

Moon, Joong-Yang 문중양, *Joeseon hugi gwahak sasangsa: Seogu ujuron-gwa Joseon cheonjigwan-ui mannam* 조선 후기 과학 사상사: 서구 우주론과 조선 천지관의 만남(The Reconstruction of Science in Late Joseon Korea: Hybridizing Western Science and Korean Science). Paju: Deulnyeok, 2016. 432 pp.

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The meeting of non-Western cultures with Western science is a challenging topic for historians of science, especially for those who deal with cases of modernization forced upon indigenous cultures from outside—usually by Western imperial powers. Historians of Korean science share this challenge and have produced massive works on Korea's reception of Western science, particularly in the late Joseon period, when Western science was first introduced into Korea. Many of those historians adopted a teleological view, asking only how successfully the stagnated Korean science was modernized by accepting the advanced Western science. However, younger generations of historians of science have recently criticized this teleological view. By investigating the historical context, these revisionist historians highlight indigenous intellectuals' efforts to incorporate foreign science into the existing frame of knowledge in Korea. Joong-Yang Moon's *The Reconstruction of Science in the Late Joseon Korea* is a synthesis of this revisionist approach.

The main focus of this book is highlighting Joseon intellectuals' agency in their reception of foreign knowledge. According to the author, Joseon intellectuals neither rejected nor ignored Western science simply because it had a foreign origin; neither did they passively accept it. Rather, the Joseon intellectuals scrupulously compared Western science with their traditional, neo-Confucian natural knowledge, creating a synthesis between them. Western science did not have a Copernican impact on the Confucian view of nature in Korea, but this does not mean that Western science made little impact on Joseon intellectuals' worldview. Rather, by incorporating Western science into the traditional system of knowledge, Joseon intellectuals constructed a new knowledge of nature that differed from the classical knowledge of nature.

Moon first criticizes the conventional view in the history of science in the Joseon

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period. According to this view, Joseon's science and technology peaked in the fifteenth century, particularly under King Sejong's reign, and this golden age was followed by a long period of stagnation and decline, which lasted until the late nineteenth century, when Western science began to be introduced in earnest into Korea. Moon argues that such a historical perspective is an illusion caused by researchers who only focused on the development of mathematical science while neglecting other fields of natural studies. In order to substantiate his point, Moon examines the development of Joseon scholars' metaphysical pursuit of nature and universe, which was in fact the dominant trend during the Joseon period. In contrast to the conventional understanding, he argues that the Koreans' understanding of neo-Confucian cosmology during the reign of King Sejong remained at an immature level. Even Yi I (1536-1584), a sixteenth-century scholar who is now considered one of the founders of Joseon's neo-Confucianism, showed little hint of the profound and creative understanding of nature.

Moon argues that Joseon's science and technology showed gradual development starting in the King Sejong period. Seo Gyeongdeok (1489-1546), a Confucian scholar who was active in the period before Yi I, signaled the gradual development in the metaphysical view of nature. Almost a century later, Jang Hyeon-gwang (1554-1636) not only fully understood the neo-Confucian cosmology, but also entertained his own new ideas of an infinite universe and the existence of other universes. Moon claims that scientific knowledge in Korea gradually and continuously developed starting in the King Sejong era, which provided a strong intellectual foundation upon which the late Joseon Confucian scholars could actively accommodate the new Western knowledge.

This neo-Confucian background was, according to the author, also a crucial factor that made the Korean response to Western science different from that of the Chinese. This book thus aims to illuminate the unique Korean way of transforming Western knowledge and the reconstruction of natural knowledge. To this end, Moon compares Joseon's case with that of contemporary China. The introduction of Western science into China was dominated by the Ming and Qing governments, and the Jesuit missionaries played major roles in this process as well. By collaborating with the government and the Jesuits, Chinese intellectuals forged their own understanding of nature, which was different from Western science. The promulgation of the *Shixian li* astronomical system is a case in point. In this process, Western astronomy was dissolved into a part of the traditional Chinese astronomical system; as such, it was only used to create an advanced treatise in the tradition of Chinese calendrical astronomy. In China, the Chinese and Western sciences were integrated with the former at the center.

In contrast with the Chinese case, the major carrier of Western knowledge in the Joseon society was not the Jesuits, but rather books, which resulted in major differences. Without any face-to-face communication, understanding Western knowledge was challenging for the Koreans. Consequently, despite the Joseon government's eager support, Joseon astronomers' full mastery of the *Shixian li* took more than 50

years.

The lack of collaboration between intellectuals and the government is another feature of Joseon's incorporation of Western science. In contrast to the positive attitude of the Korean government toward Western science, the majority of Korean intellectuals were relatively indifferent to it, and only a few showed serious interest in it. These few, but passionate scholars contributed to the introduction of Western science, especially Western astronomy, into Joseon society. For example, Yi Ik (1681-1763), a Confucian scholar in the mid-eighteenth century, accepted the idea of a round earth as a truth. In the late eighteenth century, Hong Daeyong (1731-1783) argued for the diurnal rotation of the earth and the theory of an infinite universe, while Seo Hosu (1736-1799) perfectly digested the Western astronomy and mathematics. In the mid-nineteenth century, Choe Han-gi (1803-1877) accepted the Copernican system while studying and reinterpreting Newton's law of gravity.

The Koreans' "bookish" encounter with Western science made more rooms for their own creative understanding of Western science. In "translating" Western science without appropriate translators (the Jesuit missionaries), a small number of eager Joseon intellectuals relied heavily on their indigenous metaphysical view of nature. In China, Jesuit missionaries put the Aristotelian theory of the four elements and the Euclidean geometry as the founding principle for interpreting Western science, hoping that this way of understanding of nature would lead the Chinese people to Christianity. However, such hopes were not realized with the Korean intellectuals because their principles for understanding Western science were from neo-Confucian metaphysics—the learning of images and numbers (*sangsu hak*) and the cosmology of *qi*, which originated from the neo-Confucian schools of the Song dynasty in China. Kim Seok-mun (1658-1735), an early supporter of the idea of the earth's rotation, and Seo Myeong-eung (1716-1787), who proved the idea of a round earth using *Yijing* diagrams, were the representative figures of the learning of images and numbers. Hong Daeyong and Choe Han-gi tried to explain natural phenomena using the *qi* circulation mechanism. The author thus claims that Joseon intellectuals attempted to understand nature in a completely different way than Western science or science in China. These Joseon intellectuals, who passionately studied Western science, never gave up the neo-Confucian way of understanding nature. On the contrary, they deepened their existing understanding of nature by incorporating the new Western science into the existing frame.

In sum, by describing the Joseon historical context, which was different from China, and by emphasizing the Joseon intellectuals' unique assimilation of Western science into the traditional metaphysical view of nature, Moon suggests an alternative to the teleological view of the history of science. Joseon intellectuals' understanding of Western science cannot be viewed as a misunderstanding or an immature view. It has its own historical uniqueness.

The author successfully creates a whole picture of late Joseon interaction with Western science, from various scattered studies, based on his coherent perspective. In order to achieve such a synthetic view, the author examines the formation and

advancement of Korean science prior to its encounter with Western science. He also takes a closer look at the contemporary situation in Qing China, Joseon's most important neighboring country. As a result, the author clearly demonstrates how Korean science changed after its encounter with Western science as well as the nature of the change. It is my belief that this book, the fruit of the author's hard and long efforts, will provide an exemplary case for understanding not only the Korean case, but also the issue of accommodation of Western science in other countries.