

BOOK REVIEW

Kim Youngwook 김영욱, Lee Jangjoo 이장주 and Chang Hyewon 장혜원, *Mathematics and Civilization in Korea: A History* 한국수학문명사 (Paju: Dulnyouk Publishing, 2022), 576 pp.

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Following the first publication of the series “Science and Civilization in Korea” in 2015 as part of the multi-year project by the Korean Research Institute of Science, Technology and Civilization (KRISTaC), a widely anticipated book dedicated to mathematics was finally released last year. *Mathematics and Civilization in Korea: A History* 한국수학문명사, as the title suggests, covers a tremendous amount of mathematical knowledge in the context of Korean civilization from ancient times to the early twentieth century. Previous attempts to write a comprehensive history of mathematics in Korea, emphasizing its relations to aspects such as class systems, cultures, or civilizations, had already been made. In 1977, Kim Yongwoon 김용운 and Kim Yongkuk 김용국 explored the different features between mathematics of Confucian literati and ones of bureaucratic officials in their seminal book, *The History of Korean Mathematics* 한국수학사. This was followed in 2009 by a revised edition with the addition of the subtitle *Korean Thoughts and Cultures Views through the Window of Mathematics* 수학의 창을 통해 본 한국인의 사상과 문화.¹ Chang Hyewon 장혜원 published the book entitled *Mathematics in Joseon [Korea], as Seen in Mathematical Texts* 산서로 보는 조선수학 in 2006. The author, mindful of the ancient usage of counting rod as a mathematical tool, translated old mathematical methods into modern terms.² Then in 2010, Kawahara Hideki 川原秀城 convincingly demonstrated the intertwined features of mathematics and Neo-Confucianism, or the study of Zhu Xi 주희, in his finely researched book, *The His-*

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¹ Kim Yongwoon 김용운 and Kim Yongkuk 김용국, *The History of Korean Mathematics* 한국수학사 (Seoul: Gwahakgwa ingansa, 1977). Kim Yongwoon and Kim Yongkuk, *The History of Korean Mathematics: Korean Thoughts and Cultures Views through the Window of Mathematics* 한국수학사: 수학의 창을 통해 본 한국인의 사상과 문화 (Seoul: Salim, 2009).

² Chang Hyewon 장혜원, *Mathematics in Joseon [Korea], as Seen in Mathematical Texts* 산서로 보는 조선수학 (Seoul: Gyeongmunsa, 2006).

tory of Mathematics in Joseon [Dynasty]: the Neo-Confucian Development and its Ending 朝鮮數學史:朱子学的な展開とその終焉.³ Thus, these books have shown that the study of mathematics is cultural. In the same vein, the authors of *Mathematics and Civilization in Korea: A History* also make every effort to describe how the study of “mathematics” was interwoven with various societal and cultural elements of the Korean “civilization.” They highlight the distinguishing characteristics of mathematics among different societal groups, and also the unexpected interconnections of mathematics with other fields.

The focus on “civilization,” or “culture,” is particularly evident in the first two chapters. Chapter 1 dealing with the period from antiquity to Goryeo 고려 Dynasty, and Chapter 2, roughly in Joseon 조선 Dynasty, keep a faithful track of the collection of written records, archaeological findings and artifacts, such as game tools, architectural patterns, astronomical instruments and charts, commercial records and astrological understanding of some natural numbers. They reinforce the historical observation that mathematics had permeated all corners of life.

The next four chapters are devoted mainly to mathematics in the Joseon Dynasty. The authors seem to bear the following narrative in mind. It can be said that mathematics in the Joseon Dynasty had three great strides. The first one was made in the reign of King Sejong (reign: 1397-1450) (Chapter 3), only to be crushed by wars. After the wars, there were two more great developments; one in the late seventeenth and early eighteenth centuries and the other in the early-mid nineteenth century. The former one was a true “renaissance of Joseon scholarship” (266) and “the peak of oriental mathematics” (293), achieved by mathematical official Hong Jeong-ha (1684-1727) (Chapter 5, Section 2). The last one was “the last fruits of traditional Korean mathematics” (312), produced by mathematical and astronomical official Lee Sang-hyuk (1810-1883?), literati brothers Nam Byeong-chul (1817-1863) and Nam Byeong-gil (1820-1869) (Chapter 5, Section 6).

As for the unique features of Korean mathematics from the other East Asian ones, the authors point out that there were three predominant streams in mathematics in the Joseon Dynasty, and each stream had noticeable features according to its practitioners. The mathematics practiced by mathematical officials 산원 working for the Ministry of Finance 호조 was “practical,” and the mathematics used by astronomical officials 관상감원 for the Office of Astronomy 관상감 was “limited to calendrical calculations,” while the mathematics performed by Confucian literati for personal interest, was more “conceptual” or “academical” (234). In the authors’ view, two among three of the great aforementioned developments in Korean mathematics, one in the reign of King Sejong, and the other by Lee and the Nam brothers in the nineteenth century, were achieved by the “confluence” of these streams.

³ Kawahara Hideki 川原秀城, *The History of Mathematics in Joseon [Dynasty]: the Neo-Confucian Development and its Ending* 朝鮮數學史:朱子学的な展開とその終焉 (東京:東京大學出版社, 2010).

For the enrichment of the narrative, in Chapter 3, the authors describe the development of mathematics from the start of the Joseon Dynasty to the reign of King Sejong. They delineate the role of mathematics on building the new government, including metric systems and bureaucratic mathematical institutions. They also explore how King Sejong's personal enthusiasm towards mathematics had contributed to the development of its learning. Chapter 4 briefly outlines these three streams according to societal structure and provides short explanations of twenty-two mathematical texts.

Chapter 5, entitled “the rebirth of mathematics” gives a full explanation for the achievements of individual Korean mathematicians after the wars. The authors list thirteen mathematicians or the mathematicians’ families in-chronological order and put them into the context of the Korean history of mathematics. They capture very well the individuals with phrases like “mathematics of an avid reader and writer,” or “love for mathematics from generation to generation,” although the balance in dealing with each mathematician tends to be slightly disproportionate.

Chapter 6 explores the pivotal moment in history known as ‘when West met East,’ examining the acquisition of European mathematical knowledge by East Asian mathematicians and analyzing the subsequent convergence, confrontation, or harmony that emerged in relation to their pre-existing knowledge. The authors pay particular attention to comparing and contrasting a variety of attitudes among different Korean mathematicians.

The last chapter displays a good collection of examples of traditional mathematical techniques, which will be a perfect introduction for readers who want to know more about these specific techniques. In Chapter 7, there are five sections, “counting-rod calculation,” “the method of the celestial elements 천원술,” “the method of root extraction 개방술 and the method of root extraction by iterated multiplications 증승개방법,” “the method of right-angled triangles 구고술” and “the method of spherical trigonometry 구면삼각법,” all of which are provided with modern mathematical interpretations. Although readers could observe that the same repeated mathematical content in the last few chapters, which creates a sense of redundancy, this does not disturb the overall flow of the book.

There is also an appendix about the history of Chinese and Japanese mathematics, demonstrating that the authors have thought about the placement of Korean mathematics within the wider East Asian context. Yet, the appendix may be too short for readers unfamiliar with quite massive and complex history of East Asian mathematics.

Overall, this book is a delightful addition to literature, offering a comprehensive understanding of the history of mathematics in Korea. I hope that this book will help readers continue their journey of exploring the history of mathematics in Korea, as well as in East Asia.