

Head-On Intersection of East and West: The Overlooked History of Galileo in China

Jeremy Schreier
Stanford University

On October 14, 2001, an elaborate, four hundred year old map of the world arrived at the Italian Embassy in Beijing. In an overnight journey, curators of the Central Museum in Nanjing traveled first class alongside the map, watching over it for the entire journey. They arrived in Beijing successfully with the map intact, in time to display it as a prominent piece at an exhibition commemorating the arrival of the Matteo Ricci (1552–1610), an Italian Jesuit missionary who lived in China four centuries earlier (Turner, 2001).

Though he was not a scientist, Matteo Ricci was a key figure in the Scientific Revolution responsible for linking the burgeoning mass of scientific knowledge in Renaissance Europe with the isolated Ming Dynasty (1368–1644) Kingdom in China.¹ In 1433, the distant voyages of enormous Chinese fleets to lands as far as Southern Arabia, Eastern Africa, and Mozambique ended as external threats to security led the Chinese to turn inward.² Initially, this shift towards isolationism was governmental, but later spread to the cultural sphere (Mungello, 2009). Geographic and societal separation from the rest of the world fostered a Chinese ethnocentrism, termed *Sinocentrism* (Mungello, 2009). In fact, the traditional Mandarin characters for “China,” 中國, literally mean “Middle Kingdom,” implying that China sits at the center of the world. Ricci’s map undermined Chinese isolationism. Pang Ou, one of the curators who accompanied the map in its journey to Beijing, explained that the creation of Ricci’s map was “the first time Chinese intellectuals saw the whole world and realized that China was not the center” (Turner, 2001). This contemporary anecdote of the Jesuit legacy in China provides an

¹ The term *Scientific Revolution* is employed according the definition that the philosopher and historian Alexandre Koyré composed in 1939: the dawning of modern science during the early modern period. According to this traditional description, the Scientific Revolution began in Europe towards the end of the Renaissance, and continued through the late eighteenth century, influencing the rise of the Enlightenment.

² There are many theories for why the Chinese naval expeditions, led by the Muslim mariner Zheng He (1377–1433) ended, but one of the most prominent reasons given is the outside threat of enemy groups.

illustration of how significant the work of missionaries like Ricci were, as well as the lasting consequences of interactions between Eastern and Western civilizations during the early modern period.³



FIGURE 1. *The Map of All Countries*, i.e. the map of the whole world, was compiled in 1608, during the course of Matteo Ricci's work as a missionary in Ming China. The eunuchs in the palace of Emperor Wanli (1563–1620) copied the original map and mounted it as a banner, making it a whole map of the world measuring 192 cm long and 380.2 cm wide. Today, only two of these maps still exist in China (Ricci 1608).

The discoveries of the Italian astronomer and physicist Galileo Galilei (1564–1642 CE) held great import for the Jesuits' evangelical efforts in China. During the seventeenth century, the Society of Jesus incorporated Galileo's discoveries in its efforts to promulgate the Gospel deep into the hearts and minds of the people of East Asia. The Jesuit enterprise based in Peking⁴, China, sent its missionaries as far as Korea and Japan. The traditional historical narrative of the Scientific Revolution emphasizes that Galileo's discoveries heralded the dawn of modern science, and portrays him in direct conflict with the Catholic Church. However, the history of Galileo's science in China is largely overlooked. Upon examining the

³ The use of the term "early modern period" to describe Chinese history is quite a Eurocentric approach, but this essay uses it throughout because it conveniently describes the time period 1500–1800.

⁴ Present day Beijing.

methods by which Galileo's scientific discoveries were transmitted in China, a more complex picture emerges of both the science itself and his relationship with the Church. Ultimately, the reputation Galileo achieved as the greatest scientist of his day through patronage allowed the Jesuits to look past his central philosophy of Copernican heliocentrism and propel his discoveries throughout China, in an effort to spread Christianity in the East.

Only a small amount of scholarship specifically addresses the spread of Galileo's science in China. Pasquale D'Elia, S.J, a twentieth-century Italian professor of Sinology, is the only historian who has written extensively on this topic. His paper "The Spread of Galileo's Discourses in the Far East (1610-1640)" provides an overview of the subject matter. The later published monograph *Galileo in China: Relations through the Roman College between Galileo and the Jesuit Scientist-Missionaries (1610-1640)* provides a more detailed chronicle of the same topic. However, since no other author has written extensively on the intersection of Galileo's science and Chinese society, it is essential to realize that much remains to be discovered on this topic.

However, scholarship does illustrate the Jesuit missionary enterprise in China during the early modern period. Charles E. Ronan, S.J.'s *East Meets West: The Jesuits in China, 1582–1773* elucidates the consequences of Jesuit activities in China, and argues that while the Jesuits only gained 300,000 converts out of a population of over 100 million Chinese, they were successful in that their efforts stand out as a memorable episode in world efforts at cultural accommodation. To explain the complex relationship that Galileo's discoveries held with the Catholic Church, this essay summons the work *Galileo and the Church: Political Inquisition or Critical Dialogue?* by the Israeli historian of science Rivka Feldhay. Feldhay seeks to undermine the traditional "myth" of the "clash" between Galileo's Copernican, heliocentric view of the universe and the Church's preservation of the idea of a geocentric solar system, by presenting a more complicated picture of how Galileo and various Catholic factions interacted.

The incorporation of Galilean science into Jesuit missionary efforts began centuries after the arrival of Christianity in the Far East. Long before the arrival of the Jesuits, Christianity had existed in China since the seventh century CE. The Nestorian Stele—a stone tablet created in the eighth century—records that in 635 CE, Christians reached Xian, capital of the Tang dynasty (618–c. 906). There they established places of worship and propagated their faith. During the medieval period, Christianity held influence in the Mongol Empire, as members of several Mongol tribes became Nestorian Christians. In the sixteenth century, under the direction of St. Francis Xavier (1506–1552), the co-founder of the Society of Jesus, the Jesuits established themselves in China. Immediately after Xavier's death (twelve years before Galileo's birth), several Jesuit priests rushed forward wishing to fill his role in order to

continue the promotion of Christianity beyond the “Gates of China” (D’Elia, 1950). Of all the aspiring priests, the Church chose Matteo Ricci. In September 1583, he opened his first missionary station in Kwangtung, and then gradually marched towards Peking, where he set up a Jesuit depot in 1601. Ricci died during the infancy of Galileo’s fame, when his scientific discoveries were just beginning to spread through China.

For the Jesuits, the spread of Galilean science was not an end goal in and of itself; rather, it was part of their strategy to evangelize the East. In effect, the incorporation of revolutionary European science made the missionaries’ work easier. As they wooed the Chinese with explanations of Galileo’s innovative discoveries in physics and astronomy in an effort to spread the Gospel, the missionaries attained toleration, esteem, and even affection from native society in the Middle Kingdom (D’Elia, 1950). Nevertheless, in reality, it seems that the Chinese commenced the interaction between the two groups. Chinese authorities permitted Ricci to work in Peking out of the hope that he could correct their inaccurate lunisolar calendar.⁵ The scientific rules that the calendar relied on had been lost many years ago, and the Chinese hoped that Ricci would be able to ameliorate the problems of this faulty annual time-keeping system (D’Elia, 1960). Though Ricci successfully worked in Chinese society to conduct Jesuit missionary work, he was not an astronomer. He certainly associated himself with celestial matters like the Chinese calendar, but also recognized that his scientific knowledge was too limited to fully aid the Chinese in answering their questions regarding the calendar. In 1605, Ricci wrote to the Roman College and asked that a competent astronomer be sent to Peking. D’Elia describes, “It is at this point that we find the link between Galileo and China” (D’Elia, 1950, p. 156).

Johann Schreck (1576–1630), a Swiss scientist, student of Galileo at the University of Padua, and fellow member of Prince Frederico Cesi’s Academy of the Lincei, became the first person to connect Galileo’s discoveries to China. In 1618, Schreck surprised his fellow scientists when he decided to leave the Academy to travel to China to pursue work as a Jesuit missionary. Galileo himself was upset at Schreck’s departure from the Academy, notably describing it as “a big loss” (Zetl, 2001). After a lengthy journey, Schreck finally arrived in Peking in late 1623. He wrote and translated several Chinese textbooks on mathematics, engineering, and astronomy alongside fellow Jesuit Nicolò Longobardo (1559–1654) and various Chinese scholars. Schreck combined his scientific expertise with Jesuit missionary activity to successfully fill the precise role that Ricci had requested nearly two decades earlier (Zetl, 2001). Meanwhile, back in Italy, Galileo continued to work with his telescope to make new astronomical discoveries, and gained the support of patrons and fellow scientists.

⁵ A lunisolar calendar is a calendar whose date indicates both the moon phase and the time of the solar year. Many cultures have used this type of calendar throughout history.

Most of the great scientific discoveries in early modern Europe did not occur within the walls of the university. Instead, they took place in the more exposed courts of aristocratic sponsors. As the Jesuits worked in China to integrate Galileo's discoveries and drive forward their missionary work, the scientist himself remained in Italy and developed patronage relationships that encouraged his work to rise to prominence. Galileo's success as a physicist and astronomer depended on his intellectual and experimental brilliance, but perhaps more importantly, on the lasting relationships he formed with patrons that would best sponsor his work.

Galileo's friendship with Christopher Clavius (1538–1612), a German Jesuit mathematician and astronomer who served as director of the Roman College, was crucial to the rise in esteem of his scientific discoveries. In July 1609, building off the previous inventions of the Dutch lens maker Hans Lippershey (1570–1619), Galileo constructed his first telescope. In 1610, Galileo announced the findings he made with his telescope in his treatise *Sidereus Nuncius* (The Starry Messenger), which would become one of his most famous works. He described the phases of Venus, the tricorporeal structure of Saturn, apparent mountainous formations of the moon, the stars of the Pleiad and the Milky Way, the four moons of Jupiter, and the nebulae of Orion and Cancer (D'Elia, 1950).

At this point, the friendship between Galileo and Clavius was over twenty years old. Galileo was enjoying the beginnings of a fruitful career, but Clavius was suffering in bed as old age debilitated him. Clavius was so pleased with the discoveries outlined in *Sidereus Nuncius* that in a letter to Galileo, he described that although he felt debilitated, reading the work relieved his weakness (D'Elia, 1950). Because of Clavius' influence as head of the Roman College, the friendship between him and Galileo aided in the acceptance of Galileo's new discoveries. Clavius died in 1612, during the middle of Galileo's career, though his open admiration towards his friend contributed to the rise of Galileo's fame and eventually facilitated the spread of his discoveries in China.

Clavius helped increase widespread respect for Galileo in Rome, but Galileo needed more patrons to gain sufficient support for his scientific endeavors. His greatest patron was the Medici family of Florence, a political dynasty that originated in the fourteenth century and amassed its wealth through banking. The Medici's substantial financial backing encouraged high regard for his discoveries at home in Italy, and consequently, for the Jesuits' adoption of Galilean science far away in China. In 1588, the Grand Duke Ferdinand de' Medici appointed Galileo to the professorship of mathematics at the University of Pisa, initiating the family's connection with the great scientist. He named the four satellites of Jupiter after his patrons, labeling them the *Medicean Stars*. Galileo opened *Sidereus Nuncius* with an expression of admiration to Cosimo II de' Medici (1590–1621), Grand Duke of Tuscany at the time of the work's publication. He wrote:

Most Merciful Prince, acknowledge this particular glory reserved for

You by the stars and enjoy for a very long time these divine blessings carried down
to You not so much from the stars as from the Maker
and Ruler of the Stars, God. (Galilei, 1989)

This kind of devotional opening statement was typical of Galileo's works. By addressing his findings to his patrons, Galileo secured greater reverence from the Medici patrons and continued to receive funding from them. Galileo's position as a courtier propelled his name to fame in Italy. This renown spread to the Jesuits' in China who integrated his revolutionary discoveries into their missionary work.

While the Jesuits were eager to use Galileo's discoveries to woo the Chinese to accept the Gospel, the great scientist himself was not necessarily enthusiastic to share his new discoveries with them. While in China, Johann Schreck wrote to Galileo insistently, begging him for assistance with the reform of the Chinese calendar. He requested that Galileo provide a calculation of the solar eclipses according to his new observations in Italy. Galileo was hesitant to respond, and Schreck urged Archduke Leopold and the Archduchess of Tuscany to intervene and ensure that Galileo would respond to the Jesuit mission's requests (D'Elia, 1950). Finally, in May 1624, after eight years of Jesuit persistence, Galileo produced an abrupt and quite untruthful reply: he had nothing to send to China. Despite Galileo's unwillingness to aid the missionaries with scientific knowledge, the Jesuits in China did not cease to show their interest in Galileo's work. They made an especially concerted effort to spread the telescope its resulting discoveries to the Chinese (D'Elia, 1950).

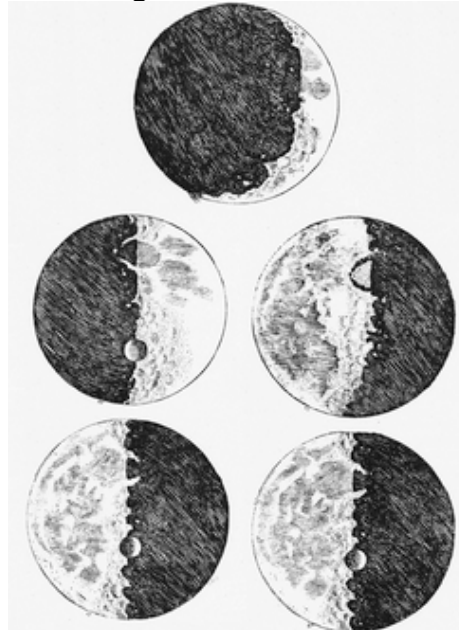


FIGURE 2: Galileo's sketches of the moon in *Sidereus Nuncius* showed that the moon's surface was rugged, contrary to previous notions that the moon was perfectly spherical (Galilei 1989, 41-6).

In 1626, the missionary-scientist Johann Adam Schall wrote a short treatise on the telescope, and became the first Jesuit to educate the Chinese about the instrument (D'Elia, 1950). Galileo's telescope was an especially marvelous innovation for the Jesuits to show the Chinese. It was a revolutionary technology, and did not require the missionary-scientists to ascribe to Galileo's greater Copernican views of a heliocentric universe. They could simply relay information about the telescope to the Chinese and not worry about conflicting with the Roman Catholic Church's intolerance for heliocentrism at the time. While it seems that Galileo's Copernican beliefs clashed with the Church's long-held Ptolemaic view that the sun revolved around the Earth, the traditional narrative of a starkly binary opposition between Galileo's science and the Church's theology is quite oversimplified.

Rivka Feldhay outlines a more nuanced "framework for a dialogic model," in which the Church permitted the use of the Copernican theory as "an astronomical hypothesis" but forbade the consideration of it as an absolute truth (Martin, 1997, p. 472). More analysis reveals that the Jesuits, Cardinal Robert Bellarmine, and the Dominicans all differed on what the phrase "an astronomical hypothesis" meant. The fact that the Jesuits were able to look beyond Galileo's Copernican beliefs and admire him as a revolutionary figure purely based on his experimental discoveries and patronage relationships augments his reputation even further. However, D'Elia argues that the Jesuits would have undoubtedly accepted the superiority of the Copernican system, but they could not proclaim it openly because of their adherence to the central authority of the Church in Rome (D'Elia). Regardless of the disputation between Galileo and the Church, the innovative excellence of Galileo's physics and astronomy, in addition to the fame he established as a courtier, ultimately encouraged the Jesuits to view him objectively as an outstanding source of scientific knowledge useful for the spread Christianity in China.

The 2001 Beijing exhibition of Matteo Ricci's *The Map of All Countries* illustrated the intersection between the knowledge of civilizations of the East and West in the same way that the Jesuits' spread of Galilean science discoveries did. Both cartography and astronomy encouraged the Chinese to break out of the Middle Kingdom and explore the rest of the globe. The Scientific Revolution as a whole encouraged the exchange of ideas and discovery between East and West, and the spread of Galileo's discoveries in China is a crucial historical event that is too often overlooked. The topic holds immense consequences on our understanding of the interactions between Europe and China, and on the development of science during the early modern period. The history of Galileo in China thus presents an exciting chapter in the history of science, and a fresh perspective on interactions between the East and West during the early modern period.

References

- D'Elia, P. (1950). The Spread of Galileo's Discoveries in the Far East. *East and West*, 1(3), 153–63.
- D'Elia, P. (1960). *Galileo in China: Relations through the Roman College between Galileo and the Jesuit Scientist-Missionaries*. (R. Suter & M. Sciascl, Eds.). Cambridge, MA: Harvard University Press.
- Feldhay, R. (1995). *Galileo and the Church: Political Inquisition or Critical Dialogue?* Cambridge, UK: Cambridge University Press.
- Galilei, G. (1989). *Sidereus Nuncius or the Sidereal Messenger*. (A. Van Helden, Ed.). Chicago, IL: University of Chicago Press.
- Martin, A. L. (1997). Review of Galileo and the Church: Political Inquisition or Critical Dialogue? *The Catholic Historical Review*, 83(3), 472–73.
- Mungello, D. E. (2009). *The Great Encounter of China and the West* (Third.). Lanham, MA: Rowman & Littlefield.
- Ronan, C. E., & Oh, B. B. C. (1988). *East Meets West: The Jesuits in China*. Chicago, IL: Loyola University Press.
- Turner, M. (2001, November 10). Matteo Ricci's Precious Bequest to China. *New York Times*.
- Bibliothek der Fachhochschule Konstanz. (2001). Terrentius Constantiensis Wissenschaftler und Chinamissionar. Retrieved from http://ausstellungen.bibliothek.htwg-konstanz.de/china/03_johannes_schreck2.htm