

Advent of the printing press



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The ‘ printing revolution’ and advent of the printing press is an event against which there is no other “ even approaching in importance” in the history of mankind. Nowadays, even in the electronic age, it is hard to imagine a world without the printed word. However what the ‘ printing revolution’ and ‘ classic’ cases of revolution, such as Russia (1917) and France (1789), have in common is not as clear cut as the scale of its impact. This essay will seek to evaluate the revolutionary qualities of the ‘ printing revolution’ in the context of the Reformation and the rise of modern science. It will begin with a brief introduction to the features of the ‘ printing revolution’. Following this will be a discussion based around the extant literature on the word ‘ revolution’ from which an adequate set of criteria will be derived. These criteria will subsequently be used as the benchmark against which the revolutionary characteristics of the ‘ printing revolution’ will be measured using the evidence presented. By taking a retrospective look at two major events in the aftermath of the ‘ printing revolution’ I hope to be able to determine the viability of calling the ‘ printing revolution’ a revolution with a degree of certainty. Subsequently I will consider the impact the ‘ printing revolution’ had on other revolutions, and whether it was a pre-requisite for revolutions in the future. The paper will close with an assessment of which of the features of ‘ revolution’ apply most to the ‘ printing revolution’, followed by a brief discussion of criticisms of the concept as proposed by Eisenstein.

The late fifteenth century in Europe saw a dramatic shift in the way texts were reproduced. Before the invention of the printing press there was a reliance on handwritten manuscript reproduction, a slow and incredibly time-consuming process. Man (2002) provides some idea of the times involved

when he states that one 1, 272 page document took two scribes five years to copy.[2]Like any human, a scribe was also susceptible to error and because texts were copied this meant that an errors were copied again and again.

Gutenberg’s invention of the printing press around 1440 would mark a turning point in the history of human civilisation. Although printing had existed before with wood-blocks, it was the ability to edit and correct a text in every copy which made Gutenberg’s invention so important.[3]He also made it possible for a large number of uniform copies to be produced. The spread of this technology from Mainz to all corners of the continent came quickly and was motivated by profit, as rather than any attempt to spread culture widely. Printing presses were established in quick succession in Cologne (1464), Basel (1466), Rome (1467), Venice (1469), London (1480) and Stockholm (1483), the centres of international trade at the time.

[4]Gutenberg “ laid the foundations of modern publicity..... which is dependent on the identical mass-production of free combinable letter-units in almost infinite variety of composition”.[5]The importance of his invention to human civilisation is unquestionable and it has had one of the longest lasting legacies of any. What remains up for debate, however, are the revolutionary qualities of the ‘ printing revolution’.

Any discussion of how revolutionary an event was requires a suitable definition of the word ‘ revolution’. Constructing a definition is, however, a difficult task as the number of attempts at doing so shows; there is little consensus as to what ‘ revolution’ actually means. Despite this lack of agreement certain words are predominant in definitions, such as ‘ violent’, ‘ brief’ and ‘ success’.[6]A thorough debate over differing definitions is out of

the scope of this essay, although a brief mention of some ideas is important to shape an answer to the question. Eisenstein highlights the issues around the use of the word ‘ revolution’ in the context of printing, and argues that there are actually two different uses of the word as an overarching concept. The first of these is what is broadly what will be discussed in this essay and what most historians use the term for; that is, a significant break from a long-standing condition. The second is a “ prolonged, irreversible, cumulative process with effects that become ever more pronounced the longer it goes on”.^[7]She cites the Industrial Revolution as an example of this more drawn-out sense of ‘ revolution’. Both the conventional and the secondary definitions have their criteria fulfilled with the ‘ printing revolution’. In the first instance, the speed of the change shows the revolutionary nature of the ‘ printing revolution’. It wasn’t so much that a new innovative machine was conceived in Mainz that is important; it is that it began to be used in so many places in a short space of time. “ By the 1490s each of the major states had one important publishing centre and some had several” notes Hay. Correspondingly, Man says that by 1480, 122 towns in Western Europe had printing presses.^[8]The speed and breadth of the spread of the technology, and specifically the replacement of hand-copying with printing as the chief mode of book reproduction, is enough for Eisenstein to consider the ‘ printing revolution’ a revolution in the sense of the word that most historians use. The justification for the ‘ printing revolution’ being typical of the second use of the word is based on its longevity. The output of 500 years of printing along with millennia of hand-writing, and the expansion of knowledge, show the irreversibility and length of the process. Indeed, it is a process which has

not yet reached an end. This raises another important point; can it be a revolution if the process has an unquantifiable end?

It is safe to assume that the majority of people, when asked to define ‘revolution’, would include a notion of violence. Images of mass beheadings in France and street battles in Russia no doubt contribute to this. Friedrich (1966) defines revolution as “the sudden and violent overthrow of an established political order”.^[9] This applies neatly to the ‘classic’ cases but not so to the ‘printing revolution’, where the affected party was not a political entity but writing by hand. Similarly, although more extreme, Arendt (1965) states that war and revolution are related, going so far as to say “revolutions...are not even conceivable outside the domain of violence”.

^[10] Both these definitions and the use of the word ‘violence’ are insufficient in trying to explain a non-political, technological revolution. Preferable would be to take the idea of violence and use the implicit idea of ‘destruction’,
^[11] such as the definition proposed by Trimberger (1978) where a takeover “destroys the economic and political power of the dominant social group of the old regime”. This also shows that a revolution has an element of replacement; a revolution is not just seeking to overthrow and destroy what is already there, it also substitutes old for new.

The speed and depth of change caused by a ‘revolution’ is also a recurring theme in definitions. Neumann (1949) defines ‘revolution’ as a “sweeping, fundamental change...indicating a major break in the continuity of development”.^[12] He also makes a significant distinction between ‘revolution’ and ‘evolution’, where the former is such a radical separation and the latter is a persistent transformation within the existing institutional

framework; the parallels with Eisenstein are clear. Revolutions can be seen as only accelerating and crystallising the evolutionary process. Similarly, Johari (1987) sees ‘revolution’ as essentially meaning “a sudden, fundamental and major transformation”. Kroeber (1996) defines ‘revolution’ as “all demands, suggestions and attempts at radical change”. [13] Once the revolutionary processes have begun parts of culture and society and different relationships between people may be fashioned anew. Revolutions signify drastic and fundamental change. The use of the word radical also implies an element of speed to events. It is this velocity of change which separates ‘revolution’ from other ideas of change such as ‘reform’ and ‘revolt’. [14]

The final overriding feature of definitions of ‘revolution’ is that the process must be successful, and this success is where “a movement overturns a regime”. [15] All the definitions considered above imply that the revolution does end with the goals of the movement attained. This fact is evident through the historiography of rebellions and revolution; it is not chance that has named the failed uprising in Ireland in 1798 the Irish ‘Rebellion’ but the action in the thirteen British colonies of America the American ‘Revolution’. For the ‘printing revolution’ to be considered successful it will have to remain an established and useful medium of communication.

The definition I will use in this essay will be a blend of the previously proposed definitions that have been discussed. Although most are designed to refer to political and social change they do have elements which can be transferred to non-political events. For the ‘printing revolution’ to be called a revolution or revolutionary it must destroy and replace what was previously

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the norm, contain some sense of radical change and upheaval over a short space of time and prove useful and successful. These are the criteria against which the revolutionary properties of the ‘printing revolution’ will be measured in the rest of this essay.

The Reformation was one of the defining events of the early modern period in Europe. The role of the printing press is a hallmark of the process by which the old Catholic Church became ever more rejected and the Protestant Church was founded. Indeed it “seems difficult to exaggerate the significance of the Press, without which a revolution of this magnitude could scarcely have been consummated”.^[16] A detailed enough discussion to do justice to the impact of the book on the Reformation is out of the scope of this essay; instead it will focus on Germany, the birthplace of the movement.

The importance of the printing press for religious reform cannot be underestimated, as “all of the attempts at reform prior to the invention and diffusion of the printing press were rather easily suppressed by the Church”.^[17] The most famous example of such attempts is that of Jan Hus in the early fifteenth century. After his martyrdom in 1415 a series of wars broke out and the ‘Hussites’ formed a rival church in Bohemia, but their sphere of influence never really extended beyond this small area as they had no way to transport their ideas.^[18] Away from the Continent in England there is a dissimilar story though. The Lollard movement had been avid readers and writers, and had sealed the relationship between heresy and books in the early fifteenth century before Gutenberg. Over 230 manuscripts of the Lollard Bible survive and evidence suggests large quantities of ephemera were also produced.^[19] However, the ultimate failure of the movement

suggests that this was not enough. Rubin's argument that "highly centralised institutions are able to easily suppress small revolts that are not able to spread due to a lack of information technology" seems to be accurate. The printing press did destroy the use of manuscript in revolts as it was not able to be widely reproduced and distributed. The Reformation was the first movement to make full use of the printing press technology and it is no coincidence that it was the most successful of the period.

The Reformation also saw a massive break from past ways of campaigns for change. For the first time in history a mass propaganda campaign could be carried out, and it was used to its full extent.[20]The Reformers saw how it made rapid dissemination of materials possible, and for this reason Luther saw the printing press as a gift from God who wanted to "drive forward the cause of true religion to the ends of the earth and to make it available in all languages".[21]Luther's Theses against clerical abuses, which sparked the Reformation, had been seen in every part of Germany within 15 days of him posting them to the chapel door in Wittenberg.[22]The ability to spread information and ideas quickly was crucial to the Reformation. Once Luther had nailed his Theses to the door "by a stroke of magic he found himself addressing the whole world" and as such the start of the Protestant Revolt can be directly attributed to this act.[23]The speed at which pamphlets by Luther could be printed and sold was phenomenal; four thousand copies of *An den Christlichen Adel deutscher Nation von des Christlichen Standes Besserung* were sold in 5 days, and in total there were seventeen different editions of the work.[24]Similarly the pamphlet *Von der Freiheit eines Christenmenschen* underwent 18 editions in a single year.[25]The course of

distribution of literature shows the revolutionary qualities of the 'printing revolution'. Whereas previously the dissemination of new ideas would have been through word of mouth or by copying, the use of the printing press meant that the same material and thoughts could be spread uniformly and quickly during the Reformation. The sheer speed and volume of materials and the way they were used signified a radical change from what had gone before. The Reformation was the first real example of the power of printing and was "the first propaganda campaign conducted through the medium of the press".[26]

The usefulness and successfulness of printing in the Reformation is clearly demonstrated by the vast amount of editions of writings published. Rubin's empirical study of the spread of the Reformation and the importance of pamphlets to it shows that cities which produced pamphlets were more likely to be Protestant than Catholic throughout the sixteenth century, although the effect did diminish over time.[27] Despite the obvious success of the printing press described, Luther and his contemporaries held reservations about the number of books being published. Hauser invites us to consider what might have been if, for example, the printing press had have been around for the Hussite Wars in the early 15th century.[28] Such counterfactual, 'what if' questions are interesting but would place too much emphasis on the role of printing. It would be going too far to say that the Reformation was the child of the 'printing revolution'; this "ridiculous thesis" is indeed just that.[29] It was not books, publishers and propagandists who caused the Reformation. Religion had become more and more of an issue in the preceding years, and was now at the forefront of people's minds.

Luther's grievances were quickly echoed by both laymen and clerics, which according to Rubin indicates there were deep-rooted anti-Papal sentiments before Luther.[30] Printing was simply the medium of exchange through which people learnt about these new ideas, it was not the new idea in itself. There is no question that the Reformation would not have had the success it did without the ability to disseminate information quickly and widely.

Having considered the three key elements of a 'revolution' discussed previously, it is clear that in the context of the Reformation the 'printing revolution' can be justifiably called as such. The use of printing presses to create and widely distribute material marked a radical break from the previous ways to spread ideas. Both the speed and volume of production of books and pamphlets were on a scale unlike anything seen before and would certainly have been impossible without mechanised printing. The 'printing revolution' and its impact upon the Reformation show its success; there is little doubt that without it the Reformation would have taken a different course. However, as Postman points out, it is questionable as to whether the Catholic Church would have fallen had the printing press been used exclusively for the reproduction of pictures, as is conceivable.[31] It was the use of the printed word which was the crucial factor in the Reformation, not simply the invention of the printing press itself.

The Scientific Revolution changed the way humanity saw and studied the world around it forever. Until the early modern period scientific observers, for they were only that, simply read doctrine which had been published previously and took that as truth. The Renaissance changed this and more people began to ask scientific questions, and the use of printing served to

galvanise the scientific community. It was in this time that the three cornerstones of classical intellect, Ptolemaic astronomy, Galenic anatomy and Aristotelian physics, met their downfall and were replaced by the science of Copernicus and Newton.

The advent of printing allowed for faster copying of works compared to manuscript, of that there is no question. However it was not simply a case of one replacing the other; a lot of works remained in manuscript form for a large amount of time once printing technology had been developed.

Mathematical works frequently were released in print yet the Triparty by Nicolas Chuquet, the most original work on algebra and arithmetic from the latter half of the 15th century, remained in manuscript.[32] Similarly, De triangulis by Regiomontanus was not printed until 1533, nearly 60 years after his death.[33] The 'printing revolution' did not have as great an impact on the production of manuscripts as might be thought. Given this, the 'printing revolution' may not have been as revolutionary in science as the Reformation. Although there were a lot of works published in print it did not totally take the place of manuscript and as such cannot be considered truly revolutionary event.

The 'printing revolution' created a huge contrast between the medieval and early modern periods. A noteworthy example of this is raised by Eisenstein in the development of astronomy around the time of Copernicus. As a young student in the 1480s Copernicus would have struggled to get a single copy of Ptolemy's Almagest, which at the time was the authoritative work on the cosmos. By the time he died in 1543 three different editions were available. [34] In a similar vein, in 1499 Aldus published a collection of the works of the

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ancient astronomers in five folios in Latin and Greek.[35]Publication of classical works made them accessible to a lot more students and scholars than previously. In turn, this meant that they could be analysed, scrutinised and updated. The same is true of journals and new discoveries; it was because of the printing press that the idea of peer review and experiment duplication became familiar. The spread of knowledge went beyond just books and journals, however. The invention of the telescope also shows the impact that printing had. Although the object was invented in the Netherlands with a patent granted in October 1608, Galileo in Italy had heard of it by November of the same year.[36]News of it was also widespread in other parts of the continent.[37]The publication of a French newsletter, *The Embassy of the King of Siam Sent to His Excellency Maurice of Nassau*, in the same month detailing the invention meant that the news was able to travel uniformly and quickly to other intellectuals in Germany, France and Italy. The next year telescopes were on sale in Paris.[38]The spread of knowledge, both academic and practical, shows the revolutionary qualities of the printing press.

The success of the printing press in the context of the Scientific Revolution is clear. The ability to spread ideas and information widely and quickly allowed for an acceleration of scientific discovery and progress unlike anything that had been seen before. A study of Copernicus's *De revolutionibus* proves this point.[39]It is shown that a first edition in 1543 consisted of around 450 copies with a similar run in 1566, and that it “ got into the hands of the majority of astronomy professors in the sixteenth century, as well as into major libraries”.[40]More interestingly, there are people from all walks of life

who owned a copy; an architect, a musical theoretician and a financier are mentioned. Whereas previously the domain of science was amongst academics, now people had freer access to materials from which they could study. The acceleration of scientific discovery after the invention of the printing press also shows the success of printing. According to Ferguson, 38% of the world's most important scientific breakthroughs occurred between the Reformation and the French Revolution, including the heliocentric model of the Solar System and Galileo's tests on gravity. [41]Scientific knowledge was spreading faster than it ever had, and a community of intellectual peers developed. The breadth and depth of distribution and development of knowledge would not have been possible without the printing press.

However, in terms of what we nowadays called 'science', the 'printing revolution' had only a limited amount of success. Although the printing press allowed books to be accessible to wider areas of the public, most people remained interested in softer subjects. This stimulated the development of a mass market for "summaries, medical remedies, prognostications and astrological tables" written in the vernacular.[42]There is no question that the printing press increased the volume of works being published. What is problematic is that "the majority of works were of no lasting scientific interest".[43]The effect this had was to dilute the amount of quality material available and keep what we would call 'scientific' and what was then considered 'scientific' the same. The 'printing revolution' was successful in that it made the dissemination of scientific information more widespread but the practises of the booksellers stunted this success. Their primary goal was

to make money, and would publish what would sell; some have even gone as far as to say the ‘printing revolution’ a negative role in the Scientific Revolution as the printing of outdated, medieval texts which sold may have delayed the acceptance of new ideas such as Copernicus.[44]By making conventional authoritative works widely available “printing...could even have said to have represented an obstacle to the acceptance of new ideas”. [45]Rather than progressing knowledge it popularised long cherished beliefs, strengthened prejudices and gave authority to seductive fallacies.[46]The main point remains though, that there was an increase in the volume of works published.

Not only was the ‘printing revolution’ revolutionary in its own right, the printed word became a vital part of revolutions throughout history. The French Revolution of 1789 is widely accepted as one of the ‘classic’ cases of revolution and makes for a good example of the influence of print on revolutionary movements. Darnton argues that the printing press was crucial at every stage of the process, and without it the widespread restructuring of French life could not have taken place. “Without the press, they can conquer the Bastille but they cannot overthrow the Old Regime” he says, and this is the key point.[47]The battle to change the minds of an entire nation could not be won without the spreading of books, almanacs, posters and anything else that would carry an impression. The same is also true of the non-classical cases of revolution, such as the Russian Revolution of 1905. In a similar vein to Darnton, Ruud argues that “without the communications infrastructure...in place in 1905, the millions of copies of revolutionary books, periodicals, brochures and proclamations could never had made so

compelling a political ‘statement’ to the government”.^[48]The Russian example also shows the fear that incumbent regimes have of the power of print. The government continued to deploy censorship into the 20th century and in the same year as the uprising decided against reform of censorship.^[49]Furthermore, it shows consciousness as to the power of print. Alexander Herzen, writing in 1861, formulated a new idea as to how to use print in a revolution; make the organisation produce a regular publication and make it central to the way they operate.^[50]Lenin also realised the importance of “the distribution of party publications as ideal for local agitation” in *What Is To Be Done?*, his seminal 1902 pamphlet. Print allowed the spread of new and avant-garde ideas quickly and to a wide audience. That is not to say that revolutions happened because of printing; it is to say that printing sped up both the path to revolution and the revolution itself. The printing press did not create the underlying issues but it did create consciousness and awareness of these issues amongst a wider group than would otherwise have been possible.

In the ‘classical’ sense of the word, the ‘printing revolution’ was not revolutionary. Neumann notes that the meaning of the word ‘revolution’ has changed.^[51]Whereas in the 19th century it almost exclusively applied to political change, it has become far more wide-reaching as an adjective. Nowadays it is transferable and applicable to other fields of study with an appropriate “qualifying adjective such as industrial, managerial, colonial, cultural, scientific, technological etc.”^[52]Johari concludes his discussion of the nature of ‘revolution’ by saying that a revolution seldom fulfils definitions of the word completely so it is not alone in that respect.

[53] However given the criteria proposed in this paper, it is clear that the ‘printing revolution’ does have revolutionary aspects. In the context of both the Reformation and the Scientific Revolution it has been shown that the ‘printing revolution’ was indeed revolutionary. The printing press changed the way that religious reforms and movements happened in that although there were already manuscripts being produced, as shown by the Lollards, it was the ease of production and distribution which made the difference. The Reformation was the first event to make full employment of the propaganda potential of the printing press, and the spreading of Luther’s Theses in such a short space of time across such a large area undoubtedly played a large part in the ultimate success of the movement. This also underlines the success