

A Cross-Cultural Scientific Bridge: A Study on the Establishment and International Influence of the European Branch of the Chinese Chemical Society in Paris

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Abstract

Founded in Paris in 1907, the European Branch of the Chinese Chemical Society was the first professional chemical organization established by Chinese people and the first organization with the nature of a scientific society. Under its influence, chemical organizations such as the Guangdong Branch of the Chinese Chemical Society emerged successively in China, promoting the development of the domestic chemical community. The European Branch played a significant role in the early institutionalization of chemistry in China.

Keywords: European Branch of the Chinese Chemical Society, Guangdong Branch of the Chinese Chemical Society, Institutionalization of Chemistry, Early Chemistry Societies

1. Introduction

The European Branch of the Chinese Chemical Society, established by Chinese students studying in Europe in 1907 (hereinafter referred to as the "European Branch"), was the first professional chemical organization founded by Chinese people, and is also known as "the first truly scientific society in China." [1]

The establishment of this organization has symbolic significance for the development of modern chemistry in China. Starting with the European Branch, Chinese people organized various forms of "chemical organizations" in the early 20th century. Although for various reasons, most of these early chemical organizations did not last long, studying these organizations is meaningful for understanding "the growth and development of Chinese chemical science." [2]

Early Chinese chemical organizations have also attracted the attention of many scholars in recent years, with research involving organizations such as the Chinese Chemical Industry Association, [2] the Chinese Chemical Society [4], and the scientific societies of Peking University's Department of Chemistry. [4]

However, concerning the earliest European Branch, previous research has touched upon it, [5][6][7][8] but studies on its establishment process, personnel, contributions, and subsequent development are relatively scarce, and the true position of the European Branch in the development of China's chemical discipline has yet to be recognized by the academic community.

In light of this, this article intends to explore the development and impact of the European Branch, aiming to clarify the process of institutionalization of Chinese chemistry and thereby deepen our understanding of the development of modern Chinese chemical disciplines.

2. The Establishment and Achievements of the European Branch of the Chinese Chemical Society in Paris

The first organization in China named after chemistry was the Chemical Guild, founded in 1897 in Hangzhou. The defeat in the First Sino-Japanese War sparked a wave of national salvation through science, with reformers at the time believing that organizing various societies was crucial for saving the nation from peril, striving for national prosperity, and promoting reforms. [9]

Liang Qichao proposed, "To rejuvenate China, we must cultivate talent, and to cultivate talent, we must establish societies." [10] Under the influence of this ideology, many "societies" were founded by Chinese people at the time, with the Chemical Guild being initiated by staff members of the Hangzhou newspaper *Jingshi Bao* during this period. [11]

Due to a lack of funds at its inception, the Chemical Guild temporarily used the *Jingshi Bao* office as its meeting place, planning to establish a separate chemical society or chemical school after achieving some success. The 33 members who joined the Chemical Guild included Wu Zonglian, Shao Zhang, Qu Anglai, and others. On November 9, 1897, the Chemical Guild held its first experiment and established a rule to hold meetings on the 1st and 15th of each month thereafter.[12]

However, *Jingshi Bao* ceased publication shortly afterward, and the Chemical Guild also faded away, much like most organizations established during the Reform period, existing only briefly.

Although the societies created at that time cannot be called modern scientific societies in the true sense, they nonetheless marked the beginning of Chinese efforts to establish modern organizations independently.[13]

The first recognized true modern chemical organization in China is the European Branch. In the summer of 1907, Li Jinghao (1882-?) who was studying in France, proposed the establishment of the Chinese Chemical Society.

In his proposal, he mentioned that the Jiangnan Arsenal Translation Bureau and the Tongwen Guan had been translating books for over forty years. If, at that time, students had united to study chemistry, China's chemistry today might not rival that of Europe and America, but it would surely be sufficient to produce the products the country needed. However, many chemical products in China still depend on imports.[14]

Li Jinghao named the organization the "Chinese Chemical Society," with the purpose of "compiling to exchange knowledge, investigating to set business guidelines, and conducting business to promote the development of China's chemical industry."

His envisioned organizational system was grand, suggesting the establishment of branches in each country, as well as branches in various provinces within China. Each provincial branch would elect a vice president, who would then nominate the president of that country, and finally, the country presidents would collectively elect a general president.

Anyone who studies chemistry and sympathizes with the society's purpose could join as a member. Members were obliged to "compile books and periodicals, investigate goods, promote industrial initiatives, plan for the society's development, and review the society's bylaws and affairs." [15]

Li Jinghao envisioned the work of the society to be divided into three parts. The first part was compiling, including standardizing chemical terminology and compiling chemistry textbooks and reference books.

The second part was investigation, which involved researching the chemical industries and raw material sources of both China and other countries, the scale and content of chemical factories in various countries, and the bylaws of chemical schools in different nations.

The third part was business, which included assisting members in fundraising for or promoting stock issues for factories they founded, mutual insurance among peers, and facilitating sales of products from various factories.

Li Jinghao also envisioned issuing stocks to build the chemical industry, with profits being distributed as dividends to managers and shareholders.

The organization envisioned by Li Jinghao was in fact both academic and commercial, rather than being purely an academic society.

After Li Jinghao made his proposal, Chen Chuanhu believed that it would take time to establish the general society and suggested first creating the European Branch as a "prelude" to the future establishment of the Chinese Chemical Society, which would then be subordinated to it.

On December 25, 1907, seven students studying in Europe, including Li Jinghao, Chen Chuanhu, Lu An, Rong Guang, Yu Tongkui (1876–1962), Li Yin (1876–1954), and Wu Kuangshi (1883–1935), gathered at the French Study Association in Paris and officially established the European Branch.[16]

Yu Tongkui was appointed president, and Li Jinghao was appointed accountant. Wu Kuangshi's father, who had previously participated in the Chemical Guild, Wu Zonglian, who was serving as the acting ambassador to Austria, was appointed honorary president. Kuai Guangdian, the supervisor of European study abroad at the time, also expressed support for the society and showed interest in donating funds. The society's goal was "to advance chemistry and promote the development of the nation's industries." [17]

The tasks outlined included standardizing terminology, compiling books and periodicals, investigation, and communication (i.e., assisting fellow countrymen with research). [18] Apart from the removal of the industrial involvement part, the other tasks were largely the same as those proposed by Li Jinghao for the Chinese Chemical Society.

The European Branch held its first annual meeting in London, UK, from August 10 to 19, 1908, with 16 attendees. In his "Mid-Year Report for 1908," Yu Tongkui mentioned that by August 1908, the society had 29 members studying in Europe, distributed across the UK, France, Germany, and Belgium. Domestically, there were 42 members, 25 of whom were undergraduate students in the Department of Chemistry at the Beijing Higher Industrial School, and there were also 3 members in Japan.

The main tasks completed by the society within the first six months of its establishment included standardizing terminology and investigating industries.

The first annual meeting mainly discussed the editing of a dictionary, publishing the "Quarterly Journal of the European Branch of the Chinese Chemical Society," translating books, and assisting domestic investigations into the chemical industry. During the meeting, Chen Zuliang was elected as the new president. The most important issue discussed at this meeting was the standardization of chemical terminology. The European Branch formulated translations for chemical elements and naming systems for inorganic and organic chemistry. Some of the translated terms from this meeting have been passed down through generations. In terms of element translations, the European Branch pioneered new terms such as "氢" (hydrogen), "氟" (fluorine), and "氯" (chlorine). The organic chemistry terms "醇" (alcohol), "醛" (aldehyde), and "酮" (ketone), proposed by member Li Yin, were adopted by the European Branch and have been used ever since.[19]

In 1910, Li Jinghao compiled the book *Examples of Organic Chemistry Nomenclature* based on the principles agreed upon at the European Branch meeting in 1908.[20] Later, the European Branch ceased its activities due to the return of its organizers to China, but its influence did not end there. Members of the society went on to organize or participate in several chemical societies in China.

3. The Continuation of the European Branch

3.1 Guangdong Branch

In 1909, Chen Zuliang, president of the European Branch, sent a letter to the Qing Dynasty's Ministry of Agriculture and Commerce, hoping to establish chemical societies in various provinces of China and later form a unified Chinese Chemical Society. He also submitted the bylaws of the Chemical Society to the Ministry, requesting that they be registered and implemented in all provinces.

The Ministry of Agriculture and Commerce believed that "the organization of the Chinese Chemical Society abroad and the development of principles to benefit industry and commerce were crucial. As the industries in various provinces are just beginning to grow, it is urgent to study science for further advancement." Therefore, they "immediately issued and stamped the original bylaws, and instructed the provincial governors to widely promote and uniformly establish this society in all provinces." [21]

The Ministry of Agriculture and Commerce also proposed, "By observing the early results, the industrial benefits can be achieved." [22]

Under the advocacy of the Ministry of Agriculture and Commerce, the provinces actively responded. After receiving the communication, Chen Qitai, the Governor of Jiangsu, instructed the Agriculture and Commerce Bureau and the Education Commissioner to jointly organize the society. Among these efforts, the establishment of the Guangdong Branch of the Chinese Chemical Society (hereinafter referred to as the Guangdong Branch) was the most successful.[23]

After receiving the communication from the Ministry of Agriculture and Commerce, Zhang Renjun, the Governor of Guangdong and Guangxi, entrusted the organization of the Chemical Society to Chen Wangzeng, the Commissioner of Guangdong's Industrial Promotion Bureau.[24]

Coincidentally, Li Yin, who had studied in Europe, returned to China and Guangdong at the end of 1908. With the support of Chen Wangzeng, Li Yin and others established the Guangdong Branch in 1909 in Guangdong, and submitted a request to the Guangdong Industrial Promotion Bureau for approval and official registration.

The Guangdong Industrial Promotion Bureau provided the Guangdong Branch with the Tianhou Temple building of the Yide Society as its meeting place and allocated 200 taels and 4 mace of silver as startup funds.[25]

Li Yin was one of the founders of the European Branch of the Chinese Chemical Society. Therefore, the establishment of the Guangdong Branch and its members had a certain continuity with the European Branch, and even the name of the society was modeled after it. The goal of the Guangdong Branch was "to develop chemical principles and promote the progress of various chemical endeavors." [26]

Similar to the European Branch, the Guangdong Branch was named "Chinese Chemical Society Guangdong Branch" so that it would be subordinated to the Chinese Chemical Society once it was established.

The tasks of the society included: studying chemistry and industrial issues, compiling books and periodicals to promote chemistry, investigating domestic and international chemical industries and chemical schools, answering chemistry-related questions from both members and the public, establishing public chemistry laboratories, setting up a chemical product exhibition hall, creating specialized chemistry schools or industrial chemistry schools, and conducting analyses of minerals or raw materials of manufactured products to support industries.

The Guangdong Branch also founded the *Guangdong Chemical Society Industrial Journal* in 1910. Although named a newspaper, it was actually a periodical, published twice a month. It specialized in introducing chemical knowledge and promoting the application of chemistry in industrial and agricultural fields, publishing more than ten professional articles in each issue.

Chen Wangzeng, Commissioner of the Guangdong Industrial Promotion Bureau, served as an honorary sponsor and wrote the inscription for the journal. He praised the journal for "not indulging in theoretical discussions, not using empty, flowery language, and for applying practical learning that aligns with the evolution of the times and meets the needs of the people, contributing to the development of public spirit and increasing knowledge." [27]

Wang Chongyou and others served as honorary contributors. The journal's editors included Li Yin and Luo Bichang, with the editorial team composed of Tang Youheng, Qu Xihui, Luo Tingyu, Li Yin, Mo Siyuan, and others. [28] Among them, Luo Tingyu was also a member of the European Branch.

In 1909, Zhang Renjun was transferred to serve as the Governor of Liangjiang and the Minister of Nanyang. In the same year, the Ministry of Agriculture and Commerce proposed the establishment of China's first exposition—the Nanyang Industrial Promotion Association. Zhang Renjun [29] became the president of the association and urged the various provincial product associations, sponsoring associations, and industrial product associations to accelerate the collection of exhibition items from the provinces and select excellent products to be sent to Nanjing. [30]

The Nanyang Industrial Promotion Association officially opened in June 1910. The Guangdong Branch also actively participated in the exhibition. After receiving the notification and months of discussion, all members contributed by manufacturing products in their areas of expertise.

For example, member Zhang Guoxing processed cow and sheep hides into tanned leather and brought it to the exhibition, explaining the tanning method in detail.

"In addition, many other members successfully experimented with and manufactured products such as soda, soap, perfumes, medicines, electroplating, and academic supplies. They planned to produce more and would later bring them to the exhibition."

An important task of the Guangdong Branch also included collaborating with the Ministry of Education (equivalent to the current Ministry of Education) in compiling a unified chemical terminology. This was the first instance of cooperation between a civilian scientific organization and the government to standardize chemical terminology. Shortly after the establishment of the Terminology Bureau in 1909, the Ministry of Education contacted the Guangdong Branch, hoping the society would help formulate chemical terminology.

It was reported that "Tang Youheng, the chief editor of the Guangdong Chemical Branch and newly selected agricultural science graduate, discussed with the Ministry of Education the establishment of the Terminology Bureau to standardize scientific terms, ensuring national uniformity and preventing barriers in education. Among all sciences, chemical terminology was the most difficult and complex. In September, he discussed terminology compilation with a certain minister at the Ministry of Education in Beijing. The minister said that the complexity of chemical terminology required collaboration with the Chemical Society to finalize the terms, and instructed the society to quickly compile the terms. The Chemical Society plans to finalize the inorganic chemistry terminology in the near future." [32]

in compiling chemical terminology. In early 1910, the Guangdong Branch faced financial difficulties as it prepared to participate in the Nanyang Industrial Promotion Association and "compiled a report on the chemical terminology and sent it to the Ministry of Education, which required a great deal of effort." [31] This shows that the society was indeed engaged in editing chemical terminology, but was hindered by a lack of funds.

In editing chemical terminology, the Guangdong Branch continued some of the work initiated by the European Branch, such as the translations of "氢" (hydrogen), "氟" (fluorine), and "氯" (chlorine).

In addition, the Guangdong Branch coined important chemical terms such as "氧" (oxygen) and "氮" (nitrogen), which are still in use today, making significant contributions to the standardization of chemical terminology.

In summary, the Guangdong Branch had bylaws, an office location, official financial support, and a regularly published journal, all of which are basic characteristics of a modern scientific society.

Therefore, the Guangdong Branch was the first practice of the European Branch's founding principles in China and the first professional chemical organization established domestically.

3.2 Other Chemical Organizations

Following the European Branch and the Guangdong Branch, former members of the European Branch, including Wu Kuangshi, Lu An, and Deng Bangyu, originally intended to establish the Chinese Chemical Society during the Nanyang Industrial Promotion Association, but this was not realized.

In 1909, the Ministry of Agriculture and Commerce submitted plans for the year, mentioning that the Beijing Industrial Experimental Institute would be established in 1910, along with the Physical and Chemical Research Society.[33]

In 1911, Zhang Kui and other comrades from the Ministry of Agriculture and Commerce gathered in Beijing to establish the Beijing Chemical Society. Its purpose was "to study academia and revive industry." The society's office was located next to the Industrial Experimental Institute in the Ministry of Agriculture and Commerce's Industrial Promotion Display Hall, and it was planned to be jointly maintained by the Ministry of Education, the Ministry of Civil Affairs, and the Ministry of Agriculture and Commerce.[34]

The society's officers included Zhang Kui and Lu An, with the editorial directors being Yu Tongkui, Yu Mingxin, and Wang Jidian. The full members included Zhang Kui, Li Jinghao, Yu Tongkui, Yu Mingxin, Wang Jidian, Gao Jinchun, and 52 others.

The Beijing Chemical Society was essentially a continuation of the earlier European Branch. Among its members, 17 had previously participated in the European Branch, including Yu Tongkui, Deng Bangyu, Guo Shiguan, Li Jinghao, Yang Baonan, and Lu An, accounting for one-third of the total membership. The society ended with the outbreak of the Xinhai Revolution and the fall of the Qing government.

After the establishment of the Republic of China in 1912, the members gathered in Shanghai with the intention of "continuing their previous work and aiming for the prosperity of academia, and addressing the core issues of national industry." They founded the Chinese Chemical Society, with Yu Tongkui serving as president. Its purpose was "to spread chemistry across the country in order to promote the development of industry."

The tasks included: 1. Standardizing terminology, continuing with the chemical naming principles established by the European Branch and expanding them, after discussions and "submitting them to the Ministry of Education for review, to be implemented uniformly nationwide." 2. Investigating domestic and foreign chemical factories, raw materials, and chemical schools; 3. Correspondence, assisting in solving related professional issues.[35]

It is clear that both of these societies can be seen as continuations of the European Branch. The members of the original European Branch played an important role in the founding process, and the tasks they outlined were essentially the same as those of the European Branch. However, the Chinese Chemical Society did not last long and left few marks in history.

In 1922, Yu Tongkui, along with Chen Shizhang and others, initiated the establishment of the Chinese Chemical Industry Association and founded the Journal of the Chinese Chemical Industry Association, with Yu Tongkui serving as the editor-in-chief.[36] The president was Zhang Xingu, also known as Zhang Kui. Among the 32 founding members, Yu Tongkui, Wu Kuangshi, Chen Chuanhu, and five others were members of the original European Branch.

The purpose of the Chinese Chemical Industry Association was: to promote knowledge of chemical industry and advance industrial development; to connect members with a spirit of mutual aid, exchanging views on the chemical industry; and to serve as a think tank for the industrial sector.[37]

The scope of the association's work included: (1) investigating domestic and foreign factories, industries, and local products; (2) collecting the latest news about the global chemical industry; (3) accepting commissions from the industrial sector to inspect materials and review industrial plans; (4) organizing lectures on the chemical industry, preparing a reference library and laboratory for chemical industry studies; (5) publishing a quarterly industrial chemistry journal and regularly publishing works on the chemical industry.

The association used the Beijing Industrial Specialized School as its correspondence office, where Yu Tongkui was the principal at the time. Starting in January 1923, the association began publishing the Journal of the Chinese Chemical Industry Association, Volume 1, Issue 1. In September 1923, a branch was established in Shanghai, with former European Branch member Cao Huiqun (1886–1957) serving as the director.

At the end of 1928, the association moved from Beijing to Shanghai.[3] On New Year's Day 1929, the association held its 4th annual meeting in Shanghai, re-electing Cao Huiqun as president, and he continued to serve for eight consecutive terms as president. It can be seen that the purpose, personnel, tasks, and other aspects of the Chinese Chemical Industry Association were influenced by the European Branch, and even its organizational structure was modeled after the European Branch's experience and framework, such as setting up positions like president, secretary, and advisory members. It should be noted that the establishment of the Chinese Chemical Industry Association had significant ties to the European Branch.

In addition to the European Branch and its subsequent societies, Chinese people also established other similar chemical organizations in the early years. In 1909, Chinese students studying in Japan established the Mathematical and Physical Chemistry Society in Tokyo, with the aim of "promoting and popularizing the progress of mathematical and physical chemistry." [38] In addition to Japanese-based students, the society also attracted many domestic members. However, the society disappeared after publishing only a few issues of the Mathematical and Physical Chemistry Society Journal.

In 1918, Wang Zuju, Li Linyu, Li Shuhua, and others initiated the establishment of the Paris Chinese Chemical Research Society, with support from Cai Yuanpei, Wang Jingwei, and Li Shiceng. The society's goal was to "study chemical principles, compile chemistry books, develop chemical education, and revitalize the chemical industry." [39] The organic chemistry naming scheme developed by the society was published in 1922 in *Xueyi* magazine. The naming mainly used free translation and coined characters, but the new terms were not adopted by later generations. [40]

The above-mentioned societies rose and fell quickly, leaving little impact on history. It wasn't until after 1920 that Chinese chemical organizations truly began to prosper.

In 1922, Wang Zhen, Zhuang Changgong, Fu Ying, and 33 other Chinese students in the United States initiated the establishment of the Chinese Chemical Society. [41] In 1930, the Chinese Society of Chemical Engineering was established at the Massachusetts Institute of Technology (MIT). [42] In 1957, it merged with the Chinese Chemical Industry Association to form the current China Chemical Engineering Society. In 1932, the Chinese Chemical Society was established and continues to this day. Some of the individuals involved had previously participated in the founding of the Chinese Chemical Industry Association and the Chinese Society of Chemical Engineering. [43]

Around 1920, with the gradual development of modern higher education, a number of chemical societies also emerged in universities.

For example, the Physical and Chemical Society of Beijing Higher Normal School [44], founded in the spring of 1917; the Chinese Chemical Society of Peking University, established at the end of 1922; the Chemical Society of National Guangdong University [45], founded in November 1925; and the Agronomy Chemistry Society organized by students of Beijing Agricultural University in March 1926. [46]

Additionally, the Chemistry Society of the Department of Chemistry at West China University [47], the Mathematical and Physical Chemistry Society of National Wuchang Higher Normal School [48], and the Mathematical and Physical Chemistry Research Society of Nanjing Higher Normal School were also established during this period.

The prosperity of both national and university-based societies greatly indicates that by around 1920, the institutionalization of the chemical discipline in China had gradually taken shape and continued to develop and expand.

4. International Influence

4.1 Cultural Dissemination and Academic Exchange

The European Branch of the Chinese Chemical Society in Paris played an important role in cultural dissemination and academic exchange in the international chemical community.

In 1909, Yu Tongkui presented a paper titled *The Phenomenon of Chinese Chemical Industry and Its Future Development* at the International Association of Applied Chemistry in London, systematically introducing China's ancient chemical achievements and the prospects for modern development. [49]

The paper emphasized China's deep scientific foundations and clarified the positive significance of China's chemical progress for the world. This initiative attracted significant attention from foreign scholars, effectively enhancing the international chemical community's recognition of China's chemical traditions, breaking the biases of the Western academic world, and earning early international recognition for China's chemical industry, thus opening a new chapter in Sino-foreign academic exchanges in chemistry.

4.2 Amplifying the Dissemination of China's Scientific Endeavors

In May 1909, the Seventh International Association of Applied Chemistry was held in London, where Yu Tongkui attended and presented his paper *The Phenomenon of Chinese Chemical Industry and Its Future Development*, introducing the achievements of China's ancient chemical industry. The paper was "immediately published by newspapers, and it attracted particular attention from the Germans," indicating that the activities of the European Branch quickly became a focal point for European media, especially gaining the attention of the German academic community.[50]

This media effect not only amplified the international voice of China's chemical industry but also created a new understanding of China's scientific development within the European intellectual community, effectively enhancing China's academic influence in Europe.

5. Conclusion

This study explores the establishment of the European Branch of the Chinese Chemical Society in Paris and its international influence, aiming to reveal the early institutionalization of the chemical discipline in China and its contributions to the international chemical community. Through the analysis of the historical background, development process, and international impact of the European Branch, this article attempts to offer a new perspective on the beginnings of China's chemical industry. Although existing studies have focused on the establishment and development of the Chinese Chemical Society, systematic research on the specific role and impact of the European Branch remains insufficient.

The theoretical value of this article lies in the review of the early development of China's chemical discipline, especially its interaction and exchange with the international academic community, filling the gaps in existing research. From a practical perspective, this article helps in understanding the important role of early chemical organizations in promoting domestic chemical education and industrial development.

Compared with previous studies, this research expands on the details, especially in analyzing international influence and academic dissemination. Although there are still many unresolved issues, such as specific scientific achievements and internal management, it is hoped that this study will provide some inspiration for future research.

Future research could further explore these aspects, promoting a comprehensive understanding and development of the institutionalization of China's chemical discipline.

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