

南京航空航天大学『十二五』规划教材·科技英语系列教材

科技英语翻译

A Practical Course of EIT Translation

主编 谢小苑



凸显技巧实践的结合
知识性实用性相结合
系统性针对性相结合
同类著作中独树一帜



国防工业出版社
National Defense Industry Press

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主编

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内 容 简 介

本书系统介绍翻译的基础知识和科技英语翻译中词法、句法、章法和文体的特点及翻译技巧,通过各种科技文体的翻译实践,使学生掌握基本的翻译技能并达到一定的熟练程度。

本书共 12 个单元,每个单元由 3 个部分组成。第一部分是“讲座”,主要讲解翻译基础知识,介绍科技英语翻译中词法、句法、章法和文体的主要特点与翻译技巧。每一讲之后的“即学即测”,精选了内容丰富、形式多样的练习,巩固学生已学的知识。第二部分是“课文”,课文内容突出科技特色,课文注释力求简明扼要,突出重点,讲清难点。第三部分是“拓展阅读”,每单元一篇文章,与课文话题相同,是对课文内容的拓展,目的是给学生提供更多的翻译实践机会,同时,通过大量阅读增加词汇量,开阔视野。书后附有每单元的练习答案,便于学生核对和自主学习。所附译文,仅供对照参考。

本书适合作为高校非英语专业本科生的科技英语翻译教材,也可供广大科技人员和科技英语爱好者阅读参考。

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前 言 | Preface

随着世界经济全球化、科技一体化、文化多元化进程的加速,国家和社会对非英语专业人才的外语能力提出了新的要求,对大学英语教学提出了新的挑战。为适应新形势,满足新时期国家和社会对人才培养的需求,南京航空航天大学实施了新一轮大学英语教学改革,重点是加强大学英语课程的内涵建设,突出知识构建、能力培养和文化素质的提高,使学生的英语知识、能力、素质得到协调发展,培养具有国际视野、做世界公民和未来开拓者人才,实现新形势下大学英语教学的可持续发展,促进大学英语课程的长远发展。

《科技英语阅读》《科技英语翻译》和《科技英语写作》,是南京航空航天大学新一轮大学英语教学改革探索和专业学术英语教学团队教学实践积累的成果,旨在帮助学生顺利阅读和翻译所学专业的英语文献和资料,并能用英语撰写所学专业的简短报告和论文。我们期待该套教材能为学生知识—能力—素质的协调发展和外语能力的提升提供一个良好的契机和新的生长点。

《科技英语翻译》具有以下特色:

1. 技巧与实践相结合

本书在编排上力求有所创新,突显技巧与实践的紧密结合。本书以“讲座”的形式讲解科技英语翻译中词法、句法、章法和文体的翻译技巧,以各类科技文体的翻译作为实践内容。翻译技巧“讲座”既体现科技英语翻译的规律和方法技巧,又提供大量的例句和相应的翻译实践,做到讲练结合;“课文”及“拓展阅读”的翻译实践以翻译理论与技巧为指导,做到学用结合。

2. 知识性与实用性相结合

本书的编写注重实用,内容力求做到深入浅出、通俗易懂,目的是帮助学生学会科技英语翻译的基础知识和技能。本书所选课文、译例和练习内容涉及科学与技术的许多学科领域,如物理科学、地球科学、生命科学、航空、航天、民航、计算机、机械工程等,学生在学习翻译技巧与进行翻译实践的同时,也可以了解其他许多学科知识,扩大科技英语的词汇量,开阔视野,提高科学文化素养。

3. 系统性与针对性相结合

本书编者认为,一本较好的科技英语翻译教材应该研究学习者本身的特点和与之关联的工作、社会、未来等的需求,应该结合学习者所学专业及相关学科。因此,本书针对高校大学生(尤其是理工科学生)的特点,按照用人单位的需求,系统介绍翻译的基础知识、科技英语翻译各层次的特点及翻译技巧,重点讲解学生在翻译中常碰到的各种问题及解决方法,选择学生未来工作中会经常接触到的文体形式及来源于实际运用中的语言材料,帮助学生尽快了解其所感兴趣的领域,以适应实际工作和满足社会的需要。

本书得以付梓,离不开方方面面的支持。首先,本书作为江苏省高等学校外语教学研究会项目“新形势下大学英语教学团队建设研究”、南京航空航天大学“十二五”本科教学建设项目“国际化人才培养视野下的大学英语教学改革”、南京航空航天大学“十二五”第二批规划教材建设立项项目的研究成果之一,我们对各项项目的资助表示感谢。其次,感谢南京航空航天大学的各级领导,尤其是教务处及教材科领导的支持,他们在经费和政策上的大力支持为本书的顺利出版提供了有力的保障。再次,感谢参与教材修订的 ESP 教学团队成员,他们在《科技英语翻译技巧与实践》(2008)的基础上,对本书内容进行补充和更新,使其更具南京航空航天大学的“航空、航天、民航”特色,日臻完善。本书在编写过程中,参考了国内外出版的相关书刊并引用了部分资料,在此向有关作者和单位表示诚挚的感谢。

由于编者水平和经验有限,书中不当之处在所难免,祈请同行专家和广大读者斧正。

编者

2014年9月于南京航空航天大学

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Lecture

科技英语的特点

Features of English for Science & Technology

随着世界科技发展的日新月异和我国对外科技交流的日益频繁,科技英语翻译的重要性越来越清楚地显现出来。为了更好地促进科技交流,促进国民经济的发展,同时也为了提高自身的专业素质,保证职业生涯的成功,大学生很有必要了解科技英语翻译方面的知识。本书主要讨论科技英语翻译技巧,但在谈技巧之前先介绍科技英语及其特点。

1 科技英语 (English for Science and Technology)

科技英语是一种重要的英语语体,也称作科技文体。它是随着科学技术的发展而形成的一种独立的文体形式。科技英语既涵盖自然科学领域的各种知识和技术,也包括社会科学的各个领域,如用英语撰写的有关自然科学和社会科学的学术著作、论文、实验报告、专利、产品说明书等。

由于科技英语有别于普通英语,因此,自 20 世纪 70 年代以来,科技英语引起了国际上广泛的注意和研究,并在教育领域成为一种专业,科技英语的重要性日益明显。

但是,仍有一些人对科技英语的重要性不以为然。他们认为,只要懂英语语法和一些科技词汇,就能理解科技英语,即科技英语 = 英语语法 + 科技词汇。其实,科技英语并不像他们想象的那样简单。科技英语在词汇、语法和文体上都具有自己的特点,表现出了语言的多样性。

2 科技英语的特点 (Features of English for Science & Technology)

为了能准确、简洁、明了地叙述自然现象,事实及其发展过程、性质和特征,科技人员喜欢在文章中使用一些典型的句型和大量的专业术语,因而形成科技英语自身的特色。本节主要通过列举实例阐明科技英语在词汇、语法和文体上

的特点。

2.1 词汇特点

大量使用科技术语是科技英语的基本特点,这是因为科技方面的专业术语是构成科技理论的语言基础,其语义单一且严谨。为了概括社会科学和自然科学方面的现象,揭示客观事物的发展规律,科技英语必须使用表义确切的专业术语。

例 1

Some of the most common methods of inputting information are to use *magnetic tape*, *disks*, and *terminals*. The computer's *input device* (which might be a *keyboard*, a *tape drive* or *disk drive*, depending on the *medium* used in inputting information) reads the information into the computer. For outputting information, two common devices used are a *printer* which prints the new information on paper, or a *CRT display screen* which shows the results on a TV-like screen.

输入信息的一些最普通的方法是使用磁带、磁盘和终端。计算机的输入装置(依据输入信息时使用的媒体,可能是键盘、磁带机或磁盘驱动器)把信息读入到计算机内。对于输出信息,有两种常用的装置:把新信息打印在纸上的打印机,或在类似电视的荧屏上显示结果的阴极射线管显示屏。

2.2 语法特点

科技英语在词法和句法等的运用上和普通英语不同,词法上主要表现在大量使用名词化结构,句法上主要表现在时态的不同用法,广泛使用被动语态,大量使用非限定动词和大量使用长句。

2.2.1 大量使用名词化结构

科技英语在词法上的显著特点是大量使用名词化结构。大量使用名词化结构主要指广泛使用能表示动作或状态的抽象名词或起名词功用的非限定动词。科技文章的任务是叙述事实和论证推断,因而科技文体要求行文简洁、表达客观、内容确切、信息量大,大量使用名词化结构正好符合科技文体的要求。

例 2

Archimedes first discovered the principle *of displacement of water by solid bodies*.

(= Archimedes first discovered the principle that water is displaced by solid bodies.)

阿基米德最先发现固体排水的原理。

2.2.2 时态的不同用法

尽管科技英语中常用的时态有一般现在时、一般过去时和现在完成时,但一般现在时是最常用的时态。在大多数的科技文章中,科技人员会使用“无时间

性”的一般现在时(Timeless Present)。这是因为科技书籍包含关于科学知识的现状,关于科学知识的各种实验以及如何利用这些信息的信息。

在科技英语中,一般过去时和现在完成时这两种过去时态常用在科技发展史、科技报告和科技报刊杂志(即有关科学和科学家的新闻报道)中。

例 3

An experiment to measure atmospheric pressure (after Torricelli)

First, a long glass tube *is* taken. The tube *is* closed at the top and *is* then completely filled with water. Next it *is* placed vertically in a large barrel half-full of water. When the bottom of the tube *is* opened, the water level in the tube only *falls* to a height of approximately 10 meters above the water level in the barrel. As a result, a vacuum *is* left in the upper part of the tube. The water in the tube *is* supported by the atmospheric pressure. The height of the column of water *can* therefore be used to measure atmospheric pressure.

测量大气压力的实验(仿照托里拆利)

首先取一根长玻璃管,将顶端封闭并盛满水,然后竖直地放在一只水半满的大桶中。当管底开放时,管中的水面只下降到桶水面之上大约 10 米高度处,结果在管的上部留下真空。管内的水为大气压力所支撑,因此水柱的高度可用来测量大气压力。

2.2.3 广泛使用被动语态

根据英国利兹大学 John Swales 的统计,科技英语中大概有三分之一的动词是被动语态。这是因为科技英语叙述的往往是客体,即客观的事物、现象或过程,而主体往往是从事实验、研究和分析的人或装置。使用被动语态比较客观,还能使读者的注意力集中在客体上。

例 4

For this reason, computers *can be defined* as very-high-speed electronic device which accept information in the form of instructions called a program and characters called data, perform mathematical and / or logical operations on the information, and then supply results of these operations.

因此,可以把计算机定义为一种高速运作的电子设备。它以被叫做程序的指令和被称作数据的字符的形式接收信息,并对这些信息执行数学的和(或)逻辑的操作,然后提供这些操作的结果。

例 5

Computers *are thought to* have many remarkable powers.

人们认为计算机有许多神奇的功能。

2.2.4 大量使用非限定动词

科技文章要求行文简练,结构紧凑。因此,科技英语中大量使用非限定动词,即分词、不定式和动名词,特别是分词。

例 6

The computer's input device (which might be a keyboard, a tape drive or disk drive, **depending on** the medium **used** in inputting information) reads the information into the computer.

计算机的输入装置(依据输入信息时使用的媒体,可能是键盘、磁带机或磁盘驱动器)把信息读入到计算机内。

2.2.5 大量使用长复句

科技文章逻辑严密,结构紧凑,因此,科技英语中往往出现许多长句。长句一般有两种:一种是带有较多的定语和状语的简单句,一种是包含多个从句(如定语从句、状语从句)或分句的复合句与并列复合句。

例 7

A computer cannot do anything unless a person tells it what to do and gives it the appropriate information; **but** because electric pulses can move at the speed of light, a computer can carry out vast numbers of arithmetic-logical operations almost instantaneously.

如果人们不指示它做什么,也不给它提供适当的信息,计算机便不能做任何事,但是因为电子脉冲能够以光速运动,所以计算机能够瞬间就执行大量算术—逻辑运算。

科技英语在语法上的特点还表现在文章中常出现表示逻辑关系的连接词。这是因为科技英语重视叙事的逻辑性、层次感和转折、对比以及推出前提、列出条件、导出结论等论证手段。如:

例 8

Computers are thought to have many remarkable powers. **However**, most computers, whether large or small, have three basic capabilities. **First**, computers have circuits for performing arithmetic operations, such as: addition, subtraction, multiplication, division and exponentiation. **Second**, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of much use. **However**, certain computers (commonly minicomputers and microcomputers) are used to control directly things such as robots, aircraft navigation systems, medical instruments, etc.

...

Third, computers have circuits which can make decisions. The kinds of decisions which computer circuits can make are not of the type: “Who would win a war between two countries?” or “Who is the richest person in the world?” Unfortunately, the computer can only decide three things, namely: Is one number less than another? Are two numbers equal? And, is one number greater than another?

人们认为计算机有许多神奇的功能。然而,大多数计算机,无论大小,都有三种基本功能。**第一**,计算机有执行算术运算的电路,如加、减、乘、除和取幂。**第二**,计算机有与用户交流的方法。如果我们不能对其提供信息并取回结果,这些计算机毕竟不会有太大用处。然而,某些计算机(通常是小型计算机和微型计算机)被用来直接控制事物,例如:机器人、飞机导航系统、医疗设备等。

.....

第三,计算机有能够做判定的电路。遗憾的是,计算机系统做不出“两个国家谁将赢得这场战争?”或“谁是最富有的人?”这样的判定。计算机只能判断三件事:一个数是否小于另一个数?两个数是否相等?以及一个数是否大于另一个数?

2.3 文体特点

科技英语在文体上的特点可归纳为:逻辑连贯、思维准确、严密、陈述客观、表达清晰、精炼。作为一种文体,科技英语非常注重逻辑上的连贯,思维上的准确和严密,表达上的清晰与精炼,以客观的风格陈述事实和揭示真理。因此,科技英语避免表露个人感情,力求少用或不用充满感情色彩的词,尽力避免使用旨在加强语言感染力的各种修辞格。请看下面例子。

例9

The general layout of the illumination system and lenses of the electron microscope corresponds to the layout of the light microscope. The electron “gun” which produces the electrons is equivalent to the light source of the optical microscope. The electrons are accelerated by a high-voltage potential (usually 40,000 to, 100,000 volts), and pass through a condenser lens system usually composed of two magnetic lenses. The system concentrates the beam on to the specimen, and the objective lens provides the primary magnification. The final images in the electron microscope must be projected on to a phosphor-coated screen so that it can be seen. For this reason, the lenses that are equivalent of the eyepiece in an optical microscope are called “projector” lenses.

电子显微镜的聚光系统和透镜的设计与光学显微镜的设计是一致的。电子

“枪”可以产生电子束,电子束相当于光学显微镜的光源。电子被高压(通常为40000~100000伏)的电位差加速,穿过聚光镜系统。聚光镜通常由两组磁透镜组成。聚光镜系统可将电子束聚集在样品上,并且物镜可对样品进行初级放大。电子显微镜的最终成像被投射到涂磷的荧光屏上,以便进行观察。正是由于这个原因,这些相当于光学显微镜目镜的透镜称为“投影镜”。

通过以上的讲座,我们对科技英语在词汇、语法和文体上的特点有了一个比较全面的了解,但真正要翻译好科技文章还需进一步了解科技翻译的特点以及各种翻译技巧,还需进行大量的翻译实践。

Quiz

1. Put the following sentences into Chinese, paying attention to the features of EST.
1. The substitution of some rolling friction for sliding friction results in a very considerable reduction in friction.
2. Nature rubber is obtained from rubber trees as a white, milky liquid known as latex. This is treated with acid and dried, before being dispatched to countries all over the world.
3. Today the electronic computer is widely used in solving mathematical problems having to do with weather forecasting and putting satellite into orbit.
4. When steam is condensed again to water, the same amount of heat is given out as it was taken in when the steam was formed.
5. In radiation, thermal energy is transformed into radiant energy, similar in nature to light.
6. This position was completely reversed by Haber's development of the utilization of nitrogen from the air.
7. Two-eyed, present-day man has no need of such microscopic delicacy in his vision.
8. This is an electrical method, which is most promising when the water is brackish.
9. It was understood that atoms were the smallest elements. It is known now that atoms are further divided into nuclei and electrons, neutrons and protons, etc.
10. If there had not been any air in the cooling system, the effect of cooling would not have been affected and the temperature could not have been kept so low.
11. Experiments show that there is a definite relationship between the electrical pressure that makes a current flow, the rate at which the electricity flows and the re-

sistance of the object or objects through which the current passes.

12. The efforts that have been made to explain optical phenomena by means of the hypothesis of a medium having the same physical character as an elastic solid body led, in the first instance, to the understanding of a concrete example of a medium which can transmit transverse vibration but later to the definite conclusion that there is no luminiferous (发光的) medium having the physical character assumed in the hypothesis.

Text

Pure and Applied Science⁽¹⁾

As students of science⁽²⁾ you are probably sometimes puzzled by the terms “pure” and “applied” science. Are these two totally different activities, having little or no interconnection, as is often implied? Let us begin by examining what is done by each.⁽³⁾

Pure science is primarily concerned with the development of theories (or, as they are frequently called, models) establishing relationships between the phenomena of the universe.⁽⁴⁾ When they are sufficiently validated, these theories (hypotheses, models) become the working laws or principles of science. In carrying out this work, the pure scientist usually disregards its application to practical affairs, confining his attention to explanations of how and why events occur. Hence, in physics, the equations describing the behavior of fundamental particles, or in biology, the establishment of the life cycle of a particular species of insect living in a Polar environment,⁽⁵⁾ are said to be examples of pure science (basic research), having no apparent connection (for the moment) with technology, i. e. applied science.

Applied science, on the other hand, is directly concerned with the application of the working laws of pure science to the practical affairs of life, and to increasing man's control over his environment, thus leading to the development of new techniques, processes and machines.⁽⁶⁾ Such activities as investigating the strength and uses of materials, extending the findings of pure mathematics to improve the sampling procedures used in agriculture or the social sciences, and developing the potentialities of atomic energy, are all examples of the work of the applied scientist or technologist.

It is evident that many branches of applied science are practical extensions of

purely theoretical or experimental work. Thus the study of radioactivity began as a piece of pure research, but its results are now applied in a great number of different ways—in cancer treatment in medicine, the development of fertilizers in agriculture, the study of metal-fatigue in engineering, in methods of estimating the ages of objects in anthropology and geology, etc. Conversely, work in applied science and technology frequently acts as a direct stimulus to the development of pure science. Such an interaction occurs, for example, when the technologist, in applying a particular concept of pure science to a practical problem, reveals a gap or limitation in the theoretical model, thus pointing the way for further basic research. Often a further interaction occurs, since the pure scientist is unable to undertake this further research until another technologist provides him with more highly-developed instruments.

It seems, then, ⁽⁷⁾ that these two branches of science are mutually dependent and interacting, and that the so-called division ⁽⁸⁾ between the pure scientist and the applied scientist is more apparent than real.

New Words and Expressions

be concerned with 涉及到

validate 有效

disregard 不顾,不理

confine 限制

potentiality 潜力

fertilizer 肥料

conversely 相反地,另一方面

stimulus 刺激(物),促进因素

mutually 相互地

division 区分

apparent 明显的

Notes

(1) 本文选自徐世延译注的《基础科技英语教程》一书。

(2) students of science 理科学生,本文为学习自然科学的学生,也可译为理工科学生。

(3) 句中 examine 意为检查,审查,考查。全句直译为:让我们从考查各自所做的开始吧。

(4) 句中 establishing 引起的分词短语,是修饰 theories 的。全句直译:理论科学涉及的是确立把宇宙间的种种现象联系起来的理论(或者人们通常所称的模型)。

(5) Polar 指的是南极和北极,Polar environment 说的是南、北两极极其寒冷

的环境。

(6) 句中 the development of new techniques, processes and machines, 直译是“发展新技术、新工艺、新机器”,但翻译成汉语时 development 采用了三种不同的搭配。

(7) then 在这里有承接前文、总结全文的意义。

(8) so-called division 指形式上的区分,real 是 real division, 指实质上的区分。

Exercises 1

I. Find out the English equivalents of the following Chinese terms from the passage.

- | | |
|------------|---------|
| 1. 理论科学 | 6. 生命周期 |
| 2. 应用科学 | 7. 方程式 |
| 3. 模型 | 8. 放射性 |
| 4. 假设 | 9. 金属疲劳 |
| 5. 现行的科学定律 | 10. 人类学 |

II. Translate the following sentences into Chinese.

1. Pure science is primarily concerned with the development of theories (or, as they are frequently called, models) establishing relationships between the phenomena of the universe.
2. In carrying out this work, the pure scientist usually disregards its application to practical affairs, confining his attention to explanations of how and why events occur.
3. Such activities as investigating the strength and uses of materials, extending the findings of materials, extending the findings of pure mathematics to improve the sampling procedures used in agriculture or the social sciences, and developing the potentialities of atomic energy, are all examples of the work of the applied scientist or technologist.
4. It is evident that many branches of applied science are practical extensions of purely theoretical or experimental work.
5. It seems, then, that these two branches of science are mutually dependent and interacting, and that the so-called division between the pure scientist and the applied scientist is more apparent than real.