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The *Futian Calendar* and *Yusi Scripture*: The Introduction of Foreign Astrology into China in the Tang Dynasty and Its Influence

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Abstract: This article examines the transmission and influence of Tang-period foreign astrology in China through two representative texts: the *Futian Calendar* (*Futian li* 符天历) and the *Yusi Scripture* (*Yusi jing* 聿斯经). The Tang and Song official and private bibliographies, which record numerous works belonging to the *Futian* system and the *Yusi* system, indicate that, after the *Futian Calendar* and the *Yusi Scripture* were introduced into China in the Jianzhong and Zhenyuan eras, respectively, they were widely disseminated through the practices and manipulations of folk diviners. An analysis of the surviving scattered records that reflect the contents of these two texts suggests that the *Futian Calendar* and the *Yusi Scripture* represent two sides of the same coin in the foreign astrology introduced to China: the *Futian Calendar* supplied the mathematical methods for calculating planetary positions for the fortune-telling aspect of astrology, which is mathematically demanding, while the *Yusi Scripture* provided the rules for astrological calculations, predicting an individual's fate based on the configuration of celestial bodies in the ecliptic at the time of the person's birth as determined by the *Futian Calendar*. The *Yusi Scripture* likely underwent multiple translations, reintroductions, and localizations, transforming the practice from predicting fate based on the seven luminaries to doing so with the eleven luminaries. The Tang-period foreign astrology represented by the *Futian Calendar* and the *Yusi Scripture* exerted

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a profound influence on China's indigenous astronomy and even its indigenous culture. This influence not only functioned at the broad social and cultural levels but also permeated from the civilian to the official sphere, eventually becoming an integral part of traditional Chinese culture. The study highlights how knowledge exchange and transmission drive civilizational development, and argues that necessary encounters and fusion between local culture and foreign knowledge constitute a healthy condition for preserving cultural independence and diversity.

Keywords: *Futian Calendar*, *Yusi Scripture*, Tang dynasty, foreign astrology, local influences

摘　要：本文以《符天历》和《聿斯经》为研究对象，考察唐代域外星命学在华的传播和影响。从唐宋时期各种官私书目中记录的大量"符天系"和"聿斯系"文献可知，《符天历》和《聿斯经》分别在唐建中和贞元年间传入中国之后，经过大量民间术士的实践和操弄而得以广泛传播。从对保存至今反映《符天历》和《聿斯经》内容的零星记载的分析，可以推断出《符天历》和《聿斯经》是域外来华星命学的一体两面：《符天历》为星命学的命运推算提供计算行星位置的数理方法，有一定的数理难度；《聿斯经》则提供了星命学的演算规则——通过《符天历》计算出的命主生辰时刻的天体黄道位置构形来预测命主的命运。《聿斯经》很可能经历了多次翻译、传入和本土化改造，从七曜推命变成了十一曜推命。以《符天历》和《聿斯经》为代表的唐代域外星命学，对中国本土天文学乃至本土文化产生了深远影响。这种影响不仅在广泛的社会、文化层面发挥作用，甚至从民间渗透到官方，最终成为中国传统文化的组成部分。本文的研究揭示知识交流与传播是文明进步的动力，本土文化与外来知识之间必要的碰撞与融合是保持文化独立性和多样性的良性常态。

关键词：《符天历》，《聿斯经》，唐代，域外星命学，本土影响

1 Introduction

The pathways through which ancient foreign astronomy and astrology were introduced into China and influenced the indigenous astronomy can generally be divided into two categories. One can be termed the official route, by which foreign astronomy and experts with relevant expertise directly entered Chinese official astronomical institutions, causing exotic astronomy to intersect directly with Chinese official or upper-class intellectual circles. The introduction of foreign astronomy, such as the "Three Indian Families" 天竺三家 and the *Navagraha Calendar* (or *Nine Luminaries Calendar*, *Jiuzhi li* 九执历) in the Tang dynasty, even played a role in the revision and reform of Chinese calendars. The other route could be called the folk route, by which soothsayers and diviners proficient in foreign astronomy catered to the demand of the common people for astrology, spreading this knowledge among the populace. The *Futian Calendar* (*Futian li* 符天历) and *Yusi Scripture* (*Yusi jing* 聿斯经) were among the works that circulated in this way at that time. The *Futian Calendar* and the *Yusi Scripture* have attracted sustained scholarly attention. Scholars such as Momo

Hiroyuki 桃裕行, Nakayama Shigeru 中山茂, Yabuuti Kiyosi 薮内清, and Chen Jiujin 陈久金 have produced significant studies on the *Futian Calendar*. In particular, Nakayama (1964) exploited numerical tables preserved in Japan—a fragment of the *Futian Calendar*, titled *Solar Anomaly Tables from the Futian Calendar* (*Futian li jing richancha licheng* 符天历经日躔差立成)—to derive an approximate formula for the *Futian Calendar* to calculate the difference between the true and mean positions of the sun. Yabuuti's (1983) and Chen's (1986) discussions of the *Futian Calendar* epoch's "*qi-shuo* discordance" (气朔不合) prompted the author's reexamination and ultimately led to the alternative conclusion of the "*qi-shuo* concordance" (气朔相合) of the *Futian Calendar* (Niu 2017). The *Yusi Scripture* has generated even broader scholarly interest: scholars such as Édouard Chavannes and Paul Pelliot (1931, 18), Fang Hao 方豪 (2015, 281–282), Ishida Mikinosuke 石田干之助 (1973, 699), Michio Yano 矢野道雄 (1990), Rao Zongyi 饶宗颐 (1982), Jiang Boqin 姜伯勤 (1990), and B. M. Mak (2014; 2015) have explored its transmission history and origins, thereby laying the groundwork for further study.

This paper focuses on the *Futian Calendar* and *Yusi Scripture* that were introduced into China through folk channels. It intends, by excavating and analyzing relevant records, to explore the introduction of foreign astrology into China during the Tang dynasty and its local influence through the ways, content, and effects of its dissemination, so as to further illuminate the integration of foreign astrology into local culture.

2 The introduction and dissemination of the *Futian Calendar* and *Yusi Scripture*

Carriers are essential for disseminating knowledge, and the people who master or carry knowledge are the most important actors in knowledge dissemination. As foreign astrology gained popularity in China, folk astrologers arrived with their exotic knowledge, serving as an important medium for the dissemination of foreign astronomy in China during the Tang dynasty. It is through these astrologers that the *Futian Calendar* and *Yusi Scripture* found their way to China.

2.1 Introduction of the *Futian Calendar* and literature on the *Futian* system

The *Futian Calendar* was written by the diviner Cao Shiwei 曹士蔿, who was active from the Jianzhong 建中 to the Yuanhe 元和 reign periods (780–820) of the Tang dynasty. According to the *New History of the Five Dynasties: Treatise on Astrology* (*Xin Wudai shi·Sitian kao* 新五代史·司天考): "During the Jianzhong period of the Tang dynasty (780–783), the diviner Cao Shiwei first reformed the ancient method, taking

the fifth year of the Xianqing era as the epoch and the Rain Water solar term as the beginning of the year, and named it *Futian Calendar*. However, it was called a 'minor calendar' in China and only circulated among the common folk" (Ouyang 1974, 670).[1] The *Futian Calendar* adopted a contemporary epoch and took the Rain Water 雨水 day as the start of the year, which was obviously typical in foreign astronomy and was considered to have come from India or be related to Indian calendars (Chen 1986). This is corroborated by ancient records. Wang Yinglin 王应麟 mentions in *juan* 9 of *Notes on Resolving Doubts in Study* (*Kunxue jiwen* 困学纪闻) that the *Futian Calendar* "originated from the calendar of Tianzhu (India)" (本天竺历法) (Wang 1325). The *Futian Calendar* provided mathematical support for the popular foreign astrology already circulating among the general populace. It was to some extent influential, though it was belittled as a "minor calendar" 小历 and rejected by calendar experts like Wang Pu 王朴, who considered themselves as representing the official orthodoxy.

In contrast, at the non-governmental level, following Cao Shiwei, interest in and dissemination of the *Futian Calendar* by diviners led to the formation of a lineage of texts related to it. According to records in the *Comprehensive Catalogue of Literary Works* (*Chongwen zongmu* 崇文总目) (Wang and Qian 1849–1885), *Comprehensive Records: Abstract of Literature* (*Tongzhi:·Yiwen lüe* 通志・艺文略) (Zheng 1747), *Critical Bibliography of Zhizhai Study* (*Zhizhai shulu jieti* 直斋书录解题) (Chen n.d., *juan* 12), *New Book of the Tang Dynasty: Treatise on Literature* (*Xin Tang shu: Yiwen zhi* 新唐书・艺文志) (Ouyang et al. 1975, 1548), and *History of the Song Dynasty: Treatise on Literature* (*Songshi:·Yiwen zhi* 宋史・艺文志) (Tuotuo et al. 1739, *juan* 207), *Futian*-related astronomical and astrological texts included: *Seven Luminaries Futian Celestial Stems Calendar* (*Qiyao futian renyuan li* 七曜符天人元历) in three *juan*, *Master Cao's Minor Calendar* (*Cao Gong xiaoli* 曹公小历) in one *juan*, *Seven Luminaries Futian Calendar* (*Qiyao futian li* 七曜符天历) in one *juan*, *Precomputed Ephemeris of the Two Hidden Luminaries Rāhu and Ketu* (*Luo ji er yinyao licheng li* 罗计二隐曜立成历) in one *juan*, *Futian Universal Precomputed Calendar of the Nine Luminaries* (*Futian jiuyao tongyuan licheng fa* 符天九曜通元立成法) in two *juan*, *Futian Planetary Palaces* (*Futian xinggong* 符天行宫) in one *juan*, *Nine Stars' Movement Chant* (*Jiuxing xingdu ge* 九星行度歌) in one *juan*, *Permanent Calendar of the Nine Stars* (*Jiuxing changding li* 九星长定历) in one *juan*, *Precomputed Ephemeris of the Nine Luminaries* (*Jiuyao xingluo licheng li* 九曜星罗立成历) in one *juan*, *Futian Calendar of the Five Phase Attributes* (*Futian wude dingfen li* 符天五德定分历) in three *juan*, *Guo Yingfu's Arcane Art of Futian: The Formula for Auspice and Calamity* (*Guo Yingfu futian dashu xiujue jue* 郭颖夫符天大术休咎诀) in one *juan*, *Zhang Wei's New*

1 "唐建中时，术者曹士蔿始变古法，以显庆五年为上元，雨水为岁首，号《符天历》。然世谓之小历，只行于民间。"

Techniques of Futian for Predicting Calamities and Blessings (*Zhang Wei Futian zaifu xinshu* 张渭符天灾福新术) in five *juan*, *Futian Celestial Stems Scripture* (*Futian renyuan jing* 符天人元经) in one *juan*, and so forth. This is not an exhaustive list, but it amply reflects the influence of the *Futian Calendar* at that time.

2.2 The introduction of the *Yusi Scripture* and *Yusi*-related literature

If the *Futian Calendar* provided the mathematical foundation for calculating the positions of the planets at the moment of a person's birth in foreign astrology, then the *Yusi Scripture* provided the rules for fortune-telling in this tradition, indicating what kind of celestial configurations at the time of birth foretell what kind of destiny.

According to the *New Book of the Tang Dynasty: Treatise on Literature*: "The *Duli Yusi Scripture* consists of two *juan*. During the Zhenyuan 贞元 period (785—805), the *Duli* diviner Li Miqian 李弥乾 passed it down from Western Tianzhu (India), and a scholar Mr. Qu 璩公 translated its text" (Ouyang et al. 1975, 1548).[2] Here, *Duli Yusi Scripture* 都利聿斯经 is the full title for *Yusi Scripture* (*Yusi jing* 聿斯经, also written 聿厮经), sometimes abbreviated as *Duli Scripture* (*Duli jing* 都利经, also written 都例经). Wang Yinglin records in *Notes on Resolving Doubts in Study*: "The use of the ephemerides of the eleven luminaries to determine the nobility or lowliness of a person's fate began with the *Duli* astrologer Li Miqian at the beginning of the Zhenyuan era in the Tang dynasty. The *Yusi Scripture* was originally a Sanskrit book" (Wang 1325).[3] These historical records suggest that the *Yusi Scripture* contains foreign-derived astrological methods for determining a person's fate and status. Due to the dissemination of astrological fortune-telling during the Tang and Song dynasties, this scripture was widely spread and adapted, resulting in a complex lineage of *Yusi Scripture*-related texts. A large number of such texts bearing the name "*Yusi*" can be found in bibliographies of this period. For instance, two bibliographic entries are listed in the *New Book of the Tang Dynasty: Treatise on Literature* (Ouyang et al. 1975, 1548), four in *Comprehensive Catalogue of Literary Works* (Wang and Qian 1849–1885), one in *Catalogue of Books in the Prefecture Study* (*Junzhai dushu zhi* 郡斋读书志), nine in *Comprehensive Records: Abstract of Literature* (Zheng 1747), two in *Critical Bibliography of Zhizhai Study* (Chen n.d.), eight under the column "Tang *Yusi Scripture*" (唐聿斯经) in the "Astronomy" section in *juan* 5 of *Jade Sea* (*Yuhai* 玉海) (Wang 1806), while the *History of the Song Dynasty: Treatise on Literature* (Tuotuo et al. 1739, *juan* 206) contains nine entries.

These texts reflect the inheritance and development of the astrological knowledge contained in the *Yusi Scripture* by the community of astrologers during the Tang and

2 "《都利聿斯经》二卷，贞元中，都利术士李弥乾传自西天竺，有璩公者译其文。"
3 "以十一星行历推人命贵贱，始于唐贞元初都利术士李弥乾。《聿斯经》本梵书。"

Song dynasties. The authors of *Yusi*-related texts who left their names during this period, such as Chen Fu 陈辅, An Xiumu 安修睦, Guan Ziming 关子明, Bao Kai 鲍鍷, Tang Mei 唐昧, Wang Ximing 王希明, Xu Shi 徐氏, Chu Yanming 楚衍明, and Liu Xigu 刘熙古, formed an influential group engaged in the practice of *Yusi Scripture*-based astrological techniques. They played a crucial role in promoting the cross-cultural sharing and cross-regional dissemination of foreign astrological knowledge, as it likely included members from diverse cultural backgrounds from both inside and outside China. For example, the author of *Duli Yusi Mnemonic* (*Duli yusi jue* 都利聿斯诀), An Xiumu, may have been a Sogdian from Central Asia (Wei 2017), while the author of the astrological text P.4071 among the Dunhuang manuscripts, the "white-robed" diviner Kang Zun 康遵, who wrote in the seventh year of the Kaibao 开宝 era (974), was probably a Sogdian from the Kingdom of Kangju (present-day Samarkand) (Rong 2001; Rao 1993, 571).

3 The main content of the *Futian Calendar* and *Yusi Scripture*

As previously stated, both the *Futian Calendar* and *Yusi Scripture* were introduced from abroad, but their original versions no longer exist. However, through their spread, adaptation, and development by foreign and native diviners in China, *Futian*-based and *Yusi*-based astrological textual lineages were formed during the Tang-Song period. Some of their specific contents can be determined from these texts.

3.1 The main content of the *Futian Calendar*

A notable characteristic of the *Futian Calendar* is the use of a contemporary epoch, "taking the fifth year of the Xianqing era as the epoch and the Rain Water solar term as the beginning of the year" (Ouyang 1974, 670).[4] As the epoch, it should be a new moon day as well as the day of the Rain Water solar term. Consulting Chen Yuan's 陈垣 (1956, 87) *Calendrical Tables for the Twenty Standard Histories* (*Ershi shi shuorun biao* 二十史朔闰表), the Celestial Stem and Terrestrial Branch of the first day of the first lunar month in that year would be *Renyin* 壬寅, corresponding to the Gregorian calendar date of February 16, 660. Yabuuti Kiyosi believed that the Celestial Stem and Terrestrial Branch of the Rain Water day in that year was *Jiachen* 甲辰. By examining the accumulated days noted in a record dated the twenty-fifth day of the twelfth month in the third year of the Ten'ei 天永 era in Japan, contained in *Records of Fortune-Telling by Constellations* (*Sukuyō Unmei Kanroku* 宿曜运命勘录) in *juan* 908 of *Zoku Gunsho Ruijū*

4 "以显庆五年为上元，雨水为岁首。"

(*Xu qunshu leicong* 续群书类从),[5] he found that if calculated from the "Rain Water *Jiachen*" (雨水甲辰) day in the fifth year of Xianqing, the accumulated days were two days off. Unable to explain this two-day discrepancy, he suggested that the accumulated days in this calendar might have been calculated from that year's first day in the first lunar month, which was *Renyin*. In other words, Yabuuti argued that the epoch of the *Futian Calendar* does not align the solar term with the new moon day, and that the epoch is the first day of the first lunar month. He also proposed that the record of Rain Water as the "beginning of the year" (岁首) is a "mis-recording" (误记), and it should have been "the beginning of the solar term" (气首) (Yabuuti 1983). Chen Jiujin (1986, 38), however, argued that "since the Rain Water day is declared as the beginning of the year, it must also coincide with the new moon day."[6] But he also admitted that "if calculated with precise values, the solar term day and new moon day in the first month of Xianqing's fifth year indeed differ by two days."[7] He then speculates that the two-day difference may have been caused by the use of an imprecise tropical year length in the *Futian Calendar*.

It is inferred in this paper that both Yabuuti Kiyosi and Chen Jiujin treated Rain Water as a mean solar term,[8] whereas the *Futian Calendar* in fact used true solar terms (Niu 2017). According to modern ephemeris (Standish et al. n.d.), February 16, 660 (*Renyin*) was both the true Rain Water day and the new-moon conjunction day (*heshuo* 合朔).[9] The first day of the first lunar month in the fifth year of Xianqing and the true Rain Water term fell within the same civil day, achieving exact "*qi-shuo* concordance" (气朔相合) (the concurrence of the solar term and the new moon).

In fact, the *Futian Calendar* indeed contained methods for calculating true solar terms. While the complete text has not been preserved, it was transmitted to Japan by the Japanese monk Nichien 日延, who studied the calendar at the Astronomical Bureau

5 *Records of Fortune-Telling by Constellations* records that "the total number of days accumulated from the *Gengshen* 庚申 year as the epoch to the present day is 165,428" (自上元庚申岁距今日所积日数十六万五千四百廿八日). *Gengshen* year refers to the fifth year of the Xianqing 显庆 era (660), indicating that this astrological book used the *Futian Calendar* to calculate the positions of the Nine Luminaries at the time of birth.

6 "既称以雨水为岁首，就必然是气朔相合。"

7 "如果以精密数值推算，显庆五年正月气朔确实相距两天。"

8 According to modern ephemeris calculations, after converting the winter solstice moment of the fourth year of Xianqing to local time in Xi'an 西安, it would be 6:02 on the *Guimao* 癸卯 day of December 19, 659. Adding the number of days for four mean solar terms (approximately 60.874 days), we get 3:01 on the *Jiachen* 甲辰 day of February 18, 660 (local time in Xi'an), which is the moment when the mean solar term of Rain Water in the fifth year of Xianqing occurred.

9 According to modern ephemeris calculations, at 14:17 local time in Xi'an on the *Renyin* day of February 16, 660, the solar longitude was 330.00 degrees, which is the moment of the true solar term of Rain Water. The moment of the conjunction (new moon) in the first lunar month of the fifth year of Xianqing was 21:41 local time in Xi'an on the same day, with both the sun and the moon at a longitude of 330.31 degrees.

of the Wuyue Kingdom in 953 (Momo 1964). A fragment of it, titled *Solar Anomaly Tables from the Futian Calendar* (*Futian li jing richancha licheng* 符天历经日躔差立成), was discovered in the *Secret Book of Astronomy* (*Tianwen mishu* 天文秘书) held in the Tenri Library 天理图书馆 in Japan today. This fragment proves that the *Futian Calendar* was capable of calculating true solar terms. The preface of this textual fragment first provides instructions on how to use the "solar anomaly table" (日躔差立成) and the method for deriving the true position of the sun from its mean position (Bo 1995, 137). Nakayama Shigeru (1964) used this table to derive an approximate formula for the *Futian Calendar* to calculate the difference between the true and mean positions of the sun:

$$\lambda - l = \frac{l}{3300}(182 - l)$$

Here, "l" denotes the mean ecliptic longitude of the Sun, while "λ" represents its true ecliptic longitude. Utilizing the precomputed tables from surviving fragments of the *Futian Calendar* or the approximate formula mentioned above, one can determine the Sun's true position, which in turn enables the calculation of dates for specific true solar terms.

As a matter of fact, it can be confirmed that true solar terms were used in all the extant *Futian*-related astrological texts for calendar compilation. *Seven Luminaries for Disaster Aversion* (*Qiyao rangzai jue* 七曜攘灾决), which Yabuuti Kiyosi (1983) identified as belonging to the *Futian Calendar* system, dedicates its second *juan* to a specialized table of "True Solar Terms along the Ecliptic"[10] and emphasizes that "all solar motion computations shall take true solar longitude as standard" (Jinjuzha 1934, 450).[11] The Japanese astrological text *Records of Fortune-Telling by Constellations* (Anonymous 1926, 429) also uses the *Futian Calendar* for calculations and annotates the birth dates of individuals with true solar terms.[12] The same is seen in another Japanese astrological text, *Manual of Fortune Calculation through Lunar Mansions and Luminaries* (*Sukuyō Gounroku* 宿曜御运录) (Anonymous n.d.), preserved in "The Documents of Rokujo Ariyasu, Tokyo" (东京都六条有康氏所藏文书) held by the University of Tokyo

10 "黄道日躔定气。"

11 "太阳之精凡行背以定气为准。"

12 At the beginning of the *Records of Fortune-Telling by Constellations*, the number of days from the moment of the native's birth to the epoch of the *Futian Calendar* is given as follows: "A boy was born at the *Chou* hour of the *Wushen* day, the twenty-fifth day of the twelfth lunar month in the third year of Japan's Ten'ei era (*Renchen* year). It was the first day of the Greater Cold. Calculation and verification: The total number of days from the epoch *Gengshen* year to today is 165,428 days" (天永三年壬辰十二月廿五日戊申时丑诞生男，大寒初日，算勘：自上元庚申岁距今日所积日数十六万五千四百廿八日). Here, "the *Wushen* day, the twenty-fifth day of the twelfth lunar month in the third year of the Ten'ei era (*Renchen* year)" corresponds to January 14, 1113. It can be calculated that the solar longitude on this day was 300.59 degrees, which conforms to the definition of the true solar term Greater Cold.

(Figure 1).[13] These three examples all demonstrate that true solar terms were adopted in the *Futian Calendar* and associated astrological practices.

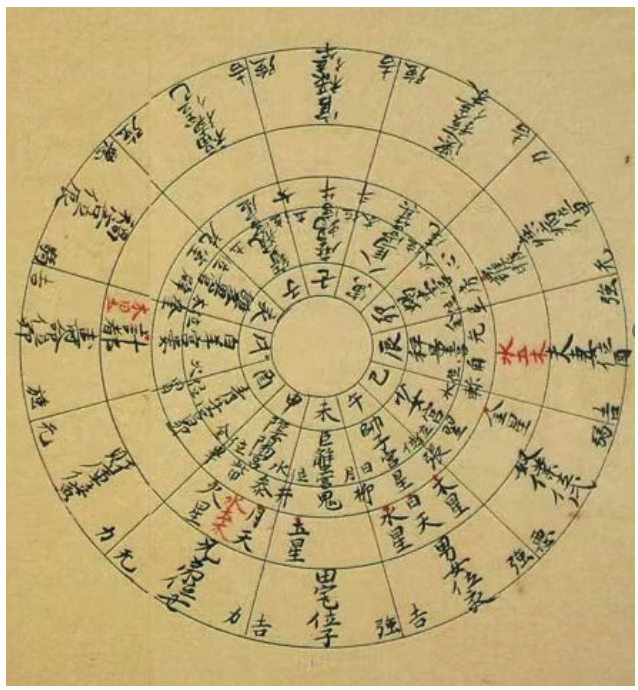


Figure 1: An astrological birth chart from the *Manual of Fortune Calculation through Lunar Mansions and Luminaries* (*Sukuyō Gounroku* 宿曜御运录), the Documents of Rokujō Ariyasu, Tokyo 东京都六条有康氏所藏文书, held by the University of Tokyo Library.

In addition, among the Russian-held Chinese-language documents from Khara-Khoto, there is a fragment of a "block-printed almanac of the first year of the Shaosheng era (1094), designated as X37" (X37 刻本绍圣元年历书) (Institute of Oriental Studies et al. 2000, 328). From the accumulated days noted in it, it can be inferred that its epoch is also the conjunction day and Rain Water day in the first lunar month of

13 At the beginning of the *Records of Fortune-Telling by Constellations*, the number of days from the native's birth date to the epoch of the *Futian Calendar* is given as follows: "A boy was born at the *Hai* 亥 hour of the *Bingwu* 丙午 day, the twenty-sixth day of the sixth lunar month in the fifth year of Japan's Ten'ei era (*Wuchen* 戊辰 year). It was the seventh day after the Start of Autumn. Calculation and verification: The accumulated days amount to 222,245 days" (文永五年戊辰六月己未廿六日丙午时亥御诞生男，当立秋七日，算勘：积日廿二万二千二百四十五日). Here, "the *Bingwu* day, the twenty-sixth day of the sixth lunar month in the fifth year of the Ten'ei era (*Wuchen* year)" corresponds to August 6, 1268. The first day of the Start of Autumn (a true solar term) in that year fell on July 31, so August 6 was exactly "the seventh day after the Start of Autumn."

Xianqing's fifth year,[14] which is the epoch of the *Futian Calendar*.

In the fourteenth *juan* of the *Great Compendium of Astral Science* (*Xingxue dacheng* 星学大成) compiled by Wan Minying 万民英 in the Ming dynasty, titled *Grand Compendium of Sun, Moon, and Stars* (*Sanchen tongzai* 三辰通载), there is an algorithm for calculating the positions of the eleven luminaries. In the case of Jupiter, the algorithm is as follows: "First set the accumulated days at 171,300, subtract the adjustment number of 74, and then repeatedly subtract the number of days in Jupiter's orbital period, which is 398 days, 88 minutes, and 61 seconds. The remainder that is not enough to subtract indicates the segment of Jupiter's orbit, which determines its position" (Wan 1986a, *juan* 14).[15] The algorithms for the other ten luminaries are similar, only with different parameters (Wan 1986a, *juan* 22). It is not difficult to find that, starting from the epoch of the *Futian Calendar*, which is the conjunction and Rain Water day in the first month of Xianqing's fifth year (February 16, 660), the 171,300th day is exactly the Rain Water day in the first month of Jianyan 建炎 era's third year of the Song dynasty (February 12, 1129, Julian Day number 2,133,468). Therefore, the "Tortoise Algorithm" (总龟算法) in *Grand Compendium of Sun, Moon, and Stars* for calculating positions of the eleven luminaries all use the Rain Water day in the first month of Jianyan's third year as the contemporary epoch. In actual calculations, the epoch moment is adjusted by adding or subtracting different numbers of days. The true epoch of this algorithm can be traced back to the epoch of the *Futian Calendar*, which is the new moon and Rain Water solar term in the first month of Xianqing's fifth year. This also implies that the eleven-luminary astrology that rose during the Tang-Song period is closely related to the *Futian Calendar*.

The above two surviving astrological texts that utilize the Nine Luminaries for divination preserved in Japan, the calendar materials unearthed from Khara-Khoto 黑水城, and the calculation methods for the eleven luminaries' positions recorded in the *Grand Compendium of Sun, Moon, and Stars* all take the conjunction as well as the Rain Water day in the first month of Xianqing's fifth year for calculation, which is the epoch of the *Futian Calendar*. This indicates that the *Futian Calendar* was widely used in both star divination techniques and popular calendrical practices during the Tang and Song dynasties.

Apart from references to Cao Shiwei's work in the "*Seven Luminaries Futian Calendar* (*Qiyao futian li* 七曜符天历) in one *juan*" (《七曜符天历》一卷), which is recorded in the

14 The "block-printed almanac of the first year of Shaosheng (1094), designated as X37" contains the notation "accumulated days: 158,492 days" (积日一十五万八千四百九十二日). The first day of the first lunar month in the first year of Shaosheng corresponds to January 19, 1094, with a Julian day number of 2,120,660. Calculating from the epoch of the *Futian Calendar* (the first day of the first lunar month in the fifth year of Xianqing, with a Julian day number of 1,962,169) to this date, inclusive of both the start and end dates, the total accumulated days is exactly 158,492.

15 "先置积日一十七万一千三百，减七十四，以周天三百九十八日八十八分六十一秒去之，看余日多少，入在何段，下太阳中定星度，又以余日数去之，不满者为定度。"

New Book of the Tang Dynasty: Treatise on Literature (Ouyang et al. 1975, 1548), Cao is also mentioned in Chen Zhensun's 陈振孙 *Critical Bibliography of Zhizhai Study* in *juan* 12: "The *Precomputed Ephemeris of the Two Hidden Luminaries Rāhu and Ketu*, consisting of one *juan*, is attributed to Grand Commandant (大中大夫, a senior official rank) Cao Shiwei. Though it is unclear who he was, it states that the calendar begins from the first year of the Yuanhe era (806)" (Chen n.d.).[16] Coincidentally, the Buddhist text *Seven Luminaries for Disaster Aversion* (*Qiyao rangzai jue* 七曜攘灾决) provides a ninety-three-year-long table of the motion of Rāhu 罗睺 and a sixty-two-year-long table of the motion of Ketu 计都. Descriptions of the motions of Rāhu and Ketu are given before their respective tables (Jinjuzha 1934, 442, 446). From the descriptions and the analysis of the two ephemerides, it can be concluded that *Seven Luminaries for Disaster Aversion* defines Rāhu as the ascending node of the moon's orbit (white path) and the ecliptic (yellow path), and Ketu is the apogee of the moon's orbit (Niu 1994). It is particularly noteworthy that the epoch of the two ephemerides is the first year of the Yuanhe era (806), which is the same epoch as Cao Shiwei's *Precomputed Ephemeris of the Two Hidden Luminaries Rāhu and Ketu*. The description of the Rāhu table also emphasizes particularly that the first year of Yuanhe "corresponds to the first year of the Daitō era in Japan, 147 years after the grand epoch of *Gengshen*."[17] *Gengshen* is the epoch of the *Futian Calendar*, the fifth year of the Xianqing era (660), and the first year of Yuanhe is exactly 147 years after the fifth year of Xianqing.

Therefore, the Rāhu and Ketu tables in *Seven Luminaries for Disaster Aversion* might be exactly the *Precomputed Calendar of the Two Hidden Luminaries Rāhu and Ketu* by Cao Shiwei. Five other planetary tables are contained in *Seven Luminaries for Disaster Aversion*, all adopting the tenth year of the Zhenyuan era (794), a *Jiaxu* 甲戌 year, as the epoch (Jinjuzha 1934, 429, 433, 437, 440, 441). Since historical records indicate that the *Futian Calendar* was introduced by Cao Shiwei during the Jianzhong era of the Tang dynasty (780–783), its epoch would not be in the later Zhenyuan or Yuanhe years. However, as it was a normal practice for "folk minor calendars" (民间小历) with foreign backgrounds to select a more recent year as the epoch, as exemplified by the *Futian Calendar*, the ephemerides presented in the *Seven Luminaries for Disaster Aversion* and *Precomputed Calendar of the Two Hidden Luminaries Rāhu and Ketu* can be regarded as adaptations and creations by later followers within the *Futian* framework. In the *Critical Bibliography of Zhizhai Study*, before the entry "*Precomputed Calendar of the Two Hidden Luminaries Rāhu and Ketu,*" another entry reads "*Qingluo Precomputed Calendar* (*Qingluo licheng li* 青罗立成历) in one *juan*" (《青罗立成历》一卷), which also "enters the calendar in the tenth year of Zhenyuan, *Jiaxu* (794)" (贞元十年甲戌入历) (Chen 2004,

16 "《罗计二隐曜立成历》一卷，称大中大夫曹士蔿，亦莫知何人，但云起元和元年入历。"
17 "当日本大同元，上元庚申后百四十七年。"

227–228). Since the epoch of the five planetary tables provided in the *Seven Luminaries for Disaster Aversion* is also the year 794, it can be inferred that the *Qingluo Precomputed Calendar* might be another derivative of the *Futian* system.

From the above, it can be inferred that the *Seven Luminaries for Disaster Aversion* also contains appropriate tools to serve as essential mathematical support for the practice of foreign astrology demonstrated in the *Futian Calendar*: an "Ecliptic Solar Position and True Solar Term" (黄道日躔定气) table for determining the true position of the Sun, namely, the dates of the true solar terms (the extant Japanese fragment of the *Futian Calendar*, *Solar Anomaly Tables from the Futian Calendar* preserves its calculation method), five planetary tables for Jupiter, Mars, Saturn, Venus, and Mercury, and tables for the two hidden luminaries Rāhu and Ketu. Additionally, due to the complex and variable apparent motion of the Moon, neither ancient official calendrical scholars nor folk diviners were able to compile a "lunar table" (月历表)—this is actually a goal that could only be achieved with the advent of Newtonian mechanics in modern celestial mechanics. In ancient astrology, the position of the Moon was calculated using a simplified algorithm. For example, in *juan* 1 "Illustrations of Astrological Auspiciousness and Inauspiciousness" (星曜吉凶图例) of the *Great Compendium of Astral Science* (Wan 1986b), a "Rhymed Formula for Approximating the Moon's Apparent Motion" (约太阴行度法歌)[18] is provided, which can roughly calculate the lunar mansion where the subject was born. Therefore, the *Seven Luminaries for Disaster Aversion* actually provides methods for calculating the positions of the nine luminaries, including the Sun, the Moon, the five planets, plus Rāhu and Ketu. Such astrological techniques, together with the *Sutra of Nakṣtras and Luminaries* (*Xiuyao jing* 宿曜经), another classic of Esoteric Buddhism, were transmitted to Japan and continuously

18 The full text of this approximate method reads: "As for the position of the Moon in its motion, it starts from the *Wei* 危 Mansion in the first lunar month. It travels thirteen degrees a day, and moves to the next two mansions every five days. In the second lunar month, it begins from the *Kui* 奎 Mansion; in the third, from the *Wei* 胃 Mansion; in the fourth, from the *Bi* 毕 Mansion; in the fifth, from the *Jing* 井 Mansion; in the sixth, from the *Liu* 柳 Mansion; in the seventh, from the *Zhang* 张 Mansion. In the eighth lunar month, it starts from the *Yi* 翼 Mansion; in the ninth lunar month (the last month of autumn), it roams from the *Jiao* 角 Mansion. In the tenth lunar month, it takes the *Fang* 房 Mansion as the starting point; in the eleventh lunar month of the *Zi* 子, look carefully for the *Ji* 箕 Mansion. It is essential to know that in the twelfth lunar month of the *Chou* 丑, it begins from the *Qianniu* 牵牛 Mansion. There is no error in the degrees of the celestial circle. This is the method for calculating the Moon's motion, from which one can derive the natal chart and ascendant of a person's life" (欲识太阴行度时，正月之节起于危。一日出行十三度，五日两宫次第移。二奎三胃四从毕，五井六柳张居七。八月翼宿以为初，龙角季秋任游历。十月房宿作元辰，建子箕星细寻觅。丑月牵牛切要知，周天之度无差忒。此是太阴行度方，人命身宫从此得). The same mnemonic verse also appears in other documents, such as the anonymous *Yuan Tiangang's Complete Book on Five Planets and Three Destinies* (*Yuan tiangang wuxing sanming daquan* 袁天罡五星三命大全), and it would have been common knowledge familiar to astrologers.

applied. This is testified to by the two astrological texts preserved in Japan discussed earlier.

3.2 The spread and adaptation of *Yusi Scripture*

According to the *New Book of the Tang Dynasty: Treatise on Literature*, during the Zhenyuan period of the Tang dynasty (785–805), the *Duli* astrologer Li Miqian introduced a *Duli Yusi Scripture* in two *juan* to China from Western Tianzhu (ancient India), and a Mr. Qu 瞿公 assisted in translating it into Chinese (Ouyang et al. 1975, 1548). The *Comprehensive Records: Abstract of Literature* dates the event to the early years of the Zhenyuan period, stating that the *Duli* astrologer Li Miqian brought a five *juan* copy of the original Sanskrit *Duli Yusi Scripture* to Chang'an, the Tang capital (Zheng 1747). It is evident from extant historical documents that the introduction of the complete, translated *Yusi Scripture* into China came just a few years after the dissemination of the *Futian Calendar* by Cao Shiwei during the Jianzhong period (780–783). Thus, an integrated theoretical system of foreign astrology was formed combining the two works, one that permeated China as a whole in the early years of the Zhenyuan period.

However, there is evidence suggesting that prior to this period, namely, the early years of the Zhenyuan era, the *Yusi Scripture* or related astrological knowledge had already found its way to China. In the *Brahma-horanavagraha* (*Fantian huoluo jiuyao* 梵天火罗九曜, *Brahma's Astrology of Nine Luminaries*) "authored by Yixing" (一行禅师修述) (Figure 2), an interlinear note about Rāhu and Ketu reads: "Throughout the year, the head of the Eclipse Deity (蚀神) resides in the two lunar mansions *Yi* 翼 and *Zhang* 张; and the tail of the Eclipse Deity resides in the two lunar mansions *Wei* 尾 and *Di* 氐. The *Yusi Scripture* says: 'Ordinary people only know of the seven luminaries, but are unaware of the hidden stars Rāhu and Ketu. These stars are invisible in their hidden positions, and when they encounter the sun or the moon, an eclipse occurs, hence the name Eclipse Deity. Ketu is its tail, also known as the Leopard Tail'" (Yixing 1934a, 461).[19] This interlinear note reveals very important information: first, it provides the ecliptic positions of Rāhu and Ketu in that particular year; second, it explains the meanings of the two luminaries, quoting the *Yusi Scripture*. Based on the positions given here, it can be inferred that this note was written in the year 751 (Niu 2005). That is to say, more than thirty years at least before the introduction of the complete *Yusi Scripture* into China in the early Zhenyuan period, a commentator of the *Brahma-horanavagraha* had already come into contact with the *Yusi Scripture* or related

19 "蚀神头从正月至年终常居二宿：翼宿、张宿；蚀神尾从正月至年终常居此二宿：尾宿、氐宿。按《聿斯经》云：'凡人只知有七曜，不知暗虚星，号曰：罗睺、计都。此星在隐位不见，逢日月即蚀，号曰蚀神。计都者，蚀神之尾也，号豹尾。'"

astrological knowledge.



Figure 2: Frontispiece of the *Brahma-horanavagraha* (梵天火罗九曜) in the *Taishō shinshū daizōkyō* (大正新修大藏经, book 21) featuring an image of Lord Rāhu 罗睺星.

Subsequently, during the Tang-Song transition, with the rise in popularity of foreign astrology, the *Yusi Scripture* was widely disseminated and adapted. Many practitioners wrote or compiled works related to it, with various *Yusi*-related texts recorded in bibliographies such as the *Comprehensive Records: Abstract of Literature* (*Tongzhi·Yiwen lüe* 通志 • 艺文略) and *Jade Sea: Astronomy* (*Yuhai·tianwen* 玉海 • 天文). However, the exact compilation dates and contents of these texts are no longer verifiable. There are also some astrological texts that contain sporadic *Yusi Scripture* quotations. For example, the *Numinous Observatory Scripture* (*Lingtai jing* 灵台经), a text completed during the Tang-Song transition and included in the *Taoist Canon* (*Daozang* 道藏), mentions: "Furthermore, the *Duli Scripture* states: When the celestial sphere rises above the horizon, the house at the eastern position (*Mao* 卯) is considered the house of Life Palace" (Anonymous 1988, 23).[20] Here, the Life Palace is defined as the zodiacal house rising on the eastern horizon at the moment of one's birth, a concept from Western astrology that appears as early as the Hellenistic period in the *Carmen Astrologicum* by Dorotheus of Sidon, and is consistent with the definitions in another *Yusi*-related text, *Yusi Scripture from the West* (*Xitian yusi jing* 西天聿斯经) included in the Southern-Song *Grand Compendium of Sun, Moon, and Stars*.

The astrological text P.4071 from among the Dunhuang manuscripts, dated the seventh year of the Kaibao era (974), has a clear dating of the fortune-telling and the name of the fortune-teller in its colophon (Figure 3). It also contains two quotations from the *Yusi Scripture*: "According to the *Yusi Scripture*, when Mercury resides in the

20 "又《都例经》云：天轮初出地平际，卯上星辰为命宫。"

Twin Maidens (Virgo), its divinatory power peaks."[21] and "According to the *Yusi Scripture*: The positions of *Zi* 子, *Wu* 午, *Mao* 卯, and *You* 酉 are called the 'Four Poles'[22]" (Shanghai Ancient Books Publishing House and Bibliothèque nationale de France 2005, 75–78).[23] Other quotes from the *Yusi Scripture* can be found in the *Records of Fortune-Telling by Constellations*: "As stated in the *Yusi Scripture*, when Venus and Mercury are in the same house, one will be benevolent, skilled in arts, and capable of writing"[24] and "the *Yusi Scripture* states: When Earth and Jupiter form a trigon, one will ascend to a high position" (Anonymous. 1926, 431–432).[25] However, these are mere fragments rather than lengthy excerpts.

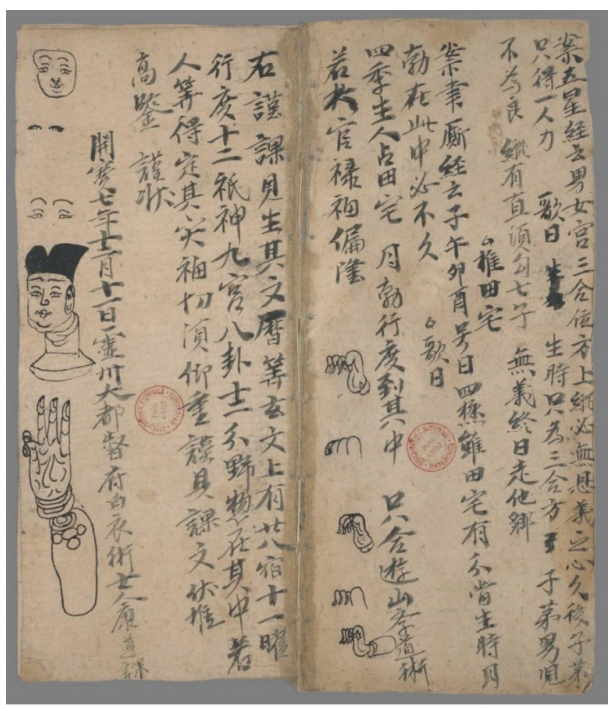


Figure 3: The colophon of the astrological text (P.4071) from the Dunhuang manuscripts, dated the seventh year of the Kaibao era (974), held by the Bibliothèque nationale de France.

21 "案《聿厮经》云：水居双女最为灵。"

22 In Western astrological birth charts, the "Four Poles" 四极 have important astrological meanings. They refer to the Midheaven, Nadir, Ascendant (eastern horizon), and Descendant (western horizon) at the moment of birth, which were translated into *Zi*, *Wu*, *Mao*, and *You* in ancient China. See Beck (2007, 29).

23 "案《聿厮经》云：子午卯酉号曰四极。"

24 "《聿斯经》云：金水同宫，即令能仁，兼有学艺，作文章。"

25 "《聿斯经》云：土木三合，并居高处。"

It was not until Qian Rubi 钱如璧 of the Southern Song dynasty, a native of the city of Jiaxing 嘉兴, included a section titled *Yusi Scripture from the West* 西天聿斯经 in his *Grand Compendium of Sun, Moon, and Stars* that the most complete text of the *Yusi Scripture* can be found to date. This work opens with the lines: "Human fate is governed by celestial calculations; profound numerology defies easy interpretation. One must master this *Scripture*, the systematic principles of which illuminate all. To determine the zodiac houses at the time of birth, count birth hours backward toward the east. When the celestial sphere rotates above the horizon, the house called Life Palace is at the *Mao* position (East). The Twelve Houses of the Zodiac are thus allocated, within which noble configurations reside."[26] It concludes with: "Fortune and misfortune are predetermined in life. Destined cycles cannot escape cosmic law. Only by mastering these poetic formulae may one comprehend the profound wisdom in the *Scripture*" (Qian n.d.).[27] The entire text consists of seven-character verses, totaling 261 lines and 1,827 characters, with complete opening and closing sections. Chen Zhensun (1179–ca. 1261) mentions in his *Critical Bibliography of Zhizhai Study* that "The *Grand Compendium of Sun, Moon, and Stars*, compiled by Qian Rubi from Jiahe (renamed as 'Jiaxing' in modern times), includes the techniques of the Five Planetary Divination" (Chen n.d.).[28] However, the same document was not included by Chao Gongwu 晁公武 (1105–1180) in his *Catalogue of Books in the Prefecture Study*. It is thus inferred that Qian Rubi lived between the mid-twelfth and the mid-thirteenth centuries, which also marks the latest possible time for the appearance of the *Yusi Scripture from the West*.

Regarding the origin of the *Yusi Scripture*, Édouard Chavannes and Paul Pelliot have argued that the *Duli Scripture* and *Yusi Scripture*, judging by their names, seem to have come from the city of Kangju (Chavannes and Pelliot 1931, 18).[29] Fang Hao 方豪 (2015, 281–282), however, classified the *Yusi Scripture* as an Indian astronomical and mathematical text. Ishida Mikinosuke 石田干之助 (1973, 699) believed that the *Duli Yusi Scripture* was a Buddhist astronomical work incorporating Iranian cultural elements. Yabuuti Kiyosi (1990, 177–191) studied the *Treatise of Four Portals* (*Simen jing* 四门经) and suggested that it might be related to Ptolemy's work *Tetrabiblos* (*The Four Books*) based on its title. Michio Yano 矢野道雄 (1990, 217–220), building on Yabuuti Kiyosi's research, proposed that the Chinese word "*Duli Yusi*" was actually a transliteration of "Ptolemy" in Pahlavi, Syriac, or Arabic. Rao Zongyi 饶宗颐 (1982, 771–793), in his *On the Seven Luminaries and Eleven Luminaries* (论七曜与十一曜), held that "*Duli*" refers to the city of Kangju in the Western Regions, and the *Yusi Scripture*

26 "人命生来禀星算，历数幽玄妙难断。须识《西天都例经》，理义分明有条贯。但问生时日宿宫，加向时辰回视东。天轮初出地平转，卯上星辰是命宫。因之以配十二位，十二位中有高贵。"
27 "人生祸福皆前定，运数无逃于天地。但知子细认其歌，更尽经中玄妙义。"
28 "《三辰通载》三十四卷，嘉禾钱如璧编集五星命术。"
29 "《都利经》及《聿斯经》，观其名似为康居之书。"

originated from the Sogdians along the Talas River in Central Asia. Jiang Boqin 姜伯勤 (1990) argued that the *Yusi Scripture* had connections with Persia. Bill M. Mak (2014; 2015) has also discussed issues such as the text, author, and origin of the *Yusi Scripture from the West*, as well as its relationship with earlier *Yusi*-system documents, pointing out that this document is similar in content to the *Carmen Astrologicum* by Dorotheus of Sidon, a Hellenistic astrologer of the first century.

Carmen Astrologicum is also known as the *Pentateuch*, which means "five scrolls" or "five books." Its original Greek version has been lost. Between approximately 222 and 267, it was translated from Greek into Pahlavi, then further supplemented between 531 and 578. The supplemented version was later translated into Arabic (Kotyk 2018). The English version commonly available today was translated by Pingree (Dorotheus of Sidon 1976). It consists of five scrolls in total: the first discusses the growth and living conditions of the subject; the second deals with marriage and children; the third explains the calculation of lifespan; the fourth concerns matters related to annual fortune, diseases, and death; and the fifth focuses on divinatory interrogations and judgements. Its division into five scrolls can be matched with the record noted above in the *Comprehensive Records: Abstract of Literature* that a *Duli* astrologer Li Miqian brought the five-scroll (*juan*) Sanskrit original of the *Duli Yusi Scripture* to Chang'an. In terms of the route of dissemination, it is highly possible that *Carmen Astrologicum* first spread to India and then on to China.

During the period of over 400 years from the Zhenyuan period of the Tang dynasty to Qian Rubi's time in the Southern Song dynasty, the *Yusi Scripture* may have been translated and introduced multiple times. The quotations from it found in the astrological texts of various periods present similar ideas, but their wording differs slightly. This is probably due to adaptations made during the copying and transcribing process. If *Carmen Astrologicum* is indeed the original text of the *Yusi Scripture*, then it tells fortune by calculating the positions of only seven luminaries. In both the *Comprehensive Records: Abstract of Literature* and *Jade Sea: Astronomy*, it is emphasized that the *Duli* astrologer Li Miqian brought a two-*juan Duli Yusi Scripture* to Chang'an for "the divination of fate with ephemerides of eleven luminaries" (Zheng 1747, *juan* 68:19b; Wang 1806, *juan* 5:34b).[30] However, in the *Yusi Scripture from the West* the terms "eleven luminaries" (十一曜) or "nine luminaries" (九曜) never appear, while the phrase "seven luminaries" (七曜) appears four times. It can be inferred, therefore, that the *Yusi Scripture from the West* was probably translated later but directly from the Syriac or Arabic version of *Carmen Astrologicum* (possibly an abridged translation). In contrast, the *Duli Yusi Scripture*, brought by Li Miqian and translated by Mr. Qu, went through more intermediate dissemination links and underwent more adaptations, even

30 "推十一星行历，知人命贵贱。"

changing from predicting fate based on seven luminaries to using eleven luminaries.

Compared with Ptolemy's *Tetrabiblos*, which boasts a rigorous and complete system of astrological theory, Dorotheus's *Carmen Astrologicum* focuses more on the application of astrology, which may have made it more conducive to its practice and dissemination among astrologers. The translation of the *Yusi Scripture*, combined with the calculation of planetary positions in the *Futian Calendar*, introduced to China an exotic form of astrology focusing on the fates of common people. This astrology quickly gained popularity and exerted an impact on the local culture, stimulating the creation of more varieties of civilian astrology.

4 The influence of foreign astrology on China during the Tang dynasty

In terms of the effects of dissemination, whether through official or civilian channels, the foreign astronomy introduced into the Tang dynasty ultimately converged in their profound impact on both Chinese indigenous astronomy and local culture. The scope of this influence extended temporally to the subsequent Song, Yuan, Ming, and Qing dynasties, and spatially to the East Asian Sinosphere. The process of this influence inevitably involved collisions, conflicts, absorption, and integration, which are all part of the necessary stages in the incorporation of heterogeneous cultures into the local culture.

4.1 The influence of the unofficial "Minor Calendar"—*Futian Calendar*—on official calendars

While belittled as a "minor folk calendar" (民间小历), the *Futian Calendar* provided a solid mathematical foundation for the astrological techniques that emerged in the late Tang dynasty and gradually gained attention from some calendrical scholars at that time. The newly discovered epitaph of Xu Sheng 徐昇,[31] author of the Tang dynasty *Xuanming Calendar* (*Xuanming li* 宣明历), mentions that he had studied the major "Futian" calculations during his "prime years" (壮岁) (Zhang 2021). Later, Xu entered the official astronomical bureau. Through the growing expertise and promotion of calendrical scholars like Xu Sheng, the *Futian Calendar* began to exert influence on the official calendars.

During the Five Dynasties period, based on the *Futian Calendar* the calendrical scholar Ma Chongji 马重绩 created the *Tiaoyuan Calendar* (*Tiaoyuan li* 调元历), and obtained its official promulgation (Ouyang 1974, 670). However, it was not well

31 It is from this epitaph that we know the correct way to write the name of the author of the *Xuanming Calendar* as Xu Sheng 徐昇, not Xu Mao 徐昴, as had been passed down in historical texts.

thought of. For instance, Li Xinchuan 李心传 (n.d.) of the Song dynasty, in his *Miscellaneous Records of the Court and the Commonality since the Jianyan Era, Part B* (*Jianyan yilai chaoye zaji yiji* 建炎以来朝野杂记乙集), argued that the *Tiaoyuan Calendar* was in error to imitate the *Futian Calendar* by no longer calculating the Grand Epoch. Ouyang Xiu (1739) made similar comments in his *Historical Records of the Five Dynasties: Treatise on Astrology* (*Wudai shiji: Sitian kao* 五代史记・司天考). His comments also reveal the two characteristics of minor folk calendars and foreign calendars: the adoption of a contemporary epoch and the use of ten thousand—a constant for calendar calculation—as the common denominator.

Traditionally, however, Chinese calendars placed great emphasis on the calculation of accumulated years since the Grand Epoch (*Shangyuan* 上元). During the Song dynasty, the accumulated year count from the Grand Epoch in most calendars amounted to tens of millions, with the smallest counts reaching several million. However, Yang Zhongfu 杨忠辅 uniquely employed a significantly smaller epochal accumulation of only 3835 years in his *Tongtian Calendar* (*Tongtian li* 统天历) (Tuotuo et al. 1977a, 2023). This move immediately drew criticism. In the third year of the Kaixi 开禧 era (1207), Bao Hanzhi 鲍瀚之 launched a lengthy critique, arguing that the "*Tongtian Calendar* had only been in use for a short time, yet its predictions of solar eclipses were already inaccurate. This was still acceptable. However, the fact that the starting point of its calendrical calculations was set merely two centuries after the reign of Emperor Yao rather than at the mythical beginning of the world, was a serious flaw" (Tuotuo et al. 1977b, 1944–1945).[32] Here Bao emphasized the importance of the epoch adopted in traditional Chinese calendars. Compared to the *Futian Calendar*, which starts from the fifth year of the Xianqing era, and the *Tiaoyuan Calendar*, which begins in the fourteenth year of the Tianbao era, the epoch of the *Tongtian Calendar* is much earlier. However, as it does not begin from the "beginning of the world," Bao classified it as a minor folk calendar, like the *Futian Calendar*.

The *Tongtian Calendar* was put into use in the fifth year of the Qingyuan era of the Southern Song dynasty (1199). Although this was more than two hundred years after Ma Chongji's *Tiaoyuan Calendar* and nearly four hundred years after Cao Shiwei's *Futian Calendar*, it is clear that the *Tongtian Calendar* was influenced by these two predecessors. In fact, the impact of minor folk calendars on official calendars was not limited to the two cases of the *Tiaoyuan Calendar* and the *Tongtian Calendar*. In another case, Pei Boshou 裴伯寿 of the Song dynasty commented on Liu Xiaorong's 刘孝荣 *Qiandao Calendar* (*Qiandao li* 乾道历) in 1167: "This new calendar originates from the *Ten-Thousandth Calendar* (*Wanfen li* 万分历), a folk calendar from the Five Dynasties

32 "进历未几，而推测日食已不验，此犹可也。但其历书演纪之始，起于唐尧二百余年，非开辟之端也。"

period. Its excess fraction of the synodic month is too large, and it is often derided by knowledgeable calendrical scholars. Now Liu has merely tripled the denominator of the minor 'ten-thousandth calendar,' using 30,000 as the day denominator to conceal its association with the 'Ten-Thousandth' title. This so-called 'Thirty-Thousandth Calendar' is, in essence, still the ten-thousandth calendar" (Tuotuo et al. 1977a, 1932–1933).[33] Here Liu intended to shield his *Qiandao Calendar* from being criticized as a minor folk calendar. Thirty years later, Yang Zhongfu adopted the epoch calculating method in the *Futian Calendar* and the *Tiaoyuan Calendar*, but he dared not use a very close epoch for the same reason. Yet, his calendar still could not avoid being ridiculed as an unofficial minor calendar.

In short, although most official calendrical astronomers, who considered themselves the orthodox authorities, firmly rejected the unofficial minor *Futian Calendar*, it spread widely and became popular among the people, influencing the official traditional calendars. Moreover, the influence of the *Futian Calendar* even extended as far as Japan. Nichien, a monk of the Tendai sect in Japan, crossed the sea to China in the seventh year of the Tenryaku era (953). He learned the *Newly Revised Futian Calendar and Its Ready-Reckoner* (*Xinxiu Futian li jing bing licheng* 新修符天历经并立成) at the Imperial Astronomical Bureau in Hangzhou, the capital of the Kingdom of Wuyue, and returned to Japan in the first year of the Tentoku era (957) (Momo 1964). The *Futian Calendar* was used in conjunction with the Tang dynasty's *Xuanming Calendar* in Japan for a long time, exerting a significant impact on Japan's official calendars.

4.2 From Rāhu and Ketu to the Four Residuals: The localization and profound influence of foreign astrological concepts

In the Tang dynasty, the foreign destiny-calculation system based on the *Futian Calendar* and *Yusi Scripture* in a sense filled the gap in local divination techniques, thus quickly gaining in popularity. It contributed to the introduction of astrological theories and concepts from abroad, enriching China's indigenous astrology. Its influence not only spread to the deeper layers of common culture but also, in the end, allowed some of the calculations in the civilian calendars to enter the mainstream and become part of the calculations of the official calendar in later generations.

By analyzing the ninety-three-year-long Rāhu ephemeris and the sixty-two-year-long Ketu ephemeris provided in the *Seven Luminaries for Disaster Aversion*, a *Futian*-system scripture included in the Esoteric Buddhism section of the *Taishō Tripiṭaka* 大正藏 (Niu 1994), and by studying the ecliptic positions of Rāhu and Ketu contained in the *Brahma-horanavagraha* (*Brahma's Astrology of Nine Luminaries*) (Niu 2005), it can be

33 "新历出于五代民间《万分历》，其数朔余大强，明历之士往往鄙之。今孝荣乃三因万分小历，作三万分为日法，以隐万分之名。三万分历即《万分历》也。"

determined that Rāhu is the ascending node of the lunar orbit (white path) with the ecliptic (yellow path), and Ketu is the apogee of the lunar orbit. During their assimilation into Chinese astronomy and calendrics, these two foreign concepts underwent further semantic shifts, eventually splitting into the "Four Residuals" (*Si yu* 四余, four auxiliary celestial bodies), namely Rāhu, Ketu, *Yuebei* (Lunar Apogee 月孛), and *Ziqi* (Purple *Qi* 紫气). An inquiry into this evolutionary process helps outline the trajectory of its Sinicization and reveal the historical contours of its conceptual transformation.

Rāhu and Ketu are Sanskrit terms (transliterated respectively as "Luohou" 罗睺 and "Jidu" 计都 in Chinese), and together with the Sun, the Moon, and the five planets (collectively known as the "Seven Luminaries"), they form the so-called "*Navagraha*" 九执 (or "Nine Luminaries" 九曜), a concept brought into China chiefly with Esoteric Buddhist scriptures.[34] Between the mid-Tang and the Five Dynasties, Esoteric Buddhism flourished, making Rāhu and Ketu widely known and adopted in official calendars and popular spells. After the Five Dynasties, however, they were generally rejected by orthodox Chinese calendric specialists. For example, when Wang Pu of the Later Zhou dynasty presented his *Qintian Calendar* (*Qintian li* 钦天历) in 956, he strongly opposed the ideas of Rāhu and Ketu, arguing that they were merely hypothetical fictions for computational convenience rather than actual celestial bodies, and therefore his *Qintian Calendar* avoided using the Nine Luminaries in its annotations (Ouyang 1975, 2409). In the first year of the Jiatai 嘉泰 era (1201), Yu Feng 俞丰 and others petitioned for a new calendar and criticized contemporary almanacs. They condemned "the use of Nine Luminaries for auspicious and inauspicious divination" (九曜吉凶之法) as "vulgar street talk" (闾阎鄙俚之说), unworthy of "rectifying customs and displaying them to the barbarians" (正风俗、示四夷之道), and urged that such "unorthodox doctrines" (不经之论) be eliminated (Tuotuo et al. 1975, 2895).

The very vehemence of Wang Pu's objections attests to the enormous influence that Rāhu and Ketu had at that time. Once incorporated with the Sun, the Moon, and the five planets to form the Nine Luminaries, they left footprints not only in astronomical and calendrical scholarship but also stubbornly permeated local ritual, music, religion,

34 Regarding the meaning of the *Navagraha*, reference can be made to the explanation in *juan* 4 of *Commentary on the Mahāvairocana Abhisambodhi Sutra* (大毗卢遮那成佛经疏) written by Yixing: "There are nine types of *Grahas*, namely the Seven Luminaries (Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn) together with Rāhu and Ketu, which form the *Navagraha*" (执有九种，即是日月火水木金土七曜，及与罗睺、计都，合为九执) (Yixing 1934b, 617). Additionally, in *juan* 7 of the same sutra: "The Sanskrit term is *Bṛhaspati*, which is translated as *Navagraha*. When they exactly converge at one place, it is called the 'exact time' in Indian calendars, and this carries the meaning of 'holding' or 'grasping'" (梵语名槃哩何，翻为九执。正相会一处，天竺历名正着时，此执持义). The Sanskrit term for "九执" is *Navagraha*, referring to the nine deities of holding or grasping.

and even drama. According to the *History of the Song Dynasty: Records of Music V* (*Songshi yuezhi wu* 宋史・乐志五), at the suburban sacrifice ceremony of the thirteenth year of the Shaoxing 绍兴 era (1143), the orchestra notably included "one gourd *sheng* each for the Seven Luminaries, the Nine Luminaries, and the Intercalary Surplus, and one command banner" (Tuotuo et al. 1986b, 406).[35] The presence of the instruments in the emperor's suburban rites demonstrates how deeply the foreign concept of the Nine Luminaries had become embedded within traditional Chinese culture.

In the first act of the *zaju* drama (a poetic-musical drama form dominant in thirteenth-fourteenth century China) *Zhang Tianshi Judges the Wind, Flowers, Snow, and Moon* (*Zhang Tianshi duan fenghua xueyue* 张天师断风花雪月) by Wu Changling 吴昌龄 of the Yuan dynasty in *Selected Yuan Dramas* (*Yuanqu xuan* 元曲选) by the Ming-dynasty anthologist Zang Maoxun 臧懋循 (1550–1620), a scene opens with:

> [Enter the main actress, dressed as the Osmanthus Fairy.] OSMANTHUS FAIRY: I am the fairy of the osmanthus in the Moon. On this fifteenth night of the eighth month I have been beset by Rāhu and Ketu; only through the *yaoqin* (a mythical lute) melody played by Chen Shiying 陈世英 from the mortal world has the mansion *Lou* 娄宿 been awakened and I saved from disaster. I owe him a karmic debt of gratitude, and today I descend to earth to repay it. (Wu 1977, 176)[36]

Rich elements of Indian culture are contained in these lines. Indian tradition explains lunar eclipses as the Asura king Rāhu stretching his hand across the disc of the full moon, a motif repeatedly recorded in Buddhist scriptures that had become common knowledge in China by then. Thus, when the fairy complains that Rāhu and Ketu are harassing her on the fifteenth night, she is invoking this Indian legend. The reason Chen Shiying's *yaoqin* melody moves the mansion *Lou* rather than any other mansions is that in India the name of the month is determined by the lunar mansion in which the full moon falls, and the eighth month in China corresponds to India's "*Lou* month" 娄月.

There is evidence that by the Northern Song dynasty, Rāhu and Ketu had already become the subject of study for some calendrical scholars. For example, the *History of the Song Dynasty: Treatise on Literature VI* lists "Zhang Pu's *Futian Universal Precomputed Calendar of the Nine Luminaries* in two *juan* and Yao Shunfu's *Eclipse Deity Hidden Luminaries Calendar* (*Shishen yinyao li* 蚀神隐耀历) in three *juan*" (Tuotuo et al. 1986a, 653).[37] Yao Shunfu 姚舜辅 was a renowned calendrical scholar of the Northern Song

35 "七星、九曜、闰余匏笙各一，麾幡一。"
36 "[正旦扮桂花仙上云]妾身乃月中桂花仙子，今因八月十五日有这罗睺、计都缠搅妾身，多亏下方陈世英一曲瑶琴感动娄宿，救了我月宫一难。我和他有这宿缘仙契，今日直至下方与陈世英报恩答义去也。"
37 "章浦《符天九曜通元立成法》二卷，姚舜辅《蚀神隐耀历》三卷。"

dynasty. He created the *Jiyuan Calendar* (*Jiyuan li* 纪元历), which was promulgated in the fifth year of the Chongning 崇宁 era (1106).

Shen Kuo 沈括 of the Northern Song dynasty (1031—1095) also mentions Rāhu and Ketu when discussing solar and lunar eclipses. In *juan* 7 of his *Dream Pool Essays* (*Mengxi bitan* 梦溪笔谈) under the section "Astronomy and Mathematics" (Xiangshu 象数) (Figure 4), he explained Rāhu and Ketu as follows: "Therefore, in the Indian methods, Rāhu and Ketu both move in retrograde. They are what we now call the nodes of the Moon's orbit. The first intersection 交初 is called Rāhu, and the middle intersection 交中 is called Ketu" (Shen 1987, 312).[38] The "first intersection" refers to the descending node of the lunar orbit with the ecliptic, and the "middle intersection" refers to the ascending intersection. Here Shen Kuo treats Rāhu and Ketu as retrograde in the sky, which clearly contradicts the records in the *Seven Luminaries for Disaster Aversion* (Niu 1994). The different understandings of Rāhu and Ketu among Tang Esoteric Buddhist astrologers and Song scholars might be related to the Sinicization of the Four Residuals and the popularity of the Eleven Luminaries.



Figure 4: "Rāhu and Ketu both move in retrograde" (罗睺计都皆逆步之), excerpted from the "Astronomy and Mathematics" (Xiangshu 象数) section of *Dream Pool Essays* (*Mengxi bitan* 梦溪笔谈), *Xuejin taoyuan* edition engraved at Zhang's Zhaokuang Pavillion in Yushan, Qing Jiaqing tenth year (1805) 清嘉庆十年虞山张氏照旷阁刻学津讨原本.

38 "故西天法罗睺、计都，皆逆步之，乃今之交道也。交初谓之罗睺，交中谓之计都。"

The so-called "Four Residuals" refer to Rāhu, Ketu, *Yuebei*, and *Ziqi* (Purple *Qi*). Here, Rāhu and Ketu are the two intersections of the ecliptic (yellow path) and the lunar orbit (white path). *Yuebei*, originally just an alternative name for Ketu, became one of the Four Residuals and inherited the astronomical meaning of Ketu to independently serve as a term for the lunar apogee. As one of the Four Residuals, the origin and astronomical meaning of *Ziqi* have always been somewhat unclear; it is generally considered to be a hypothetical celestial body related to the intercalary surplus. Together, the Four Residuals and the Seven Luminaries make up the Eleven Luminaries.

In the *Annals of the Five Dynasties* (*Wudai huiyao* 五代会要), *juan* 18, Wang Pu 王溥 (922–982) of the Song dynasty records a report from the Imperial Astronomical Bureau in the second month of the third year of the Changxing 长兴 era of the Later Tang dynasty (932): "We have received an order from the Secretariat and the Chancellery to annually submit to the Historical Archives a 'Detailed Ephemeris of the Eleven Luminaries' (Shiyi yao xi xingli 十一曜细行历) and the auspicious and inauspicious changes of the celestial movements" (Wang 1978, 294).[39] This is the earliest known record of the Eleven Luminaries in historical documents. In the *Comprehensive Essentials of Military Affairs* (*Wujing zongyao* 武经总要), *juan* 20, Zeng Gongliang 曾公亮 of the Song dynasty (999–1078) also mentions, in the section "The Six-Ren Avian Method" (六壬用禽法, a method to predict auspiciousness or inauspiciousness with specific star constellations known as "avian stars"): "Examine which lunar mansion in the sky the Eleven Luminaries reside in, and which one they are temporarily positioned above" (Zeng 1986).[40]

From the collation of the *Yusi*-related astrological texts, it is evident that the Eleven Luminaries are closely associated with the *Yusi Scripture*. Chao Gongwu mentions in his *Catalogue of Books in the Prefecture Study*: "The Eleven Luminaries, namely the Sun, the Moon, the five planets, Rāhu, Ketu, *Ziqi*, and *Yuebei*, are used to calculate the twelve zodiacal signs and degrees to determine a person's status, longevity, and fortune or misfortune."[41] However, learned scholar as he was, Chao could not identify the origin of the Eleven Luminaries, merely stating, "Some say it originates from the Brahmanical studies of India" (Chao 1819).[42] Wang Yinglin 王应麟 (1223–1296) of the Song dynasty mentions in his *Notes on Resolving Doubts in Study*: "The use of the ephemerides of the eleven luminaries to determine the nobility or lowliness of a person's fate began with the *Duli* astrologer Li Miqian at the beginning of the Zhenyuan era in the Tang

39 "奉中书门下牒令，逐年中送史馆《十一曜细行历》并周天行度祥变等。"
40 "审天上十一曜在何宫宿，而时下临何宿。"
41 "日、月、五星、罗睺、计都、紫炁、月孛十一曜，演十二宫宿度，以推人之贵贱、寿夭、休咎。"
42 "不知其术之所起。""或云天竺梵学也。"

dynasty" (Wang 1935).[43] The Yuan scholar Wu Lai 吴莱 (1297–1340) argues: "The so-called Eleven Luminaries refer to the Sun, the Moon, the five planets, and the Four Residuals. [. . .] This idea is fundamentally based on the *Duli Yusi Scripture*. *Duli* is probably a transliteration of Dulai, a city in the Western Regions on the Dulai River. Thus, the '*Yusi* Scripture' we speak of today is a Brahmanical technique. Li Miqian was indeed a Brahmanical astrologer" (Wu 1919).[44] Here, Wu traces the origin of the Eleven Luminaries to Kangju city in the Western Regions. Towards the end of the Ming dynasty, Xing Yunlu 邢云路 essentially reiterates Wu Lai's view in his *Study of Ancient and Modern Calendars* (*Gujin lüli kao* 古今律历考), arguing that the concept of the Four Residuals had already appeared in the *Dulai Yusi Scripture* translated by the Brahman Li Miqian during the Zhenyuan years (785–805) (Xing 1986). Thus, from Chao Gongwu's "not knowing the origin of the technique" (不知其术之所起) through Wang Yinglin to Wu Lai, the theory of the Eleven Luminaries was confirmed as having been transmitted by the *Duli* astrologer Li Miqian from Kangju city, and Li Miqian received it from India. It is also apparent that Chao, Wang, and Wu, based on their prime years, though more and more distant chronologically from the Zhenyuan era, their assertions regarding the origin of the Eleven Luminaries from the *Yusi Scripture* became increasingly affirmative.

However, as previously mentioned, the *Yusi Scripture from the West*, included in the *Grand Compendium of Sun, Moon, and Stars*, never mentioned the Eleven Luminaries, only the Seven Luminaries. The Esoteric Buddhist scripture *Brahma-horanavagraha*, which was probably translated between the Kaiyuan era and the tenth year of the Tianbao era (751) (Niu 2005), cites the "*Yusi* scripture" in its interlinear notes (Yixing 1934a, 461), but only mentions Rāhu and Ketu. In the *Comprehensive Catalogue of Literary Works*, *juan* 8, "Calendrical and Mathematical Works" (历数类), written by Wang Yaochen 王尧臣 (1003–1058) of the Song dynasty, seven book titles with the words "*Yusi*," "Seven Luminaries," and "Nine Luminaries" are recorded (Wang 1986), but no titles are found with the term "Eleven Luminaries." Wang Yaochen lived a century earlier than Chao Gongwu, and the Tang dynasty works he had access to must have been more extensive than those seen by Wang Yinglin and Wu Lai. Therefore, the concept of the Four Residuals does not seem to have been simply transmitted from Indian Brahmanical studies; other reasons may lie behind their formation.

Examining past documents mentioning the Eleven Luminaries, it is found that most are related to Taoist literature. As previously discussed, Chao Gongwu's *Catalogue of Books in the Prefecture Study* records a *Scripture of Measuring Luminaries* (*Chengxing jing* 秤星经) in three *juan*, which might be exactly the *Essential Secret Scripture of Measuring*

43 "以《十一星行历》推人命贵贱，始于唐贞元初都利术士李弥乾。"

44 "所谓十一星者，日、月、五星、四余是也。……今其说一本之《都利聿斯经》。都利盖都赖也，西域康居城当都赖水上。则今所谓《聿斯经》者，婆罗门术也。李弥乾实婆罗门伎士。"

Luminaries from Numinous Observatory (*Chengxing lingtai miyao jing* 秤星灵台秘要经) included in the *Taoist Canon* (*Daozang* 道藏) under the "Category of Various Arts" (众术类) in the "Section of True Grottoes" (洞真部). The existing version of the scripture is incomplete, with only one *juan* remaining. In it one can still find methods for invoking and appeasing Mars, Jupiter, Saturn, and the Hidden Luminaries, as well as an incomplete "Song of the Subtle Limit" (*Dong wei xian ge* 洞微限歌). The terms "Purple *Qi*" and "*Yuebei*" are present in the song beyond the Nine Luminaries (Anonymous 1977a, 6061). However, as Chao Gongwu notes, the book "has no recorded author" (不著撰人), making it impossible to determine the exact date of its completion. It is tentatively inferred that it was completed around the late Tang dynasty to the Five Dynasties period.

The *Taoist Canon* includes another text, the *Numinous Observatory Scripture*, which is collected in the same *juan* as the *Essential Secret Scripture of Measuring Luminaries from Numinous Observatory*. Originally consisting of twelve chapters, the *Taoist Canon* version now contains only the last four chapters. In Chapter Ten "Flying to Various Palaces" (*Feipei zhugong* 飞配诸宫) under the section "Dead Prisoner Palace" (死囚宫), the names of the four Hidden Luminaries—Rāhu (*shishen* 蚀神, Eclipse Deity), Ketu (*jiaozhong* 交中, middle intersection), Purple *Qi* (*tianyi* 天一, Celestial Unity), and *Yuebei* (*taiyi* 太一, Great Unity)—are mentioned (Anonymous 1977b, 6051). However, the author of the scripture is unknown. Zheng Qiao 郑樵 (1104–1162) records in the "Calendrical and Mathematical Works" (历数类) of his *Comprehensive Records: Abstract of Literature* an entry "*Numinous Observatory Scripture* in one *juan*" (《灵台经》一卷), which is likely this very book. It can be roughly inferred that the scripture was written between the Five Dynasties and the Northern Song dynasty.

The Dunhuang manuscript P.4071, a horoscope dated to the seventh year of the Kaibao era (974), is the earliest firmly dated text employing the Eleven Luminary system for fate calculation, showing that this method was already fully developed in contemporary civilian astrology. In 1015, during the eighth year of the Dazhong Xiangfu 大中祥符 era, Wang Qinruo 王钦若, by imperial order of the Song Emperor Zhenzong, compiled the *Rituals of the Grand Offering to the Heavenly Hosts* (*Luotian dajiao yi* 罗天大醮仪). In the seventeenth list of the "Twelve-Hundred Holy Divine Seats Venerated in the Huanglu (Yellow Register) Ritual,"[45] the complete titles of the True Lords of Eleven Luminaries 十一曜真君 are enumerated (Lü 1977, 42497–42498), an act that can be viewed as the formal establishment of the Eleven Luminaries within the Taoist star-deity pantheon. Thereafter, Taoist scriptures regularly present the Eleven Luminaries in a systematic manner. For example, the *Supreme Scripture on the Grand Offering Rites to Heavenly Hosts Revealed by the Highest Numinous Treasure Celestial Worthy*

45 "黄箓罗天一千二百分圣位"

(*Taishang dongxuan lingbao tianzun shuo luotian dajiao shangpin miaojing* 太上洞玄灵宝天尊说罗天大醮上品妙经) lists the names of the Eleven Luminary Lords (Anonymous 1977c, 37996). In Song times, in the "Proper Ascent to the Mystery" (正升玄) section of *juan* 30 of the *Genuine Scripture of the Jade Marrow* (*Yusui zhenjing* 玉髓真经) by Zhang Dongxuan 张洞玄, the Eleven Luminaries are also mentioned. It states that the "Ascent to the Mystery" is fundamentally a method to "make the sector presided over by the Eleven Luminaries naturally reveal its own auspicious or inauspicious nature" (Zhang 1550).[46]

In the early years of the Southern Song dynasty, Li Changling 李昌龄, a hermit from Jiajiang, when annotating the phrase "evil stars bring disasters" (恶星灾之) in the *Supreme Scripture of the Response and Retribution* (*Taishang ganying pian* 太上感应篇), wrote: "According to the *Scripture of the Great Disaster-Dispelling Mantra of the Eleven Luminaries* (*Shiyi yao da xiaozai shenzhou jing* 十一曜大消灾神咒经), sentient beings in the Desire Realm do not follow the orthodox path and are unaware of the cycles of the Five Elements and the illumination of the Eleven Luminaries, which determine their fortunes and misfortunes" (Li 1977, 36211).[47] Here the *Scripture of the Great Disaster-Dispelling Mantra of the Eleven Luminaries* refers to the *Scripture of the Great Disaster-Dispelling Mantra of the Eleven Luminaries Spoken by the Celestial Worthy of the Primordial Beginning* (*Yuanshi tianzun shuo shiyi yao da xiaozai shenzhou jing* 元始天尊说十一曜大消灾神咒经). The author of the scripture is unknown, but it likely dates no earlier than the early Northern Song dynasty. It is included in the *Taoist Canon* under the category of "Scriptures" in the True Grottoes section. The text is attributed to the Celestial Worthy of the Primordial Beginning 元始天尊 speaking to the *Qingluo* Perfected Lord 青罗真人. It mainly consists of the mantras for the Eleven Luminaries—Sun, Moon, Jupiter, Mars, Venus, Mercury, Saturn, Rāhu, Ketu, Purple *Qi*, and *Yuebei*. The *Ritual of the Jade Sound* (*Yuyin fashi* 玉音法事), compiled during the Zhenghe years of the Northern Song dynasty, also lists the names of the Eleven Luminaries in the section "Homage to the Eleven Luminaries" (礼十一曜) in its second *juan* (Anonymous 1977d, 14403).

Additionally, the Eleven Luminaries were also commonly depicted in paintings and murals during the Song dynasty. In the eighth *juan* of the *Continued Records of Painting* (*Hua ji* 画继) by Deng Chun 邓椿 from the late Northern Song and early Southern Song periods, there is a record of "Sun Taigu's Eleven Luminaries Painting" (孙太古《十一曜图》) (Deng 1964, 104). Sun Taigu, also known as Sun Zhiwei 孙知微, was a painter who lived during the reigns of Taizong (939–997) and Zhenzong (998–1022) of the Song dynasty. Historical records describe him as "well-versed in literature, proficient in the *Analects* and Huang-Lao studies, and skilled in miscellaneous painting,

46 "升玄本是使十一曜所临之方自见吉凶"

47 "按《十一曜大消灾神咒经》，欲界众生不修正道，不知有五行推运，十一曜照临，主其灾福。"

initially studying under the monk Lingzong" (Liu 1986).[48] Furthermore, Guo Ruoxu 郭若虚 in the third *juan* of his *Records of Experiences in Painting* (*Tuhua jianwen zhi* 图画见闻志) mentions a Changsha native named Wu Dongqing 武洞清, "who excelled in painting Buddhist and Taoist figures with exceptional precision, and whose works such as *Miscellaneous Merits*, *Eleven Luminaries*, *Twenty-Eight Lunar Mansions*, and *Twelve Immortals* were passed down to posterity" (Guo 1985, 134–135).[49] It is therefore evident that the Eleven Luminaries were a popular subject in stellar deity paintings in the Song dynasty. Moreover, in the essay "Record of the Jade Emperor Hall" (*Yuhuang dian ji* 玉皇殿记), included in *juan* 86 of *Huang's Daily Notes* (*Huangshi richao* 黄氏日钞) by Huang Zhen 黄震 (1213–1280) of the Song dynasty, it is mentioned that: "The Eleven Luminaries are enshrined alongside for worship" (十一曜，旁列祀) (Huang 1337). Here, the deities of the Eleven Luminaries worshipped in the Jade Emperor Hall are represented as statues.

Taken together, the evidence suggests that during the Five Dynasties and the early Northern Song dynasty the concept of the Eleven Luminaries—formed by adding the Four Residuals (including Purple *Qi* and Lunar Apogee) to the original Seven Luminaries—first crystallized, most likely through the adaptation of native Chinese astrologers working from the earlier nine-luminary scheme. Throughout the Northern and Southern Song dynasties the Eleven Luminaries proliferate in Daoist texts and appear as stellar deities in Buddhist and Daoist shrines, where their chief roles were fate-calculation and calamity-dispelling. This shows, on the one hand, that these four originally foreign astronomical concepts—descendants of Rāhu and Ketu—continued their process of Sinicization during the Song; on the other hand, it indicates that the creation and spread of the "Four Residuals" were inseparably tied to Daoism. In Wang Qinruo's Song-dynasty work *Prime Tortoise of the Record Bureau* (*Cefu yuangui* 册府元龟), *juan* 53, the section on "Imperial Esteem for Huanglao-Taoism" (帝王部尚黄老第一) relates that the Northern-Wei figure Kou Qianzhi 寇谦之 "calculated the positions of the Eleven Luminaries, failed to fully comprehend them and was left in dismay" (Wang 1986),[50] yet the original text of the *Book of Wei* (*Wei shu* 魏书) reads "he calculated the positions of the Seven Luminaries but failed to fully comprehend them" (Wei 1986, 339).[51] This is an obvious anachronistic alteration—the concept of the "Eleven Luminaries" did not exist during the Northern Wei period—yet it subtly betrays the Daoist predilection for the Eleven Luminaries at that time.

The shift from the worship of the Seven or Nine Luminaries to the Eleven Luminaries can be corroborated by other examples. For instance, in the frontispiece of the *Sūtra of the*

48 "知书，通《论语》、黄老学，善杂画，初师沙门令宗。"
49 "工画佛道人物，特为精妙，有《杂功德》、《十一曜》、《二十八宿》、《十二真人》等像传于世。"
50 "算十一曜，有所不了，惘然自失。"
51 "算七曜，有所不了。"

Dhāraṇī of the Great Majestic and Disaster-Dispelling Auspicious Uṣṇīṣa of the Blazing Light Buddha (炽盛光佛顶大威德销灾吉祥陀罗尼经) (Figure 5), a Northern Song engraved edition from the fifth year of the Kaibao era (972), held at Kaminobo Temple 上之坊寺院 in Nara, Japan, deities of the Eleven Luminaries, the Twelve Zodiac Signs, and the Twenty-Eight Lunar Mansions are depicted around the Buddha of Blazing Light. However, in the main text of the sutra, we read, "At that time, Shakyamuni Buddha was in the Palace of Tranquil Abode, addressing the constellations, the heavenly beings who roam the skies, the *Navagraha*, the Twenty-Eight Mansions, the Twelve Zodiac Deities, and all the holy assembly."[52] Here, the "*Navagraha*" refers to the "Nine Luminaries." This comparison of the illustration with the text shows the transition from the Nine Luminaries to the Eleven Luminaries. Given that this sutra was printed in the Northern Song period,[53] this change undoubtedly took place in China.

In another case, the *Hora Chart* (火罗图) (Figure 6), housed in Kyoto's To-ji Temple 东寺, a copy of the Esoteric Buddhist text *Brahma-horanavagraha* (*Brahma's Astrology of Nine Luminaries*) collected in the *Taishō Tripiṭaka*, is arranged in the layout of a star



Figure 5: The frontispiece of the *Sūtra of the Dhāraṇī of the Great Majestic and Disaster-Dispelling Auspicious Uṣṇīṣa of the Blazing Light Buddha* (炽盛光佛顶大威德销灾吉祥陀罗尼经), a Northern Song engraved edition in the fifth year of the Kaibao era (972), held at the Kaminobo Temple 上之坊寺院 in Nara, Japan.

52 "尔时，释迦牟尼佛在静居天宫，告诸宿曜、游空天众、九执大天及二十八宿、十二宫神、一切圣众。"

53 The colophon at the end of the sutra indicates that the engraver was Qian Zhaoqing 钱昭庆, and the engraving date was "the fifth year of the Kaibao era of the Song dynasty (972), the year of *Renshen*, on the eighth day of the fourth month" (大宋开宝五年岁次壬申四月八日). See Li (2002, 32).



Figure 6: The *Hora Chart* (火罗图), held at the To-ji Temple, Kyoto.

mandala. However, careful comparison reveals that the depictions in the *Hora Chart* of the two hidden luminaries, Rāhu and Ketu, especially Ketu, are slightly different from those in the *Brahma-horanavagraha*. The position of Rāhu in the *Hora Chart* remains in the lunar mansions *Yi* 翼 and *Zhang* 张, while Ketu's position has, remarkably, shifted

from the mansions of *Wei* 尾 and *Di* 氐 in the *Brahma-horanavagraha* to the mansions of *Wei* 危 and *Shi* 室. Given the ecliptic positions of the twenty-eight lunar mansions, it is inferred that the To-ji Temple's *Hora Chart* presents Rāhu and Ketu in exactly opposite positions on the ecliptic, which is consistent with the definition of the two hidden luminaries as the ascending and descending nodes of the moon's orbit. The *Brahma-horanavagraha* was written in 751 and was transmitted to Japan along with the *Sutra of Nakṣtras and Luminaries* (*Xiuyao jing* 宿曜经) and others, which promoted the popularity of Nine-Luminaries fortune-telling astrology in Japan. The *Hora Chart* was made in 1166, judging from the inscription "Hora Chart, copied from the Cizunyuan edition in the middle of the sixth month of the second year of Eiman (1166)."[54] During the era when the Eleven Luminaries system was prevalent in China, the *Hora Chart* produced at that time began to depict Rāhu and Ketu as part of the Eleven Luminaries, rather than of the Nine Luminaries system that was popular in Japanese astrology.

Another example is the incident recorded in the *History of Goryeo* 高丽史 by Jeong In-ji 郑麟趾 of the Ming dynasty, which occurred in the fourteenth year of King Chungnyeol (1288): "In the twelfth lunar month [. . .] on *Bingchen* 丙辰 day, the king visited the Hall of the Nine Luminaries to offer sacrifices to the Eleven Luminaries" (Jeong 1451).[55] This shows that Goryeo, as part of the Sinosphere, was influenced by China's worship of the Nine Luminaries, and built the Hall of the Nine Luminaries 九曜堂 to enshrine their deities. After the Eleven Luminaries system became popular, Goryeo began to worship the deities of the Eleven Luminaries, but the name of the Hall remained unchanged.

Zhao Youqin 赵友钦 (1271–ca. 1335), a Quanzhen Taoist priest of the Yuan dynasty, provided a detailed description of the speeds, movements, and directions of the Four Residuals in *juan* 3 of his *The New Treatise on Astronomy* (*Gexiang xinshu* 革象新书) (Zhao 1986), which can be regarded as offering a standard definition of the Four Residuals. Proficient in calendrical calculations, Zhao's description of their movements was therefore more refined and mathematical than those of other Taoist figures.

By the Ming dynasty, the concept of the Four Residuals had shed its predominantly folk character—previously confined largely to Taoist texts and astrological manuals—and became a standard element in the calculations of the official *Great Uniformity Calendar* (*Datong li* 大统历). The *History of the Ming: Treatise on Calendars VI* (*Mingshi·lizhi liu* 明史·历志六) records the technique of "calculating the Four Residuals" (步四余). It states that Purple *Qi* (*Ziqi*) and Lunar Apogee (*Yuebei*) each have their own orbital period (*zhouri* 周日) and daily movement (*dulü* 度率), while Rāhu and Ketu share the same orbital period and daily movement. It contains items such as

54 "火罗图，永万二年六月中旬以慈尊院本奉写之。"
55 "十二月……丙辰幸九曜堂醮十一曜。"

"calculating the accumulated days for the Four Residuals crossing the threshold degrees of lunar mansions," "determining the lunar day when the Four Residuals cross the threshold degrees of lunar mansions," "calculating the daily movement of the Four Residuals," and "calculating the Four Residuals' transitions between zodiacal signs" (Zhang et al. 1986a, 90).[56] This transition, from being included in unofficial to official calculations, can be seen as the outcome of both the widespread dissemination and the deep cultural Sinicization of the Four Residuals concept.

In Chapter 88 of the popular novel the *Water Margin* 水浒传 by Shi Nai'an 施耐庵 (1296–1372), the four imperial nephews of the Liao Kingdom—Yelü Derong 耶律得荣, Yelü Dehua 耶律得华, Yelü Dezhong 耶律得忠, and Yelü Dexin 耶律得信—are depicted as the mortal incarnations of the four celestial deities: Lord Rāhu, Lord Ketu, Lord Purple *Qi*, and Lord *Yuebei*, respectively (Shi 1993, 678). Similarly, in Chapter 51 of the novel *Journey to the West* 西游记, Wu Cheng'en 吴承恩 (1501–1582) also describes a scenario where the celestial beings of the upper realm—including the Eleven Luminaries (the Seven Luminaries and the Four Residuals)—assure that "none of them had longed to descend to the mortal world" (Wu 1993, 362).[57] It is evident that by this time the Four Residuals had evolved into a significant cultural symbol deeply integrated into the daily discourse of the common people.

Most civilizations typically exhibit two attitudes towards foreign elements: one is to assimilate and absorb them, while the other is to doubt and reject them. While the Sinicization of the Four Residuals was profound, doubts and rejections persisted throughout the Ming and Qing dynasties. Song Lian 宋濂 (1310–1381) of the Ming dynasty put forward in his "Discernment on Fortune and Destiny" (*Luming bian* 禄命辨) in *juan* 6 of his *Collection of Imperial Procession Slopes* (*Luanpo ji* 銮坡集), which is part of *juan* 16 of his *Collected Works of Scholar Song* (*Song xueshi wenji* 宋学士文集), that the idea of the Eleven Luminaries did not originate in ancient times and therefore should not be fully trusted (Song 1919). Song Lian was a student of Wu Lai and undoubtedly had a clear understanding of the origins of the Four Residuals. In fact, in "Discernment of Fortune and Destiny," he mentions "having heard it from my teacher" (尝闻之于师) and extensively cites Wu Lai's *Collected Works of Yuanying* (*Yuanying ji* 渊颖集), which attributes the transmission of the Four Residuals to the Brahmanical astronomer Li Miqian. However, after examining ancient studies of calendric calculation and studying theories on Yin-Yang and the Five Elements, Song Lian determined that the idea of the Eleven Luminaries "should not be fully trusted" (不能尽信). This represents a typical questioning attitude towards foreign theories based on native traditional doctrines.

56 "推四余入各宿次初末度积日""推四余初末度积日所入月日""推四余每日行度""推四余交宫"

57 "并无思凡下界行者。"

Song Lian's account shows his struggle to comprehend the mathematical and astronomical significance of the Four Residuals. He interprets *Yuebei* (Lunar Apogee) as a comet and could not understand why Rāhu and Ketu, which are not actual stars, should have detailed ecliptic positions. In fact, in eclipse calculations, the movements of invisible "celestial bodies" such as the ascending and descending nodes, the apogees and perigees must be calculated. However, this seems to have been somewhat challenging for a Neo-Confucianist. Xie Zhaozhe 谢肇淛 (1567–1624), another scholar of the Ming dynasty, states in "Heavenly Matters I" (天部一), included in *juan* 1 of his *Five Miscellaneous Records* (*Wu za zu* 五杂组), that the celestial phenomena of the Four Residuals were nowhere to be seen and were the result of "forced explanations" (强为之说) by fortune-tellers (Xie 1616).

In 1635, the eighth year of the Chongzhen reign of the Ming dynasty, Li Tianjing 李天经 submitted the "Proposals for Revising the Calendar" (参订历法条议), in which he states: "Purple *Qi* doesn't exist in the celestial operating system. It used to be regarded as generated from the intercalary surplus, as the residual energy of the planet Jupiter. However, today's close examination of the celestial system shows no evidence for this, which suggests that the concept of Purple *Qi* is a baseless addition" (Zhang et al. 1986b, 70).[58] As one of the late Ming dynasty's calendar reformers, Li Tianjing would have undoubtedly understood the astronomical significance of the Four Residuals. While Rāhu, Ketu, and *Yuebei* had clear meanings and were essential elements in calendar calculations, Purple *Qi*'s ambiguous astronomical significance led him to question its place among them. It was most likely fabricated by one or a school of astrologers to make up the number when the concept of Four Residuals was first proposed, which is why Li Tianjing deemed it a "baseless addition" (妄增).

At the beginning of the Qing dynasty, Johann Adam Schall von Bell 汤若望, who was equally proficient in astronomy and calendrical calculations, removed Purple *Qi* from the Four Residuals in his calendrical computations. This triggered a fierce Sino-Western debate, which escalated so intensely that it eventually cost the lives of a number of officials.[59] Although Western methods, supported by Johann Adam Schall von Bell, Ferdinand Verbiest 南怀仁, and others, with their advanced calendrical systems finally turned the tables and triumphed over the Eastern ones, thus concluding the debate, the concept of the Four Residuals, including Purple *Qi*, had already become deeply ingrained in traditional Chinese culture. A reversal was seen in the ninth year of the Qianlong era (1744): "This year, the designations of Rāhu and Ketu were recalibrated, and Purple *Qi* was added to constitute the Four Residuals" (Zhao et al.

58 "天行无紫气。旧谓生于闰余，又为木之余气。今细考诸曜，无象可明，知为妄增。"
59 For a detailed discussion of this calendar dispute, see Huang (1993).

1986, 246).[60] However, by then, all parties involved in that dispute had long passed away—some ascending to heaven, others descending to the underworld.

As evidenced above, doubts regarding the concept of the Four Residuals were raised on two distinct fronts during the Ming and Qing dynasties. On the Neo-Confucian philosophical front, scholars argued that as invisible luminaries, the Four Residuals—and by extension the notion of Eleven Luminaries—contravened the ancient tradition of "regulating the Seven Luminaries" (以齐七政) as upheld in the *Book of Documents* (*Shangshu* 尚书). On the calendrical astronomy front, influenced by Western learning, calendar specialists maintained that Purple *Qi*, one of the Four Residuals, lacked any substantive astronomical significance and should therefore be removed.

5 Conclusion

Taking the *Futian Calendar* and the *Yusi Scripture* as examples, this paper examines the dissemination and influence of foreign astrology in China during the Tang dynasty from three aspects.

In terms of the routes of dissemination, the *Futian Calendar* and the *Yusi Scripture* were brought in by itinerant fortune-tellers with a background in foreign astronomical knowledge. Driven by widespread demand among the general populace for fortune-telling, these texts were widely disseminated through the practices and manipulations of a large number of folk fortune-tellers. Few of these folk fortune-tellers left behind their names, and most of their lives and deeds unknown.

In terms of the content disseminated, the *Futian Calendar* and the *Yusi Scripture* represent two sides of the same coin: The *Futian Calendar* provided the mathematical methods for calculating the positions of the sun, moon, five planets, and Rāhu and Ketu, which are essential for the fortune-telling aspect of astrology. The *Yusi Scripture*, on the other hand, offered the rules for astrological calculations, predicting an individual's fate based on the configuration of celestial bodies in the ecliptic at the time of the person's birth as determined by the *Futian Calendar*. The driving force behind the spread of folk astrological knowledge primarily stemmed from the market demand for personal fortune-telling. Elements of this foreign astrology, such as the planetary tables provided in the *Seven Luminaries for Disaster Aversion*, had a certain level of mathematical complexity and was of moderate intellectual difficulty, making it accessible to most astrologers who could master or learn to use it. The content of the *Yusi Scripture* likely underwent adaptation during its multiple translations and dissemination processes, experiencing a form of localization that transformed the practice from predicting fate based on the Seven Luminaries to doing so with the

60 "是年更定罗睺、计都名目，又增入紫气为四余。"

Eleven Luminaries.

In terms of the effects of dissemination, the Tang dynasty's foreign astrology represented by the *Futian Calendar* and the *Yusi Scripture* had a profound impact on China's indigenous astronomy and even its indigenous culture. This influence not only functioned at the broad social and cultural levels but also permeated from the civilian to the official spheres, eventually becoming an integral part of traditional Chinese culture. The scope of this influence extended temporally to the subsequent Song, Yuan, Ming, and Qing dynasties and spatially to the East Asian Sinosphere. The process of this influence included the inevitable processes of collision, conflict, absorption, and integration that occur when heterogeneous cultures are integrated into the local culture.

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