Research on Missionaries’ Astronomic Translations and Its Significance During Late Ming Dynasty

Tian-yan XIE¹,a and Hao-yuan MA²,b,*

¹School of Teacher Education, Nanjing Normal University, Nanjing, Jiangsu, China
²Teaching Affairs Office, Nanjing University of Economics and Finance, Nanjing, Jiangsu, China

a 820812grace@163.com, b mhybest0816@163.com

*Corresponding author

Keywords: Missionaries; Astronomical Translations; Late Ming Dynasty; Technological Dissemination.

Abstract. Missionaries from Western countries during Ming and Qing dynasty prompted scientific interflow between two western and eastern cultures immensely. The promotion gave a boost especially in China’s advance of science, among which, astronomy had achieved the most. Missionaries coming to China brought in comparatively advanced astronomic knowledge and instruments, generating bran-new concepts and perspectives for Chinese studies of astronomy, which was on the verge of stagnation at the end of Ming dynasty.

Introduction

At the end of Ming dynasty, missionaries coming to China brought in many scientific translations, scientific methodologies and scientific apparatuses, which functioned as part of “Scientific spreading religion”. As one of the integrated developmental subjects, astronomy was on the list. At the same time, Chinese astronomy was progressing slowly, nearly stagnating; Chinese calendar was disrepairing. Therefore, missionaries’ astronomic translations and other western Astronomical achievements rendered bran-new research methods and perspectives, which prompted Chinese traditional astronomy development.

In recent years, missionaries’ scientific translation has been paid more attention the academic circle. Its value on the history of science, communication of science and translation has been commonly recognized. Some scholars have systematically categorized the scientific translations brought by missionaries during Ming and Qing dynasties; some have discussed the meanings of scientific exchange systematically; some even have made further research on the scientific exchange activities made by missionaries in a specific time with detailed social and cultural backgrounds with the trend of western learning spreading to the east. Based on above-mentioned studies, this paper selected late Ming dynasty as time node, selected astronomical works as research objects, selected four targeted translated works by missionaries involved (Chongzhen Calendar, Theory of Sphere-heavens Illustrated by Graphs, Inquiries of Heaven, The Aspectual Meanings of Heaven and Earth), paying close attention to the process and achievements of the development of translation. The contents of this paper are more focused and penetrating and well-targeted so that the outcomes will manifest its values in arenas like the history of translation and history of science.

The Background of Occurrence of Scientific Translations by Missionaries Coming To China

The second upsurge of translation in Chinese history occurred in Ming and Qing dynasty, with missionaries coming to China dominating. The translation is said to start from Matteo Ricci and end with Kangxi Emperor’s prohibition of religion in his late ages. This upsurge of translation was closely related to the spread of religion. Well –known missionaries coming to China at the end of Ming and begin of Qing dynasty were amount to more than 70 figures. 400 works were done by all the missionaries, among which about 130 books were about science[1]. Science in western
countries in the same period of Ming dynasty was developing comparatively faster. The research methods were innovated constantly, the studies of theories were attached more importance. In the process of scientific research, people inclined to employ experimental methods and put more weight on logic analysis as well as emphasized the essence of matters and fundamental developing patterns. In such scientific researching atmosphere, achievements like the revolutions of the heavenly sphere, analytical geometry, calculus, law of conservation of mass were constantly obtained. Thus, the development of science came into a flourishing time. Though the missionaries coming to China mainly worked on religious works, the influence of scientific translations was indispensable.

Translations translated by missionaries covered an immense range of knowledge, most of which focused on science with many subjects involved. The way of integrated translation overcame the divergences between western and eastern cultures to the largest extent, securing some successful translations like Elements. “Though influenced by missionaries’ final purposes and academic prejudices, the missionaries didn’t introduce the most advanced thoughts and knowledge from western countries to China. At the same time, they evaded the crucial points of new thoughts and achievements after the literary trend of thoughts of Europe. [2]” However, as for the state of China’s scientific stagnation, the scientific translations by missionaries coming to China literally functioned as cardio tonic. The translations expanded the perspectives of scientific research, helped research staff to break away from conventions and get rid of traditional and lagging thinking patterns. They also strengthened the practicability and creditability of scientific research, continuously pioneered and invented and promoted the progress of science. Astronomy, as an important arena of western and eastern scientific interflow, was affected immensely and thus, enjoyed the most achievements of translations.

Chinese calendar became outdated at the early times of Ming dynasty with huge deviation in reckoning eclipse. The missionaries’ visit to China was so timely that it not only brought about advanced astronomical apparatuses but also knowledge in the form of astronomical translations, which boosted the progress of astronomical development and the revolution of calendar in China, especially for Chongzhen Calendar which represented the tremendous advance of Chinese Astronomy at the end of Ming dynasty. As translations of Theory of Sphere-heavens Illustrated by Graphs, Inquiries of Heaven, The Aspectual Meanings of Heaven and Earth etc came out, they in the further level brought in bran-new research methods and advanced technical terms. They also introduced cosmological theories like spherical earth that made our research in Astronomy basing more on advanced theories. Meanwhile, many western astronomical apparatuses as armillary spheres, sundials, telescopes, star dials, star globes etc. were imported to China, all of which promoted the development of astronomy at the end of Ming dynasty.

**Chongzhen Calendar**

**Chongzhen Calendar**, with another name *New Calendar Ephemeris*, whose translation was great significance in astronomical history of Ming dynasty. The translation, which represented progress in ancient astronomy, was translated by Xu Guangqi, Johann Adam Schall von Bell, and Niccolo Longobardi, as well as other missionaries in China.

Xu Guangqi played an active role in the translation of *Chongzhen Calendar*. He was the first scholar bureaucrat who realized that he could take advantage of western calendar to make reformations to Chinese traditional calendar, and he also persuaded Emperor Chongzhen to carry out the reform as planned. Thus, in 1629, Xu Guangqi complied with Emperor Chongzhen to repair the calendar. Xu also recommended missionaries featured by Niccolo Longobardi, Johann Schreck, Johann Adam Schall von Bell and Giacomo Rho to participate in the repair of calendar. In the process of repairing calendar, Xu Guangqi focused more on translating western calendars with explicit translation principles. As he said in the memorials to the throne in 1631:

“It is Supposed to divide into six sections, first is the calendar of the sun, second of stars, third of the moon, fourth of the intersection of the sun and the moon, fifth of the five latitudinal stars, sixth of the intersection of five stars; supposing five fundamental
categories, the first named principles, second named figures, third named calculations, fourth named apparatuses, fifths named consummation.” [3]

Ascribed to the above principle, the bureau hosted by Xu Guangqi translated over 130 volumes in 1629-1634. All of the volumes were presented to the emperor in five times. The first presentation was in 28th the first month of lunar year in 1631, including 24 volumes as 2 series. The second presentation was in 1st August in 1631, including 20 volumes covering books, charters and graphs. The third presentation was in 4th April in 1632, including 30 volumes. The fourth presentation was in 19th of July in 1634, including 30 volumes, the fifth in 24th November in 1634, including 32 volumes. The first three times were represented to the emperor by Xu Guangqi himself, while the last two times by Li Tianjin.

In the process of compiling and translating Chongzhen Calendar hosted by Xu Guanqi, massive astronomical theories, measuring instruments, methods of calculating and measuring and fundamental knowledge of astronomy like scientific books on mathematics were translated. Thus, it led an all-around development in astronomy during the period of Ming. By his recommendations, missionaries, such as Niccolo Longobardi, Johann Schreck, Johann Adam Schall von Bell and Giacomo Rho, and Chinese scholars and scholar bureaucrats, such as Li Zhizao, Wu Mingzhu, Chen Yubi all performed their expertise.

Chongzhen Calendar also had defects. Because of multi-aspect reasons, missionaries coming to China failed to introduce the most representative theories and achievements of the West. As a result, heliocentric theory was not mentioned while geocentric theory was emphasized in Chongzhen Calendar. In addition, the book denied the autorotation of celestial bodies. Defects lay in the overlapping of language as well, which, seems to be seriously defectiveness in nowadays. However, as to the specific historical stage, the achievement of Chongzhen Calendar was still worth affirmation. For example, geocentric theory was first mentioned in Chongzhen Calendar in history; new western measuring regulations were brought in, which, made Astronomy of China gradually kept pace with international astronomic development. In a word, Chongzhen Calendar was a turning work of transition.

Theory of Sphere-heavens Illustrated by Graphs

This book was translated cooperatively by Matteo Ricci and Li Zhizao in 1607. The book was mainly constructed with graphs to illustrate the constructions and principles of astrolabe. Li Zhizao prefaced the book which used western cosmological theories for reference and fully affirmed the function of western astronomical theories and apparutuese. As Li Zhizao put in preface:

“Since I have known Matteo Ricci who is an European, I get to know planispheric astrolabe which is global and engraved with circles. The upper represents heaven while the opposite earth, both of which surrounded with stars. The regulations also come from circular globe with central part as its north pole. Complied with views of Plain Questions make the Three Rules as the principles of dividing years; it manifests the common rules of the universe, which makes it a book without precedence.” [4]

Theory of Sphere-heavens Illustrated by Graphs introduced the fundamental principles, the constructions and ways of usage of astrolabe, making Chinese researchers in astronomy know of astrolabe and related principles. The basic principle of astrolabe mentioned in the book was spherical earth and universe theory, which was extracted from ancient Greek celestial views. This theory defined the earth as well as heaven as round-shaped. It proclaimed that the earth stood still in the central of the universe. This theory is more advanced than the traditional astronomic theory of sphere-heavens and theory of canopy heavens and bore a definite meaning of reference. Though it was defective compared with current astronomy, it possessed a high level of cognition. We had to admit that Theory of Sphere-heavens Illustrated by Graphs pushed our traditional astronomical research forward with a great stride.
Inquiries of Heaven

*Inquiries of Heaven* was translated by Portuguese missionary Emmanuel Diaz in 1605. It was incorporated in *Primary astronomy* and the branch of astronomical calculations of *Complete Library of Four Branches of Books*. It mainly introduced the fundamental thoughts and concepts of western astronomy to repair the calendar of Ming dynasty. The book also had some reference meanings to *Chongzhen Calendar*. However, *Inquiries of Heaven* had its defect that the words on religions were inappropriate which manifested the author’s prejudice.

*Inquiries of Heaven* was written in the form of asking and answering questions. It talked about fundamental knowledge of astronomy like the weight of heaven, seven weft, annual motions of sun, causes of sun eclipse, seasons, lengths of night and day, and laws of seleno-motion. The book was all-around, involving what overlapped with traditional astronomy as well as bran-new theories and research of western celestial bodies. This book had directive meanings to astronomical research in late Ming Dynasty. It brought in fundamental concepts of astronomy and rendered new research perspectives to traditional research of astronomy. The inscription of the translation got full approval from scholar bureaucrats who reckoned that the inscription would benefit Chinese astronomical calendar a lot, which can be seen from the preface made by Kong Zhenshi (traditional scholar bureaucrat, Confucius’ grandson of 63rd generation).

The Aspectual Meanings of Heaven and Earth

*The Aspectual Meanings of Heaven and Earth* was translated by Matteo Ricci in 1605 and was claimed by the editor of *Complete Library of Four Branches of Books* to be the start of western learning spreading to east. The book was divided into upper, middle, last volumes with graphs inside. What the upper and middle volumes talked about were all about celestial knowledge, involving many chapters, much of what was not covered in Chinese traditional literature. The last volume was mainly about the rationales for area and volume of the round by comparison, covering much knowledge of arithmetic. What it talked about was by experiment and explicit. The narratives of the book and expressions were adopted by *Mathematical Essence* later.

*The Aspectual Meanings of Heaven and Earth* was irreplaceable in the transmission of Western learning, the influence of which mainly accumulated on astronomy, mathematics and cartography, especially for the astronomical knowledge that benefitted the stagnation in Ming Dynasty a lot. The value of the book was fully admitted by astronomical circle. “When errors constantly occurred in Ming’s calendar, though many people featured by legal inheritor of Zheng Zaiyu and Xing Yunlu managed to make up with them, what they have learnt failed to be equivalent to what they need to learn. Since Xu Guangqi repaired the calendar, the calendar has become more and more detailed. Till now, it is not only delicate in its contents but also rises from its initial stage into a strengthened version.”[5] However, the book was only circulated in the scholar bureaucrats who hid the book in palace instead of being circulated in civilian arena of science.

In a word, Matteo Ricci and other missionaries’ astronomical translations and astronomical apparatuses introduced by western learning spreading to the east furnished the astronomy at late Ming Dynasty with advanced astronomical theories, astronomical thoughts and more scientific research methods, which directly pushed forward the development of astronomy of late Ming Dynasty, indirectly brought along the fundamental subjects featured by mathematics advanced.

Conclusions

Translations brought by missionaries coming to China during late Ming Dynasty promoted the development of astronomy, perfected the calendar of Ming Dynasty with its advanced astronomical knowledge, astronomical ideas and astronomical research methods. Thus, the contribution of all the translations deserves affirmation.

Astronomical translations worked down by missionaries like Matteo Ricci, not only influenced the development of astronomy during late Ming Dynasty but also laid the foundation for the further
development of Chinese astronomy. The translations conveyed comparatively new scientific achievements and methodologies timely, expanding the horizons of researchers in late Ming Dynasty, forming a connecting link in the history of Chinese Literature, playing a non-negligible in Chinese astronomical history.

The meaning of dissemination of the astronomical works was significant as other scientific translations in other arenas. The translations brought by missionaries coming to China introduced new astronomical terms as well as new rhetorical methods of expressions from the West. All of these expanded the contents of words, enriched the literature studies, and rendered bran-new perspectives for researchers, thus, enlarging themes of translatology studies.
The activities of missionaries coming to China in Ming and Qing Dynasties constituted the main body of the second upsurge of translation. More importantly, they introduced the western scientific achievements to China in the form of scientific translation, pushing forward the progress of western learning spreading to the east, playing an active role in the history of translation, literature, Chinese science and interflow between the East and the West.

References