

## The Printing Revolution

Of the new technological discoveries of the late Middle Ages, that of the printing press by **Johannes Gutenberg (d. AD 1468) of Mainz, Germany**, in the middle of the 15<sup>th</sup> century AD ranks as one of the greatest in the Western World. Printing traditionally has been defined as a technique for applying under pressure a certain quantity of colouring agent onto a specified surface to form a body of text or illustration. By the end of the 2<sup>nd</sup> century AD, the Chinese apparently had discovered printing; certainly they then had at their disposal the three elements necessary for printing, namely, (1) paper, the techniques for the manufacture of which they had known for several decades by then, (2) ink, whose basic formula they had known for 25 centuries, and (3) surfaces bearing texts carved in relief.

Techniques for manufacturing paper which is essential for printing had reached Europe from China through the Arabs in the mid-13<sup>th</sup> century AD. Papermaking centres grew up in Italy after AD 1275 and in France and Germany in the course of the 14<sup>th</sup> century AD. But the knowledge of the typographic process does not seem to have succeeded, as papermaking techniques had, in reaching Europe from China. This the Europeans developed themselves. Thus, the essential elements of the printing process collected slowly in Western Europe, where a favourable cultural and economic climate had formed.

**Xylography**, the art of printing from wood carving, the existence and importance of which in China was never suspected by Marco Polo, the Venetian merchant and traveller who had visited China in the 13<sup>th</sup> century AD, appeared in Europe no earlier than the last quarter of the 14<sup>th</sup> century AD spontaneously and presumably as a result of the use of paper. It had been observed that paper was better suited than rough-surfaced parchment for making the impressions from wood reliefs which the manuscript copyists used to reproduce the outline of ornamental initial capital letters.

**Metallographic impression** is more likely to turn out to be the direct ancestor of typography; although the record is far from clear. It involved three steps; (1) a set of dies, each bearing a letter of the alphabet, was engraved in brass or bronze; (2) using these dies, the text was struck letter by letter to form a mould on the surface of a matrix of clay or of soft metal such as lead; (3) lead was then poured over the surface to form a small plate that, once hardened, would bear the text in relief.

**The invention of typography** – Gutenberg (AD 1450?): This association of die, matrix, and lead in the production of durable typefaces in large numbers and with each letter strictly identical, was one of the two necessary elements in the invention of **typographic printing** in Europe. The second necessary element was the concept of **the printing press** itself, an idea, which had never been conceived in the Far East.

**Johannes Gutenberg** is generally credited with the simultaneous discovery of both these elements, though there is some uncertainty about it, and disputes arose early to cloud the honour. Chronicles published after his death **attributed the invention of printing to him**. Gutenberg's method of printing

from **movable type** was used without important change until the 20<sup>th</sup> century AD. **The Forty-two-Line Bible, Gutenberg's masterpiece** which heralded a revolution in printing technology, was completed, according to Gutenberg's major biographers, in AD 1455 at the latest.

Aiding Gutenberg were advances in the production of paper. Up to this time, documents were made from the hides of animals; parchment from sheep and vellum from calves. As each animal yielded at the most four suitable folios, the production of a Bible, for example, would require the slaughter of large numbers of costly animals. Paper however could be produced for roughly one-sixth the cost of animal skins; and printing itself greatly reduced the cost by producing many identical copies without the tedious, time-consuming chore of copying out each book by hand.

Gutenberg and his press revolutionized printing. His invention, in effect, meant that the cost of learning to read and write declined, and with this began a time of growing literacy, which in turn further fuelled the need for books and the establishment of printing presses throughout the towns of Europe. Hitherto unknown in Europe, printers' workshops would be found in every important municipal centre by AD 1500. These workshops added a new element to urban culture in hundreds of towns. And by the turn of the 16<sup>th</sup> century AD, about eight million books had been printed. The first major role of the printed book was to spread literacy and then general knowledge among the new economic powers of society. In the beginning it was scorned by the princes, and many wealthy Europeans, especially among the Italians, were at first reluctant to accept the new printed books. But the sheer availability of new writings and of previously scarce books – pamphlets, classical literature, religious reading, handbooks – and the ideas these contained made them highly desirable. Readership increased by leaps and bounds leading to a growing thirst for knowledge. It is significant that the contents of the first books were often devoted to literary and scientific works (which **facilitated the diffusion of the new scientific knowledge**) as well as to religious texts, though printing was used to ensure the broad dissemination of religious material, first Catholic and, shortly, Protestant. Thus, printing participated in and gave impetus to the growth and accumulation of knowledge. In each succeeding era, there were more people who were able to assimilate the knowledge handed down to them and to augment it with their own contribution.

The invention of the printing press began nothing less than a revolution in communication. Ideas from Wittenberg (where Martin Luther had begun his Reformation in AD 1517) in Germany, for example, could be transmitted rapidly to Switzerland or Paris in a matter of days. Martin Luther's success as a reformer owes a particular debt to the press. Thanks to the press, his pamphlets were avidly snapped up by readers, and the growing number of printers willingly accommodated his many adherents. In no time, presses were at work in Italy, France, and Spain. By AD 1544 the Spanish had even brought the printing press to Mexico.

The printing revolution gave a fillip to the **vernacular-translation movement** which was aimed at readers unlearned in Latin. It was designed to appeal to landed gentry, cavaliers, and courtiers as well as to shopkeepers and clerks.

The invention of printing at the dawn of the age of the great discoveries was in part a response and in part a stimulus to the movement that, by transforming the economic, social, and ideological relations of

civilization, would usher in the modern world. The economic world was marked by the high-level of production and exchange attained by the Italian republics, as well as by the commercial upsurge of the Hanseatic League and the Flemish cities; social relations were marked by the decline of the landed aristocracy and the rise of the urban mercantile bourgeoisie; and the world of ideas reflected the aspirations of this bourgeoisie for a political role that would allow it to fulfill its economic ambitions. Ideas were affected by the religious crisis that would lead to the Protestant Reformation.

At the same time, printing has facilitated the spread of ideas that have helped to shape alterations in social relations made possible by industrial development and economic transformations. By means of books, pamphlets, and the press, information of all kinds has reached all levels of society in most countries.

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