The Significance of Missionary’s Scientific Translation at Ming Dynasty to the Development of Chinese Science and Technology

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\textbf{Abstract.} Missionary’s entering into China during the period of Ming Dynasty was a significant event and Missionary’s translation had made up the second translation upsurge in the history. These Missionaries played a positive role in the cross-cultural communication between the East and West as well as in the invasion of western culture. As they spread the concept of religion, they also brought western scientific knowledge, scientific methodology into China through translation, which had a positive impact on the development of science and technology.

\textbf{Introduction}

Western missionaries began to come to China since mid Ming Dynasty; the number of missionaries coming to China had been greatly expanded at the end of late Ming Dynasty. Some missionaries had exerted great influence on the development of Chinese science and technology, such as Matteo Ricci, Michele Ruggieri, Diego de Pantoja, Sabbatino de Ursis, etc. Although their final aim was to propagate religious doctrine, these missionaries also brought some advanced scientific and technological knowledge at that time from western countries, thus to make their religious doctrine more acceptable in the upper grade of Ming government. The scientific and technological knowledge covered many aspects of science, such as astronomy, mathematics, geography, etc.

The major way of spreading western science was translating western scientific works; and the major translation method was “cooperatively translation”, which means the translation was done by the cooperative work of missionaries and Chinese scholars and made up the divergences of culture and language to the largest extent. It should be admitted that these translations was some kind of cultural aggression, but these translations had indeed brought western scientific knowledge and methodology to China, which had a positive effect on the development of Chinese science. The missionaries didn’t bring the most advanced and newest scientific achievements to China for many reasons, but it can’t be denied that the exotic knowledge and technology had brought a totally new research vision to Chinese Scientific circle.

This research chooses late Ming Dynasty as research time node and missionaries’ scientific translation as research contents; mainly discusses the value of missionaries’ scientific translation to the development of Chinese astronomy, mathematics, geography, etc. during late Ming Dynasty.

\textbf{Missionaries’ Scientific Translation in Ming Dynasty}

Ming Dynasty is a special period in Chinese history, during which occurred the second climax in translation history. It is commonly hold that missionaries’ translation in China happened during Ming and Qing Dynasty was started from Matteo Ricci, and ended by the prohibition of religion during the late years of Kangxi, which lasted about 200 years. The spring up of translation activities during this time was tightly related to the input of religion. There were over 70 missionaries...
entering into China during the time of late Ming and early Qing Dynasty and over 400 kinds of translation works, among which about 130 kinds were related to science [1].

Missionaries’ translation was started by the strategy of “Scientific Religious Spreading”, which means that the missionaries propagated Catholicism in an orderly way by translating a large number of scientific works which Chinese people were interested in [2]. The main character of the translation activity at that time was the input of western scientific knowledge. Because of their aim of religious spreading and academy bias, the missionaries didn’t introduce the most advanced scientific thoughts, and ignored the new thought and new results achieved after European literary thoughts [3], but missionaries’ scientific translation had broaden the horizons of the researchers and laid solid foundations for the overall development of science during Qing and modern China.

**The Promotion of Missionaries’ translation to Chinese Scientific Development**

Despite the small number of famous pieces of scientific works, the scientific development of Ming Dynasty was very slow. The main method to promote science was the inheriting from traditional science and technology, depending on experience and summarizing of classical literature. However, since mid Ming Dynasty, more and more Chinese people had broadened their horizon and began to accept, even explored from exotic scientific results. Therefore, missionaries’ scientific translations could be accepted and applied to the development of Chinese science. The accumulation during this period had laid a good foundation for the later scientific development.

The science of western countries at the same time had a rapid development on the contrary. New research methods had been created one after another; more focus had been put on theory research. What’s more, the process of scientific research relied more on the method of experiment and focused on logical analysis at the same time. Western scientific research had paid more attention to the nature and basic rule of the development. Under such scientific atmosphere, famous scientific results, such as De Revolutionibus Orbium Coelestium, analytic geometry, calculus, conservation of mass, came out one after another.

Western missionaries and Chinese scholars “had introduced western modern philosophy, logics, art, especially astronomy, mathematics, physics, geometry and some other fields in nature science to China [4]” in the form of translation. As we have discussed above, missionaries’ final aim of entering into China was to spread religious doctrine, therefore, over 50% of missionaries’ scientific translation were related to religion. But their scientific translation had introduced both the advanced scientific knowledge and scientific methodology, which greatly promoted the development of Chinese science. And it should be admitted that the introduction of scientific methodology was more influential than the introduction of scientific knowledge. The methodology of depending on experiment and focusing on logical analysis absorbed from western scientific circle still give guidance to scientific research nowadays. The scientific methodology introduced in missionaries’ scientific translation helped the scientific community in Ming Dynasty to break the established conventions and make a breakthrough in the scientific research, thus to promote scientific development and train some scientific talents, such as Xu Guangqi, Li Zhizao, etc.

Matteo Ricci was one of the most influential missionaries, and commonly recognized as the first missionary to enter into China. During his years in China, he not only completed his basic obligation of spreading religious doctrine, but also made remarkable contributions to the development of astronomy, mathematics, geometry and other scientific field in Ming Dynasty through the way of scientific translation.

Matteo Ricci mainly took four ways to promote his religious doctrine: “1st, getting support from the emperor and the other governors; 2nd, adopting the ways that appropriate for Chinese traditional customs; 3rd, spreading religion in academic ways, which means getting a good impression from the upper grade of Ming Dynasty by introducing western science, philosophy and art; 4th, holding a good relationship with Chinese government and people” [5]:28-29. Spreading religion in academic ways made his religion-spreading work developed smoothly and introduced a large amount of scientific knowledge to Ming Dynasty. During the late period of Ming Dynasty, many aspects of
nature science in western countries had been introduced into China, among which astronomy, geometry and mathematics had made greater achievements than the other branches.

Astronomy

In early Ming Dynasty, because of the influence of politics and research methods, the development of astronomy was nearly stagnant. But after Wanli Period, the astronomy had made new development. And at that time, the missionaries had introduced astronomic knowledge from Europe to China by translating astronomic works, thus to quicken the development of astronomy and calendar reform in Ming Dynasty; especially the compilation of *Chongzhen Li Shu*, which represented the progress of astronomy of Ming Dynasty. Matteo Ricci was the leading figure in the spreading of western astronomical knowledge to China. His famous works including *Qian Kun Ti Yi*, *Yuan Rong Jiao Yi*, *Hun Gai Tong Xian Tu Shuo*, etc.. These works had brought advanced research methods and technical terms to China.

All in all, Matteo Ricci and the other missionaries had introduced some famous universe theories, such as Round-Earth Theory, to China by the way of translating astronomical works, which made the development of astronomy to step onto a new level. They also introduced a lot of astronomical instruments, such as armillary sphere, sundial, telescope, star dial, star globe, etc..

Mathematics

Mathematics is one of the most important basic subjects, and can provide basic knowledge to the research of other subjects, such as astronomy and irrigation works. Although Chinese mathematics started very early, the development of mathematics began to stagnate in Ming Dynasty, thus to give impediment to the development of other scientific branches. At that time, the mathematical translated works by the missionaries brought mathematical knowledge and methodology to China and promoted the development of mathematics.

There were many famous mathematic translated works, such as *Elements* (the first 6 columns) and *Tong Wen Suan Zhi; Elements* (the first 6 columns) was the most influential one. This book was also translated under the guidance of the strategy of “Scientific Religious Spreading”. It was cooperatively translated by Matteo Ricci and Xu Guangqi. Its academic value was widely admitted throughout the whole academic circle and made great contributions to the development of mathematics. Its academic value was embodied in the aspects of broadening the horizon of Chinese mathematics researchers. After its translation, more and more scientific translated works began to come into China; therefore, it also has a special status in the history of scientific communication.

Geometry

During Ming Dynasty, the input of western geometry knowledge refers to the translation of geometrical works and drawing of maps. In translated works, the most famous missionary was Jiulio Aleni, whose famous works were *Zhi Fang Wai Ji* and *Xi Fang Wen Da*, with the former one was more influential. “This book was written in a popular and simple manner, and introduced geometry knowledge of the world. It also had a general introduction to the five continents and seas” [5]:120. This translated work expressed a more accurate knowledge to Chinese scientific field.

The representatives in the aspects of maps drawing were Matteo Ricci and Diego de Pantoja. The most influential works was *Shan Hai Yu Maps* by Matteo Ricci. It helped Chinese people to establish right “world outlook” and broaden their scientific horizon. Besides, Matteo Ricci also introduced some terms, such as Rome, Atlantic Ocean, equator, to China. These terms had been continued to use until nowadays.

Conclusion

Generally speaking, the scientific translations of missionaries in Ming Dynasty had brought some advanced scientific knowledge and methodology from western countries, which confirmed their contribution to the development of Chinese science.

These translated works also provide new research vision and material for translation theory and practice. They also introduced some new terms and rhetorical methods, thus to enrich the study of
Chinese literature. These translated works also promoted the development of scientific and cultural communication between China and western countries. Translation was the main approach to carry out cultural communication and further broadcasting activities. By translating, Chinese scientific circle had achieved more information from western science. Last but not least, missionaries’ scientific translation also laid solid foundations for the further development in the following Qing Dynasty, thus to provide essential conditions for sustainable development of Chinese science and technology.

The translation activities of missionaries in Ming and Qing Dynasty was the main part of the second translation climax, they introduced some of the western scientific achievements to China and promote the process of eastward of western knowledge; therefore, the whole process and the achievements were significant in the history of translation, culture and communication between China and western countries.

References