

## Paper and Print

1. Welcome to this 16<sup>th</sup> video lecture on the co-evolution of religion and technology. In this video we will explore how new paper and print technologies in the late middle ages catalyzed the dissemination of literacy far beyond the academy and the governing elites to urban merchants, traders and artisans—an emergent middle class between aristocrats and peasants that will disrupt feudal society and inaugurate modernity. This lecture will provide the groundwork for later explorations of how print literacy enables and informs modern philosophy, modern Christianity and the modern ideals of autonomous individuals as citizens in a democracy.
2. The rise of print culture is an excellent example of how the introduction of a new technology does not by itself cause a cultural revolution but does serve to enable its emergence. For without the introduction of rag paper production from China a century before, the explosion of printed texts and the expansion of literacy that accompanied it could not have happened. (1) It is estimated that in 1400 there were up to 100,000 manuscripts throughout Christendom. (2) By 1500, just fifty years after the invention of the printing press the estimated number of books in print rises to seven to nine million. There were not enough sheep and calves to skin for that volume of books. But there were plenty of rags.
3. But even paper and the printing press by themselves were not sufficient conditions for this explosion of books and literacy either. China had already invented printing and was the source of the new paper production technology from Italian traders along the Silk Road, but China did not see the same explosion of texts or expansion of literacy.
4. Ultimately the more interesting question is not what caused this revolution in communication technology but how it changed Christendom both culturally and religiously. Most importantly, it enabled the further differentiation of the secular from the sacred, of court from church, of philosophy from theology. With the ability to read for themselves, people acquired the ability to both think for themselves, and pray by themselves.
5. With access to paper, people were able to also record their own observations of the natural world, to study not only texts but to record their own observations of nature. And with the ability to write they were also able to write down and so critically examine not

- only their own thoughts, but their own feelings, desires and experiences. (1) Both in private journals and through intimate correspondence to family, friends and lovers.(2) they were now able not only to tell their own story but to write it down, even publish it.
6. Thus the print revolution enabled the intensification of both objectivity and subjectivity. Math and logic, science and technology on the one hand; diaries and autobiographies on the other. The popular genre of the day was no longer epic, myth or legend but the novel, stories not just about the great and the heroic but about ordinary individuals like themselves. But unlike Jesus' iconic characters, novels were peopled by individuals not only with unique stories but subtle, inevitably conflicted interior lives.
  7. In a subsequent video I trace how paper and print catalyzed the splintering of Christianity in the Protestant Reformation. (1) Scripture alone, (2) Faith alone, (3) the priesthood of all believers— all assume both the ability to read the bible by oneself , and the possibility of owning a bible for oneself.
  8. Descartes Meditations distilled the new literate way of thought into the method of proof found up till then only in geometry. (1) For Geometry alone did not vary from culture to culture. Nor had it ever been subject to revision over the centuries once systematized by Euclid two thousand years earlier.
    - a. (2) First, to doubt all the traditional common beliefs imparted through scribal culture and its oral roots. Doubt not only what is reasonable to doubt, but whatever is possible to doubt at all. For we need to raze the foundations, Descartes argues, and rebuild literate knowledge on objective universality and geometrical certainty, irrespective of culture or authority.
    - b. (3) Second to analyze our beliefs down into their simplest elements—into axioms and definitions each themselves clear and distinct, immediately self-evident.
    - c. (4) Then to reconstruct our beliefs through formally valid deductive logic, each step clear, distinct and certain.
    - d. (5) Finally to check over your work, to ensure that no steps have been skipped, no ambiguities unresolved.
  9. Descartes choice of title, for his second work, the Meditations on First Philosophy, is itself suggestive of the epochal scope of his project. Just as Evagrius and later mystics had called for a purification of our will and intellect, here Descartes calls for a

purification of our reasoning. It is in effect a Rational Reformation, whose impact on religious belief and practice will ultimately prove as revolutionary as the Protestant Reformation itself.

10. How paper and print radically changes knowledge production, storage and dissemination can be illustrated by looking at some pages from the first edition of the Encyclopedia Britannica published by two “gentlemen of Scotland” over a period of three years in weekly installments from 1768-1771. When complete it could be bound in three volumes with a total of 2391 pages. 3,000 subscriptions, bound into three volume sets were eventually sold. First there is its very organization, (1) alphabetically by topic, rather than by disputed questions or through epic narrative. (2) The very title page announces it as a “new plan.” For there is nothing to remember, no tradition with which one needs to be familiar. One need only know the alphabet to find the treatment of any topic. So too topics are addressed without reference to past traditions or competing theories. Rather each topic presents only the conclusions of all argument, arrived at by the universal consent of the scholarly community. (3) This is a “dictionary” of scientific knowledge, not a scroll of cultural wisdom or the transcript of an academic disputation. Also note how many entries even on the first page are of little importance. The first page alone has 23 entries. Paper does not need to be economized. (4) It seeks rather to be a “complete” encyclopedia, literally an “encircling” or “all-encompassing instruction” in the arts and sciences.
11. Another innovation, the three volumes contain not only words, but also formulae proven in symbolic mathematical notation, and columns of numbers. Just imagine how much time and attention it would take for a scribe to copy accurately by hand just these two pages.
12. Print enables not only a new way of arriving at knowledge but a new way of organizing it—systematically, through classification trees that can be reproduced identically for as many copies as can be sold, tables that can be understood and consulted at a glance. In doing so thought comes to be imagined spatially. Concepts are containers. The meaning is the thought “contained” within it.
13. The knowledge is also illustrated by diagrams—geometrical diagrams,
14. also analytical diagrams of the newest technologies, their parts all laid out and labeled.

15. The human body itself is diagrammed as a complex mechanism. Again, imagine the time and the skill that would be required to copy by hand even one set of these drawings accurately and precisely. Paper and print thus enabled an intensification of objectivity. Science replaces tradition as the storehouse of knowledge. Deductive proofs replace scribal dialectics, which in turn had replaced oral dialogue as the principle vehicle for reasoning.
16. Paper and print also enabled the recording of hundreds of observations of organisms in the wild, and experimental results in the lab. Impartial and detached, objective observation became an integral part of scientific training and research. Scribal hermeneutics was replaced by experimental science. To study the human body for example, physicians no longer read Galen and Hippocrates but dissected their own cadavers,
17. botanists no longer read Aristotle but made their own observations and drew their own sketches. Their diagrams were still idealized but far more detailed and accurate than you could trust scribes to ever copy. If print enabled researchers to think for themselves, paper also enabled scientists to see for themselves.
18. The invention of telescopes and microscopes extended such observations, but without paper and print, empiricism could never have supplanted scribal hermeneutics as the ideal method for the study of nature nor could the impartial, detached observer have replaced the authoritative master scribe as the role model for the scientific practitioner.
19. Cartography also takes off, not only because engravings could be printed in indefinite quantities but also because a myriad of measurements could be recorded as one traversed the landscape. Lewis and Clark on their "Voyage of Discovery" were instructed to map the terrain they explored.
20. They were also told to inventory flora and fauna...and native tribes. As oral, hunter-gatherer tribes Indians were classified under nature rather than civilization. They were effectively part of the wild life of an untouched continent. And having no land deeds or even the concept of private property, the native tribes were not even considered to own their ancestral hunting grounds. As John Locke remarked, the land was open wilderness, having never been worked. "At the beginning of creation," he writes, "all was America."

21. As mentioned earlier, while intensifying objectivity, paper and print also intensified subjectivity as well. Personal observations of one's own individual nature, exploration of one's distinctive thoughts, feelings and desires could be dutifully recorded, reflected over and evaluated. (1) Identity shifted from communal to individual as the stories defining people became personal and unique. A solitary, first person orientation to reality could now find expression in word and image. Individuals were free not only to think for themselves and see for themselves but they were also free to express themselves as they felt themselves to truly be, beyond communal expectations and public supervision.
22. In the next video we will explore how paper and print also enabled a new religious movement calling for people to pray for themselves as well: the Protestant Reformation. We will see how the print revolution's new methodical reason, impartial observation, and subjective expressivism come to shape and be shaped by religious thought and belief. (1) One will address the "rationalization" of theology, in an effort to turn "folk" faith into an objective science even more radically "axial" than medieval scholasticism. (2) Another will look at the evolution of first person expressivist reasoning, abstracted from personal subjectivity to provide an analysis of an objective transcendental subjectivity applicable universally and necessarily to all rational persons.