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张韵菲

A Course on English Translation of Chinese for Science and Technology

汉英科技翻译教程

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Foreword

It is never easy to master a foreign language, much less so when one's goal is to master it so well that he or she can translate into it from other languages. It may be even more challenging to translate in a specific genre, say science and technology, as it takes not only proficiency in the general language, but, often more importantly, a considerable knowledge of the specific field, as well as the linguistic regularities therewith associated.

There is no lack of textbooks available out there that aim to instruct on translation in the field of science and technology, though less can be found to deal with translating from Chinese to English than the other way around for understandable reasons. However, they come not without flaws. First, in spite of what the titles promise, a good portion of such textbooks are not really that scientific. What is meant is that they draw materials from the field of science, but show a general disinterest in the language of science itself, dwelling unduly on the so-called translation techniques, which can be found in abundance in the general-purpose translation courses. Second, the examples and exercises in not a few textbooks on English Translation of CST (Chinese for science and technology) want improvement, due to the insufficiency of good and relevant examples of C-E translation. Third, mainstream translation textbooks often display some degree of insensitivity to the real practice of the language service industry, which is a pity given their aim of cultivating professionals for the latter.

This textbook seeks to make up on the above fronts, among others. Materials are organized around stylistic features of the language of science, arming translation learners with a much needed knowledge of the particular register of the language they are expected to understand and write in. Extra efforts have been made to provide sufficient examples and exercises of good quality, and abundant examples from the real language service industry are included for the benefit of those readers who

want a clue as to how translation is actually done in reality.

As the world becomes smaller, and the tentacles of cross-cultural communications reach into every nook of the globe, more translators are called for. The situation is particularly urgent in China. The country has adopted an ambitious initiative to present its cultural and economic prowess to the rest of the world, and is therefore in great need of talents who can help with the process. However, competent translators, especially those who excel in translating from Chinese to English, are hard to come by. The journey is long and there is still a lot of work to done, but we hope this textbook can be a tiny part of the grand design.

Wu Jian

Nov. 28, 2014

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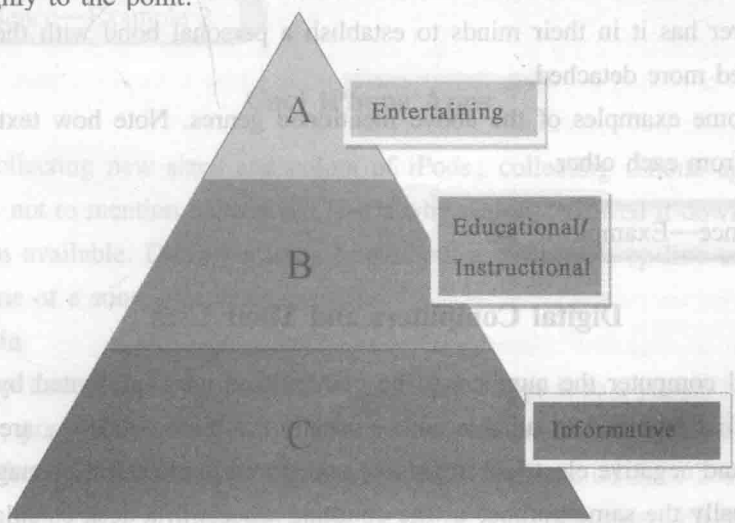
Chapter 1 A Brief Introduction to Scientific Translation

1. Defining scientific translation

Scientific Translation refers to the transmission, wholly or partially, faithfully or freely, of information in scientific texts across two or more languages. Here "scientific" is rather an umbrella term that subsumes a broad variety of genres, ranging from plainly-worded articles for popularization purposes, to the highly technical ones targeted at professionals.

The readers should be warned against a confusion of terminology about scientific translation and technical translation, as the latter is an even broader term including almost all translation activities except literary translation. Therefore, loosely speaking, technical translation is exchangeable with non-literary translation.

Generally speaking, translators working in this field expect to encounter texts whose purpose is to transmit information. However, the rigidity with which the transport of information is demanded does vary. While academic papers generally attempt at accuracy of information, popular science articles allow the writer a certain degree of freedom with rhetoric. If we were to divide all scientific texts in terms of the functions they serve, the following classification would be roughly to the point.



1.1 Informative Function

Informativeness is the major function of scientific texts, most typically exemplified in academic papers.

1.2 Educational/Instructional Function

The purpose of certain texts is providing instructions on how to complete a given task, e.g. a user's manual for an electronic device, or a popular science article designed to educate.

1.3 Entertaining

Some texts exist to provide information; however, they make a point of delivering the information in an interesting approach. Not a few science books are written in very vivid languages, and with eye-catching illustrations.

Different functions demand different styles of language to deliver the message in. As we move up the echelon, the expectation of the formalness of language eases and the writer is allowed increasing freedom to individualize his or her message.

It is worth pointing out that the three functions are often found in overlapping coexistence in a single text. The important variant is which one takes precedence.

For example, a popular science article would only include non-entertaining facts written in a very serious tone if it mainly aims at providing information; or it can lighten up its tone and weave those same facts in a stylistically appealing manner.

The same can be said about user's manuals. Some manuals are written in an informal tone as the manufacturer has it in their minds to establish a personal bond with the users, while others are rendered more detached.

Below are some examples of the above mentioned genres. Note how texts of the same genre can differ from each other.

Popular Science—Example 1

Digital Computers and Their Uses

In the digital computer the numbers to be manipulated are represented by sequences of digits which are first recorded in suitable code—usually the binary code—, are often converted into positive and negative electrical impulses, and stored in electrical or magnetic registers which serve basically the same purpose as the counting wheels in a desk calculating machine.

The technique of making the computer carry out a particular calculation is known as "programming", which involves first breaking the calculation down into a sequence of arithmetic operations, and then preparing a series of instructions which cause the computer to carry out the required operations on the stored information in the correct order. It is now possible to add or subtract two large numbers in one to two microseconds, and to multiply or divide them in ten to twenty microseconds, so that a computer can perform as much arithmetic in a quarter of an hour as an efficient clerk with pencil and paper might reasonably hope to achieve in a lifetime.

These are many situations in which this ability to handle and to analyze large quantities of arithmetic data according to instructions is of great value. Some examples are fields of scientific investigation such as crystallography, atomic physics and astronomy, where masses of experimental data are involved and complex theoretical concepts need to be tested against them; in engineering design where the design parameters, of which there are many, can be varied systematically and their effects studied and optimized; and for the storage of reference data in libraries and insurance offices in such a way as to afford ready access to particular references on request.

A particular important application of the digital computer in simplified form is as a component in the control equipment of manufacturing processes—as the nerve centre which accumulates and analyzes data recording the operating conditions and performances of the plant, and sends out instructions, when appropriate, for their modification. This is one aspect of what is called "automation"—the replacement of human control by instrumental control. The completely automatic factory is no longer a fantasy. What is restraining its realization are the difficulties in handling the severe economic considerations and the complex human problems involved.

Popular Science—Example 2

Cool iPhone Apps

Just like collecting new sizes and colors of iPods, collecting iPhone apps can become quite addicting, not to mention expensive. That's why we've narrowed it down to the 15 Coolest iPhone Apps available. Don't get lost, be without a witty pick up line or struggle to remember the name of a song ever again.

Bargain Bin

We all know that a hipster having the coolest iPhone apps is to a yuppie having a Lamborghini, but alas, you've already spent all of your cash on the iPhone. But don't fret, pick of Bargain Bin, a free app that lets you know when other apps are on sale. Sort by Bargain or Free and build your library of impressive and excessive apps with ease! FREE Source

Band Name Generator

One of the most important decisions a Rock Band can make is choosing a Band Name. Your band's name will reflect the essence of the band, and the decision could potentially break you up before your first gig. Therefore it shouldn't be taken lightly. A decision this important could effect your game forever, and Sleepy Homicide Kittens will never make it to the top with a lesser name. That's why you need Band Name Generator. $0.99 Source

IDrink

Sometimes you're just already too hammered to relay your favorite drink to the bartender... or that weird chick you went home with. It's a good thing there's iDrink, which contains 4500 cocktail recipes, and lets you edit or add your own concoctions. And if you're not concerned what exactly what kind of booze goes in you, there's a fun randomize button to help you really mix things up. $4.99 Source

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Instruction—example 1

Notes on the LCD screen, electronic viewfinder, lens, and image sensor

- The LCD screen and electronic viewfinder are manufactured using extremely high-precision technology so over 99.99% of the pixels are operational for effective use. However, there may be some tiny black points and/or bright points (white, red, blue or green in color) that constantly appear on the LCD screen and electronic viewfinder. These points are normal in the manufacturing process and do not affect the images in any way.
- Do not hold the camera by taking hold of the LCD screen.
- Do not expose the camera to sunlight or shoot sunward for a long time. The internal mechanism may be damaged. If sunlight is focused on a nearby object, it may cause a fire.
- There is a magnet on the back and around the rotating shaft of the hinge part of the LCD screen. Do not bring anything that is easily affected by a magnet, such as floppy disk, credit cards near the LCD screen.
- Images may trail across on the screen in a cold location. This is not a malfunction. When turning on the camera in a cold location, the screen may become temporarily dark. When the camera warms up, the screen will function normally.

Instruction—example 2

How to Keep Homemade Cookies Soft

Cookies are delicious, especially when they're warm, soft, and chewy. Those are the best qualities you want in a cookie. But when they become hard enough to break your tooth,

that's when you hardly want a cookie anymore. But you want to save them and keep them soft, right? Here's how to keep the homemade cookies everyone loves nice and soft.

Step 1: Add some extra butter to the recipe. Consider your sugar to butter amount carefully. If you have more sugar than butter, you will usually have a harder, flatter cookie, but if you have a little extra butter, you will have a softer, more chewy cookie. Even though it's a little more calories to add to your system, they will stay much softer.

Step 2: Don't let them burn. If cookies burn, they will start off hard, not just turn hard. Take them out a little after they turn golden brown, which means you may need to watch them constantly. If you make them perfect, you can keep them soft for a while.

Step 3: Let the cookies sit for a little while. Allow the cookies to cool for about two or three minutes, and after, transport them to a cooling rack for about ten to twenty minutes. By doing this, they can dry quicker and stay fresh. Make sure that they are totally cooled before you put them away.

Step 4: Add some applesauce. If you put in about a quarter of the amount of oil called for in the recipe with applesauce instead, your cookies will stay a bit softer and give your cookies a little fruity taste.

Step 5: Store your cookies correctly. Keep your cookies in an air-tight container and shut it tight. If air gets in because it isn't closed correctly, the cookies are more likely to harden. Put the container in the refrigerator (it will keep them cold; just be sure to let them defrost for a few minutes before eating them), but shut the container correctly before placing it in.

Step 6: Add a slice of bread. This is a classic trick used for many cookies. Adding half a slice of bread to the cookies' container makes them absorb the moisture of the bread and stay fresh and soft. It will become hard in a few days though, so be sure to change it.

2. Scientific translation and the current state of affairs

2.1 A brief look back

Translation is a millennium-old profession, tracing back to the early years of human civilization when people speaking different dialects needed to communicate with each other, to negotiate peace or for other purposes. While oral interpretation has a much longer history, its written counterpart appeared much later for understandable reasons.

Scientific translation in China has its root in the cultural and economic exchanges between the Central China-based East Han Dynasty(25 – 220) and other parts of Asia. A highlight of the exchanges was the introduction of Buddhist scriptures from Ancient India to

China, and with it, some texts of ancient Indian medicines, astrology and mathematics too.

Scientific translation welcomed its first boom in the Sui (581－618) and Tang (618－907) Dynasties, when China strengthened and extended its tentacles of cultural exchanges beyond its neighbors towards farther destinations. Arabian medicine, for example, was also recorded in the Tang Dynasty.

A good portion of scientific and technological exchanges of the times came along with the inflow of Buddhist sutra—a principal product of cultural transmission spanning from Han Dynasty to Tang Dynasty. Xuan Zang, a monk of Tang Dynasty, was an active messenger for Sino-Indian cultural exchanges, and was predominantly remembered as the greatest translator of Buddhist sutra.

The appearance of woodblock printing technology in the ninth century further facilitated China's exchanges with foreign cultures.

Despite its debut in the Tang Dynasty, Arabian sciences had not become a respectable target for China's massive scientific translation until the Song and Yuan Dynasty. As Genghis Khan of the Yuan Dynasty ambitiously expanded China into an empire that spanned from Asia to Europe, Arab gradually replaced India as China's major partner of cultural exchanges.

The Renaissance in the 16th century Europe marked the rise of the continent as a world power, as it saw leaps and bounds in its technological development, while China remained very much stagnant. The Ming Dynasty saw an increasing number of European missionaries in China promoting Christianity, bringing with them advanced western sciences and technologies. Geography was among the first disciplines the missionaries had enlightened the Chinese on, marking the beginning of China's long quest for western sciences, which has lasted till the very present. Xu Guangqi(1562－1633) was a forerunner of China's scientific translation.

The first science book translated into Chinese was Euclid's *Elements of Geometry*, dictated by Matteo Ricci(1552－1610), an Italian missionary who figured heavily in China's cultural exchanges with Europe.

The intellectuals of Qing Dynasty were even more shocked by China's backwardness in science and technology and therefore more determined and actively engaged in introducing to China western science. Lin Zexu and Wei Yuan, both officials of Qing Dynasty, pioneered the mission. Their first attempt was on the geographic front too, as Lin Zexu first had a book on the world geography translated into Chinese and then provided materials to help Wei Yuan compile the famous *Illustrated Treatise on the Maritime Kingdoms.*

To learn the western sciences better, the Reformists in the Qing Government established schools to cultivate translators, which further boosted translation in multiple fields of sciences.

2.2 Current state of affairs

Today, scientific translation has advanced to occupy a prominent niche on the contemporary translation scene.

As the world witnesses a breathtaking speed in the development of science and technology, all nations feel an increasing need to import and export the "primary productive force". Multinational companies such as APPLE need to distribute its user's books in as many languages as it wishes to export its products to. New researches around the world vie for publication in English—an international language. A bidding proposal needs to be presented to the authority in the local language. The list is practically endless.

If we calculate the global need for technological exchanges across languages in terms of market value, the number could be in billions. China, on its rise to becoming a global power as both an importer and exporter, will with little doubt be a significant part of the global market.

A survey by the author of the book indicates scientific translation accounts for nearly 90 percent of the business of quite a few translation service providers.

As the market grows, so does the need for professionals. Unfortunately, qualified scientific translators have been found in lack, a stumbling block for both translation service companies and education institutions to overcome.

3. Assessing scientific translation

Translation, like all finished products, is to be evaluated by certain standards. The idea of quality applies here no less than any other context, which begs the question: What is a good piece of scientific translation? What are the criteria?

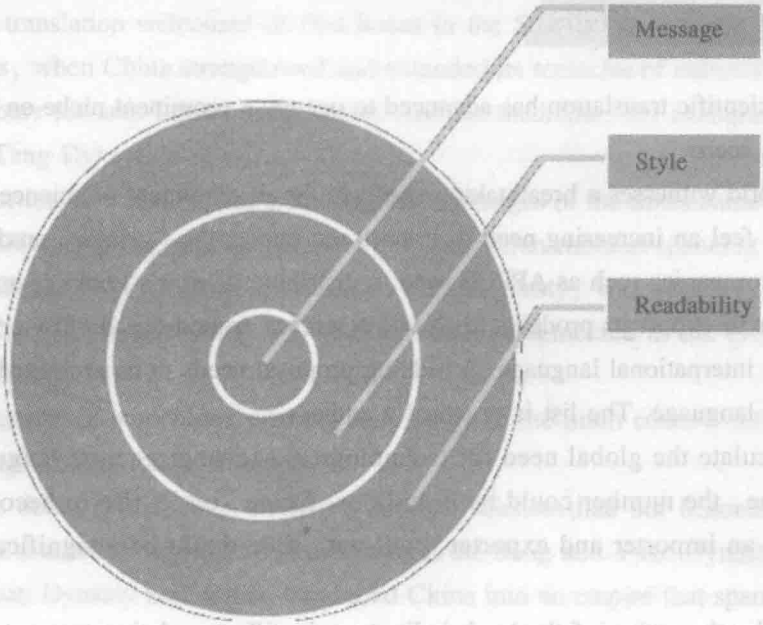
Before dealing with that question, we would better begin with the broader issue of translation in general and then proceed to specific genres.

One important factor that any given act of translation evaluation shall take into account is **Text Typology.** Different types of texts serve different functions, target at different readerships and therefore shall be assessed in a different light.

For example, good translations of academic papers, as mentioned above, shall retain the original information in a very rigid sense; when rendering a piece of popular science into a different language, the translator needs to keep their eyes open for all the stylistic devices that make the source texts not only informative but also entertaining.

There are generally three yardsticks by which any given translation product can be

assessed: message (information/function); style; and readability.



3.1 Faithful message (information/function)

Faithful message is always the golden rule of translation. But there are two ways of interpreting what faithfulness actually means. One is information, the other being the communicative function.

As far as the translation of scientific texts is concerned, the accuracy of information cannot be emphasized enough. The translation of some texts, such as academic papers, is almost entirely pivoted upon how accurately or faithfully the information is transplanted to the target language.

For other types of texts, faithfulness in message may not be confined to hard information, but its communicative function shall also receive due attention. For example, the translator of a commercial would give precedence to the communicative effect of his translation rather than a rigid reproduction of the information of the original.

It should be pointed out, however, that certain translation acts only seek to represent part of the original message, an act known as edition-translation often applied for very practical purposes. For example, a purchase manager may only require his or her assistant to glean and translate essential information about a potential supplier so he or she can make informed decisions.

3.2 Faithful style

Language is never just about what is said, but also, sometimes even more importantly, about how it is said. The meaning of a text resides partly in the message it conveys, and partly in the way the message is delivered. For example, a research paper published in a peer-reviewed journal would strike one as being highly formal—formal vocabulary, involuted syntax, impersonal tone, etc, which contributes to transmitting the impression of objectiveness. This formal style shall have to be faithfully represented in the target text.

3.3 Readability

Faithful message and style would be enough for an acceptable translation in most cases. However, a rigid assessor would expect a piece of translation to have the good qualities of the target language as if it had been composed by a good writer in the said language. For example, we would expect a Chinese-English translation to avoid repetitiveness that is often found in Chinese texts.

Let's take a look at an example to try out the principles laid out above.

Original

风能、水能、太阳能等清洁能源属于地域性资源，本身无法直接输送，必须转化为电能并通过电网供应到户。电网可以为清洁能源开发、输送、利用提供平台，推动能源供应体系实现低碳发展。

Translation 1

Clean energies like wind energy, hydropower energy, and solar energy, are all regional resources, so they can't be transported by themselves, and must be changed into electricity power and then supplied to homes through the power grid. Power grid can provide a platform for the development, transportation and utilization of clean energies.

Translation 2

Clean energies such as wind power, hydro energy and solar power are highly region-confined resources that can only be transformed into electricity and then transmitted to individual households through the power grid, a platform for the development, transmission and utilization of clean energies that can drive energy supply systems low carbon.

Both translations have retained the essential message or information of the original text. However, the use of such informal vocabulary "like", "home", "change" as well as the conjunction word "so" suggests a lack of formalness that is essential to the original text, while the second translation has obviously given better thought to the stylistic factor. And then, the second translation is in comparison more concise and compact, a desirable quality of

scientific texts.

4. Training towards a professional translator

4.1 A breakdown of translational competence

There are roughly six parameters of translational competence.

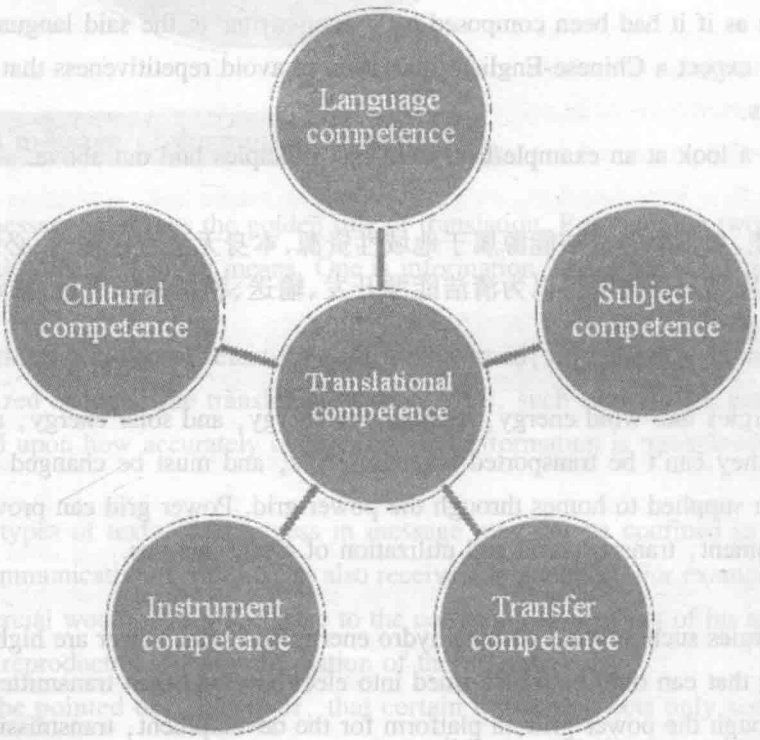
(1) language competence

(2) subject competence

(3) cultural competence

(4) instrument competence

(5) transfer competence



It is roughly the interplay of these kinds of competence that distinguishes translation from other areas of communication. To be precise, (1), (2), (3), and to some extent also (4) are shared with other types of communications, whereas transfer competence is the distinguishing domain of translation, and it is also the one that integrates all the other skills.

4.1.1 Language competence

Language competence is the core of translational competence. As a matter of fact, language competence is so important that many are misled to believing it to be the only building block of one's capacity to translate. Once we have tried our own hands in the profession we would immediately realize that the idea is a complete misconception.

Language competence is most often interpreted to be the ability to understand and produce in a given language, and it can only be acquired through a continuous process of practicing over a considerable span of time.

If we define language competence in looser terms, we can extend it to include the user's proficiency in the stylistic nuances of involved languages.

For example, a competent user of a language is expected to not only be able to express a certain idea in the language, but also accomplish the task in the most context-appropriate way. And by the same token, he or she shall have a good knowledge of the entire stylistic reservoir of the language.

Generally speaking, being a good translator automatically entails language proficiency, however, a good language user still needs to take some training to become a good translator.

4.1.2 Cultural competence

A qualified translator shall be one well equipped with awareness of the source and target culture, as translation is essentially an act of intercultural exchange. Cultural competence goes deeper than a knowledge of a couple of facts of history or customs. It is a deep understanding of how the speakers of one language think and perceive the world, and package the message of the original text with optimal cultural relevance to the speakers of the target language.

When translating a tourism brochure from Chinese to English, for example, a trained translator would know better than retaining all the empty, sometimes repetitive, rhetoric and present to the reader an appropriately-styled one that is more relevant and therefore makes more sense to the western ear.

4.1.3 Subject competence

Even a well-trained translator often finds himself or herself struggling with the exact meaning of a simple piece of description, despite its simple vocabulary and approachable syntax. Below is an example.

Design techniques considered include formal models of structured programming, stepwise refinement, segmentation, top-down design, data abstraction, information hiding and object oriented development. Modern programming language will be used.