

Article

Compilation of Dictionaries and Scientific and Technological Translations by Western Protestant Missionaries in China in the Nineteenth Century

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Abstract: The 19th century saw the important transformation of modern Western concepts into Chinese lexical resources. The missionaries were the initiators and important driving force for the translation of Western books into Chinese in modern China. They promoted ‘translating terms’ and ‘coining terms’ in their translations of Western books and the compilation of dictionaries with the cooperation of Chinese intellectuals. Their work provided a tangible ‘word’ carrier of ‘concepts’ for disseminating modern knowledge from the West to the East. Compiled by missionaries, the English–Chinese bilingual dictionaries introduced a brand-new concept of dictionary compilation and changed China’s history of having *zidian* (字典, character dictionaries) but no *cidian* (辞典, specialized dictionaries). In particular, John Fryer applied the translation method of creating new words or characters in the translation of chemical terminology. Members of the School and Textbook Series Committee, including John Fryer and Calvin Wilson Mateer, made great contributions to theories and strategies for translation, which keep inspiring Chinese–English translation of terminology and its theoretical construction.

Keywords: protestant missionary; dictionary compilation; Chinese translation of terminology; John Fryer



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1. Introduction

The interaction between Eastern and Western civilizations necessitates successful communication between their languages. As cultural birthplaces, both China and Europe have profoundly influenced the course of world civilization. The initial contact and communication between Chinese and European civilizations at the level of language and vocabulary were made possible through large-scale translation and interpretation activities pioneered by Catholic missionaries in the 16th century and driven by Protestant missionaries in the 19th century. With Jesuits and Protestant missionaries as intermediaries, the Chinese translation of Western books required both ‘word-to-word translation’ and ‘translation by creating new words’ from the late 16th century to the end of the 19th century. The Chinese–foreign language dictionaries, in the form of textual vocabulary, defined the results of the encounter, contact, and communication between the wisdoms of Chinese and Western civilizations at the levels of ‘substance’ and ‘logic’. As such, the history of modern Chinese–foreign language dictionaries is also the history of the communication between Chinese and Western civilizations.

From the perspective of communication between Eastern and Western civilizations in the modern era, this study focuses on the characteristics of dictionary compilation by missionaries who arrived in China in the 19th century, based on a review of the compilation of Chinese–foreign language dictionaries by missionaries in China spanning nearly 300 years from the Ming to Qing dynasties. Through a comparative analysis of the translation characteristics of English–Chinese dictionaries by missionaries such as Morrison, Medhurst, and Lobscheid, this article provides an overview of the process of transforming new Western

concepts into Chinese lexical resources in the 19th century. The coinage of scientific and technological terminology by missionaries was largely conducted under their principles of conducting missionary work by sharing texts and conducting missionary work by disseminating knowledge of science and technology in China. For instance, the School and Textbook Series Committee's translation of chemical terms and its theory and practice of translation of terminology promoted the modernization of the Chinese vocabulary in the so-called Sinographic World. This article also discusses John Fryer's translation methods, such as creating new words and characters in chemical terminology, and their unique contribution to the history of translation. Fryer's strategies and philosophy about translating Chinese and Western scientific terminology remain valuable and inspirational today.

2. Compilation of Chinese–Foreign Language Dictionaries by Western Missionaries in China

Before the 19th century, Chinese–foreign dictionaries were generally Portuguese–Chinese, Latin–Chinese, Spanish–Chinese, French–Chinese, and other non-English bilingual ones. These dictionaries played a crucial role in assisting the missionaries to acquire Chinese during the Ming and Qing dynasties. Also, the cultural knowledge conveyed in those dictionaries laid a great foundation for the compilation and subsequent publication of dictionaries that were completed in Europe.¹ Most importantly, these dictionaries functioned as reference books, especially in terms of writing style and content selection, for the following large-scale translation of Western books by Protestant missionaries who came to China in the 19th century (Qu 2014; Shen 2011b). In addition, the new words coined by missionaries also served as lexical carriers for the dissemination of modern Western scientific, technological, and social knowledge to the East. These words were eventually integrated into batches of standardized textual materials during the transformation of modern China. In the late Qing dynasty, around seventy dictionaries were compiled by missionaries, other Westerners, and Chinese scholars (Yuan 2013). These English–Chinese or Chinese–English dictionaries include some that have long been overlooked in academia. These dictionaries involved different dialects and specialized fields, and they give an insight into the history of modern cultural exchange between China and the West.

2.1. Catholic Missionaries and Manuscripts of Chinese–Foreign Dictionaries before the 19th Century

According to Yan (1902), the early compilation of Chinese–foreign language dictionaries served to make it convenient for Westerners to learn Chinese characters. Although the compilation was a personal activity serving to enable the missionaries to learn Chinese and conduct missionary work, it objectively laid the linguistic foundation for the communication of Chinese and Western civilizations and the mutual communication between cultures. The earliest Chinese–foreign language dictionary written in China was the *Portuguese–Chinese Dictionary*, which was jointly compiled by Jesuit missionaries Michele Ruggieri and Matteo Ricci. As a manuscript, the dictionary was completed around 1583–1588 with more than 6000 entries in alphabetical order. Specifically, Portuguese entries are followed by Roman phonetic notation and corresponding Chinese entries. The corresponding units of Portuguese and Chinese are not limited to words but also include entries of phrases and short sentences. Matteo Ricci, with the assistance of Chinese scholars Zhong Mingren and Guo Jujing, also compiled a *Chinese–Portuguese Dictionary*, which solved the problem of phonetic transcription of Chinese characters with the Western alphabet and attempted to use a Chinese character phonetic transcription system to alphabetize Chinese–foreign language entries. Unfortunately, the manuscript was lost, but before that occurred, it was of great importance in the history of compiling Chinese–foreign language dictionaries.

Between 1595 and 1603, Jesuit missionary Petrus Chirino (1557–1635) in the Philippines compiled a *Dictionarium Sino-Hispanicum* (*Chinese–Hispanic Dictionary*) with eighty-three hinges in total. It was organized according to the writing habits of the Chinese characters and the arrangement of the Five Elements in China. It also made simple divisions

of Chinese characteristics by the types of plants and animals, as well as the positive and negative meanings of the words, for easy use.

The above-mentioned dictionaries had limitations since they were not compiled in Latin, the common academic language of Europe at the time, and their target users were Portuguese and Spanish speakers. The Franciscan missionary Basilio Brollo (Chinese name, Ye Zunxiao) attempted to compile a Chinese–Latin dictionary in the late 17th century. The dictionary consisted of two parts. The first part was completed in 1694 and organized in the order of radicals, and the second was completed between 1698 and 1700 and organized in the order of phonetic notation. This dictionary was a great breakthrough in terms of the scale of words collected, design of layout, interpretation, examples, and other intrinsic qualities, which were not only practically useful but also solved the problem of retrieving Chinese characters in Chinese–foreign language dictionaries.

As a whole, the Chinese and foreign language dictionaries, compiled by Western missionaries who came to China after the middle of the 16th century, were important tools for the convenience of missionary work and Western missionaries' adaptation to Chinese culture. The representatives were the Jesuits. A significant difference between the Jesuits and other sectors, such as the Dominican Order (i.e., *Ordo Praedicatorum* in Latin), was their emphases on different missionary target groups. Dominican Order mainly targeted the general public, and the Chinese language they learned was the spoken Chinese language. However, the Jesuits had close interaction with Chinese officials and Confucians, which required a more rigorous literary style in terms of expression and written communication. Most of these dictionaries are unpublished manuscripts (Yao 2007) of personalized style. There are also varying degrees of loss and absence due to age and other reasons. However, as the first important documents in the history of Chinese–foreign language dictionaries, these dictionaries are valuable for research purposes. The missionaries' initial attempts at compilation, design styles, and translation methods of Chinese–foreign language dictionaries still need to be carefully examined in future studies in terms of the history of concepts, etymology, and the history of translation.

2.2. Protestant Missionaries and the Typological Features of the English–Chinese Bilingual Dictionaries in the 19th Century

The spread of Christianity in China was suspended in the middle of the 18th century and was henceforth banned for more than a hundred years due to the negative intervention of the Vatican and the Qing government. After the protestant reformation, the strength of Protestant Christianity continued to grow, and the Protestant missionaries' enthusiasm for overseas preaching in Eastern countries increased. An increasing number of Protestant missionaries arrived in China in the 19th century, and the language barrier was the most urgent problem that the missionaries needed to address (Scrimgeour 2016). At the same time, Anglo-American business practitioners in China needed to learn Chinese due to the growth of Anglo-American trade with China. Other motivating factors include political interactions and conflicts between Anglo-American states and the Qing government at the end of the 18th century. Also, English became the most important and commonly used language worldwide. Owing to these factors, English–Chinese dictionaries became the mainstay of Chinese–foreign language dictionaries, as well as important reference books for practical uses. Lexicographers, mainly comprising Western missionaries and a small number of secular Westerners and Chinese intellectuals, compiled and published nearly seventy Chinese–English and English–Chinese bilingual dictionaries of various categories and sizes in less than one hundred years from the early 19th century (Shen 2011a; Yuan 2013).

Before the Opium War, the compiled dictionaries were relatively slim. The most well-known is Robert Morrison's *A Dictionary of the Chinese Language* (华英字典), which contains about 40,000 entries and was compiled between 1815 and 1823.² In the 1830s, dialect dictionaries were compiled in Fujian dialects, including *A Dictionary of the Ko-Keen Dialect of the Chinese Language* (福建土话字典) by Medhurst in 1832 and the *Vocabulary of the Hok-Kien Di-*

alect (福建土话字汇) by Samuel Dyer in 1838. These dialect dictionaries paved the way for the publishing of Chinese dialect–English dictionaries after the Opium War. The *English–Chinese Yunfu Calendar* (英华韵府历阶) was compiled by the American Protestant missionary Samuel Wells Williams (1812–1884) in 1844, and his *Chinese–English Yunfu* (汉英韵府) was published in 1874.³ Another important work was the *English–Chinese Language Dictionary* (英华字典) compiled by the British missionary Walter Henry Medhurst (1796–1857) during 1847–1848. The German missionary Wilhelm Lobscheid (1822–1893) compiled and published the *English–Chinese Language Dictionary* (英华字典) during 1866–1869 and the *Chinese–English Language Dictionary* (汉英字典) in 1871. The American missionary Rev. Justus Doolittle (1824–1880) compiled the *English–Chinese Cuilin Yunfu* (英华萃林韵府) in 1872. Herbert Allen Giles (1845–1935) from England published the *Chinese–English Language Dictionary* (华英字典) in 1892. All these dictionaries are systematically coherent and developmental, and they make contributions in exploring new forms and styles of dictionary compilation. However, their most important contribution lies in the fact that a large number of new vocabularies recorded the eastward transformation of new knowledge and concepts after the Industrial Revolution. These dictionaries saw the transformation of modern lexical resources in East Asia and were valuable in terms of studying the history of concepts, lexis, and translation.⁴

In addition, dictionaries of this period compiled by the missionaries also reflected regional differences for easier preaching. A typical feature was the publication of dialect dictionaries. Nearly 30 dialect dictionaries were published, mainly in Cantonese and Min Chinese, as well as dictionaries in Wu, Shu, and Beijing dialects and so on. These dialect dictionaries paid much attention to the meticulous phonetic notation of Chinese characters for the convenience of Westerners seeking to learn the diverse Chinese culture and different dialectal pronunciations across regions. For example, the Chinese characters in Herbert Giles's *Chinese–English Language Dictionary* (华英字典) were labeled with both conventional pronunciations and dialectal ones, including Guangzhou dialect, Hakka dialect, Fuzhou dialect, Wenzhou dialect, Ningbo dialect, Beijing official dialect, Central Plains dialect, Sichuan dialect, and so on. The large number and the variety of dialect dictionaries also served as an indication of the regional activity of missionary work.

The above regional features can be contextualized in three ways. Firstly, there were the Qing government's restrictions on the activity areas for missionaries and other Westerners. Before the Opium War, the Qing government opened only one trading port in Guangzhou, and Protestant missionaries in China could only live in the Nanyang area, Macao, and Guangzhou, taking Cantonese as the regional common language. Therefore, their knowledge of the Chinese language was mainly derived from learning Cantonese. Secondly, there were regional characteristics of dialect users and missionary target groups. The general missionary target group at that time was the general public, who used dialects, unlike the upper-class officials, who spoke the official language. For example, people who lived in the Nanyang area were mostly Fujianese and they generally communicated in Southern Min Chinese, so the Southern Min dictionaries became necessary reference books in this area. Thirdly, China has a large land area with obvious regional differences in Chinese languages, especially concerning pronunciation. Even Chinese people may not be able to distinguish or understand other dialects due to the dramatic differences in terms of pronunciations and grammatical structures. To evangelize Chinese locals in specific regions, missionaries overcame the great difficulties in learning Chinese dialects by compiling the necessary dictionaries, and their substantial efforts should not be ignored.

3. Traditional Chinese ‘Character Dictionary’ (字典) and *yunfu* (韵府) versus the Compilation of Chinese–Foreign Language ‘Specialized Dictionaries’ (辞典)

3.1. Traditional Forms and Features of Chinese ‘Character Dictionary’ (字典) and *Yunfu* (韵府)

Various dictionaries compiled by missionaries in the 19th century were termed dictionary (*zidian*, 字典) and *yunfu* (韵府).⁵ *Zidian* or *yunfu* was what a reference book was called in Chinese. The *Kangxi Dictionary* (康熙字典) can be regarded as China's earliest ref-

erence book in the configuration of a dictionary in the Qing dynasty. Compiled by Zhang Yushu, Chen Tingjing, and other scholars, the *Kangxi Dictionary* was published during the reign of the Kangxi Emperor (1661–1722). This dictionary was grounded in two Chinese character books, namely *Zihui* (字汇) written by Mei Yingzuo and *Zhengzitong* (正字通) by Zhang Zilie in the Ming dynasty. The compilation of the *Kangxi Dictionary* began in 1710 and ended in 1716. The *Kangxi Dictionary* adopted a radical classification method and arranged single characters according to their strokes. The dictionary was divided into twelve collections, resonating with the twelve terrestrial branches, and each collection was divided into three volumes. The rhyming table and its corresponding Chinese characters were arranged according to rhymes and tones, as well as syllables. A total of 47,035 Chinese characters were included in the dictionary. However, although a major reference book for studies of Chinese characters, the *Kangxi Dictionary* did not include interpretations of Chinese characters.

A dictionary used for interpretation and for identifying the etymology of words was called *yunfu* (韵府, or rhyme dictionary) in ancient China. A *yunfu* was similar to the modern dictionary in its form. A representative *yunfu* is the *Peiwen Yunfu* (佩文韵府) compiled by more than twenty scholars appointed by the Kangxi Emperor, including Zhang Yushu, Chen Tingjing, Wang Hao, and others. *Peiwen* (佩文) was the name of the Kangxi Emperor's study. The dictionary was divided into the main part and the supplementary part, with each one having 106 volumes. It collated Chinese characters according to the 106 rhyme groups of the Pingshui Rhyming Scheme (*pingshui yun*, 平水韵).⁶ As the largest dictionary arranged according to rhyme in China, the *Peiwen Yunfu* collected more than 19,000 Chinese characters and became an extremely important reference book for looking up sources of ancient Chinese words, idioms, and allusions. However, since the compilation was a huge workload, part of its content was poorly written, even with errors.

Traditional Chinese dictionaries (*zidian*, 字典, character dictionary) and *yunfu* were compiled in different forms for different purposes, and they were not exact in the same sense as dictionaries today. What needs to be particularly noted is that a reference book that includes and explains various words for retrieval and reference is usually called *cidian* (词典, a word dictionary) in modern Chinese. A vocabulary book that takes words pertaining to a specific field or profession as entries with interpretations, etymology, and examples of uses can be called *cidian* (辞典, a specialized dictionary).⁷ A *cidian* (辞典) normally includes comprehensive vocabulary and terminology. The paradigm of the compilation of *cidian* (辞典) in China can be traced back to the Chinese–foreign language dictionaries compiled by missionaries in the 19th century. Although dictionaries compiled by the modern Protestant missionaries followed the old Chinese names such as *zidian* (character dictionary) and *yunfu*, they referred to the traditions of compiling modern Western dictionaries in terms of their paradigm and content structure. This introduced a brand-new concept of dictionary compilation and promoted the modernization of Chinese dictionaries. As Shen (2020) mentioned:

The compilation of Chinese-foreign language dictionaries led by missionaries not only provided effective tools for people (e.g., Chinese, westerners, Japanese) to learn languages (English and Chinese) but also made the Chinese people realize the reality that China only had *zidian* (字典, character dictionaries) but no *cidian* (辞典, specialized dictionaries) since ancient times. (以传教士为主导的汉外辞典编纂, 不仅为中外人士 (甚至包括日本人) 的外语学习 (英语和汉语) 提供了有效的手段, 而且使中国人认识到中国自古以来只有字典而无辞典的现实。) (p. 114)

Fu Yan (1908) also reflected on the old forms of Chinese dictionaries and positively evaluated the novelty of Western dictionaries in the preface to the *English and Chinese Language Standard Dictionary* (英华大辞典):

... The Chinese character books are old now... These books provide interpretations and pronunciations of Chinese characters, but they show in the form of a single Chinese character in a single line. However, the things and idioms in our

country cannot be fully explained by a single Chinese character. Therefore, the *Peiwen Yunfu* is compiled to make up for that. A character dictionary is arranged by radicals, while a *yunfu* is arranged by rhymes. This is to benefit the scholars so that they can learn by themselves. Because of this, the function of *yunfu* deserves to be upheld. ...The so-called *cidian* (辞典, specialized dictionary) is a combination of the two systems afforded by *zidian* (字典, character dictionary) and *yunfu* (韵府). That is why the country's names and objects are abundant, and why there are more and more dictionaries. (.....今夫中国字书旧矣.....虽然其书释义定声, 类属单行独字, 而吾国名物习语, 又不可以独字之名尽也, 则于是有《佩文韵府》以济其穷。字典以部画相次, 而韵府则以韵为分, 此其嘉惠学者, 使自得师, 其用意皆可尚也。.....而所谓辞典者, 于吾字典、韵府二者之制得以合。此其国名物所以降多, 而辞典所以日富也。)

3.2. New Forms of English–Chinese Dictionaries Compiled by Missionaries and the Lexicalization of Modern Concepts

The lexicalization of concepts refers to understanding a concept that is expressed in a language and then expressing and framing that concept with words of another language in the form of fixed words. All concepts can be expressed, but not all concepts can or must be lexicalized. From the perspective of translation, the process of lexicalization includes at least three steps: understanding the description, choosing or creating a corresponding word, and determining the translated term based on the consensus within the community. This process is also applicable to the missionaries' compilation of Chinese–foreign language dictionaries.

The missionaries who came to China in the 19th century realized the importance of mastering the Chinese language and culture for integrating into the local society and for better missionary work, and they made efforts to gain a deeper understanding of China through the aspects of language and culture. The compilation of English–Chinese and Chinese–English bilingual dictionaries became the basic work of the missionaries as they learned the Chinese language and carried out missionary work through the medium of texts in the 19th century. Having overcome the difficulties of the Chinese language barrier with their perseverance, they introduced a brand-new Western approach to writing dictionaries and integrated the form of a Western word-based dictionary into the traditional compilation of Chinese *zidian* (字典, character dictionary). However, there were two challenges in the compilation: situations where there were no corresponding Chinese words for Western concepts and situations where there were no corresponding words for certain meanings. What is worth noting is that Chinese characters do not correspond to the English alphabet, and they are not equivalent to the unit of a word in the English language. As Morrison exemplified in *A Dictionary of the Chinese Language*, the Chinese did not have the sound of the letter [b] in their language, and they could not distinguish the sounds of [b] and [p]. 'No sound' and 'mixed sound' issues were thus pointed out by the missionaries.

In the process of compiling the English–Chinese bilingual dictionaries, the missionaries realized this problem clearly in the process of Chinese–English language conversion. There was a long process of exploration from 'interpreting a target word by a sentence or phrase in the source language' to 'translating a target word by a word in the source language'. Take the important reference books as examples, the first part of Morrison's *A Dictionary of the Chinese Language* was completed in 1823, and the *English–Chinese Language Dictionary* by Medhurst and that by Lobscheid were completed in 1848 and 1869, respectively. With time intervals of more than 20 years between the three, they are representatives of earlier and later Chinese–foreign language dictionaries compiled by missionaries before the 1870s (Chen 2019). Examples of the three can be seen in Table 1.

Table 1. Translation examples by Morrison, Medhurst, and Lobscheid (data from the Corpus of English–Chinese Dictionaries (英华字典资料库 <https://mhdb.mh.sinica.edu.tw/dictionary/index.php>, accessed on 10 May 2024).

By Morrison	By Medhurst	By Lobscheid
MICA, or Muscovy glass, 千層紙, 'the thousand fold paper', name from its numerous lamina. The Chinese have a manufacture of glue which is transparent like mica, and called by the same name		MICA, foliated千層紙 ditto friable金星石 decomposed ditto蒙石
CRYSTAL, 晶、水晶、水晶石 opaque crystal, 墨晶	CRYSTAL, 水晶、水精、水玉、玉瑛, crystals of quartz, 砵 crystals of salt, 戎 鹽、礬 opaque crystal, 墨晶...crystal with many impurities, 帶綿之晶	CRYSTAL, 晶, rock-crystal水晶、玉瑛、水精, white ditto, 白石瑛, rose ditto, 紫石英、紅晶, smocky ditto, 墨晶, ditto cairngorm or tea-stone, 茶晶, crystal glass, 水晶料, to form crystals, 結晶, to form salt crystals, 結鹵, crystal palace, 水晶宮、晶料宮, consisting of crystal, 晶的、晶嘅, clear, transparent, 晶、透光、明朗
BUTTOCK, 臀尖、屁股	BUTTOCK, 屁股、尻脊、肩、豚、脰、 肱、臄、蹠、骹、臀、臀尖	BUTTOCK, the rump, 臀、吕、屁股、 尿窟、後臀、蹠、肩、骹、肱、臀 尖、豚 BUTTOCK, the convexity of a ship behind, under the stern, 船吕

It can be seen from the examples in Table 1 that although Morrison’s *A Dictionary of the Chinese Language* (华英字典) was named a *zidian* (字典, character dictionary) in Chinese, it was written more in the manner of a Western specialized dictionary. He gave detailed and varied explanations for each word, and his dictionary had the characteristics of an encyclopedia, which could be used not only for English–Chinese bilingual learning but also for intercultural interpretations. In terms of the features of individual entries, Morrison was more likely to cite the classics and gave expository descriptions of words in the form of sentences and phrases. In contrast, Medhurst in his work presented a large word cluster, and provided more choices of translated terms in the target language in different contexts. Dictionaries of different periods provide us with a tangible database of words, and we can detect the development of modern lexicalization of concepts based on their contents and paradigms, as well as new Western concepts’ transition to Chinese words.

4. John Fryer’s Refutation of the View of ‘the Untranslatable’ and the Translation Achievements of Western Scientific and Technological Books into Chinese in the 19th Century

In addition to the above-mentioned dictionaries for general or dialectal use, the missionaries also made attempts to compile specialized dictionaries in the history of translation. Due to the division of the Western academic disciplines and the eastward transmission of specialized knowledge, the missionaries first needed to address the problem of how to translate English terminology into Chinese. Specifically, in their academic preaching, they were faced with issues such as standardizing translated terminology such as chemical and medical terminology. After the establishment of the Translation House of the Kiangnan Arsenal in the 1860s, the missionaries working there, represented by the British missionary and translator John Fryer (1839–1928), cooperated with Chinese scholars and completed several wordlists of Chinese and English nouns. John Fryer was considered a master of Western learning in China, who introduced Western science and technology to China and had a great influence on academia at that time (Bennett 1967; Wright 1996; Yang and Li 2018). The works produced include the *Wordlist of Chinese and Western Names of*

Metal and Stone (1883) (金石中西名目表), the *Wordlist of Chinese and Western Names of Chemical Materials* (1885) (化学材料中西名目表), and the *Wordlist of Chinese and Western Names of Medicines* (1887) (药品中西名目表). Meanwhile, the School and Textbook Series Committee (益智书会) and the publishing agencies also made pioneering attempts and efforts at standardizing translations and compiling Chinese–English specialized dictionaries.

4.1. Difficulties in Translating Western Technical Terminology into Chinese and the View That Western Books Cannot Be Translated into Chinese

Since the 1860s, the late Qing government had a clearer perception of the fast development of Western science and technology, and it promoted the Chinese translation of Western works. The Peking Imperial Tongwenkan and the Translation House of the Kiangnan Arsenal started the large-scale translation of Western books into Chinese successively. Chinese translation of Western scientific and technical literature became the mainstream. Although Catholic missionaries had made initial attempts at Chinese translation of astronomical, mathematical, geographical, and other scientific terms as early as the 16th century, the influence of their translations was limited because most of these translations were small in size, unpublished, and prohibited by the government for a long time. Against the background of the ‘eastward spread of Western learning’ in the 19th century, and the fervor of Western knowledge’s translation and introduction, a large and complicated group of terminology entered into the East. For the Chinese translation of English technical terms, the most difficult parts revolved around whether Western knowledge could be translated into Chinese and the dilemma of having no corresponding words that could be used for translation.

The problem of having no corresponding words for translation was prominent as early as the 16th century when Matteo Ricci came to China. In the cooperation between Chinese translators and Western missionaries, both sides felt the difficulty of translation due to the lack of suitable counterpart words. As Matteo Ricci mentioned in his preface to the translated version of *Elements of Geometry* (几何原体), the disciplines in the East and the West were different, and in many cases, there were no corresponding words for translation. Because of this, mistakes in translation were unavoidable. Translation could barely be performed through oral interpretation, while written translation was intricate and obscure (Chen 2019). Nonetheless, early missionaries still translated some of the mathematical, astronomical, and other terms and phrases, which are still used today. For example, Matteo Ricci collaborated with the Chinese translator Xu Guangqi to translate “geometry” as “几何”, and translated geometrical terms such as “point, line, straight line, curve, parallel line, angle, right angle, acute angle, obtuse angle” as “点, 线, 直线, 曲线, 平行线, 角, 直角, 锐角, 钝角” and so on (Xu and Wang 2023). The technical terminology and the manuscripts of these technical dictionaries laid a great foundation for the later large-scale translation of books and words, as well as the compilation of technical dictionaries carried out in the 19th century. It also enabled the Chinese intellectuals of the Ming and Qing dynasties to learn more about the complexity of translation. For example, the Chinese translator Li Zhizao (1571–1630) who worked with Matteo Ricci admitted how difficult it was to move forward with translation:

The classical Chinese language is obscure and hard to translate, which often makes my translation work suspended. So, I started the creative translation of tangible things like the *wu da* (五大)—sky, earth, water, wind, fire... The meaning is profound yet difficult to express, or the writing brush is almost overused while no word has been decided yet, or the less difficult translation is done, and the referencing takes a relatively short while. Thereby, it took several years to complete about ten *zhi* (帙) of books. (文言夔绝, 喉转棘生, 屡因苦难阁笔。乃先就诸有形之类, 摘取形天、土、水、气、火、所名五大者而创译焉.....第厥意义宏深, 发抒匪易; 或只字未安, 含毫几腐, 或片言少棘, 证解移时, 以故历数年所竟帙十许。).⁸ (quoted in Chen 2020, p. 58)

In contrast to those who considered Western languages the optimal ones to convey Western knowledge in China, Fryer ([1880] 1953) underscored the reliability of Chinese in spreading Western knowledge. Meanwhile, other Westerners believed that the Chinese language could not exactly express the wisdom in Western books. Diego de Pantoja, for instance, pointed out that spoken Chinese and written Chinese were different (Chen 2000). Ludovic Bugli also frankly expressed that the cultures were different and the words were limited in number (ibid.). The differences between Chinese characters and Western words led to language barriers, coupled with China's ancient tradition of emphasizing classics and history works and foregrounding logic studies, while marginalizing technologies and skills. Furthermore, there was a serious disconnection between the traditional history of ideas and natural science. According to Chen (1923):

Ancient Chinese academics mostly emerged from the methods of various traditions that did not emphasize the facts of nature or empirical analysis. Thus, they were not related to the modern science in the West. Most of us lack the sense of 'things' and 'numbers', and do not favor natural sciences, which is also the result of the fact that we have been deeply influenced by the ancient methods of logic. Be it reconsidering the national policies or importing European civilizations, we have to reform the inherited ancient method of logic. Otherwise, it will be hopeless ultimately. (总之, 中国古代的学术, 多由于各家的方法产生出来, 即不重自然的事实和分析的实验, 自无西洋近代的科学了。我们多缺乏“物的观念”和“数的观念”, 不喜研究自然科学, 也由于熏染古代名学方法太深所致。我们无论整理国政, 或是输入欧化, 非先改革遗传的古代名学方法, 终恐无大望了。). (p. 85)

Even some of the translations that had been completed were ignored. *Exploration of Dialectics* (明理探), which was translated by Li Zhizao in the late Ming dynasty, was a great early work introducing the logical correlation of the Western academic traditions. However, it did not attract much attention for more than two hundred years, nor the terminology it defined. By the time Protestant missionaries came to China in the 19th century, the introduction of Western knowledge surpassed that of the Jesuit missionaries of the late Ming and early Qing dynasties in terms of the depth, scope of knowledge, and overall audience scale (Shen 2017). A large number of terminological clusters were produced due to the academic development of different disciplines and sub-divisions in the West for hundreds of years. In contrast, in modern China, academic development in science and technology lagged behind. Therefore, the terminology that could be used for translating the Western natural sciences was severely deficient. The problems of translation concepts, the translation methods, and the rules applied were even more prominent. In this regard, some people even believed that the solution to the translation problems relied on the development of English education. These people expected Chinese people to accept 'Western learning' (西学), which hinged on learning English, allowing them to ignore or escape from the difficulties of Chinese translation of Western works.

Regarding the widely held view that Western learning was untranslatable (see Wu and Zheng 2009), the Anglican missionary John Fryer ([1880] 1953) working in the Kiangnan Arsenal gave a clear refutation (Gorman 1977) to the idea that Chinese culture and language were self-contained; instead, he proposed that Chinese people must use the Chinese language to bring in Western knowledge.⁹

"Chinese texts have been passed down for thousands of years since ancient times without being replaced. People attached great importance to them, and the country relied on them for governance. How can a great and independent nation abandon its language and works and use languages of other nations? (中国书文流传自古, 数千年来未有或替, 不特国人视之甚重, 即国家亦赖以治国焉。有自主之大国, 弃其书文而尽用他邦语言文字者耶?)" (quoted in Fryer [1880] 1953, p. 20)

While serving in the Kiangnan Arsenal for twenty-eight years, John Fryer worked with his colleagues to translate a large number of Western works. He interpreted one hundred and thirteen kinds of books, among which ninety-five were published and eighteen were unpublished. Among the published ninety-five interpretation books, nine were on mathematics, four on physics, twelve on chemistry and chemical engineering, ten on mining and metallurgy, nine on mechanical engineering, four on medicine, three on agronomy, five on surveying and mapping, fifteen on military ordnance, and ten on other technologies. According to Fryer, the written Chinese language was flexible, concise, articulate, receptive to foreign ideas, and was able to constitute new and understandable scientific terminology. He proposed that a term could be translated with the very expressive and concise Chinese language, making it easy for Chinese intellectuals to understand Western science from translations. Fryer ([1899] 2010) held his opinion that the concise and powerful nature of (Chinese) written language made it compelling both when reading and listening to it. Thus, symbols that were only phonetic and not ideographical could not replace it. The extremely similar sounds of some Chinese characters confused Westerners, but Chinese people used these characters to express the most refined and abstract ideas they could think of, as effortlessly as they expressed matters in their everyday lives.

4.2. Major Translation Institutions in China and Missionaries' Achievements in Scientific and Technical Translations in the 19th Century

Despite the pessimistic attitude of many translators towards the difficulty of translating Western scientific and technical literature into Chinese, the late Qing government, together with churches and missionaries, established ten translation organizations successively in the 19th century. The more influential ones included Peking Tongwenguan (1861), the Translation House of the Kiangnan Arsenal (1867), the Mohai Bookstore (1843–1866, Medhurst), the Meihua Bookstore (1860), the School and Textbook Series Committee (1877), the Tianjin Maritime Academy (1881), the Gezhi Compendium Society (1876), the Christian Literature Society (1887), Guangzhou Boji Hospital (1866), and the Translation Association (1897) (see Wang 1988). Some missionaries were employed by the organizations and others worked as their founders. Foreign missionaries were the core translators to promote the translations of both Chinese and English works. Among these, the organization with the most outstanding achievements in translation and publication was the Translation House of the Kiangnan Arsenal. Established in 1867 in the late Qing dynasty, the translation department was run by the Qing government. It combined translation and publishing, and it had the longest-running activities, the largest scale of publications, and the most high-quality translation works. It employed fifty-nine people in total to take part in the translation of books, among which nine were foreign translators. Western translators were responsible for oral interpretation and Chinese scholars recorded and polished the content. Some of the well-known Protestant missionaries, as the central force in the interpretation, were John Fryer (1839–1928), Alexander Wylie (1815–1887) from the London Missionary Society, Young John Allen (1836–1907) from the American Board of Overseers, Daniel Jerome MacGowan (1815–1893) from American Baptists, and so on. As Na (2012) stated, the Translation House of the Kiangnan Arsenal combined 'translation and compilation', 'translation and publishing', 'theory and practice', 'literature and history with science and technology', 'theoretical foundations and practical applications', 'books and information', and 'translation and scientific and technological education'. While in operation for nearly forty years, the House translated and published scientific and technical books in more than a dozen specialized fields, including military science, craftsmanship, military systems, medicine, mineralogy, agronomy, chemistry, arithmetic, graphology, engineering, electricity, geography, astronomy, academics, acoustics, optics, and so on.

J. Wang (1999) commented that its staff constituted not only one of the most important knowledge groups in modern China but also the first talented publishing group in China, as well as a cultural group. Xiong (2011) likewise asserted that John Fryer, Young

John Allen, Hua Hefang, Xu Shou, and others were talented translators in the transitional era when the passively opened China was in urgent need of bringing in Western studies. These translators overcame all obstacles, endured great hardships, and made a monumental contribution to the introduction of Western studies by combining Chinese and foreign languages, interpreting and writing, refining translations, creating new words, and compiling wordbooks of Chinese and Western terms.

5. Translation Theory by the School and Textbook Series Committee and Compilation of Dictionaries of Terminology

Founded in 1877, the School and Textbook Series Committee (益智书会, STSC henceforth) was initially set up to address issues with the curriculum, textbook writing, and teacher deployment in church education. The original members were missionaries W.A.P. Martin (1827–1916), A. Williamson (1829–1890), C.W. Mateer (1836–1908), Y.J. Allen (1836–1907), and others. John Fryer, who was working in the Translation House of the Kiangnan Arsenal at that time and had rich experience in compiling Western books, was also invited to join the committee. Among the many missionaries who came to China, John Fryer was the first who made important elaborations and significant contributions to scientific and technical terminology's translation, as well as the theoretical development of translation. Based on his massive practice in translation, John Fryer developed his theory and method for the translation of scientific and technological terminology. Fryer and other members of the Committee were dedicated to standardizing scientific and technical translations for consistency. Although sometimes they failed to achieve that, his reflections on translation still inspire terminology to be translated and specialized dictionaries to be written today.

5.1. Fryer's Terminology Translation Theory and Strategies for the Chinese Translation of Chemical Elements

John Fryer believed that the absence of related disciplines and concepts was the biggest obstacle to the translation of Western books into Chinese, and he pointed out that the first task in translating Western books was to provide terms (quoted in [Shen 2020](#), p. 136). According to Fryer, the diplomatic communication between China and the West was increasing, which resulted in the emergence of new concepts and items. These needed to be named in Chinese, and only new names could express their intended meanings. If the naming was limited to existing words and their conventional meanings, successful translation would never be accomplished. Based on his translation practice, John Fryer ([1880] 1953) proposed principles and methods of translating scientific and technical terminology ([Tola 2017](#)). He suggested approaches to both existing and new terms. On the one hand, for existing terms (or nomenclature) in the Chinese language but not compiled in Chinese dictionaries, Fryer proposed two specific means of identification: (1) referring to the existing books on science or craftsmanship, as well as those written by missionaries, and (2) confirming with Chinese merchants, manufacturers, craftsmen, or others who likely knew the terms.¹⁰ As such, Fryer emphasized the continuity and specialization of the translated words. He suggested preserving and using the existing Chinese translations, and he also tried to preserve the translation achievements of the Catholic missionaries and Jesuits who came to China in the 16th century. Meanwhile, he kept in mind the universal application of terms and the specialization of translation.

On the other hand, for terms that did not exist in the Chinese language, new Chinese terms needed to be coined. There were three ways of doing this. First, translators could add radicals to the existing Chinese characters to create a new term and keep the same pronunciation. Second, translators could use a few Chinese characters to explain new yet untranslated concepts. By doing so, the explanation itself, comprising these characters, could become the new term. The use of fewer Chinese characters was preferred for conciseness. The third solution was transliteration (or phoneticizing), that is, using the Chinese characters to represent Western terms, with the two sharing similar pronunciations. The official accent was more favorable in this case. Fryer's application of the

methods above can be found in his translation of terms of chemical elements. A typical example is the translation of the chemical element “magnesium”. Fryer adopted the commonly used Chinese character “美” (*mei* in *Pinyin*) to pronounce the chemical element in Chinese, and added the ideographic radical “金” (meaning “gold” in Chinese) to describe the metallic nature of the substance. Therefore, the decided translation of “magnesium” was “镁”. Another example is the word “silicon”, which was translated as “矽”, with the character “夕” (*xi* in *Pinyin*) for its pronunciation and the character “石” added to mark its non-metal property.¹¹ Apart from those, Fryer also referred to rarely used Chinese characters and invested new meanings in them for translations of new terms. For example, the ancient Chinese character “鉀” (*jia* in *Pinyin*) had the meaning of “armor” and was utilized by Fryer as the Chinese counterpart of “kalium”, which is better known as potassium in modern terms. Fryer’s methods of translating chemical elements were different from prior translation of terminology by earlier missionaries such as Lobscheid. Specifically, Lobscheid adopted the strategy of adding the Chinese character “行” (*xing* in *Pinyin*), as a radical, to existing Chinese characters to represent chemical elements. For example, Lobscheid translated “magnesium” into “行美”, creating a new word consisting of two Chinese characters. Fryer’s methods of translating chemical elements were so advanced that new single characters were formed so that they could easily combine with other characters or stay independent with complete meanings. Also, the metallic and non-metallic properties were clearly divided, which could be identified from the layer of form only.

Fryer’s principle of using as few characters as possible and the principle of liberal translation contributed to the translation of new terms such as “養氣” (“oxygen”) and “輕氣” (hydrogen). He preserved the two-word compound form (not three or four words) and mapped the new Chinese words with their referents in meanings. Fryer, compared with Morrison and others, was more aware of lexicalization and specialized translation.

Fryer insisted on using the official accent for the translation of terminology. Various dialects and accents in China could lead to confusion in translation (Yin 2020). For instance, the Cantonese dialect adopted in the transliteration of the English word “America” (“亞美利加”) pronounced “亞” as [a], not [ia] as in the official accent (Chen 2020). To solve such inconsistency, Fryer insisted on using a unified approach to transliteration based on official accent and looked forward to the establishment of a set of Chinese character lists particularly for onomatopoeia to standardize transliteration.

In addition, Fryer suggested compiling a glossary or wordlist that could integrate Chinese and Western terminology. All new terms coined upon translation should be recorded in a Chinese–English wordlist anytime anywhere. Such a glossary could be attached to the end of the book so that its readers could refer to it. Terms in an individual book could be collected and compiled into a large volume so that future translators could check them and avoid the problem of mixing up terms.

5.2. STSC’s Work on Unifying Scientific and Technical Terms and the Compilation of the *Technical Terms in English and Chinese* (术语辞汇)

The School and Textbook Series Committee (STSC) was initiated to compile teaching materials for church schools.¹² By 1890, the STSC had already published fifty scientific and technological textbooks. The Committee greatly facilitated the spread of modern scientific and technological knowledge against the backdrop of the eastward spread of Western learning that was promoted among modern Chinese intellectuals. In May 1890, the Protestant missionaries held their second national convention in Shanghai. Calvin Wilson Mateer served as president of the STSC, and John Fryer continued serving as the editor-in-chief and director-general. The STSC maintained a lasting focus on the compilation of wordlists of scientific and technological terms, as well as specialized dictionaries. Despite disagreement among its members and the eventual suspension of translation, the STSC’s pioneering attempts at ensuring the consistency of terms and its eventual compilation of the *Technical Terms, English and Chinese* (术语辞汇) (Mateer 1904) were important moves toward the specialization of modern Chinese dictionaries.

5.2.1. Relevance of Textbook Compilation to the Consistency of Terms' Translation

Inconsistency of translated terms in textbooks was a fundamental issue to address in writing textbooks. To ensure the uniformity of translated terms in textbooks, the STSC asked its members to collect relevant Chinese translations or original Chinese texts, read them carefully, and list the specialized terms in the books, to compile an integrated glossary. The reality was that early modern translators had to create new terms by themselves because they were confronted with a large number of new concepts. For example, the word “science” was translated by B. Hobson (1816–1873) as “博物” (*bowu*), whereas A. Wylie (1815–1887) and Li Shanlan translated it as “格致” (*gezhi*). Some of the early translators tried attaching wordlists of English–Chinese terms to books or publishing them in single volumes. Yet, most of the books did not have such references, or a wordlist was attached in the first edition but was not kept in the reprint. Because of that, they were difficult for readers to understand, and this affected the popularization of new concepts and terms. Before the founding of the STSC, for the consistency of terms' translation, the most influential wordlist was that in the dictionary *English–Chinese Cuilin Yunfu* (1872), which was compiled by the American Congregationalist missionary Justus Doolittle (1824–1880). The third part of the dictionary collected lists of specialized terms, most of which were supplied by missionaries engaged in the translation of technical and scientific writings. These wordlists reflected the realistic situation of translating technical and scientific terminology in China before 1872. It collected the well-accepted terms at that time and contributed to the unification of scientific and technical terminology in translation.

5.2.2. Theoretical Convergence and Opinion Divergence in the Translation of Scientific and Technological Terminology

From the founding of the STSC to the completion of the *Technical Terms, English and Chinese* (术语辞汇) in 1904, the unification of terms in translation was subject to ongoing discussion, suspension, and progress for over twenty years. As important members of the STSC, John Fryer and Calvin Wilson Mateer witnessed the convergence of their theories and the divergence of their opinions on consistency in translation. Both of them refuted the view that Western works of science and technology were untranslatable. As discussed above, Fryer put forward strategies including using old Chinese terms to translate scientific and technological terminology (Tola 2018), adopting liberal translation in the creation of a new term, taking into account the pronunciation, keeping the translation as brief as possible, following the official accent, and so on. Similarly, Mateer (1877) addressed the same issue and argued that some translators should not take a passive attitude toward technical translation. Mateer held the view that each discipline had a specialized set of terminology, and that to introduce this discipline to China, it was necessary to introduce its set of terminology. He also asserted that it was impossible to bring in scientific knowledge accurately without using scientific terminology. He had some suggestions for the translation of terms: First, terms should be short, even if they might not perfectly capture the definition or illustrate the meaning literally. Second, terms should be convenient to use and applicable in a variety of contexts. Third, terms of the same kind should be in line with each other. Fourth, terms should be precisely defined, and the exact definition of a new term should be given.

Thirteen years after Mateer's discussion, with a growing call for the consistent translation of terminology, John Fryer gave a presentation at the Second National Protestant Conference in 1890. In his talk, he offered a detailed discussion of the principles and methods of creating scientific and technical terminology in seven aspects (Y. Wang 1991). It was proposed by Fryer that the translation of terminology should try to avoid transliteration, and that Chinese readers were more likely to accept terms of liberal translation. In special cases, a combination of the two was acceptable. He also added to his translation theories that a set of Chinese characters should be suggested for transliteration, the new terms should be clearly delineated and defined, the consistency of new terms in meaning should always be guaranteed, and the translation of new terms should be flexible and adaptable.

Both Fryer and Mateer held the ‘translatable’ stance and emphasized the issues of brevity, accuracy, contextual applicability, and so on.

Although Fryer and Mateer agree with each other on methods of translation of terminology, they also had divergent opinions in terms of practical translation. The STSC once decided to compile two textbooks; John Fryer was in charge of the elementary textbook, and Young John Allen was in charge of the advanced one at the beginning of its establishment. A notice was issued in 1878 that translators were required to provide a list of terms to guarantee the consistency of terms appearing in textbooks. According to the labor division based on disciplinary fields, John Fryer was responsible for translations of science and technology and of manufacturing categories. Calvin Wilson Mateer was responsible for the translation of terminology in mathematics textbooks. While Mateer advocated for the use of Arabic numerical characters to translate numbers, John Fryer insisted on the use of Chinese characters to express numbers. Regarding chemical terms, Mateer also suggested that John Fryer revise the Chinese characters (referring to different terms) with the same pronunciation in his chemical translations, to avoid confusion and inconvenience, but John Fryer insisted on the continuity of his translation and refused to change it. With these divergent opinions among translators, the work of unifying the translations by the STSC progressed slowly, also affected by private matters such as the translators’ return to their home countries.

In total, John Fryer compiled and published four lists of terms collected during his time at the Translation House of the Kiangnan Arsenal until 1890. Those were the *List of Chinese and Western Terms of Metal and Jade* (金石中西名目表), the *List of Chinese and Western Terms of Chemical Materials* (化学材料中西名目表), the *List of Chinese and Western Terms of Western Pharmaceuticals* (西药大成药品中西名目表), and the *List of Chinese and Western Terms of Steam Engines* (汽机中西名目表). These were among his achievements in unifying the translation of terminology, promoted by the STSC. After Fryer returned to the United States, he completed the editing work of the *Agreement on Chemical Nomenclature* (协定化学名目) in 1899 and the *Technical Terms, English and Chinese* (术语辞汇) in 1904, promoted by Mateer and others. All the wordlists above took on the prototype of specialized dictionaries. Published in 1904, the *Technical Terms, English and Chinese* contained more than 12,000 terms from more than 50 disciplines, including mathematics, navigation, mechanics, optics, chemistry, geography, astronomy, botany and zoology, political economy, international law, etc.; however, the size of the theological vocabulary was extremely small. This dictionary could be regarded as China’s first comprehensive technical dictionary in modern times (Y. Wang 1991). This also marked an important further move toward the specialization of the compilation of dictionaries in modern China.

Regarding the consistency of translation, the missionaries had initial discussions, made first attempts, and used careful divisions of labor in the STSC. Although this huge project was not fully and completely accomplished, its practical process triggered a reflection on missionary translation in modern China. Firstly, it was highlighted that the consistency of scientific and technological translations was inevitably in second place, while the priority was given to missionary activities in modern China. That is because the STSC itself was a Protestant Christian textbook compilation and publishing organization, and the compilation of reference books served evangelism and church education. In addition, for translators and members from different countries and sectors, it was difficult to cooperate in unifying translations. Secondly, as a translator who left the Church, Fryer’s status and attitude toward religion affected the implementation of his proposals, despite his passion for technical translation and his urgent call for the unification of terms. Thirdly, the missionaries’ translation was heavily constrained by their knowledge of science and technology, as well as their knowledge of the Chinese language. This meant the missionaries could not complete the Chinese translation of Western books independently, and they had to rely on Chinese translators to polish the works, for instance. Fourthly, it was extremely challenging for the missionaries to complete projects because of the demanding task of comparing and deciding on suitable terms. Specifically, this task

required missionaries' profound specialized knowledge, broad vision, and constant focus. Also, based on the English–Chinese dictionaries compiled by the missionaries in the early days and the Chinese translations of Western books, Japan had already created a large number of new terms in the late 19th century. Most of these terms also adopted the forms of Chinese characters, which meant that the missionaries were confronted with the task of standardizing translations not only in China but also in Japan in the same cultural circle of Chinese characters. That made the work more difficult. The hard truth is that consistency of translation was not fully accomplished, and the parties involved did not produce many socially recognized achievements. Consequently, some terms in the Japanese translations of modern Western books were mistakenly considered original by some Chinese students in Japan in the early 20th century. That is because they did not realize the contributions of prior Chinese translation to the Japanese translation of Western knowledge, with Japanese language subject to the wider influence of the Sinographic World.

6. Conclusions

Against the background of interaction between Eastern and Western civilizations, massive and far-reaching East–West literary interchange has been promoted for nearly 300 years, with missionaries as its pioneers and promoters and Chinese scholars as collaborators. The translation of Western books and compilation of dictionaries have been important means of improving cross-cultural exchange. The compilation of English–Chinese bilingual dictionaries has moved from encyclopedic dictionaries to English–Chinese and Chinese–English dictionaries. Among these, there were also dialect dictionaries for missionary needs. In the early 20th century, the appearance of specialized dictionaries was a sign of the move towards a more specialized and refined compilation of dictionaries in modern China. Such progress also indicated a shift from compiling for missionary purposes to compiling for scientific and technological dialogues between the East and the West. Moreover, the specialized dictionaries reflected the gradual process of transforming Western concepts into Chinese lexical resources. Those dictionaries and the terms coined provided great convenience for Western missionaries seeking to spread their religious beliefs, Western cultural values, and scientific and technological information in China. That profoundly influenced the conceptual world of modern Chinese people. Furthermore, dictionary publishing employing mechanized printing, mixed typesetting of Chinese and English lead and movable type, and binding hailed a whole new era of Chinese characters' lead typesetting and movable type printing (Deng and Deng 2022). The spread of English–Chinese bilingual dictionaries in East Asia has played an indispensable role in transforming the new concepts of Western modernization into important lexical resources for the countries in the Chinese character culture circle. The movable corpus of literature and rhetoric has effectively supported East Asian countries, represented by China and Japan, to complete the transformation of language modernization. The compilation and publication of English–Chinese and Chinese–English dictionaries by missionaries, reflection on the translation methods of scientific and technological terms, the process of theoretical condensation, and the slow advancement in the consistency of translations have all combined to create a broad field of thought and discernment concerning mutual learning and communication between Chinese and foreign civilizations today, regional-localization issues in cultural and educational policies, and the evolution of new translation theories and strategies in the era of human–computer interaction.

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Notes

- ¹ The first dictionary containing Chinese characters was *Miscellanea Curiosa Noremburgæ* by Christian Mentzel (1622–1701), published in Europe in 1685. Those Chinese characters appeared in its appendix *Sylloge Minutiarum Lexici Latino-Sinici*. In addition, the *Museum Sinicum* (1730) by Gottlieb Siegfried Bayer (1694–1738) also had a section on Chinese grammar and dictionaries.
- ² The *Chinese–English Language Dictionary* is an umbrella name for three parts and six volumes of dictionaries compiled by Morrison; its full name is *A Dictionary of the Chinese Language, in three parts. Part the first, containing Chinese and English, arranged according to the radicals; Part the second, Chinese and English arranged alphabetically; and Part the third, English and Chinese*.
- ³ It is currently known as the *Chinese–English Pinyin Dictionary* (汉英拼音字典).
- ⁴ Studies on modern Chinese–foreign language dictionaries compiled by Protestant missionaries have not been fully carried out in China. The current studies also contain some errors in facts. The challenges of conducting relevant research include the lack of first-hand research data and the difficulties in producing findings. Also, the translation and lexicalization of new words in East Asia took a long time, spanning from the 16th to the 19th centuries. Additionally, the participation of people from different countries and areas in different periods (e.g., China, Japan, and the West), coupled with the rapid changes in China’s social formations in the early 20th century, led to scarce research on the compilation of Chinese–foreign language dictionaries (Yuan 2013).
- ⁵ *Yunfu* (韵府), interchangeably understood as *yunshu* (韵书, rhyme dictionary), is an ancient type of Chinese dictionary that organizes Chinese characters by tone and rhyme, instead of by radicals. Wikipedia. Available online: https://en.wikipedia.org/wiki/Rime_dictionary (accessed on 18 February 2024).
- ⁶ Compiled in the Jin dynasty, *pingshui yun* (平水韵) is an important rhyming system in Chinese poetry and the official standard in ancient China. Wikipedia. Available online: https://en.wikipedia.org/wiki/Pingshui_Yun (accessed on 19 February 2024).
- ⁷ *Cidian* (辞典, more of a specialized dictionary) here is different from the *cidian* (词典, a comprehensive word/phrase dictionary), though they share the same *pinyin* form.
- ⁸ *Wu da* (五大) is a Buddhist concept; *zhi* (帙) is an ancient Chinese quantifier of books.
- ⁹ Sent by the Anglican Church, John Fryer (1838–1928) came to China in 1861 and lived in China for more than 35 years. Having served as the chief interpreter in the Translation House of the Kiangnan Arsenal, he devoted himself to the translation of Western books, especially scientific and technological books, and was the translator with the largest number of Western book translations in the second half of the 19th century. However, he did not have much enthusiasm for evangelism, and because of this, he was categorized by later generations as a secularist with the least religious character among missionaries in the late Qing dynasty. He was in charge of translating works in various disciplines during his time in the Translation House and participated in or founded many ‘first industries’ in China’s modern history. For example, he participated in the preparation of Gezhi College (格致书院) in 1874, which was the first specialized school teaching science and technology in China’s modern times; he founded the first comprehensive scientific and technical periodical *Gezhi Repertory* (格致汇编) in modern China in 1876; he established the first scientific and technical bookstore *Gezhi Bookstore* (格致书室) in modern China with his funds in 1885; he joined the School and Textbook Series Committee (益智书会), which was the first dedicated to the consistency of scientific and technical terminology in modern China, in 1877.
- ¹⁰ However, the translations made by merchants, craftsmen, and other civilians were laden with many colloquialisms and were of little value for extended use (see Shen 2020).
- ¹¹ In modern Chinese, it is written as “硅”, while it was formerly known as “矽”.
- ¹² The School and Textbook Series Committee was renamed the Chinese Education Association in 1905 and the China Christian Education Association in 1915.

References

- Bennett, Adrian Arthur. 1967. *John Fryer: The Introduction of Western Science and Technology into Nineteenth-Century China*. Cambridge: Harvard University Press.
- Chen, Chen 陈晨. 2020. Wanqing yingyuan yinyi waitaici yanjiu 晚清英源音译外来词研究 [Research on the Chinese Loanwords Transliterated from English in Late Qing Dynasty]. Ph.D. dissertation, Central China Normal University, Wuhan, China, May 20.
- Chen, Kangfu 陈福康. 2000. *Zhongguo yixue lilun shigao* 中国译学理论史稿 [A history of Chinese Translation Theory]. Shanghai: Shanghai Foreign Language Education Press.
- Chen, Liwei 陈力卫. 2019. *Donglai dongwang: Jindai zhongri zhijian de yuci gainian* 东往东来: 近代中日之间的语词概念 [From the East to the East: Word Concepts between China and Japan in Modern Times]. Beijing: Social Sciences Literature Press.
- Chen, Qitian 陈启天. 1923. *Zhongguo gudai mingxue lunlue* 中国古代名学论略 [A Brief Introduction to Ancient Chinese Logic]. In *Mingxue jigou* 名学稽古. Edited by Dongfang Zazhi 东方杂志. Shanghai: The Commercial Press, p. 85.
- Deng, Chunxu 邓纯旭, and Liping Deng 邓丽萍. 2022. Shijiu shijichu huaying zidian bianzuan dui zhongguo jindai chubanye de qidi 19世纪初《华英字典》编撰对中国近代出版业的启迪 [Inspirations of the compilation of Chinese-English Language Dictionary on modern Chinese publishing industry in the 19th century]. *Dalian Daxue Xuebao* 大连大学学报 43: 57–61.
- Fryer, John 傅兰雅. 1953. Jiangnan zhizao zongju fanyi xishu shilue 江南制造总局翻译西书事略 [Overview on the Deeds of Western Books Translation by the Jiangnan Manufacturing Bureau]. In *Zhongguo jindai shiliao chubian* 中国近代出版史料初编 [The First Edition of Historical Materials on Chinese Modern Publishing]. Edited by Jinglu Zhang 张静庐. Shanghai: Shangza Press, pp. 14–5. First published 1880.
- Fryer, John 傅兰雅. 2010. Philosophy of the Chinese Language. In *The John Fryer Papers*. Edited by Ferdinand Dagenais. Guilin: Guangxi Normal University Press. First published 1899.
- Gorman, Mel. 1977. A Survey of the Chemical Translations of John Fryer in Nineteenth-Century China. *Ambix* 24: 89–95. [CrossRef]
- Mateer, C. Wilson. 1877. Books for China. *The Chinese Recorder and Missionary Journal* 8: 427–32.
- Mateer, C. Wilson, ed. 1904. *Technical Terms, English and Chinese*. Shanghai: Presbyterian Mission Press.
- Na, Shiping 那世平. 2012. Jiangnan zhizaoju fanyiguan de xishu fanyi jiqi tedian 江南制造局翻译馆的西书翻译及其特点 [Translation and characteristics of Western books in the Translation House of Jiangnan Arsenal]. *Tushuguan Xuekan* 图书馆学刊 4: 113–16. [CrossRef]
- Qu, Wensheng. 2014. Chinese translations of legal terms in early modern period: An empirical study of the books compiled/translated by missionaries around the mid-nineteenth century. *Semiotica* 201: 167–85. [CrossRef]
- Scrimgeour, Andrew. 2016. Between lexicography and intercultural mediation: Linguistic and cultural challenges in developing the first Chinese–English dictionary. *Perspectives* 24: 444–57. [CrossRef]
- Shen, Guowei 沈国威. 2011a. *Jindai yinghua huaying cidian tijie* 近代英华英辞典解题 [Annotations to Modern English-Chinese and Chinese English Dictionaries]. Osaka 大阪: Kansai University Press 关西大学出版部.
- Shen, Guowei 沈国威. 2011b. Linian yu shijian: Jindai hanwai cidian de dansheng 理念与实践: 近代汉外辞典的诞生 [Theories and practice: The birth of modern Chinese-foreign language dictionaries]. *Xueshu Yuekan* 学术月刊 43: 121–30. [CrossRef]
- Shen, Guowei 沈国威. 2017. Ciyuan 1915 yu hanyu de jindaihua 《辞源》(1915) 与汉语的近代化 [Etymology (1915) and the modernization of the Chinese language]. *Zhongguo Chubanshi Yanjiu* 中国出版史研 4: 7–19. [CrossRef]
- Shen, Guowei 沈国威. 2020. *Xinyu wanghuan: Zhongri jindai yuyan jiaosheshi* 新语往还: 中日近代语言交涉史 [New Language Communication: A History of Modern Language Negotiations between China and Japan]. Beijing: Social Sciences Literature Press.
- Tola, Gabriele. 2017. An introduction to John Fryer's theories on translation into Chinese: Records of the General Conference of the Protestant Missionaries of China. *Journal of East Asian Cultural Interaction Studies* 10: 237–56. Available online: <https://kansai-u.repo.nii.ac.jp/record/12516/files/KU-1100-20170331-17.pdf> (accessed on 3 March 2024).
- Tola, Gabriele. 2018. John Fryer and the translator's vade-mecum. *Monumenta Serica* 66: 91–114. [CrossRef]
- Wang, Jianhui 王建辉. 1999. Jindai chuban de qunti yanjiu 近代出版的群体研究 [Studies on modern publishing groups]. *Hanjiang Luntan* 江汉论坛 4: 69–72.
- Wang, Yangzong 王扬宗. 1988. Jiangnan Zhizaoju fanyiguan shilue 江南制造局翻译馆史略 [History of the Translation House of Jiangnan Arsenal]. *Zhongguo Keji Shi Zazhi* 中国科技史杂志 3: 65–74.
- Wang, Yangzong 王扬宗. 1991. Qingmo yizhi shuhui tongyi keji shuyu gongzuo shuping 清末益智书会统一科技术语工作述评 [Review on the work of unifying scientific and technological terminology]. *Zhongguo Keji Shiliao* 中国科技史料 2: 9–19.
- Wright, David. 1996. John Fryer and the Shanghai polytechnic: Making space for science in nineteenth century China. *British Journal for the History of Science* 29: 1–16. [CrossRef]
- Wu, Xian, and Liren Zheng. 2009. Robert Morrison and the First Chinese-English Dictionary. *Journal of East Asian Libraries*, 1–12. Available online: <https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=2386&context=jeal> (accessed on 3 March 2024).
- Xiong, Yuezhi. 2011. *Xixue dongjian yu wanqing shehui* 西学东渐与晚清社会 [Eastward Spread of Western Learning and the Late Qing Dynasty]. Beijing: China Renmin University Press.
- Xu, Mingwu, and Pei Wang. 2023. Kuayue shikong de duihua——Xu Guangqi he Li Shanlan fanyi Jihe Yuanben yanjiu 跨越时空的对话——徐光启和李善兰翻译《几何原本》研究 [A dialogue across time and space: A study of Xu Guangqi and Li Shanlan's translation of Elements of Geometry]. *Zhongguo Waiyu* 中国外语 20: 98–104.
- Yan, Fu. 1902. Xu yan 序言 [Preface]. In *Shangwu Shuguan Huaying Yinyun Zidian Jicheng* 商务书馆华英音韵字典集成 [A Collection of the Commercial Press Chinese-English Bilingual Dictionary]. Edited by Lobscheid Wilhelm. Beijing: The Commercial Press.

- Yan, Fu. 1908. Xu yan 序言 [Preface]. In *Yinghua Dacidian* 英华大词典 [*English and Chinese Language Standard Dictionary*]. Edited by Huiqing Yan 颜惠庆. Beijing: The Commercial Press.
- Yang, Lifang, and Changbao Li. 2018. A Review on John Fryer's Scientific Translation in the Late Qing Dynasty. *Studies in Literature and Language* 17: 35–9.
- Yao, Xiaoping 姚小平. 2007. Zaoqi de hanwai zidian—Fandigang guancang xishi yuwen shougao shisizhong lueshu 早期的汉外字典——梵蒂冈馆藏西士语文手稿十四种略述 [The early Chinese-foreign language dictionary—A brief description of fourteen kinds of Western scholars' manuscripts in the Vatican collection]. *Dangdai Yuyanxue* 当代语言学 9: 97–116.
- Yin, Yan'an 尹延安. 2020. Shijiushiji zaihua xiren guifan xixue hanming shitan 19世纪在华西人规范西学汉名史探 [An investigation of the Westerners' standardization of Chinese terms of Western knowledge in the nineteenth century]. *Shanghai Journal of Translators* 上海翻译 6: 76–80.
- Yuan, Qing 元青. 2013. Wanqing hanying yinghan shuangyu cidian bianzuan chuban de xingqi yu fazhan 晚清汉英、英汉双语词典编纂出版的兴起与发展 [The rise and development of Chinese-English and English-Chinese bilingual dictionary compilation and publication in the late Qing dynasty]. *Jindaishi Yanjiu* 近代史研究 1: 94–106.

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