

Accommodating Westerners' Knowledge in the Chinese Calendar: Confucian Scholars on Xu Guangqi's Slogan*

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Introduction

Xu Guangqi 徐光啓 (1562-1633) seems to have asserted his famous slogan—"Melt the materials of that side, and incorporate them into the mould of *Datong*" (*Rong bifang zhi caizhi, ru Datong zhi xingmo* 鎔彼方之材質, 入大統之型模)—mainly to justify his accommodation of Western astronomical methods and knowledge to the Chongzhen 崇禎 calendar reform. Many later Confucian scholars quoted, modified, and commented on it, while coping with the problem of introducing Western astronomical knowledge and methods into the Chinese calendrical system. In this paper, I will look at the different ways they dealt with the slogan, which will illustrate the different attitudes they had towards various Western astronomical knowledge and methods, and their different views about the proper way to accommodate them in what they considered the "correct" calendrical method.

Complementing the Chinese Scientific Tradition with Western Science

Faced with some Western scientific knowledge and methods which appear superior to their own, many Confucian scholars in the seventeenth and the eighteenth centuries tried to complement Chinese science with them. An early, and influential, expression of such an inclination was laid out by Xu Guangqi in his preface to the

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Jihe yuanben 幾何原本. He said that by translating the book, he “unexpectedly obtained what could patch up the lost meanings of the missing books” of the ancient times.¹ Li Zhizao 李之藻 (1565-1630) also showed a similar tendency when he explained the workings of the astrolabe shown to him by Ricci in terms of the ancient Chinese cosmological ideas of *huntian* 渾天 (spherical heaven) and *gaitian* 蓋天 (vaulted heaven).²

Others followed by showing similar attitudes. For example, the author of an anonymous foreword to Nicolaus Smogulecki’s (Mu Nige 穆尼閣, 1611-1656) *Tianbu zhenyuan* 天步真原, most probably Fang Yizhi 方以智 (1611-1671), said, after mentioning the improvement of the calendrical method by Western achievements: “Is this not greatly complementing the ‘*kaipi*’ 開闢 (Beginning of the World), which [even] Rongcheng 容成 and Danao 大撓 had not done?”³ Wan Sitong 萬斯同 (1638-1702) said that the Western calendrical method “can really complement what Chinese [calendrical method] could not reach.”⁴ Pan Lei 潘耒 (1646-1708) said: “In the Westerners’ calendrical techniques, there indeed are what Chinese have never spoken of, which complement what the Chinese calendar lacks.”⁵ Wang Honghan 王宏翰 (c. 1648-1700) said that the discussions in the Western books on astronomy and geography “indeed lay out what earlier people have never spoken of. They complement our Confucian learning of ‘*gewu*’ 格物 (investigation of things) so that [we] understand for the first time the reason by which heaven and earth is as it is.”⁶ Lu Xiyao 陸希言 (1631-1704), who joined the Society of Jesus in 1688 in Macau, even said that one can use the Westerners’ “learning of ‘*gewu qiongli*’ 格物窮理 (investigation of things and fathoming the

¹ “不意古學廢絕二千年後，頓獲補綴唐虞三代之闕典遺義”：“*Ke Jihe yuanben xu*” 刻幾何原本序, Wang Zhongmin 王重民 ed., *Xu Guangqi ji* 徐光啓集 (Shanghai: Zhonghua shuju, 1963), 75.

² “*Hun’gai tongxian tushuo xu*” 渾蓋通憲圖說序, Xu Zongze 徐宗澤 ed., *Ming Qing jian Yesuishi yizhu tiyao* 明清間耶穌會士譯著提要 (Beijing: Zhonghua shuju, 1949 reprint), 263-264.

³ “豈不大補開闢，容撓所未有哉”：“*Tianbu zhenyuan yin*” 天步真原引. This foreword has been discussed by Shi Yunli in his “Nicolaus Smogulecki and Xue Fengzuo’s *True Principles of the Pacing of the Heavens*: Its Production, Publication, and Reception,” *East Asian Science, Technology, and Medicine* 27 (2007), 63-126, esp. Appendix 1V.

⁴ “迨西法既入，其說實可補中國所未及”：“*Song Mei Dingjiu nanhuan xu*” 送梅定九南還序, *Shiyuan wenji* 石園文集, juan 7, 19a (*Xuxiu Siku quanshu* 續修四庫全書, vol. 1415, 518).

⁵ “西人曆術誠有發中人所未言，補中曆所未備者”：“*Xuancheng youxueji xu*” 宣城遊學記序, *Suichutang wenji* 遂初堂文集, juan 7, 28a (*Xuxiu Siku quanshu*, vol. 1417, 493).

⁶ “其論盡發前人之未言，補我儒格物之學，始知天地之所以然也”：“*Qiankun gejing zixu*” 乾坤格鏡自序, quoted from Xu Haisong 徐海松, *Qing chu shiren yu xixue* 清初士人與西學 (Beijing: Dongfang chubanshe, 2000), 155.

li)" in complementing what are lacking in the "Gewu zhizhi" 格物致知 (investigation of things and extension of knowledge) chapter of *Daxue* 大學.⁷

In such efforts to complement the Chinese learning with Western science, Chinese scholars tried to put the Western scientific knowledge and methods in the framework of their own scientific tradition. In fact, the Chongzhen calendrical reform project itself was an attempt to incorporate Western astronomical methods into traditional Chinese luni-solar calendrical system. Xue Fengzuo 薛鳳祚 (1600-1680) and Mei Wending 梅文鼎 (1633-1721) exerted more serious, full-fledged, efforts to synthesize the astronomical and mathematical knowledge coming from the West and the traditional Chinese calendrical learning.⁸ What those belonging to the circle of Xiong Mingyu 熊明遇 (1579-1649) and Fang Yizhi did when they endeavored to incorporate the Western scientific ideas in the framework of the traditional Chinese cosmological system was also of the same synthetic character.⁹ With the compilers of the *Siku quanshu* 四庫全書 in the late eighteenth century, when this synthetic movement had gone on for some time, the Chinese scientific tradition had become the basic framework to encompass all the Western scientific knowledge.¹⁰ The traditional Chinese system into which Western astronomical knowledge and techniques were incorporated included the subject of astrology also, the beliefs and practices of which continued to have importance after the adoption of Western methods.¹¹ There were similar modifications in medicine, as can be seen from the example of Wang Honghan, who reconstructed traditional Chinese medical system by incorporating Western anatomical knowledge.¹²

⁷ “用其格物窮理之學，以啓發吾國之才俊，則物理可辨，推測可明，精微可盡，大學格物致知之章，可以補其闕失矣”：“Aomen ji” 塹門記 in *Kaitian baoyue* 開天寶鑑 (Bibliothèque nationale de France, Chinois, 7043) (<https://gallica.bnf.fr/ark:/12148/btv1b9006112q>), 28.

⁸ Shi Yunli, “Nicolaus Smogulecki and Xue Fengzuo’s *True Principles of the Pacing of the Heavens*,” 63-126; Chu Pingyi, “Technical Knowledge, Cultural Practices and Social Boundaries: Wan-nan Scholars and the Recasting of Jesuit Astronomy, 1600-1800” (Ph.D. Dissertation, University of California, Los Angeles, 1994), chapter 4.

⁹ Zhang Yongtang 張永堂, *Mingmo Fangshi xuepai yanjiu chubian: Mingmo lixue yu kexue guanxi shilun* 明末方氏學派研究初編—明末理學與科學關係試論 (Taipei: Wenjing, 1987); *Mingmo Qingchu lixue yu kexue guanxi zailun* 明末清初理學與科學關係再論 (Taipei: Xuesheng shuju, 1994).

¹⁰ Chu Pingyi, “Scientific Texts in Contest, 1600-1800,” in Florence Bretelle-Establie ed., *Looking at It from Asia: The Processes that Shaped the Sources of History of Science* (Berlin: Springer, 2010), 141-166, esp. 151ff.

¹¹ Chu Longfei, “A Distinctive Way of Integration: The Main Portion of Xue Fengzuo’s *Lixue huitong* Revisited,” *The Korean Journal for the History of Science* 37:2 (2015), 499-514.

¹² Chu Pingyi, “Narrating a History for China’s Medical Past: Christianity, Natural Philosophy and History in Wang Honghan’s *Gujin yishi* 古今醫史 (History of Medicine Past and Present),” *East*

The expression, “*huitong*” 會通 (literally, to meet and to comprehend), was frequently used by Xu Guangqi in referring to this kind of accommodating and synthetic work. In his memorial to the emperor in 1631, describing what he was going to do in his work for calendar reform, Xu Guangqi listed “*huitong*” as the fifth item among the so-called “basic five items” (*jiben wumu* 基本五目).¹³ He explained why “*huitong*” was needed.

[The practice of] having separate sections in charge of each [the *Datong* 大統 calendar and the Western calendar] has stopped. The *Datong* [Calendar] could not by itself become different from the earlier [calendars]. Western method also cannot be what we must use. It is also like the way the calculations had been carried out by separate departments for the [last] two hundred years. We humbly believe that if we want to excel, we must “*huitong*”; before “*huitong*,” we must translate.¹⁴

Afterwards, the expression, “*huitong*,” was frequently used by many Confucian scholars in referring to the efforts to synthesize and integrate the Western and Chinese knowledge and methods.¹⁵

Xu Guangqi's Slogan

After his remark about “*huitong*” quoted above, Xu Guangqi pointed out that the Western method, being more recent and based on observations, was not only more accurate at the moment, but could be further reformed in the future to become even more accurate. He went on: “After the translations [of the books on the Western method] had taken a basic shape, we ordered those who clearly understood the *Datong* [calendar] and had a profound knowledge of its methods and meanings to review [the translations] in examining and fixing [the calendrical method].”¹⁶ It was after this that he presented his famous slogan: “Melt the materials of that side, and incorporate them into the mould of the *Datong* [calendar] (鎔彼方之材質，入大統

Asian Science, Technology, and Medicine 28 (2008), 14-35.

¹³ Xu Guangqi ji (cit. n. 1), 374-375. The other four were *fayuan* 法原 (origin), *fashu* 法數 (number), *fasuan* 法算 (calculation), and *faqi* 法器 (instruments). Xu Guangqi ji, 375-376.

¹⁴ “夫使分曹各治，事畢而止。大統既不能自異於前，西法又未能必為我用，亦猶二百年來分科推步而已。臣等愚心以為，欲求超勝，必須會通；會通之前，先須翻譯”：“Lishu zongmu biao” 曆書總目表, Xu Guangqi ji, 374.

¹⁵ Xue Fengzuo, for example, titled his treatise, “Lixue huitong” 曆學會通 (‘*Huitong*’ of Calendrical Studies).

¹⁶ “翻譯既有端緒然後，令甄明大統深知法意者，參詳考定”：Xu Guangqi ji, 374.

之型模)。”

Some modern scholars suspect that this slogan may have been strategic on Xu Guangqi's part, and his real intention may have been to camouflage his all-out adoption of the Western method.¹⁷ But if we believe Xu Guangqi for what he said, what did he mean by this slogan and the analogy?

We may note that, immediately after presenting the slogan, he drew an analogy with a “house builder” (*zuo shi zhe* 作室者): “Compare it to a house builder. The plans, models, and scales are all the same as before, but the wood, stone, tiles, and bricks are all extremely good. There cannot be damages or decays for hundred and myriad years.”¹⁸ Obviously, he was comparing Western knowledge and methods, the “materials” (*caizhi* 材質) in his slogan, to “wood, stone, tiles, and bricks” (*mu shi wa pi* 木石瓦甃) and the Chinese calendrical system, the mould (*xingmo* 型模), to “plans, models, and scales” (*guifan chicun* 規範尺寸). One year earlier, in his memorial recommending Adam Schall (Tang Ruowang 湯若望, 1592-1666) and Giacomo Rho (Luo Yagu 羅雅谷, 1593-1638) for the work of the calendar reform, Xu Guangqi used different expressions.

Now in reforming [the calendar], we must consult the Western methods and use them. Achieve our name (*mingyi* 名義) by means of their stipulations (*tiaokuan* 條款). Expound clearly based on the great root (*da ben* 大本) and the great origin (*da yuan* 大原) of the calendrical method. Afterward we can discuss the reform.¹⁹

Thus, for Xu Guangqi, the “Western methods” and their “stipulations” were the “materials” that needed to be incorporated into the *Datong* mould, which he referred to as “our name” and “the great root and the great origin of the calendrical method.”

In the *Yueli lizhi* 月離曆指 compiled under his supervision, Xu Guangqi was more detailed about the “materials,” while pointing out what was lacking in the traditional Chinese calendrical method.

Now let us examine each calendrical treatise of the twenty-one dynastic histories. In general, they have years, months, days, but they do not have hours, minutes, seconds, longitudes, latitudes, degrees and numbers. ... We

¹⁷ Chu Pingyi, “Scientific Texts in Contest, 1600-1800,” 144-145; Roger Hart, *Imagined Civilizations: China, the West, and Their First Encounter* (Baltimore: Johns Hopkins University Press, 2013), 256.

¹⁸ “譬如作室者。規範尺寸一一如前，而木石瓦甃悉皆精好，百千萬年必無敝壞”：Xu Guangqi ji, 375.

¹⁹ “今茲修改，必須參西法而用之。以彼條款，就我名義，從曆法之大本大原，闡發明哲，而後可以言改耳”：“Xiugai lifa qing fangyong Tang Ruowang Luo Yagu shu” 修改曆法請訪用湯若望羅雅谷疏, Xu Guangqi ji, 344.

cannot but borrow the Western calendar and use it by “*huitong*.”²⁰

Thus, it was Western method that gives such detailed data as hours, minutes, seconds, longitudes, latitudes, degrees and numbers that needed to be incorporated as “materials” into the *Datong* “mould,” which only gives years, months, and days. Also, the fact that Xu Guangqi’s main efforts in the Chongzhen reform project was exerted in translating Western books—those on basic mathematical knowledge, computation methods, astronomical theories, land surveys, instruments, tables, etc.—indicate that these were what he considered to be “the materials of that side.”

As for “the mould of the *Datong*,” on the other hand, Xu Guangqi’s use of the name “*Datong*” indicates his belief that those “materials” of Western astronomy needed to be incorporated into the system of the *Datong* calendar then in use in the Ming dynasty.²¹

Quotations and Modifications of Xu Guangqi’s Slogan

Xu Guangqi’s slogan impressed many later Confucian scholars, who quoted and commented upon it. None of them, however, quoted it exactly in its original form. They modified it in various different ways, and to a different extent. For example, in quoting the slogan in the draft of the calendrical treatise of the *Mingshi* 明史, Huang Baijia 黃百家 (1643-?) changed just one character: from “*bi*” 彼 (that) to “*xi*” 西 (West) (熔西方之材質，入大統之型模).²²

Others usually made more changes. On the whole, more modifications were made on the first half of the slogan than on the second half. The modifications made the first half more explicit than its original expression: “That side” changed to “Europe”

²⁰ “今考二十一史各天文志，大都有年月日，而無時刻分秒經緯度數。... 不得已借西曆，會通用之”：Yueli lizhi 月離曆指，juan 1, 9b: Bo Shuren 薄樹人 ed. *Zhongguo kexue jishu dianji tonghui. Tianwen juan* 中國科學技術典籍通彙·天文卷 (Zhengzhou: Henan jiaoyu chubanshe, 1995), vol. 6, 1149.

²¹ After mentioning the translation of three *juan* of Islamic astronomical books in early Ming, he regretted that Islamic calendrical method was not fully incorporated into the Chinese calendrical system: “There was no one who could use their method, incorporate it into [the system of] the *Datong* [calendar], achieve “*huitong*,” and unify [them] into one” (所惜者，翻譯既少，又絕無論說。是以一時詞臣曆師，無能用彼之法，參入大統，會通歸一者), “Lishu zongmu biao,” *Xu Guangqi ji*, 374.

²² The 1689 draft of the *Mingshi* 明史, “Lizhi” 曆志: quoted from Han Qi 韓琦, “Cong *Mingshi* ‘Lizhi’ de zuanxiu kan xixue zai Zhongguo de chuanbo” 從明史曆志的纂修看西學在中國的傳播, Liu Dun 劉鈍, Han Qi 韓琦 et al., eds., *Keshi xinzhuan* 科史薪傳 (Shenyang: Liaoning jiaoyu chubanshe, 1997), 61-70, esp. 65. Emphasis mine.

(*Ouluo* 歐羅) or the “West” (*xi* 西), and “materials” changed to “method” (*fa* 法) or “calculation” (*suan* 算). On the other hand, the “mould” or “frame” of the second half, into which the “materials” mentioned in the first half were to be incorporated, became more inclusive: “*Datong*” 大統 changed to China (*zhong* 中, *zhongguo* 中國, or *zhongtu* 中土).

All the three great scholars well versed in calendrical astronomy in the second half of the seventeenth century—Xue Fengzuo, Wang Xichan 王錫闡 (1628-1682), and Mei Wending—quoted Xu Guangqi's slogan in modified forms.

(1) Xue Fengzuo

Xue Fengzuo, the first of the three, made the most substantial modifications of the slogan. It appeared in the preface to his *Lixue huitong* 曆學會通 (1662): “Melt the materials of *each* side, and incorporate them into the mould of *our/my own learning*” (鎔各方之材質, 入吾學之型範).²³ Thus, he made substantial modifications to both the first and the second halves of the slogan.

First, Xue Fengzuo changed “the materials of that side” (*bi fang* 彼方) to “the materials of each side” (*ge fang* 各方). What does the expression, “each side,” refer to? Does it reflect the need he felt to incorporate the methods and data of both the Western and the Chinese, in other words the need for *huitong*?

It can be noted that Xue Fengzuo had expressed a strongly Sinocentric sentiment before quoting Xu Guangqi's slogan: “China is the birthplace of the civilization, rites, and music; how could we therefore be inferior to foreign countries?” But he immediately added: “Yet we should not force sayings and fabricate theories. We must first establish ourselves on faultless ground, and afterwards our way will begin to be respected. This is why “*huitong*” cannot be slowed down.”²⁴ He concluded:

The old theory can be both followed and changed. [But I] am not tied to the views already established. The new theory can be both followed and changed. But I do not avoid being blamed for following it. In establishing the *yi* 義 (the basic principles) [of this book], eight or nine tenths are taken from the *Shoushi* 授時 [calendar] and the *Tianbu zhenyuan*; and [the materials of] both the Muslim and the West are sometimes appended. All [I have done] is *to melt the materials of each side, and to incorporate*

²³ *Lixue huitong*, “Zhengji xu” 正集序: Bo Shuren, *Zhongguo kexue jishu dianji tonghui. Tianwen juan*, vol. 6, 619-620.

²⁴ “中土文明禮樂之鄉, 何詎遂遜外洋。然非可強詞飾說也。要必先自立于無過之地, 而後吾道始尊。此會通之不可緩也”: *Ibid.*, 619.

*them into the mould of our/my own learning.*²⁵

Thus, Xue Fengzuo took “materials” from many different methods in both China and the West. For him, neither the Western method nor the Chinese method, which he referred to as “the materials of each side,” was a single fixed method. He spoke of “the old Chinese method” (*jiu zhongfa* 舊中法) and “the new Chinese method” (*xin zhongfa* 新中法), and of “the present Western method” (*jin xifa* 今西法) and “the new Western method” (*xin xifa* 新西法).²⁶ The main sources, from which he took 80-90% of his materials, were the *Shoushi* calendar and the *Tianbu zhenyuan* of Smogulecki whom he met in Nanjing in 1652; the remaining 10-20% were from the Muslim and the European sources.²⁷ And he wanted to “melt” and incorporate all these materials. After pointing out the difficulty of *huitong* in the preface to the “Kaoyan” 考驗 Section of the *Lixue huitong*, he advocated broadly examining various different sources in order to “*huitong*” them:

... *Huitong* is difficult. If you want to speak of *huitong*, you must cover widely and pick broadly. For each item, exhaust its causes and effects, and afterwards you can accommodate various viewpoints and seek to reach the one right [viewpoint]. You must be thoroughly familiar with the *li* 理 and numbers (*shu* 數) [of each of them].²⁸

In the second half of the slogan, Xue Fengzuo changed “the mould of *Datong*” in the original slogan to “the mould of ‘our/my own’ learning” (*wu xue* 吾學). This shows that the frame into which he was incorporating the various elements of calendrical methods—both the Western and the Chinese—was not that of the *Datong* calendar, but something different: something new, and something better. Of course, it is still possible that what he meant by “our/my own learning” was “our own Chinese” learning, as the others took the slogan to mean. But it appears more likely that what he was referring to was not the traditional Chinese calendrical system

²⁵ “舊說可因可革，原不泥一成之見。新說可因可革，亦不避蹈襲之嫌。其立義取于授時及天步真原者十之八九，而西域西洋二者亦間有附焉。皆錄各方之材質，入吾學之型范”：Ibid., 619-620.

²⁶ Shi Yunli, “Nicolaus Smogulecki and Xue Fengzuo’s *True Principles*” (cit. n. 3), 69.

²⁷ It may be noted in this connection that, unlike Xu Guangqi and many others, Xue Fengzuo learned, through Smogulecki, the more recent Western astronomical knowledge, including the Copernican idea of the moving earth: Shi Yunli, “Nicolaus Smogulecki and Xue Fengzuo’s *True Principles*,” 82-92.

²⁸ “...會通之難也。欲言會通，必廣羅博採，事事悉其原委，然後能折衷衆論，求歸一是，非熟諳其理數不可”： *Lixue huitong* 曆學會通，“Kaoyan xu” 考驗敘，in Han Yuqun 韓寓群 ed. *Shandong wenxian jicheng* 山東文獻集成, vol. 23, part II (Jinan: Shandong daxue chubanshe, 2008), 410.

represented by the *Datong* calendar, but his own new system, which he had constructed by his work of incorporating much of the Western astronomical knowledge. And this clearly had something to do with the fact that, unlike Xu Guangqi who worked for the government and was in charge of the work for calendar reform, Xue Fengzuo was a private scholar working independently from the government.²⁹

In fact, Xue Fengzuo himself noted such a different nature of his own work, and contrasted it with that of Xu Guangqi. He ended his preface to the *Lixue huitong* by pointing out this difference:

The *huitong* [work] of the past [i.e., in Xu Guangqi's time] was all in this [Astronomical] bureau. The *huitong* [work] of the present examines into diverging paths to a greater degree. Isn't [the difference of their being] difficult and easy extremely far apart?³⁰

In other words, while the *huitong* of Xu Guangqi, who worked in the Astronomical Bureau, was carried out based on the Chinese calendrical method, Xue Fengzuo could afford to carry out his own *huitong* by studying and incorporating many different systems of calendrical astronomy.

What Xue Fengzuo actually came up with as the mould of “our/my own” learning was, as he said, primarily based on the system of *Tianbu zhenyuan*, and thus was basically that of Western astronomy. But he introduced many changes into it, incorporating many elements of the traditional Chinese calendrical method, which he preferred over those of the Western astronomy. For example, he used traditional Chinese terminology in expressing many Western astronomical concepts.³¹ Xue Fengzuo also preferred Chinese centesimal system over the Western sexagesimal angular system, and the Chinese 100 *ke* 刻 system over the Western 96 *ke* system, and held on to the traditional order in listing the five planets.³² The most important for him in this regard was the Chinese astrological system traditionally tied with the calendar. He adopted the traditional Chinese astrological system and tried to incorporate Western astrological discussions into this “mould.”³³

As a result of his work of *huitong*, Xue Fengzuo's mould became a completely

²⁹ Han Qi, “Astronomy, Chinese and Western: The Influence of Xu Guangqi's Views in the Early and Mid-Qing,” in Catherine Jami, Peter Engelfriet, and Gregory Blue eds., *Statecraft and Intellectual Renewal in Late Ming China: The Cross-Cultural Synthesis of Xu Guangqi (1562-1633)* (Leiden: Brill, 2001), 360-379, on 371.

³⁰ “昔之會通皆在本局，今之會通更綜岐路。其難易不甚懸乎”： *Lixue huitong*, “Zhengji xu,” Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 6, 620.

³¹ Chu Longfei, “A Distinctive Way of Integration” (cit. n. 11), 504-505.

³² Chu Longfei, “A Distinctive Way of Integration,” 503, 506.

³³ Chu Longfei, “A Distinctive Way of Integration,” 506-508.

new one, and a neutral one, not impartial to the Chinese or the Western. And he “melted” all the materials into this, “our/my own,” mould. Xue Fengzuo believed that he had eventually fulfilled the task of *huitong* by incorporating different elements of Western astronomy. He said, for example: “Now that the *Tianbu zhenyuan* has also come, the method of the true origin of the Great West has also been integrated into the Chinese method.”³⁴ He called his method the “integrated Chinese method” (*huitong zhongfa* 會通中法) or the “new Chinese method” (*xin zhongfa* 新中法).³⁵

(2) Wang Xichan

While Xue Fengzuo made substantial modifications to the slogan, changing the nature of both the “materials” and the “mould,” the other scholars did not change the basic frame of “Melt the materials (calculations, methods, etc.) of the West side (that side), and incorporate them into the mould of the *Datong* (China).”

Wang Xichan, for example, quoted Xu Guangqi’s slogan in the following way in his preface to the *Xiaolan xinfa* 曉菴新法, written at about the same time as Xue Fengzuo’s preface discussed above: “At the beginning of translating the [Western] books, it was originally said [by Xu Guangqi]: ‘Take the materials of the *Western calendar*, and return them to the mould of the *Datong* (取西曆之材質, 歸大統之型范).’”³⁶ So the “materials” for Wang Xichan were those of the Western calendrical method. One can first note that he used the characters “*qu*” 取 (take) and “*gui*” 歸 (return) instead of “*rong*” 鎔 (melt) and “*ru*” 入 (incorporate). The character “*qu*” may indicate that he was thinking of a more or less straightforward process of adopting Western methods into the frame of the *Datong*. And the character “*gui*” implies that the materials of the Western calendar were what had originally existed in China and thus that it was only natural for those to come back to their original place.

The words Wang Xichan added after quoting the slogan expressed his disapproval of the state of calendrical astronomy in his time, which did not follow the aim of *huitong* advocated by Xu Guangqi but relied exclusively on the Western method: “It was not said [by Xu Guangqi] that [one should] discard the established routine

³⁴ “今天步真原復來, 大西真原法復會通於中法”: *Lixue huitong*, “Jin xifa xuanyao xu” 今西法選要敘, Han Yuqun, *Shandong wenxian jicheng* 山東文獻集成, vol. 23, part II (Jinan: Shandong daxue chubanshe, 2008), 364.

³⁵ Chu Longfei, “A Distinctive Way of Integration,” 500-502.

³⁶ “譯書之初本言, 取西歷之材質, 歸大統之型范”: “*Xiaolan xinfa zixu*” 曉菴新法自序, Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 6, 434.

completely and use the Western method exclusively as [it is done] today.”³⁷ This, then, was followed by the explanation of his own method:

Therefore I took both Chinese and the Western [methods], eliminated their defects and errors, collated [them] with my own ideas, and wrote [a book] on the calendrical method in six parts. I integrated (*huitong*) a few items, rectified a few items, clarified a few items, expanded a few items, and established a few items. Although the old method has deviations, it cannot be abolished suddenly.³⁸

So Wang Xichan explicitly said that he adopted both the Western and the Chinese methods. This syncretic aspect of Wang Xichan was duly noted in the *Chouren zhuan* 疇人傳: “[Wang Xichan] mastered both the Chinese and the Western learning, and established the new method himself.”³⁹

(3) Mei Wending

Mei Wending quoted the slogan in many different ways. In the preface to his rhapsody (*fu* 賦) on *xuanji yuheng* 璇璣玉衡, written on the occasion of the *Boxue hongru* 博學鴻儒 examination of 1679, he expressed the spirit of the slogan, advocating the need to “*exhaust the skills of Europe and hand them down to the good mould of ancient China*” (竭歐邏之巧力, 紹蒲坂之芳型).⁴⁰ Thus, all the words in Xu Guangqi's original, except for the two “zhi” 之, were changed:

³⁷ “不謂盡墮成憲，而專用西法如今日者也”：“*Xiaoan xinfazixu*” 曉菴新法自序, Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 6, 434. In an essay, titled “*Lishuo*” 曆說 (Discussion on Calendars), written a few year earlier, he had criticized the followers of Xu Guangqi for busying themselves only in translating, without giving attention the work of *huitong*, although Xu Guangqi himself had taught them that “if we want to excel, we must ‘*huitong*’; before ‘*huitong*’, we must translate” (“文定以爲，欲求超勝，必須會通；會通之前，先須翻譯。... 文定既逝，而繼其事者，僅能終翻譯之緒，未遑及會通之法,” *Xiaoan yishu* 曉庵遺書, “*Lishuo yi*” 曆說一, Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 6, 593-594).

³⁸ “余故兼采中西，去其疵類，參以己意，著歷法六篇。會通若干事，改正若干事，表明若干事，增草若干事，立法若干事。舊法雖舛而未可遽廢者”：Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 6, 434-435.

³⁹ “兼通中西之學，自立新法”：Chouren zhuan 疇人傳, juan 34, 1a (*Xuxiu Siku quanshu* 續修四庫全書, vol. 516, 333).

⁴⁰ “Ni xuanji yuheng fu” 擬璇璣玉衡賦, *Jixuetang wenchao* 續學堂文鈔, juan 1, 4b (*Xuxiu Siku quanshu*, vol. 1413, 338).

“melt” (鎔) → “exhaust” (*jie* 竭);
 “that side” (彼方) → “Europe” (*Ouluo* 歐邏);
 “materials” (材質) → “skills” (*qiaoli* 巧力);
 “incorporate” (入) → “hand down” (*shao* 紹);
 “*Datong*” (大統) → “ancient China” (*Puban* 蒲坂⁴¹);
 “mould” (型模) → “good mould” (*fang xing* 芳型).

In spite of these changes, however, the original meaning of Xu Gaungqi was maintained. In the rhapsody itself Mei Wending used new expressions—“*xie*” 擷 (collect); “*jingying*” 精英 (essence)—and said that Xu Gaungqi after “opening the Bureau and gathering Europeans together with Confucian scholars ... *collected* the essences of the *Western land* and *incorporated* them into the mould of *Chinese calculation*” (擷西士兮精英, 入中算兮鑪鑄).⁴²

In a brief essay titled “On the Sameness of the Two Methods of China and the West” (Lun Zhongxi erfa zhi tong 論中西二法之同) in the *Lixue yiwen* 曆學疑問 of the early 1690’s, Mei Wending explained what he meant: “[As for] the main points of the deficiencies in the Chinese method, *get the Western method in order to complement its incompleteness*” (得西法, 以補其未備矣).⁴³ This clearly shows Mei Wending’s intention to complement the Chinese method with Western methods. In another essay in the *Lixue yiwen*, he quoted Xu Gaungqi more directly: “Melt *Western calculations*, in order to incorporate them into the mould of the *Datong*” (鎔西算, 以入大統之型模).⁴⁴ In still another essay in the *Lixue yiwen*, he was more explicit about what is sought from the “Western method”: “As for the reason why [we] must *use the Western method*, it is just because of *the accuracy of their observations and calculations*, and not [because we] like their being different” (用西法者, 以其測算之精).⁴⁵ In an essay in the *Lixue yiwen bu* 曆學疑問補, written some time after 1705, he quoted the slogan after noting that the new calendar uses the Westerners’ method of “*dingqi*” 定氣 (fixed fortnightly period) in determining intercalary month, although the Western calendar itself has only intercalary day, and

⁴¹ The name of an ancient Chinese city, considered to have been the capital of King Shun 舜.

⁴² “吳淞太史 ... 集歐邏與儒素, 擷西士兮精英, 入中算兮鑪鑄, 屢清臺兮禠候, ...”: Ibid., juan 1, 7a (*Xuxiu Siku quanshu*, vol. 1413, 339).

⁴³ “中曆缺陷之大端, 得西法, 以補其未備矣. 夫於中法之同者, 既有以明其所以然之故, 而于中法之未備者, 又有以補其缺.”: “Lun Zhongxi erfa zhi tong,” *Lisuan quanshu* 歷算全書, juan 1, 3b (*Wenyuange Siku quanshu* 文淵閣四庫全書, book 794, 7).

⁴⁴ “Lun zhongxi zhi yi” 論中西之異, *Lisuan quanshu*, juan 1, 5a (*Wenyuange Siku quanshu*, book 794, 8).

⁴⁵ “凡所以必用西法者, 以其測算之精而已, 非好其異也.”: “Lun jinfa yu xili you ququ zhi gu” 論今法于西曆有去取之故, *Lisuan quanshu*, juan 1, 5b (*Wenyuange Siku quanshu*, book 794, 8).

no intercalary month. He put the character “*qiao*” 巧 (clever) to characterize Western calculation: “Melt the *clever calculations of the West*, incorporate them into the mould of the *Datong*” (鑄西洋之巧算, 入大統之型模).⁴⁶

(4) Eighteenth and Nineteenth Centuries

Xu Guangqi's slogan was continuously quoted by other Confucian scholars, always in modified forms. After Mei Wending, most of them followed his format in quoting the slogan: incorporating Western calculation methods into the Chinese (calendrical) system. And this was in line with the predominant sentiments of the Confucian scholars of the time, many of whom, through their evidential studies of classical texts, were reevaluating and reasserting the Chinese scientific tradition.

This trend was evident in the imperial compilation projects frequently carried out in the eighteenth century. For example, in a memorial presenting the *Lixiang kaocheng houbian* 曆象考成後編 in 1742, the compilers, including Yinlu 胤祿 (1695-1767), quoted the slogan in the following way: “The two *bian* of the *Lixiang kaocheng* (i.e., the *Lixiang kaocheng* and the *Lixiang kaocheng houbian*) melted the calculations and numbers of the Western method, and incorporated them into the mould of the Chinese method (鑄西法之算數, 入中法之型模).”⁴⁷ The compilers of the *Yixiang kaocheng* 儀象考成 of 1754, again led by Yinlu, noted that the reconstructed astronomical instruments, which were built combining the features of both the Western and the traditional Chinese instruments, “used the present numbers and categories and combined them with the ancient mould (用今之數目, 合古之型模).”⁴⁸

In fact, some scholars actually cited Mei Wending's quotation of the slogan rather than going back to what Xu Guangqi had originally said. For example, while commenting, in his *Shuxue* 數學, on Mei Wending's account of the *Huihui* 回回 calendar, Jiang Yong 江永 (1681-1762) changed one character in the slogan from

⁴⁶ “Zailun hengqi dingqi” 再論恒氣定氣, *Lisuan quanshu*, juan 5, 14b (*Wenyuange Siku quanshu*, book 794, 72).

⁴⁷ “曆象考成上下二編, 鑄西法之算數, 入中法之型模。理必窮其本源, 數必究其根柢”: *Lixiang kaocheng houbian* 曆象考成後編, Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 7, 970.

⁴⁸ *Yixiang kaocheng* 儀象考成, juan shou shang 卷首上, Bo Shuren, *Zhongguo kexue jishu dianji tonghui*. *Tianwen juan*, juan 7, 1369. The same expression was repeated in the imperial compilation of 1767, the *Huangchao tongzhi* 皇朝通志: “親莅靈臺, 徧觀儀象, 以渾天制最近古, 而時度信宜從。今觀其會通, 斯成鉅典。於是用今之數目, 合古之型模”: “Dai Jinxian jiheng fuchenyi shuo” 戴進賢璣衡撫辰儀說, *Huangchao tongzhi*, juan 23, 14b (*Wenyuange Siku quanshu*, book 644, 265).

the way Mei Wending quoted it in the *Lixue yiwen bu*—from “clever calculations” (巧算) to “accurate calculations” (*jingsuan* 精算): “Melt the *accurate calculations of the West*, and incorporate them into the mould of the *Datong* (鎔西洋之精算, 入大統之型模).”⁴⁹ In the *Wuli tongkao* 五禮通考, Qin Huitian 秦蕙田 (1702-1764) put the slogan in the same form, while excerpting large portions from Jiang Yong’s *Shuxue*.⁵⁰ In the *Chouren zhuan*, after praising Yuan Huang’s 袁黃 (*jinshi* 進士 1596) *Lifa xinshu* 曆法新書 for “melting the *Huihui* [calendrical] method and incorporating it into the techniques of the *Shoushi* 授時 [calendar]” (鎔回回法, 入授時術), Ruan Yuan 阮元 (1764-1849) quoted Mei Wending as saying: “Liaofan [Yuan Huang’s] *Xinshu* integrated the calculation methods (*licheng* 立成) of the *Huihui* [calendar] into the *Datong* [calendar] (梅文鼎曰, 了凡新書通回回之立成于大統).”⁵¹ In his preface (1896) to Wang Renjun’s 王仁俊 (1866-1913) *Gezhi guwei* 格致古微, Lin Yishan 林頤山 (*jinshi* 1892) used the same words that Mei Wending put in the above-mentioned rhapsody—“*xie*” 擷 (collect) and “*jingying*” 菁英 (essence): “Even though one wants to collect the essences of the Great West and to melt [them] into the mould of China, it is not difficult (雖欲擷泰西之菁英, 鎔中土之模範, 不難矣).”⁵²

Joseon scholars also followed Mei Wending in quoting Xu Guangqi’s slogan. Seo Ho-su 徐浩修 (1736-1799), for example, followed Mei Wending in endorsing Xu Guangqi’s slogan: “Melt the calculation method of the West, and incorporate them into the mould of the *Datong*. It is truly a proper view (徐文定所謂, 鎔西洋之算法, 入大統之型模, 真公論也).”⁵³ Yi Cheong 李晴 (fl. first half of the nineteenth century) changed the slogan a little more in quoting it: “Some say, ‘Melt the calculations of the West, and incorporate them into the mould of the Chinese land (鎔西洋之算, 入中土之型).’ Some say, ‘Abolish the Western method completely, and use the Chinese method exclusively. It is not right for the discussion to be prejudiced to one side.’”⁵⁴ Later, Nam Byeong-cheol 南秉哲 (1817-1863) said,

⁴⁹ *Shuxue* 數學, juan 7, 6b (*Wenyuange Siku quanshu*, book 796, 739). But elsewhere in the *Shuxue* Jiang Yong quoted directly from Mei Wending, and put the slogan exactly as the latter had put it. “然非西法之咎, 乃譯書者之疎畧耳。何則, 西法原只有閏日而無閏月, 其仍用閏月者遵舊法也。亦徐文定公所謂, 鎔西洋之巧算, 入大統之型模也。”: *Shuxue*, juan 3, 15a (*Wenyuange Siku quanshu*, book 796, 649).

⁵⁰ “Zhoutian shiergong ci” 周天十二官次, *Wuli tongkao* 五禮通考, juan 182, 62b (*Wenyuange Siku quanshu*, book 139, 407).

⁵¹ *Chouren zhuan*, juan 30, 15b (*Xuxiu Siku quanshu*, vol. 516, 299).

⁵² *Gezhi guwei* 格致古微, “Lin Yishan xu” 林頤山敘, *Siku weishoushu jikan* 四庫未收書輯刊, series 9, book 15.

⁵³ *Jeungbo munheon bigo* 增補文獻備考, juan 2 “Sangwigo II” 象緯考 二, 10a (Gojeon ganhaenghoe 古典刊行會: Dongguk munhwasa 東國文化社, 1957), 34.

⁵⁴ “或云, 鎔西洋之算, 入中土之型。或云, 盡廢西術, 專用中法。不可以一偏議也”:

after pointing out some deficiencies in Mei Wending's calendrical method: "These are caused by the saying, 'Melt *the talents (zizhi 姿質) of the West*, and *return them into the mould of the Chinese land (鎔西人之姿質, 歸中國之型範)*.'" ⁵⁵ It is interesting to note that, while criticizing Mei Wending, Nam Byeong-cheol, a strong opponent of the idea of the Chinese origin of Western learning, chose to put Wang Xichan's expression, "return," which implied a Chinese origin. A Japanese scholar, Shibukawa Kagesuke 澁川景佑 (1787-1856), also quoted the slogan in a modified form, but still essentially in Mei Wending's way, in his discussion of a new astronomical book: "This work *simply melted the mathematical li of the Western method*, and *included it in the mould of the imperial dynasty (此編直鎔西法之數理, 容諸皇朝之型模)*." ⁵⁶

Finally, it can be noted that another slogan, in line with the Xu Guangqi's, appeared and was widespread among Chinese scholars in the late nineteenth century. Impressed, and at the same time threatened, by superior weapons and other technological products of the West, but still convinced of the superiority of their own value and tradition, the Chinese scholars of the time raised a new slogan, i.e., "Chinese substance and Western functions" (*Zhongti xiyong 中體西用*), and advocated adopting Western materials and technology as "functions" to enrich and strengthen their country, while holding on to the Chinese spirit, value and culture as the "substance." ⁵⁷ Thus, what the proponents of the new slogan aimed at was of the same nature as the aims of the proponents of Xu Guangqi's slogan. What was different was the range and scale: Whereas the earlier slogan of Xu Guangqi aimed at improving the Chinese calendrical method by incorporating Western astronomical knowledge and methods, the slogan of "Chinese substance and Western functions" aimed at enriching and strengthening the country by adopting Western knowledge and techniques. Indeed, Xu Guangqi's slogan is echoed unmistakably in the

Jeonggwan pyeon 井觀編, "Seo" 序, *Dasan hakdan munheon jipseong* 茶山學團 文獻集成 (Seoul: Seonggyungwan daehakgyo chulpanbu, 2008), book 6, 12.

⁵⁵ "猶此費辭者。直爲所謂鎔西人之姿質, 歸中國之型範之語所致也": "Seo Chubo sokhae hu 書推步續解後 *Gyujae yugo* 圭齋遺藁, juan 5 (*Hanguk munjip chonggan* 韓國文集叢刊: Hanguk gojeon chonghap 韓國古典綜合 DB: a316_634d).

⁵⁶ "Kyōgō chu zatsuroku" 校合中雜錄, *Shinpo rekisho zokuhen* 新法曆書續編, quoted in An Dae-ok 安大玉, "Seongni jeongui-wa seohak 性理精義와 西學", *Daedong munhwa yeongu* 大東文化研究, 77 (2012), 301-341, on 307.

⁵⁷ On the *zhongti xiyong*, see Wang Ermin 王爾敏, "Qing ji zhishi fenzi de zhongti xiyong lun" 清季知識分子的中體西用論, *Wan Qing zhengzhi sixiang shilun* 晚清政治思想史論 (Taipei: Huashi chubanshe, 1969), 51-71; Min Tu-gi, "Chinese 'Principle' and Western 'Utility': A Reassessment," Tu-gi Min, Philip A Kuhn and Timothy Brook eds., *National Polity and Local Power: The Transformation of Late Imperial China* (Cambridge, Mass: Harvard University Asia Center, 1989), 51-88.

following remarks by Feng Guifen 馮桂芬 (1809-1874), one of the most important proponents of the nineteenth-century slogan: “If one takes the constant moral norms and the excellent teachings of China as the basis, and complement them with the techniques of various [Western] countries to strengthen the army, is it not the best among what are good?”⁵⁸

Concluding Remarks

We have seen various different ways Xu Guangqi’s slogan was quoted and modified by many Confucian scholars. The differences they showed reflected the different attitudes they had towards various Western astronomical knowledge and methods, and their different views about the proper way to accommodate them in the calendrical method. On the whole, the slogan was used by those advocating both the adoption of the Western method and the maintaining of the traditional Chinese calendrical system. Those who stood firmly on the Chinese side, believing its superiority over the Western method, did not take the slogan. For example, the compilers of the calendrical treatise of the final 1739 edition of the *Mingshi*, led by Mei Juecheng 梅穀成 (1681-1763), Mei Wending’s grandson, eliminated Xu Guangqi’s slogan, which Huang Baijia had put in an earlier draft of 1689 to support his claim that both the Western and the Chinese methods should be studied and should be taken into account.⁵⁹

⁵⁸ “如以中國倫常名教為原本，輔以諸國富强之術，不更善之善者哉”：“Cai xixue yi” 采西學議，Zheng Zhenduo 鄭振鐸，*Wan Qing wenxuan* 晚清文選 (Shanghai: Shanghai shudian, 1987), 105-106.

⁵⁹ Han Qi, “Cong *Mingshi* ‘Lizhi’ de zuanxiu kan xixue zai Zhongguo de chuanbo,” 65. Huang Baijia’s earlier draft reads, “徐光啓亦云，熔西方之材質，入大統之型模。義取兼收，意無偏尚，惡得學一廢百乎。”

ABSTRACT

Xu Guangqi 徐光啓 (1562-1633) seems to have asserted his famous slogan—"Melt the materials of that side, and incorporate them into the mould of *Datong*" (*Rong bifang zhi caizhi, ru Datong zhi xingmo* 鎔彼方之材質，入大統之型模)—mainly to justify his accommodation of Western astronomical methods and knowledge to the Chongzhen 崇禎 calendar reform. Many later Confucian scholars quoted, modified, and commented on it, while coping with the problem of introducing Western astronomical knowledge and methods into the Chinese calendrical system. In this paper, I will look at the different ways they dealt with the slogan, which will illustrate the different attitudes they had towards various Western astronomical knowledge and methods, and their different views about the proper way to accommodate them in what they considered the "correct" calendrical method.

Keywords: Xu Guangqi's slogan, *huitong*, *Datong* calendar, Western "materials", Chinese "mould".