The Intellectual Isolation and Opening of Japan and China

著者	Yamada Keiji
journal or publication title	アジア・ヨーロッパ間の科学・技術の移転―ヴァスコ・ダ・ガマから現代まで
volume	7
page range	3-7
year	1994-03-31
URL	http://doi.org/10.15055/00003215

The Intellectual Isolation and Opening of Japan and China

Yamada Keiji

International Research Center for Japanese Studies

The introduction and transfer of modern science and technology is one of the most important factors in modern intellectual history in Japan and China. A comparison of this process in the two nations provides striking results. In this paper, the expression *intellectual isolation* will be used for negative attitudes and *intellectual opening* for positive attitudes concerning the introduction of Western or modern science and technology into a country. Just after Japan abandoned its intellectual isolation policy, which had been practiced for over ninety years, China entered a period of intellectual isolation for one hundred and twenty years. Different measures against Western impacts after the Opium War, and the bifurcation of modernization in Japan and China, thereafter, originated in this reversal of intellectual isolation and opening of these two nations. This paper will focus on the meaning of this *reversal*.

Just after his enthronement in 1723, Emperor Yong Zheng Di prohibited Christian missionary work and banished all missionaries from China, apart from those who were members of the national observatory. It is symbolic that in the same year, two scientific works by Chinese scientists, the *Li Xiang Kao Cheng* and *Li Suan Quan Shu*, were published. *Li Xian Kao Cheng* was compiled by Chinese scientists based on a series of astronomical books introduced by Jesuits at the end on the Ming dynasty. This shows that some Chinese scientists had mastered Western astronomy rooted in the world system of Tycho Brahe. *Li Suan Quan Shu*, by Mei Wen Ding, is one of the best achievements in an endeavor to integrate Western science with traditional science. It could be called a masterpiece of *hybrid science*. Hybridization in science and technology spells a sure way for a country to assimilate alien science and technology with indigenous science and technology. *Li Xiang Kao Cheng Ho Pian* was later compiled by a Jesuit employed at the astronomical observatory. Published in 1742, this book demonstrates historical significance beyond that of *Li Xiang Kao Cheng*, for it introduces Kepler's method of calendar making. This was also the last scientific volume compiled by a Jesuit in China. On the other hand, knowledge of Galilean mechanics and the telescope had already been accepted, to some extent, in China in the previous century. To sum up, prior to intellectual isolation, the Chinese had been accepting Western science from ancient times to the middle ages, as well as modern science up to Galileo-Keplerian times via the Jesuits.

In Japan, Shôgun Tokugawa Yoshimune removed a ban on importing Western books translated into Chinese, excluding Christian writings, in 1720. Obviously, the major reason behind this change in policy was a desire to import books on science and technology.

After this intellectual opening, the Japanese first conducted research in Western and modern science already accepted by the Chinese. One of the first to challenge this area of unknown intellectual inquiry was Takebe Katahiro. He started to translate *Li Suan Quan Shu*, previously referred to as a masterpiece of *hybrid science*, at the order of the Bakufu (government) in 1726. It is worth noting that Takebe was a mathematician and also an excellent researcher of the Shou Shi calendar, which was considered to be the best product to come from Chinese astronomy. Japanese astronomers subsequently went on to study *Li Xiang Kao Cheng*. Asada Gôryû and his disciples obtained calendar making methods from *Li Xiang Kao Cheng* in the 1780's. Furthermore, Takahashi Yoshitoki, one of Asada's disciples, mastered Kepler's method of calculation in *Li Xiang Kao Cheng Hou Pian* by 1802. In the following year, he wrote an abridged translation and notes of the Dutch version of *Traité d'Astronomy* (1764) by a leading French astronomer, J. J .F. Lalande. This showed Takahashi's understanding of Kepler's law of planetary motion and the Newtonian world system. This was merely forty years after the original publication of Lalande's book, suggesting that leading scientists in Japan caught up with contemporary modern science in the early nineteenth century within a period of forty years.

From 1720, the Bakufu attempted to acquire knowledge on science and technology directly from the Dutch in Nagasaki. The Bakufu appointed a few academics to learn Dutch and ordered them to study Dutch books in 1740. Under this new policy which effectively increased interest in Western science, those who particularly acquired knowledge via Dutch studies were medical doctors. Their work resulted in the publication of the first translation of a Dutch science book, *Kaitaishinsho* (New Book of Anatomy) in 1774.

The development of Dutch studies thereafter was exceedingly rapid, and interest in Dutch studies spread out into the intellectual world in both cities and rural areas. The arrival of P. F. von Siebold, a German doctor and scientist who was sent by the Dutch East Asian Company to Japan, gave further impetus to the promotion of Dutch studies. It is recorded that he taught fifty-seven intellectuals as students at his private school, and had forty-five intellectuals as friends. Dutch scholars began to open their own private schools in Japan, the most famous being

Ogata Kôan's school, founded in Osaka in 1838. Many of the graduates were to become leading figures during the Meiji restoration. This was the situation of the intellectual opening in Japan just before the Opium War.

With the Opium War erupting in 1840, Chinese knowledge of modern sciences was to advance no further than the Galileo-Keplerian stages, while Japanese scientists engaged in commerce as a means to further pursue nineteenth century science. This difference was not confirmed to scientific knowledge. Prior to the Opium War, a group of Dutch scholars embarked on a criticism of the foreign policy of the Bakufu, also claiming that the Bakufu had to be suppressed. Dutch studies in Japan provided the soil for cultivating scope and discernment necessary for leaders and rising generations to understand the present state of Japan in the global situation, and to deal with politico-military matters.

The Opium War in 1840 broke down China's intellectual isolation but it was Japan, rather than China, which immediately reacted, via actions, to the impact of this war. A few intellectuals, like Wei Yuan, sounded the alarm for the Chinese, but their appeals met with no response. In contrast, the Bakufu in Japan started, without any delay, to take measures against Western military aggression in 1841. The domains of Saga, Satsuma and others supported and followed the Bakufu from the beginning of the 1850's. Smelting works built for arms production in Saga in 1850 and in Satsuma in 1851, marked the beginning of a move towards enhancing the wealth and military strength of the nation of Japan. The Yang Wu movement, or the movement to promote the wealth and military strength of the nation in China, commenced in 1861 after the Second Opium War which finally woke up Chinese intellectuals and high officials. This time lag of ten years between Japan and China for the beginning of such movements was due to each nation's different experiences since the 1720's, and this had a symbolic meaning for modernization processes as well.

The subsequent courses of the introduction and transfer of science and technology, however, bear a surprising resemblance in Japan and China. Although there was a time lag of about ten years on average between these two countries, both the Japanese and Chinese recognized the Western impact as a menace of military strength, and therefore, promoted, first of all, measures to strengthen their own nations. By and by, however, Japan and China recognized the necessity of enriching their own respective countries in order to found a nation with a strong armament. The above mentioned close resemblance in the pattern of development between Japan and China was produced by the same dynamics involved in the inevitable shift of policy from overriding armament to a move towards promoting the wealth and armament of the country.

A comparison of Japan and China is as follows. Arsenals were founded at Saga and Satsuma, begun in 1850 and 1851, respectively, and in 1862 in Anquig and Shanghai. The construction of a steamboat took place at Satsuma in 1855, and in 1864 in Hanzhou. A naval academy was established at Nagasaki in 1855, at Fuzhou in 1867. A shipyard was founded at Nagasaki in 1857, Shanghai in 1865 and at Fuzhou in 1866. Students were sent to Europe by the Bakufu and some domains in 1862, while the Qing dynasty started to send students to the United States in 1872. A spinning mill was established in Satsuma in 1867, in Lanzhou in 1880. The Kei-hin rail line was inaugurated in 1872, and the Jing-Jin rail line in 1881. Many other cases could be mentioned.

The resemblance of the two countries was never confined to exterior matters, but often extended to the details of transferred technology. For instance, the shipyards founded in Yokosuka in 1865 and in Fuzhou in 1866 are typical cases of successful transfers of technology. They were both based on French technology, possessed approximately the same kind and scale of factories, and employed about the same number of foreign engineers and technicians as instructors and native engineers, technicians and workers. They both built about the same quantity of warships and a few merchant vessels by 1910, until the Meiji era and the Qing dynasty ended.

In spite of these notable resemblances, differences between Japan and China cannot be overlooked. For one, Japan started to try to *hybridize* Japanese traditional technology and Western *second-rate* technology, after an unsuccessful transplantation of the most advanced technology from the West. Japanese industrialization, therefore, really started with the formation of *hybrid technology*. Also, Japanese political leaders had a strong will to reform the ancient regime and push forward the modernization of the country by selectively adopting Western institutions. One can easily recall the sharp contrast between the success of the Japanese Meiji Restoration in 1868 and the setback of the Chinese reform movement in 1898. This reflects different experiences between the two countries from the 1720's, and this is cogently expressed in the time lag of ten years at the introduction of technology.

The time lag of ten years symbolizes the reversal of intellectual opening and isolation in Japan and China. The precedence of ten years implies the might of knowledge and the flexibility of Japanese political institutions. Even though both nations followed similar courses, why did Japan's modernization differ so much from what China accomplished? One of the answers to this question lies, without any doubt, in the reversal experience of intellectual opening and isolation.

Finally, the importance of comparative studies concerning the history of science and technology in Asian countries should be emphasized. I am convinced that such studies will uncover many new discoveries.