

Astronomical Books and Charts in the Book of *Bibliographie Coréenne*

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Abstract

We investigate astronomical materials listed in the book of *Bibliographie Coréenne* written by Maurice Courant. He classified ancient Korean books into nine Divisions (部) and thirty six Classes (類), and published them as three volumes (ranging from 1894 to 1896) and one supplement (in 1901). In total, 3,821 books including astronomical ones are listed together with information on physical size, possessional place, bibliographical note, and so forth. Although this book is an essential one in the field of Korea bibliography and contains many astronomical materials such as Cheon-Mun-Ryu-Cho 天文類抄, Si-Heon-Seo 時憲書, and Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do 天象列次分野之圖, it has not been well known to the public nor to astronomical society. Of 3,821 catalogues, we found that about 50 Items (種) are related to astronomy or astrology, and verified that most of them are located in the Kyujanggak Royal Library 奎章閣. We also found an unknown astronomical chart, Hon-Cheon-Chong-Seong-Yeol-Cha-Bun-Ya-Ji-Do 渾天總星列次分野之圖. Because those astronomical materials are not well known to international astronomical community and there have been few studies on the materials in Korea, we here introduce and review them, particularly with the astronomical viewpoint.

Keywords: history of astronomy, ancient astronomical materials, ancient Korea, bibliography

1. Introduction

Bibliographie Coréenne is a catalogue of ancient Korean literatures written by Maurice Courant (1865–1935), a scholar of oriental study and an interpreter of the first French Ambassador to Korea, Collin de Plancy. While staying in Korea as an interpreter, he studied ancient Korean books by Plancy's suggestion. After working three years, he moved to Japan and published a book composed of three volumes (in 1894–1896) and one supplement (in 1901). Differently with the traditional classification system of old oriental books, i.e., four Divisions (部), he divided ancient Korean books into nine Divisions and then subdivided into thirty six Classes (類). He compiled a total of 3,821 materials with the descriptions of physical size and/or possessional place, and/or explanatory remark. His book has been known as a representative Bible in the field of Korea bibliography (Kim 1979). The book contains lots of information on Korean historical documents preserved in European countries as well as in Korea. It was also the first book that introduced Korean documents to Western countries

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(Kang 1974), and some of them are now to be National Treasures. In the book, for example, Courant firstly mentioned that Baek-Wun-Hwa-Sang-Cho-Rok-Bul-Jo-Jik-Ji-Sim-Che-Yo-Jeol 白雲和尚抄錄佛祖直指心體要節 (no. 3738; On the Essentials of Chan 禪 [Meditation] Buddhism), shortly Jik-Ji, was printed from movable metal types in 1377. Recently, the book was confirmed as the extant world's oldest one printed from movable metal types and registered as a Memory of the World in 2001 (refer to Chon 1973, Son 1973, Hyun 2000, Hanebutt-Benz 2004, on Jik-Ji).

Relating to Courant and his book, there have been some introductory papers (Lee 1970, Kang 1974, Kim 1979) since Kim's (1946) work. Later, detailed bibliographical studies on the books presented in *Bibliographie Coréenne* have been performed by many authors (e.g., Lee 1988a, Jo 1989). Particularly, Kim (1990) restricted to catholic books and investigated the books at great length. Nonetheless, it takes one century to be completely translated into Korean (Lee 1994b) after Courant's book was published. On the other hand, there were also independent researches on ancient Korean astronomical books (Song & Yun 1998, Lee 2001). However, all previous studies are focused on the bibliographical point of view.

Hence, we introduce and review the astronomical materials listed in *Bibliographie Coréenne* in this paper, particularly those which Courant referred linking to astronomy and/or astrology. Therefore, we exclude books which are definitely related to astronomy but have no Courant's reference. For example, there are approximately 240 records of astronomical events in Samguksagi 三國史記 (no. 1835; The History of the Three Kingdoms) such as solar eclipse, nova, comet, and so forth (Park & La 1994, also Yang 2004). We do not include in our list because Courant introduce it as only a history book. Of 3,821 catalogues, we found that about 50 Items (種) are related to astronomy and/or astrology. In next section, we list those selected items with respect to Courant's classification and classify into three groups, and then review them from the astronomical point of view. Finally, we summarize them in section 3.

2. Astronomical Materials

As mentioned above, Courant newly classified ancient Korean bibliographical documents into nine divisions and thirty six subdivisions. We summarize astronomical materials according to Courant's classification system in the followings;

- Gyo-Yuk 教育 (Teaching) Division: Gan-Dok-Cho 簡牘抄.
- Eon-Eo 言語 (Language) Division: Hwa-Eum-Gye-Mong 華音啓蒙, Hwa-Eo-Yu-Cho 華語類抄.
- Yu-Gyo 儒教 (Confucianism) Division:
- Mun-Muk 文墨 (Literature) Division:
- Ui-Beom 儀範 (Custom) Division: Un-Gwan-Jeol-Mok 雲觀節目.
- Sa-Seo 史書 (History) Division: Hwi-Chan-Ryeo-Sa 彙纂麗史, Dong-Guk-Mun-Heon-Bi-Go 東國文獻備考, A-Hi-Won-Ram 兒戲原寶, Cheon-Ji-Do 天地圖, Sa-Min-Pil-Ji (see Figure 11a), Go-Sa-Shin-Seo 攷事新書, Ji-Gu-Jeon-Hu-Do/Hwang-Do-Nam-Buk-Hang-Seong-Do 地球前後圖/黃道南北恒星圖.
- Gi-Ye 技藝 (Science) Division:

1. San-Beob 算法 (Mathematics) Class:

2. Cheon-Mun 天文 (Astronomy) Class: Je-Ga-Ryeok-Sang-Jib 諸家曆象集, Chu-Bo-Cheob-Rye 推步捷例, Chu-Bo-Sok-Hae 推步續解, Chil-Jeong-San 七政算 or Chil-Jeong-Ju 七政籌, Si-Heon-Gi-Yo 時憲紀要, Ryeok-Sang-Bon-Yo 曆象本要, Tae-Yang-Chul-Ib-Pyo 太陽出入表, Gyu-Il-Go-Seo 揆日考序, Si-Heon-Wol-Ri-Beob 時憲月離法, Wol-Ri-Se-Cho 月離細草, Gyo-Sik-Ryeok-Ji 交食曆指, O-Wi-Ryeok-Ji 五緯曆指, Hwang-Jeok-Do-Geo-Do-Pyo-Yong-Beob 黃赤道距道表用法, Sam-Won-Gyo-Hoe-Shin-Seo 三元交會神書, Hang-Seong-Pyo 恒星表, Si-Heon-Seo 時憲書 or Ryeok-Seo 曆書, Baek-Jung-Ryeok 百中曆, Si-Heon-Chil-Jeong-Baek-Jung-Ryeok 時憲七政百中曆, Jung-Su-Dae-Myeong-Ryeok 重修大明曆, Ryeok-Ju 曆註, Yul-Ryeok-Ji 律曆志, Nu-Ju-Tong-Ui 漏籌通義, Shin-Beob-Nu-Ju-Tong-Ui 新法漏籌通義, Cheon-Mun-Ryeok-Beob 天文曆法, Cheon-Mun-Ji 天文志, Cheon-Mun-Do 天文圖, Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do 天象列次分野之圖, Hon-Cheon-Chong-Seong-Yeol-Cha-Bun-Ya-Ji-Do 渾天總星列次分野之圖, Cheon-Ji-Do 天地圖, Bo-Cheon-Ga 步天歌, Shin-Beob-Bo-Cheon-Ga 新法步天歌, Shin-Beob-Ji-Pyong-II-Gu 新法地平日晷, Gan-Pyong-II-Gu 簡平日晷/Hon-Gae-II-Gu 渾蓋日晷, Hon-Cheon-Jeon-Do 渾天全圖, Seong-Shin-Do 星辰圖, Hon-Jung-Seong-Do 昏中星圖.
3. Sul-Su 術數 (Divination) Class: Cheon-Mun-Dae-Seong-Gwan-Gyu-Jib-Yo 天文大成官窺輯要, Cheon-Mun-Yu-Cho 天文類抄.
4. Byeong-Ga 兵家 (Military) Class:
5. Ui-Ga 醫家 (Medicine) Class:
6. Nong-Jam 農蠶 (Agriculture) Class:
7. Ak-Bo 樂譜 (Music) Class:
8. Ye-Sul 藝術 (Art) Class:
 - Gyo-Mun 教門 (Religion) Division:
 - Gyo-Tong 交通 (International Relations) Division: Han-Seong-Ju-Bo 漢城周報.

Most astronomical materials belong to Science division, particularly in astronomy class, and to History division. We, here, classify those items into three groups: astronomical books, instruments, and others, and then review each one. The abbreviations of possessional places, M.C., K.R.L., J.R.L., L.O.V., B.N.F., and P.O. mean Maurice Courant, Kyujanggak Royal Library 奎章閣, Jangseogak Royal Library 藏書閣, Institut National des Langues et Civilisation Orientales in Paris, French National Bibliography, and Paris Observatory, respectively. The catalogue numbers beginning with 'no.' represent those of Courant's, while we referred to the works of Lee (1994a) and Jeong (1998) for those of L.O.V.. Finally, being interested in those materials on the astronomical point of view, we do not pay much attention to the views of the bibliographical aspects, i.e., book size, printing type, detailed catalogue number, and so forth.

2.1 Astronomical (Astrological) books

2.1.1 Un-Gwan-Jeol-Mok 雲觀節目 (no. 1656)

=辛亥啓下觀象監釐正節目(K.R.L. 奎 2222, Lee 1994b); 1 Book (冊); 1793.

The edition of K.R.L. has a cover title of Shin-Hae-Gye-Ha-Gwan-Sang-Gam-Ri-Jeong-Jeol-Mok 辛亥啓下觀象監釐正節目. The book was published in 1793, although Shin-Hae is the year of 1791. Un-Gwan-Jeol-Mok 雲觀節目 deals with the overall problems and the guidelines for the management of Gwan-Sang-Gam 觀象監, the Royal Bureau of Astronomy and Geomancy. Joseon-Wangjo-Sillok 朝鮮王朝實錄 (Chunchugwan 春秋館, 1392–1863; The Annals of the Joseon 朝

鮮 Dynasty; hereafter Sillok) also shows that the book, Jeol-Mok, was published by Gwan-Sang-Gam. According to Sillok, the book deals with revised stipulations of Gwan-Sang-Gam on salary, organization, examination, and so forth. Until the early periods of the Joseon dynasty, the Royal Bureau had been called Seo-Wun-Gwan 書雲觀 (refer to Yu 1997 and Cho 1998) since 1308, the 34th reign of King Chungyeol 忠烈 in the Goryeo 高麗 dynasty. In terms of contents, this book is similar to those of Seo-Wun-Gwan-Gi 書雲觀志 (Records of the Seo-Wun-Gwan) written by Seong¹ Ju-Deok 成周憲 (1759–?) in 1818 (Seong 1818). Those are valuable books for the understanding of the organization and functions of Gwan-Sang-Gam in the late Joseon periods (see Hu 2000 mainly on the Astronomical Section). Judging from the titles of the books such as Seo-Wun-Gwan-Gi, Wun-Gwan-Bang-Mok 雲觀榜目 (in 1885), and Wun-Gwan-Seon-Saeng-An 雲觀先生案 (in 19C; List of Gwan-Sang-Gam officers), the officers of Gwan-Sang-Gam seem to have preferred the name Seo-Wun-Gwan over Gwan-Sang-Gam due to the reminiscence of renaissance in science during the reign of King Sejong 世宗 (1418–1450).

2.1.2 Dong-Guk-Mun-Heon-Bi-Go 東國文獻備考 (no. 2112)

K.R.L.; 100 Volumes (卷), 40 Books; 1770.

Motivated by Chinese Wen-Xian-Tong-Kao 文獻通考 (no. 2173; Annotated Collection of Documents), King Yeongjo 英祖 (1724–1776) ordered Kim Chi-In 金致仁 et al. to compile an encyclopedia on the civilizations and institutions of the Joseon dynasty from classical literatures. It took about eight months to the compilation and consisted of thirteen Studies (考); the first one is Sang-Wi 象緯, related to astronomy ranging from one to five volumes. According to Seung-Jeong-Won-II-Gi 承政院日記 (Diary of the Royal Secretariat), Sang-Wi-Go 象緯考 was written by Seo Ho-Su 徐浩修 (1736–1797). Later, Lee Man-Wun 李萬運 (1723–1797) and his son expanded and corrected the book as twenty Studies in 246 volumes, and entitled Jeung-Jeong-Mun-Heon-Bi-Go 增訂文獻備考. Finally, the scholars of Hong-Mun-Gwan 弘文館 (The Office of Special Advisers) supplemented and revised as sixteen Studies in 250 volumes with the title of Jeung-Bo-Mun-Heon-Bi-Go 增補文獻備考 in 1908. Sang-Wi-Go of Jeung-Bo-Mun-Heon-Bi-Go has summarized the whole ranges of astronomical works from the Three Kingdoms in ancient Korea to the Joseon dynasty. This, therefore, is one of the essential books and is frequently referenced by Western scholars on the study of Korean history of astronomy (e.g., Rufus 1936, Needham et al. 1986).

2.1.3 Je-Ga-Ryeok-Sang-Jib 諸家曆象集 (no. 2339)

K.R.L., J.R.L.; 4 Volumes, 4 Books; Yi Sun-Ji 李純之 (1406–1465); 1445.

This is one of representative astronomical books written by Yi Sun-Ji, a great astronomer in the early Joseon dynasty (Kim 1997). Following the order of King Sejong, Yi compiled in four subjects: Cheon-Mun 天文 (Astronomy), Ryeok-Beob 曆法 (Almanac), Ui-Sang 儀象 (Astronomical Instrument), and Gu-Ru 晷漏 (Sundial and Water Clock). In the subject of Cheon-Mun, Cheon-Ji 天地 (Heaven and Earth, i.e., cosmological theories) and historical arguments on the movement of the Sun, Moon, and Five Planets are explained. The almanacs and their histories are discussed in Ryeok-Beob subject. The astronomical instruments such as Hon-Sang 渾象 (Celestial Globe), Hon-Ui 渾儀 (Armillary Sphere), and Gan-Ui 簡儀 (Simplified Armillary Sphere) are summarized in Ui-Sang. Astronomical clocks and water clocks such as Gyu-Pyo 圭表 (Gnomon) and Nu-Gak 漏刻 (Clepsydra) are explained in Gu-Ru. A brief description and the facsimile edition of the book is given in the work of the Korean History of Science Society (1982). Also, the fact that a star map was engraved in a stone in the twenty-seventh reign of King Sejong, 1445, was mentioned in the

¹In the notations of the names of ancient people, we write family name without comma at first, a blank, and then last one with hyphen.

epilogue of the book (also in Jeung-Bo-Mun-Heon-Bi-Go and Seo-Wun-Gwan-Ji). While the stone sky charts constructed in the reigns of King Taejo 太祖 (1392–1398) and of King Sukjong 肅宗 (1674–1720) (refer to 2.2.3) still remain, that of Sejong is not extant. See Nha (2000) for more on the mysteries of King Sejong's stone sky chart.

Many astronomical books published during the Joseon dynasty are directly or indirectly related to Ryeok-Beob at that time. Therefore, we briefly summarize the history of Ryeok-Beob during the Joseon dynasty in a chronological order from Jeung-Bo-Mun-Heon-Bi-Go to offer better understanding of the books presented below. Refer to Lee (1985) for more detailed history.

In the beginning of the Joseon dynasty, Su-Si-Ryeok 授時曆, calendar invented by Guo Shou-Jing 郭守敬 of the Yuan 元 dynasty in China, had been used since the reign of King Chungseon 忠宣 (1308–1313) of the Goryeo 高麗 dynasty. However, the Ryeok-Beob has not been used in the calendrical calculations on the eclipses of Il-Wol 日月 or Yang-Yo 兩曜 (the Sun and the Moon) and on the motions of O-Seong 五星 or O-Wi 五緯 (Five Planets) because scholars of Seo-Wun-Gwan at that time did not know the calculation method in details. In 1433, King Sejong ordered Jeong In-Ji 鄭麟趾 et al. to make Chil-Jeong-San 七政算 (Calculations for Chil-Jeong 七政 or Chil-Yo 七曜 [seven stars, i.e., Il-Wol and O-Seong]) Nae-Pyeon 內篇 (The First Part) from the corrections of Dae-Tong-Ryeok 大統曆 of the Ming 明 dynasty. Also, the king ordered Yi Sun-Ji et al. to make Chil-Jeong-San Oe-Pyeon 外篇 (The Last Part) using Hoe-Hoe-Ryeok 回回曆 (An Islamic Calendar). Prior to the compilation of Chil-Jeong-San, King Sejong made Yi et al. had corrected and published the series of Tong-Gwe 通軌 books such as Dae-Tong-Ryeok-II-Tong-Gwe 大統曆日通軌, Tae-Yang-Tong-Gwe 太陽通軌, and so forth. The series of Tong-Gwe books correspond to each chapter of Nae-Pyeon (Lee 1988b). Later, Kim Yuk 金堉, a chief of Gwan-Sang-Gam, suggested the usage of Si-Heon-Ryeok 時憲曆 or Si-Heon-Seo 時憲書 of Tang Ruo-Wang (湯若望; Adam Schall) in 1644, the twenty-second reign of King Injo 仁祖 (1623–1649), and was accepted in 1653, the fourth reign of King Hyojong 孝宗 (1649–1659). However, the calendrical calculations for O-Seong by Si-Heon-Ryeok were successfully completed in 1708, the thirty-fourth reign of King Sukjong 肅宗 (1674–1720), and for Chil-Jeong (Il, Wol, and O-Seong) by the Ryeok-Beob in 1725, the first reign of King Yeongjo 英祖 (1724–1776). In the sixth reign of King Jeongjo 正祖 (1776–1800), 1782, the king ordered officers of Gwan-Sang-Gam to publish Cheon-Se-Ryeok 千歲曆, a calendar for one hundred years. From 1894, the thirty-first reign of King Gojong 高宗 (1863–1907), Tae-Seo-Tae-Eum-Ryeok 泰西太陰曆 was adopted and Si-Heon-Ryeok was used as the reference. Lastly, Cheon-Se-Ryeok was renamed as Man-Se-Ryeok 萬歲曆 in 1904.

2.1.4 Chu-Bo-Cheob-Rye 推步捷例 (no. 2340)

K.R.L., J.R.L.; 2 Volumes, 2 Books; Nam Byeong-Gil 南秉吉 (1820–1869); 1861.

This book is a ready reference for almanac calculations written by Nam Byeong-Gil and published in Gwan-Sang-Gam in 1861 (Fang 1969). The book was designed for the calculations on the motions of the Sun, Moon, and Five Planets, and on the eclipses of the Sun and Moon in accordance with Si-Heon-Ryeok. The list of each volume is presented in Courant's list. Chil-Jeong-Bo-Beob 七政步法 preserved in K.R.L. (奎 12618) has the cover entitled Chu-Bo-Cheob-Rae with the same contents. The author and his brother, Nam Byeong-Cheol 南秉哲 (see below), were the representative astronomers and mathematicians during the later Joseon dynasty. In addition to the books introduced in this study, he also edited many books such as Seong-Gyeong 星鏡 (see 2.1.29), San-Hak-Jeong-Ui 算學正義 (K.R.L. 奎 7838; a mathematics book), Jib-Go-Yeon-Dan 緝古演段 (K.R.L. 奎 7090; a mathematics book; see Fang 1969), Cheuk-Ryang-Do-Hae 測量圖解 (Explanatory Diagrams on the Triangular Measurement), Yang-Do-Ui-Do-Seol 量度儀圖設 (K.R.L. 奎 7653; explanation on 'Yang-Do-Ui', an astronomical instrument, using diagrams), Chun-Chu-II-Sik-Go 春

秋日食攷 (K.R.L. 奎 12614; confirmation on the eclipses in the book of Chun-Qiu 春秋 in China) and so forth.

2.1.5 Chu-Bo-Sok-Hae 推步續解 (no. 2341)

K.R.L., J.R.L.; 4 Volumes, 3 Books; Nam Byeong-Cheol 南秉哲 (1817–1863); 1862.

This is a kind of explanatory book on calendrical calculations based on Chu-Bo-Beob-Hae 推步法解 of Jiang Shen-Xiu 江慎修, a Chinese astronomer of the Ching 清 dynasty. The contents of the book are Il-Jeon (see Figure 11b); (Sun's Motions), Wol-Ri 月離 (Angular Distance Between Moon and Star), Goe-Sik 交食 (Eclipses of the Sun and Moon), and Hang-Seong 恒星 (Fixed Stars). This book was designed for the calculations on the motions of the Sun and Moon but not on that of Five Planets, and on the eclipses according to Ryeok-Sang-Go-Seong-Who-Pyeon 曆象考成後篇 or Dae-Beob 戴法, which was developed by Dai Jin-Xian 戴進賢 (I. Kögler) and Xu Wu-De 徐懋德 (A. Perira) of the Ching 清 dynasty in 1742.

2.1.6 Chil-Jeong-San 七政算 or Chil-Jeong-Ju 七政籌 (no. 2342)

K.R.L.; 5 Books.

Chil-Jeong-San is the general name for Chil-Jeong-San Nae-Pyeon 內篇 and Oe-Pyeon 外篇 composed of five Books; three are Nae-Pyeon and two Oe-Pyeon. Chil-Jeong-San is the first independent calendar in Korea (Jeon 1974). The main differences of Oe-Pyeon compared with Nae-Pyeon is that there are many numerical tables for easy calculations, it uses 360 as the degrees of the circumference of a circle, and it gives weight to the zodiac rather than 28 oriental constellations. Another characteristic of Oe-Pyeon is that this part is numerically more systematic than Nae-Pyeon due to the usage of a circle or multi-circles such as epicycles of Ptolemy on the motions of planets. In particular, an eccentric center around outside of the Earth is used to explain Kepler's first law (see Seoul National University Kyujanggak for more bibliographical notes). The books were firstly translated into Korean by Yu et al. (1973, 1974) and a detailed study on Nae-Pyeon is given in the work of Lee (1996). Because the compilation of Chil-Jeong-San is one of the greatest works of King Sejong, this book was also appended into Sejong Sillok 世宗實錄 (Veritable Records of King Sejong) together with Ji-Ri-Ji 地理志 (Geography Section), unlike other Kings' Sillok. Relating to Chil-Jeong-San, Chil-Jeong-San-Nae- and Oe-Pyeon-Jeong-Myo-Yeon-Gyo-Sik-Ga-Ryeong 七政算 內·外篇 丁卯年交食假令 (K.R.L. 奎 3188 and 3185) are books on the exemplary calculations of the Sun's and the Moon's eclipses at the first and last moon in August 1447, respectively.

2.1.7 Si-Heon-Gi-Yo 時憲紀要 (no. 2343)

K.R.L.; 2 Books; Nam Byeong-Gil; 1860.

Si-Heon-Gi-Yo is a summary book for the essentials of Si-Heon-Ryeok-Beob 時憲曆法, a work of Adam Shall. In 1860, Nam Byeong-Gil assorted key points of the Ryeok-Beob considering actual circumstances of the Joseon dynasty and added the history of the calendar (see also Fang 1969) in this book. Although Si-Heon-Ryeok was introduced in 1653 as mentioned above, there have been no introductory books on the calendar for two centuries. Even beginner scholars had studied a calendar using the previous Ryeok-Beob. For those reasons, Nam compiled this book although he thought Si-Heon-Ryeok was not perfect calendar but no other calendars were better than that at that time. This book consisted of twenty-six sections and was once used as one of textbooks for the examination of Gwan-Sang-Gam, that included books such as Cheon-Mun-Ryeok-Beob 天文曆法 (see 2.1.26) and Bo-Cheon-Ga 步天歌 (see 2.1.28)/Shin-Beob-Bo-Cheon-Ga 新法步天歌 (see 2.1.29), as mentioned in the preface (see Figure 1). For the purpose of illustration, we present the preface part of the book in Figure 1.

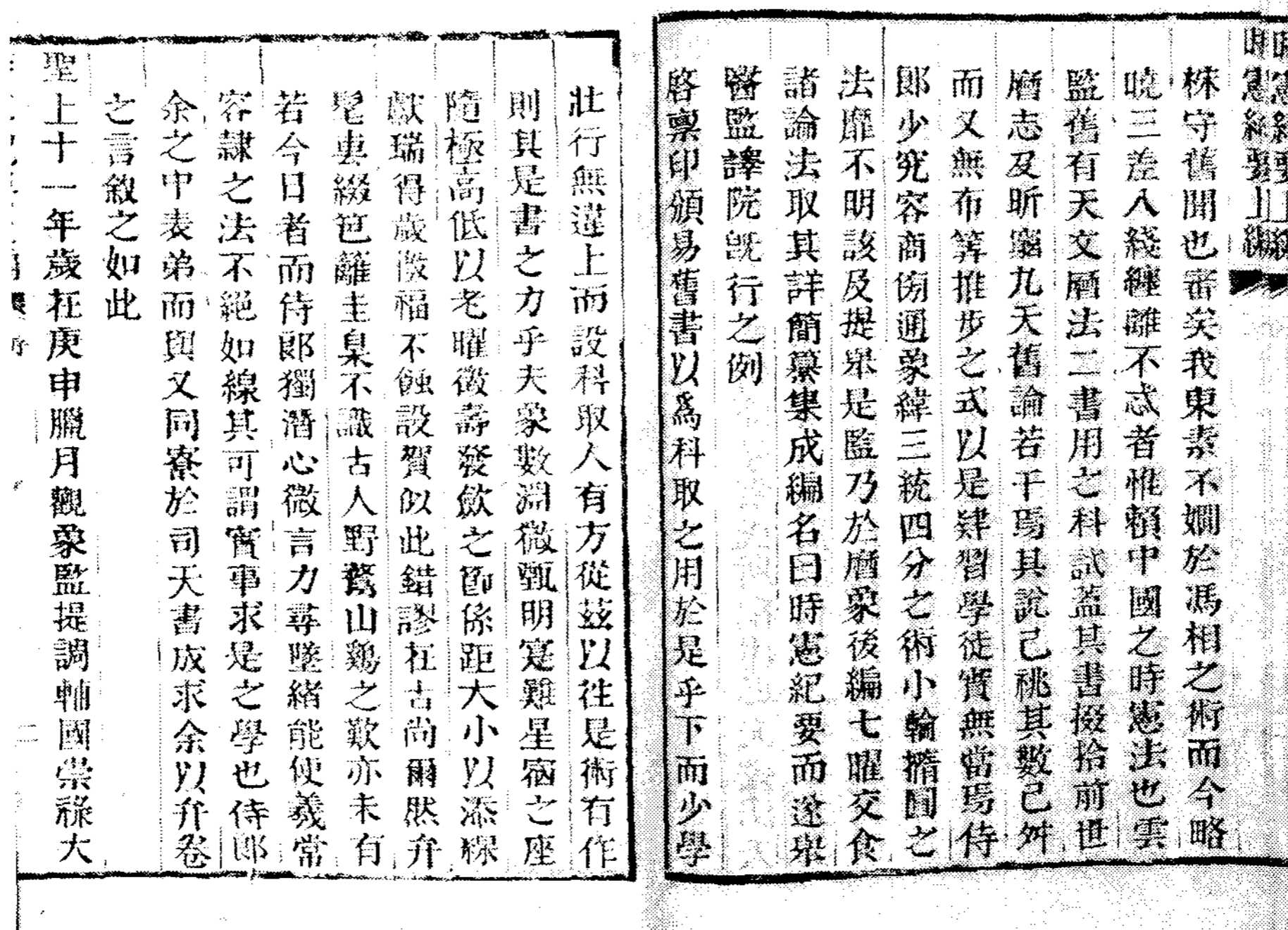


Figure 1. The preface part of Si-Heon-Gi-Yo.

2.1.8 Ryeok-Sang-Bon-Yo 曆象本要 (no. 2344)

K.R.L., J.R.L., L.O.V. COR.I.376; 1 Book.

This is also a summary book on the calendar and astronomical instrument, which is hand-written by unknown author without the preface and the epilogue. In the book, the author outlined the view-points on the change of heaven from the Zhou 周 dynasty (B.C. 1122 – B.C. 256) to his day. For example, the sky globe was described to have 365.2425 degrees during the Zhou dynasty, but 360 degrees in recent times. This book contains explanations for various items together with illustrated diagrams. Figure 2 shows the motions of the Mars and Jupiter. All motions of planets are still explained by Tyconic universe.

2.1.9 Tae-Yang-Chul-Ib-Pyo 太陽出入表 (no. 2345)

K.R.L.; Nam Won-Sang 南元裳 (1820–1869); 1867.

The cover tile of this book is Tae-Yang-Kyung-Nu-Pyo 太陽更漏表. As might be inferred from the titles, the book contains timetables on sunset, sunrise, lengths of day and night, and so forth based on Nu-Ju 漏籌 (Water Clock) for one year. The tables for eight time periods at eight regions including Han-Yang 漢陽 (Seoul) followed, and the time changes in twenty-four seasonal subdivision are recorded in the last part of the book (Cf. 2.1.24). Considering publication year of this book, Seoul National University Kyujanggak (1987) estimated 1827, twenty-seventh reign of Sunjo 純祖, from the sentence of 'Jeong-Myo-Gu-Wol-Yu-Jae-Nam-Won-Sang-Ji 丁卯九月留齋南元裳

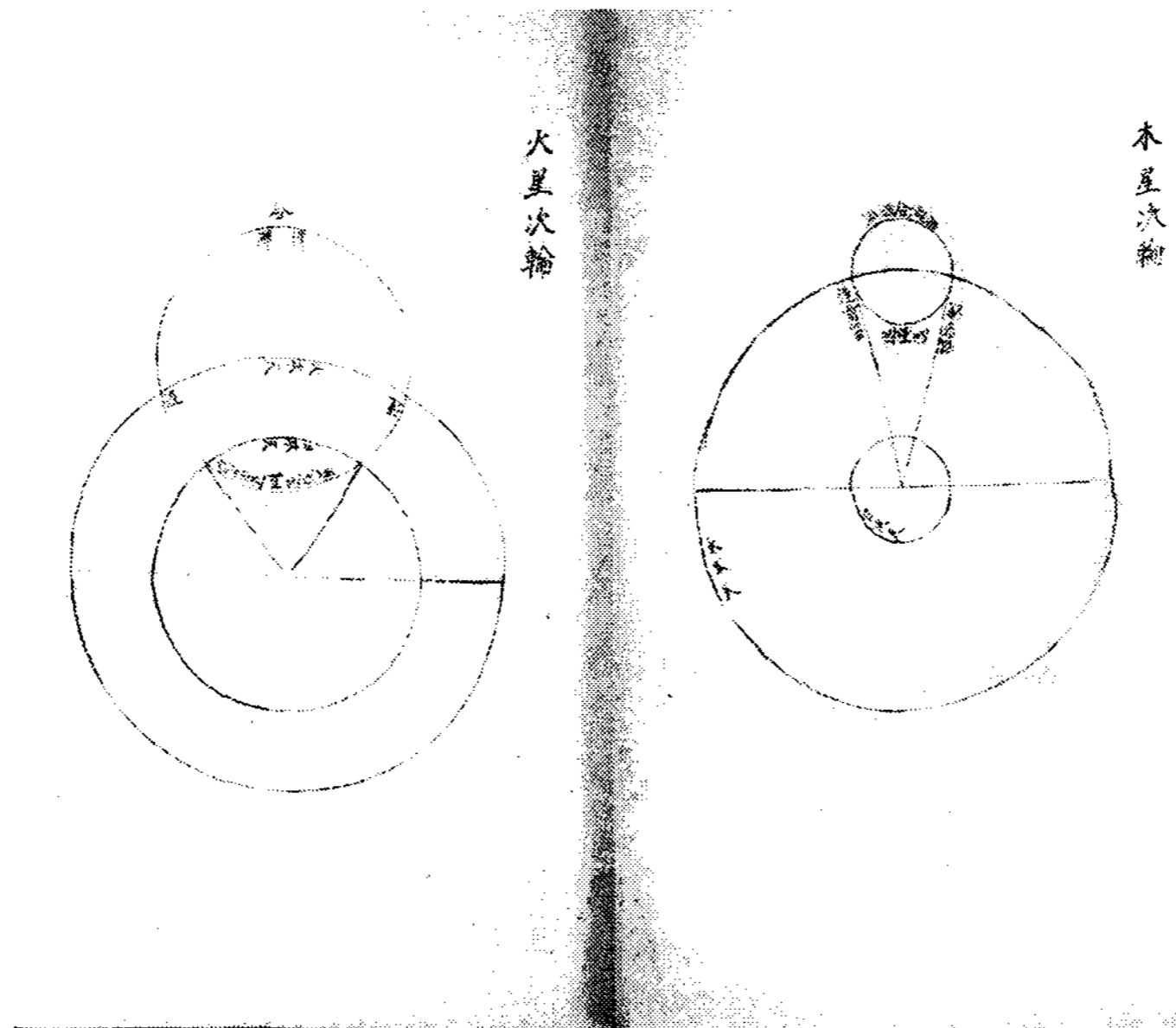


Figure 2. A diagram showing the motions of Hwa-Seong 火星 (Mars) and Mok-Seong 木星 (Jupiter) from Ryeok-Sang-Bon-Yo 曆象本要.

識' written in the preface. However, the year of 1827 is Jeong-Hae 丁亥 not Jeong-Myo 丁卯 in the sexagenary cycle. Although Courant put a question mark against 1867, he seemed to correctly infer the publication year of the book because Won-Sang 元裳 is a courtesy names (字) of Nam Byeong-Gil (1820–1869) together with Ja-Sang 字裳. He also had the second name of Nam Sang-Gil 南相吉 and several pen names (號) such as Hye-Cheon 惠泉, Yuk-II-Jae 六一齋, and so forth. However, Yu-Jae 留齋 is not well known to us. Therefore, this is the book written by Nam Byeong-Gil whose pen name is Yu-Jae and courtesy one is Won-Sang in Jeong-Myo, 1867. From the book, we present the table showing the times of sunset and sunrise, and the lengths of day and night at Seoul in Figure 3. According to the figure, the latitude of Seoul is $37^{\circ} 39' 15''$ (Compare with modern value $37^{\circ} 34' 07''$).

2.1.10 Gyu-II-Go-Seo 揆日考序 (no. 2346)

K.R.L., J.R.L.; 1 Book; Yi Sang-Hyeok 李尚爌 (1810–?); 1850?.

Although Courant listed the item of no. 2346 as Gyu-II-Go-Seo, the correct book title is 'Gyu-II-Go', without 'Seo 序 (Preface)'. It seems that he looked over only the preface part of the book and quoted the title from the preface. This book deals with the theory about Gu-Pyo 晷表 (Sundial), i.e., 晷表說, the method for the production of Gu-Pyo (i.e., 製晷表法), the calculating methods on the right ascension and longitude of the Sun (i.e., 求太陽赤道緯道), the distance of the Sun from the north pole (i.e., 求日距北極), and so on together with various diagrams and tables (see also National Librarian Bureau 國會圖書館司書局 1966). Without establishment of authorship, Courant merely pointed out that the first preface was written by Nam Byeong-Gil and the second by Kim Deuk-Eon 金得彦 both in 1850. It is now known that Gyu-II-Go was written by Yi Sang-Hyeok, an astronomer

陽		漢		宮		度
夜	晝	入日	出日	宮	度	極高三十七度三十九分十五秋
刻分	刻分	時刻	時刻	宮	度	
五八〇六	三七〇九	申正 二一二	辰初 一〇三	丑	〇〇	
五八〇〇	三八〇〇	三〇〇	一〇〇	丑	一五	
五七〇一	三八一四	三〇七	〇〇八	寅	三〇	
五六〇二	三九一三	三一四	〇〇一	寅	四六	
五五〇五	四〇一〇	酉初 〇〇五	卯正 三一一	卯	六二	
五四〇八	四一〇七	〇一一	三〇四	卯	七八	
五三一一	四二〇四	一〇二	二一三	辰	九三	
五二一二	四三〇三	一〇九	二〇六	辰	〇九	
五一一三	四四〇二	二〇一	一四七	辰	二五	
五〇一四	四五〇一	二〇八	一〇七	辰	四一	
五〇〇〇	四六〇〇	三〇〇	一〇〇	辰	五七	
四八一四	四七〇一	三〇八	〇〇七	辰	七三	
四八〇〇	四八〇〇	酉正 〇〇〇	卯初 三〇〇	巳	八九	
四七〇一	四八一四	〇〇七	卯初 三〇八	巳	〇五	
四六〇〇	五〇〇〇	一〇〇	三〇〇	巳	二一	
四五〇一	五〇一四	一〇七	二〇八	巳	三七	
四四〇二	五一一三	一四四	二〇一	巳	五三	
四三〇三	五二一二	二〇六	一〇九	巳	六九	
四二〇四	五三一一	二一三	一〇二	巳	八五	
四一〇七	五四〇八	三〇四	〇一一	巳	〇一	
四〇一〇	五五〇五	三〇一	〇〇五	巳	一七	
三九一三	五六〇二	戌初 〇〇一	寅正 三三四	午	三三	
三八一四	五七〇一	〇〇八	三三〇	午	四九	
三八〇〇	五八〇〇	一〇〇	三二二	午	六五	
三七〇九	五八〇六	一〇三	三二二	午	八一	

Figure 3. The table showing the times of sunset and sunrise, and the lengths of day and night at Seoul.

and mathematician, presumably in the same year, 1850 (The Academy of Korean Studies 1972).

2.1.11 Si-Heon-Wol-Ri-Beob (時憲月離法; no. 2347)

This book does not seem to exist anymore in Korea, so the details of this manuscript are unknown. However, inferring from the title of the book, this book might be related to a method (法) to determine Wol-Ri (see 2.1.5) based on Si-Heon-Ryeok.

2.1.12 Wol-Ri-Se-Cho (月離細草; no. 2348)

According to Courant's work, this book is one Book of eight pages preserved in Gwan-Sang-Gam and has the subtitle called Yong-Pyo-Chu-Wol-Ri-Beob 用表推月離法 (i.e., method to calculate the Moon's motion using tables). However, the K.R.L. editions of Yong-Pyo-Chu-Wol-Ri-Beok

are seven pages on the method to calculate the motions of the Moon such as Pyeong-Haeng 平行 (mean motion of the Moon), Wol-Geo-Il 月距日 (angular distance between the Sun and Moon), and so on from tables. In total, forty subjects with only names of fifteen tables are presented (i.e., the actual tables are not included). A brief summary on the motion of the Moon are also described in Chil-Jeong chapter of Sang-Wi-Go (refer to 2.1.2).

2.1.13 Gyo-Sik-Ryeok-Ji 交食曆指 (no. 2349)

K.R.L., J.R.L.; 7 Volumes, 7 Books; Adam Shall and Giacomo Rho; unknown publication year.

This book is listed as Gyo-Hoe-Ryeok-Ji 交會曆指 in Courant's writings and consequently in Lee's (1994b) Korean version. Based on Western astronomical knowledge, Adam Shall (湯若望) and Giacomo Rho (羅雅谷) compiled many almanac books under the supervision of Xu Guang-Oi 徐光啓 and Li Tian-Jing 李天經 during the Sung-Jeong 崇禎 reigns (1628–1635) in the Ming dynasty. Throughout five compilation projects, 135 Volumes were made and called Sung-Jeong-Ryeok-Seo 崇禎曆書 (Yu 1985). In the beginning of the Ching dynasty, those books were reconstructed as 100 Volumes and called Seo-Yang-Shin-Beob-Ryeok-Seo 西洋新法曆書 or Shin-Beob-San-Seo 新法算書. From 36 to 44 and from 64 to 70 Volumes of the San-Seo are O-Wi-Ryeok-Ji 五緯曆指 (see below) and Gyo-Sik-Ryeok-Ji, respectively. According to Courant, the latter is a reprinted book by Gwan-Sang-Gam as the seven Books. He also points out that the characters of 'Ya-So 耶蘇 (Jesus)' were wiped away with ink. That fact implies that the Joseon dynasty still accepted the knowledge of developed Western science even during the periods of persecution for Catholicism. Gyo-Sik-Ryeok-Ji is the guide (指) books explaining the principles and calculations of the Solar and Lunar eclipses (交食) with the aid of many illustrations.

2.1.14 O-Wi-Ryeok-Ji (五緯曆指; no. 2350)

K.R.L., J.R.L.; 9 Volumes, 9 Books; Adam Shall and Giacomo Rho; unknown publication year.

These are guide books on the calculation of O-Wi 五緯 (Five Planets) using Western calendar science. This edition is a reprint of Chinese book, like Gyo-Sik-Ryeok-Ji. Although Courant described the book as nine Volumes and five Books, the versions of the Kyujanggak and Jangseogak libraries consist of nine Volumes and nine Books. (refer to Seoul National University Kyujanggak (1987) for detailed lists in each book). We reckon that Shin-Beob-San-Seo was selectively reprinted including both Ryeok-Jis.

2.1.15 Hwang-Jeok-Do-Geo-Do-Pyo-Yong-Beob 黃赤道距度表用法 (no. 2351)

L.O.V. COR.I.427 (manuscript); unknown author; unknown publication year.

Courant simply noted that this book seems to be a reproduction of the book calculated with the reference point in Beijing and preserved in Gwan-Sang-Gam and L.O.V., without any further details. Although Lee (1994a,b) confirmed the existence of the book possessed by L.O.V. and specified its catalogue number, we could not find the book in Gwan-Sang-Gam. We, therefore, can not correctly describe the book here. Generally, Geo-Do 距度 means the angular distance from the determinative star(s) in each 28 oriental constellation. For the reason, we feel that this book is related with the usage of the Geo-Do table in the coordinates of elliptic (黃道) and equatorial (赤道), particularly observed at Beijing as Courant pointed out. However, Geo-Do is explained as the angle between the elliptic and equatorial planes in the book of Hwang-Jeok-Jeong-Gu-Pyo 黃赤正求表 (K.R.L. 奎 12617), which is also related with the usage of the Geo-Do table.

2.1.16 Sam-Won-Gyo-Hoe-Shin-Seo 三元交會神書 (no. 2352)

K.R.L., L.O.V. COR.I.373; 1 Book; unknown author; unknown publication year.

This book contains the records of the Solar and Lunar eclipses during Sam-Won-Gab-Ja 三元甲

子. Sam-Won can be divided into three periods: Sang-Won 上元, Jung-Won 中元, and Ha-Won 下元, and the periods of each span are 1684–1743, 1564–1623, and 1624–1683, respectively. In this book, dates and duration time of eclipses are recorded during the three periods, 180 years ranging from 1564 to 1743.

2.1.17 Hang-Seong-Pyo 恒星表 (no. 2353)

1 Books, 12 pages; manuscript.

Hang-Seong-Pyo 恒星表 is also included in Shin-Beob-San-Seo of Adam Shall et al. ranging from 59 to 61 Volumes. We also found the similar one entitled Sang-Won-Gab-Ja-Hang-Seong-Pyo 上元甲子恒星表 from K.R.L. (奎中 4647). As mentioned above, Sang-Won-Gab-Ja means the period from 1684 to 1743. The K.R.L. edition with 97 pages was compiled by Jia Bu-Wei 賈步緯 of the Qing dynasty in China, and printed with Ancient Printing Fonts (古活字本). The first section of the book contains star maps entitled Jeok-Do-Nam- and Buk-Hang-Seong-Do 赤道南·北恒星圖 followed by the section of Bo-Cheon-Ga 步天歌 (see 2.1.28) without illustrations. After the section of Kyung-Seong-Hwi-Go 經星彙考, the last one is Sang-Won-Gab-Ja-Hang-Seong-Pyo. In that section, ecliptic latitudes and longitudes, right ascensions (RA), declinations (Dec), precessions in RA and Dec, and magnitudes of the stars in 28 oriental constellations are recorded.

2.1.18 Si-Heon-Ryeok 時憲書 or Ryeok-Seo 曆書 (no. 2354)

K.R.L., J.R.L..

Si-Heon-Ryeok or Si-Heon-Seo, sometimes shortly as Ryeok-Seo, is an almanac rather than a calendar that used Si-Heon-Ryeok-Beob 時憲曆法 which was based on Seo-Yang-Shin-Beob-Ryeok-Seo. Courant devoted lots of pages to the explanations of the book. According to his description,

an officer of Gwan-Sang-Gam visited Beijing to get one hundred copies of this almanac every lunar June (Cf. Duhalde, *Description de la Chine*, tome III, p.343; P. Hoang, *De Calendario sinico*) and came to hand in lunar October. The officer came back to Joseon at the end of the year and paid it to the King in the (next) winter solstice after comparison with Joseon's Ryeok-Seo (presumably with Chil-Jeong-San). Less than 17,714 copies with stamp of Gwan-Sang-Gam were distributed to the usage of the Palace and officers, and to the sales.

Courant also wrote the contents and their short descriptions of the Si-Heon-Seo published in 1892, Dae-Cheong-Gwang-Seo-Sib-Pal-Yeon 大清光緒十八年. Considering the numbers of copies, he guessed that the numbers mean only copies with the grand format. However, he seems to be confused the unit used in Ryeok-Seo. According to Yuk-Jeon-Jo-Rae 六典條例 [no. 1462; published around 1860's](Kyujanggak 1979), 17,694 Chuk 軸 (Bunch), i.e., 353,881 Geon 件 (Copy) of Si-Heon-Seo was printed, where one Chuk is 20 Geon. In Table 1, we summarize Si-Heon-Seo (Ryeok) that still remains in Korea.

2.1.19 Baek-Jung-Ryeok 百中曆 (no. 2355, 2356)

K.R.L., J.R.L.; 1 Book.

While Si-Heon-Seo (Ryeok) is a kind of almanac published every year, Baek-Jung-Ryeok is that generally covers 'last' one hundred years (Hu 2000). Dae 大 (Large) or So 小 (Small) of a month in the numbers of days and sexagenary cycle, and twenty-four seasonal subdivisions belonging to the month and their time are listed in the book based on Si-Heon-Ryeok and/or Dae-Tong-Ryeok. No. 2356 entitled as Figure 11c is the book transcribed into Korean from a Baek-Jung-Ryeok written in

Table 1. The list of Si-Heon-Seo (Ryeok) that still remains in Korea.

Name	Year	Preserved place	Note
Si-Heon-Ryeok	1638	K.R.L.	
	1662,1668	M.J.C.	Myeongjae Yoon Jeong's Family Collection (from Lim & Kang 2005)
	1673	K.R.L.	
	1674,1679	M.J.C.	
	1675,1679,1681, 1684-1686,1688	K.R.L.	
	1689	M.J.C.	
	1699,1702,1707	K.R.L.	
	1704	M.J.C.	
	1707	K.R.L.	
	1709,1714	M.J.C.	
	1722	K.U.L.	Korea University Library
	1723	M.J.C.	
	1724	S.O.L.	Sogang University Library
	1725	K.R.L.	
	1728	M.J.C.	
	1729	N.L.K.	The National Library of Korea
	1732	Y.U.L.	Yeungnam University Library
	1737-1739	M.J.C.	
	1744	J.R.L.	
	1746	K.R.L.	
	1752	M.J.C.	
	1753,1757	S.U.L.	Sookmyung Women's University Library
	1760	K.O.L.	Konkuk University Library
1762	K.N.U.	Kyungpook National University	
1765	K.R.L.		
1766,1767,1769,1771	D.U.L.	Dankook University Library	
Si-Heon-Seo	1772-1774	K.R.L.	
	1778	N.K.H.	National Institute of Korean History
	1780-1781	K.R.L.	
	1782	N.K.H.	
	1783,1785-1895	K.R.L.	
Si-Heon-Ryeok	1896-1897	K.R.L.	
Si-Heon-Seo	1898-1902	N.K.H.	

Chinese characters. In his Table 4-2, Hu (2000) summarized the series of Baek-Jung-Ryeok which are preserved in Korea together with possessional places.

2.1.20 Si-Heon-Chil-Jeong-Baek-Jung-Ryeok 時憲七政百中曆 (no. 2357)

K.R.L.; 1 Book; Gwan-Sang-Gam.

Chil-Jeong-Baek-Jung-Ryeok (without 'Si-Heon 時憲') is an ephemeris recording daily positions of Chil-Jeong (Sun, Moon, and Five Planet) with respect to 28 oriental constellations by Si-Heon-Ryeok. Although the publication year of the book is unknown, it might be at least later than 1708, when the calendrical calculations for Five Planet by Si-Heon-Ryeok succeeded. Differently with 2.1.19, Chil-Jeong-Baek-Jung-Ryeok of K.R.L. editions contains records for several tens of years (maybe 'last' year likely Baek-Jung-Ryeok). For example, one book catalogued 奎 1274 in K.R.L. covered 32 years ranging from 1676 to 1707 and another catalogued 奎 3265 did 62 years from 1650 to 1711. On the other hand, Si-Heon-Chil-Jeong-Baek-Jung-Ryeok is also an

Figure 4. A snapshot of Si-Heon-Chil-Jeong-Baek-Jung-Ryeok.

ephemeris of Chil-Jeong but for ten years, from 1772 to 1781, published in the late eighteenth century. Because the book was based on Si-Hyeon-Ryeok, it was presumably called Si-Hyeon-Chil-Jeong-Baek-Jung-Ryeok in order to distinguish it from Dae-Tong-Chil-Jeong-Baek-Jung-Ryeok 大統七政百中曆 (K.R.L. 奎 4980) which was based on Dae-Tong-Ryeok 大統曆. Not only Large (大) or Small (小) of a month in the number of days, like Baek-Jung-Ryeok, but also sexagenary cycle for every day are recorded in the book. For better understanding, we present a page of the book in Figure 4 as an example.

2.1.21 Jung-Su-Dae-Myeong-Ryeok 重修大明曆 (no. 2358)

K.R.L.; 2 (or 1) Books; Yi Sun-Ji and Kim Dam 金淡; unknown publication year.

Dae-Myeong-Ryeok is a calendar made by Zhao Chong-zhi 祖冲之 of Chinese Sung 宋 dynasty in A.D. 463. In this calendar, the author used the precessional value as one degree per forty-five years. As the calendar became inaccurate, Zhao Zhi-Wei 趙知微 made Ji-Mi-Ryeok 知微曆 and Ye Lü-Lü 耶律履 did Eul-Mi-Ryeok 乙未曆 in the period of the Jin 金 dynasty in China. These two calendars were called Jung-Su-Dae-Myeong-Ryeok, improved Dae-Myeong-Ryeok, and had been used until the beginning of the Yuan 元 dynasty. Before King Sejong started the compilation of Chil-Jeong-San, there had been many studies and publications on Chinese calendars. Probably Jung-Su-Dae-Myeong-Ryeok was published around at that time with consideration for the location of Han-Yang 漢陽, the capital of the Joseon dynasty. The book contains the method for calculation on the solar and lunar eclipses, the motion of Five Planets, and so forth. Considering this calen-

dar, Jung-Su-Dae-Myeong-Ryeok-Jeong-Myo-Yeon-Il-Sik-Wol-Sik-Ga-Ryung 重修大明曆丁卯年日食月食假令 (K.L.R. 奎 4049 etc) is the example book on the estimation of the solar eclipse (日食) occurred in the first moon of August, 1447 (i.e., 丁卯年) using the Jung-Su-Dae-Myeong-Ryeok.

2.1.22 Ryeok-Ju 曆註 (no. 2359)

According to Courant, this is a manuscript with subtitle of Man-Nyeon-Seo (萬年書) consisting of four Books. However, we can not trace the book except for Dae-Tong-Ryeok-Ju 大統曆註 in K.R.L.. The edition preserved in K.R.L. is an annotation of Dae-Tong-Ryeok composed of twelve Volumes in four Books; each month is allocated to one Volume and four seasons are one Book. This book is annotation on Dae-Tong-Ryeok, and also contains the times of sunset, sunrise, moonset, and moonrise at twenty-four seasonal subdivisions (refer to Seoul National University Kyujanggak 1987). Considering the subtitle of Ryeok-Ju, we can only find the name from the records of Sillok and Il-Seong-Rok 日省錄. However, because those are the records before the name change of Cheon-Se-Ryeok into Man-Se-Ryeok (i.e., 1904), Man-Nyeon-Seo was the work of China. Also the book might have influenced the renaming of Cheon-Se-Ryeok as Man-Se-Ryeok. The remaining editions of Cheon- or Man-Se-Roek in Korea are well summarized in Table 4-2 in the thesis of Hu (2000).

2.1.23 Yul-Ryeok-Ji 律曆志 (no. 2360)

There is no information on this book in Courant's, except that it is one volume associated with the rules of a calendar (i.e., 'NOTICE SUR LES RÈGLES DU CALENDRIER, 1 vol.'). Ji 志 (Records) usually means a section in a history book, for example, Cheon-Mun-Ji 天文志 (Astronomy Section) or Ryeok-Ji 曆志 (Almanac Section) in Goryeosa 高麗史 (The History of the Goryeo Dynasty). In general, Yul-Ryeok-Ji or Ryeok-Ji is the section on the explanation of calendar(s) used in a dynasty. Most of Chinese history books, for example Han-Shu 漢書 (no. 2120), Hou-Han-Shu 後漢書 (no. 2123), Sui-Shu 隋書 (no. 2126), Sung-Shi 宋史 (no. 2132), and so forth, have Yul-Ryeok-Ji. In Korea, Goryeosa is the only history book that contains Ryeok-Ji, similar to Yul-Ryeok-Ji. To our knowledge, no. 2360 is probably a calendrical section separately published from one or several of Chinese history books or at least a book related to a calendar.

2.1.24 Nu-Ju-Tong-Ui 漏籌通義 (no. 2361)

K.R.L., J.R.L.; 1 Book; unknown author; unknown publication year.

This is the book that records the changes in the twenty-four seasonal subdivisions (節氣) and 28 oriental constellations (宿) using Nu-Jeon 漏箭, a float-rod in Clepsydra. During the Joseon dynasty, the night period is divided into five Kyung 更, and one-Kyung is subdivided into five Jeom 點. On account of the difference in the lengths of night time with respect to seasons, float-rods with different scales were used. Following the preface, Sib-Il-Jeon-Mok-Rok 十一箭目錄 (the catalogue of eleven float-rods covering twenty-four seasonal subdivisions) is listed. For example, the first Jeon (箭) was used from the first day of Dong-Ji 冬至 (Winter Solstice) to the second day after Dae-Han 大寒 (Severe Cold; around 22 January) and from the forth day before So-Seol 小雪 (Slight Cold; around 22 November) to the first day before Dong-Ji. The text consists of eleven sections corresponding to eleven Jeon 箭 and each section does five Kyung 更, i.e., from one to five. Moreover, each Kyung is subdivided into five Jeom 點, and then times according to Nu-Jeon are recorded. In the next, the times of sunset and sunrise during the twelve months and the 28 oriental constellations seen at Hon 昏 (dusk), Hyeo 曉 (dawn), Pae 罷 (around five-Kyung and three-Jeom) during the twenty-four seasonal subdivisions are recorded. This is followed by illustrations of oriental constellation(s) seen at Hon, Hyeo, Pae, and at one to five Kyung amongst twenty-eight ones are presented with respect to twenty-four seasonal subdivisions. Figure 5 is the illustrations corresponding to U-Su 雨水 (Rainy Weather; around 22 February) and Kyung-Chib 驚蟄 (Excited Insects; around 6 March) amongst

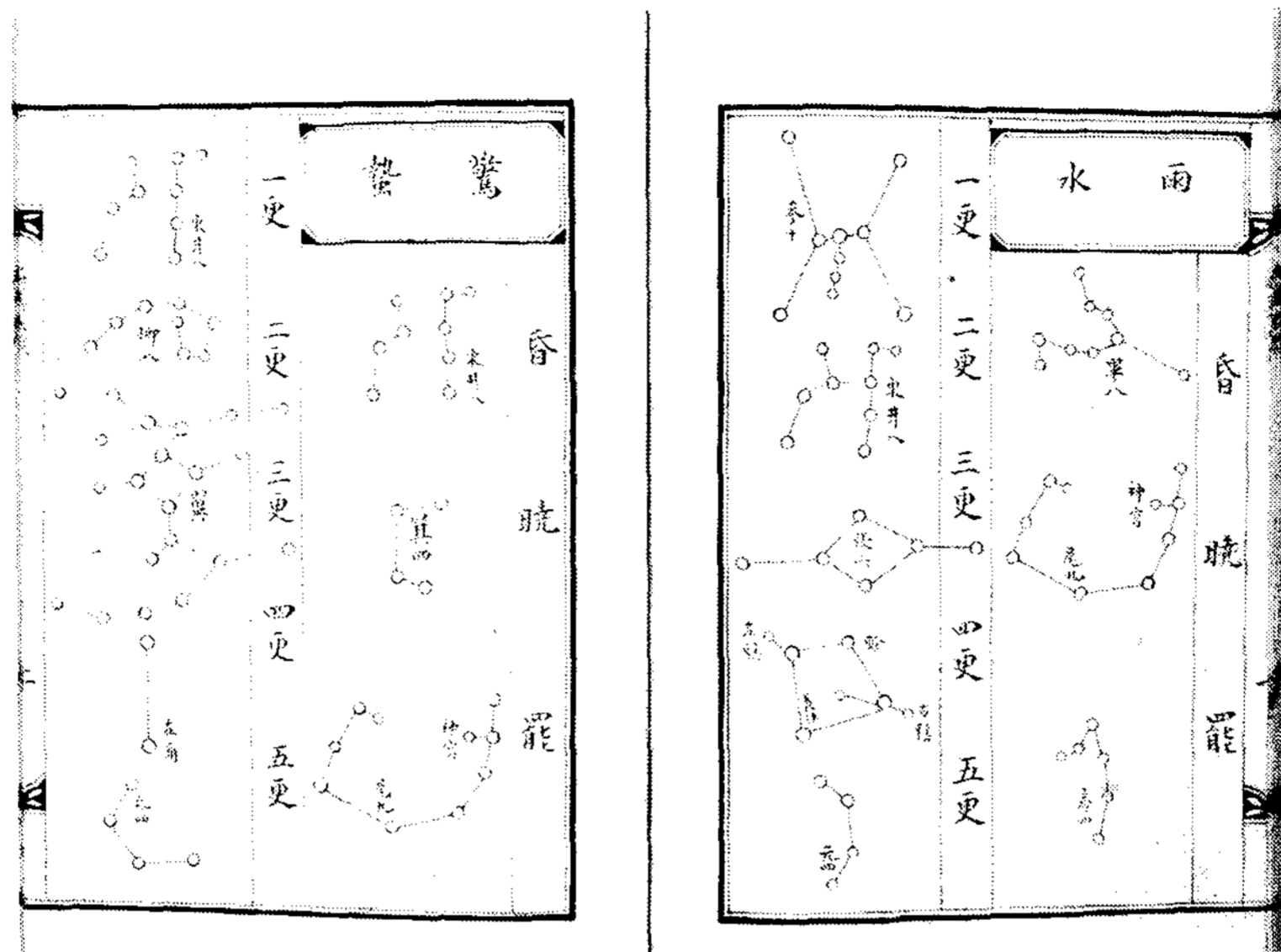


Figure 5. Oriental constellation(s) seen Hon, Hyeo, Pae, and one to five Kyung at U-Su and Kyung-Chib. See text for details.

twenty-four seasonal subdivisions.

2.1.25 Shin-Beob-Nu-Ju-Tong-Ui 新法漏籌通義 (no. 2362)

K.R.L.; 1 Volume, Kim Young 金泳; unknown publication year.

This is a new version of Nu-Ju-Tong-Ui compiled by Kim Young 金泳, an officer of Gwan-Sang-Gam at the reign of King Jeongjo 正祖 (1776–1800). According to introductory remarks of the book, each seasonal subdivision is subdivided into three seasonal terms (節候) and thirty-seven Nu-Jeon is used, more than 24 Nu-Jeon compared with the old version. Subsequently, a table showing the time periods corresponding to each Jeon 箭 is presented. The remaining part is allocated to time records corresponding to each Jeon (from one to thirty-seven), each Kyung (from one to five), and then each Jeom (from one to five), hence so to eight hundred cases in total.

2.1.26 Cheon-Mun-Ryeok-Beob 天文曆法 (no. 2363)

Courant introduced this as the book used to the examination of Gwan-Sang-Gam citing Dae-Jeon-Hoe-Tong 大典會通 (no. 1461, 3402; Comprehensive Collected Edition of the Grand Code) published in 1865 (see also Seong 1818). In the code, the fact that Cheon-Mun-Ryeok-Beob was replaced by Si-Heon-Gi-Yo (see 2.1.7) as the textbook of the examination of Gwan-Sang-Gam is recorded. Hence, Si-Heon-Gi-Yo is presented in Yuk-Jeon-Jo-Rye 六典條例 (no. 1462; Applications of the Six Codes) published in 1866. Considering this item, Lee et al. (2003) interpreted this book as two books, Cheon-Mun and Ryeok-Beob in the translation of Seo-Un-Gwan-Ji 書雲觀志. On the other hand, Yu (1991) did as one book, Cheon-Mun-Ryeok-Beob, as the same way as Courant did. According to the preface of Si-Heon-Gi-Yo (see Figure 1), Nam Byeong-Gil stated the compilation purpose of the book as the following:

.....監舊有天文曆法二書用之科試.....

.....In ancient, there were two books of Cheon-Mun and Ryeok-Beob for the examination of Gwan-Sang-Gam.....

Hence, we think that this item must be unknown two books, Cheon-Mun and Ryeok-Beob not Cheon-Mun-Ryeok-Beob (see also Lee 2007).

2.1.27 Cheon-Mun-Ji 天文志 (no. 2364)

1 Volume.

Although Courant commented that this book was compiled from the selections of Chinese works, we can not find the book in Korea Royal libraries. However, we found two manuscripts consisted of several Ji (志) such as Cheon-Mun-Ji, Ji-Ri-Ji (地理志), O-Haeng-Ji (五行志), and so forth from Kyungpook National University Library (古520天37-1 and 2). Presumably, this book is also an astronomical section (天文志) which is separately published from one or several of Chinese works like Yul-Ryeok-Ji in the section of 2.1.23.

2.1.28 Bo-Cheon-Ga 步天歌 (no. 2369)

K.R.L., J.R.L.; 1 Volume; Wang Xi-Ming 王希明 (Chinese); unknown publication year.

This book explains the oriental constellations and their star numbers using a poem formed of Chil-Eon-Jeol-Gu 七言絕句 (a quatrain with seven characters per line). The contents are consisted of 28 oriental constellation, Sam-Won 三垣 (Tae-Mi-Won 太微垣, Ja-Mi-Won 紫微垣, and Cheon-Si-Won 天市垣; three areas in the star chart around Polaris), and Cheon-Ha-Gi-Mol 天河起沒 (Milky Way; Cf. 天河 in 2.3.3) in that order. Although it is widely known that Wang Xi-Ming whose pen name was Dan-Yuan-Zi 丹元子 is the author of the book, that fact is still unclear as Courant pointed out. It is also unknown when this book was introduced into Korea. The oldest record related to Bo-Cheon-Ga in Korea is that Yi Sun-Ji referred its constellations and poems in the compilation of Cheon-Mun-Yu-Cho 天文類抄 (see below). In addition to Cheon-Mun and Ryeok-Beob (see 2.1.26), this book was also used to the examination of Gwan-Sang-Gam. Finally, Courant classified this item into a kind of a star chart rather than an astronomical book.

2.1.29 Shin-Beob-Bo-Cheon-Ga 新法步天歌 (no. 2370)

K.L.R., J.R.L.; 1 Volume; Yi Jun-Yang 李俊養; 1862.

Because it had been a long time since Bo-Cheon-Ga was published, the values of stellar positions became incorrect. For this reason, Yi Jun-Yang made corrections and published the result as Shin-Beob (new method)-Bo-Cheon-Ga in 1862. The composition of this edition is similar to Bo-Cheon-Ga, but the order of contents is Ja-Mi-Won, Tae-Mi-Won, Cheon-Si-Won, 28 oriental constellation, and Cheon-Han-Gae-Do 天漢界度 (Milky Way) instead of the term of Cheon-Han-Gi-Mol 天漢起沒. According to the preface, Yuk-Il-Jae 六一齋 (i.e., Nam, Byeong-Gi; see 2.1.9) read proofs. A year earlier, Nam (1861) also published a similar book called Seong-Gyeong 星鏡 (K.R.L. 奎 1667). This book contains not only Chil-Eon-Jeol-Gu and constellation illustrations of Bo-Cheon-Ga but also stellar positions and magnitudes (Ahn et al. 1996) and was proofread by Yi Jun-Yang. Meanwhile, Seong Ju-Deuk 成周憲 stated that Bo-Cheon-Ga was used as the textbook for the examination of Gwan-Sang-Gam but nowadays replaced by Shin-Beob-Bo-Cheon-Ga in the chapter of Gwa-Si 科試 (Examination) of Seo-Un-Gwan-Ji. He also introduced Bo-Cheon-Ga in the section of Seo-Gi 書器 (Book):

Long times ago, there were Chil-Eon-Jeol-Gu and constellation diagrams of Wang Xi-Ming 王羲明 of the Sui 隋 dynasty and of Ferdinand Verbiest (南懷仁), a missionary

of the Ming 明 dynasty. In new edition, Chil-Eon-Jeol-Gu was adopted from Wang and constellation illustration from Verbiest. Stars which were in ancient but not in present and vice versa are listed in the end of the book. This edition was printed with woodblock in 1792 and the wood plates were preserved in Gwan-Sang-Gam.

Although Seong Ju-Duk used Bo-Cheon-Ga as the title of the book, that book seems to be a different version of Shin-Beob-Bo-Cheon-Ga of Yi Jung-Yang.

2.1.30 Cheon-Mun-Dae-Seong-Gwan-Gyu-Jib-Yo 天文大成官窺輯要 (no. 2378)

K.R.L., J.R.L.; 80 Volumes; Huang Ding 黃鼎 (Chinese); ~1653.

This work composed of 80 volumes contains huge astronomical information. Despite a preface of the year 1653, the precise publication year is not known. Although listed as Cheon-Mun-Dae-Seong-Gwan-Gyu-Jip-Yo in Si-Ku-Quan-Shu-Zong-Mu 四庫全書總目 and in *Bibliographie Coréenne*, K.R.L. did as Cheon-Mun-Dae-Seong (K.R.L. 奎中 2285) or Gwan-Gyu-Jib-Yo (K.R.L. 奎中 2284, 3266, 3671). Nonetheless, 'Gwan-Gyu-Jib-Yo' is written on the rear cover in the previous edition and 'Cheon-Mun-Dae-Seong' is on Pan-Shim 版心 in the latter editions. In the case of K.R.L. 奎中 2285, there are three prefaces by Fang Gong-Gan 方拱乾, the author, and his son, Huang Jiu-Xi 黃九錫. Followed by the preface, the author described the nine regulations on the compilation of the book. For instance, the author referred only from authentic history chronicles and the illustration in the book was selected from the records of Cheon-Mun-Deung-Rok 天文等錄 (probably an astronomy book) so as to a wise man can easily understand. The contents of each book are given in Seoul National University Kyujanggak (1987).

2.1.31 Cheon-Mun-Yu-Cho 天文類抄 (no. 2379)

K.R.L., J.R.L., L.O.V. COR.I.59; Yi Sun-Ji.

In the bibliographical notes, Courant explained this book as one Book manuscript of Wang Xi-Ming's (see 2.1.18) work. In addition, he classified the book not into astronomy but into divination class, although the book has contents similar to those of Bo-Cheon-Ga or Shin-Beob-Bo-Cheon-Ga (see 2.1.28 or 2.1.29). The editions of K.R.L. are also one Book composed of two Volumes but were printed with a woodblock plates without the preface and the epilogue, so the author is unknown. According to the section of Seo-Gi 書器 in Seo-Un-Gwan-Ji, this book was compiled by Yi Sun-Ji under the order of King Sejong. Yi adopted Chil-Eon-Jeol-Gu from Bo-Cheon-Ga and their explanations from other people, and appended the theories on Cheon-Ji 天地 (Heaven and Land), Pung-Un 風雲 (Wind and Cloud), and Noe-U 雷雨 (Thunder and Rain). The contents about stars in the oriental constellations such as Sa-Bang-Chil-Su 四方七宿 (Seven oriental constellations in each four direction), 28 oriental constellations, and Sam-Won 三垣 (see 2.1.28) are described in the first volume and the those about non-stars such as the Moon, the Mars, and the Venus in the last volume (Korean History of Science Society 1983, Kim & Yoon 2006). Additionally, this book explains unique Korean constellations composed of imaginary animals in the first page (Yang & Park 2003).

2.2 Astronomical Instruments

2.2.1 Cheon-Ji-Do (天地圖; no. 2184, 2368)

L.O.V. COR.I.329.

According to Courant's description, this book consists of six large pages. The first page contains sexagenary cycle (干支), zodiac, eight signs of divination (八卦), human body, and so forth. The second and third are charts of stars located each in the north and south of Earth orbital with the comment that was engraved on wood by Tae-Yeon-Jae 泰然齋 in 1834. The fourth and fifth are Earth

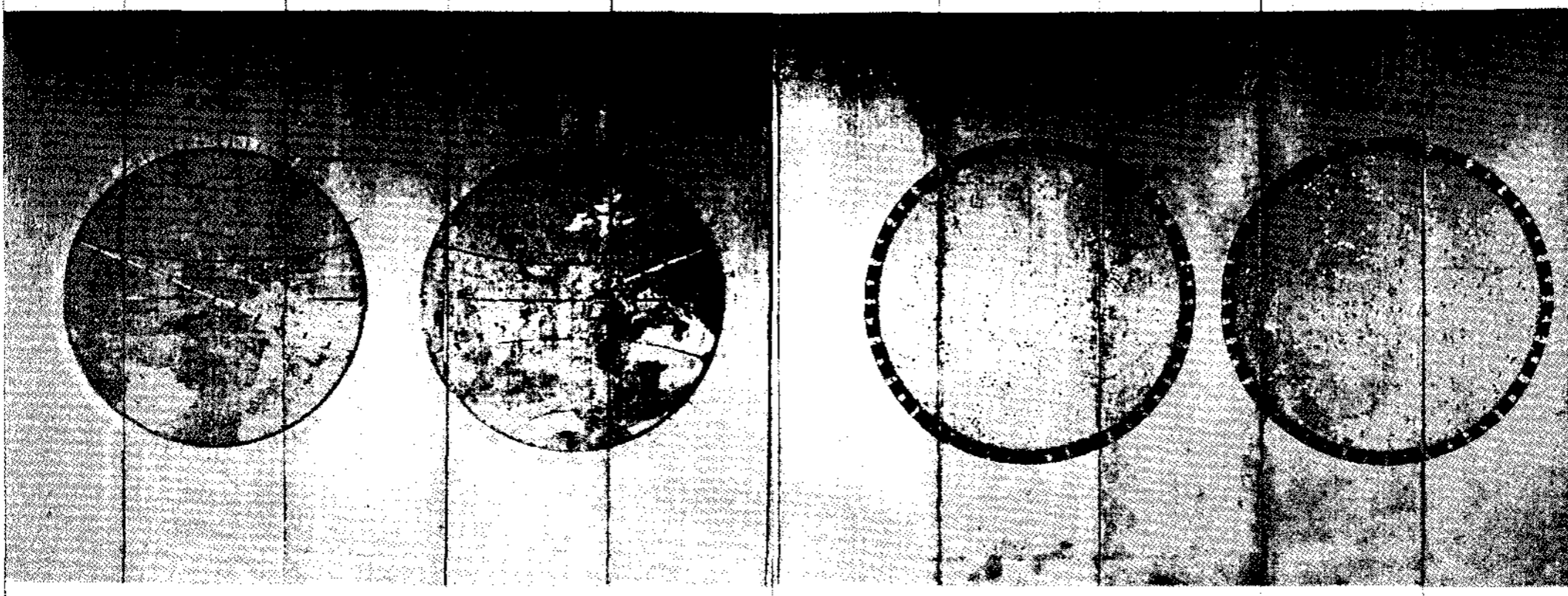


Figure 6. Ji-Gu-Jeon-Do (left) and Hwang-Do-Nam-Buk-Hang-Seong-Do (right) (Courtesy Korea University Museum).

planispheres and the last is a Korea map produced by means of western technique. Judging from the descriptions, the second and third chart is Hwang-Do-Nam-Buk-Hang-Seong-Do 黃道南北恒星圖 (astronomical charts depicting southern and northern parts of the zodiac) and the fourth and fifth are Ji-Gu-Jeon-Who-Do 地球前後圖 (world maps). Considering the pen name called ‘Tae-Yeon-Jae’, it is unclear whether it refers to Choi Han-Gi 崔漢綺 (1803–1879; a practical scientist) who compiled Ji-Gu-Jeon-Yo 地球典要 (a geographical book) or Kim Jeong-Ho 金正浩 (1804–1866?; a geographer) who made Dae-Dong-Yeo-Ji-Do 大東輿地圖 (no. 2196; a map of Korea engraved on wood). We assume that Choi might have provided data on the charts and Kim, Tae-Yeon-Jae, engraved them. In Figure 6, we present Earth planispheres and astronomical charts preserved in the Korea University museum.

2.2.2 Cheon-Mun-Do 天文圖 (no. 2365)

Courant catalogued this star chart in his book purely based on the record found in Dae-Dong-Un-Bu-Gun-Ok 大東韻府群玉 (no. 2108; Encyclopedia of Korea, arranged by the Rhymes of the Entries). According to the book, there is an article that a monk of the Silla kingdom in Korea, Do-Jeung (道證; ‘訂’ is typo of ‘證’ in Courant’s), dedicated a star map to King Hyoso 孝昭 in A.D. 692 after coming back from China. The same article is also found in Sam-Guk-Sa-Gi 三國史記 (no. 1835) and in Jeong-Bo-Mun-Heon-Bi-Go 增補文獻備考 (see 2.1.2). Courant also cited another record that O Yun-Bu 伍允孚 (‘充’ is typo of ‘允’ in Courant’s) during the reign of King Chungyeol 忠烈 (1274–1308) of the Goryeo dynasty devised a star chart. Unfortunately, neither charts survive to our time. Based on the article on Do-Jeung, Rufus (1913) conjectured that Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do (see below) was modeled after one of astronomical charts imported around 7th century from China. However, Park (1998) showed by scientific analysis that Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do was a independent star map from that of China. Park (2007) also compared wall paintings of tombs during the Goguryeo kingdom (around 5 – 6C) with Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do, and concluded that the latter modeled after not a Chinese star map but the former.

2.2.3 Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do 天象列次分野之圖 (no. 2366, 3674)

M.C., K.R.L., B.N.F. coréen 3470, P.O.; rubbed copy from the stone (石印本).

Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do is an astronomical chart engraved on a stone in 1395, the fourth year of the Joseon dynasty. According to descriptions engraved in the stone, this was modeled after the astronomical chart of the Goguryeo kingdom, which was subsequently lost during the disturbance of war (see also Yang-Chon-Jib 陽村集 [no. 537, 3025; Collected Works of Yang-Chon]). This star chart is one of the well studied Korean astronomical relics (Rufus 1913, 1915, 1936, 1944, Needham & Lu 1966, Ri 1982, Park 1998 references therein). According to the book of *Bibliographie Coréenne*, the chart of no. 2366 is 90×145 cm in size and reserved in L.O.V. and P.O., while that of no.3674 is 46×138 cm and did in B.N.F.. However, Lee (1994b) could not verify the charts possessed in L.O.V. and P.O.. Although Courant stated that Kim Hu 金候 put his signature to the descriptions of the stone star chart, Kim was just one of the officers mentioned in the chart. We suspect that the size of 46×138 cm of no.3674 might be wrong compared with currently measured size of 86×140 cm (Park 1998). Nonetheless, Cournat was the first person introduced this Korean star chart to foreign countries (Rufus 1913). Courant's book contains thirty seven plates including this map, which are not included in the translated version of Lee (1994b). For this reason, we present Courant's plate in Figure 7. Inferring from the quality of the rubbed copy, it is likely that the plate was rubbed by Courant himself not by an officer of Gwan-Sang-Gam.

2.2.4 Hon-Cheon-Chong-Seong-Yeol-Cha-Bun-Ya-Ji-Do 渾天總星列次分野之圖 (no. 2367)

P.O.; manuscript.

According to Courant's bibliographical notes on this map, it is a sky chart depicting stars in the north hemisphere together with zodiac. In addition, there are list of stars observed before the sunrise at the left-top margin, description of the fact that the map was constructed in Gwan-Sang-Gam after several corrections of the old one at the right-top margin, and contents about astronomy at the bottom. He also pointed out that this chart was collected by Admiral Mouchez, citing an annual report of Paris Observatory (Mouchez 1889; see Débarbat 2004 for English translation). In the early periods of the Joseon dynasty, Cheon-Sang-'Yeol-Cha-Bun-Ya-Ji-Do' was a traditional star chart name. Later, that was replaced by 'Hon-Cheon'-Jeon-Do 渾天全圖 (no. 3678) in the 18th century when western astronomical knowledges flooded into the Korea. Therefore, 'Hon-Cheon'-Chong-Seong-'Yeol-Cha-Bun-Ya-Ji-Do' seems to have been made in the period between the 14th and the 18th century. However, the existence of this map has never been reported to modern astronomical societies. We tried to confirm the existence of this map with no success. It does not seem to be preserved in the Paris observatory anymore (Débarbat 2006).

2.2.5 Shin-Beob-Ji-Pyeong-II-Gu 新法地坪日晷 (no. 3675)

1 sheet; 1.55×0.55 m.

Shin-Beob-Ji-Pyeong-II-Gu is a horizontal sundial of new model made by Giacomo Rho and Adam Shall under the lead of Li Tian-Jing 李天經 in 1636 (Needham et al. 1986). The item of catalogue no. 3675 is a rubbed copy of Shin-Beob-Gi-Pyeong-II-Gu, which was preserved in Gwan-Sang-Gam but displayed in the Royal Museum of Deok-Su 德壽 Palace at present. According to Courant, that sundial is the replica of Chinese one in Beijing. It is now believed that the sundial was carried by the prince So-Heon 昭顯 on his way back to Joseon from China in 1645.

2.2.6 Gan-Pyeong-II-Gu/Hon-Gae-II-Gu 簡平日晷/渾蓋日晷 (no. 3676)

1 sheet; 0.50×1.25 m.

Gan-Pyeong-II-Gu/Hon-Gae-II-Gu is a unique astronomical relic which contains two sundials engraved on one stone in 1785. Gan-Pyeong-II-Gu is the same as Ang-Bu-II-Gu 仰釜日晷 (a scaphe

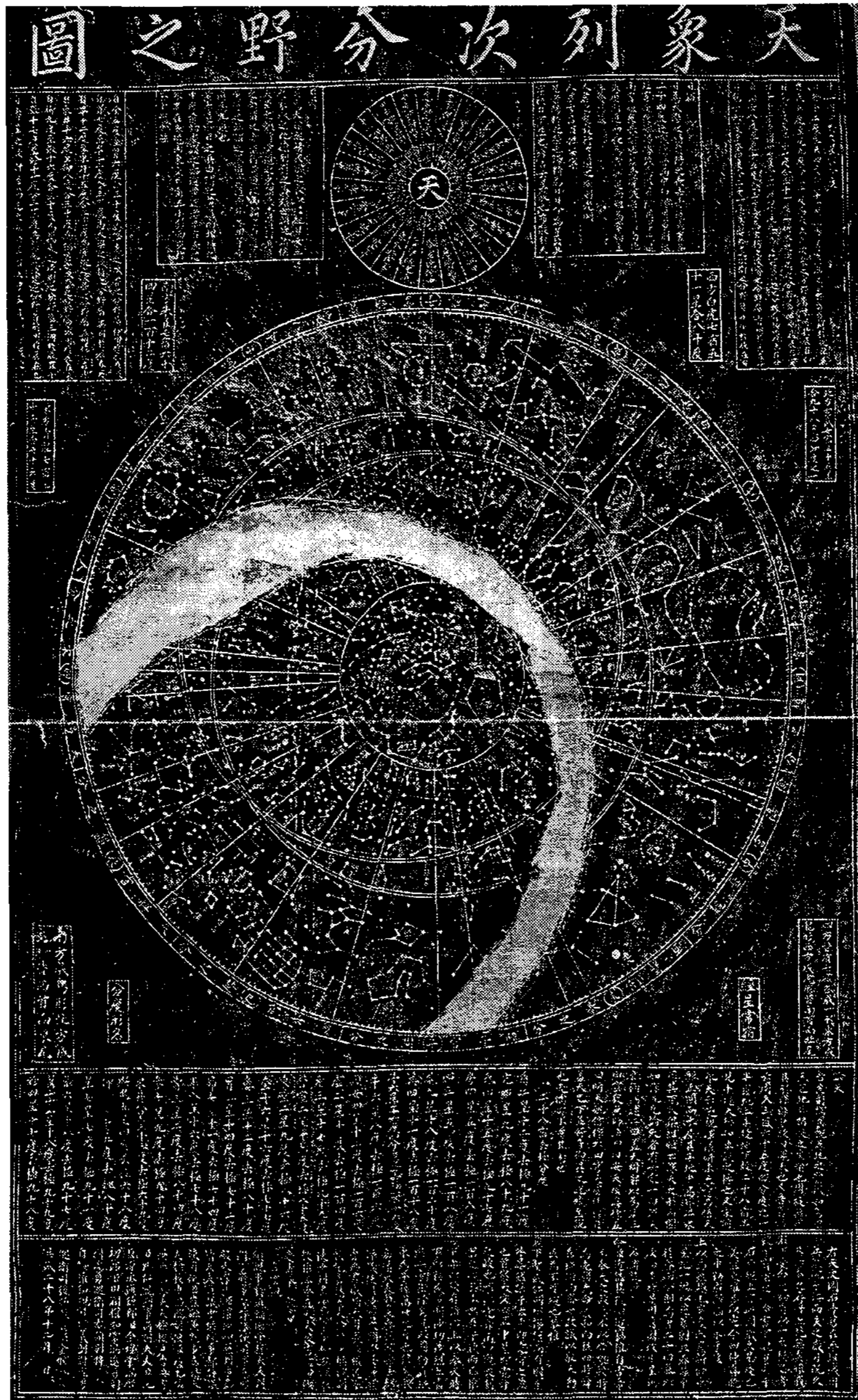


Figure 7. Plate of Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do included in the book of *Bibliographie Coréenne*.

sundial; see Needham et al. 1986) projected into the horizontal plane. In the meanwhile, Hon-Gae-Il-Gu is a sundial representing the theories of Hon-Cheon 渾天 and Gae-Cheon 蓋天 (see Rufus 1913 for the explanation of those theories). The following statement is engraved in the sundial preserved in the Royal Museum of Deok-Su Palace:

漢陽北極出地三十七度三十九分一十五秒 時憲黃赤大距二十三度二十九分

乾隆五十年乙巳仲秋立

The latitude of Seoul is $37^{\circ} 39' 15''$, the distance between the ecliptic and the equator is $23^{\circ} 29'$ by Si-Heon-Ryeok. Built in the height of autumn of 1785.

The item of no. 3676 is also a rubbed copy of this sundial, which was located in Gwan-Sang-Gam at that time.

2.2.7 Heon-Cheon-Jeon-Do 渾天全圖 (no. 3678)

K.R.L., J.R.L..

According to Courant, this is composed of 11 Books including 1×0.6 m size star-map which was woodblock printed and colored together with many descriptions. However, both editions of K.R.L. and J.R.L. are only the star charts with size around 0.86×0.6 m. Moreover, the latter is in black and white. Heon-Cheon-Jeon-Do is a woodblock printed star chart made in around 18th century (Jeon 1974, 1998). We here present the photograph of the K.R.L. edition in Figure 8. Although this star map was influenced by western astronomical knowledge like other celestial planispheres of 17th century, it is a unique because it tried to implement modern western astronomy into traditional Korean astronomy. No such star maps with similar names are found in China or in Japan. According to the descriptions around center circle, it contains 1449 stars in total, including 121 un-observable stars from the north hemisphere and the explanation on the structure of Tychonic universe. Five Planets observed through a telescope are drawn in the upper area, including a ring and five satellites in Saturn and four satellites in Jupiter (refer to Park 1995 for detailed descriptions).

2.2.8 Seong-Shin-Do 星辰圖 (no. 3679)

This item is described as the following: a round paper with 0.69 m in diameter, colored manuscript, northern hemispheric sky, and unknown publication year. We found a book with a similar title, Seong-Shin-Do-Seol (星辰圖設; K.R.L. 奎 6285; theory of Seong-Shin-Do) from the list of Kyujanggak Library. However, the item of K.R.L. 奎 6825 is not a star map but a book composed of the same contents as Bo-Cheon-Ga (see 2.1.28) except that stars are colored. For example, see Figure 9 showing the constellation of Ja-Mi-Won.

2.2.9 Hon-Jung-Seong-Do 昏中星圖 (no. 3680)

We can not find any information on this item. From the title, we presume that it is a star chart showing stars at the sunset. According to bibliographical note of Courant, this item is a round paper with the size of 0.26 m in diameter drawn with black and white.

2.3 Others

2.3.1 Gan-Dok-Cho 簡牘抄 (no. 31)

J.R.L.; 2 Volumes; anonymous; unknown publication year; manuscripts.

This book contains sample sentences of letters for various cases: to mother, brother, cousin, and so forth. According to Courant, this book also includes the constellation names in Korea and China or Korean and Chinese characters (the translations are unclear). It seems that there are various kinds of editions because we can not find those descriptions in the book preserved in Jangseogak Library nor in private ones.

2.3.2 Hwa-Eum-Gye-Mong 華音啓蒙 (no. 69)

K.R.L., L.O.V. COR.I.350, I.390; 2 Volumes; Yi Eung-Heon 李應憲 (1838–?), 1883; movable metal printing.

This is a textbook on the Chinese conversation. Throughout the book, Chinese pronunciations are written in Korean alongside each Chinese syllable. In addition to conversational phrases, Cheon-

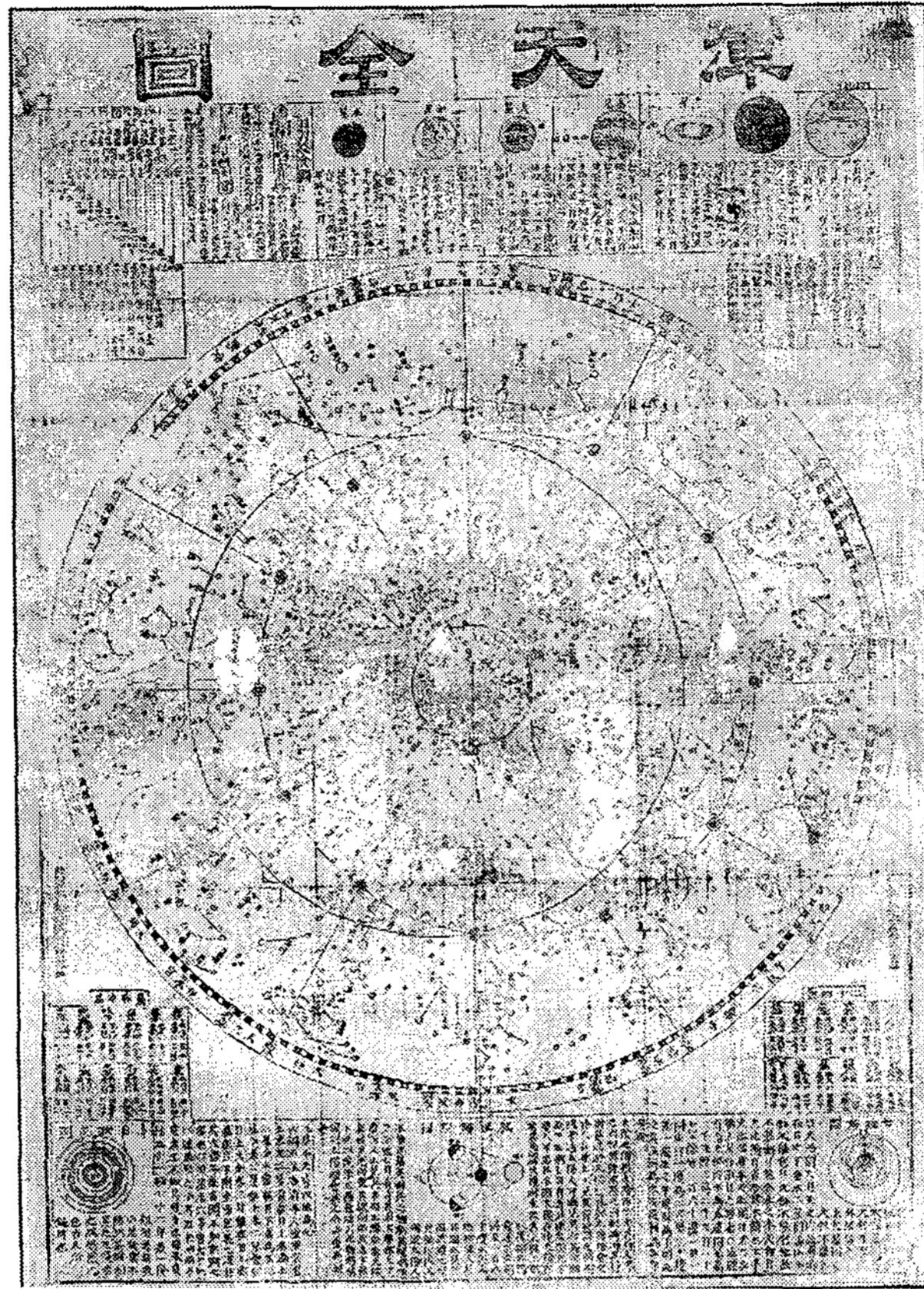


Figure 8. The photograph of Hon-Cheon-Jeon-Do preserved in K.R.L..

Gan-Ji-Ji 天干地支 (elements of the sexagenary cycle), 28 oriental constellations, the numbers (算數), and so forth are listed in the book. For example, we present the page listing with 28 oriental constellations and the numbers in Figure 10.

2.3.3 Hwa-Eo-Yu-Cho 華語類抄 (no. 72)

K.R.L., L.O.V. COR.I.433; anonymous; unknown publication year; woodblock printing.

This is also a Chinese-Korean vocabulary book. The book consists of several subjects, and Chinese pronunciations of the vocabularies for each subject are written in Korean as in Hwa-Eum-Gye-Mong. We summarize vocabularies belonging to 'Astronomy (天文)' subject in the followings;

No-Cheon 老天: sky, Il-Du 日頭: Sun, Tae-Yang 太陽: Sun, Il-Hun 日暈: the halo of the Sun, Il-Kwon 日圈: the halo of the Sun, Il-Hong 日紅: rainbow, Il-Sik 日蝕: solar eclipse, Wol-Du 月頭: Moon, Tae-Eum 太陰: Moon, Wol-Rang 月亮: moonrise, Cheon-Ha 天河: Milky Way, Seong 星: star, Yu-Seong 流星: shooting star (meteor), Rang-Seong 朗星: bright star, Sam-Seong 參星: three stars, Mi-Pa-Seong 尾把星: comet.

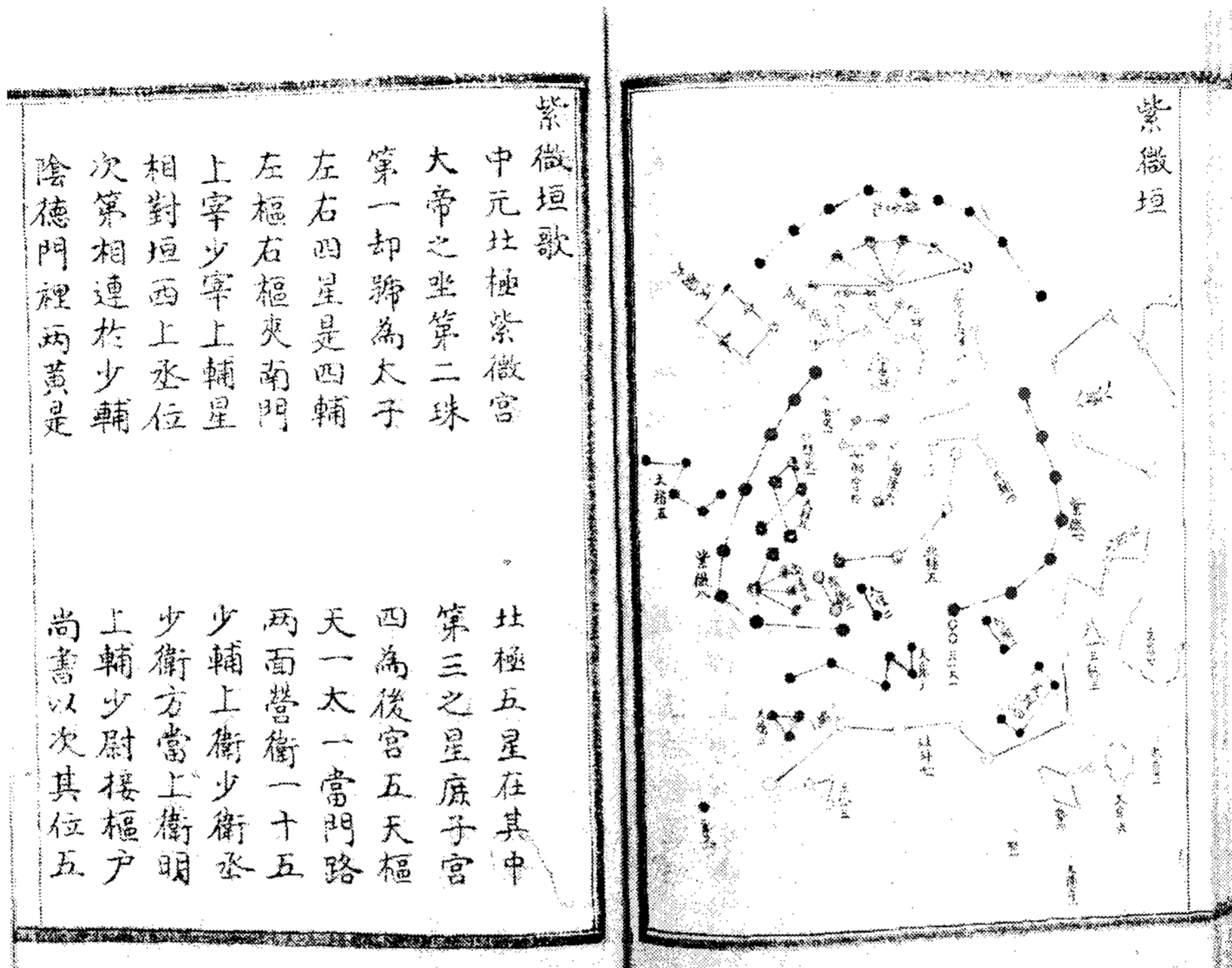


Figure 9. The constellation of Ja-Mi-Won presented in Seong-Shin-Do-Seol.

2.3.4 Hwi-Chan-Yeo-Sa 彙纂麗史 (no. 1863)

K.R.L., L.O.V. COR.I.102; Hong Yeo-Ha 洪汝河 (1621–1678), unknown publication year.

This is a history book of the Goryeo dynasty written by Hong Yeo-Ha 洪汝河 with the preface of Jeong Jong-Eo 鄭宗魯. Based on Goryeosa 高麗史 (no. 1846), Hong compiled this book as forty eight volumes. The seventh and eighth volumes, Cheon-Mun-Ji 天文志 and O-Haeng-Ji 五行志, deal with the astronomy and five elements, respectively. According to Courant's notes, one complete collection of the book was presented to the French president and now preserved in L.O.V.. In Goryeosa (total 139 volumes), Cheon-Mun-Ji constitutes from the forty-seventh to forth-ninth volumes, Ryeok-Ji 曆志 (omitted in Hwi-Chan-Yeo-Sa) successive three volumes, and O-Haeng-Ji from fifty-third to fifty-fifth. Like Samguksagi 三國史記 (no. 1835), many astronomical events are recorded in Cheon-Mun-Ji and O-Haeng-Ji, such as solar eclipses, meteor and meteor shower, aurora, and so forth. See, for example, Yang et al. (1998) for the sunspot and aurora records in Cheon-Mun-Ji and O-Hang-Ji of Goryeosa.

2.3.5 A-Hi-Won-Ram 兒戲原寶 (no. 2115)

K.R.L.; 1 Volume; Jang Hon 張混 (1759–1828), 1803.

This book was compiled from the selections of the classics of all ages in order to offer a convenient usage for the beginning scholars. It consists of ten Themes 組 (Hyeong-Gi 形氣, Chang-Si 創始, Bang-Do 邦都, Guk-Sok 國俗, Tan-Yuk 誕育, Ja-Seong 姿性, Jae-Min 才敏, Su-Bu 壽富,

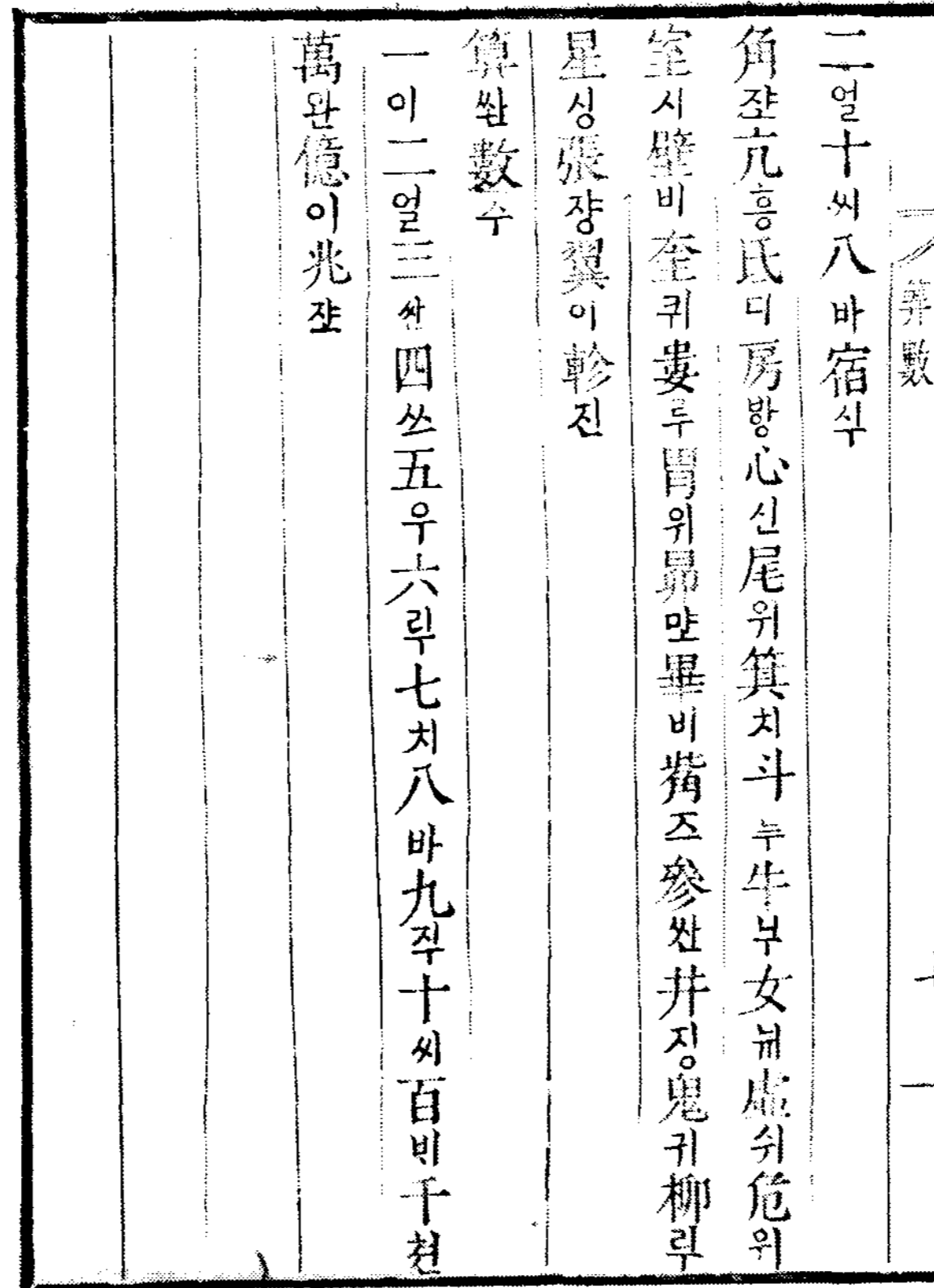


Figure 10. An example of the page of Hwa-eum-gye-mong 華音啓蒙 listing 28 oriental constellations (二十八宿) and the numbers (算數).

Byeon-Yi 變異, and Jeon-Un 傳運) together with an appendix and a supplement. An oriental cosmological theory is explained in the Hyeong-Gi Theme. It also explains 28 oriental constellations (cf. 2.3.2), 12 orders (12 次), and so forth. This book can be called a small encyclopedia.

2.3.6 Sa-Min-Pil-Ji (no. 2313): see Figure 11a

K.R.L., L.O.V. COR.I.466; 1 Volume; H. B. Hulbert (1863–1949, U.S.A); 1891.

This is a world geography book written in Korean by H. B. Hulbert, an American missionary and English teacher of Yuk-Yeong-Gong-Won 育英公院 (the first modern school in Korea), in 1891. In the preface, Hulbert pointed out that this book was intended to offer the knowledge that civilians (士民) have to (必) know (知) in the globalization era. In the subject of Sta-Deong-Yi (Earth: see Figure 11d), the theory of planets' motion around the Sun, the structure of the Earth, the Milky Way, and so forth are explained. It also includes a picture of solar system, which contains a comet naming Mi-Seong (尾星) not Mi-Pa-Seong (see. 2.3.3).

- (a) 스민필지
- (b) 日躔
- (c) 빅중력
- (d) 짜덩이
- (e) 地球圖日圖
- (f) 地球日圖成歲序圖

Figure 11. Old Korean and rare Chinese characters used in this study.

2.3.7 Go-Sa-Shin-Seo 攷事新書 (no. 3611)

K.R.L., J.R.L.; L.O.V. COR.I.358; 15 Volumes, 7 Books; Seo Myeong-Eung 徐命膺 (1716–1787).

Since the contents of Go-Sa-Chal-Yo 攷事撮要 (no. 3150, by Eo, Suk-Gwon 魚叔權) were concise and mainly focused on the relationships with China, Seo Myeong-Eung compiled Go-Sa-Shin-Seo by expunging and supplementing Go-Sa-Chal-Yo in 1771 (forty-seventh reign of King Yeongjo 英祖). Of 15 volumes, the first one is Cheon-Do-Mun 天道門 consisted of 7 items: Go-Gan-Ji 古干支 (ancient sexagenary cycle), Sib-Yi-Gung-Myeong 十二宮名 (names of zodiac signs), Sib-Yi-Wol-Ho 十二月號 (names of twelve months), Yi-Sib-Sa-Geol-Gi 二十四節氣 (twenty-four seasonal subdivisions), Il-Yeong-Jeong-Si 日影定時 (directions of the Sun's shadow), Jung-Seong-Jeong-Si 中星定時 (directions of stars in each seasonal subdivision), and Dong-Guk-Bun-Seong 東國分星 (East countries belonging to Regular Divisions).

2.3.8 Han-Seong-Ju-Bo 漢城周報 (no. 2819)

J.R.L..

This was the first weekly newspaper of Korea launched in 1886. The newspaper was published in Bak-Mun-Guk 博文局 to give allegiance to the king and to enlighten civilians. For these reasons, many of articles were focused on Western science and technology of the time (Park 1981). In 77th volumes (i.e., 22 Aug. 1887), an article relating to astronomy is reported. We also found similar articles together with diagrams entitled ‘Ji-Gu-Do-Hae 地球圖解, Ji-Gu-Won-Il-Do (see Figure 11e) and Ji-Gu-Won-Il-Seong-Se-Seo-Do (see Figure 11f)’ in the first volume of Han-Seong-Sun-Bo 漢城旬報, Han-Seong-Ju-Bo’s former self, published every ten days.

3. Summary

We surveyed astronomical materials from the lists of *Bibliographie Coréenne* written by Maurice Courant from 1894 to 1896 and found about 50 items related to astronomy or astrology. We classify them into three groups, astronomical books, instruments, and others, and introduce them with the astronomical point of view.

With the except of some astronomical books such as Si-Heon-Wol-Ri-Beob and Wol-Ri-Se-Cho,

most of items are previously known ones. However, they had not been well studied particularly with the astronomical viewpoints. Considering astronomical instruments, we would like to emphasize that Courant is the first man who introduced Cheon-Sang-Yeol-Cha-Bun-Ya-Ji-Do (see 2.2.3), a famous Korean astronomical chart engraved in a stone, to the Western communities. We also found an astronomical chart, Hon-Cheon-Chong-Seong-Yeol-Cha-Bun-Ya-Ji-Do (see 2.2.4), which has not been known to academic societies. Inferring from the fact that astronomical contents are found in many non-astronomical books, it seems that astronomy was one of important subjects in the Joseon dynasty.

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