate symbols used in Europe.

Unless whole words or even pages were to be printed over and over again, a more versatile system had to be found so that individual words could be spelt out using movable (and reusable) individual letters. However reducing wooden blocks to tiny movable units holding one letter or symbol does not work well and precious detail is lost regardless of how expert the carver is. In order to produce clear and beautiful print, movable metal type was needed and to carve metal one needs engravers and goldsmiths, artisans and experts in their craft and adept at casting small intricate objects, these artisans and craftsmen, Europe had in abundance and the problem was solved quickly with movable metal typefaces perfected by 1450.

There was however one other lesser problem to be solved once metal typeface was utilized. Water based paint will not adhere to metal so oil based paint had to be found. Luckily Flemish artists had been using just such paint since the early 15th century so it was a relatively simple step to add the necessary ingredients; Lampblack or Powdered Charcoal as pigment ground in linseed-oil varnish, which transmuted the artist’s oil paint into printer’s ink.

The Chinese had one particularly significant advantage over the rest of the World when it came to printing, they had also invented paper, which is wholly essential when one is determined to use printing for mass production.

Before paper in the West the medium for the printed word had evolved through several stages from the clay tablet of the ancient Babylonians Hebrews and Persians through the Papyri of the Egyptians to the Greek and Roman styli and finally to Vellum or Parchment in Medieval Europe. It is obvious that none of these - with the possible exception of Papyrus, which amazingly did not lead directly to the invention of paper as the Egyptians were definitely heading in the right direction – readily lends itself to mass production by printing. Clay tablets and styli just wouldn’t work in a mechanical device and Vellum and Parchment are too expensive to produce on a large scale. So, as the Chinese had serendipitously discovered, paper was indispensible if printing was to bring the word to the masses.

Vellum and parchment were used by early printers when the emphasis was more on éclat than expediency, however with a single large book such as the bible requiring as many as 170 calf skins (Vellum) or 300 sheep skins (Parchment) per print run, to make printing viable (and profitable) a cheaper material had to be found.

Just like so many other inventions that we have taken for granted throughout the centuries, Europeans did not invent their own paper, again as with the technique of printing, it came from China , this time via the Arab world and Moorish Spain during the 12th Century CE. It spread slowly during the next two centuries but had reached Germany in time to be the yin to the printing presses yang by the beginning of the 15th Century.

Once paper arrived printing could really take off and by the time of the printing revolution in Mainz, paper was cheap and plentiful, supplied by a burgeoning industry of paper manufacturers using the ancient Chinese technique.

Hans Sachs the cobbler poet and hero of Wagner’s Meistersinger von Nurnberg eloquently and succinctly describes the process in a poem which accompanies the earliest known illustration of the paper maker at work.

*I am using old rags in my mill*

*Where flowing water turns the wheel*

*That tears up the rags and shreds them up.*

*Then I soak the pulp in a water tub,*

*Mold the sheets, on a felt them lay,*

*And squeeze them in my press all day,*

*I hang them up to let them dry,*

*Snow white and glossy, a treat for every eye.* (From the foundations of early modern Europe 1460-1559. Eugene F Rice Jnr and Anthony Grafton)

It is reasonable to assume that during the first half of the fifteenth century artisans experimented with type face ink and perhaps even paper and of course we have no way of knowing how many giants shoulders Gutenberg, Fust or Schoffer stood on to see further than anyone else, but it is to them, as it is to Henry Ford in the case of the motor car, that history credits the creation of printing in Europe.

The perfect synergy of the printing press, movable metal type, printers ink and paper set the stage for the printing revolution of the mid fifteenth century. Now as never before could the printed word become available to anyone able to read it. Even the illiterate benefitted from the abundance, we only have to look at the power of the pamphleteers to see that one literate person with an audience and a mass produced pamphlet to read aloud, could change society.

For hundred of years classical writings had been copied by skilled scribes into beautifully illustrated manuscripts available to only the very few.

As they copied they made mistakes, and these mistakes were replicated and further mistakes added by scribes in the future. It was through this process that many ancient manuscripts became unintelligible. The scribes were skilled indeed, but most were not learned so they failed to understand the concepts of much of what they wrote and many would not have even understood the Greek or Latin of the original.

Printing ended this relentless process of intellectual deterioration; whatever copy of the manuscript made available to the printer was printed faithfully and without error. This meant that researchers could from then on, when using a printed book, reference against other identical copies in their search for the truth. Through this practice, earlier mistakes in hand copied manuscripts could be corrected, leading inevitably to a definitive edition, with all copies throughout Europe identical.

The Scientific Revolution could not have happened without this exactness, this attention to detail that printing brought to books. Scientists working remotely from each other could in the future use identical copies of classical and contemporary works as their research tools, and correspond with their colleagues referencing an identical book that both used in their research.

No more was it necessary to learn facts by rote; knowledge could be stored in libraries, available to students not through memory alone but through research and study.

In 1580 the French Essayist and humanist Philosopher Michel de Montaigne elegantly restated the principal theme of Renaissance educational theory, not as a large amount of factual knowledge, but as a Trained Intelligence, Sound Judgment and Cultured Taste.

Students no longer had to sit at lecture writing text as dictated by a tutor who quoted from an ancient manuscript, in effect making their own copies of the book. Now unencumbered by rote, their minds were free to question, to discuss and to use their intellect to reason out the mysteries of our world. It was printing that ushered in the enlightenment.

One could be excused for thinking that such innovation would be welcomed universally but this was not the case.

The lucrative and arcane industry of the so called Stationers who employed small armies of Illuminators and Scribes to copy manuscripts to order and even to produce popular books from antiquity on speculation to be sold in their shops; saw the new technology as a direct threat to their centuries old and highly profitable business.

One such stationer, the Florentine Vespasiano da Bisticci, who continued to produce beautiful hand written manuscripts well into the age of print, which he despised; produced over 200 custom made books for Cosimo de’Medici in just twenty months and worked on a similar massive scale for other rulers and collectors all over the continent. His magnificent manuscripts still survive throughout Europe in such libraries as the Vatican Oxford and Cambridge Universities and practically every other library and museum where rare and beautiful books are valued.

However despite his opposition to, and his industrial scale output against, printed media, da Bisticci could not hold back the tidal wave of relatively cheap and available books that broke upon Europe and it’s readers after 1450; in the face of which many of his fellow stationers simply changed hats and became publishers.

It is indeed ironic that censorship and early bibliophobes first appeared almost contemporaneously with available print. It had not been the usual practice of the authorities, either church or state, to interfere in the reading habits of the populace during medieval times. Of course the members of the populace having the ability to read and having access to the hugely expensive and scarce reading material was minimal indeed during that time, so it is reasonable to assume that they (the authorities) did not fear the spread of sedition through books. Not so after 1450. By encouraging reading and making it possible to do so through the production of books, printing actually created censorship. Both temporal and spiritual authorities began the practice of systematic censorship, to maintain political as well as religious orthodoxy.

In the words of Pope Alexander VI from his bull of 1501

“*The art of printing is very useful insofar as it furthers the circulation of useful and tested books; but it can be very harmful if it is permitted to widen the influence of pernicious works. It will therefore be necessary to maintain full control over the printers so that they may be prevented from bringing into print writings which are antagonistic to the Catholic faith or which are likely to cause trouble to believers”* (From the foundations of early modern Europe 1460-1559. Eugene F Rice Jnr and Anthony Grafton)

Following on from this, lists of prohibited books were compiled by the church, in an effort to stop the spread of Lutheranism. Henry VIII of England had one such list compiled in 1526. These eventually lead to the production of the definitive Roman Index of Prohibited Books in 1559.

Happily, nothing could stop the march of the printed word. Protestants, Catholics, Princes and Kings even Universities used censorship and ritual book burning (often along with their authors and even their publishers or printers when available) in an effort to combat ideologies not consistent with theirs. None of it worked, the genie was out of the bottle and its work of rolling back the darkness of ignorance was unstoppable.

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