或問 WAKUMON 95
No. 3 (2001) pp. 95 ~ 100

Notes on Late Qing Dictionaries of Physics

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要 旨

筆者は、この小文で物理学用語が清末において幾つかの重要な外国語辞書に収録されていく様子を紹介している。また 1908-1910 年に出版された物理学専門の辞書にも簡潔に言及した。これらの辞書の出版などに見られる編纂者や宣教師たちの積極的な取り組みがあったにもかかわらず、中国では清末までに標準的な物理学用語の選定・確立は成功しなかった。これは物理学者たちの努力により 1880 年代にすでに近代物理学用語の基礎が築き上げられた日本と全く異なる展開である。

Physics was among the first Western sciences introduced into China during the late Qing period. While prior to the very last years of the nineteenth century physics was introduced in a piecemeal fashion with great emphasis on the sub-branches of the field, the question of terminology was of great importance from the beginning. Since Western translators and their Chinese collaborators had only a very limited reservoir of traditional (or for that matter Jesuit) terms from which they could draw, the coining of new and ideally fitting terms was one of the major tasks every translator had to face. It is well known by now that these early efforts, however admirable they may have been, had only a limited effect on the eventual formation of the physical lexicon in China. Since the beginning of the twentieth century physical terms—like those in most other sciences—were mainly adapted from Japan.[1] In the case of physics, this holds true even for the modern Chinese term today for physics itself *wulixue* 物理學 which made its first appearance in China at the very end of the nineteenth century. While a specialized dictionary of physics was published in Japan as early as 1888[2] the first Chinese dictionary of physics, the *Wulixue yuhui* 物理學語彙, was only published in 1908.

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[1] For a brief overview of the problem cf. Wang Bing 王冰. 1995. "Wo guo zaoqi wulixue mingci de fanyi ji yanbian" 我國早期物理學名詞的翻譯及演變, *Ziran kexueshi yanjiu* XIV:3 , pp. 215-226.

[2] Butsurigaku yakugo kai 物理學譯語會(comp.). 1888. *Butsurigaku jutsugo Wa-Ei-Futsu-Doku taiyaku jisho* 物理學術語和英佛獨對譯字書 (Japanese-English-French-German dictionary of physical terms). Tokyo: Hakubunsha

Terms from the field of physics were of course included into general Chinese dictionaries published in the second half of the nineteenth century, e.g. Lobscheid's *Ying Hua zidian* 英華字典, (1866-69) which contains about 300 physical terms[3], most of them quite crude and hardly used by other translators; Yan Xun's *Yingzi zhinan* 英字指南(1879) which includes about 250 terms[4]; Kwong Ki-chiu's *English and Chinese Dictionary* (1882) which includes about 150 terms of physics[5], or Schlegel's *Nederlandsch-Chineesch Woordenboek* of 1886 which contains about 250 relevant terms[6].

The first more systematic attempt to come to terms which the evolving language of physics can be found in the second part of Justus Doolittle's *Ying Hua cuilin yunfu. A Vocabulary and Handbook of the Chinese Language* 英華萃林韻府 (1872/73). Doolittle's "synthesis" consists of wordlists provided by a number of translators and missionaries engaged in translation and educational work.[7] The section most relevant to physics was compiled by W.A.P. Martin. It was entitled "Terms Used in Natural Philosophy" and contained more than 650 items. Except for a number of cases the list mainly contained terms which Martin had first used in his *Gewu rumen* 格物入門.[8] Other lists relevant to the subject were "Elements of Natural Sciences", adopted from B. Hobson's Medical Vocabulary[9] and parts of A. Wylie's lists on mechanics ("Terms Used in Mechanics with Special Reference to the Steam Engine") and astronomy ("Mathematical and Astronomical Terms").[10] While certainly interesting Doolittle's effort can not be considered as particularly successful since the lists provided by

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[3] Wilhelm Lobscheid. 1866-69. *Ying Hua zidian* 英華字典. *English and Chinese Dictionary, with Punti and Mandarin Pronunciation.* Hong Kong: Daily Press Office.

[4] Yang Xun 楊勳. 1879. *Yingzi zhinan* 英字指南, Shanhai: Meihua shuguan.

[5] Kwong Ki-chiu (Kuang Qizhao 鄺其照). 1882. *Hua-Ying zidian jicheng* 英華字典集成 . *English and Chinese Dictionary.* Hong Kong.

[6] Gustave Schlegel. 1886. *He-Hua wenyu leican* 荷華文語類參. *Nederlandsch-Chineesch Woordenboek met de Transcriptie der Chineesche Karakters in het Tsiang-Tsiu Dialekt.* 13 vols. Leiden: E.J. Brill.

[7] Cf. Shen Guowei. 2001. "The Creation of Technical Terms in English-Chinese Dictionaries from the Nineteenth century", in: Michael Lackner, Iwo Amelung and Joachim Kurtz (eds.), *New Terms for New Ideas. Western Knowledge and Lexical Change in Late Imperial China,* Leiden: Brilll, p. 287-304.

[8] Martin notes that he based his list on David Ames Wells, *Wells's Natural Philosophy : for the use of schools, academies, and private students : introducing the latest results of scientific discovery and research : arranged with special reference to the practical application of physical science to the arts and the experiences of every-day life : with three hundred and seventy-five engravings.* This book was very popular at that time and saw numerous editions.

[9] Cf. Benjamin Hobson (Hexin 合信). 1858. *A Medical Vocabulary in English and Chinese. Yixue Ying Hua zishi* 醫學英華字釋 Shanghai: Shanghai Mission Press.

[10] Justus Doolittle (Lu Gongming 廬公明). 1872-1873. *Ying-Hua cuilin yunfu* 英華萃林韻府. *A Vocabulary and Handbook of the Chinese Language, romanized in the Mandarin dialect.* 2 vols. Foochow, Shanghai: Rosario, Marcal & Co.

his collaborators were by no means exhaustive. Moreover in a large number of cases different lists offered different Chinese words for the same Western (English) term. For example we find radically different terms for 'uniform motion' and 'refraction' in Wylie's and Martin's lists respectively (*pingsuxing* 平速行 and *mengqicha* 蒙氣差 vs. *dongwu kuaiman* 動物快慢 and *liangzhe* 兩折). Of course this reduced the usefulness of the dictionary and it obviously failed to exert noticeable influence on later translations of physical works, especially on the comparatively influential translations from the Jiangnan Arsenal. The same seems to hold true for a specialized French-Chinese dictionary of technical and scientific terms published in 1874 which only includes slightly more than 100 terms from the field of physics.[11]

One may speculate, however, whether Doolittle's dictionary and the French-Chinese dictionary could have exerted any influence, even if they had been more exhaustive and consistent. It is important to keep in mind that in the 1870s and 80s there was no unified "physical discourse" in China since there were no Chinese physicists communicating with each other or with their students and thus requiring a standardized vocabulary as a means for successful communication. In Japan, in contrast, the need for scientific communication was an important impetus for the compilation of the above mentioned dictionary published in 1888. Actually it was the collaborative work of Japanese physicists who met in regular intervals, which brought the completion of this dictionary about.[12]

Since there were no professional Chinese scientists interested in the compilation of specialized dictionaries, which were of course always compiled with a view on standardizing the technical terms employed, this task was to some extent taken up by translators—as for example John Fryer who was working with elaborate lists of terms in order to ensure that at least the terminology employed in his own translations remained consistent—and missionaries, who were well aware of the need of some degree of standardization and consistency. Already since 1877 protestant missionaries, organized in the "School and Textbooks Series Committee" which was renamed to "Educational Association of China" (the Chinese name for both organizations was *Yizhi shuhui* 益智書會) in 1890 made efforts to compile lists of Chinese terms which they hoped would be consistently employed in translated works. Until 1890, four lists of technical terms were published. None of these, however dealt with physics. Due to the objective difficulties of the task at hand and the numerous differences of opinion and style

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[11] *Dictionnaire Technique Français-Chinois; comprenant les terms professionnels et scientifiques employés à l'arsenal de Fou-Tcheou*. 1874.

[12] Cf. Koizumi, Kenkichiro. 1975. "The Emergence of Japan's First Physicists: 1868-1900", *Historical Studies in the Physical Sciences* VI, p. 3-108, especially p. 46-47. For a more exhaustive analysis cf. Nihon butsurigaku kai (ed.) 日本物理学会（編）. 1978. *Nihon no butsurigaku shi* 日本の物理学史, Tokyo 2 Vols.: Tokai Daigaku, Vol 1, p. 77-88.

among the translators and missionaries, the work proceeded very slowly.[13] Not until 1904 *Technical Terms. English and Chinese* was finally published, prepared mainly by Calvin Mateer.[14] This dictionary, which can rightly be considered as the first specialized Chinese dictionary of Technical terms, contained about 12.000 entries, of which about 1.700 relate to the field of physics. It is somehow ironic that this important effort exacted its first results only when physical terminology dramatically changed under Japanese influence. While *Technical Terms* certainly was better than Doolittle's effort 30 years earlier, it also shows some signs of resignation. For many English terms a number of different translations were given. The compilers marked their preference only by putting the term they considered best in front of the other terms—a rather futile gesture given the evolution of physical terminology in the years to come.

Already in the years prior to the turn of the century more and more Chinese scholars became aware of the problem of translated terms and the standardization of terminology. The statutes of the "Bureau of translation", i.e. the former *Tongwenguan* which was attached to the Imperial University in 1903, stipulated that special attention should be accorded to translated terms, without stating, however, how this should be accomplished in detail.[15] Only in 1905 the Qing government established a Board of Education (*Xuebu* 學部) to which in 1906 a "Bureau of translation" (*Bianyi tushuju* 編譯圖書局) was added, that included an office exclusively concerned with the standardization of terminology (*shendingke* 審定科). One of the first results of this office was the compilation of the above mentioned Dictionary of Physics.[16] The *Wulixue yuhui* was trilingual (Chinese-Japanese-English) and contained about 950 terms.[17] It is not clear how the *Wulixue yuhui* was compiled. An educated guess is that large parts were done by Chang Fuyuan 常福元, who was working at the *Xuebu* at that time[18] and had helped to translate a book on Western mechanics only a few years earlier[19], and that the final result was revised by Yan Fu 嚴復, who was in charge of the office responsible for standardizing terms at the *xuebu*. Yet we have not indication that the dictionary mirrored the actual state of terminology at

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[13] Cf. Wang Yangzong 王揚宗. 1991. "Qingmo Yizhi shuhui tongyi keji shuyu gongzuo shuping" 清末益智書會統一科技術語工作述評, *Zhongguo keji shiliao* XII:2, pp. 9-19.

[14] Cf. Calvin W. Mateer. 1904. *Technical Terms. English and Chinese*. Shanghai: Presbyterian Mission Press.

[15] Cf. *Jingshi daxuetang yixueguan zhangcheng* 京師大學堂譯學館章程. 1903, p. 18b.

[16] Cf. Xuebu shendingke 學部審定科. 1908. *Wulixue yuhui* 物理學語彙. Shanghai: Shangwu yinshuguan.

[17] For a very brief introduction to this dictionary cf. Zhang Chenhua 張橙華.1993. "Zhongguo di yi bu wulixue biaozhun cihui" 中國第一部物理學標準詞彙, *Zhongguo keji shiliao* XIV:3 (1993), p. 96.

[18] Cf. *Diyi lishi dang'anguan, Xuebu* 第一歷史檔案館，學部 168.

[19] Cf. Philip Magnus 馬格訥斐立. 1906. *Lixue kebian* 力學課編, tr. by Yan Wenbing 嚴文炳 and Chang Fuyuan 常福元 Beijing: Xuebu bianyi tushuju

that time. A comparison with some books on physics compiled at the same time—for example the *Jinshi wulixue jiaokeshu* 近世物理學教科書, which was also published at the *Xuebu* in 1906—reveals considerable differences. The actual number of identical terms is much smaller than the number of different ones.[20] It is equally difficult to say to what extent the dictionary was compiled with view on standardization. If it was actually, the effect was rather limited since the terminology employed later varied considerable from the one employed in the book.[21] In addition the dictionary itself was not without problems. If we leave aside the rather small number of terms included, we have to note that some very basic terms, such as statics, were missing. The Chinese terms given for "refraction" and "diffraction" were identical (*quzhe* 屈折), a fact certainly not enhancing the reliability of the book. Nonetheless, another dictionary was published that was largely based on the *Wulixue yuhui*. This dictionary was called *Deutsch-Chinesisches Verzeichnis von Fachausdrücken aus dem Gebiete der Physik und Verwandten Gebieten* (German-Chinese glossary of technical terms of physics and related areas) and did not have a Chinese title. Most of its about 1.100 terms were drawn from the the *Wulixue yuhui*. Some of the errors were tacitly corrected. The additional terms were marked by an asterisk. Most of them relate to the field of atmospheric sciences. According to its preface the book was intended to serve as a manual for students and teachers at the Deutsch-Chinesische Hochschule (German-Chinese College) in Qingdao, which had been established in 1909.[22] The dictionary was one of the first publications of the "Übersetzungsanstalt" (Translation Bureau) attached to the College which, according to official designs was founded in order to balance a perceived Anglo-American dominance in textbooks for primary and secondary education in China.[23] The dictionary can therefore be considered as a result of German cultural policy in China which has to be viewed against imperialist rivalries of the times.

On a practical level the book addressed one of the biggest problems of the German-Chinese College, namely the students' insufficient grasp of the German language and the inability of most of the teachers to speak Chinese. Since the German-Chinese College was closed after the Japanese

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[20] Cf. Seiji Nakamura 中村清二. 1906. *Jinshi wulixue jiaokeshu* 近世物理學教科書 tr. by Xuebu bianyi tushuju 學部編譯圖書局. Beijing: Xuebu bianyi tushuju.

[21] The suggestion that this book was not very influential is at least partially corrobated by the fact that it is hard to find in libraries.

[22] Cf. H. Wirtz. 1910. *Deutsch-ChinesischesVerzeichnis von Fachausdrücken aus dem Gebiete der Physik und Verwandten Gebieten.* Tsingtau: Deutsch-chinesische Hochschule, Übersetzungsanstalt.

[23] Cf. Roswitha Reinbothe. 1992. *Kulturexport und Wirtschaftsmacht. Deutsche Schulen in China vor dem Ersten Weltkrieg*, Frankfurt/M.: Verlag für interkulturelle Kommunikation.

occupation of Qingdao in 1914, the dictionary failed to exert lasting influence on the evolution of the physical lexicon in China.

Although these two dictionaries are the only specialized dictionaries of physics published during the Qing there must have been an attempt to compile a new dictionary or word-list shortly after the *Wulixue yuhui* was published. We can infer this from the entries related to physics in Karl Hemeling's *English-Chinese Dictionary* of 1916. This dictionary includes terms from a standardization effort by a Commission of the Chinese Ministry of Education directed by Yan Fu. These terms are marked by the Chinese charaters *buding* 部定 (approved by the board [of education]).[24]

While Hemeling claims that these terms had been selected in 1912 they most likely originate from the very last years of the Qing. The physical terms marked as *buding* in Hemeling's dictionary differ considerably from the *Wulixue yuhui* so that we can be certain that this dictionary was not the basis for Hemeling's work. In the case of logic, however, we have the table of terms on which Hemeling's *buding* terms were in all likelihood based.[25] Although this list was not formally published and it is not entirely clear when it was compiled there is no doubt that it must have been designed during the last three years of the Qing. We are thus entitled to assume that a new list or a table of terms of physics had been prepared around the same time. This list or table, however, has not been found up to now.[26]

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[24] Cf. Karl Ernst Georg Hemeling. 1916. *English-Chinese Dictionary of the Standard Chinese Spoken Language and Handbook for Translators, including Scientific, Technical, Modern and Documentary Terms.* 官話. Shanghai: Statistical Department of the Inspectorate General of Customs.

[25] Cf. *Bianxue ding mingci duizhaobiao fu xinlixue ji lunlixue mingci duizhaobiao* 辦學訂名詞對照表附心理學及論理學名詞對照表. Beijing: Bianding mingciguan no year.

[26] I checked the archives of the *Xuebu* in the first Historical Archives in Beijing and was not able to retrieve any hint to relevant dictionaries or lists.