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"Universal Science" Versus "Chinese Science": The Changing Identity of Natural Studies in China, 1850-1930

Benjamin A. Elman
Professor of East Asian Studies & History, Princeton University

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Abstract:

This article is about the contested nature of "science" in "modern" China. The struggle over the meaning and significance of the specific types of natural studies brought by Protestants (1842-1895) occurred in a historical context in which natural studies in late imperial China were until 1900 part of a nativist imperial and literati project to master and control Western views on what constituted legitimate natural knowledge. After the industrial revolution in Europe, a weakened Qing government and its increasingly concerned Han Chinese and Manchu elites turned to "Western" models of science, medicine, and technology, which were disguised under the traditional terminology for natural studies. In the aftermath of the 1894-95 Sino-Japanese War, Chinese reformers, radicals, and revolutionaries turned to Japanese and Western science as an intellectual weapon to destroy the perceived backwardness of China. Until 1900, the Chinese had interpreted the transition from "Chinese science" to modern, universal scientific knowledge – and its new modes of industrial power – on their own terms. After 1900, the teleology of a universal and progressive "science" first invented in Europe replaced the Chinese notion that Western natural studies had their origins in ancient China, but this development was also challenged in the aftermath of World War One during the 1923 debate over “Science and the Philosophy of Life.”

關鍵詞

中國，科學，宗教，工業，歷史

摘要

本文要討論的是「科學」性質在「近代」(modern) 中國的爭議。新教傳教士 (1842-1895) 將研究自然的特殊模式帶到中國。有關這些模式的意義和重要性之抗爭，發生在一種歷史背景下，即晚清。晚清一直到 1900 年為止，自然的研究都屬於要保護本土文化的帝國和知識份子的計劃的一部份。計劃的目的在支配和管理西方有關什麼才是正當的自然知識的觀念。

工業革命在歐洲發生以後，衰弱的滿清政府和及與政府有關的滿漢菁英將目光轉向「西方的」科學、醫藥和科技模式，但這些模式都被隱藏在中國有關自然研究的傳統術語之下。在中日甲午戰爭 (1894-1895) 的餘波下，中國的改革者、激進分子和革命分子將焦點轉向日本的和西方的科學，他們將科學視為可用來摧毀中國認知落後的知識武器。

直到 1900 年為止，從「中國的科學」到現代普遍的科學知識－及其在工業力量中的新表現方式－中國人都用他們自己的說法來解釋這個轉變。1900 年之後，歐洲首創一個普遍進化的「科學」目的論，在中國它取代了「西學源於中國說」的中國人看法。惟此項發展在第一次世界大戰的餘波中，在 1923 年「科學與人生觀」論戰期間也受到挑戰。

The Protestants and Modern Science in China

In the aftermath of the bloody defeat of Taiping rebels (1850-64), a weakened Qing dynasty (1644-1911) and its literati-officials faced up to the new technological requirements to survive in a world increasingly filled with menacing nation-states. Literati such as Xu Shou 徐壽 (1818-82) and Li Shanlan 李善蘭 (1810-82), who were involved in translating the new Western natural sciences into Chinese at the Jiangnan Arsenal (*Jiangnan zhizaoju* 江南製造局) in Shanghai beginning in the 1860s, built conceptual bridges between post-industrial revolution Western learning and traditional Chinese natural studies.[1]

Literati associated with statecraft and evidential studies after the Taiping Rebellion created the intellectual space needed to legitimate literati study of natural studies and mathematics within the framework of "Chinese studies as fundamental, Western learning as useful" (中學為體西學為用). For instance, Li Shanlan first went to Shanghai in 1852 and for eight years there worked for the London Missionary Society to translate Western science works into classical Chinese. Later in 1864, Li was recommended to the newly established Beijing *Tongwen'guan* 同文館 (Translators' bureau), but he took up the appointment in 1866 only after the *Tongwen'guan* was upgraded to a college and a department of mathematics and astronomy was added. There, Li Shanlan worked with the American missionary W.A.P. Martin (Ding Weiliang 丁韙良, 1827-1916), who served as president of the college from 1869 to 1882, to teach mathematics and prepare scientific translations.[2]

Xu Shou initially collaborated with John Fryer (Fu Lanya 傅蘭雅, 1839-1928) at the Jiangnan Arsenal in Shanghai to translate Western scientific literature into classical Chinese, an enterprise that combined a narrow, textually based vision of science, brought by Protestant missionaries to attract Chinese converts, with the Chinese view of the sciences as a domain of classical studies appropriate only for literati. Together Xu and Fryer founded the *Gezhi shuyuan* 格致書院 in Shanghai in 1874, which was curiously translated into English as the "Shanghai Polytechnic Institute." From different

1 Wright 1996.
2 Hummel 1972: 480.

sides, Chinese literati and Western modernizers saw in *gezhixue* 格致學 (lit., "investigating things and extending knowledge") what they wanted to see, a native trope (= "Chinese science") or Western (= "universal") science.[3]

At first sight, scholars such as Xu and Li remained somewhat marginal because of their lack of success in the prestigious civil service examinations, which were the most respected avenue to official position. Their emergence, however, marked the increasing respectability of Western studies as a complement for classical learning. Advocates of the traditional statecraft internally faced unprecedented demographic growth and externally confronted extraordinary military power. By 1900, scholars interested in science and technology progressively replaced the traditional scholar-official as the model for the Qing state.[4]

Influenced by the British missionary John Fryer's extensive translation work and 1850s Protestant journals such as the *Liuhe congtan* 六合叢談 (known as the *Shanghae Serial*), which from 1857 to 1858 introduced the new fields in the modern Western sciences in Chinese as *Gezhixue*, Xu Shou, for example, used the *Bowu xinbian* 博物新編 (New edition of the broad learning of things, i.e., "science") by the English medical missionary Dr. Benjamin Hobson (He Xin 合信, 1816-73), which was published in Canton in 1851, to construct China's first steamboat. A pioneering translation, the *Bowu xinbian* contained introductory sections on modern physics, chemistry, astronomy, geography, and zoology.[5]

In the eighteenth century, Sino-Western accommodations between Chinese literati and Jesuits in China had been presented by Qing scholars and officials as confirmation that "Western learning had its origins in ancient China" (*Xixue Zhongyuan* 西學中源). For instance, the graphical forms for expressing and solving quadratic and higher algebraic equations, known as the "heavenly unknowns notation" (*tianyuanshu* 天元術) and "four unknowns notation" (*siyuanshu* 四元術), were recovered in the late eighteenth century by Mei Juecheng (d. 1763) and others. They presented *tianyuan* as the Chinese

3 Meng Yue 1999.
4 On late Qing changes in civil service examinations, see Elman 2000 a: 585-608.
5 Xiong Yuezhi 1994, and Wang Yangzong 1999: 212-214.

correlate to the algebra (*jiegenfang* 借根方, lit., "method for borrowing roots") introduced by the Jesuits.

The "four unknowns notation" was thought by Qing evidential scholars to be superior to the Jesuits' mathematical techniques. Chinese notational forms had been used much earlier, during the Song (960-1280) -Yuan (1280-1368) transition, but neither had received attention during the Ming dynasty (1368-1644). Not until the introduction of the differential and integral calculus in the mid-nineteenth century, for which the Chinese could not find a precedent in China, did Li Shanlan and other Chinese mathematicians admit that although the "four unknowns notation" was perhaps superior to Jesuit algebra, the Chinese had never developed anything resembling the calculus.[6]

Similarly, the "Chinese origins" trope in Chinese mathematics was what Alexander Wylie's (1815-87) and Li Shanlan's influential 1857 article entitled "Xiguo tianxue yuanliu" 西國天學源流 (Progress of astronomical discovery in the West) aimed at refuting. The article appeared serially from the ninth issue (September 1857) of the *Liuhe congtan* in a total of seven issues and was reissued as a single work in 1890. Wylie and Li Shanlan traced the history of western astronomy from the ancient Greeks to Ptolemy, then to Copernicus, Brahe, Kepler, Galileo, and Newton up to the eighteenth and early nineteenth century, thereby demonstrating that it had evolved separately from China. The universal pretences of Chinese learning were gently challenged.[7]

A new, nineteenth century version of *Xixue* 西學 (Western learning) now equaled a new, nineteenth century version of *Gezhixue*. Both Chinese terms had been widely used by the Jesuits and their collaborators in the seventeenth century. Moreover, as for the Jesuits and Ming dynasty literati, each term was still seen as complementary to Chinese natural studies after 1860. The obvious firepower of Western military technology after the Opium War (1839-42), however, confronted the Qing dynasty government, which took for granted the alleged universalism of native learning, with new and dangerous possibilities if they refused to master Western learning.[8]

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6 Hu Mingjie 1998: 214-229. See also Martzloff 1997: 149-159, and Han Qi 1998: 199-200.

7 Wang Yangzong 1999: 211-226.

8 Standaert 1994. See also Elman 2000 b.

In the process, post-industrial revolution Western science, now called modern science, was initially introduced in the mid-nineteenth century as compatible with, but no longer subordinate to, native classical learning. John Fryer wrote in 1880 that the Jiangnan Arsenal in Shanghai had commenced publishing translations of Western works in 1871. By June 30, 1879, some 98 works were published in 235 volumes (*juan* 卷). Of these, 22 dealt with mathematics, 15 were on naval and military science, 13 covered the arts and manufactures. Altogether, the Translation Office had sold 31,111 copies representing 83,454 volumes, and this had been accomplished without advertisements or postal arrangements. Another 45 works in 142 volumes were translated but not yet published, and 13 other works were in process with 34 volumes already completed.[9]

For example, one of the volumes for a Science Outline Series, which was part of the translation project at the Jiangnan Arsenal, focused on a textbook of the current British scientific fields of learning compiled by Henry Roscoe (1833-1915) and others. It was entitled the *Gezhi qimeng* 格致啟蒙 (Primer on science studies, lit., "Primer for the investigation of things and the extension of knowledge"). Completed in 1875 through the collaboration of the American missionary Young J. Allen and Zheng Changyan 鄭昌棪, it was reissued in 1879 in four volumes, one each dealing with the fields of chemistry (*huaxue* 化學), physics (*gewu* 格物), astronomy (*tianwen* 天文), and geography (*dili* 地理). Roscoe's series had been published in England by Macmillan in 1872. The series represented the collaboration of Thomas Huxley (1825-95), Sir Archibald Geikie (1835-1914), and Balfour Stewart (1828-87), J. N. Lockyer (1836-1920), along with Roscoe.[10]

Roscoe's struggles to make science respectable among elites in England in the 1870s paralleled Fryer's efforts to accomplish the same goal in contemporary China. After joining the British Royal Society in 1863, Roscoe had been instrumental in organizing the journal *Nature*, which began publishing in November 1869. From 1857 to 1870, for instance, Roscoe had with the support of Huxley, then at Oxford, remade Owens College in Manchester, England, into a scientific college with a focus on a scientific education, which

9 Fryer 1880.

10 See *Gezhi qimeng* 1875-79.

broke ranks with the earlier "Oxbridge" focus on an education for gentleman.[11]

Although London was the home of the Royal Society, and Manchester had been at the center of the British industrial revolution, the gentlemanly practice of science and the grimy production of factories and arsenals had not yet produced an encouraging ethos in favor of science and technology among "men of science" and industrialists that would make such technical fields as socially and intellectually acceptable among England's middle class and elites as an Oxbridge classical education. Consequently, the late Qing Chinese reaction to modern science must be measured by British elite resistance to a science education, not by twenty-first century hindsight.[12]

Roscoe's civilian role to promote modern science in his public lecture series and in his organization of cultural events as part of the Manchester Literary and Philosophical Society in the 1860s was the model for Fryer's translations inside the Jiangnan Arsenal and for his secular programs outside the Arsenal among Shanghai literati and merchants, which also aimed to heighten their appreciation for Western learning. Since 1872, a group of foreigners in Beijing had formed the "Society for Diffusion of Useful Knowledge in China" (*Guangxue hui* 廣學會). Their goal was to introduce modern science and liberal thought as a means to overthrow ancient superstitions and to prepare the way for inevitable innovations in China.

Besides their use in missionary schools, such studies were also institutionalized as texts within a regional matrix of arsenals, factories, and technical schools that formed the nineteenth century roots of the twentieth century industrial revolution in China. If Owens College became Fryer's model for the Shanghai Polytechnic, the École Polytechnic provided Prosper Giquel (1835-86) with the framework for technical schooling in the Fuzhou Shipyard. These empire-wide venues included:[13]

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11 Ayano Hiroyuki 1999 and Gillispie 1970-78: 11:536-38. The Royal Society, of course, had been a pre-industrial revolution haven for early modern English gentlemen interested in natural studies, not a technical institution for training in the sciences.

12 Ayano Hiroyuki 1997: 209-217. See also Fryer 1881: 9-11, 54-57.

13 Kuo Ting-yee and Liu Kwang-Ching 1978: 519-537, Biggerstaff 1961: 203-211, and Hatano Yoshihiro 1960.

- Anqing Arsenal (1861), set up by Zeng Guofan.
- Beijing Field Force Arsenal (1883).
- Daye Iron Mine (1890), in Hubei.
- Fuzhou Shipyard (1866), the base for the Southern Fleet, established by Zuo Zongtang.
- Guangzhou Arsenal (1874).
- Hangzhou Arsenal (1885).
- Hanyang Ironworks, in Hubei (1890).
- Hanyang Arsenal (1892).
- Hunan Arsenal (1875).
- Jiangnan Arsenal (1865), set up in Shanghai by Zeng and Li Hongzhang.
- Jilin Arsenal (1881).
- Jinling Arsenal (1867) in Nanjing used for making breech rifles and steel.
- Lanzhou Arsenal (1871).
- Port Arthur Naval Station (Lüshun 旅順, 1881-82).
- Shandong Arsenal (1875), used for arms purchase, making acid and gunpowder.
- Sichuan Arsenal (1877).
- Tianjin Arsenal (1867), under Li Hongzhang used to manufacture gunpowder and acid.
- Taiwan Arsenal (1885).
- Weihaiwei Shipyard (1882) for the Beiyang Fleet.
- Yunnan Arsenal (1884)
- Xian Arsenal (1869).

Thousands of administrative experts and advisors served in these provincial arsenals under the chief ministers of the late Qing, especially Zeng Guofan 曾國藩 (1811-72), Li Hongzhang 李鴻章 (1823-1901), Zuo Zongtang 左宗棠 (1812-85), and Zhang Zhidong 左宗棠 (1837-1909), the leaders of the post-Taiping turn toward foreign studies (*Yangwu yundong* 洋務運動). Li Hongzhang, for example, followed Feng Guifen's 馮桂芬 (1809-74) recommendation and in 1863 established the *Tongwen'guan* 同文館 (Translator's bureau) for Western languages and science in Shanghai, which was added to the Jiangnan Arsenal in 1869. Similar schools were established in Beijing in 1862 and in Guangzhou in 1864. Li Hongzhang also proposed establishing eight categories for civil examinations (*bake qushi* 八科取士) in 1867, which included mathematics and science (*suanshu gezhi* 算數格致) and technology and manufacturing (*jiqi zhizuo* 機器制作) as a single category. Although the proposal was rejected, technical learning was at a very high premium among the staffs of reformist Han Chinese provincial leaders.[14]

Xu and Fryer also created the earliest science journal in China entitled the *Gezhi huibian* 格致彙編, known in English initially as *The Chinese Scientific Magazine* and later in 1877 as *The Chinese Scientific and Industrial Magazine*. It ran monthly issues in 1876-77 and 1880-81 in Shanghai before turning into a quarterly from 1890 to 1892. With 4,000 copies printed per issue, at its peak it reached some 2,000 readers in the treaty ports. Such conceptual compromises were based on maintaining the Jesuit term for natural studies, i.e., *gezhi*, but this time using *gezhixue* to refer to modern Western, not early modern, Aristotelian science. In this way, mathematics and the industrial sciences such as chemistry became more acceptable, if still less popular than the civil service, activities for literati.[15]

The Institute in addition had a reading room and library of scientific works. Fryer had set up the *Gezhi shushi* 格致書室 (Chinese Scientific Book Depot) as an outlet for official translations in 1884. One of the most successful undertakings of the *Gezhi shuyuan* was the "Chinese Prize Essay Contest" (*Gezhi shuyuan keyi* 格致書院課藝) that began in 1886. The essay-writing contest was conceived by Fryer as a means to attract the many Chinese literati proficient in civil examination essay writing to write about foreign subjects, including science and technology:

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14 See "Yangwu yundong dashiji" 洋務運動大事記, in Xu Tailai ed. 1986: 349-448. See also Spence 1980: 133-140.

15 Reynolds 1991. See also Wright 1996 and Wright 1995.

> To popularize Western knowledge among the *literati* it is necessary to take advantage of all such existing national characteristics; and hence it was conceived that in essay writing there existed a most powerful means for inducing the better classes of Chinese to read, think, and write on foreign subjects of practical utility, and thus carry out one of the main objects for which the Polytechnic Institution was founded.[16]

Three major and ten minor prizes were given, and the winners were announced in the Chinese and Western press. The best essays were released to newspapers. From 1886 to 1893, the three major prizewinners had their essays printed together in a book that was placed on public sale for others to emulate. They were subsequently reprinted several times in special volumes printed in the 1890s. Among the Chinese essay topics on science, translated into English by Fryer, were queries such as:

- Spring, 1887, "Theme" by Xu Xingtai 許星台, Provincial Administration Commissioner of Hangzhou: "Compare the sciences of China and the West, showing their points of difference and similarity." (格致之學中西異同論);

- Spring, 1889, "Extra Theme" by Li Hongzhang: "With respect to the 'Science' referred to in the 'Great Learning,' from Ching-kang-ching downwards, there have been several tens of scholars who have written on the subject. Do any of them happen to agree with Western scientists? Western science began with Aristotle in Greece; then came Bacon in England who changed the previous system and made it more complete. In later years, Darwin's and Spencer's writings have made it still more comprehensible. Give a full sketch of the history and bearings of this whole subject." (問: 大學格致之說自鄭康成以下， 無慮數十家， 於近今西學有偶合否？ 西學格致始于希臘之阿盧力士托德爾， 至英人貝根出， 盡變前說， 其學始精， 逮達文， 施本思而家之書行， 其學益備。 能詳溯其源流歟？)

The essay competition met with an enthusiastic response. After Wang Tao's 王韜 (1828-97) death, however, and Fryer's departure for Berkeley in 1896, the contests were not as enthusiastically promoted, but they were still held regularly, sometimes monthly, sometimes quarterly in 1901, 1904, 1906,

16 Fryer 1888: 100-101. Compare Biggerstaff 1956: 141-143.

and 1907. Wang had formally joined the Academy in 1885 and became its director and head of the Reading Room. He was also editor for the prize science essay volumes published by the *Gezhi shuyuan* from 1886 to 1893, which paralleled collections of 8-legged essays for the civil examinations that were widely in print in Ming and Qing China.[17]

Despite the relative success of traditional Chinese natural studies and modern Western science in developing together as objects of study by a select and relatively small number of the literati elite in the late nineteenth century under the rubric of *gezhixue*, there was less attention by those same elites and their Protestant informants to European science as a form of practice requiring laboratories to replicate experiments and for such experiments to confirm or reject past scientific findings. For Catholic or Protestant missionaries and literati mathematicians, natural studies was often little more than a textual exercise requiring translation of technical knowledge, mastery of those technical texts, and the reproduction via memory of technical learning.

Furthermore, Chinese students were presented with a Sino-Western amalgam of traditional Chinese mathematics and modern mathematics, which in the minds of Chinese administrators at the many arsenal schools represented a hybrid merging of the two traditions. This merging of Chinese and Western mathematics was usually overlooked by Western teachers and translators who – except for Alexander Wylie – looked down on such traditionalistic impulses. These accommodations are usually mentioned in passing without comment by Western historians of the arsenals and schools.[18]

Classical learning was continued, for instance, in the Jiangnan Arsenal after the Shanghai *Tongwen'guan* moved into the Arsenal in 1869 and assumed the name of the *Guangfangyan'guan* 廣方言館 (School for the diffusion of languages). It remained separate from the Translation Department in the hope that its graduates would go on to pass the more prestigious civil examinations. For the classics, students studied the *Spring and Autumn Annals* and the *Zuo Commentary* (*Chunqiu Zuozhuan* 春秋左傳). For history, Sima Guang's 司馬光 (1019-86) *Zizhi tongjian* 資治通鑒 (Comprehensive mirror for aid in gov-

17 Xiong Yuezhi 1994: 374n3. Fryer's "Ching-kang-ching" is the Later Han classicist Zheng Xuan 鄭玄 (127-200). On civil examination essay collections, see Elman 2000 a: 400-420.

18 Hu Mingjie 1998: 232-285. Cf. Biggerstaff 1961: 171.

ernment) was stressed over Zhu Xi's more moralistic digest entitled the *Tongjian gangmu* 通鑒綱目 (Condensation of the comprehensive mirror).[19]

Dao Learning tracts such as the *Jinsilu* 近思錄 (Record of things near at hand; co-authored by Lü Zuqian, 呂祖謙, 1137-81) and the *Xiaoxue* 小學 (Lesser learning for youths), which were associated with Zhu Xi, were also taught at the Arsenal's school, as was the *Xingli jingyi* 性理精一 (Essential meanings of works on nature and principles), which the Kangxi emperor had authorized in 1715 as an official reiteration of Cheng-Zhu orthodoxy under Manchu rule. Arsenal students were also drilled in the 8-legged essay at the same time that mathematics was given high priority. For the latter, the "Ten Computational Canons" (*Suanjing shishu* 算經十書), several of which had been reconstituted by Qing evidential research scholars in the eighteenth century, were used to teach traditional Chinese mathematics, while students also studied Western algebra, geometry, trigonometry, astronomy, and mechanics in the lower division curriculum. They were also provided training in international law, geography, and mechanical drawing.[20]

Moreover, in the late nineteenth century, those who were drawn to scholarly work in the new industrial arsenals in Fuzhou, Shanghai, and elsewhere, or translation positions in the three *Tongwen'guan* in Beijing, Shanghai, and Guangzhou, still tended to be literati such as Xu Shou and Li Shanlan, men who had failed the more prestigious civil examinations several times and saw Western learning and the sciences as an alternative route to fame and fortune. Yan Fu 嚴復 (1853-1921) and Lu Xun 魯迅 (Zhou Shuren 周樹人 1881-1936) were also famous examples of this group of outcasts from the civil examinations that initially served as the pool of highly educated men who filled late Qing technical institutions oriented toward science and technology.

Lu Xun's grandfather, Zhou Fuqing 周福清, a Hanlin academician and the first important scholar in the Zhou family from Shaoxing in Zhejiang province, had been arrested for attempting to bribe an examiner assigned to the 1893 Zhejiang provincial examination. The scandal affected Lu Xun's family both financially and socially, and Lu was forced to leave his lineage

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19 Compare this to the classical curriculum of the civil examinations before 1900 described in Elman 2000 a: 239-294. On the histories, see Elman 2000 a: 485-503.

20 Biggerstaff 1961: 166-171. See also Martzloff 1997: 15, 123, and Li Yan and Du Shiran 1987: 225-232.

school. Before turning to literature, Lu Xun was first trained at the Jiangnan Arsenal, and he later traveled to Japan to study modern medicine at Sendai just before the 1904-05 Russo-Japanese War.[21]

Better known as a translator and publicist who was critical of late Qing reform efforts, Yan Fu, for example, was a graduate of the Fuzhou naval division and later received advanced training in Europe. In 1874, as a twenty-one year-old graduate, Yan was acting captain of the Haidongyun 海東雲, (Cloud on the east of the sea), a small steamer owned by the Fujian-Zhejiang administration, although it had not been built at the Fuzhou naval yard. He became dean and professor of navigation and mathematics at the Fuzhou Shipyard for many years. In early 1880s he served as a professor of navigation and mathematics in the Tianjin Naval Academy, where he also served as an administrator for nearly twenty years. In 1902 he was appointed chief editor for the new official Translation Bureau in Beijing after the fame he received for his translations of John Stuart Mills' *On Liberty* and Herbert Spencer's social Darwinism.[22]

Recent research indicates, however, that the various arsenals, shipyards, and factories in the treaty ports were important technological venues for experimental practice where, in addition to the production of weapons, ammunition, and navies, a union of traditional and Western scientific knowledge and experimental practice among literati and artisans was first forged in Shanghai, Nanjing, Tianjin, Wuhan, and elsewhere. Accordingly, outside the civil examination regime, where millions competed for few places in the bureaucracy, a notable group of doctors, nurses and medical assistants were trained in missionary schools, and an even larger group of engineers, military technicians, naval officers, and technical specialists were instructed in the hybrid sciences in China's arsenals and shipyards. Such accommodations still assumed, however, that "Chinese learning" was universal and fundamental.[23]

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[21] On Lu Xun, see Boorman and Howard eds. 1967: 417, and Buck 1993: 118-127. See also Elman 1980: 389-401.

[22] Biggerstaff 1961: 53, 251. See also Kuo Ting-yee and Liu Kwang-Ching 1978: 534, and Wright 1997.

[23] See Kennedy 1994: 197-214. For more recent views, see Meng Yue 1999, Takehiko Hashimoto 1999: 53-72, and Wright 1995: 81. Cf. the less sanguine account in Itō Shūichi 1967: 65-77.

The Denigration of Traditional Chinese Natural Studies

It was not until the Sino-Japanese War of 1894-95, when the Japanese navy, tied to Yokosuka military technology, decisively defeated the Qing navy, which was tied to Fuzhou and Shanghai technology, that the alleged superiority of Japan in modern science, or so it was interpreted, became common knowledge to Chinese and Japanese patriots. Although the Jiangnan Arsenal had appeared superior in science and technology to the Yokosuka Dockyard until the 1880s, after 1895 each side then read their different fates in 1895 teleologically back to the early Meiji period (later even back further to *Rangaku* 蘭學 "Dutch Learning" in Tokugawa Japan), in the case of triumphant Japan, or back to the failures of the self-strengthening movement after 1865 (later back to all classical learning), in the case of the defeated Qing.[24]

The Jiangnan Arsenal in Shanghai and the Fuzhou Shipyard, for example, were generally acknowledged by Europeans and Japanese to be more advanced than their competitor in Meiji Japan, the Yokosuka Dockyard, until the 1880s. David Pong has contended, for instance, that if the Qing navy had engaged the Japanese in a naval battle over Taiwan in 1874-75, when the Japanese threatened the island in April 1874, Chinese maritime defense preparations would have gained greater support. Due to a policy debate, however, the Chinese sued for peace to avoid hostilities with the result that the budget for the two modern naval fleets in north and south China was cut to four million taels, much less than was needed. The mid-1870s saw a cutback in the production of ships in both the Jiangnan Arsenal and Fuzhou Shipyard. By the late 1870s China's armaments industries were mainly producing ammunition. Besides financial difficulties, corruption was also rife among leading officials who competed with each other for the remaining funds.[25]

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24 Curiously the land battles between the Japanese and Chinese forces are usually overlooked in accounts of the Sino-Japanese War. See Okamoto 1983: 11-16.

25 See Kennedy 1978: 150-160, and Pong 1994: 292-293, 335. See also Kitayama Yasuo 1954: 1-8, who contends that Zeng, Li, and Zuo built up the armaments industry mainly for their power bases and to maintain domestic security, not for attacks from foreign aggression.

According to John Rawlinson, only three Japanese ships with about 3,600 men were in the 1874 Japanese expedition to Taiwan. The Japanese naval ministry was established in 1872, and by 1874 it had just seventeen ordinary ships with an aggregate of about 14,000 tons. Foreign observers thought China's twenty-one steamers in the one thousand ton class would be able to handle the Japanese threat, but, as in 1894-95, the Chinese ships were not in a unified fleet. Because it would take time to gather a fleet in Taiwan, the Director-general of the Fuzhou Navy Yard, Shen Baozhen 沈葆楨 (1820-79), who wrongly feared that Japan had two ironclads, agreed to end the crisis with a financial payment to Japan and de facto recognition of Japanese control over the Liuqiu (Ryūkyū) Islands. By 1879, China had two ironclad steamships, which had been ordered from the Vulcan factory in the Baltic for the Beiyang Fleet and were more advanced than anything the Japanese navy had at the time. They were both sunk in the Sino-Japanese War. In gunpowder manufacture, moreover, the machinery used in Germany, interestingly, was not as advanced as that in Shanghai at the Jiangnan Arsenal.[26]

The lack of coordination between the northern and southern navies thereafter became the chief disadvantage of the Chinese fleet vis-à-vis their counterpart in Japan, which was a unified fleet under a central command based in Yokosuka. This disadvantage became clearer after 1874 when the French claimed Vietnam as protectorate leading to conflict with Qing China in the upper Red River area. France then began a naval buildup on the China coast, which provoked several naval engagements. France did not win all the battles of the Sino-French War, but it did win the war in 1884-85 because of the lack of coordination between the vulnerable Chinese fleet based at the Fuzhou Shipyard and the Beiyang Fleet under Li Hongzhang's control in the north.

The Qing had over fifty modern naval ships in 1884, with more than half built in China. Among the others, thirteen were Armstrong gunboats, two were Armstrong cruisers, and two more were German ships with two 8" guns each. The latter two pairs were divided equally between the northern commissioner's Beiyang fleet and southern commissioner's Nanyang fleet. There was no unified fleet, however. The Qing navy was divided into four fleets: the

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26 Rawlinson 1967: 60-61, and Wright 1995: 81.

Northern at Weihaiwei and Port Arthur, one in Shanghai, another in Fuzhou, and the smallest in Guangzhou. Unfortunately, the 1884-85 war was fought by Fuzhou flotilla nearly alone in the climatic Mawei battle in its homeport.

At Mawei, the Fuzhou fleet was all but completely destroyed in fifteen minutes because of the vagueness of international law when war had not yet been declared, which had allowed French vessels to sail past the Min River defenses and approach the Fuzhou dockyard unchallenged. The modern fleet at the Mawei anchorage on August 23, 1884, numbered eleven ships. All were at least nine years old and made of wood. Eight French vessels were anchored near by and were on the whole superior, but the Chinese ships had respectable if non-standard armaments. Nor did the Chinese take advantage of the tides to outmaneuver the heavier French vessels, which suggests that on the day of the battle the Fuzhou captains were of questionable fitness. Li Hongzhang only sent two of the ships requested from his Beiyang fleet, and he withdrew these from the battle by asserting that the Japanese threat in Korea had mandated their return north.

The French fleet withdrew to Taiwan, but after a failed landing there it threw a blockade around the west coast of the island. Negotiations then resumed after a Chinese land victory over the French. China's loss, then, was not simply due to French military superiority. Rawlinson has noted that French technological superiority in the 1880s was not as great as England's in the Opium War of 1839-42 and the Second China War of 1856-60. The gap between China and Europe had been closed technologically. The actual problems were: 1) the political disorganization of the empire; and 2) naval personnel were insufficiently trained and had a poor grasp of modern naval strategy.[27]

The rise of the Beiyang flotilla after 1885 as China's chief fleet was the result of the "Disaster in the South." Although demanded by the court, subsequent efforts to create a single command for a unified naval fleet never succeeded. The new Navy Board and Li's Beiyang fleet competed for financial resources, which were declining due to further naval budget cuts between 1885-94. In the postwar period, progress at the Fuzhou dockyard was limited

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27 Rawlinson 1967: 109-128.

in scope, while Li sought to purchase naval vessels for his Northern Fleet rather than build them at home. Li also had to supply his Anhui land army.[28]

The evident strength of the Beiyang fleet, however, was clear to the Japanese because of stops the Chinese fleet made there in the 1880s after cruises to Vladivostok. Moreover, the inconclusiveness of the Sino-French War, which was watchfully reported in Japan, had restored Chinese prestige in Japanese eyes from the low it had reached after the Opium War. In the "Nagasaki Incident" of 1886, four warships of the Northern Fleet dropped anchor in Nagasaki on their return trip from the Russian port. Reinforced by new ships purchased from Germany, Li Hongzhang sought to make a propaganda statement by showing the Japanese that China's naval equipment was superior to Japan's. Fights between Chinese sailors, who claimed the right of extraterritoriality while in Japan, and Nagasaki police, who viewed it differently, broke out during the port call, and each side blamed the other.

Japanese hostility was apparently aroused by China's flaunting of its naval superiority. Similarly, the "Kobe Incident" of 1889 was based on Japanese-Chinese fights that became a diplomatic dispute after a Chinese port stop there. Another visit by the Chinese fleet in July 1890 was reported in the newspaper *Kokumin shimbun* 國民新聞 (Citizen's press) as an instance of the Chinese showing off their new ships. Toyama Masakazu 外山正一 (1848-1900), an educator and former president of Tokyo University, visited the flagship of the Chinese fleet and came away impressed with its large caliber guns and thick steel armor. The Sino-Japanese War put an end to these diplomatic controversies by exploding the notion of Chinese superiority and rejecting Chinese claims of extraterritoriality in Japan.[29]

Upon the outbreak of the Sino-Japanese War on July 24, 1894, the foreign press generally predicted an eventual Chinese victory even after reports of initial Chinese losses. G. A. Ballard, Vice-Admiral in the British Royal Navy, thought the Beiyang fleet in the 1890s was in serviceable condition and ready for action. Later comparisons between the naval fleets of China and Japan indicated that China might have won the sea war. Japan's fleet totaled 32 warships and 23 torpedo boats manned by 13, 928 men. Ten were built in

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[28] Rawlinson 1967: 129-139.

[29] Kamachi 1980: 69-72. See also Keene 1971: 122-123.

Britain, and two in France. The Yoshino from Armstrong's shipyard was regarded as the fastest vessel of its time when it was timed at twenty-three knots in 1893 trials. China's navy still had a four-fold division into the Beiyang, Nanyang, Fujian, and Guangdong fleets, however. In 1894, these four combined had about 65 large ships and 43 torpedo boats. The strongest was the Beiyang fleet which more or less equaled Japan's entire fleet.[30]

If general opinion among foreigners favored Li Hongzhang's fleet over Japan's, then Japanese newspapers, magazines and fiction were marked by exhilaration at the prospect of war with China. Many Japanese themselves were not overly confident of victory, however. Indeed, the Meiji emperor initially had his doubts and refused to send the required messengers to the imperial ancestral shrine at Ise or to his father's grave to announce the outbreak of war. The publicist Fukuzawa Yukichi 福澤諭吉 (1835-1901), warned against overconfidence, for instance, although he agreed with Japan's just cause in spreading independence and enlightenment to a subjugated Korea. In reality, Japanese Diet members were surprised at the easy victory.[31]

Another British observer noted, however, that on the Chinese ships engaged in the Sino-Japanese War, Chinese crews were at half-strength but salaries for full crews was paid. The greatest contrast lay in fact, however, that Japan's navy was unified. There was some synchronization between China's four fleets, but in the end the Beiyang navy was left to fight the Japanese principally alone. Li had kept his fleet out of the Fuzhou battle in 1884, and the Nanyang officers now got their revenge by keeping their fleet out of war with Japan for the most part. No combined fleet existed, even on paper.

With the political and economic opening of Korea as the key dispute in Sino-Japanese relations, hostilities commenced when Japan seized the Korean king shortly after Li Hongzhang sent Qing troops into Korea in July 1894 to preserve Korea as a Qing dynasty tributary ally. The king's regent then declared war on China. The first encounter between Chinese and Japanese ships occurred on July 24th, and China's two warships proved no match against Japan's ships at Fengdao. After that sea battle, the Qing

30 Rawlinson 1967: 163-169. See also Keene 1971: 132.
31 Keene 1971: 127, 132, and Okamoto 1983: 13.

Northern Fleet tried to defend the Chinese coast from Weihaiwei to the mouth of Yalu River and declared war on Japan on August 1st.

Subsequently, the Japanese naval raid at Weihaiwei on August 10th stunned the Qing court, while Li Hongzhang stalled and made excuses about his inadequate ships. The main Beiyang fleet gathered at the mouth of the Yalu where the great naval battle with Japan commenced on September 17, 1894. Each side had twelve ships in the battle. China had the advantage in armor and weight in a single salvo, while Japan had an advantage in speed of ships and metal thrown in a sustained exchange of salvos. Japan had more quick-firing guns that could fire three times the weight of metal from China's 6” to 12” guns.[32]

Technology was not the key determinant of the outcome. Japan proved to be superior in naval leadership, ship maneuverability, and the availability of explosive shells. Some observers described the Fuzhou-trained officers as cowards, and they were the dominant Chinese group because of their experience and training when compared to the Tianjin-trained officers, few of whom were captains. Rawlinson has contended, however, that cowardice was not the decisive factor. He has noted that China fired 197 12” projectiles at the decisive naval battle of Yalu, with half of them being solid shot rather than explosive shell. They scored ten hits with six shots and four shells.

From smaller guns, Chinese fired 482 shots and registered 58 hits, 22 on one ship, the Hiyei. They also launched 5 torpedoes without hits. China scored about 10% of her tries. The Japanese, on the other hand, with their quick-firers scored about 15% of their tries. In addition, the Chinese were hampered by woeful shortages of ammunition especially for her ships' big guns. Some ordinance was filled with cement, e.g., the shell that struck the Matsushima and the two that passed through the Saikyo. This suggests to Rawlinson that there were serious corruption problems in Li Hongzhang's supply command. With hindsight, assuming the same strategic decisions, it was clear that the speed and rapidity of fire were more important at Yalu than the weight of vessel and its armor.

32 Rawlinson 1967: 169-174, 201.

Shore engagements continued after the battle at the mouth of the Yalu as the Japanese took advantage of their decisive victory at sea. Li Hongzhang now sought to rebuild his navy minus the Weihaiwei naval port. The poor command structure of the Beiyang Fleet and the lack of a court martial system made it impossible to place blame on officers and allocate reward properly, although many were made scapegoats for the defeat. Moreover, the Qing personnel system of naval rewards and punishments was filled with inequity and unpredictability. Many Chinese captains and officers simply committed suicide. No one dared to question the command structure or demand of the Manchu emperor a board of review independent of the navy.[33]

The Sino-Japanese War generated intense Japanese self-confidence after 1895. Moreover, Japanese industrialization accelerated after the Qing dynasty was forced to pay a sizable indemnity to the Meiji regime. Wider Western notice of the small island kingdom that had defeated the Qing empire also came with the victory. For the Japanese public, the war victory developed into the key event that energized the newly emergent Meiji press, and drowned out editorial debate over the war. Public enthusiasm for military adventures became a common feature when the dissemination of the national news became a central feature of the Japanese press after 1895. There were by then 600 thousand subscribers altogether in Tokyo and Osaka alone. The Japanese victory over China echoed throughout the country and demonstrated to Japanese the preeminence of Meiji Japan in East Asia.

The shift to an information press in Meiji Japan that grew out of news accounts of the Sino-Japanese War stimulated the demand for news and information in a new, unified Japanese language. The Hakubunkai 白文會 Publishing House, for example, took advantage of the outbreak of war and quickly published a tri-monthly, illustrated record in September 1894 entitled the *Nisshin sensō jikki* 日清戰爭日記 (Diary of the Japanese war with Qing China), which was enormously popular and helped create a cult of Japanese war heroes. Other publishers quickly followed suit, and novels, plays and woodblock printed posters about the war became best sellers. The *Yomiuri*

33 Rawlinson 1967: 174-917. See also Yoda Yoshiie 1967: 1-38.

shimbun 讀賣新聞 newspaper initiated a prize competition for the "best" anti-Chinese war songs.[34]

In a completely opposite way, the naval disaster at the mouth of the Yalu River and the decisive Qing defeat in the Sino-Japanese War, energized public criticism of the dynasty's inadequate policies and enervated the staunch conservatives at court and in the provinces who had opposed Westernization. The unexpected naval disaster at the hands of Japan had shocked many scholars and officials and now led to a new respect for Western studies in literati circles. The renewed success of the Shanghai Polytechnic/*Gezhi shuyuan* in 1896, for example, was tied to this event. John Fryer now reported: "The book business is advancing with rapid strides all over China, and the printers cannot keep pace with it. China is awakening at last."[35]

In particular, the account of the Sino-Japanese War by one of the leading Beijing missionaries and translators, Young J. Allen, when translated into Chinese, was frequently pirated, for example, and became required reading for the 1896 Hunan provincial examination in Changsha. Allen's account of the defeat also outlined his views of needed reforms in China. Earlier Allen had published an extended essay entitled "Zhongxi guanxi luelun" 中西關係略論 (Precis of Sino-Western relations) in the September 1875 to April 1876 issues of the *Wan'guo gongbao* 萬國公報 (Review of the Times; originally called the *Chinese Missionary News* or *Jiaohui xinbao* 教會新報 in 1868). With Allen as editor, the *Wan'guo gongbao* was published weekly in Beijing from 1874 and monthly after 1889.[36]

In the essay, Allen had traced China's backwardness to three root causes: 1) superstition (*mixin* 迷信); 2) opium (*yapian* 鴉片); and 3) civil examinations (*keju* 科舉). In this series, he also stressed the importance of *gezhi* cum science as a corrective for the causes of China's backwardness. Native studies of *gezhi*

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[34] Keene 1971: 121-175, and Virgin 2001: 64-111. See also Huffman 1992: 574-579, and Richter 1992: 591.

[35] Wright 1996: 15, and Kuo Ting-yee and Liu Kwang-Ching 1978: 587.

[36] See Xiong Yuezhi 1994: 620-623. See also Onogawa Hidemi 1969: 52-85, which stresses the shift from science and technology to institutional changes needed in Qing China for government reorganization. This suggests that technical achievements before 1895 were recognized but seen as insufficient – not in terms of science and technology – but in terms of institutional systems.

had, according to Allen, failed to grasp the universal lessons of modern science. In particular, China's assimilation of Western science was missing the importance of "study of the principles of things" (*wuli zhi xue* 物理之學), or what in the late 1890s would be called "physics," which by then was based on Japanese translations of Western scientific texts.[37]

Another sea change in elite and popular opinion in late Qing China now determined how the Manchu-Chinese refraction of Western science and technology through the lens of *gezhixue* would be interpreted after 1895. Literati radicals such as Yan Fu declared that the accommodation between Chinese ways and Western institutions, which had informed the "Self-strengthening" (*Ziqiang* 自強) movement since the 1860s had failed. The Sino-Japanese War thus altered the frame of reference for the 1860-95 period for both Chinese and Japanese. The beginnings of the "failure narrative" for Chinese science as *gezhixue*, i.e., why China had not produced science or technology, paralleled the story of political decline (why no democracy) and economic deterioration (why no capitalism) during the late empire. "Chinese science" was now increasingly seen as incompatible with the universal findings of *kexue* 科學, the Chinese pronunciation of *kagaku*, which was the Japanese term for "modern science" since early Meiji times.[38]

Yan Fu, whose poor prospects in the civil examinations led him to enter the School of Navigation of the Fuzhou Shipyard in 1866, associated the power of the West with modern schools where students were trained in modern subjects requiring practical training in the sciences and technology.[39] For Yan Fu and the post-1895 reformers, Western schools and Westernized Japanese education were examples that the Qing dynasty should emulate. The extension of mass schooling within a standardized classroom system stressing science courses and homogeneous or equalized groupings of students seemed to promise a way out of the quagmire of the imperial education and civil examination regime, whose educational efficiency was now, in the 1890s, suspect.[40]

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37 See the shortened version of the essay in Qian Zhongshu and Zhu Weizheng eds. 1998: 179-201.

38 Reardon-Anderson 1991: 76-78.

39 Bastid 1988: 12-13, and Wang, Y. C. 1966: 52-59.

40 See Elman 2000 a: 585-594.

One of the institutional products of the political iconoclasm in China after the Sino-Japanese War, which survived the Empress Dowager's counter-coup against the Reform Movement in 1898, was the Imperial University of Beijing (*Jingshi daxue* 京師大學), which was established at the pinnacle of an empire-wide network of schools that would expand on the *Tongwen'guan* system in Beijing, Shanghai, and Guangzhou. The new university was designed like the Translator's Bureau to train civil degree-holders, i.e., literati, in Western subjects suitable for government service. W. A. P. Martin, a distinguished missionary who had earlier worked with Li Shanlan after Martin was appointed head of the Beijing *Tongwen'guan* in 1869, was chosen as the dean of the Western faculty in 1895.

Science courses at the Imperial University, interestingly, were still referred to as *gezhi*, although the facilities included modern laboratories equipped with the latest instruments for physics, geometry, and chemistry. This promising development was short-lived, however, because north China rebels associated with the Boxer Rebellion smashed everything in sight at the university in the summer of 1900. European armies had not been any kinder to things Chinese during their occupation of Beijing after the Boxer siege of the foreign legations was lifted.[41]

The race to establish Chinese institutions of higher learning that would stress modern science accelerated after the occupation of the capital by Western and Japanese troops in 1900. The Boxer popular rebellion in north China and the response of the Western powers and Japan to it unbalanced the power structure in the capital so much that foreigners were able to put considerable pressure on provincial and metropolitan leaders such as Li Hongzhang. Foreign support of reform and Western education thus strengthened the political fortunes of provincial reformers such as Yuan Shikai 袁世凱 (1859-1916) and Zhang Zhidong, who had opposed the Boxers.[42]

In official circles in China, the delegitimation of classical learning after 1900 initially did not challenge the use of *gezhi* as a term from the Four Books to translate modern science into classical Chinese, however. In the reformed,

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41 See Lund 1956: 118-122, and Reardon-Anderson 1991: 109. See also Hevia 1999: 192-213.

42 Elman 2000 a: 608-618. See also Bailey 1990: 26-27.

post-1901 civil examinations, for example, candidates were asked to assess the importance of modern science. A catalog of policy questions used in the civil examinations after the reforms, which was compiled in 1903, identified the "sciences" (格致) as one of the categories that were used. For example, five of the eight questions on the natural sciences, which was still called *gezhi* in Chinese, were phrased as follows:

1. Much of European science (格致) originates from China (中國); we need to stress what became a lost learning as the basis for wealth and power. (歐洲格致多源出中國，宜精研絕學以為富強基策。)

2. In the sciences, China and the West (泰西) are different; use Chinese learning (中學) to critique Western learning (西學). (格致之學中西異同，以中學駁西學策。)

3. Substantiate in detail the theory that Western methods all originate from China. (問，西法悉本中國，能詳徵其說否。)

6. Prove in detail that Western science studies mainly were based on the theories of China's pre-Han masters. (問，西人格致之學多本於中國諸子之說，試詳證之。)

7. Itemize and demonstrate using scholia that theories from the Mohist Canon preceded Western theories of calendrical studies, optics, and mechanics. (墨子經上及說上已啟西人所言曆學光學重學之理，其條舉疏證以聞。)[43]

Such views revealed that in official terms, the wedding between the traditional Chinese sciences and Western science, worked out beginning in the eighteenth century, was still in effect among imperial examiners, but they were no longer representative of the new currents sweeping through urban China after 1895. By this time, such appeals to the "Chinese origins" of the universal principles of Western science were widely contested outside official circles, particularly among overseas students in Japan, Europe, and the United States. Nativist pride reflected the last stand of traditionalist impulses in the bureaucracy. Publicly at least, the officials of the late Qing dynasty

43 See *Zhongwai shiwu cewen leibian dacheng*, *mulu* 目錄, 1a-28b, especially 13a-13b.

maintained the fiction that "the Western sciences for the most part derived from the teachings of the pre-Han masters" (西人格致之學多本於中國諸子之說).[44]

After 1905, however, when the civil examinations were abolished, ever increasing numbers of overseas Chinese students in Japan, Europe, and the United States perceived that outside of China the proper language for modern science included a new set of universal concepts and terms that superseded traditionalist literati notions of "Chinese" natural studies associated with *gezhi*. For example, Japanese scholars during the early Meiji period had already in the 1860s demarcated the new sciences by referring to *wissenschaft* as *kagaku* (*kexue* 科學; lit., "classified learning based on technical training")[45] and natural studies as *kyūri* (*qiongli* 窮理, lit. "exhaustive study of the principles of things"). The latter term, long associated with the "Dao Learning" stress on the "investigation of things" popular in early Tokugawa Japan, was reinterpreted in Japan based on the Dutch Learning tradition of the late eighteenth century, when Japanese scholars interested in Western science still used terms from Chinese learning (*Kangaku* 漢學) to assimilate European natural studies and medicine.[46]

After 1895, Chinese students and scholars adopted the Japanese bifurcation between technical learning and natural studies. Yan Fu, for instance, rendered the terms science or sciences as "*kexue*" in his 1900-02 translation of John Stuart Mill's *System of Logic*, while translating natural philosophy as *gewu* (= "investigation of things"). Similarly, when regulations for modern schools were promulgated in 1903, the term *gezhi* referred collectively to the sciences in general, while the sciences as individual, technical disciplines were designated as *kexue*. This two-track compromise in terminology lasted through the end of the Qing dynasty and continued during the early years of the Republic of China. Chinese students who returned from abroad increasingly empha-

44 Ibid., "*mu-lu*," 13a.

45 Lydia Liu 1995: 33, 336, presents *kexue/kagaku* as a second-hand *kanji* borrowing from classical Chinese that the Japanese used to translate science into Japanese. Her source is the Song dynasty literatus Chen Liang 陳亮 (1143-94), where Chen uses *kexue* as a shorthand reference to mean civil examination studies (*keju zhi xue* 科舉之學 equals *kexue*). This twelfth-century usage is unique to the Song dynasty, which the Japanese borrowed.

46 Craig 1965: 139-142. See also Numata Jirō 1992: 60-95.

sized instead a single, modern Japanese term for the Western sciences that would abandon the earlier accommodation between traditional Chinese natural studies and modern science.[47]

Many university and overseas students were by 1915 as radical in their political and cultural views, which carried over to their scientific iconoclasm. Traditional natural studies became part of the "failed" history of traditional China to become "modern," and this view now included the claim that the Chinese had never produced any modern science. The earlier claim for the "Chinese origins" of Western science, so prominent before 1900, was now deemed superstition (*mixin* 迷信), following the lead of nineteenth century missionaries such as Young J. Allen. How pre-modern Chinese had demarcated the natural and supernatural vanished, when Chinese "modernists" and "socialists" accepted the West, via Japan, as the universal starting place of all science as *kexue*, which was diametrically opposed to Chinese *gezhi* as superstition.[48]

After 1911, many radicals linked the Chinese political revolution with the claim that a scientific revolution was also mandatory. Those Chinese who thought a revolution in knowledge based on universal Western learning was required not only challenged classical learning, or what they now called "Confucianism" (*Kongjiao* 孔教), but they also unstitched the patterns of traditional Chinese science and medicine long accepted as components of an ideological tapestry buttressing imperial orthodoxy.[49] Those educated abroad at Western universities such as Cornell University or sponsored by the Rockefeller Foundation after 1914 for medical study in the United States, as well as those trained in the sciences locally at higher-level missionary schools, regarded modern science as *kexue* 科學, not *gezhixue*, because they believed the latter term was derived from the language of the discredited, "Chinese" past and inappropriate for universal, modern science.

The belief that Western science represented a universal application of scientific methods and objective learning to all modern problems was increas-

[47] Reardon-Anderson 1991: 82-87.

[48] Compare Geertz 1975 on early modern science. She notes: "It is not the 'decline' of the practice of magic that cries for explanation, but the emergence and rise of the label 'magic.'"

[49] See Elman 1997.

ingly articulated in the journals associated with the New Culture Movement. The journal *Kexue* 科學 (Science), which was published by the newly founded (in 1914) Science Society of China (*Zhongguo kexueshe* 中國科學社) and first issued in 1915, assumed that an educational system based on *kexue* was the panacea for all of China's ills because its universal knowledge system was superior. By 1920, the Science Society, which had been founded by overseas Chinese students at Cornell in 1914, had some 500 members in China and grew to 1,000 in 1930.[50]

Such uncritical faith in science, i.e., "scientism," on the part of Chinese scientists trained abroad, many from Cornell, was iconoclastic in its implications for traditional natural studies in China and influenced post-imperial intelligentsia such as Chen Duxiu 陳獨秀 (1879-1942), who argued in the issues of the journal *Xin'qingnian* 新青年 (New youth), which he helped found in 1915, that science and democracy were the twin universal pillars of a modern China that must dethrone the Chinese imperial past. In the process, post-imperial scholars and novelists such as Ba Jin 巴金 (Li Feigan 李芾甘; b. 1904) in his 1931 novel *Family* 家, for example, initiated an assault on premodern Daoism and traditional medicine as a haven of superstition and backwardness, a scientistic ideology among republicans that has continued among socialists after the People's Republic was formed in 1949.

During the early Republic, the elite view of popular customs (*fengsu* 風俗) was also reconfigured in modernist terms, a trend that included Xu Ke's 徐珂 *Qingbai leichao* 清稗類鈔 (Classified jottings on Qing dynasty unofficial history). In Xu's collection, popular lore was divided up and reclassified into the categories of "magicians and shamans" (*fangji* 方伎) and "confused beliefs" (*mixin* 迷信), for example. Xu Ke intended his collection of lore, published in 1920, as a sequel to the Northern Song dynasty *Taiping kuangji* 太平廣記 (Expanded records of the Taiping reign, 976-83) and the later *Songbai leichao* 宋稗類鈔 (Classified jottings on Song dynasty unofficial history) compiled by Pan Yongyin 潘永因 in the early Qing and printed circa 1669. However, the new cultural context ensured that such lore was publicly acceptable among modernist literati only if it could be pigeonholed as premodern superstition.[51]

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50 Buck 1980: 171-185, and Kwok 1965.

51 *Qingbai leichao*, 74.11, and *passim*.

Traditional Chinese medicine, which was the strongest field of the Chinese sciences during the transition from the late Qing to the Republican era, was also subjected to such derision, although it was more successful in retaining its universalist prestige than Chinese astrology, geomancy, and alchemy, which were dismissed by modern scholars as purely superstitious forms of knowledge.[52] When the Guomindang-sponsored Health Commission proposed to abolish Chinese medicine (*Zhongyi* 中醫) in February 1929, for example, traditional Chinese doctors responded by calling for a national convention in Shanghai on March 17, 1929, which was supported by a strike of pharmacies and surgeries nationwide. The protest succeeded in having the proposed abolition withdrawn, and the Institute for National Medicine (*Guoyiguan* 國醫館) was subsequently established. One objective of the Guomindang that was retained, however, was to reform Chinese medicine according to the standards of universal Western medicine.[53]

After 1915, the teleology of a universal and progressive "science" first invented in Europe replaced the Chinese notion that Western natural studies had their origins in ancient China. The dismantling of the traditions of *gezhixue* 格致學 and *bowuxue* 博物學, among many other categories, which had linked natural studies, natural history, and medicine to classical learning from 1370 to 1905 climaxed during the cultural and intellectual changes of the New Culture Movement. When their iconoclasm against classical learning and its traditions of natural studies climaxed after 1915, New Culture advocates helped replace the imperial tradition of natural studies with modern science and medicine.[54]

As elites turned to Western studies and modern science, fewer remained to continue the traditions of classical learning (Han Learning) or Cheng-Zhu moral philosophy (Dao Learning) that had been the basis for imperial orthodoxy and literati status before 1900. Thereafter, the "traditional Chinese sciences," classical studies, "Confucianism," and "Neo-Confucianism" have survived as vestiges of native learning in the public schools established by the

52 Lean 1996.
53 See Andrews 1997: 142-143.
54 See Chou 1974: 23-35.

Ministry of Education after 1905 and have endured as contested scholarly fields taught in the vernacular in universities since 1911.[55]

Even the Chinese protagonists involved in the 1923 "Debate on Science and Philosophy of Life" (*Kexue yu rensheng guan* 科學與人生觀) which we will discuss next, accepted the West as the repository of universal scientific knowledge and merely sought to complement such knowledge of nature with Chinese moral and philosophical purpose.[56] Both Western scholars and Westernized Chinese scholars and scientists essentialized European natural studies into a universalist ideal. Until Joseph Needham, when Chinese studies of the natural world, her rich medieval traditions of alchemy and medicine, or pre-Jesuit mathematical and astronomical achievements in China were discussed, they were usually treated dismissively and tagged with such epithets as "superstitious," "prescientific," or "irrational" to contrast them with the triumphant objectivity and rationality of the modern sciences.[57]

The Legacy of the 1923 "Debate on Science and Philosophy of Life"

The "Great War" from 1914 to 1919 acted as a profound intellectual boundary between those in Republican China who still saw in modern science a universal intellectual model for the future and the "New Confucians" (*Xinru* 新儒), such as Zhang Junmai 張君勱 (1886-1969), who showed renewed sympathy for distinctly Chinese forms of moral order after the devastation visited on Europe during World War One. The reformer and scholar-publicist Liang Qichao 梁起超 (1873-1929), who was then in Europe leading an unofficial group of Chinese observers at the 1919 Paris Peace Conference, visited a number of European capitals. Both Zhang Junmai and Ding Wenjiang 丁文江 (1887-1936), the future antagonists in the 1923 "Debate on Science and Philosophy of Life" were part of Liang's traveling group. Each witnessed the war's deadly technological impact on Europe. They also met with leading European intellectuals such as the German philosopher Rudolf Christoph Eucken (1846-1926), Zhang Junmai's teacher, and the French

55 See Pusey 1983.
56 See Wang Hui 1995: 14-29. See also Furth 1970.
57 For discussion, see Hart 1999: 88-114.

philosopher Henri Bergson (1859-1941) to discuss the moral consequences of the war.[58]

In his influential *Ouyou xinyinglu jielu* 歐遊心影錄節錄 (Condensed record of travel impressions while in Europe), Liang Qichao related how the Europeans they met with regarded the first world war as a sign of the bankruptcy of the West and the end of the "dream of the omnipotence of modern science" (科學萬能之夢). Rather than getting advice about modernity from them, Liang found instead that these Europeans now sympathized with what they considered the more spiritual and peaceful "Eastern civilization" and bemoaned the legacy in Europe of an untrammeled material and scientific civilization that had fueled the world war. Liang's account of the spiritual decadence in post-war Europe included an indictment of the materialism and the mechanistic assumptions underlying modern science and technology. The lesson was clear. A turning point had been reached, and the dark side of "Mr. Science" (科學先生) had been exposed. Behind it lay the colossal ruins produced by Western materialism.[59]

In 1919, however, Liang Qichao was still careful to criticize only the mythology surrounding science/*kexue* and not science itself. He added this note to the end of the section of his travel impressions on the "dream of the omnipotence of modern science": "Readers, please do not misunderstand this as an attack on science/*kexue*. I definitely do not acknowledge the bankruptcy of science. However, I do not acknowledge the omnipotence of science either." Whether in favor of science or not, it was clear from Liang's account that the West had produced it. To remedy its excesses, he appealed to the spiritual resources that traditional Chinese civilization could provide. Liang made no mention of the pre-modern scientific achievements of Chinese civilization in 1919 (he had in some of his earlier writings), because his measure of science and technology was modern science (now called "*kexue*") and not traditional natural studies (*gezhixue*).[60]

In the comparison between China and Liang's "imagined" West, China's pre-modern science as *gezhi* was not worth taking seriously. Earlier in 1902,

58 See Ding Wenjiang 1972: 551-574.

59 Liang Qichao 1919: 10-12. For discussion, see Chow 1960: 327-329, and Grieder 1970: 129-135.

60 Liang Qichao 1919: 12.

while Liang was living in exile in Japan, he had composed a three-part article surveying the history of science in the West, probably based on Japanese translations, which he entitled "Gezhixue yange kaolue" 格致學沿革考略 (Synopsis of the vicissitudes in the history of science). In that 1902 account Liang noted that 200-300 years ago, except for "*gezhixue*" (i.e., "modern science"), China had been comparable to the West in all other fields of learning. Liang's article presented the scope of *gezhixue* in the West and its relation to other specialized fields since the ancient Babylonians and Greeks. He then discussed the Arab transmission of Greek science to Europeans.

Liang added, ironically, that printing, gunpowder, and the compass, which all came from China to Islam and then were transmitted to Europe, had enabled the scientific revolution (*kexue gexin* 科學革新) in sixteenth century Europe but not in China. Although Liang occasionally used the term *gezhixue* for modern science in the essay, in addition to *kexue*, the former no longer evoked memories of the patient "investigation of things and the extension of knowledge" that late-Qing literati had inscribed in its semantic life as a translation for "science." Liang's intellectual transition from parochial *gezhixue* in 1902 to universal *kexue* 1919 as the Chinese translation for modern science was not mentioned in the *Ouyou xinyinglu jielu*. Science now equaled "*kexue*" only.[61]

Liang Qichao's postwar disillusionment with modern Western civilization and its false dream of the omnipotence of science and technology had wide impact in China among students and scholars when his travel impressions of Europe were syndicated in China in 1919 and again when published all together as a separate work. Subsequently in 1921 Liang Shuming 梁漱溟 (b. 1893) presented a series of lectures at Beijing University and elsewhere in 1920 and 1921 that addressed the subject of Eastern and Western civilizations, specifically comparing the West, China, and India. In the aftermath of the First World War, Liang Shuming's lectures reopened the "cultures controversy" that Liang Qichao's travel impressions had initiated. After it was published in late 1921, Liang Shuming's book, entitled *The Cultures of East and West and Their Philosophies* (*Dongxi wenhua ji qi zhexue* 東西文化及其哲學) went through eight printings in four years, signaling that the nativist backlash

61 Liang Qichao 1902: 3-14.

against the excesses of the 1915 New Culture Movement and its faith in "Mr. Science" was gaining a wider audience among the emerging intelligentsia in China's urban centers.[62]

Searching for a solution to the malaise China faced, Liang Shuming directly confronted the central premise of the New Culture Movement, namely that Chinese culture was doomed and should be replaced by a modern Western version of culture based on universal science. Unlike Liang Qichao, who saw the salvation of Chinese culture in an amalgamation of its spiritual strengths with the scientific strengths of Western civilization, Liang Shuming contended that Chinese culture must survive intact or not at all. A synthesis of East and West was impossible because of the cultural uniqueness that each civilization manifested.[63]

Evoking the legacy of the German romantics and their anti-materialist appeals to human voluntarism and vitalism, Liang Shuming was in many ways reiterating for Chinese what Eucken and Bergson were arguing in Europe in the aftermath of World War One. Oswald Spengler's (1880-1936) *Der Untergang des Abendlandes* (The decline of the West), for example, was first published in 1918, at the moment of Germany's bitter defeat, and became a bestseller in Europe. Its central premise was that all cultures had their peculiar configurations and therefore must be studied to understand their unique strengths and weaknesses.

The cultural life of all nations and peoples followed cultural cycles that by necessity must run their course, as Western civilization now realized. The question for Spengler was what new culture might appear to replace Europe's. In his defense of Chinese civilization as the antidote to the excesses of Western materialism, Liang Shuming was making Chinese philosophy and the Chinese way of life the next destination for world culture – after leaving behind the dead-end of Western modernity. Europe's universalism was now turned inside out against itself, and Liang revived China as an antidote.[64]

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62 See Alitto 1979: 77-81.

63 See Grieder 1970: 135-145.

64 See Elman 1980: 389-401, Alitto 1979: 82-125, and Grieder 1970: 137-144. Cf. Edwards ed. 1967: 1:287-295, 3:134-135, 7:527-530.

This culturalist approach struck a responsive cord among many Chinese intellectuals who thought that cultural iconoclasm in China under the Republic had gone too far. Traditional Chinese culture and values could now be salvaged intact because their anti-materialist spiritual foundations were the remedy for modern European excesses done in the name of science and technology. The Beijing University philosophy professor Feng Youlan (Fung Yu-lan), for instance, while at Columbia University in 1922 published an article in English entitled "Why China Has No Science – An Interpretation of the History and Consequences of Chinese Philosophy."

Rather than dwelling on China's failures, Feng argued instead that according to her own traditional standard of values China did not need science. Daoism had emphasized the return to nature against human artificiality. The pre-Han philosopher Mozi had stressed utilizing the past to control the future, which included a system of logic or definitions. Later literati, had debated whether knowledge of external things took priority (following Zhu Xi 朱熹, 1130-1200), or the internal stress on the mind (following Wang Yangming 王陽明, 1472-1528) was more important than mastering the world. Since Chinese did not regard life as a search for power, Feng continued, they stressed human and practical affairs and thus had no need of scientific certainty. The lesson Feng Youlan drew, however, was that Wang Yangming had been wrong. Chinese must stop searching for the truth in the "barren land of the human mind." The sciences of the outside world must be studied.[65]

Similarly Hu Shi (1891-1962) in 1921 published an article praising the scholarly methodology of Qing dynasty textual scholars as a Chinese precedent for contemporary scientific research. The English version of this essay was reworked in 1962 when it was published under the title "The Scientific Spirit and Method in Chinese Philosophy." The essay in Chinese was followed in 1922 by the publication of Hu's 1917 Columbia University dissertation entitled *The Development of the Logical Method in Ancient China* (Shanghai, Oriental Book Co.). As radical culturally as Hu Shi had been during the New Culture Movement – he was also one of the founders of the Science Society of China while at Cornell in 1914 – Hu Shi was also moderating his views

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65 Fung Yu-lan 1922: 237-263.

after the First World War. But in his own mind he was still a public advocate of the West and saw modern science as the universal model. When China conformed with that model, as with aspects of Qing evidential studies, Hu Shi praised China; when it didn't, then China had to change.[66]

The cultures controversy boiled over, however, when Zhang Junmai presented a lecture at Qinghua University on February 14, 1923, before a group of science students. There Zhang laid down the gauntlet to those who championed science in China, notably at Qinghua and Beijing universities. Borrowing ideas from Rudolf Eucken, Zhang contended that science must be secondary to and complement a viable "philosophy of life" (*rensheng guan* 人生觀). Science of itself, Zhang contended could never provide a vision of life that people could follow because its materialist and objective assumptions ruled out a spiritual vision of human values and could never satisfy the subjective needs of individuals. It was intriguing that Zhang was willing to base his defense of spirituality and moral conscience on the relativity and subjectivity of human values, which in effect jettisoned the universalistic pretensions of the unity of heaven and humanity (*tianren heyi* 天人合一) prominent in traditional Chinese civilization.[67]

As one of Liang Qichao's travel companions in Europe in 1919, Zhang shared Liang's views of what had happened in Europe. In addition, he had studied abroad in Japan and later in Britain and Germany, which put him in touch with foremost European thinkers such as the philosopher Eucken at the University of Jena. For Zhang, science must be complemented by a spiritual vision giving it a universal moral direction and purpose. China's spiritual legacy was rich and must be restored if China was to avoid the materialist excesses of Europe. China's traditions of quietism based on moral cultivation, Zhang argued, were sufficient to counteract the overly selfish search for materialistic satisfaction exemplified by modern Europe.[68]

However, another of Liang Qichao's 1919 travel companions in Europe, Ding Wenjiang, found Zhang's views outrageous. Two months after Zhang

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66 Hu Shi 1921. See also Hu Shi 1967. Because the audience for the latter was Westerners, Hu painted a rosier portrait of China's past in the English version than in the 1921 Chinese essay. Cf. Grieder 1970: 80n8.

67 See Zhang Junmai 1923. See also Saitō 1993, and Lin Yü-sheng 1985: 1183.

68 See Kwok 1965: 140-160, Chow 1960: 333-334, and Grieder 1970: 145-150.

Junmai's lecture at Qinghua, Ding picked up the gauntlet. As a noted scientist who had been trained for seven years in London and Glasgow and received degrees in biology and geology, Ding Wenjiang published a rejoinder in April 1923 to Zhang's lecture. The 1923 "Debate on Science and Philosophy of Life" now began in earnest. Lasting a year, the controversy led to the publication of some 250-300 thousand words on both sides. All the rejoinders and surrejoinders were then published in a memorable collection that went through three printings by 1928 and successfully aired in public the misgivings scholars such as Zhang Junmai had concerning the modernist agenda that scientists and radicals had promoted as in China's best interests.[69]

Ding's initial reply to Zhang Junmai was entitled "Metaphysics and Science" ("Xuanxue yu kexue" 玄學與科學, lit., "dark studies and science") and appeared in April 1923 in issues 48 and 49 of the journal *Nuli zhoubao* 努力週報 (Endeavor weekly), which he and Hu Shi had established in Beijing. A distinguished scientist at Beijing University, Ding had initiated the Chinese Geological Survey while chief of the geology section of the Ministry of Industry and Commerce after his return from his studies in Britain. Hence, his credentials as a scientist opposed to the metaphysical humanism favored by Zhang Junmai were impeccable. At the outset, he accused Zhang of resurrecting the "ghost of metaphysics" (*xuanxue de gui* 玄學的鬼) in Zhang's fanciful and relativistic account of traditional spirituality, human intuition, and humanistic values:

> Metaphysics is really a worthless devil [*wulaigui* 無賴鬼] – having scraped along in Europe for something over two thousand years, until he is now coming to find himself with no place to turn and nothing to eat, suddenly he puts up a false trade mark, hangs out a new signboard, and comes swaggering along to China to start working his swindle. If you don't believe it, please just take a look at Zhang Junmai's "The Philosophy of Life" in the *Qinghua Weekly*.[70]

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[69] See *Kexue yu rensheng guan*. Another series of essays prefaced by Zhang Junmai appeared in Shanghai in 1924.

[70] See *Kexue yu rensheng guan*, I, 1, translated in Grieder 1970: 150. The essays are reprinted in Hong Shaobin ed. 1999: 3-64. Cf. Wang Y. C. 1966: 378-381, and Saitō 1993: 140-142.

Ding Wenjiang would brook no challenge to the universal legitimacy of science as the framework for modern life. Nor would he allow champions of traditional Chinese civilization, which he held responsible for China's backwardness, to take advantage of the postwar pessimism that had overtaken Europe after 1919 and repackage it as a new humanistic vision of moral values. Those "Chinese" moral values, according to Ding, were bankrupt by the end of the nineteenth century.

Ding accused Zhang Junmai and others of trying to turn the tables and claim that science and technology via materialism had bankrupted Europe and would do the same in China. According to Ding, the European debacle had been the result of international politics and not science per se. To blame science and its constant search for the truth for world war one was misguided. Its technologies had been misused by European politicians. The problem was politics, not science.

Zhang Junmai countered with a long article on the philosophy of life in which he invoked European thinkers such as Eucken and Kant to show that the knowledge system based on science was limited to phenomenal experience and thus could not go beyond sense experience and reach the higher levels of human feelings, art, and religion. These were entirely separate and essential domains of human experience that the scientism of Ding Wenjiang refused to acknowledge. Ding replied immediately in May 1923 that Zhang was confusing the difference between spiritual and material matters, which was neither absolute nor inaccessible to human reason. Only the scientific method, Ding argued, was the universal means to solve the quandaries of human life. A vague and subjective "philosophy of life" would simply obfuscate human realities.[71]

Liang Qichao, whose impressions of postwar Europe had provoked the 1923 "Debate on Science and Philosophy of Life," tried to mediate albeit unsuccessfully. He repeated that he had never stated that science per se was bankrupt, but he added that human feelings went beyond science and reason and must be addressed through art, religion, and philosophy. The debate, however, had polarized Chinese intellectuals in Beijing and elsewhere. Hu Shi, who had been ill for much of 1923, had earlier made clear his views on

71 See Kwok 1965: 142-148, Chow 1960: 334-335, and Grieder 1970: 150-151.

the debate in a review of Liang Shuming's book on Eastern and Western cultures. He noted that the only way to solve human problems was to apply the scientific method to them. Hence for Hu Shi, both Liang Shuming and Zhang Junmai were challenging the universal basis of science by appealing to the subjective world of human feelings, art, and religion.[72]

In his preface to the *Kexue yu rensheng guan* volume, Hu Shi added that Liang Qichao's 1919 travel impressions had set off the debate, which had challenged the materialistic foundations of science. The discussions and debates had been useful, Hu added, but in the end he sided with the Guomindang spokesman Wu Zhihui (1864-1953) 吳稚暉, who in the second stage of the debate went beyond even Ding Wenjiang by acknowledging that science could provide a universal philosophy of life that was purely materialist and mechanistic. Both Hu and Wu held that a "naturalistic conception of life and the universe" was the only possible position that science could uphold. Wu argued that in a dark and essentially chaotic universe, all sense experience, emotions, art, and religion were the product of energy and matter. Hu Shi contended that China's pretensions to spiritual superiority could not hide the country's material and spiritual backwardness. Universal science was the only solution.[73]

The "Debate on Science and Philosophy of Life" continued for several years, and it is usually argued that the advocates of science gained the upper hand in this brouhaha. Many others joined in the fray, including leading members of the newly established Communist Party, who saw the debate as a chance to promote the scientific pretensions of Marxist socialism. As part of the third stage in the development of the debate from December 1923 to August 1924, for example, Qu Qiubai 瞿秋白 (1899-1935) prepared an essay for *New Youth* entitled "Freedom and Necessity" ("Ziyou shijie yu biran shijie" 自由世界與必然世界) in which he stressed the social realities conditioning human agency. Similarly, Chen Duxiu, one of the founders of the Chinese Communist Party, denied that human agency depended on individual subjectivity in an August 1923 essay for *New Youth*, which gainsaid the claims about the subjectivity of human life and culture made by Zhang Junmai and Liang

72 For Hu's review of Liang's book, see Hu Shih 1923 b.

73 Hu Shih 1923 a. See also Kwok 1965: 154-155, Chow 1960: 336-337, Alitto 1970: 126-129, Grieder 1970: 151-152, and Saitō 1993: 142-414.

Qichao. Human choice was based on social and economic factors that could be scientifically delineated as natural developments.[74]

What is significant here is that the followers of both Ding-Hu scientism and Qu-Chen Marxist materialism were odd bedfellows as champions of modern science. Moreover, the Liang-Zhang humanist appeal to China's spiritual resources never questioned that "science" meant "Western science and technology." When Wu Zhihui created a materialist philosophy of life to complement his view of science, he revealed that the significance of modern science carried over to human agency, which the Marxists also readily accepted.

Accordingly, the entire debate was actually premised on the mutual agreement that the value of universal science in its modern Western form could not be denied. Neither side wished to appeal to traditional Chinese achievements in astronomy, mathematics, or medicine because for each side China had "failed" to develop science. When Liang Qichao appealed for a new unity between Chinese cultural values and modern science, his position required the amalgamation of European science and technology, that is, what China lacked, with Chinese culture, i.e., what China already had.[75]

Final Comments

Modern intellectuals in Beijing and Shanghai were generally separated into two opposing intellectual camps on science after 1923, which curiously made for strange bedfellows among the followers of the Guomindang and Chinese Communist parties. Some of those who saw in modern science the intellectual revolution of the future, such as Chen Duxiu, would march on in the name of Communism and modern science. Later the wedding between Chinese Maoism and universal socialist science would require another "Cultural Revolution" in the 1960s.

Many of those who saw modern science as the enemy, such as Zhang Junmai, would continue to appeal to the conservation of traditional philoso-

74 Saitō 1993: 144-146.
75 Wang Y.C. 1966: 382-383, and Kwok 1965: 160-162, and Saitō 1993: 138.

phical values from the borderlands of China in Hong Kong and Taiwan. Like German romantic philosophers, such as Heidegger and Gadamer, who also questioned the moral meaningfulness of modern science, however, "New Confucians" after 1949 would have to find a middle ground that would allow "Confucian hermeneutics" to assimilate scientific studies.[76]

Although ostensibly defeated in the realm of public opinion, the vocal revolt against Chinese scientism by Liang Qichao and Zhang Junmai marked the initial stage of the rise of those whom Hao Chang has rightly called the "New Confucians" (*Xin Ruja* 新儒家). Indeed, Zhang Junmai's later account of Song-Ming Neo-Confucianism, i.e., Cheng-Zhu Dao Learning, grew out of his 1920s efforts to demonstrate the importance of China's pre-modern intuitive and empathetic modes of thinking as an antidote to Western materialism. This new frame of reference for the post World War One revival of traditional Chinese thought forces us to rethink the usual theme of the "end of Confucianism."[77]

Instead, we may be able to tie the so-called "last Confucians" of the Qing dynasty to the twenty-five years after the Sino-Japanese War of 1894-95 and up to 1919. This was a time when some Chinese elites for a time lost confidence in their own cultural resources and sought universals in Western political, economic, and scientific models. After 1919, a significant minority of Chinese intellectuals – "New Confucians" – began to appeal in subjectivist terms to the cultural resources bequeathed from the Chinese past, particularly the moral and philosophical doctrines of moral cultivation and "Song Learning" as the foundation of a modern Chinese civilization. A flourishing Chinese civilization would then stand as an equal with other cultures on the world stage.[78]

In this light, it is useful to evaluate the 1958 "A Manifesto for a Reappraisal of Sinology and Reconstruction of Chinese Culture" by Mou Zongsan 牟宗三, Xu Fuguan 徐復觀, Zhang Junmai, and Tang Junyi 唐君毅 on the future of Chinese civilization. The first Chinese version of the

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[76] See Elman 2002, which discusses the impact of Gadamer on "Confucian hermeneutics."

[77] Chang Hao 1976: 276-302.

[78] See Wang Hui 1998. Cf. Levenson 1969, and Lin Yü-sheng 1985: 1196-1197. For Zhang Junmai's later works, see Chang Carsun 1962 and 1963.

"Manifesto" (*Xuanyan* 宣言), entitled "Zhongguo wenhua yu shijie qiantu zhi gongtong renshi" 中國文化與世界前途之共同認識 (Chinese civilization and the prospects for mutual understanding in the world), was published in Taiwan in 1958, and subsequently in Hong Kong, Japan, and the United States. In addition to their claim that Chinese civilization had universal significance, Mou et al. also recognized that Chinese traditional learning had to assimilate modern science if Chinese culture were to prosper.[79]

They noted that the excessive stress on moral practice (過重道德的實踐) in traditional Chinese teachings had precluded the development of science in pre-modern times. There was now a need for growth in modern China of theoretical scientific knowledge that had been lacking in the past (少了一個理論科學知識之擴充). In effect "New Confucians" were trying to have it both ways. Moral universals required scientific knowledge to prosper in a future China that would contribute to world civilization. In this regard at least, if Liang Qichao, and the "New Confucians" had exposed the cultural limitations in any claim for the worldwide omnipotence of modern science, they had also admitted that any appeal to moral cultivation and humanism would require scientific learning as a universal travel companion.[80]

79 Mou Zongsan et al. 1969.
80 Mou Zongsan et al. 1969.

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