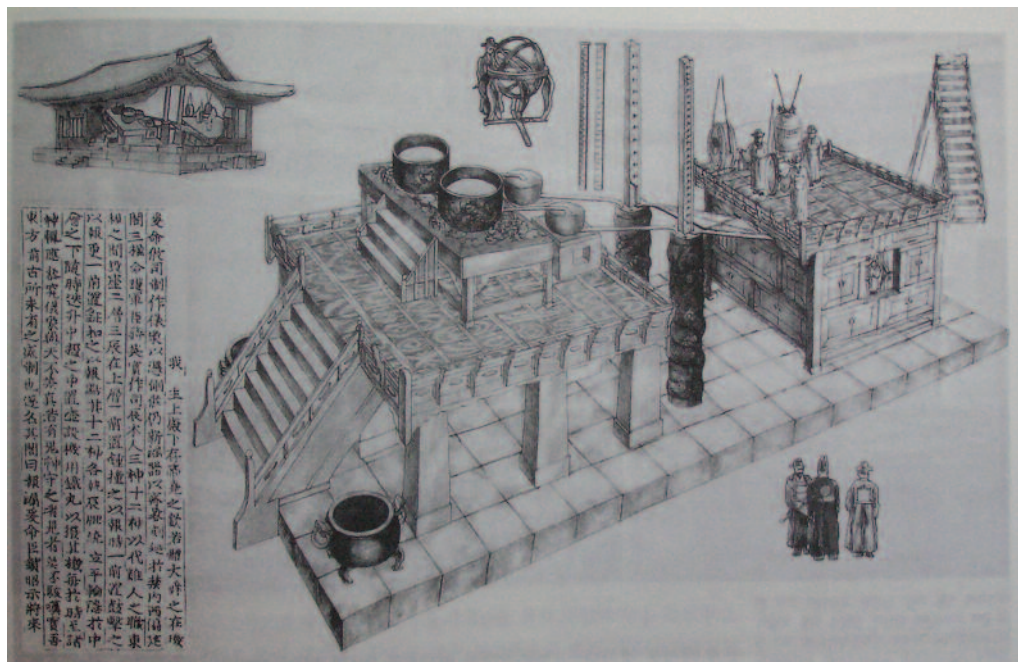


The “Problem of China” in the Study of the History of Korean Science: Korean Science, Chinese Science, and East Asian Science



Yung Sik Kim 金永植

Seoul National University

古今論衡 第 18 期 2008.10

Because of the Chinese origin of many ideas and artefacts in traditional Korean science, and the overwhelming Chinese influence on its development, the history of Korean science suffers from a kind of identity problem--the problem of whether traditional Korean science should be considered a part of Chinese science. Jeon Sang-woon, for example, begins his account of traditional Korean science by referring to its history as "a tributary of the mainstream of scientific developments in traditional China."^① But Jeon quickly adds that Koreans did not merely adopt ideas and techniques from China, but modified them and adapted them to their own needs and conditions. This led to many "independent" developments of Korean science, and often to new discoveries and inventions. Much of the previous work--and indeed most of the early works by modern scholars--on traditional Korean science have focused on the new contributions by Koreans and their differences from the Chinese developments.^②

This raises a problem, however, which has been troubling me when I attempt to think in general terms about the history of traditional Korean science. The problem, which I call "the problem of China in the study of the history of Korean science," is basically about the significance of the scientific ideas and technical artefacts of China apparently present everywhere in traditional Korean science and technology.^③ What roles and meanings should be assigned to such ideas and techniques in the history of Korean science? Would it be reasonable, or permissible, for a historian of Korean science to neglect them and to study only what is uniquely Korean? It would of course be understandable if a foreigner were to be interested in knowing mainly those elements and aspects that were unique in Korea. But should--or could--the Korean historian do the same? These are the questions that first confronted me as I began to think about this "problem of China." In discussing these questions in the present paper, however, I will be posing a good number of other questions. Indeed, rather than trying to come up with solutions for them, I will present the problem and share my concerns about these issues.

1. Some Key Questions

I became aware of this problem while supervising the dissertation research of my graduate students on topics in Korean science. I found very often that large parts of the

- ① Sang-woon Jeon, *Science and Technology in Korea: Traditional Instruments and Techniques* (Cambridge, Mass.: MIT Press, 1974), p. 1.
- ② Yung Sik Kim, "Problems and Possibilities in the Study of the History of Korean Science," *Osiris* 13 (1998): 48-79.
- ③ Although I have come to realize that the problem is more or less common to all the other branches of Korean history, it appears to be more pronounced in history of science. I am not sure, however, whether this is indeed the case, and, if so, why this is the case.

writings of traditional Korean thinkers or scientists which my students were reading consisted of excerpts and collations of earlier Chinese writings. Of course, this does not discredit the scholarship of these traditional Korean thinkers who wrote them. What they were doing was essentially the same kind of thing that many of their contemporaries in traditional China were doing. But it posed problems for my students, and then for myself.

Expressed in a blunt manner the problem is as follows: How should the historian of Korean science treat those ideas and techniques that were straightforward importations from China? In other words, how should the historian deal with the theories and practices that were exactly the same as those of China except for the fact that they were discussed and carried out in Korea geographically? If the historian restricts himself to what is uniquely Korean, he will have to leave out much that is actually Korean, but not uniquely so. Conversely, if the historian includes all that took place in Korea, he will have to deal with much that is not different from what was happening in China. Is this a legitimate way to study and understand traditional Korean science? ⁴

One could agree with Nakayama Shigeru, who, while speaking of "the primary sources of science that were ... written in classical Chinese by people in Korea, Vietnam, and Japan," once said: "One can speak of all these sources as Chinese science." ⁵ Even if we follow Nakayama and refer to these sources as "Chinese science," there are still fruitful questions which can be asked by the historian of Korean science. Through what channels were those scientific ideas and technical artifacts transmitted to Korea? To what extent did Koreans understand, adopt, assimilate, and master the ideas, techniques, and artifacts that had arrived from China? Did the Koreans accept them individually or as parts of a whole? And how much were they committed to that whole body, system, or corpus of Chinese science? Frequently, it appears that Koreans adopted Chinese systems in their entirety. But was this always the case? Which among them did the Koreans prefer, and why? Indeed, these are questions that can shed more light on the nature of scientific and technical activities in traditional Korea, and their place in traditional Korean culture and society.

But what about the actual content of these ideas and techniques that were the same as those of China? Should the historian of Korean science ignore them? These ideas and techniques were of course mostly a continuation, duplication, or repetition of those of China. But can we thus conclude that they are therefore of no importance to the historian of Korean science? To him such materials are clearly different--different from the similar contents written by the Chinese. But what is the real significance of such difference?

⁴ Language cannot be used as a distinguishing factor for the historian, because traditional Korean scholars/scientists invariably used classical Chinese for their writings. The situation was more or less like Arabic in medieval Islam, and Latin in the Christian medieval West.

⁵ Shigeru Nakayama, "History of East Asian Science: Needs and Opportunities," *Osiris* 10 (1995): 80-94, on p. 86.

Sometimes a historian of Korean science studies such a material with utmost interest, not realizing that the same content had been written by a Chinese historian. Now, what happens, or what should happen, when he finds out that the same content had been written by a Chinese? Clearly, the significance of the material to him will change the moment when he finds that out. What is the nature of this change and how should the historian then deal with the material?

Now, we can turn the question by 180 degrees and ask what the significance of such materials is to the historian of Chinese science. Should he treat the same contents differently (either as more important or as less important) because they were written by a non-Chinese outside China, and had been written by a Chinese earlier? Or should he treat them the same way as he would treat similar contents written somewhere in China by a Chinese? And at this point, one is led to ask whether the history of Korean science becomes a local history, or peripheral history, of Chinese science.⁶ One may try to evade all these questions by wondering whether the term, “East Asian science” will resolve these problems.

2. The Problem of “Center vs. Periphery”

The problem mentioned above can be seen as an example of the problem of “center vs. periphery” in the history of science, in which China is the center and Korea is a periphery. A few things come to mind when we look at the history of Korean science from this perspective.

2.1. Chinese “Center” vs. Korean “Periphery”

First, China may be too large geographically to be called a “center.” Indeed, there may be many centers and peripheries within China itself. Various localities in China can be regarded as centers and peripheries. For example, Beijing and the Jiangnan region can both be considered as centers during various times in history. In the early 15th century and the second

⁶ A very interesting case comes to my mind. For some years Wann-sheng Horng’s (Hong Wansheng 洪萬生) research group on the history of mathematics at National Taiwan Normal University have been studying mathematical works written by 18th and 19th century Koreans. And since few Korean historians study such materials, his group is the largest group in the world working on traditional Korean mathematics. Now do they view their work as the history of Korean mathematics, Chinese mathematics, or East Asian mathematics? See, e.g., Wann-sheng Horng, “Sino-Korean Transmission of Mathematical Texts in the 19th Century: A Case Study of Nam Pyong-gil’s *Kugo Sulyo Tohae*,” *Historia Scientiarum* 12.2(2002): 87-99; Hong Wansheng (Horng Wann-sheng 洪萬生), “Shiba Shiji Dongsan yu Zhongsan de Yiduan Duihua: Hong Zhengxia vs. He Guozhu” 十八世紀東算與中算的一段對話：洪正夏 vs. 何國柱 (A Dialogue between Korean and Chinese Mathematics in the Eighteenth Century: Hong Chong-ha vs. Ha Kuk-chu), *Hanxue yanjiu* 漢學研究 20 (2002): 57-80.

half of the 18th century, Korea could also be considered as one such center of "Chinese" science. Even within Korea, one might argue that there were centers and peripheries: The court of King Sejong 世宗 (r. 1418-1450) during the first half of the 15th century and the metropolitan Seoul area in the 18th century are two examples.

When we think of periods like these, my focus on "the problem of China in the study of Korean science" can be turned upside down and become "the problem of Korea in the study of Chinese science": When a historian of Chinese science discovers an original, or unique development in Korea, how should he deal with it? Should he deal with it differently than when confronted with a similar original or unique development that occurred in a particular locality of China? In other words, should unique developments in science be given special attention when they arise in Korea and simply be taken for granted when they appear in some locality in China? This last question often arises when I encounter overenthusiastic responses of Korean historians concerning a Korean priority (a discovery or invention made first in Korea before anywhere in the world, and especially before China) and when I discern the difficulties that some Chinese historians have in accepting such Korean priority. ⁷

Yet, although such cases of Korean priorities have attracted more attention from the historians, the more common cases, in which developments that had first occurred in China occurred in Korea at a later time, are equally interesting, and at times yield even more interesting insights into the Korean and the Chinese situations. Examination of these cases will show, for example, how differently (or similarly) the Koreans responded to a situation when knowing what the Chinese had done in the same situation earlier. Lim Jongtae's study of the flourishing, among the 18th century Korean scholars, of the sort of cosmological speculations found among the Chinese scholars of the Ming-Qing transition period has enhanced our understanding of the intellectual climates of both the 17th century China and the 18th century Korea. ⁸ We may also note that many 17th and 18th century Korean scholars quoted and discussed the views of Chinese scholars of the Song, Yuan, and Ming periods in the same way as they would have discussed the views of their contemporaries.

⁷ I might add, in this connection, that the Korean historians' tendency of searching for something uniquely Korean, arose mainly as a reaction to the colonial historiography of the Japanese colonial period, which tended to stress the negative aspects of Korean history and criticize in particular its lack of originality and dependence on China. But part of the reason for the persistence of this tendency among Korean historians is the feeling among many of them that Korean contributions are still being ignored or neglected by contemporary Chinese and Japanese historians. See Seong-Rae Park, "Pride and Prejudice in the Historiography of Science in East Asia," Yung Sik Kim and Francesca Bray eds., *Current Perspectives in the History of Science in East Asia* (Seoul National University Press, 1999), pp. 3-12.

⁸ Im Chong-t'ae 임중태 (Lim Jongtae 林宗台), "Sipch'il sipp'al segi sōyang chirihak-e taehan Chosōn Chungguk hagindul-ūi haesōk" 17,18 세기 서양 지리학에 대한 朝鮮, 中國學人들의 해석 (17,18 世紀西洋地理學에 대한 朝鮮, 中國學人들의 解釋, Seventeenth and Eighteenth Century Korean and Chinese Scholars' Interpretation of the Western Geographical Knowledge) (Doctoral dissertation, Seoul National University, 2003), pp. 114-148.

Yet there is a still another aspect of “the problem of China.” This dimension surfaced during a dissertation committee meeting for a student of mine, who wrote an excellent dissertation entitled “Assimilating Jesuits’ Geographical Knowledge in Seventeenth and Eighteenth Century Korea.” As the student delved more deeply into the Chinese background of the Korean materials, his dissertation expanded to cover a substantial amount of Chinese materials, including those of earlier periods. However, a colleague on his dissertation committee, a member of the Korean History department, protested by saying that “this is not Korean history.” A historian of China on the committee then rebutted by saying that “this is exactly how we should study Korean history.” In the end the dissertation was approved with much praise, but a word was added to the title of the dissertation: “Assimilating Jesuits’ Geographical Knowledge in Seventeenth and Eighteenth Century Korea and China.” Thus, the student’s dissertation was proclaimed to analyze not just Korean history but Korean and Chinese history. To be sure, this did not mean that Korean history should not deal with what was happening in China. But it certainly carried an implicit message that the Korean historian does not necessarily have to understand what was happening in China during or before the events studied in Korea.

2.2. Dominance of the “Chinese Center”

On the whole, however, the Chinese dominance in East Asian science was almost absolute. As Nakayama has noted, China was the “center” where significant developments almost always took place first and subsequently spread to the “peripheries.”⁹ Undeniably, shifts did occur in terms of centers and peripheries in different geographic areas of China throughout history. But these shifts were never so frequent or oscillatory, as was the case in the West for example. This dominance was especially complete in the field of science. While some other countries in East Asia could gain a temporary superiority over China in political, military, or economic aspects, Chinese dominance in science was hardly ever challenged.

Due to this nearly absolute dominance, the Chinese centrality was accepted by people at the peripheries of the Chinese cultural world. This is best illustrated by the acceptance, among 18th century Koreans, of the so-called theory of “the Chinese origin of Western learning” (*xixue zhongyuan* 西學中源), the theory that the Western scientific ideas that came to China actually had their origins in ancient China. According to this theory, the Chinese already had knowledge of them in the ancient golden ages, but such knowledge was

⁹ Shigeru Nakayama, “The Spread of Chinese Science into East Asia,” Kim and Bray, *Current Perspectives in the History of Science in East Asia*, pp. 13-20.

lost later and fell into the hands of the barbarians, who developed it further and brought it back to China.¹⁰ Many 18th century Korean scholars accepted this theory, and due to the historical circumstances they faced, many Korean scholars became ardent advocates of this theory. After the humiliating defeat of their country to the Manchus in the early 17th century, anti-barbarian sentiments became widespread among Korean Confucians. Since the Manchu barbarians had already conquered the Chinese heartland, many Korean Confucians of the time came to consider themselves to be the true bearers of the "Central Culture" (*Zhonghua* 中華, *chunghwa* in Korean), or "the Korean Central Culture" (*Chosŏn chunghwa* 朝鮮中華). The "*chonjuron*" 尊周論, or the tendency of admiring the ancient Zhou 周 culture--the culture that was considered ideal by many neo-Confucians--became the dominant tendency among Korean scholars.¹¹ In this atmosphere, the need to rationalize the barbarian knowledge of Western science for the "Central Culture" became a concern of particular urgency. The theory of "Chinese origin" provided a good rationale for such legitimization.¹²

Here "the problem of China" manifests itself in an extreme fashion. The mentality of these Koreans was exactly the same as that of the Chinese, to such an extent that they would identify themselves with Chinese culture and attribute Chinese, and not Korean, origin to Western ideas. In some cases Koreans showed an even stronger adherence to the Chinese tradition than the Chinese themselves. And as a result, an interesting difference from the situation in China developed. Whereas for the 17th century Chinese the similar military humiliation gave rise to some critical, soul-searching, attempts at a re-examination and purification of their own tradition through critical studies of the classics, many of their Korean contemporaries tended to cling even more strongly to the classical tradition. While in China there was a growing rejection of the Cheng-Zhu 程朱 school of Song-Ming Neo-

¹⁰ On the theory of "the Chinese origin of Western learning," see Wang Ping 王萍, *Xifang Lisuanxue zhi Shuru* 西方曆算學之輸入 (*Introduction of the Western Calendrical and Mathematical Learning*) (Taipei: Institute of Modern History, Academia Sinica, 1966); John B. Henderson, "Ch'ing Scholars' Views of Western Astronomy," *Harvard Journal of Asiatic Studies* 46 (1986): 121-148, on pp. 139-143; Jiang Xiaoyuan 江曉原, "Shilun Qingdai Xixue Zhongyuanshuo" 試論清代西學中源說 (An Essay on the Theory of the Chinese Origin of Western Learning in the Qing Period), *Ziran Kexueshi Yanjiu* 自然科學史研究 (*Studies in the History of the Natural Sciences*) 7 (1988): 101-108.

¹¹ On the Korean *Zhonghua* theory and the "*Chonjuron*," see Chŏng Ok-cha 鄭玉子, *Chosŏn hugi Chosŏn Chunghwa sasang yŏn'gu* 조선후기 조선중화사상연구 (朝鮮後期朝鮮中華思想研究, *A Study of the Idea of the Korean Zhonghua in the Late Chosŏn*) (Seoul: Ilchisa 一志社, 1998).

¹² Pak Kwon-su 박권수 (朴權壽), "Sŏ Myŏng-ŭng-ŭi yŏkhakchŏk ch'ŏnmun' gwan" 徐命膺의易學의天文觀 (Sŏ Myŏng-ŭng's Interpretation of Astronomy in the Framework of the *Yijing* Studies), *Han'guk Kwahak-sa Hakhoe-ji* 한국과학사학회지 (韓國科學史學會誌, *Journal of the Korean History of Science Society*) 20 (1998): 57-101, p. 93. Even Qing culture was accepted as a kind of Chinese origin theory: A number of Korean scholars, especially those who belonged to the "Northern Learning school" (*pukhakpa* 北學派), saw no problem in accepting Qing culture since they considered it to be the "remaining institution" (*yuje* 遺制). On the "Northern Learning school," see Yu Pong-hak 유봉학, *Yŏnam ilp'a pukhak sasang yŏn'gu* 燕巖一派北學思想研究 (*Studies of the Ideology of "Northern Learning" in the School of Yŏnam [Pak Chi-won]*) (Seoul: Ilchisa, 1995).

Confucianism, in Korea the development of the orthodox Zhu Xi 朱熹 school of learning continued and deepened, at least for some time. Even more interesting is the difference in the Chinese and Korean scholars' attitudes toward the study of the *Yijing* 易經 (the Book of Changes) (*yixue* 易學). Whereas the Qing Chinese were attempting to purge it of its excessive, contaminating elements--such as the numerological speculations of Shao Yong 邵雍 (1011-1077) and Cai Yuanding 蔡元定 (1135-1198)--Koreans like Kim Sök-mun 金錫文 (1658-1735) and Sö Myöng-üng 徐命膺 (1716-1787) proceeded to develop these elements further. ¹³

It is interesting to note, however, that even under such circumstances, Koreans did not seem to feel that they were full members of Chinese learned circles. The Chinese scholars could read the writings of Korean scholars of the Chosön period because they were written in classical Chinese. Yet, as a matter of fact, the Chinese rarely paid attention to the Korean writings. Even Korean authors always seemed to be writing with only Korean readers in mind. Occasional recognition by the Chinese could have made the Koreans proud of their achievements, but there were few cases of such recognition. ¹⁴ Some Korean scholars who visited Beijing tried to use the occasion of their visit to impress the Chinese scholars. Pak Chi-won 朴趾源 (1737-1805), for example, in preparing his meetings with Chinese colleagues, chose topics of conversation which he thought would impress them. What he chose, after some deliberation, was the idea of the earth's rotation and the question of what a man on the moon would see if he looked at the earth from the moon. ¹⁵ Would provincial--peripheral--Chinese scholars have shown similar attitudes towards the scholars in Beijing or other Chinese centers of learning?

While the similarity to the Chinese situation was overwhelming in the traditional period, differences become more pronounced during the period of the transmission of Western science to Korea. Perhaps it is for this reason that recently more work is being done on the late Chosön period during which the influence of the Western science became prevalent, and differences from the Chinese situations became evident.

¹³ John B. Henderson, *The Development and Decline of Chinese Cosmology* (New York: Columbia University Press, 1984), pp. 184-193; Moon Joong Yang, "Traditional Cosmology Associated with the *I-ching* and Anti-Cosmological Discourses in Eighteenth Century Korea," *Seoul Journal of Korean Studies* 12 (1999): 177-227; Yung Sik Kim, "Western Science, Cosmological Ideas, and the *Yijing* Studies in Seventeenth and Eighteenth Century Korea," *Seoul Journal of Korean Studies* 14 (2001): 299-334.

¹⁴ Hong Tae-yong 洪大容 (1731-1783) and Kim Chöng-hüi 金正喜 (1786-1856) could have been cases of such exceptions. See Kim T'ae-jun 김태준, *Hong Tae-yong p'yöngjön* 洪大容評傳 (*A Critical Biography of Hong Tae-yong*) (Seoul: Minümsa 民音社, 1987), chapters 5-6; Benjamin A. Elman, *From Philosophy to Philology: Intellectual and Social Aspects of Change in Late Imperial China* (Cambridge: Harvard University Press, 1984), pp. 155-156.

¹⁵ Kim T'ae-jun, *Hong Tae-yong p'yöngjön*, pp. 252-259.

Nevertheless, China played the role of center even as a channel for the introduction of Western science to the East Asian world. For example, until well into the 19th century, Koreans relied almost entirely on the Chinese books in accepting Western science. In fact, the Korean dependence on China for books--not just the Western books, but all books--grew in the late Chosŏn period. In the 18th century, when the number of books imported from China increased rapidly and became more widely available, historians note a considerable decrease of interest in the collected works of Korean scholars, which continued to be printed in Korea.¹⁶

The notion of the Chinese centrality must have been so deeply ingrained in Korean minds that the Koreans rarely tried to learn Western languages.¹⁷ They must have felt that what they were receiving from China was enough for them. Also, some Koreans might have accepted Western scientific knowledge largely because the Chinese had already accepted it. For example, when the Korean government decided to adopt the *Shixianli* 時憲曆 (*Sihŏn-lyŏk* in Korean), it was not so much a decision to adopt a Western calendar as a decision to adopt the new calendar that had already been adopted by the Chinese government.¹⁸ In this sense, the adoption of the *Shixianli* can be seen as a mere continuation of the long-term practice of the Chosŏn government adopting the newly established official calendar of China. On the other hand, one may wonder whether it was easier for the Koreans than for the Chinese to accept the Western ideas, because the Koreans had been very much used to accepting Chinese ideas which were also foreign to them. Indeed, Korean scholars of the time used the same expressions, "the calendrical books" (*lishu*, *yŏksŏ* 曆書) and "the calendar specialists" (*lijia*, *yŏkka* 曆家), in referring to the books of Western astronomy translated into Chinese and to their authors with sinicized names.

¹⁶ Kang Myŏng-gwan 姜明官 (姜明官), "Chosŏn hugi sŏjŏk-ŭi suip yut'ong-kwa changsŏga-ŭi ch'ulhyŏn: sipp'al sipku segi Kyŏnghwa sejok munhwa-ŭi han tanmyŏn" 조선후기 서적의 수입·유통과 장서가의 출현--18,19세기 京華世族 문화의 한 단면 (朝鮮後期書籍의輸入流通과藏書家の出現--18,19世紀京華世族文化의 한斷面, The Importation and Distribution of Books and the Emergence of Book Collectors in the Late Chosŏn: Aspects of the Culture of Major Scholarly Families in Eighteenth and Nineteenth Century Seoul), *Minjok munhaksa yŏn'gu* 민족문학사연구 (民族文學史研究, *Studies of the History of National Literature*) 9(1996): 171-194.

¹⁷ Pak Sŏng-rae 박성래 (朴星來, Seong-rae Park), *Han'guksa-edo kwahak-i innŭn'ga* 한국사에도 과학이 있는가 (*Is There Also Science in Korean History?*) (Seoul: Kyobo mun'go 教保文庫, 1998), pp. 204-206.

¹⁸ On the adoption of the *Shixianli* by the Chosŏn government, see Chŏn Yong-hun 전용훈 (全勇勳), "Sipch'il-sipp'al segi sŏyang kwahak-ŭi toip-kwa kaltŭng: Sihŏn-lyŏk sihaeng-kwa chŏlgi paech'ipŏp-e taehan nollan-ŭl chungsim-ŭro" 17-18세기 서양과학의 도입과 갈등--時憲曆施行과 節氣配置法에 대한 논란을 중심으로 (17-18世紀西洋科學의導入과葛藤--時憲曆施行과 節氣配置法에對한論難을中心으로, Conflicts over the Introduction of Western Science in the Seventeenth and Eighteenth Centuries: Adoption of the *Shixianli* and Controversies over the Arrangement of the [Twenty-four] Seasonal Points), *Tongbang hakchi* 東方學志 117 (2002): 1-49.

2.3. Initiatives at the “Korean Periphery”

To be sure, there were times when Koreans exerted concentrated efforts to find, study, develop, and establish what was uniquely their own. In particular, during the reign of King Sejong in the early 15th century, such efforts were exerted in many areas.¹⁹ The project of devising the system of *hangŭl* 한글, the Korean alphabet with the name of “*hunmin chŏngŭm*” 訓民正音 (Correct Sounds for Edifying People) is the most important and characteristic example of such attempts. But projects of similar nature were also carried out in many scientific subjects. For example, in the field of calendrical astronomy, Sejong’s astronomers succeeded for the first time in Korean history in preparing a calendrical system based on the latitude of Seoul, which replaced the one based on the latitude of the Chinese capital which had been used until then. Using this new system which they named *Ch’ilchŏngsan* 七政算, they were able to predict the solar and lunar eclipses of 1447. There were many important achievements in medicine as well: The compilations of two medical treatises, the *Hyangyak chipsŏngbang* 鄉藥集成方 (Collected Prescriptions of [Korean] Native Medicines) and the *Ŭibang yuch’wi* 醫方類聚 (Classified Compilation of Medical Prescriptions), are generally considered as representative of the culmination of Koreans’ efforts to develop their own system of medical knowledge, distinct from that of China. There was also remarkable progress in the field of agriculture: New theories, techniques, and other practices were developed, most of them geared toward the needs of the newly adopted intensive and continuous cultivation. These efforts are well documented in the *Nongsa chiksŏl* 農事直說 (Straight Accounts of Agriculture). Other areas that showed similar progress in the period were music, geography, and cartography. Techniques in such fields as printing, paper-making, firearms technology, and even forensic medicine, also improved greatly during this period.

These activities are generally viewed as examples that reveal the independent spirit of Korean science of the period, and the Koreans’ understanding of the differences between Korea and China in terms of language, latitude, resources, climates, and so on. Naturally, the subjects of such projects were the ones in which significant local differences could be expected, as was manifest by the phrase “the winds and earths [of China and Korea] are not the same” (*p’ungt’o pul il* 風土不一). Recently, however, Moon Joong Yang has pointed out that even these efforts can be seen as attempts by Sejong and the scholars of his court to

¹⁹ Chŏn Sang-un 全相運 (Sang-woon Jeon), “Chosŏn chŏn’gi-ŭi kwahak-kwa kisul--Sibosegi kwahakkisulsa yŏn’gu chaeron” 朝鮮前期의 科學과 技術--15세기 科學技術史研究再論 (Science and Technology in the Early Chosŏn: Another Discussion on the Study of the History of Fifteenth Century Science and Technology), *Han’guk Kwahak-sa Hakhoe-ji* 14 (1992): 141-170.

reach the same level of scientific achievement as the Chinese.²⁰ According to Moon, when the Koreans of the Sejong period exerted great efforts to construct a calendrical system based on the latitude of Seoul, their efforts reflected not so much an independent spirit as an attempt to achieve a level of competence in calendrical astronomy that was on a par with the Chinese. In other words, these efforts demonstrate their wish to become truly equal to the Chinese by having a calendrical system based on their own capital. Ultimately, because they could not refer to their calendrical system as *li* 曆 (calendar, *lyŏk* in Korean), they called it *suan* 算 (computation, *san*). This, of course, was to avoid provoking the Ming government, which would have become suspicious if it were to learn that the Korean king had established an independent calendrical system, which was considered the sole right of the Ming emperor. This example serves to illustrate another aspect of the Koreans' acceptance of Chinese centrality.

Another period of interest is the period of King Chŏngjo (正祖, r. 1776-1800).²¹ The astronomers of his court not only based the calendars on the latitude of Seoul, but also tried to provide the calendrical numbers for the latitudes and longitudes of all the provincial capitals of Korea, just as the Chinese had been doing in their annual calendars. While Chŏngjo's efforts pointed to an independent spirit (and having experienced the collapse of the Ming "Central Culture," this spirit may have been even more genuine), in a sense this again shows how eager the Koreans were to upgrade the level of their calendars to that of the Chinese calendars. It is significant to note that the numbers written on those calendars were not obtained from observations; they were obtained from computation. What was important for them was to have the numbers placed on their calendars so that they would appear as complete as the Chinese calendars.

King Chŏngjo's efforts did produce some results. In the end of the 18th century, when his astronomers had mastered the detailed computational methods of the *Shixianli*, and especially after Sŏ Ho-su 徐浩修 (1736-1799) became in charge of the Astronomical Bureau (*kwansanggam* 觀象監) and compiled the *Kukcho yŏksang go* 國朝曆象考 (Examination of the Calendrical Astronomy of the [Chosŏn] Dynasty), the court was confident enough to choose the Korean calendar over the Chinese when differences occurred between Chinese and Korean calendars in the computations of the seasonal points. We know that earlier in

²⁰ Mun Chung-yang 文重亮, Joong-yang Moon, "Sejongdae kwahakkisul-ŭi chajusŏng tasi pogi" 세종대 과학기술의 '자주성' 다시보기 (世宗代科學技術의 '自主性' 다시보기, Another Look at the Science and Technology of the Sejong Period), *Yŏksahakpo* 歷史學報 189 (2006).

²¹ Mun Chung-yang, "Sipp'al segi huban Chosŏn kwahak kisul-ŭi ch'ui-wa sŏngkyŏk: Chŏngjodae chŏngbu bumun-ŭi ch'ŏnmun yŏksan hwaltong-ŭl chungsim-ŭro" 18세기 후반 조선 과학기술의 추이와 성격--정조대 정부 부문의 천문역산 활동을 중심으로 (18世紀後半朝鮮科學技術의 推移와性格--正祖代政府部門의天文曆算活動을 중심으로, Trends and Characteristics of Science and Technology in Late Eighteenth Century Chosŏn: The Royal Astronomical Projects in the Period of Chŏngjo), *Yŏksa-wa Hyŏnsil* 역사와 현실 (歷史와現實) 39 (2001): 199-231.

history when such cases occurred, the court would punish the astronomers for making mistakes. Such confidence led Chǒngjo to compile a Korean equivalent of the *Lǜli yuanyuan* 律曆淵源 (Sources of Harmonics and Calendrical Astronomy). Similar efforts were also exerted in the field of agriculture.²²

Finally, when discussing the issue of “center vs. periphery,” it has to be pointed out that differences may exist in the degree of “peripheral-ness.” For example, the situation of Japan was different from that of Korea: Japan was more peripheral, but accepted their peripheral-ness and the centrality of China to a lesser extent. That may be why the “problem of China” seems to be less pressing in the study of the history of Japanese science.²³

3. Comparisons with Western Situations: Local vs. Universal Science

In dealing with these issues, it would be useful to look at comparable situations in the West. Unfortunately, however, there does not seem to have been a situation in Europe comparable to the one-sided relation between Chinese science and Korean science. Undoubtedly, there were periods in Western history when the science of one country was dominant. Yet the center of dominance frequently shifted from one country to another.

Perhaps the example of Greek science in the ancient Mediterranean world and in the medieval West show some similarities to our case. Yet, while the overwhelming degree of dominance was similar, the location of the center shifted continuously from one place to another. Another case similar to the East Asian situation would be that of 18th and early 19th century Europe, where the dominant French science was transmitted to the rest of Europe. But again, compared with the Chinese case, the period of such dominance of French science was very brief. Moreover, the dominance of French science were not solely of their own making, but contained important elements from elsewhere. Nevertheless, it may be interesting to draw comparisons between the French-dominated European science of the time and the Chinese-dominated East Asian science. It is helpful to analyze the ways in which the historians of Western science deal with the French-style sciences being practiced in other parts of Europe at the time. Also, how should historians of science regard the overwhelming dominance of the United States in science after World War Two? This of course also includes Korea, where we see a dominance of the influence of the United States, not only in content, but also in terms of institutions, education, and even personnel (mostly

²² Mun Chung-yang, *Chosŏn hugi surihak-kwa suri tamnon* 조선후기 水利學과 水利담론 (朝鮮後期水利學과 水利談論, *Hydraulics and Hydraulical Discourses in Late Chosŏn*) (Seoul: chimmundang 집문당, 2000), pp. 134-144.

²³ Is this really the case? I wonder whether my Japanese colleagues would agree with me on this point.

having received American training).²⁴ Do we then see here a problem of essentially the same nature--"the problem of the United States in the study of modern Korean science," that is, the problem of the significance of the content of science practiced in contemporary Korea, which is largely taken from the United States?

One can approach the "problem of China" from a different perspective by regarding it as a problem of a "universal" science vs. a "local" science. Comparable situations in the West can shed some light on this. For example, when we speak of a 19th century "English," "French," "German," or "Italian" science, or "American" science, we are talking about such "local" sciences. Now, is the relation between "Korean" science and the "Chinese" science similar to that between one of these local sciences and the universal European science? And if so, should the so-called "Chinese science" be considered the universal science of the East Asian world, or an "East Asian science"? To provide another example, how do historians of European science regard the periods in which the sciences of Spain, Italy or the Netherlands no longer contributed significantly to the European science, or the periods in which Russian or American science had not yet reached the level of the European science at the center? Historians of East Asian science may benefit from studying how historians of Western science approach these questions.

4. The Problem and the "Korean Why-not Question"

The "problem of China" can be raised in connection with what can be called the Korean "why-not" question.²⁵ For example, in dealing with the "stagnation" and "decline" of Korean science and technology after the Sejong period during which some areas of Korean science and technology had reached a peak--indeed even the highest level then existing in the world--can the historian ignore the situation in China at the time? Can he ignore questions such as: What were the levels of the Chinese scientific ideas and techniques that Koreans of the Sejong period adopted? How did they change in China in subsequent years?²⁶ If Chinese science and technology did stagnate or decline, would it

²⁴ Yung Sik Kim, "Some Reflections on Science and Technology in Contemporary Korean Society," *Korea Journal* 28.8 (1988): 4-15.

²⁵ Yung Sik Kim, "The 'Why not' Question of Chinese Science: Scientific Revolution and Traditional Chinese Science," *East Asian Science, Technology, and Medicine* 22 (2004): 96-112.

²⁶ We read about the supposed decline of many sciences in the Ming, although there are some debates concerning the reality of such decline. On the decline of science in the Ming, see, e.g., Joseph Needham, *Science and Civilisation in China* (Cambridge: Cambridge University Press, 1959), vol. 3, pp. 50-52; Li Yan and Du Shiran, *Chinese Mathematics: A Concise History* (Oxford: Clarendon Press, 1987), p. 175; Liu Dun, "400 Years of the History of Mathematics in China--An Introduction to the Major Historians of Mathematics since 1592," *Historia Scientiarum* 4 (1994): 103-111, on pp. 103-104. See also Willard J. Peterson, "Calendar Reform prior to the Arrival of Missionaries at the Ming Court," *Ming Studies* 21 (1986): 45-61.

have been possible for Korean science and technology to continue to develop independently? Was it possible, for example, for certain elements of Chinese science and technology which stagnated or declined in China to continue to prosper in Korea alone? The importance of Islamic influence as a source of the vitality for Korean science of the period,²⁷ which Jeon Sang-woon has alluded to but not elaborated upon, is an indication that the situation in Korea could have been different from (or at least more complicated than) that of China. But, if we were to conclude in the end that it was not possible for Korean science to prosper alone, would that mean that the Korean “why-not” question should be reduced to a part of the Chinese “why-not” question?

5. Concluding Remarks

As I have stated in the beginning of this paper, I have raised questions rather than provide answers or explanations for the “problem of China” in the study of the history of Korean science, Chinese science, and East Asian science. How prevalent are these concerns I mention among historians of science focusing on Korea, China, or East Asia in general? Studies by historians of science working on scientific developments in different regions of the world might provide interesting comparisons.

NOTES

Earlier versions of this essay have been presented at the 11th International Conference on the History of Science in East Asia (Munich, 2005), the Paris Workshop on “When Nations Shape History of Science” (REHSEIS, CNRS, 2006), Seoul National University (Discussion Group on “Late Chosŏn Science and Thought”), Harvard University (Korea Institute), and at Columbia University (Weatherhead East Asian Institute). In preparing the present, still tentative, version of this essay, I have benefited greatly from the questions, comments, and criticisms by various participants of the above presentations.

²⁷ Chŏn Sang-un, “Chosŏn chŏn’gi-ŭi kwahak-kwa kisul.”