Chinese Cultural Studies:
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China, Technology and Change

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In this text a modern commentator cautions against judging Chinese history by later events in Europe.

Francis Bacon (1561-1626), an early advocate of file empirical method, upon which the scientific revolution was based, attributed Western Europe's early modern take-off to three things in particular: printing, the compass, and gunpowder. Bacon had no idea where these things had come from, but historians now know that all three were invented in China. Since, unlike Europe, China did not take off onto a path leading from the scientific to the Industrial Revolution, some historians are now asking why these inventions were so revolutionary in Western Europe and, apparently, so unrevolutionary in China.

In fact, the question has been posed by none other than Joseph Needham, the foremost English-language scholar of Chinese science and technology. It is only because of Needham's work that the Western academic community has become aware that until Europe's take-off China was the unrivaled world leader in technological development. That is why it so disturbing that Needham himself has posed this apparent puzzle. The English-speaking academic world relies upon him and repeats him; soon this question and the vision of China that it implies will become dogma. Traditional China will take on supersociety qualities-able to contain the power of printing, to rein in the potential of the compass, even to muffle the blast of gunpowder.

The impact of these inventions on Western Europe is well known. Printing not only eliminated much of the opportunity for human copying errors, it also encouraged the production of more copies of old books and an increasing number of new books. As written material became both cheaper and more easily available, intellectual activity increased. Printing would eventually be held responsible, at least in part, for spread of classical humanism and other ideas from the Renaissance. It is also said to have stimulated the Protestant Reformation, which urged a return to the Bible as the primary religious authority.

The introduction of gunpowder in Europe made castles and other medieval fortifications obsolete (since it could be used to blow holes in their walls) and thus helped to liberate Western Europe from feudal aristocratic power. As an aid to navigation the compass facilitated the Portuguese- and Spanish-sponsored voyages that led to Atlantic Europe's sole possession of the Western Hemisphere, as well as the Portuguese circumnavigation of Africa, which opened up the first all-sea route from Western Europe to the long-established ports of East Africa and Asia.

Needham's question can thus be understood to mean, Why didn't China use gunpowder to destroy feudal walls? Why didn't China use tile compass to cross the Pacific and discover America, or to find an all-sea route to Western Europe? Why didn't China undergo a Renaissance or Reformation? The implication is that even though China possessed these technologies, it did not change much. Essentially Needham's question is asking, What was wrong with China?

Actually, there was nothing wrong with China. China was changed fundamentally by these inventions. But in order to see the changes, one must abandon the search for peculiarly European events in Chinese history, and look instead at China itself before and after these breakthroughs.

To begin, one should note that China possessed all three of these technologies by the latter part of the Tang dynasty (618-906)-between four and six hundred years before they appeared in Europe. And it was during just that time, from about 850, when the Tang dynasty began to falter, until 960, when the Song dynasty (960-1279) was established, that China underwent fundamental changes in all spheres. In fact, historians are now beginning to use the term revolution when referring to technological and commercial changes that culminated in the Song dynasty, in the same way that they refer to the changes in eighteenth- and nineteenth-century England as the Industrial Revolution. And the word might well be applied to other sorts of changes in China during this period.

For example, the Tang dynasty elite was aristocratic, but that of the Song was not. No one has ever considered whether the invention of gunpowder contributed to the demise of China's aristocrats, which occurred between 750 and 960, shortly after its invention. Gunpowder may, indeed, have been a factor although it is unlikely that its importance lay in blowing up feudal walls. Tang China enjoyed such internal peace that its aristocratic lineages did not engage in castle-building of the sort typical in Europe. Thus, China did not have many feudal fortifications to blow up.

The only wall of significance in this respect was the Great Wall, which was designed to keep steppe nomads from invading China. In fact, gunpowder

may have played a role in blowing holes in this wall, for the Chinese could not monopolize the terrible new weapon, and their nomadic enemies to the north soon learned to use it against them. The Song dynasty ultimately fell to the Mongols, the most formidable force ever to emerge front the Eurasian steppe. Gunpowder may have had a profound effect on China-exposing a united empire to a foreign invasion amid terrible devastation - but an effect quite opposite to the one it had on Western Europe.

On the other hand, the impact of printing on China was in some ways very similar to its later impact on Europe. For example, printing contributed to a rebirth of classical (that is, preceeding the third century AD) Confucian learning, helping to revive a fundamentally humanistic outlook that had been pushed aside for several centuries.

After the fall of the Han dynasty (201 BC-AD. 220), Confucianism had lost much of its credibility as a world view, and it eventually lost its central place in the scholarly world. It was replaced by Buddhism, which had come from India. Buddhists believed that much human pain and confusion resulted from the pursuit of illusory pleasures and dubious ambitions: enlightenment and, ultimately, salvation would come from a progressive disengagement from the real world, which they also believed to be illusory, This point of view dominated Chinese intellectual life until the ninth century. Thus the academic and intellectual comeback of classical Confucianism was in essence a return to a more optimistic literature that affirmed the world as humans had made it.

The resurgence of Confucianism within the scholarly community was due to many factors, but printing was certainly one of the most important. Although it was invented by Buddhist monks in China, and at first benefited Buddhism, by the middle of the tenth century, printers were turning out innumerable copies of the classical Confucian corpus. This return of scholars to classical learning was part of a more general movement that shared not only its humanistic features with the later Western European Renaissance, but certain artistic trends as well.

Furthermore, the Protestant Reformation in Western Europe was in some ways reminiscent of the emergence and eventual triumph of Neo-Confucian philosophy. Although the roots of Neo-Confucianism can he found in the ninth century, the man who created what would become its most orthodox synthesis was Zhu Xi (Chu His, 1130-1200). Neo-Confucianism was significantly different from classical Confucianism, for it had undergone an intellectual and political confrontation with Buddhism and had emerged profoundly changed. It is of the utmost importance to understand that not only was Neo-Confucianism new. it was also heresy, even during Zhu Xi's lifetime. It did not triumph until the thirteenth century, and it was not until 1313

(when Mongol conquerors ruled China) that Zhu Xi's commentaries on the classics became the single authoritative text against which all academic opinion was judged.

In the same way that Protestantism emerged out of a confrontation with the Roman Catholic establishment and asserted the individual Christians autonomy, Neo-Confucianism emerged as a critique of Buddhist ideas that had taken hold in China, and it asserted an individual moral capacity totally unrelated to the ascetic practices and prayers of the Buddhist priesthood. In the twelfth century Neo-Confucianists lifted the work of Mencius (Meng Zi, 370-290 BC) out of obscurity and assigned it a place in the corpus second only to that of the Analects of Confucius. Many facets of Mencius appealed to the Neo-Confucianists, but one of' the most important was his argument that humans by nature are fundamentally good. Within the context of the Song dynasty, this was all assertion that morality could be pursued through all engagement in human affairs, and that the Buddhist monks' withdrawal from life's mainstream did not bestow upon them any special virtue.

The importance of these philosophical developments notwithstanding, printing probably had its greatest impact on the Chinese political system. The origin of the civil service examination system in China can be traced back to the Han dynasty, but in the Song dynasty government-administered examinations became the most important route to political power in China. For almost a thousand years (except the early period of Mongol rule), China was governed by men who had come to power simply because they had done exceedingly well in examinations on the Neo-Confucian canon. At any one time thousands of students were studying for the exams, and thousands of inexpensive books were required. Without printing, such a system would not have been possible.

The development of this alternative to aristocratic rule was one of the most radical changes in world history. Since the examinations were ultimately open to 98 percent of all males (actors were one of the few groups excluded), it was the most democratic system in the would prior to the development of representative democracy and popular suffrage in Western Europe in the eighteenth and nineteenth centuries. (There were some small-scale systems, such as the classical Greek city-states, which might be considered more democratic, but nothing comparable in size to Song China or even the modern nation-states of Europe.)

Finally we come to the compass. Suffice it to say that during the Song dynasty, China developed the world's largest and most technologically sophisticated merchant marine and navy. By the fifteenth century its ships were sailing from the north Pacific to the cast coast of Africa. They could have made the arduous journey around the tip of Africa and oil into Portuguese ports; however, they had no reason to do so. Although the Western

European economy was prospering, it offered nothing that China could not acquire much closer to home at much less cost. In particular, wool, Western Europe's most important export, could easily be obtained along China's northern frontier.

Certainly, the Portuguese and the Spanish did not make their unprecedented voyages out of idle curiosity. They were trying to go to the Spice Islands, in what is now Indonesia, in order to acquire the most valuable commercial items of the time. In the fifteenth century these islands were the world's sole suppliers of the fine spices, such as cloves, nutmeg, and mace, as well as a source for the more generally available pepper. It was this spice market that lured Columbus westward from Spain and drew Vasco Da Gama around Africa and across the Indian Ocean.

After the invention of the compass, China also wanted to go to the Spice Islands and, in fact, did go, regularly - but Chinese ships did not have to go around the world to get there. The Atlantic nations of Western Europe, on the other hand, had to buy spices front Venice (which controlled the Mediterranean trade routes) or from other Italian city-states; or they had to find a new way to the Spice Islands. It was necessity that mothered those revolutionary routes that ultimately changed thee world.

Gunpowder, printing, the compass - clearly these three inventions changed China as much as they changed Europe. And it should come as no surprise that changes wrought in China between the eighth and tenth centuries were different from changes wrought in Western Europe between the thirteenth and fifteenth centuries. It would, of course, be unfair and ahistorical to imply that something was wrong with Western Europe because the technologies appeared there late. It is equally unfair to ask why the Chinese did not accidentally bump into the Western Hemisphere while sailing east across the Pacific to find the wool markets of Spain.