Obituary

“A Journey on a Single Path”: A Life Devoted to the History of Korean Science

In Memory of Jeon Sang-woon

(1932-2018)

Prof. Jeon Sang-woon, one of the great masters in the field of the history of Korean science, passed away on January 15, 2018. Born in Wonsan, currently in North Korea, in 1932, he was 86 years old at his passing. He crossed the border toward the South in 1950, in the midst of the Korean War, after deciding he did not want to attend college in the North. Although he was more interested in the humanities than in natural sciences, he chose to study chemistry at Seoul National University because he was a refugee without any connections in the South.

Prof. Jeon began taking an interest in history of science in 1955, during his senior year in college, when he first read George Sarton’s article “The
New Humanism” (1924), in a Japanese translation. After graduating from college and before getting a job, Prof. Jeon meticulously translated this work, which critically influenced his professional career. (Regrettably, his translation was never published due to the circumstances of the publishing company.)

Prof. Jeon’s interest in the general history of science turned into a focus on the history of Korean science in 1959, when he began to read Joseph Needham’s multi-volume oeuvre Science and Civilisation in China. Later, he wrote of the shock he felt when he first encountered Needham’s monumental work: “My relationship with you [Joseph Needham] began in 1959. While I was in the midst of deciding to devote my life to the study of the history of Korean science, your great books gave me a shock—a shock greater than Sarton’s book had given.”

Prof. Jeon joined the History of Science Society of Japan in 1959 and then contributed a short article, “A Different View on the Invention of Metal Movable Type Printing Technology,” to the “Letter to the Editor” section of the society’s journal. This article elaborates on the argument about Korean metal movable type made in John D. Bernal’s Science in History, which had just been published in a Japanese translation, in which Bernal argues that this technology was first invented in Korea. It was the first article published by Prof. Jeon in which he discussed a topic related to the history of Korean science. In the following seven years, Prof. Jeon published twelve articles on important subjects in the history of Korean science, including the honcheon 計器 armillary clock, which combined Western and Eastern versions of these celestial-motion spheres, and the cheugugi 测雨器, the world’s first rain gauge. The collection of these twelve articles was published as Prof. Jeon’s first book, Han’guk Gwahakgisulsa 韓國科學技術史 A History of Korean Science and Technology (Seoul: Gwahaksegyesa, 1966) in Korean.

Prof. Jeon dedicated this first book to his mentor, Professor Hong I-seop 洪以燮. In order to fully understand Prof. Jeon’s early scholarly path, we have to appreciate this pioneer in the exploration of the history of Korean science. Prof. Hong wrote Joseon Gwahaksa 朝鮮科學史 History of Science in Joseon (Seoul: Jeongeumsa, 1946) in his early thirties. This book presented, for the first time, a systematic overview of the pre-twentieth century

1 Sarton (1938).
3 Jeon (1962).
history of Korean science—at a time when there had not been any substantial work on history of Korean science and technology by a Korean scholar. Prof. Hong considered science and technology to be the essence of any culture during this modern age of science. Thus, during the time Japanese colonial rule was at its most oppressive, he planned to create an historical overview of Korean science and technology. It was when the Japanese adopted extreme assimilation policies toward Koreans, such as the ‘Japan and Korea are one’ policy and the ‘turning Koreans into imperial subjects’ policy. Although it was a work about the history of science in Korea, then Japan’s colony, in size and systematic quality. Prof. Hong’s Joseon Gwahaksa was not inferior to the 310-page Nihon kagaku-shi History of Science in Japan (Tokyo: Daigaku bunko, 1941) by Itō Shirō伊藤至郎 (1899-1955). As for Chinese scholarship in the history of Chinese science, there had as yet been no adequate book-length treatment of the topic.

Prof. Jeon learned from Prof. Hong not only a broad perspective toward the entire history of Korean science, but also his scholarly approach. Prof. Hong argued that “We do not have to discuss only brilliant aspects of Korean science and technology (Hong (1946), p. 10).” He preferred a cool-headed approach and an overview of the entire tradition of Korean science rather than an emotional and nationalistic approach, in which only praiseworthy legacies of science and technology were highlighted. Yet he also rejected the defeatist and nihilistic attitude, represented by the Japanese colonialists and some Korean intellectuals, which claimed that Korea could not help collapsing because of its inadequate cultural legacy. He claimed: “We should reject and critically discern the way in which, for ulterior motives, people have in the past categorically ignored what should have been appreciated in traditional science.”

In 1966, after receiving the first edition of Han’guk Gwahakgisulsa 韓國科学技术史 by Prof. Jeon, Prof. Hong declared that the role he had been playing in the history of science in Korea was over, because “a scholar who is both a scientist and an historian has appeared on the scene.”

Prof. Jeon’s book differed from Prof. Hong’s book, first of all, in its organizational method. Prof. Jeon organized his book according not to historical periods but to fields. For example, in astronomy, his book deals with the ancient Chinese theory of the universe, then with the heliocentric theory in the eighteenth century, then presents astronomical charts, observation and measurement instruments, facilities, and various clocks, and ends its discussion of astronomy with the world’s first measurement of the altitude of the North Pole, under the Joseon dynasty. He organized the other scientific fields—meteorology, physics and applied physics,
chemistry and applied chemistry, and geography and cartography—similarly focusing on scientifically significant achievements.

Whereas Prof. Hong arranged features of science and technology in different periods and extracted their characteristics specific to that period, Prof. Jeon tried to understand scientific principles by analyzing the overall structures of scientific and technological fields. If Prof. Hong had outlined a history of science and technology in Korea, Prof. Jeon revealed its specific content.

Not surprisingly, the structure of Prof. Jeon’s Han’guk Gwahakgisulsasa (韓國科學技術史) follows that of Joseph Needham’s Science and Civilisation in China series. As Prof. Jeon himself acknowledged, Needham was a second mentor. Around the time Prof. Jeon began studying the history of science in Korea, the first four volumes of Needham’s multi-volume project were published in six books: Volume 1: Introductory Orientations (1954); Volume 2: History of Scientific Thought (1956); Volume 3: Mathematics and the Sciences of the Heavens and Earth (1959); Volume 4, Part 1: Physics (1959); Volume 4, Part 2: Mechanical Engineering (1962); and Volume 4, Part 3: Civil Engineering and Nautics (1962). In 1962, Prof. Jeon spent the entire scholarship fund he had received from a foundation to purchase these books, which he wanted to read. The breadth and depth of Science and Civilisation in China were the gold standards, according to which Prof. Jeon decided on the themes and levels of his study of Korean science.

In his book, Prof. Jeon adopted the same methods that Needham applied to the understanding of the history of Chinese science and technology. He assessed scientific and technological levels in Korean astronomy, physics, chemistry, printing technology, weaponry and gunpowder, metal craft and mining, civil engineering and architecture, and cartography. His book includes measured assessments of well-known achievements in the history of Korean science and technology, such as the earliest surviving Asian observatory structure, Cheomseongdae (瞻星臺); world-renowned Goryeo 高麗 celadon; the metal movable type technology of the Goryeo and Joseon periods; the rain gauge during the early and late Joseon periods, and geobugseon (龟船 'Turtle Ship'), known as the world’s first armored battleship. Prof. Jeon’s approach focused not on whether or not a scientific achievement could be considered the world’s ‘first,’ but whether it succeeded in securing universally acceptable data, proper scientific analysis, and historical interpretation based on them. His conclusions, based on these analyses, showed the general excellence in the tradition of science and technology in Korea. In sum, he tried to support scientific excellence in traditional Korean science using universally recognised criteria.

Further, Prof. Jeon contributed critically to the recognition of the history of science in Korea within the history of science in East Asia by
participating in an international conference on the history of science in East Asia in Hong Kong in 1968. There he met those historians of his generation who worked on science in East Asia, such as Ho Peng-Yoke 何丙郁, an historian of Chinese mathematics and astronomy; Nakayama Shigeru 中山茂, an historian of Chinese and Japanese astronomies, and Nathan Sivin, an historian of Chinese alchemy at that time, as well as Yabuuti Kiyosi 萩内清, an elder master historian of Chinese mathematics and astronomy. Through these meetings, Prof. Jeon realized that his peers did not know much about history of science in Korea, while at the same time he felt greatly stimulated by their advanced scholarly achievements. He also realized that this ignorance on the part of foreign scholars had much to do with the simple lack of information about the history of science in Korea. These scholars agreed on the urgent need for a book on the history of science and technology in Korea—written in English. Nathan Sivin, who was an editor of the MIT Press East Asian Science Series, invited Prof. Jeon to write such a book for the series.

During his preparation for Science and Technology in Korea: Traditional Instruments and Techniques (Cambridge, Mass.: MIT Press, 1974), Prof. Jeon's views on the history of science in Korea expanded greatly. As the editor of the book, Nathan Sivin wanted to know not only the overview of the history of science and technology in Korea, but also the relationship between the histories of Korean and Chinese science. Because of this request, Prof. Jeon had to go beyond explaining the achievements in traditional Korean science in each field, but had to think seriously about an overarching theory of the entire history of science in Korea, that is, the origins of creativity in Korean science and technology. In this English-language book, Prof. Jeon revealed insights into the history of science in Korea that had not been discussed in his previous books. In its preface, Prof. Jeon argued that traditional Korean science accepted Chinese science to a large degree, but also showed a pattern of creating its own scientific knowledge, based on accepting, rejecting, copying, and applying Chinese science. As a result, Prof. Jeon revealed that ‘civilization’ around China was achieved not by China alone, but through that country’s interactions with other Asian civilizations, as in the example of metal movable type, which had always been considered a Chinese achievement, when it was actually invented in Korea.

Immediately after the publication of this book, Prof. Jeon visited the Institute for Research in Humanities at Kyoto University in Japan to do doctoral research. During his stay, he deepened his scholarship about the history of science in East Asia, while interacting with historians of science in East Asia, such as Yabuuti Kiyosi, Yamada Keiji 山田慶兒, and

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Yoshida Mitsukuni 吉田光邦, and solidified his theory of the creative transformation of Chinese science by Korean scientists. In 1976, he wrote about this theory in the preface of the Japanese translation of his English book, which was published two years later, in 1978, in Tokyo by Komabook.

The second revision of the Korean edition of his Han’guk Gwahakgisulsasa 韓國科學技術史 History of Korean Science and Technology (Seoul: Jeongeumsa, 1976) shows a more advanced approach than either the English or the Japanese editions. No longer does he protest about Korean society’s ignorance of its own history in science. Rather than following the categories of modern science, as Needham had done, the book is organized along the themes of the heavens and earth, life and body, and technology and mineralogy, under the overarching theme of Korean science’s creative transformation of Chinese science. In addition, this book includes an enriched understanding of the history of Korean science through his study of North Korean scholarship in this area, which was banned in South Korea, but which he could access during his stays at the Harvard Yenching Institute and at Kyoto University. It is thanks to this book that the history of Korean science was decisively established as a full-fledged scholarly field.

There have been criticisms of Prof. Jeon’s works, particularly of his emphasis on the excellence of Korean science, the understanding of Korean science in the context of Chinese science, his emphasis on science and technology rather than on their social and theoretical contexts, applying a modern science-based approach to traditional science, and the omission of many aspects of traditional science, as well as the lack of balance among different disciplines. But Prof. Jeon fully acknowledged that he had had no ability or time to study sociology of science or traditional theories of science in East Asia. Instead, he made a conscious decision to write about only what he knew, based solely on his strengths in directly examining traditional scientific products and supporting his understanding through historical data.

Prof. Jeon also continued to meticulously revise and expand his book, which was completed with the publication of Korean edition of Han’guk Gwahaksasa 韓國科學史 History of Science in Korea (Seoul: Science Books, 2000). Prof. Jeon decided to write this book, based on his unique approach, and thus organized it according to categories such as science of the heavens; science of the soil and fire; Korean printing technology; science of the earth; science in ancient Japan and Korea; and scientists during the Joseon dynasty and their achievements. Written not only for scholars but also ordinary people, it was selected as one of 100 Representative Korean Books at the 2005 Frankfurt Book Fair in Germany. The book was translated into English by Robert Carruba and Lee Sung Kyu and published as A History of

For fifty-seven years since the publication of his first book, in 1959, Jeon Sang-woon fiercely devoted his life to the study of the history of science in Korea. Koreans are now so familiar with the results of his research that it is hard to realize how fresh his arguments were when they first appeared. Today, numerous publications, including encyclopedias, simply copy the results of his studies about the heritage of traditional Korean science. And both scholars and ordinary readers ingest this knowledge without realizing that it came through the meticulous and hard work of this scholar. What is more, his two English books are the universal resource for most people in the world who wish to gain an appreciation of traditional Korean science.

“A Journey on a Single Path” was Prof. Jeon’s favorite phrase. The middle school he went to in Wonsan was renamed Hangil Middle School 한길中學校 after the liberation of Korea from Japan. The word ‘hangil’ means ‘a single or large path or road.’ This ‘single path’ was his path and destiny his entire life. We should also remember that, on this scholarly road, there were gigantic mentors, such as Hong I-seop, Joseph Needham, and Yabuuti Kiyosi, and that Prof. Jeon strode this road with international colleagues, such as Ho Peng-Yoke, Nathan Sivin, and Nakayama Shigeru. Although he regretted that he could never step on the soil of his hometown again due to the division of Korea, he nevertheless studied and absorbed the achievements of North Korean scholarship on history of science as well. It is now the task of scholars of a younger generation to extend and broaden this road. Beyond his passing, the scholarship he has left will last long into the future. May Prof. Jeon rest in peace!

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(Translated by Seung Hee Jeon)
References


Hong I-seop 洪以燮 (1946), Joseon Gwahaksa 朝鮮科學史 (History of Science in Joseon), Seoul: Jeongeumsa.

Itō Shirō 伊藤至郎 (1941), Nihon kagaku-shi 日本科學史 (History of Science in Japan), Tokyo: Daigaku bunko.

Jeon Sang-woon 全相運 (1966), Han'guk Gwahakgisulsa 韓國科學技術史 (A History of Korean Science and Technology), Seoul: Gwahaksegyesa.


——— (1976), Han'guk Gwahakgisulsa 韓國科學技術史 (History of Korean Science and Technology), Seoul: Jeongeumsa.


——— (2000), Han'guk Gwahaksa 韓國科學史 (History of Science in Korea), Seoul: Science Books.


——— (1938), Kagakushi to shin hyūmanizumu 科学史と新ヒューマニズム (History of Science and the New Humanism), translated by Morishima Tsuneo 森島恒雄, Tokyo: Iwanami shoten.