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EXTREME-ORIENT EXTREME-OCCIDENT

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Archiving Knowledge: A Life History of the *Calendrical Treatises of the Chongzhen Reign* (*Chongzhen lishu*)

Pingyi Chu

Introduction

This paper discusses how the life of an archive is embedded in the socio-political network that sustains its existence, and how a shift of this network transforms the meaning of the archive. Archives, collections of organized information, create order out of chaos. Like the external world, an archive does not possess any innate order. However, after the constructed order is formed via classification, the archive appears to enjoy a life of its own and helps shape the order of the world when the agents who draw on it take action. An archive is thus a space of fantasy, stimulating the imagination of order, as if appropriately applying a stored body of knowledge were automatically to lead to an order of the world. An archive is thus no longer a static concept of storage but the foundation for action. Such imagining of order derives from the order of an archive the functions of which rely on classifications of the materials collected. This active nature of the archive renders its construction and classification the foci of struggle among the interested agents, even though the later users may ignore the original intentions of the archive architects. The complicated power relations among agents are thus registered in the enterprise of archive building. An analysis of the compiling process of archives thus is the "commencement" to unravel how historical agents seek to dominate each other.[1] The disentangling of the power relationship beneath the archive in turn reveals how an archive as an object is embedded in a complicated socio-political network without which the existence and use of archives is impossible.[2]

The *Calendrical Treatises of the Chongzhen Reign* is a good example to demonstrate this "archive phenomenon." It is an imperially commissioned collectanea (*congshu*) aiming at translating astronomical and mathematical knowledge transmitted from Europe in the seventeenth century. This

collectanea laid down the foundation for astronomical and mathematical practices in the seventeenth and eighteenth centuries. Collectanea are collections of books compiled for a particular purpose or purposes. They can gather texts concerning a certain subject matter, or texts of a certain genre, or of a local tradition of literature. The books collected in collectanea do not have to bear any relation to each other. Collectanea work like a functional aggregation; when put together the texts they include acquire an ostensive significance. The compilers of collectanea impose a relationship on the books collected, and thus imbue the collectanea with a structure and meaning. Each work within a collectanea, however, has a life of its own and can be circulated separately. The collectanea thus functions as an archive that is something more than the sum of the works it contains.

This paper will illuminate how the compilation process of the *Calendrical Treatises of the Chongzhen Reign* and its variants bear the mark of struggle among interested social groups which attempted to stabilize the meaning of a body of knowledge by bestowing on it a corporeal format, thereby inscribing meaning on the materiality of these books. The existence and meaning of an archive is thus deeply entangled with human affairs. Moreover, this archive also served as an interface through which various social groups interacted with each other.[3] Without its existence, such a power struggle among different groups regarding calendrical studies in the seventeenth and eighteenth centuries would be unimaginable. This exercise will help us not only understand the political process centering around the compilation of the *Calendrical Treatises of the Chongzhen Reign* but also contribute to our understanding of the nature of the archive as a material object.

Creating the Archive: The Making of the *Calendrical Treatises of the Chongzhen Reign*

The *Calendrical Treatises of the Chongzhen Reign* came into existence when both the mandate of the Ming and its calendar were at stake. The precision of the calendar was a symbol of legitimacy in traditional China. Since the middle of the fifteenth century, the Ming emperors and their subjects had long noticed mismatches between the calendar and celestial phenomena. There were several futile attempts to reform the calendar.[4] Court astronomers, most of whom held hereditary positions, were incapable of manipulating the complicated calculating techniques bequeathed by their predecessors. Political upheavals further hindered the efforts of calendar reforms. This circumstance offered the newly arrived Jesuits an opportunity to establish a foothold at court and expand their religious influences via science.[5]

Through the assistance of their patrons, the Jesuits launched their first calendar reform in 1610 but were soon interrupted by the anti-Christian movement of 1616. The newly enthroned Chongzhen emperor decided to make another try when the court astronomers' prediction missed a solar eclipse in 1629. By then, famines, plagues, bandits, and the Manchu were eroding the Ming's mandate. Chongzhen assigned Xu Guangqi (1562-1633), one of the pillars of the church in the late Ming, to undertake this task. Xu soon organized a team to translate Western astronomy and mathematics with the belief that they would be integrated into the Chinese astronomical and mathematical tradition.[6] The fruit of their labor was the *Calendrical Treatises of the Chongzhen Reign*, which Xu Guangqi and his successor Li Tianjing (1579-1659) submitted to the throne between 1629 and 1634. The submission included 44 books in 135 chapters (*juan*), as well as two star maps. Li Tianjing later reorganized these translated materials and had them published.[7]

We do not know the exact date of the publication of the *Calendrical Treatises of the Chongzhen Reign*. The work survives only in fragments in various libraries today, such as the oriental manuscripts section of the Bibliothèque Nationale de France, the Palace Museum in Mainland China, and the Fu Ssu-nien library at the Academia Sinica in Taiwan. The Kyujanggak library of Seoul National University also possesses a fragment of this collectanea which mixes texts from *Calendrical Treatises in Accordance with the New Western Methods*.[8] The French collection is a good example to demonstrate the artificial nature of an archive. In the library catalogue, the *Calendrical Treatises of the Chongzhen Reign*, which no doubt possesses a unified identity as a single collectanea in Chinese classification, is reclassified according to the contents of each individual title. This is probably helpful for the users of the library but obscures its original organizing principle.

The French version of the *Calendrical Treatises of the Chongzhen Reign* bears the name of the carver of the woodblocks Li Zaizhen of Nanjing who also carved the woodblocks of the *First Collectanea of Heavenly Learning* (*Tianxue chuhan*) in 1612.[9] The *First Collectanea of Heavenly Learning* was the most important collectanea produced by the Christian community in the late Ming to spread Christianity and Western science. The fact that Li carved the woodblocks of these two most important collectanea indicates that Christian publishing probably was quite well-organized.

On the front-page of these fragments of the *Calendrical Treatises of the Chongzhen Reign*, the division of labor in compilation is clearly demonstrated by the wording written on it. (Fig. 1 & 2) The first, or second, line of the front-page of each *juan* of a certain title in the collection begins with the official title of Xu Guangqi, sometimes together with Li Tianjing, the two main

officials in charge of the project. The imperial nature of the project is clearly indicated by the terms *qinchai* (imperially commissioned) or *qinming* (imperially ordered). As the highest-ranking officials of the team, they supervised (*duxiu*) the project. The Jesuits transmitted methods (*shoufa*), established methods (*lifa*), authored texts (*zhuan*), corrected texts (*ding*), or proof-read texts (*yue*). In addition to these main actors, many "invisible technicians" also worked for the project,[10] namely the missionaries' Chinese assistants who were either officials in the Astronomical Bureau (*Qintianjian*) or literati recruited from Chinese society. They performed various functions such as polishing the translated texts (*run* or *xiurun*), performing calculations (*suan*) or recalculations (*fusuan*), drawing plates (*huitu*), doing measurements (*ce*), collating and publishing (*jiaozi*) texts. The official titles attached to each name ranked these actors in the bureaucratic system. All of them served under imperial auspices. The *Calendrical Treatises of the Chongzhen Reign* thus is an archive produced under a bureaucratic network. The bureaucrats working in the project are responsible for their division of labor and are rewarded or punished accordingly.

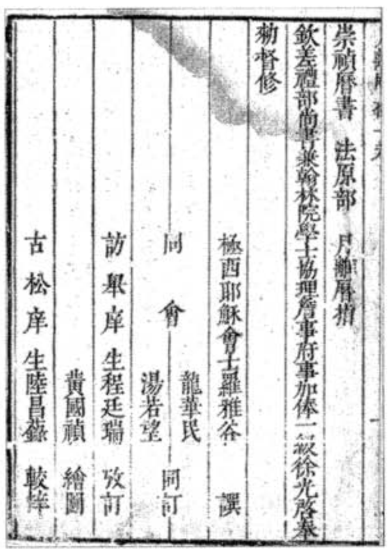
It is important to acknowledge this bureaucratic nature of the *Calendrical Treatises of the Chongzhen Reign*. The Astronomical Bureau during the Chongzhen reign was very complicated. Xu Guangqi and his associates were not the only team to reform the calendar. In addition to the *Datong* (Grand Unity) section which was responsible for producing the yearly calendar, a Muslim section had existed since the early Ming. The Muslim calendar probably functioned as a comparison and collation for the *Datong* calendar. Another newly formed section led by Wei Wenkui, who had modified the model of the *Datong* calendar and was particularly hostile to Western astronomy, also challenged the legitimacy and efficacy of the Western section (*xiju*) led by Xu and Li.[11]

In such a competitive environment, Xu Guangqi had to make extra efforts to sustain the existence of the *Calendrical Treatises of the Chongzhen Reign*. Xu often engaged Wei Wenkui in astronomical debates. From surviving records, Xu seems to have gained the upper hand because he possessed new astronomical tables the Jesuits had transmitted and new calculation tools such as trigonometrical tables. He also prevented astronomers from other sections from gaining access to his secret weapons. Xu's previous wish that Chinese and Western traditions of astronomy would someday be integrated had now become merely rhetoric once the battle among different sections began. After the importation of Western astronomical tables and instruments, Xu quickly realized that integration was difficult if not impossible and urged the astronomers in the Bureau to convert to the Western astronomical system.[12]

After the drafts were finished, Li Tianjing applied for state funds to meet the necessary expenses of creating the *Calendrical Treatises of the Chongzhen Reign*.[13] As a result, each individual in the Western section was held accountable for the work he had done, and the division of labor was laid out on the front-page of the *Calendrical Treatises of the Chongzhen Reign*. To persuade the emperor that his section was indeed better than its rivals, Xu Guangqi and Li Tianjing made new instruments and performed several astronomical predictions to demonstrate the precision of the calendar they had produced. In other words, Xu did not win his battle by relying on the emperor's favor. In the bureaucratic system, Xu had to demonstrate his strength, and the emperor had to appear impartial. Nevertheless, Xu invested Western scientific knowledge with additional functions, claiming that it could also help to build a strong state financially and militarily.[14] He demonstrated the utility of Western scientific knowledge by making cannons and by launching mining operations.[15] This must have been very persuasive for the emperor as the empire was being assaulted by all sorts of enemies from every corner. The existence of the *Calendrical Treatises of the Chongzhen Reign* was largely due to the success of Xu Guangqi's "heterogeneous engineering" in creating such a supporting network.[16]


崇禎曆書

Figure 1. The title-page of the *Calendrical Treatises of the Chongzhen Reign* (courtesy of the Fu Ssu-nien Library)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勅督修
極西耶穌會士羅雅谷 譔
同會 龍華民 湯若望 同訂
訪舉庠生程廷瑞 攷訂
黃國禎 繪圖
古松庠生陸昌龢 較梓

Figure 2. The front-page of the *Calendrical Treatises of the Chongzhen Reign* (courtesy of the Fu Ssu-nien Library)

Renovating the Archive: *Xiyang xinfa lishu*

The Jesuits and their Chinese supporters finished translating and compiling the drafts of the *Calendrical Treatises of the Chongzhen Reign* in 1634, but the Chongzhen emperor did not proclaim the adoption of the Western methods until 1643. The first edition of the *Calendrical Treatises of the Chongzhen Reign* was published in between. The reason for this delay is not entirely clear. In any case, before the new calendar was issued, the Manchus captured Beijing in 1644 and the new calendar thus paved the way for the legitimacy of the Qing. Once the Ming were overthrown, Adam Schall von Bell (1592-1666), then the most important official to continue the Jesuit engagement on behalf of Western astronomy and religion at the imperial court, tried to save his church by immediately dedicating the calendar to the Manchu rulers. So did other officials who espoused different astronomical traditions in the Astronomical Bureau. It took Schall only two months to defeat his competitors. The Board of Rites suggested that the new regime continue the Chongzhen emperor's unfulfilled policy and adopt the calendar Schall had made. The new Manchu emperor, in desperate need of a new calendar, adopted Schall's calendar and bestowed on it a new name to celebrate his mandate.[17] Though Schall easily won this battle, the competition that he faced did not attenuate,[18] as his enemies remained in the Astronomical Bureau.

After establishing the Jesuit-made calendar and securing official posts for the missionaries and their Chinese converts in the Astronomical Bureau, Schall recompiled the *Calendrical Treatises of the Chongzhen Reign* and reissued it in 1646 under the title *Calendrical Treatises in Accordance with the New Western Methods* (*Xiyang xinfa lishu*) to enhance the status of Western astronomy. Schall carried out this task promptly because the woodblocks of the *Calendrical Treatises of the Chongzhen Reign* had been housed right in his church. Since there is no extant complete set of the *Calendrical Treatises of the Chongzhen Reign*, it is hard to tell how Schall recompiled the *Calendrical Treatises in Accordance with the New Western Methods* aside from adding some new treatises. However, the scope of revision was probably limited judging from the fact that Schall mainly relied on the woodblocks that had been left in his church.[19] When the new collectanea was ready, Schall donated his stipend to publish thirteen sets which were used to educate the officials in the Astronomical Bureau.[20]

Schall issued the *Calendrical Treatises in Accordance with the New Western Methods* in an attempt to glorify European astronomy. The compilation process revealed his intentions.[21] The message of changing the

title is unmistakable. Schall presented the calendrical knowledge from the West as utterly new and something that could only be produced in the West, while the compilers of the *Calendrical Treatises of the Chongzhen Reign* had attempted to represent it as compatible with the Chinese calendrical tradition.[22] As Schall confessed in the late Ming:

> The word *xi* (Western) is very unpopular (among the Chinese), and the emperor in his edicts never uses any word (to describe the calendar) other than *xin* (new). In fact, the former word is employed only by those who wish to deprecate us.[23]

After the dynastic change, the calendar came to be legitimately referred to by the word *xi*, and the newly established Qing calendar thus bore the characters "*yi xiyang xinfa*" (according to the new methods from the West) on its cover. Schall implied that only Christian civilization could have produced such superior calendrical knowledge, and he instrumentalized his astronomical knowledge to bring the Manchu rulers' attention to the superiority of his religious beliefs.

Schall added new elements to his collectanea to transform its significance, turning the *Calendrical Treatises in Accordance with the New Western Methods* into a new object. At the beginning, he published the memorials he had presented to the throne in the first two years of the Shunzhi reign. The contents of these memorials vividly recounted Schall's path to success in a kind of "eye-witness" reports. In them, he claimed that he had won this bitter war over the Chinese and the Muslims not by luck but by precisely predicting the celestial phenomena. During both the late Ming and the early Qing, Schall and his predecessors were called upon time and again to demonstrate the accuracy of their methods, and they always defeated their competitors. In his memorials, Schall attacked both the Chinese and Muslim calendars, pointing out their "errors." Some of these were caused by different astronomical definitions. In addition, Schall accused those who espoused the "old" Chinese methods of being stubborn and lazy and suggested examining members of the Astronomical Bureau for their knowledge of the Western methods so as to screen those who were not qualified to stay in their positions. By contrast, he protected his adherents and requested rewards for them.[24] Although Schall's cohorts did not replace all officials, Schall firmly controlled the Astronomy Bureau.

In his memorials, Schall represented all the institutional changes he initiated as disinterested loyalty to the empire. Owing to his vows as a priest, he initially had to decline an official post in the Astronomical Bureau, but he took advantage of this situation by fashioning himself as a disinterested priest of the Dao. Eventually, with the authorization from the Church he accepted an

office.[25] Schall thus monopolized both symbolic and material interests in his struggle to success and his memorials related the story of his loyal and disinterested behavior to the readers.

Schall also added Xu Guangqi's memorials to the Chongzhen emperor regarding the calendrical reform to the *Calendrical Treatises in Accordance with the New Western Methods*. Moreover, he provided the background of how the Western astronomy entered the court, created new instruments, and translated astronomical tables and books. In other words, Schall emphasized the labor that they had gone through. It was these efforts that had helped Xu Guangqi and Schall outrun their competitors. Four of Schall's short treatises, a comparison of the differences between the Chinese and Western methods, a description of the astronomical traditions of the West, a general introduction to Western astronomy and a discussion of the characteristics of the Western astronomy, followed Xu's memorials. They presented Schall as the master propagator of the new knowledge.

The target audience of the *Calendrical Treatises in Accordance with the New Western Methods* was not limited to official astronomers: Schall also attempted to educate the emperor. Schall separately bound three of the four treatises that he had added to the *Calendrical Treatises in Accordance with the New Western Methods* into two volumes, entitled them as *Simplified Calendrical Treatises* (*Jianyao lishu*), and presented them to the throne in 1656, hoping that the emperor would have an opportunity to read them during his leisure time. Schall further requested that this work be sent to the Archive of Dynastic History so that differences among various calendrical methods would be eliminated. The Shunzhi emperor granted his request. In 1657, Schall made a vehement attack on the Muslim calendar kept at court, thereby kindling the struggle between Schall and Muslim astronomers in the late years of the Shunzhi reign.[26]

Technical treatises constituted the remaining contents of the *Calendrical Treatises in Accordance with the New Western Methods*, which were taken over from the *Calendrical Treatises of the Chongzhen Reign* with few additions. The most dramatic change was the format of the front-page in each *juan* of these technical sections. First the character "Ming" was added on top of Xu Guangqi's official title to indicate that Xu had supervised the production of these texts during the previous dynasty, which had already become history. The "real" authors were the Jesuits. The names of the Chinese officials who had taken part in compiling the *Calendrical Treatises of the Chongzhen Reign* were now all prefixed with the title of "disciple" (*menren*), implying that they had merely received the methods (*shoufa*) from the Jesuits. (Fig. 3-4) Thereby Schall effaced the complicated and delicate division of

labor through which the *Calendrical Treatises of the Chongzhen Reign* had come into being. In the Ming, the officials had been bureaucrats of the state; now they became Schall's personal team, and many of them were converts to Catholicism. The names of these "disciples" were not necessarily the same as those "invisible technicians" listed on the corresponding front-page in the *Calendrical Treatises of the Chongzhen Reign.* In addition to updating the information in the list, Schall sometimes replaced the name of a Ming official with the name of a Christian convert in his Bureau.

The different renderings of the front pages of these two astronomical collectanea are meaningful. Many officials involved in compiling the *Calendrical Treatises of the Chongzhen Reign* were Chinese Christians; what time they could spare from their bureaucratic duties they devoted to helping Jesuits write Christian treatises. The boundaries between religion and science were strictly observed when they served the empire.[27] Schall, however, blurred the difference, practicing astronomy in the name of his religious cause. Ultimately one might say that he succeeded in transforming the Astronomical Bureau into a church where the officials took on the identities of Christians and subjugated themselves to his religious authority. He was the high priest of both science and religion.

Figure 3. The title-page of the *Calendrical Treatises in Accordance with the New Western Methods*

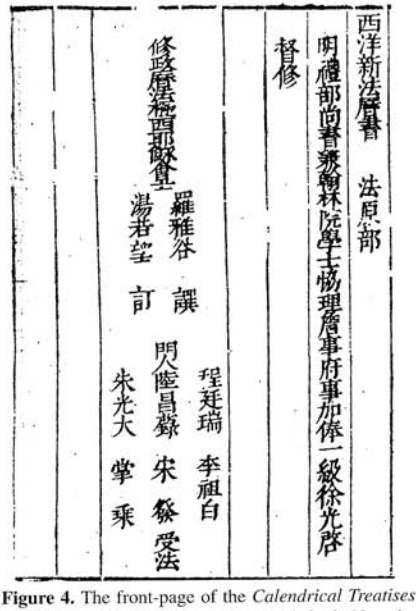


Figure 4. The front-page of the *Calendrical Treatises in Accordance with the New Western Methods.* Note the changes of the titles of the functionaries.

The compilation of *Calendrical Treatises in Accordance with the New Western Methods* witnessed changes in the symbolic significance of the calendar and the realignment of the institution. It seems that the calendrical knowledge now evaded imperial control and was being turned into a product of Schall's own creation. Small wonder that it provoked the repugnance of the Chinese literati who claimed Schall had usurped imperial power in order to advance the interest of the Church, an act they interpreted as a sign of treason.

Relocating the Archive: *Calendrical Treatises in Accordance with the New Methods* (*Xinfa lishu*)

Treason was indeed the "crime" a Chinese literatus named Yang Guangxian (1597-1669) charged Adam Schall with in 1664. Yang argued that the "accordance with the new Western methods" written on the cover of the calendar had represented the Qing as subservient to the Pope's authority. He further accused the Jesuits of fashioning themselves as calendar experts to cover up their treacherous attempts at collecting converts and subverting the empire. The four missionaries in Beijing as well as converted Chinese astronomers in the Astronomical Bureau were at one point sentenced to die for the crime. They were later released thanks to a strong earthquake that hit the eastern part of China immediately before their execution date. Still five Chinese converted astronomers lost their lives because they were the "real" traitors who had obeyed the commands of a foreign religion. Later the missionaries were to come back to the stage due to Yang Guangxian's lack of knowledge about astronomy, defeating Yang successfully in a series of competitive astronomical predictions in 1669. After that time, the calendrical techniques transmitted by the missionaries replaced the Chinese astronomical tradition.[28]

Taking the place of the deceased Adam Schall, Ferdinand Verbiest (Nan Huairen, 1623-1688) restored Western astronomy at the Qing court. In 1699, he wrote *I Cannot Restrain Myself from Rebutting* (*Budeyi bian*) in 1699 to refute Yang Guangxian's arguments. Verbiest argued that the methods Yang advocated were identical to those used by the previous dynasty, whereas the missionaries' new methods had passed several tests of predicting celestial phenomena, and the Shunzhi emperor had endorsed them as the methods best fitted to the new dynasty.[29] While associating Western knowledge with imperial power, Verbiest was more cautious in wording than Schall had been. Instead of using the word *xi* (Western), he used the word *xin* (new) to refer to European astronomy. In his appeals to the emperor, he downplayed the fact that the astronomical knowledge the missionaries employed came from the

West and re-described it as only new methods that, because of their efficacy, should replace the old ones.

Under Verbiest's new, defensive strategy, the *Calendrical Treatises in Accordance with the New Western Methods* was reissued with *xiyang* expunged.[30] The functions and contents of this collectanea remained the same, but Western methods were merely presented as new methods, a move with which the young emperor Kangxi would also agree. Kangxi had received instruction in astronomy and mathematics from Verbiest in his youth and believed in the superiority of the Western astronomy.[31] He even exhorted his offspring to heed the importance of the calendar because, when Yang Guangxian's case had troubled him, the courtiers, who knew next to nothing about calendrics, had been unable to assist him.[32] He was, however, cautious about the symbolic implications of the two characters as *xiyang* (Western) written on the cover of the calendar and held the missionaries more in check than Shunzhi had done. The new fashioning of the book *Calendrical Treatises in Accordance with the New Methods* (*Xinfa lishu*) thus compromised the missionaries' attempt to demonstrate the superiority of their religion through the greater efficacy of their calendar. Verbiest yielded to the emperor's will, turning himself into one of the imperial bureaucrats. The missionaries' role as the transmitters of the Gospel of God concurrently dwindled.

The *Calendrical Treatises in Accordance with the New Western Methods* was published twice during the Shunzhi reign. The advantage of woodblock printing is that a book can be reprinted in the same format whenever necessary, but information on the exact number of copies made is unavailable unless the printers specify it. The first edition of the *Calendrical Treatises in Accordance with the New Western Methods* has been republished recently. It contains only two *juan* of Schall's memorials presented from 1644 to 1646. In addition to the Shunzhi editions of the *Calendrical Treatises in Accordance with the New Western Methods*, there are so-called Kangxi editions that include four *juan* of Schall's memorials from 1644 to 1660. Schall's honorific title *tongxuan jiaoshi* (Master of Comprehending Subtlety) is changed to *tongwei jiaoshi* to heed the taboo on Kangxi's personal name. I suspect that these so-called Kangxi editions of the *Calendrical Treatises in Accordance with the New Western Methods* were actually Verbiest's *Calendrical Treatises in Accordance with the New Methods* published no earlier than 1669. Schall had been under severe attacks by the Muslim astronomers and Yang Guangxian by the end of the Shunzhi reign, and he had lost his battle to Yang in 1664. It seems impossible for him to have the *Calendrical Treatises in Accordance with the New Western Methods* republished again in the early years of the Kangxi reign. But Verbiest's way of handling the publication of

the *Calendrical Treatises in Accordance with the New Methods* is probably the main reason why many libraries have wrongly catalogued this entry.

I have found two versions of the *Calendrical Treatises in Accordance with the New Methods* wrongly catalogued as the *Calendrical Treatises in Accordance with the New Western Methods*. The front-page of most technical texts of the *Calendrical Treatises in Accordance with the New Western Methods* in the Palace Museum in Taipei and in Fu Ssu-nien libraries clearly bear these characters "*Xinfa lishu*" as the title for the collectanea. (Fig. 5) However, once one turns the front-page, the format of the texts is the same as that of the *Calendrical Treatises in Accordance with the New Western Methods*. Moreover, the first line of these texts actually read "*Calendrical Treatises in Accordance with the New Western Methods.*" In other words, when Verbiest reissued Schall's collectanea under the new title of *Calendrical Treatises in Accordance with the New Methods*, he merely changed the woodblocks of the front-page. This is far from uncommon in Chinese printing. For unknown reasons, in the copies I could see, one or two technical texts had kept the title of "*Calendrical Treatises in Accordance with the New Western Methods.*"

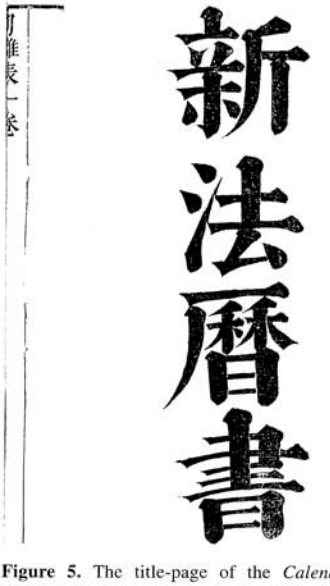


Figure 5. The title-page of the *Calendrical Treatises in Accordance with the New Methods* (courtesy of the Palace Museum, Taipei)

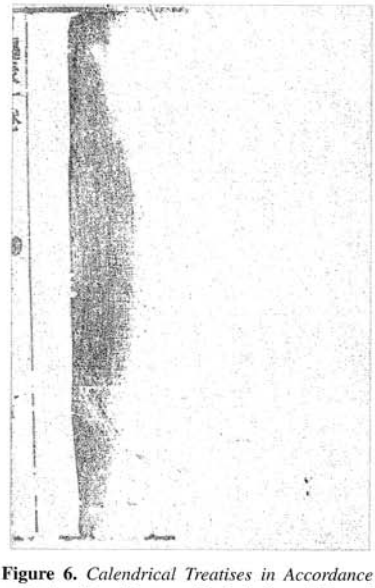


Figure 6. *Calendrical Treatises in Accordance with the New Western Methods* from Zikawei with the title expunged to erase the implication that the calendar had been imported from the west (courtesy of the Fu Ssu-nien Library)

There is another incomplete set of the so-called Kangxi edition of the *Calendrical Treatises in Accordance with the New Western Methods* once kept in Zikawei library, and now stored in the Fu Ssu-nien library. Its format is the same as the other copy of the *Calendrical Treatises in Accordance with the New Methods* stored in Fu Ssu-nien library, with the exception that the title on the front-page is expunged. (Fig. 6) Understandably, it was catalogued as *Calendrical Treatises in Accordance with the New Western Methods.* It seems that Verbiest only renamed the work grudgingly under bureaucratic pressure. He probably saw no alternative if he was to continue his religious enterprise.

The Weight of the Archive: Dissemination of the *Calendrical Treatises of the Chongzhen Reign* and Its Variants

The *Calendrical Treatises of the Chongzhen Reign* and its variants in the Qing spread rapidly, but usually not in the form of an entire set. The richness of Western mathematical and astronomical texts accounted for the main reason why so many Chinese astronomers were attracted to Western astronomy. Xu Xuchen who prefaced Giulio Aleni's (1582-1649) two works, adopted Adam Schall's star maps to compose his own work entitled the *Maps of the Earth and Heaven* (*Gaizai tuxian*).[33] Qin Wenyuan used astronomical techniques in the *Calendrical Treatises in Accordance with the New Methods* for his own *Mr. Qin's Complete Works on the Seven Planets* (*Qinshi qizheng quanshu*).[34] Hu Dan admitted that he consulted the *Calendrical Treatises in Accordance with the New Western Methods* when he composed his *Tables of Twenty-eight Constellations* (*Zhongxingpu*) in 1669.[35] Both Mei Wending (1633-1721) and Zhuang Hengyang cited *Calendrical Treatises in Accordance with the New Methods* in their works.[36] In 1710, Jiang Yong (1681-1762) gained access to the *Calendrical Treatises of the Chongzhen Reign* in Nanjing and improved the quality of his astronomical research dramatically under its influence.[37] Mei Wending and Jiang Yong were two of the most important Chinese astronomers of this day.[38] The others were not as famous but they all attempted to make new Western science available for other scholars. The *Calendrical Treatises of the Chongzhen Reign* and its variants were no doubt the most important sources for these astronomical experts to work with during the seventeenth and eighteenth centuries.

The missionaries had created a corpus of astronomical texts, an archive whose material existence compelled anyone who during the seventeenth and eighteenth centuries attempted to defeat Western astronomy to draw information from it. For instance, in his preface to Du Zhigeng's *Introduction to Geometry* (*Jihe lunyue*), Wu Xuehao suspected that there must have existed

an ancient Chinese geometrical tradition, which probably could no longer be restored. Wu claimed that his Chinese contemporaries could gain access to geometry only now thanks to Xu Guangqi's translation of Euclid's *Elements*. However, the *Elements* was a difficult text and Du's *Introduction to Geometry* simplified it so that the *Elements* would be more easily accessible to scholars.[39] Lacking enough textual resources in their own mathematical and astronomical traditions, most Chinese mathematicians and astronomers adapted, reduced and spread the new knowledge from the West during the seventeenth century. The works of You Yi and Jie Xuan followed the same trend.[40] In this sense, the *Calendrical Treatises of the Chongzhen Reign* and its variants as archives of Western calendrical studies connected not only the network of the missionaries and their followers in the Astronomical Bureau, but also the Chinese astronomers who applied these resources to their studies.[41] An archive, though embedded within a social network, became one of the nodes holding the whole network together through its richness and availability.

In the second half of the seventeenth century, the Western methods had actually gained the upper hand in the competition between the Western and Chinese astronomical systems partly due to the richness of materials available, a factor often overlooked by modern scholars. Nevertheless, stalwarts of the Chinese methods like Yang Guangxian and Zhang Yongjing remained confident that they could defeat the Western methods, resorting to what was left of the Chinese astronomical tradition. These resources were largely from the monographs of the calendar or astronomy in *Dynastic Histories* and the astronomical sections of *leishu* (encyclopedia).[42] Their failure exposed the internal crisis of transmission of the indigenous calendrical methods. Not only were the texts of the ancient calendrical methods sparse, but they also contained errors. The textual advantages of the Western methods thus tilted the balance of the competition between Western and Chinese calendars.

The *Comprehensive Collection of the Four Treasuries* and the Fate of the *Calendrical Treatises of the Chongzhen Reign*

While scholar-astronomers were attracted to the *Calendrical Treatises of the Chongzhen Reign* and its variants for whatever purpose, they were worried about the religious implications appended to the Western astronomy. Western science was closely associated with Christianity in Chinese readers' minds. Although most of them admitted that the Western methods were indeed superior, they denied that the origin of calendrical learning was in the West.

Moreover, the Jesuits had altered the rules of setting up the intercalary month, which even an open-minded Chinese astronomer like Mei Wending could not tolerate.[43] This changed thousands of years of practice, Mei argued, and would destroy the methods of setting up the orthodox calendar (*zhengshuo*) bequeathed by the ancient sages. Scholar-astronomers yearned to revive the Chinese indigenous tradition, but the materials available to them were relatively few. Mei, however, also understood that the restoration of the Chinese calendrical tradition would have to rely on building a "counter-archive." Collecting and collating ancient texts was a crucial first step. However, Mei's wish to build a "counter-archive" could hardly be realized until the *Comprehensive Collection of the Four Treasuries* (*Siku quanshu*) project took shape in 1773 when a large stock of texts became available to Chinese scholar-officials.

Scholar-astronomers were not the only group that heeded the significance of the calendar. Kangxi, whom the Jesuits had instructed on calendrical matters, often employed European science to assert his superiority as a Manchu emperor to his Han Chinese ministers.[44] He did not doubt the superiority of European science but was cautious, and had new missionaries from other countries check the work done by the missionaries at the Astronomical Bureau. Whenever there was a discrepancy, he immediately ordered the missionaries to update their astronomical knowledge, tables and instruments. After the Rites Controversy erupted in 1705, Kangxi grew suspicious of the loyalty of the missionaries. In 1713, Kangxi set up a special Academy of Mathematics (*suanxueguan*) specifically to work on a global encyclopedia which would include mathematics, astronomy and regulation of musical pitch-pipes.[45] Chinese astronomers cooperated with the Jesuits to work on this project, which updated astronomical and mathematical knowledge since the publication of the *Calendrical Treatises of the Chongzhen Reign*. Although later scholars praised Kangxi for this enterprise, the contents of these encyclopedias remained largely the knowledge transmitted from the West. This was not a "counter-archive," but a renewed archive. Nevertheless, one of the main moves made in the encyclopedia was to shift the historical origin of calendrical studies back to China. Chinese astronomers now needed more texts to prove their ideological claims of origin and revived the study of their own traditions. The *Comprehensive Collection of the Four Treasuries* project provided this opportunity.

The *Comprehensive Collection of the Four Treasuries* was the largest collectanea before the twentieth century. It contained 3461 titles, divided into 79,309 *juan*, and mobilized more than 3000 personnel, including scholars and copiers, to work on the project. The Qianlong emperor (1711-1799)

commissioned this project to enhance his personal glory and the prestige of the empire, and to censor anti-Manchu opinion.[46] This project marked the beginning of a large-scale empire-wide search for texts. In addition to purchasing books from private collectors, the project also made an effort to recover books from the *Grand Compendium of the Yongle Emperor* (*Yongle dadian*), the unpublished Ming imperial encyclopedia, housed at court.

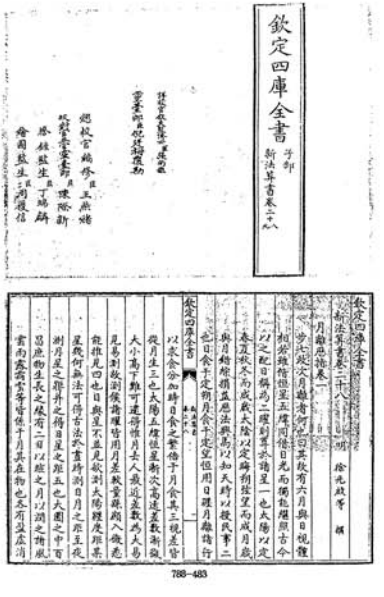
Finished in 1408, the *Grand Compendium of the Yongle Emperor* was the largest encyclopedia in imperial times. Unlike collectanea, a Chinese encyclopedia extracted entries from individual books and recomposed them according to a certain schema, such as the cosmic framework of Heaven, Earth and Man. Readers would be able to gain access to all sorts of information by searching a certain topic in the catalogue. Early encyclopedias were often for the consultation of emperors and officials. In the late Ming, encyclopedias became popular and were often consulted by literati for daily conversations and entertainment.[47]

Only literati with phonological knowledge could extract the archived knowledge stored in the *Grand Compendium of the Yongle Emperor*. Unlike a common encyclopedia, the *Grand Compendium of the Yongle Emperor* classified knowledge into categories according to the keyword in the title of either a book or part of a book, and assigned each character under a certain rhyme according to the *Hongwu Rhyme Book* (*Hongwu zhengyun*) to index the subject matter. For instance, the mathematical texts, whose titles often included the *suan* (calculate) character, were collected under the *suan* character which was classified under the *han* rhyme.

A large portion of the *Grand Compendium of the Yongle Emperor* had been lost when the *Comprehensive Collection of the Four Treasuries* project began. Nevertheless, the *Grand Compendium of the Yongle Emperor* became the repository of the search for lost knowledge and resulted in the creation of new scientific objects. Dai Zhen (1723-1777), who was responsible for recomposing seven fragments of mathematical texts from the *Grand Compendium of the Yongle Emperor*, was celebrated as a cultural hero of the day.[48] He seemed to employ the Tang (618-907) concept of the "ten classics," which had been used in the past to test the official astronomers and which he aimed at restoring. Note that the texts he endeavored to recover had all been composed before the Song (*i.e.* 960). Small wonder that Kong Jihan (1739-1783), a disciple of Dai Zhen, published these seven texts together with three others and bestowed them the name "*Ten Classics of Mathematics*," (*Suanjing shishu*) as if they were a revival of the ten mathematical classics in the Tang.

Once the lost ancient Chinese methods were revived, the status of the methods transmitted from Europe had to be reevaluated. The *Calendrical*

Treatises in Accordance with the New Methods, which had influenced the generation of astronomers and mathematicians between the mid-seventeenth and mid-eighteenth centuries, was reissued again under the name of *Xinfa suanshu* (*Computational Treatises in Accordance with the New Methods*) to avoid the character "*li* (calendrical)" in the Qianlong emperor's name. It kept the original size of 100 *juan* designed by Schall but its format changed. (Fig. 7) The front-page naming the personnel involved in the project disappeared. Only "Compiled by Ming Xu Guangqi *et al.*" was printed on the page at the beginning of each *juan*. The authorship of the missionaries who composed these texts was ignored, and the names of the invisible technicians, who were once turned into disciples of the missionaries in the *Calendrical Treatises in Accordance with the New Western Methods*, were now expunged. Adam Schall's memorials, which had appeared at the beginning of the *Calendrical Treatises in Accordance with the New Western Methods* to document how the Western methods had come to reign supreme, were replaced by the original memorials of Xu Guangqi and Li Tianjing, which had appeared in a different order in the *Calendrical Treatises in Accordance with the New Western Methods*. The function of Xu's and Li's memorials was also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788-483

Figure 7. *The Computational Treatises in Accordance with the New Western Methods* in the *Siku Quanshu* .

changed. They were now only part of the historical narrative about how the new calendar had been introduced to the Ming, which had not adopted it, and thus paved the way for the mandate of the Qing.[49]

In the *Comprehensive Collection of the Four Treasuries*, the *Computational Treatises in Accordance with the New Methods* is only part of an even bigger collectanea – an archive within an archive. Its significance was also realigned. The compilers of the *Synopsis* state:

> The new calendar proved to correspond closely to Heaven and its methods reveal the essence of European calendrical learning. The courtiers of the Ming were confined by the methods of their own schools....They had known that the new methods were more precise but did not put them into practice. Not until our August Dynasty rose and adopted these books were the (Europeans) able to serve in positions as court astronomers. Is this not a blessing of Heaven?... Our Shengzu emperor (Kangxi)...commissioned the *Essentials of Mathematical Principles* (*Shuli jingyun*) and *Investigations into Calendrical Studies* (*Lixiang kaocheng*) and advanced the learning... The precision of (our) calendar sets the model for ten thousand years to come. Such accomplishments simply could not be achieved by [Xu] Guangqi and his associates. However, [*Computational Treatises in Accordance with the New Methods*] commences the changes of the calendar. We therefore preserve it so that whoever discusses the beginning of the [transmission of] Western methods can consult them.[50]

Through the *Synopsis*, Kangxi's imperially commissioned mathematical and astronomical collectanea gradually became the center around which other texts would aggregate and acquire their significance. The *Synopsis* of the *Investigations into Calendrical Studies* further praises the achievements made by Kangxi's collectanea and marginalizes the significance of the *Computational Treatises in Accordance with the New Methods*:

> The ancient methods of calendar making did not leave any trace for investigation. What can be explored are the calendars left from the Han *Taichu* calendar to the *Datong* calendar of the Ming. Since Matteo Ricci entered China, the precision of the calendar improved. The dispute over the calendar also rose....The culture of our August Dynasty spread worldwide and (more) countries from the extreme West came to pay their tributes. The Westerners' (calendrical) methods became even more precise but their new books and tables [imported during our August Dynasty] did not match the *Computational Treatises in Accordance with the New Methods*, which was originally produced in the Chongzhen reign. Moreover, when the *Computational Treatises in Accordance with the New Methods* was compiled, the Europeans kept their learning in secret, and their theories were too subtle to be comprehended. Our Sacred Ancestor and Benevolent Emperor (*i.e.* the Kangxi emperor) thus ordered his courtiers to investigate the origins of their methods and compiled this collectanea...which integrated the methods East and West and set up

> what should be followed between Heaven and Earth.....They correct many significant errors in the *Computational Treatises in Accordance with the New Methods*....They are indeed the creation of a great sage and nothing can exceed their boundaries even after ten thousand years.[51]

According to the officials of the *Comprehensive Collection of the Four Treasuries*, the *Investigations into Calendrical Studies* had replaced the *Computational Treatises in Accordance with the New Methods* and become the new yardstick for astronomers and mathematicians to follow. This collectanea largely updated the information of Western astronomy and improved its precision. The *Computational Treatises in Accordance with the New Methods,* once the reservoir of calendrical knowledge, and symbolizing the mandate of the Manchu empire, now only had historical value. The existence of the mathematical and astronomical archives shifted not only back to the bureaucratic network but also fell once again under the supervision of the emperor.

Conclusion: Give Me an Archive and I Will Rewrite History

This paper touches upon an issue that has rarely been explored in the history of Chinese astronomy in the seventeenth and eighteenth centuries, namely how the quantity of documents astronomers could work with impacted the balance of power between Chinese astronomers and Jesuits astronomers in China. Chinese scholar-astronomers during this period complained that they lacked sufficient materials to revive the indigenous tradition and so allowed the Jesuits to take advantage of the situation to master calendrical matters in China. The Jesuits began their enterprise of calendrical reform by building an archive of translated books in the early seventeenth century. The history of Chinese astronomy in the seventeenth and eighteenth centuries thus unfolded itself in the form of competitions in archive building.

The *Calendrical Treatises of the Chongzhen Reign* was the first archive built by the Jesuits and their associates. Its life history mirrored the transformation of calendrical studies during the seventeenth and eighteenth centuries. Once it was created, each agent attempted to include this archived knowledge and know-how in his network, substantiated its existence and appropriated it to achieve his goals. Whenever the *Calendrical Treatises of the Chongzhen Reign* shifted from the network in which it was embedded and traveled to another network through recompilation, its significance changed. The marks and traces left on the material shaping of the *Calendrical Treatises of the Chongzhen Reign* thus witnessed the vicissitudes of the human world.

When Li Tianjing published the *Calendrical Treatises of the Chongzhen Reign*, it was just like other papers produced in the bureaucratic system, dedicated to a single purpose, calendrical reform. The theories, techniques and tables for making calendars were the main contents. The intensive struggle within the Bureau was not revealed. The differences between the Chinese and Western methods were not mentioned, neither did the origins of calendrical studies occupy a significant position. Each official performed his function at a certain position and was responsible for his performance. Situated in this context, the *Calendrical Treatises of the Chongzhen Reign* was no more than a technical manual that a bureaucratic system had produced.

The *Calendrical Treatises of the Chongzhen Reign* changed its identity after the Qing conquest in 1644. To secure the existence of Western calendrical technology, Adam Schall reconfigured the meaning of the *Calendrical Treatises of the Chongzhen Reign* by changing the format of its front-page and quickly published it under the new title of the *Calendrical Treatises in Accordance with the New Western Methods*. He paid for the printing from his own pocket. Schall also revealed the fierce struggle within the Astronomical Bureau and appended his memorials related to the adoption of the Western methods in this new collectanea. These documents not only provided the background of Western calendrical studies but also narrated Schall's path to glory. It was a "Whiggish history" proper. In the due course, the origin and history of calendrical learning had become important issues as Schall emphasized the differences between Chinese and Western techniques in order to imply that only the Christian West could have produced them.

Xiyang (the West) was underscored in the title of the new collectanea. In addition, Schall rendered the Jesuits who had composed the *Calendrical Treatises of the Chongzhen Reign* the main authors of his new collectanea and he himself assumed the position of "mentor" to transmit his methods to the official astronomers who had been turned into his "disciples" in the front-page of the new collectanea. As Schall closely associated Christianity and calendrical studies from the West, he also transformed the Astronomical Bureau into a "church" where many astronomers in the Bureau had actually been converted. Schall thus relocated the *Calendrical Treatises in Accordance with the New Western Methods* in a new context and such a re-networking inscribed on the material form of this collectanea. The *Calendrical Treatises in Accordance with the New Western Methods* was more than an archive of technical knowledge. This technical archive transformed the identities of the agents, stimulated the fantasy of Western superiority, and contrived a link between Christianity and technical knowledge.

Yang Guangxian challenged the two characters "*xiyang*" presented on the calendar and caused the most severe crisis of the Church in China and of the Western calendrical studies in 1664. Although Verbiest finally overcame this tide of anti-Christian and anti-Western calendrical studies in 1669, Verbiest had to take "*xiyang*" off the title, downplay the origins of calendrical studies, and represent the calendar from the West as merely new methods. The struggle over the significance of the calendar again displayed itself through the physical appearance of the collectanea whose title was now changed to the *Calendrical Treatises in Accordance with the New Methods*.

During the seventeenth and eighteenth centuries, the Western calendrical studies spread quickly among interested Confucian literati who largely drew their information from the *Calendrical Treatises of the Chongzhen Reign* and its variants. Meanwhile, they were worried about the religious implications within the calendar. However, they were unable to build an archive of indigenous traditions due to the lack of documents. Searching for the lost tradition to confirm the origin of the calendrical studies had occupied the minds of these literati. However, their project of reviving indigenous traditions of calendrical studies did not materialize until the *Comprehensive Collection of the Four Treasuries* project took shape and a large amount of ancient texts housed in the court became available to them. Dai Zhen was championed as the cultural hero of this rediscovery. His recompilation and collation of mathematical and astronomical texts from the *Grand Compendium of the Yongle Emperor* in fact created new objects, the ancient scientific texts, but were presented as if he merely revived the already extant traditions. The astronomical and mathematical sections of the *Comprehensive Collection of the Four Treasuries* included these new texts, other imperially commissioned astronomical and mathematical encyclopedias created during the Kangxi reign, and the *Calendrical Treatises of the Chongzhen Reign* which was renamed as *Computational Treatises in Accordance with the New Methods*. Given the great amount of materials archived in the astronomical and mathematical sections of the *Comprehensive Collection of the Four Treasuries*, the significance of the *Computational Treatises in Accordance with the New Methods* greatly decreased and its identity changed. It was now assigned to the collective authorship of "Xu Guangqi *et al.* of the Ming", and Schall's memorials were expunged. In addition, the compilers of the synopses appended to each work in the *Comprehensive Collection of the Four Treasuries* consciously reconfigured the meaning of the *Computational Treatises in Accordance with the New Methods* as only possessing historical value, since its information was updated in the astronomical and mathematical encyclopedias that Kangxi had commissioned.

The astronomical and mathematical sections of the *Comprehensive Collection of the Four Treasuries* thus can be considered as a "counter-archive" to the *Calendrical Treatises of the Chongzhen Reign* and its variants. This archive enabled Confucian literati to combat European missionaries serving at court as astronomical experts on two fronts. On the ideological front, the assertion that Western learning originated in China was grounded in the physical presentation of the materials collected in the archive. On the front of actual research, Confucian literati interested in mathematics drew their information from the new archive and applied Western knowledge to execute their research of ancient wisdom and develop theory of equations.

The emperors, however, had to scrutinize confrontation between Confucian astronomers and European missionaries so that the dispute over the calendar would not cause a crisis of legitimacy of the empire. The astronomical and mathematical sections of the *Comprehensive Collection of the Four Treasuries* rendered the calendrical studies East and West, past and present centering around the few imperial astronomical and mathematical collectanea compiled during the Kangxi and Qianlong reigns. The Manchu emperors had attended to the precision and religious implications of the Western knowledge and strived to update it by organizing different compiling projects while sterilizing its religious implications by having court literati discourse upon it in the *Synopsis* of the *Comprehensive Collection of the Four Treasuries*. Through these various means, the archive "speaks," orchestrated by the emperors and executed by the Confucian literati. Without these vociferous materials in the archive, however, these historical agents, the missionaries, the Confucian literati, and the Manchu emperors, would remain silent.

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Notes

1. Jacques Derrida, Eric Prenowitz, trans., *Archive Fever* (Chicago: University of Chicago Press, 1995), p. 1-5.
2. Lorraine Daston ed., "Introduction," *Biographies of Scientific Objects* (Chicago and London: Chicago University Press, 2000), p. 12-14.

3. Lorraine Daston ed., "Introduction," *Things That Talk* (New York: Zone Books, 2004), p. 9-23.
4. Willard Peterson, "Calendar Reform Prior to the Arrival of Missionaries at the Ming Court," *Ming Studies* 21 (1986): 43-61.
5. Pingyi Chu, "Le Prime Reazioni All'astronomia Occidentale," in *Storia della Scienza* (Rome: Instituto della Enciclopedia Italiana, 2001), p. 490-493.
6. Keizo Hashimoto and Catherine Jami, "From the *Elements* to Calendar Reform: Xu Guangqi's Shaping of Mathematics and Astronomy," in Catherine Jami, Gregory Blue, and Peter M. Engelfriet eds., *Statecraft and Intellectual Renewal in Late Ming China: The Cross-Cultural Synthesis of Xu Guangqi (1562-1633)* (Leiden; Boston: Brill, 2001), p. 263-310.
7. Pan Nai has nicely studied the fragments of the *Calendrical Treatises of the Chongzhen Reign* and its variants in the Early Qing. He also notices the changes of format, though he does not elaborate on the implications of these changes. See: Pan Nai, "*Xiyang xifa lishu tiyao*," in Bo Shuren (*et al.*) eds., *Zhongguo kexue jishu dianji tonghui: tianwen juan* (Zhengzhou: Henan jiaoyu chubanshe, 1993) vol. 8, p. 643-50. This version of restored *Calendrical Treatises in Accordance with the Western New Methods*, however, improperly mixes different fragments of the *Calendrical Treatises of the Chongzhen Reign* and the *Calendrical Treatises in Accordance with the Western New Methods*. Pan's information may derive from Henri Bernard, "L'Encyclopédie astronomique du Père Schall (*Tch'ong-tcheng li-cho*, 1629, et *Si-yang sin-fa li-chou*, 1645). La réforme du calendrier chinois sous l'influence de Clavius, de Galilée et de Kepler," *Monumenta Serica* 3 (1938): 35-77, 441-527.
8. I would like to thank Dr. Kim Yung Sik at National Seoul University for checking this version of the *Calendrical Treatises of the Chongzhen Reign*, acquired in the nineteenth century.
9. Li Guoqing, *Mingdai kangong xingming suoyin* (Shanghai: Shanghai guji chubanshe, 1998), p. 137. This index, however, does not list the *Calendrical Treatises of the Chongzhen Reign* as one by the works by Li Zaizhen.
10. Steve Shapin, "The Invisible Technician," *American Scientist* 77 (1989): 554-63.
11. Pingyi Chu, "Sanjiao hanshubiao yu Mingmo de Zhongxi lifa zhi zheng: Kexue de wuzhi wenhua shitan," (Trigonometrical Tables and the Late Ming Calendrical Reform: A Case Study of Material Culture in Science) *Dalu zazhi* 99.5, 99.6 (1999): 41-48; 9-18.
12. *Ibid.*
13. Gugong bowuyuan ed., *Xiyang xinfa lishu* (Calendrical Treatises in Accordance with the Western New Methods) (Haikou: Hainan chubanshe, 2000), vol. 1, p. 124-130.
14. Ibid., p. 64-65.
15. Huang Yi-long, "Sun Yuanhua: A Christian Convert Who Put Xu Guangqi's Military Reform Policy into Practice," in Catherine Jami, Gregory Blue, and Peter M. Engelfriet eds., *Statecraft and Intellectual Renewal in Late Ming China*, p. 225-262.
16. John Law, "Technology and Heterogeneous Engineering: The Case of Portuguese Expansion," in W. E. Bijker, T. P. Hughes, and T. Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge: MIT Press, 1987), p. 111-134. Bruno Latour, "On the Practical Existence

of Existing and Nonexisting Objects," in Lorraine Daston ed., *Biographies of Scientific Objects*, p. 245-269.

17. Chu Pingyi, "Scientific Dispute in the Imperial Court: The 1664 Calendar Case," *Chinese Science,* vol. 14 (1997), p. 7-34.
18. Fang Zhiqi, "Bureaucratic Paper," in Adam Schall and Ferdinand Verbiest, eds., "Memorials" in *Xinfa lishu* (Taipei: Library of Palace Museum, rare book), *juan* 1, pp. 10a-11b.
19. Pan Nai has compared the translated drafts during the Chongzhen reign with the first edition of the *Calendrical Treatises in Accordance with the New Western Methods*. We, however, do not know the differences between the published *Calendrical Treatises of the Chongzhen Reign* and *Calendrical Treatises in Accordance with the New Western Methods*. See Pan Nai, "*Xiyang xifa lishu tiyao*," p. 647-49.
20. Gugong bowuyuan ed., *Xiyang xinfa lishu*, vol. 1, p. 2.
21. Alfons Väth, Yang Bingchen trans., *Johann Adam Schall von Bell S. J. Missionary in China, Kaiserlicher Astronom und Ratgeber am Hofe von Peking, 1592-1666* (Köln, 1933. Translated into Chinese in 1949, Taipei: Shangwu yinshuguan,) vol. 1, p. 451.
22. Hashimoto and Jami, "From the *Elements* to Calendar Reform," p. 263-310.
23. Joseph Needham and Wang Ling, *Science and Civilization in China, vol. 3. Mathematics and the Science of Heaven and Earth* (Cambridge: Cambridge University Press, 1959), p. 449.
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28. Chu Pingyi, "Scientific dispute in the imperial court: The 1664 calendar case," 7-34; Huang Yi-long, "Court divination and Christianity in the K'ang-hsi era," Nathan Sivin (trans.), *Chinese Science* 10 (1991): 1-20. An Shuangcheng, "Tang Ruowang an shimo," (The Adam Schall's case) *Lishi dang'an*, 3 (1992): 79-87.
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31. Ferdinand Verbiest, *The Astronomia Europaea of Ferdinand Verbiest, S.J. (Dillingen, 1687)*, Noël Golvers trans., (Nettetal: Steyler Verlag-Wort und Werk, 1993), p. 62-65.
32. Qing Shizong, *Shengzu tingxun geyan* (Paternal Instructions and Wise Sayings from Shengzu (Kangxi)). *Siku quanshu zhenben jicheng* (Selections from the *Siku quanshu*) ser. 8., (Taipei: Shangwu yinshuguan, 1972), p. 69a-b.
33. Yong Rong *et al.*, *Siku quanshu zongmu tiyao* (*Catalogues and Synopsis of the Complete Collection of the Four Treasuries*) (Taipei: Shangwu yinshuguan, 1965), vol. 20, p. 108.
34. Ibid., p. 109.
35. Hu Dan, "Preface to *Zhongxingpu*," in *Zhongxingpu* (*Tables of Twenty-eight Constellations*), in *Siku quanshu*, vol. 793., p. 534-535.

36. Yong Rong *et al.*, *Siku quanshu zongmu tiyao* , vol. 20, p. 101.
37. Jiang Yong, "Preface I," *Shuxue* (*Mathematical Learning*), (Shanghai: Shangwu yinshuguan, 1936), p. 1-2.
38. Jonathan Porter, "The Scientific Community in Early Modern China," *Isis* LXXIII, no. 4 (1982): 529-544.
39. Wu Xuehao, "Preface to *Jihe lunyue*", in *Jihe lunyue* in *Siku quanshu*, vol. 802., pp. 2-3.
40. Ruan Yuan, *Chourenzhuan,* p. 453.
41. For the network of astronomers and mathematicians centering around certain important figures see Jonathan Porter, "The Scientific Community in Early Modern China," p. 529-544.
42. For instance, Yang Jingnan in 1673 waged another struggle against Verbiest. His materials were largely citations from encyclopedias, according to Verbiest. Of course, Yang did not stand a chance, not only because the Kangxi emperor supported Verbiest, but also because Yang was unable to make any intellectually meaningful claims by using his sources. Ferdinand Verbiest, *Xichao ding'an* (*Settled Cases in Our August Dynasty*), in Wu Xiangxiang ed., *Tianzhujiao tongchuan wenxian*, p. 181-187.
43. Pingyi Chu, "Fudu Shengcai: '*Lixue yiwenbu*' yu '*Sanjiaoxing tuisuanfa*' lun," (Reading the Words of His Majesty: On the Dialogue between Mei Wending's *Supplements to the Doubts about Calendrical Learning* and Kangxi's *On Trigonometry*) *Xin shixue* 16.1 (2005): 51-84.
44. Pingyi Chu, "Technical Knowledge, Cultural Practices and Social Boundaries: Wan-nan Scholars and the Recasting of Jesuit Astronomy, 1600-1800" (UMI: UCLA Ph.D. dissertation, 1994), p. 178-179. Also see Han Qi, "Junzhu he buyi zhijian: Li Guangdi zai Kangxi shidai de huodong jiqi dui kexue de yingxiang," (Between Monarch and Civilian: Li Guangdi and His Influence on Science during the Kangxi Reign) *Tsing-hua hsueh-pao*, new ser. 26.4 (1996): 421-445.
45. Han Qi, "Gewu qiongli yuan yu mengyangzhai: 17,18 shiji Zhong-Fa kexue jiaoliu," (The Royal Academy of Science and Mengyangzai: Scientific Exchanges between China and France in the Seventeenth and Eighteenth Centuries), *Faguo hanxue* 4 (1999): 302-324.
46. For the compilation of *Siku quanshu*, see: Guo Bogong, *Siku quanshu zhuanxiu kao* (Shanghai: Shanghai Shudian, 1992 reprint 1937 edition). Kent Guy, *The Emperor's Four Treasures: Scholars and the State in the Late Ch'ien-lung Era* (Cambridge: Harvard University Press, 1987).
47. Wang Cheng-hua (Wang Zhenghua), "Shenghuo, zhishi yu wenhua shangpin: Wan Ming Fujian ban 'riyong leishu' yu qi shuhuamen," (Living, Knowledge and Cultural Commodities: The Late Ming Encyclopedias from Fujian and their Categories of Painting and Calligraphy) *Bulletin of the Institute of Modern History, Academia Sinica* 41 (2003): 1-85.
48. Ruan Yuan, *Chourenzhuan* (Biographies of Astronomers and Mathematicians) (Taipei: Shijei shuju, 1982), p. 542.
49. Yong Rong *et al.*, *Siku quanshu zongmu tiyao*, vol. 20, p. 68-69.
50. *Ibid.*
51. Yong Rong *et al.*, *Siku quanshu zongmu tiyao*, vol. 20, p. 72-73.

GLOSSARY

Budeyi bian 不得已辨
cc 測
Chongzhen lishu 崇禎曆書
congshu 叢書
Dai Zhen 戴震
Datong 大統
ding 訂
Du Zhigeng 杜知耕
duxiu 督修
fangcheng 方程
Nan Huairen 南懷仁
fusuan 覆算
Gaizai tuxian 蓋載圖憲
Giulio Aleni 艾儒略
han 翰
Hongwu zhengyun 洪武正韻
Hu Dan 胡亶
huitu 繪圖
Jiang Yong 江永
jiaozi 較梓
Jie Xuan 揭暄
Jihe lunyue 幾何論約
juan 卷
Kangxi 康熙
Kong Jihan 孔繼涵
leishu 類書
Li Tianjing 李天經
Li Zaizhen 李再楨
li 曆
lifa 立法
litianyuanyi 立天元一
Lixiang kaocheng 歷象考成
Mei Wending 梅文鼎
menren 門人
Ming 明
Qianlong 乾隆
Qin Wenyuan 秦文淵
qinchai 欽差
qinming 欽命
Qinshi qizheng quanshu 秦氏七政全書
Qintianjian 欽天監
run 潤 or *xiurun* 修潤
Shengzu 聖祖
shoufa 受法
shoufa 授法
tiyao 提要
Siku quanshu 四庫全書
Jianyao lishu 簡要曆書
suan 筭
suan 算
Suanjing shishu 算經十書
suanxueguan 算學館
Shuli jingyun 數理精蘊
Taichu 太初
Tianxue chuhan 天學初函
tongwei jiaoshi 通微教師
tongxuan jiaoshi 通玄教師
Wei Wenkui 魏文魁
Wu Xuehao 吳學顥
xi 西
xiju 西局
xin 新
Xinfa lishu 新法曆書
Xinfa suanshu 新法算書
Xiyang xinfalishu 西洋新法曆書
xiyang 西洋
Xu Guangqi 徐光啟
Xu Xuchen 許胥臣
Yang Guangxian 楊光先
yi xiyang xinfa 依西洋新法
Yongle dadian 永樂大典
You Yi 游藝
yue 閱
zhuan 譔
Zhang Yongjing 張雍敬
zhengshuo 正朔
Zhongxingpu 中星譜
Zhuang Hengyang 莊亨陽
Zikawei 徐家匯

Extrême-Orient Extrême-Occident consacre chaque numéro à un thème ou une question (la divination, le divertissement, le jugement, l'art des jardins, l'existence d'une philosophie chinoise, etc.) intéressant l'ensemble des productions culturelles du monde sinisé (Chine, Corée, Japon, Viêt-Nam). Les différentes contributions élaborent par convergence des éléments de réponse à partir des horizons et des savoirs les plus divers. L'ensemble est traditionnellement offert, pour clore le volume, à la réflexion d'un « regard extérieur » qui les met en perspective avec des travaux menés sur des questions similaires dans les civilisations d'« Extrême-Occident ».

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