

elements, also, has been among the more frequently discussed topics. These, of course, led to much interesting explanation of various particular ways Chinese scientific knowledge developed, or failed to develop. But they raise problems as well.

The present paper discusses mainly these problems. But it also raises other problems that come up when the "science - religion" relationship is studied in the context of traditional China. It indicates, among other things, that not only is the "science - religion" relationship culture - dependent but also is what we mean by "science - religion relationship."

The Central Institute of Industry, Korea, 1946 - 1961

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The Central Institute of Industry, Korea has a history of over one hundred years. It can be traced back to Chŏnhwan'guk, a combination of the Bureau of Mint and Government Printing Office which was established by the government of Chosŏn in 1883 and lasted until 1904. Two years later the government started Technical School.

After the annexation of Korea to Japan in 1910, the Japanese Colonial Government created the Central Research Laboratory in 1912 and put Technical School under its control. After World War II the Laboratory survived, but its name underwent a change three times.

The Central Institute of Industry covers 15 years starting with the U.S. military rule, through the establishment of Korean government in the south in 1948, the Korean War from 1950 to 1953, and the overthrow of Rhee Syngman regime in 1960 and ending with the

military coup in 1961. It is the most important and glorious period in its long history.

Korea was liberated from the Japanese colonial rule in 1945. It had had an affluent heritage of traditional science which ended with the fall of Chosŏn Dynasty. However, the Korean science had to start almost out of nothing after the vacuum of 35 years. The Japanese extremely discouraged the Koreans to be trained in science and technology. As a result, there were about one thousand engineers who were educated at a junior college level and less than one hundred scientists with university degrees when the Japanese left Korea. In physics, for example, there were only three Ph. D. holders, two from the United States, one from Japan and ten with bachelor's.

The Central Research Laboratory was one of very few assets Korea inherited from the Japanese colonialists. It was taken over by Ahn Tong Hyuk who had been the only high ranking Korean engineer in the Laboratory before the liberation. He was a graduate of Keijo Technical College which was closely associated with the Laboratory and later of Applied Chemistry Department, Kyushyu Imperial University in Japan.

When it was reshuffled and started anew as the Central Institute of Industry in 1946, Ahn could recruit 146 staffs of which 41 were engineers and 44 were technicians. The Institute consisted of 4 sections, namely, Applied Chemistry, Dyeing and Weaving, Ceramics, Analysis and Brewing, and later Mechanical Engineering and Food Industry were added. It did not confine itself to carrying out the industrial tests and research as the predecessor did. It aimed at establishing the foundation of science and technology and at developing industry. Ahn, Director of the Institute, if not materialized, contemplated a huge plan to

make it a full-fledged institute of science and technology. The political, social, and economic situation at that time was far from realizing such an ambitious plan. The division of the country into two and the fierce ideological strife in the southern part led Korea to chaos. The U.S. Military Government did not have time to pay attention to science and technology.

In spite of unfavorable conditions, the Institute achieved a lot. In 1946 it launched nearly 30 research projects. The majority of them were mission-oriented research, but some were on pure science like chemical thermodynamics. It did hundreds of requested analyses and gave numerous advices to the industry. It opened a program of training technicians and middle school science teachers at the request of the Ministry of Education. Later it even published a monthly popular science magazine named *Kwahaksidae* (The Age of Science) to disseminate science and technology to the general public.

Such multi-faceted activities of the Institute might be regarded as the reflection of the character of Director Ahn. He was a fascinating person with humanistically-mindedness and devotion to his work. Furthermore, he was an excellent manager. He might be compared with J. J. Thomson or Ernest Rutherford of Cavendish Laboratory. Right after the War, he had a choice between President of Seoul Technical College, former College of Engineering, SNU and the Director of the Laboratory. He chose the latter unexpectedly and devoted his whole life to the Institute until he became Minister of Commerce and Industry in 1953.

Under the leadership of Ahn the Institute attracted the best engineers and scientists who later joined the faculty of various univ-

ersities. With the establishment of the government, the Institute became the subsidiary body of Ministry of Commerce and Industry. The government, however, was occupied with nation building and did not show special concern with the Institute. There was no science policy as such. Then the War broke out and the Institute had to move to Pusan, temporary capital in the southeast staying there for three years. When the armistice came into effect in 1953, the Institute came back to Seoul with deep scar on it. Much of its equipments were destroyed. What was more serious was the loss in manpower. 40 per cent of the staff were killed or missing. It was a serious blow, but rehabilitation proceeded quickly.

In the meantime, the function of the Institute was partly shared by the Army Institute of Technology which took over the basic and applied research with sufficient fund. The Institute of Industry was destined to be less important accordingly. In 1953 Director Ahn was succeeded by Yi Chae Ho, an old mechanical engineer. He was a single-minded stubborn man. For the next ten years during which he was in office, the Institute was expanded greatly. But the ideal and characteristics of the Institute given by his predecessor waned.

In the 1950s President Rhee became very much interested in atomic energy. He wanted to raise the prestige of the country by initiating nuclear research earlier than other developing countries. In 1956 the Mutual Pact on Atomic Energy between Korea and the United States was signed and Korea Atomic Energy Research Institute was created in 1959. The government laid formidable emphasis on it and it was unrivaled by any institutes.

It was natural that the Central Institute of Industry became relegated to a mere testing

laboratory though it continued to grow in scale. Most of the competent researchers at the Institute transferred to universities. However, there is no doubt that the Central Institute of Industry was the cradle of science and technology in the 1940s as Ahn pointed out.

Transmission of Scientific Ideas and Language

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Modern scientific ideas were transmitted into East Asia via translations. Korean experiences, in comparison with the Japanese and the Chinese, are particularly interesting and illustrating.

The Chinese and the Japanese started to have contacts with the West from the early seventeenth century through the visiting missionaries like Matteo Ricci and Francisco Xavier among others. Yet Koreans had never had any direct contact with the Westerners on intellectual level until the nineteenth century, for Western missionaries did not come. Under the given circumstances the only way of learning science before the nineteenth century was through the imported books from China. Western missionaries translated many books on science into Chinese there.

Koreans started their study of science through the Chinese rendition of Western science, not through Western books. The tradition lingered on even after the opening of Korea in 1876. Though Westerners were formally accepted into their land, Koreans never bothered to learn any of the Western languages as a means of absorbing science. Instead they had eventually switched their transmitter from the Chinese to the Japanese at the turn

of the century. The basic pattern of indirect transmission of scientific ideas continued in the Japanese language period, 1900 - 1945.

Direct transmission of scientific ideas into Korea became finally possible only after 1945. Very soon, however, another difficulty developed for free transmission of scientific ideas among the three peoples of East Asia. Activated by the post-war nationalism, the Chinese started to build their own terminology in science and the Koreans simply stopped their use of Chinese characters.

What we see today is the gradual destruction of Chinese character-based communication system in East Asia as an intermediary language. It is time that East Asians have to start to reestablish something for the losing vitality of their language system for more effective transmission of scientific ideas among the three peoples. Efforts for the device of common scientific terms are highly desirable.

Pan-Paradigm in Korean History of Science

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One of the most important scientific achievements in Korea was recorded by King Sejong of Chosŏn dynasty (1419 - 1452). His academicians and the king himself devoted to the development of many branches of science, i.e., linguistics, astronomy, mathematics, music, calendar making, medicine, measurement, metaphysics, etc. It is clear that these achievements were inspired by one principle: their effort to adapt classical Chinese scientific methods to Korean environment. This also applies to political philosophy of the dynastic Korea in which orthodox confucian doctrine was creatively adapted to the reality of Korea.