LECTURE THREE: THE PRINT REVOLUTION

Seen to be the (slide) “major cultural/technological transformation in the history of the West” (Crowley & Heyer 2003:84), the print revolution began in the middle of the 15th century, marking the (slide) end of the Middle Ages and the dawn of the Modern Era. But (slide) why was its invention considered to be such a pivotal event in Western society? There are a number of reasons why the invention of print can be considered a vital innovation; however the major reason (slide) is its influence on the development of other forms of technology associated with mass production. Print is also believed to have had a significant impact “on the world of ideas by making knowledge widely available” (Crowley & Heyer 2003:84) to the public.

It is important to clarify at this point whether the development of print technology was a direct result of cultural determinism. While to a certain degree it was, many of the conditions necessary for the invention of the printing press were already present in Western society. The content of the printed texts was already in existence, and there already existed a ready audience waiting to receive them. And as explored in the second week’s lecture, a number of changes and advancement during the Middle Ages had already resulted in “several earlier shifts in communications [that] prepared the way for and accelerated the influence of print” (Crowley & Heyer 2003:84).

For example, when texts written in the vernacular – or local languages – began to be manufactured during the 12th and 13th century, it presented a direct challenge to “the Church’s monopoly on written communication” (Crowley & Heyer 2003:84). When texts were previously written in Latin, literacy depended on the learning of a complex second language. By using the vernacular instead, literacy became much more attainable. Vernacular texts were also important in instilling “in their audience…a sense of cultural tradition and regional place” (Crowley & Heyer 2003:84). The spread of these texts was facilitated by the transfer from the more expensive medium of parchment to paper, a less costly and easier to manufacture alternative for written communication.

Paper, of course, was not a recent discovery nor was it an invention of Western civilization (slide). It originated in China “perhaps as early as the first century A.D” (Crowley & Heyer 2003:84) and was only incorporated into Western culture in the 12th century. It didn’t actually start to be manufactured in Europe until the 13th century. However by the 1500s, “every major European city had a paper mill, without which the growing demand for printed books in the vernacular could not have been met” (Crowley & Heyer 2003:84) (slide). Paper is also thought to
be responsible for the circulation of Arabic numbers throughout Western culture – a development that had a significant impact on science and commerce. Yet, according to Carter in his essay, *Paper and Block Printing*, China was not only responsible for the invention of paper, it had also developed a “precursor to the moveable type press” (Crowley & Heyer 2003:84), in the form of wooden blocks that were carved and used to print on paper. Therefore, at a time when European civilization was still primarily an oral culture with high levels of illiteracy, China was already producing a wide range of “printed paper books” (Crowley & Heyer 2003:84).

In the next essay, *The Invention of Printing*, Mumford highlights the fact that with the advent of the printing press in Western society, “the reproduction of written texts became mechanized” (Crowley & Heyer 2003:85). As such, when print initially attempted to reproduce the ornate and highly decorative style of writing used to produce early manuscripts, the results were often less than desirable. It was realised that in order to ensure legibility, it was important to achieve “a more standardized style” (Crowley & Heyer 2003:85) of font. Therefore, the aesthetic aspect of calligraphy was sacrificed for “a new world of mass-produced knowledge based on typography” (Crowley & Heyer 2003:85). As such, the role of the scribe became obsolete with the advent of the printing press, instigating the mass unemployment and redeployment of writing artisans. However, according to Mumford, the number of benefits that resulted from the public’s “increased access to books made possible by print” (Crowley & Heyer 2003:85) fair outweighed the scribe’s redundancy.

Where were the intellectuals and the scholars located before the advent of print? According to Elizabeth Eisenstein in her essay, *The Rise of the Reading Public*, scholars either “worked under the auspices of the Church, or [they] acquired a patron from the nobility or wealthy merchant class” (Crowley & Heyer 2003:85). However, the mass production of books generated by the print revolution enabled the development of a new class of intellectual. Books related to the topics of science and philosophy were of particular interest to the public audience and soon became “a major aspect of the printing industry” (Crowley & Heyer 2003:85). It is also important to remember that this mass distribution of knowledge occurred independently of organizations. As will be explored in the next essay, Graff’s *Early Modern Literacies*, this freedom of expression was to have serious consequences for the most dominant of organizational infrastructures of the time – the Church.

According to Graff, the advent of the printing press had a significant “influence on the Protestant Reformation” (Crowley & Heyer 2003:85) in that it enabled Martin Luther to spread his ideas and concerns regarding the Church rapidly throughout the population. The ease
with which these texts were incorporated into the vernacular (slide) also aided its dissemination amongst the public.

In the final essay of this section – *The Trade in News*, John B. Thompson examines (slide) the early history of printed news. In order to achieve this, he must first answer the question of (slide) how was news disseminated before the advent of print? Before print, news was generally spread via three major sources – (slide) the Church, word of mouth, and through travellers. As such, news was often sparse and generally unreliable. “However, with the advent of printed news (slide), individual citizens had rapid and widespread access to information” (Crowley & Heyer 2003:86), with particular focus paid to political and economic news.

**FOCUS: Carter and Paper and Block Printing – From China to Europe**

Paper is synonymous with China. At a time when documentation of any sort was considered a rarity in Europe, China had already produced a vast array of paper based products – including toilet paper. Official documentation (slide) has listed the year paper was invented as being 105AD. However, evidence does suggest that this discovery was the direct result of a more gradual process of development. The first writing surfaces used in China were wood and bamboo (slide). Wood was primarily used for relatively short messages while strips of bamboo were generally used for longer passages, including books. Eventually wood was replaced by silk, however the expense of silk combined with the cumbersome weight of bamboo still meant that “a new writing material was needed” (Carter 2003:87). The first ‘paper’ is believed to have been produced from raw silk. Its superiority over bamboo as a writing surface meant that it was quickly adopted by the Chinese population, however “it was still…regarded (slide) as a cheap substitute” (Carter 2003:89).

Extensive steps (slide) were therefore undertaken to improve the quality of paper. Initially, the paper was coated with a layer of gypsum in order to aid the absorption of ink. Gypsum was then replaced by glue or gelatine produced from lichen. This was followed by the use of dry starch flour to permeate the paper, and “finally this starch flour was mixed with a thin starch paste, or else the paste was used alone” (Carter 2003:89). It is important to clarify at this time that these many improvements to the quality of paper had been perfected by the Chinese well before the invention was passed on to the Arabs who invaded the Chinese settlement at Samarkand in the 8th century (slide). The invention (slide) was then eventually passed on to Western Europe in the 12th century.
However, Western civilization owes China yet another debt of gratitude for the introduction of block printing (slide). Evidence has been found that the Chinese experimented with a number of different ways of creating multiple impressions on paper – “not only rubbings from stone inscriptions, but also stencils and pounces, printed textiles, seals and seal impressions, and a great profusion of little stamped figures of Buddha” (Carter 2003:90). All of these techniques directly contributed in some way to the development of the block printer. However, the great breakthrough occurred when it was realized that by turning the stamps upside down and then laying the paper on it and rubbing with a brush, impressions of any size could be produced. It was this discovery that led the way “for such improvement of technique…[as to make] the new invention a force in the advancement of civilization” (Carter 2003:91).

**FOCUS: Mumford and The Invention of Printing**

In fact, according to Mumford (2003:93), the development of print (slide) “from moveable types is second only to the clock in its critical effect upon our civilization”. Not only was its invention an important component in the advancement of knowledge, it also provided a basis from which to link together East and West (slide), as each culture contributed in some way to the establishment of “the final product” (Mumford 2003:94). The spread of printing was also important in that it (slide) signalled a fundamental shift in the structure of society. Prior to this moment in history, the ability to read or write was restricted to the small segment of the population that possessed money and power – the Church and the nobility. Therefore, before the printing press could be used in the mass production of books, society first had to have advanced to such a stage that it was ready “to equalize cultural advantages once reserved” primarily for the “ruling caste” (Mumford 2003:94). The increasing number of literate citizens provided a ready audience and thus a ready incentive for the adoption of a “method for manifolding and cheapening the process of producing books” (Mumford 2003:94).

Printing was initially designed to be used specifically in relation to art (slide) – in particular, the “printing of woodcuts” (Mumford 2003:94). Gradually however, as public interest in the written word began to grow, the technology was developed until it eventually resulted in “the invention of movable type” (Mumford 2003:94), and thus became the printing press. Originally designed to be operated by hand, the printing press (slide) became power-driven in the 19th century, becoming “one of the earliest pieces of standardized, increasingly automatic, machinery” (Mumford 2003:94). The advent of the printing press was to have a significant impact on the positions traditionally associated with book production. In fact, within a century of its
development, printing had virtually driven the hand-copyist and the calligrapher out of business (slide). This was a time of rapid change and development – so much so that within one generation, the printed book had “reached a perfection in type, impression, and general form that has not in fact been surpassed by any later efforts” (Mumford 2003:94). However, this transition from writing to printing was not a simple, straightforward process.

The very mechanics of handwriting make it unsuitable for mass production. Not only was it extremely time-consuming to transcribe a document by hand, the very unique and individual quality of each person’s handwriting was considered a handicap in itself “to the widest kind of communication” (Mumford 2003:95). The time and effort it would take to decipher each writer’s individual style of writing was considered a major deterrent to its use. Therefore, “for the sake of general legibility and universality it was important that the human being who copied a book should achieve a certain kind of neutrality and impersonality” (Mumford 2003:95). It was this very same concern that led to the (slide) establishment of printing fonts.

Printers initially attempted to duplicate the intricate nature of handwriting in its moveable type. In fact, right up to the 19th century, printed texts often contained a number of embellishments – elaborate decorations, opulent scroll-work, etc, that were reminiscent of the calligrapher and illustrator of the hand-printed texts. However, as with handwriting, there came a time when the technical and the aesthetic aspects of printing had to part ways (slide). While printers were initially hesitant to allow the type to “speak for itself”, as it were, it was eventually realised that printing “was essentially a new art, with its own special canons of taste, its own standards of aesthetic expression” (Mumford 2003:95). The true ‘beauty’ of printing lay in its functional ability, and as such a series of font types were developed around the premise of “mechanical accuracy and finish” (Mumford 2003:96). In fact, practically within a century of printing’s invention, the major font types from which all modern fonts were derived, were already established.

The invention of the printing press was not technically a result of technological determinism – it merely served “to standardize in a more rigorous fashion a product that was already standardized” (Mumford 2003:96) to a certain extent. Yet its development was still an essential component in the advancement of civilization. While on one hand print resulted in the dissolution and eventual elimination of the craftsmen originally associated with book production, it also “released the writer and conferred on him the privilege of talking directly to a greater number of fellow men than he had ever addressed before” (Mumford 2003:96). It was in this way that print and the growing levels of literacy in the population, enabled people to transcend the boundaries of class division to access culture previously restricted to the nobility.
Australian Perspective: Lyons & Arnold’s A History of the Book in Australia

The period between 1860 and 1890 (slide) was a time of great development and investment for manufacturing in Australia, however the 1880s were considered the “boom time for the colonial printing industry” (Arnold 2001:104) (slide). Up until this time, the two major elements of printing – namely composing, in which the text to be printed was set by hand; and presswork, which involved the manual operation of ‘flat-bed wooden presses’ (Arnold 2001); had changed little from the initial invention of the moveable type printing press in 1450 (slide). Eventually the wooden presses were replaced by iron presses, but the major innovations to the printing industry were to come from revolutionary techniques “pioneered by the large-circulation daily newspapers” (Arnold 2001:104) (slide), such as the London Times. It was for this particular newspaper that in 1814 Koenigh and Bauer developed an innovative new printing press which used a cylinder to make an impression, as opposed to the more standard plate. This same printing press was also designed to be self-inking and powered by steam (slide).

According to Arnold (2001:105), “the output of these new machines grew with increased levels of literacy and demand for reading matter”. However, while this new press exponentially increased the rate at which documents could be printed, the overall process was still labour intensive as the plate setting still had to be arranged by hand. For a time, the printing press was literally caught between two worlds – its mechanization and steam power symbolic of the Industrial Revolution, yet its dependency on manual labour evidence of “pre-industrial techniques” (Arnold 2001:107). This imbalance was to be addressed in 1886 with the invention of the first Linotype printing press (slide).

Yet this evolution, as with the initial invention of printing itself, was to come at the expense of the craftsmen typically involved in its development. Instead of handsetting, the Linotype machine used a system of keys which, when pressed, “matrices of the letters required fell into line with the machine’s composing stick. Molten metal was then poured over the assembled matrices and spaces and the machine automatically cast its ‘line of type’” (Arnold 2001:107). Its ability to do the equivalent work of 3-6 people meant that when the Linotype printing press was eventually introduced into Australia in the 1890s, massive cut-backs in the composition staff soon followed. Yet, as Mumford stated in relation to the unemployment of the hand-copyists and calligraphers after the initial advent of printing, these losses could be considered a small price to pay for increased literacy levels in colonial Australia.