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## Standardization of Chinese Scientific Loanwords

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The scientific loanwords are an important portion of Chinese vocabulary. The standardization of Chinese scientific loanwords is very important for the modernization of the science and technology.

How to translate these loanwords from donor language into Chinese language?

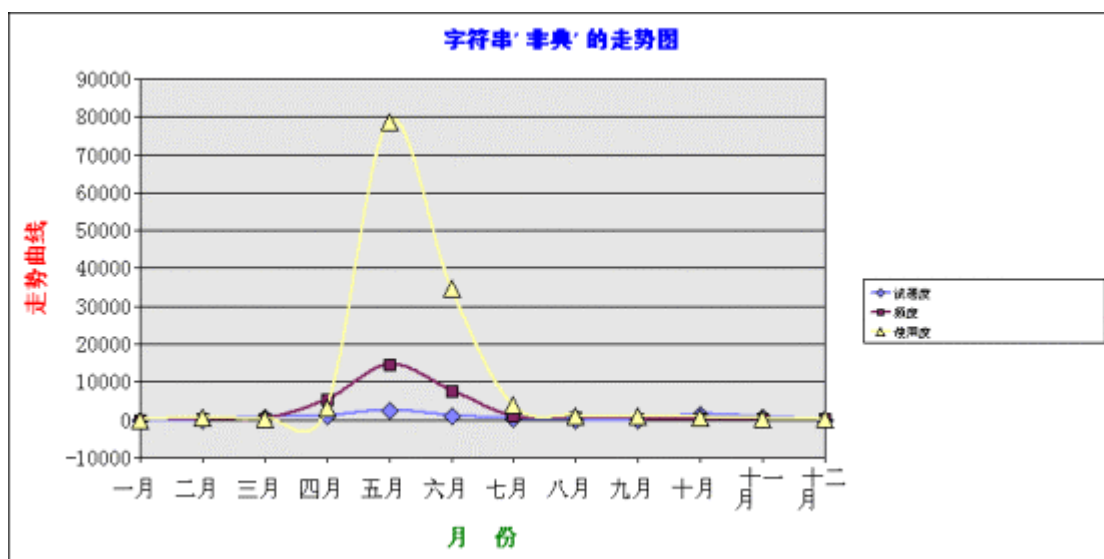
We have two selections: one is to translate the words in donor language into phonemic loanwords; another one is to translate them into semantic loanwords. We can also combine these two approaches and to translate them into semi-phonemic & semi-semantic loanwords.

Semantic loanwords: Atypical Pneumonia → 非典型肺炎/fei dianxing feiyan/ → 非典/feidian/. 非典/feidian/ is Chinese abbreviation of semantic loanword 非典型肺炎/fei dianxing feiyan/. Another semantic loanwords: Severe Acute Respiratory Syndrome → 严重急性呼吸系統綜合症/yanzhong jixing huxi xitong zonghezhen/.

The English abbreviation of “Severe Acute Respiratory Syndrome” is SARS, so phonemic loanword of SARS is : SARS → 薩斯/sasi/ (in China) or 沙斯/shasi/ (in Singapore).

Semi-phonemic & semi-semantic loanwords: SARS → 薩斯/sasi/(SARS) + 病 /bing/ (disease).

The semantic loanwords use original Chinese words or morphemes to translate the meaning of the words in donor language. They are relatively easy to learn and to memorize for common people, so the semantic loanwords became the main trend for translation of loanwords. Now in the documents of government, we prefer to use the shortest semantic loanword “非典”。In according to statistics on corpus including 400 million words, “非典” is a popular loanword in 2003 in China.



The usage trend of semantic loanword “非典” /feidian/ in 2003

However, there are many types of “非典” disease, the Severe Acute Respiratory Syndrome is only one type of “非典”. There are different types of “非典” in the medicine. In recent day, a famous medicine expert Dr. Zhong Nanshan (钟南山) pointed out that “非典” is not so exact translation for the Severe Acute Respiratory Syndrome. Some scholar believe that phonemic loanword SARS is better than semantic loanword “非典”. How can we translate Severe Acute Respiratory Syndrome to Chinese? It is until a problem for us.

Obviously, the translation of scientific loanwords is very difficult. The Chinese scholars discuss this problem for a long time.

Mr. Xuan Zang (玄奘, 600-664) proposed the principle of loanword translation: “既须求真, 又须喻俗” /ji xu qiu zhen, you xu yu su /(loyal to donor language, easy understandable for common people in recipient language).

Mr. Yan Fu (严复, 1853-1921) described the difficulty of creation of new loanwords: “一名之立, 旬月踟躇” /yi ming zhi li, xun Yue chouchu/(For creation of a new loanword, it needs to consider for several months).

Mr. Zhou Youguang (周有光, 1906 - ) said: “一名之定, 十年难期” /yi ming zhi ding, shi nian nan qi/(For confirmation of the translation of a new loanword, it needs more than 10 years time).

Therefore the creation and confirmation of loanwords is a very difficult work. The government must support this work, and must take attention to it.

In the end of Qing Dynasty, the necessary for unification of scientific loanwords became more and more acute. In 1909, the Ministry of Education assigned Mr. Yan Fu to compile the concordance table between the foreign scientific words and its Chinese equivalents for all the disciplines. In the same time, the Ministry of Education sets up the Agency for elaboration of scientific loanwords. It is the first organization for verification of scientific loanwords in China.

After the Revolution 1911, the association for research of teaching of physics and chemistry attached to Jiangsu Education Association firstly verified the loanwords in the domain of physics and chemistry. China Association of Medicine organized to verify the medical loanwords. In 1915, the scientific loanwords in the fields of chemistry, physics, mathematics, zoology, biology and medicine were verified. In 1918, China Science Association proposed a project for the verification of scientific loanwords. In the next year, the Commission for Verification of Scientific Terminology was founded, and in 1923 this commission published the summary of vocabulary on mineralogy and geology. In 1931, this commission verified the scientific loanwords for 14 disciplines.

In 1932, the National Translation Bureau set up. This bureau is responsible for the verification and the examination of scientific loanwords in China. Under the support of the Ministry of Education in that moment, this Bureau organized the symposiums to discuss the scientific loanwords on the fields of astronomy, physics and mathematics. In 1933, this Bureau published the principles for the formation of chemistry terminology. In 1934, it published the draft of physics terminology. In 1935, it published the lexicon of mathematics. In 1936, it published the draft of mineralogy. In 1939, it published the lexicon of meteorology. Before 1949, in the field of biology, several drafts of terminology in following subfields were published: comparative anatomy, entomology, cytology, histology, phytopathology, botanic, vegetal ecology, common horticulture, ornamental horticulture, etc. In the end of 1949, the draft of terminology of mineralogy, human geography, electro-mechanics, and mechanics also were published.

In 1950, The Translation Bureau of Chinese Academy set up. It collects all the drafts of terminology proposed by the National Translation Bureau.

In 6<sup>th</sup> April of 1950, the Committee for Scientific Terminology Unification set up. This Committee is sub-divided into 5 groups: natural science, social science, medicine & hygiene, literature, arts. Chinese Academy takes the responsibility of the group of natural science including following disciplines: astronomy, mathematics, physics, chemistry, zoology, botanic, geology, geography, geophysics, construction, agronomy, etc. In 1956, the commission for edition and publication of Chinese Academy set up the Bureau of terminology. This Bureau is responsible for the unification of scientific loanwords in the country. In the beginning of 1960s this Bureau became the Bureau of terminology directly under the Chinese Academy. In the period of culture revolution, the work for the unification of scientific loanwords was totally stopped.

In 1978, Chinese Academy plans to set up the National Commission for Unification of Terminology of Natural Sciences. Under this Committee there are several sub-Committees respectively for mathematics, physics, chemistry, astronomy, earth science, biology science, technical science, agricultural science, medicine, etc. A series of standard terminology in different subject fields were published. In 25<sup>th</sup> April of 1985, the National Commission for Unification of Terminology of Natural Sciences officially setup in Beijing.

The duties of this Commission are as following:

- Study and fix the orientation and concrete measure for the unification of terminology of natural sciences.
- Elaborate the plans of long time and the programs of short time for the work of unification of natural sciences.
- Take the propaganda for the urgent and important of the unification of terminology of natural sciences in the modernization of sciences and technologies.
- Coordinate the principles for unification of terminology of natural sciences and scientific symbols.
- Organize the research work of terminology of natural sciences, collect the documents and information about the terminology, study and fix the principle and method.
- Establish the relation with the different international institutions of terminology in order to harmonize the elaboration of terminology of natural sciences.
- Establish the relation with institutions of Hong Kong, Taiwan and Macao through different canals and exchange the terminology in the field of natural sciences.

For example, in the domain of mathematics, diverse lexicons were published: <Lexicon of Mathematics> (1956), <Supplement Lexicon of Mathematics > (1964), <English-Chinese Lexicon of Mathematics> (1974). In order to harmonize the terminology of mathematics, the Commission for unification of mathematics terminology set up and it holds the first meeting in 1987. Some principles are proposed for the unification of mathematics terminology. For example, when a conception is represented by two or plus terms, it is necessary to decide one between them -- 公理/gongli/ : 公设/gongshe/ (for 'axiom'), 无穷/wuqiong/ : 无限/wuxian/ (for 'infinite'). However, when it can not be decided, there is possibility to reserved the different terms -- 矢量/shiliang/ : 向量/xiangliang/ (for 'vector'), 算子/suanzi/ : 算符/suanfu/ (for 'operator'). Some times, It is also possible to take the terms which already decided in other discipline. For example, in the case 既约 /jiyue/ : 不可约 /bukeyue/ (for 'irreducible'), it exists already the normal term 不可约 in physics, so mathematics can adopt it as the reasonable term.

In order to respond the new necessary, the National Commission for Unification of Terminology of Natural Sciences is renamed as the National Commission for Unification of Terminology of Sciences and Technology. The 'sciences and technology' is replaced the 'natural sciences'. Until now, the Commission took four conferences already.

In 1985, the national Bureau of Technique Supervision created the National Technical Committee of Terminology Standardization which is responsible for the standardization of terminology

A series of national standards for terminology data-bank are promulgated:

- GB 1.6-88, Directive for terminology work. Rules for edition of terminology standard, 1988,
- GB 10112-88, Principles and methods of terminology, 1988.

- GB 11617-89, Symbols for lexicography, 1989.
- GB 15237.1-94, Glossary of terminology, 1994.
- GB/T 13725-92, General principles and methods for establishing terminology data bank, 1992.
- GB/T 13726-92, Magnetic tape exchange format for terminological/lexicographical records, 1992.
- GB/T 15387.2-94, Guideline for the development of terminology data banks, 1994.
- GB/T 15387.1-94, Guideline for the documentation for developing terminology data bank, 1994.
- GB/T 15625-1995, Guideline for the evaluation of terminology data banks, 1995.

A lot of terminology data-banks are created:

- Terminology data bank on machinery: 250,000 terms, Chinese – English – French – German – Russian - Japanese, Institute for Scientific and Technical Information, the Ministry of Machinery, 1989.
- Thesaurus bank on agriculture: Chinese-English, 25,000 terms, Chinese Academy for Agriculture, 1991.
- Thesaurus bank on chemical industry: Chinese-English, 25,000 terms, China Information Center of Chemical Industry, 1989.
- Encyclopedia terminology data bank: Chinese-English, there are definition and explanation for every term, 180,000 terms, China Encyclopedia Press, 1995.
- Terminology data bank for standardization: Chinese-English, China Standard center.
- Comprehensive scientific terminology data bank: Chinese-English, 50,000 terms, Institute of Scientific and technical Information of China (ISTIC).

In the age of rapid advances in technology as well as in numerous scientific and technical disciplines, competition becomes ever more acute – and the need for standard, unified scientific loanwords increases, especially in China, given the particularities of its language and writing system. The standardization of scientific loanwords in China will become more and more important.

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