

Scientific Translation and its Social Functions: a Descriptive-Functional Approach to Scientific Textbook Translation in China

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ABSTRACT

From 1900 to 1911, a large number of scientific textbooks for primary and secondary schools from foreign countries were translated into Chinese for the purpose of introducing science education in China. These translated books have since exerted a great influence on the Chinese society. Adopting the descriptive-functional methodology and with reference to statistical analysis, this paper describes and examines this translation phenomenon, including the historical-cultural context which affected and constrained the translation selections of such textbooks, the translating process, and their criticism and social functions. The paper concludes that translated scientific textbooks influence both the surface and deep structures of Chinese traditional culture, and that their criticism should be integrated into the cultural background in order that the criticism becomes more inclusive, scientific and objective.

KEYWORDS

Translation, scientific textbooks for primary and secondary schools, history and culture, translation criticism, translation selection, social functions

1. Introduction

China's traditional culture has witnessed two major changes. Both were induced by the impact of foreign cultures, partly as a result of large-scale translation activities. The first one involved the translation of Buddhist Scripture starting from the Han Dynasty (25-220). The second one was related to scientific translation undertaken on an extensive scale in the early 20th century. The latter was led by the translation of scientific textbooks. As G. Toury suggests, "most texts were selected for ideological reasons" (cited in Gentzler 1993: 126). Though the translation of scientific textbooks surged at that time, the historical elements, conditioning the selection of the translations, shaped themselves after the Sino-Japanese War in 1894. The War shocked the whole Chinese society who came to realise the importance of introducing western knowledge to China and the necessity of reforms. An examination of the dominant ideological factors of the times can serve to provide a general picture for the understanding of the motivation for the translation selections at the macroscopic level, such as the purposes of the

translation, the translator's cultural stances and strategies, and for the investigation of the cultural functions of these translation activities.

2. Saving China by science— historical background

The Chinese Foreign Affairs Movement (1860-1894) came to an end upon the military defeat of China in the 1894 war. During this period, the doctrine advocated and prevailing in China was "Chinese learning as the foundation and western learning for the application". It was used as a guideline for the purpose of introducing western technologies to China. However, the result of the war exposed the historical limitations of such a doctrine. The translation for the purpose of "making the country rich and strong" was reduced to a visionary hope. The effect was so considerable that "the noise of the cannons in 1894 shattered into pieces the nice dreams of the numerous ministers from the School of Foreign Affairs and also acutely shocked the age-old heart of the Chinese people"(Gao, et al 1992: 5). Yan Fu (1854-1921), the great translator and enlightener in modern China, published five papers within three months from early February to early May in 1895 (Yan 1986: 1-40)¹. In one of those papers, he proposed the well-known guiding principles for saving the Chinese nation: arousing strength from the people, inspiring wisdom within the people and refreshing the minds of the people (Yan 1895: 14, 27). He further advocated the necessity of both drawing on the scientific knowledge of the western world and importing their advanced cultures of humanities and of systems, both social and political ones (Ibid: 15). Thereafter, the beliefs of "saving the nation through science" and "saving the nation through education" became the consensus of the Chinese elite intellectuals, such as Kang Youwei, Liang Qichao and Yan Fu, who claimed that the road to strengthen the country existed in education. This idea was to be taken as dogma by many magazines originated and published during the years to come (Zhang et al 1986: 694).

In order to achieve the aim of saving China by science and education, the "1902 Education System" of the Chinese Qing government was revised in 1903 by Zhang Baixi, the educational minister, among others. Many subjects in science were introduced in Chinese schools at various levels, the only exceptions being nurseries and kindergartens (Li 1997: 481-482). Nevertheless, one of the necessary conditions for the realisation of education on science then was the abolition of the Imperial Examination System. It was finally abolished in 1905 after its continuance for some one thousand years. This subsequently triggered modern science education in the new-style schools at the beginning of the 20th century. Statistics show that, during the years between 1907 and 1909, the number of primary schools approached 210,000 with the total number of pupils nearing 2.5

million, and high schools reached 1319 with 110,000 students.² This scale was unprecedented in establishing schools to promote the education of science and transmit scientific knowledge to a younger generation, which would be essential to the first cultivation of science culture on a large scale in modern China.

At that time, two pressing problems associated with the new education involved the training of teachers and the preparation of textbooks. Subsequently, proposals for sending students to study abroad, and extensive translation of books on western knowledge, flourished. Due to the influence of various factors such as political and economic ones, most Chinese students going to study abroad went to Japan instead of Europe or the USA (Chen et al 1991: 686-688; Li 1997: 736). In spite of its limitations, a large number of Chinese students went to study in Japan and teachers as well as translators were trained within a short span of time. There is no denying the fact that the initiation of modern education naturally entailed the extensive translation of books on western knowledge because China otherwise did not have them. As some contemporary intellectuals put it, "At present a new policy is being implemented and education being reformed. Consequently, although many things need to be done, the translation of textbooks is the priority." For "only the translation of a variety of textbooks is closely associated with the new-style education..." (Li 1996: 340-341). Sending Chinese students abroad was not only one part of absorbing western science culture, but prepared translators for translating western books on various subjects. Therefore, the establishment of new schools, sending students to study abroad and translating western books was closely associated with each other—studying abroad to train teachers for modern education, which in turn served to enlighten the Chinese people, and translating books that formed one of the necessary preconditions for the other aspects. It naturally followed that "the beginning of political reform resides in the prosperity of schooling and the key of the latter lies in translating books", and "translating books in particular forms the base of education" (Ibid: 94). Furthermore, various textbooks had to be translated—"Since schools now must teach western politics and western science, it is natural that textbooks of this type should be translated to satisfy the need to study western books" (Qu et al 1991: 25-31).

3. Large-scale translation of scientific textbooks

Under the policy and doctrine of "saving the nation by science" and "saving the nation by education", translation activities in China entered a new era and reached another climax. Because some materials are not accessible and a long time has passed since the publication of some translated books, it is impossible to examine each translated book in detail in this paper. In

addition, this research focuses on the cultural functions of such translation in the recipient culture. This being the case, the following elaboration will be developed around a general survey, statistical analyses, a comparative study, a description of criticism and social functions.

3.1 A general survey of the translation of scientific textbooks

The translation of scientific textbooks in modern China can be roughly divided into two phases up to the year 1894. The first stage, lasting from 1840 to 1894, is characterised by passiveness, small number and narrow scope of use. Many translated scientific textbooks were originally scientific books and were only used in a couple of very small higher education institutions. The original works were mainly selected from European and American countries and the translators were mostly western missionaries with the participation of a small number of Chinese scholar-bureaucrats.

The second stage of scientific textbook translation extends from 1894 to 1919, the latter time point indicating a new era in the history of China. Towards the end of the 19th century and the beginning of the 20th century, a new surge of translated books was promoted by the emergence of a new-style of schooling. Translation activity was then stimulated and a large number of books were translated, which exerted an extensive influence. The original works were mostly selected from Japan and translation work was carried out largely by Chinese students still studying there or who had already come home, and also by some voluntary public organisations. Scientific textbooks were translated mostly to meet the need of the newly-established schools. After this initial period, the translation of western scientific textbooks entered a new stage. They were unequalled in number and were accepted with enthusiasm though their quality was, and is, believed to be far inferior to that of translated books in the earlier era due to various historical factors (Wang 1996: 12). In addition, attention was paid to some extent to the unification of translated terms in Chinese in translated scientific textbooks.

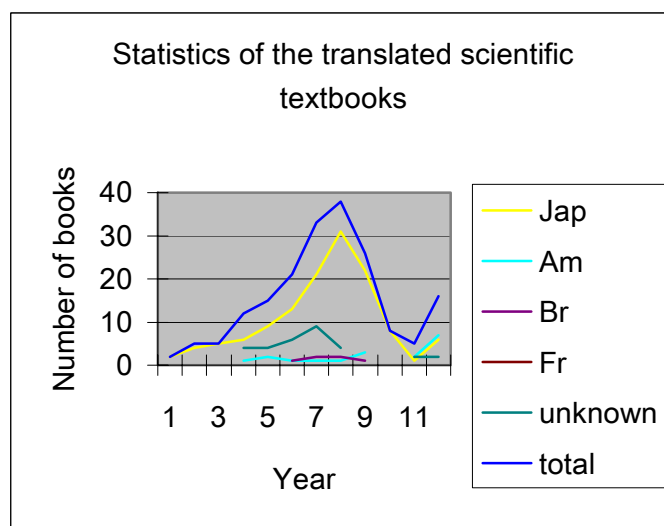
In order to provide an accurate description of the translated scientific textbooks of this period, statistics have been collected on the basis of available material sources. The latter include : *Textbooks for Primary and Secondary Schools* and the appendix *Textbooks for Primary and Secondary Schools of the Late Qing Dynasty* in *The General Bibliotheca of the Republic of China* (1911-1949); the fascicule of "natural science" in this bibliotheca also includes some scientific textbooks translated during the years from 1900 to 1911, twenty- three of which can be confirmed as textbooks and are therefore included in the statistics; *The Comprehensive Bibliotheca of China's Translated Books from Japan* also lists some translated books,

thirty-six of which are scientific textbooks, including those marked by “before 1911” while excluding the science books in an encyclopaedia translated at that time from Japanese. There are five translated books in the first source whose publication years are unknown and are therefore not counted in the final results (Beijing Library et al 1993: 262, 271, 337, 341, 350).

Fig 1 Statistics showing numbers of translated scientific textbooks for primary and secondary schools during the period 1900-1911

Year Country	1900	01	02	03	04	05	06	07	08	09	10	11	total	%
Jap	2	4	5	6	9	13	21	31	22	8	1	6	128	68.8
Am				1	2	1	1	1	3		2	7	18	9.7
Br						1	2	2	1			1	7	3.8
Fr				1									1	0.5
?		1		4	4	6	9	4			2	2	32	17.2
total	2	5	5	12	15	21	33	38	26	8	5	16	186	
%	1	2.7	2.7	6.5	8.1	11.3	17.7	20.4	14.4	4.3	2.7	8.6		100

? stands for “adaptation” and “unknown”.



Overall, these statistics reflect the profusion of scientific translation. They also give us important information regarding two points.

First, most of the scientific textbooks were translated from Japanese at the start of the 20th century, amounting to 68.8% of the total books translated; there must be some more among the 32 books classified as 'adaptation' and

'unknown' which were also translated from Japanese. In contrast, books translated from other countries add up to much smaller numbers. It has been correctly pointed out that "nearly all textbooks of natural science are translated from Japanese" (Tan 1980: 62). This selection orientation concretely materialises the ideological principle of learning from Japan and translating Japanese books to import western knowledge indirectly.

Second, there are still some books classified as 'edited' in the general bibliotheca which are actually translated in a flexible way. The two books published by The Commercial Press in 1903 were both "adapted from Japanese books on mineralogy" (Sanetou 1983: 283). Third, translations of scientific textbooks from Japanese were all undertaken by students studying in Japan or persons who learned Japanese in China. This indicates that home-made translators had become independent practitioners of translation in the new era, in striking contrast to the translation activity in the previous stage.

It is clear from Figure 1 that the climax of scientific textbook translation occurred during the years between 1903 and 1908, with 145 books translated in 6 years and accounting for 80% of the total. It is this period that witnessed the abolition of the Imperial Examination System and the large-scale implementation of the new-style education, which reflected the underlying purposes and social functions of science translation at that time. Translation in this direction declined from 1909 onwards. This can be explained by the following factors.

(1) The statistics are based on a bibliotheca including the books in three major libraries in China and some translated textbooks may have got lost. But the tendencies in the statistics still reflect the essential characteristics of scientific textbook translation at this stage.

(2) The 1902 Education System was not put into effect and it was the system established in 1903 that was officially enforced, with the result that schools at various levels began to require translation of scientific textbooks, which further mirrors the influence and constraints of socio-historical background over translation activity and its definite purposes.

(3) The momentum of initiating new schooling had been going on since 1894, but it was not until the complete abolition of the Imperial Examination System that the education system of science culture in modern China was finally established and the need for scientific textbooks accordingly proliferated.

(4) The declining number of translated scientific textbooks in 1909 shows that the ability of Chinese authors to edit textbooks independently had

improved and that their number increased. Du Yaquan, one of the best-known science translators at that time, pointed out in the preface of a translated scientific textbook that “textbooks can never adapt to the teaching work in this country unless they are compiled with new ideas” (Du 1905: i).³

Moreover, the number of publishing houses which published these translated textbooks amounted to 60. This indicates that the enterprise of publishing gradually flourished in education and translation. Furthermore, the total number of translated scientific textbooks reaches an average annual number of 24 books translated during the six years of the translation climax. This number was large even in comparison with those translated during the Republic of China.

Fig 2 Statistics for Translated Scientific textbooks for Primary and Secondary Schools during the Republic of China

	Jap	Am	others	?	total	%
1912-1918	39	10	6	12	67	38.7
1919-1936	4	30		29	63	36.4
1937-1949	2	26		15	43	24.9
total	45	66	6	56	173	
%	26	38.2	3.5	32.3		100

A comparison between Fig 1 and Fig 2 (with the same sources for statistics) indicates that the tide of scientific textbook translation sharply ebbed during the Republic of China with an average annual number of only 4 books; books translated from the Japanese reduced considerably and those from the USA rapidly increased. This indicates another shift of translation selection of the original works in the 20th century.

3.2 Detailed description of translated scientific textbooks

The direct purpose of scientific translation in the first half of the 20th century was to serve the teaching practice in the new-style schools at various levels. Translated books of this type stored in the Shanghai Library generally give such explanations in their prefaces. The “notes on the use of the book”, appended to the translated *Lectures on Chemistry—A Book of Experiments*, say that “indeed few books on chemical experiments can be found in this country and this book has been translated to fill a void” (Kametaka 1902: i). It is worth noting that, at the beginning of developing education on new knowledge, some translators resorted to translation to expound the principle of reading and academic study in order to urge students and inspire study. Du Yaquan, in the preface to a translated book, gave a detailed explanation of this topic:

There are branches of study specific to one country and there are general branches common to the world ... Among the latter, however, there are also specific branches ... Physics and chemistry may focus on the artifacts and products of one's own country, using its own materials to support them and its own language to record them ... Chemistry books in our country have been translated for 30 to 40 years. Today, however, there is only general chemistry but there is no chemistry of our own. No proper samples for a term can be found to explain essential notions; for a theory, no words can be used to clearly express its details and subtleties ... In my opinion, scholars have two responsibilities in order to absorb the general chemistry and establish one of our own: one is to import and the other is to refine. The former means to seek new knowledge from other countries as a basis of materials; the latter means to verify the new theories and methodologies from other countries. They are to be taught and popularised among our people and be substantiated with materials collected from China so as to make new findings in a branch and make contributions to the world. Then this branch will be one of our own (Du 1905: 1-2).

Needless to say, discussion of this type is still enlightening for academic studies today.

The translator of *Chemistry*, after making a comment in the Preface on the demerits of translation in previous times, entrusted great expectations from Chinese readers. The translator thought that, though modern knowledge of chemistry had spread in China for over 30 years and a few books had been translated,

... scholars in former times clung to ancient laws and disdain truth. Only a couple of intellectuals with prevision explored deeply, collecting strange ideas for study by themselves with a result of vague effect in spite of their knowledge of an outline...The Authorized Education Statute prescribes that chemistry be taught in all schools above the secondary level. I believe there must be students with excellent talents from now on who will pool their efforts to make extensive study in chemistry (Still 1903: i).

The Statute was issued and implemented in 1903 and the translated book was published in September of the same year. It serves to show that the translator cherished great hopes about western-style education in the newly-established schools. Translations in previous times exerted influence within a narrow scope, while new education was carried out on a large-scale in these new schools. As Xiong Yuezhi, one Chinese scholar, put it in one of his works cited in this paper, western knowledge imported by the way of Japan at the beginning of the 20th century is of the greatest amount and of the widest influence (Xiong 1994: 6).

Various new textbooks, which enter into thousands upon thousands of families and which a vast number of students read day and night, exert a social influence which greatly surpasses that by the famous works translated by Yan Fu, the great translator at that time (*Ibid*: 6-7).

In comparison with the books translated directly from western countries by organisations and publishing houses, the books on western knowledge translated from Japanese "exerted greater influence both in width and in depth" (*Ibid*: 7).

It is generally believed that science texts are uniform in meaning and the surface structure tends to be in harmony with the deep structure. Words used in them are expected to be precise in their explanations, avoiding ambiguity or polysemy. Nevertheless, this does not mean that there is a one-to-one correspondence between words and meanings. Therefore, translators at that time also adopted the translation method of flexible treatment:

Where there are considerable difficulties in transference, minor changes have been introduced. The main ideas of the original are preserved while shifts and additions are occasionally employed (Du 1905: i).

The original meanings which sometimes do not agree with those of Chinese have been shifted slightly after careful consideration and all the rest remain the same (Still 1903: i).

Thus translation of any type of text must resort to the combination of literal and liberal translation methods as a result of linguistic differences, only with a variation of degrees.

Translated terms have always been a crucial problem in science translation. Their study forms the basis of the discipline of terminology, which is

... concerned with the collection, description, processing, and presentation of terms, which are lexical items belonging to specialized fields of discourse. Terminologists are therefore among those in a position to investigate and to influence the development and use of specialized language. Numerous sets of guidelines have been proposed by terminology scholars...They commonly address issues such as monosemy (one-to-one relationships between terms and concepts), transparency, and conciseness" (Bowker 2001: 589-590).

Generally, translation methods for technical terms include (i) not translating the term; (ii) transliteration of the sounds into phonemes and then the graphs in language L₂; (iii) the adoption of an existing term in L₂; (iv) the

formation of a new term combining two or more existing terms or characters in L_2 ; and (v) the formation of a new character or the revival of an archaic one (Wright 2000: 204-209). It is suggested that Chinese translators in modern times tended to adopt such translation methods as employing existing characters and ready-made translated terms, translating meanings, transliteration and coining new words (Wen 2005: 87) In the actual translation of technical terms, as early as in the period of Foreign Affairs Movement, organisations such as the Translation House of Jiangnan Arsenal once made initial valuable efforts in this aspect. Led by John Fryer (1839-1928) and Xu Shou (1818-1884), it established three principles for translating technical terms: continuing to use ready-made translated terms, employing transliteration or coining new characters by adding radicals, and making Chinese-English vocabularies (Wang 1995: 15).⁴ The fundamental approach implied in its translation of chemical substances is based on the radical-phonetic principle with the only exceptions being the gases. Since this principle largely agrees with the modern tendency of coining Chinese characters by means of *xingshengzi*, viz. one part within the character indicating the sound and the other part indicating the meaning, the system of translating terms "used in all the Jiangnan Arsenal translations... eventually overcame all its rivals to be the basis of modern chemical terminology in Chinese" (Wright 2000: 339, 341). Meanwhile, of all the sixty-five chemical elements translated by Jiangnan Arsenal in *Huaxue jianyuan (Mirroring the origins of chemistry)*, 36 have continued to be used up to today (Zeng 2005: 25). These facts further indicate the great contributions made by the Jiangnan Arsenal to the translation and unification of technical terms in modern China. After that, important supplementary effort was made by Du Yaquan, who followed the aforementioned principle to translate terms for gaseous substances, using the gas radical with a phonetic component. This was again retained by the standardisers of the 20th century (Wright 2000: 349). In contrast, the Terminology Committee of the Education Association of China set up in 1890 tried in vain to standardise terminology in different ways (*Ibid*: 346-349).

At the beginning of the 20th century scholars such as Du Yaquan and Yu Heqin, and organisations such as the Translation House of the Capital University, the Translation Division set up in 1904 and the Book Translation and Editing Bureau of the new Ministry of Education also paid attention to the problem of the unification of translated science terms. For all their efforts, translated terms remained a big obstacle in scientific textbook translation for a long time, partly because "...other authors were busy inventing yet more variations in their own textbooks, picking and choosing from other systems as they saw fit" (Wright 2000: 345), and "none of the translators was willing to admit his own system was inferior to the others" (*Ibid*: 346). Translators then tended to add explanations for their own ways of treating

terms, weights and measures in the prefaces to the translated books, especially those which had never been encountered in previous translations. Du Yaquan explained that

translated works in former times have not touched any bit of the theory in this book. The translated terms cannot but move towards the Japanese original, adopting those which agree with Chinese and creating new Chinese terms on the basis of the theory when the originals do not agree with Chinese, which does not mean that the translator is fond of creation (Du 1905: i).

In translating this book, terms for minerals and organic substances were treated with different methods for the purpose of unification. For translated terms, Ma Junwu chose to "continue to use the ready-made nouns from Chinese with the occasional adoption of Japanese terms", and there were also not a few "newly created ones" (Ma 1918: i).

David Wright insightfully points out that "the state of *translated* terminology is sensitive to the cultural milieu and the circumstances in which the translations are conducted" (Wright 2000: 327). He explains that "the process of term formation is an evolutionary process, not only in the sense of 'development', but as a process which has analogies with natural selection in the biosphere" (*Ibid*: 329), but "the length and outcome of these struggles is hard to predict. Synonymous terms arise, and may coexist for long periods" (*Ibid*: 333). At last, "something approaching the peaceful, bland, compromised ecosystem of a garden is established, in which only 'cultivated' terms, which no longer compete aggressively for semantic domains, are allowed to exist" (*Ibid*: 328).

As a matter of fact, various linguistic, cultural and historical factors contributed to the confusion of translated technical terms around 1900 in China. First, translators worked in mutual isolation at the very beginning and formed their own sets of terms which competed for survival. Second, the related department of the centralised government tried at times to control the "terminological wilderness" both for practical reasons and as a demonstration of its "national and linguistic sovereignty" (Wright 2000: 327-328). Third, the approaches adopted to translate technical terms violated the norms of the recipient language, as was the case with part of the practice of the Terminology Committee. In other words, lexical importation is constrained by "the cultural compatibility of foreign items" (Amelung et al 2001: 5). Fourth, the historical context had changed and "foreign influence on the course of chemical terminology in China was already on the wane" whereas the western missionaries were still too arrogant to show any regard for book publication and to "include a single Chinese person on their committee" (Wright 2000: 349). Fifth, readers' familiarity with existing translated terms was ignored (*Ibid*: 350). Sixth, the rapid development of

chemistry in the 19th century produced a great number of chemical elements and inorganic and organic compounds and subsequently posed difficulties in establishing translated terms; by contrast, the number of terms needed in physics, astronomy, botany and mathematics was relatively small and “it was almost always possible to coin new terms by employing existing characters” (*Ibid*: 222).⁵ Seventh, the swiftness and the extent of change of lexical and cultural borrowing around 1900 had no parallel in Chinese history and “the Chinese scientific and political lexicons were almost completely displaced by new terms” (Amelung et al 2001: 2).

Such being the case, translated terms in the scientific textbooks at the beginning of the 20th century remained rather chaotic despite all those efforts both by individuals and by organisations. “Much divergence has been existing among terms in chemistry”, which left translators confused about what to choose. Terms of minerals in *Chemistry* “all follow the newly worked-out ones by School and Textbook Series Committee”, and those for organic substances “have mostly adopted terms translated by Fryer” (Still 1903: i). Translation of weights and measures was even more difficult. Since different translated books adopted different translated terms, this book “allows the original numbers to remain intact, sometimes with Chinese numbers listed to the left for reference” (*Ibid*). But most of the transliterations of weights and measures in the book are now abandoned. In addition, most of the terms in the translated book of *Botany* published in 1904 differ considerably from those now prevalent and some of the Chinese characters were even coined by the translator, which are hard to recognise and write (Wang 1993: 10). The translated terms in *Textbook of Chemistry* translated by Zeng Zonggong from the Translation House of Capital University also include some terms widely different from those prevalent ones, despite those still being adopted today (Yang 1986: 282-287). It follows that terms provided by the contemporary official authorities may still be abandoned in subsequent eras. Thus only after years or even decades of negotiation and debate were the definitions and systematic values finally settled in the new contexts and approached a uniform status (Amelung et al 2001: 1).

Naturally, the standardisation of technical terms after 1900 in China also benefited from the large number of words transmitted from Japan. That is because Japan had created new character combinations or neologisms in such fields as chemistry, botany and anatomy for the purpose of knowledge transmission (Montgomery 2000: 231):

Terms coined in Japanese typically followed the word-formation patterns of Chinese, thus allowing their smooth importation into Chinese contexts after the translation of Japanese texts was recognized as a short-cut to acquiring new knowledge (Amelung

et al 2001: 5).

A statistical investigation shows that confusion in translated chemical terms had reigned before 1920 and after that technical terms were rather uniform (He 2005: 176). In 1932 when the Ministry of Education of the Republic of China published *Huaxue mingming yuanze* (The principles of naming chemical substances), years of discussion on the translation of chemical substances finally came to a temporary end.

Modern Chinese first appeared in newspapers, the first of which must be *Hangzhou Modern Chinese Newspaper* first published in 1895 by Lin Qinnan (or Lin Shu, 1852-1924). Lin was a major literary translator, equally famous as Yan Fu, who mainly translated Western works on social science. Lin translated over one hundred novels which exerted great influence over Chinese literature and writing in the late 19th and early 20th centuries. Statistics show that over one hundred and seventy newspapers in modern Chinese were published during 1897-1918, not including those partly adopting modern Chinese (Cai 1987: 493-546). However, few translated books at that time adopted modern Chinese.⁶ Though books translated then were of new knowledge, the translation language was not modernised. In reality, the title of "students studying abroad" in the late Qing Dynasty, especially towards the end of the 19th century, was by no means a shining one as it is today. On the contrary, in the eyes of the scholar-bureaucrats, it was a title associated with such evil names as idlers, persons blindly worshipping foreign things, and those with low standards of morality and having neither learning nor skills. The lines "Learning foreign languages by mistake / The whole world decided to forsake" (Yan 1986: 586) by Yan Fu vividly reflect his depression resulting from the cold treatment by the scholar-bureaucrats for his learning foreign languages. Zhang Taiyan, a well-known traditional scholar, used as pretexts Yan Fu's studying in the west, adoring the western countries and laying a superficial foundation of Chinese learning, to ridicule him for his translation of *History of Politics* (1904). So Yan Fu formally acknowledged as his teacher the master of Tongcheng Prose School with the deliberate purpose of studying classical Chinese literature and he even "hesitated for ten days to one month for the translation of a term" (Yan 1986: 1322), which not merely represents his strict attitude in his study, but embodies his effort to demonstrate his good foundation of traditional learning of classical Chinese (Xiong 1994: 699). He claimed that his translations were for those who were familiar with classical Chinese books, which also reflects his psychological betrayal of his wish to build up a new image of students studying abroad among traditional Chinese scholar-bureaucrats (Ibid). Therefore, probably for similar reasons, those students coming back from studying abroad also translated scientific textbooks using classical Chinese, and the punctuation in translations were

also of the old style, though language norms must also have worked in this process of language choice. As late as in the last years of Qing Dynasty and even in the Republic of China (1911-1949), classical Chinese was still used in translating scientific textbooks as well as other science books (Ueno 1909; Ma 1918). In fact, many scientific translations in the later half of the Republic of China, viz., during 1930s and 1940s, still were produced in classical Chinese even though the Government issued a mandate in 1920 that schools at various levels partly adopt textbooks in modern Chinese from the autumn of that year, and that textbooks in classical Chinese be abolished from the winter of 1922. Examples are translations of such science masterpieces as *Philosophiae Naturalis Principia Mathematica* by Isaac Newton and translated in 1931, *Science et Méthode* written by Henri Poincaré (1854-1912) and translated in 1933, *An Absolute Scale of Temperature* by William Thomson (1824-1907) and translated in 1937, and *Origin of Cultivated Plants* by Alphonse de Candolle (1806-1893) and translated in 1940, to name but a few to illustrate the use of classical Chinese in scientific translation at that time.

Statistics in the above show that, from the beginning of the 20th century to the period of the May the Fourth Movement (1919), the majority of translated scientific textbooks were from Japanese originals. Nevertheless, the high number of Japanese books to be translated inevitably resulted in the poor quality of some translations. This led to more severe criticism than praise of the translated textbooks by the contemporaries. Fu Sinian offered unusual affirmation (Fu 1919), and Tan Ruqian, in his high praise of the quality of the translated scientific textbooks, said, "the translations of natural science are generally of high quality; they are mostly clear and offer good readability in addition to fine illustrations." Yet "translations at that time were often incorrect, and wanton, stiff translations and even mistranslations were very common" (Tan 1980: 62). Some magazines published at that time, such as *China's Education* (Yang 1994: 143-150) *China Daily and Foreign Countries* (Li 1996: 349-351) and *Shanghai Daily*, (Li et al 1995: 199) all published articles strongly criticising the quality of translations. In criticising the demerits and the poor quality of translations, Zhou Guisheng said,

It is rare to observe at once the three principles of faithfulness, smoothness and elegance in translating books. These days the so-called translators in the main are only capable of picking up a pen and translating literally. Otherwise they choose to copy and even plagiarise with pages full of perfunctory treatments. Translations from Japanese are characterised by new terms; translations from western languages are unavoidably filled with difficult words and awkward structures" (Zhang 1957: 58).

