Unit One

Science and Technology

Part A Lecture

科技英语的特点

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。为了更好地促进国民经济发展、加强科技交流，同时也为了提高自身的专业素质，大学生需要学习并掌握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 科技英语概述

科技英语是一种重要的英语语体，也称科技文体。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。

科技英语有别于通用英语。自 20 世纪 70 年代以来，科技英语就引发了国际上的广泛关注，并在教育领域成为一门专业，科技英语的重要性日益突显。有人认为，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。

2 科技英语的特点

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的方法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等方面的现象，揭示客观事物的发展规律，科技英语必须使用表意明确的专业术语。

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 ***key-board,*** 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, and 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**，输入装置可能是**键盘**、**磁带机**或**磁盘驱动器**）把信息读入计算机内。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**，以及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的运用上和通用英语不同，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复句。

➤ 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作用的非限定动词。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。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知识的信息。

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、科技报告和科技报纸杂志（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。当管的底部打开时，管中的水面只下降到大桶水面之上大约 10 米高度处。结果，在管的上部就会留下真空。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 devices 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。它以指令（称为程序）和字符（称为数据）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

科技文章要求语言简练，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.

计算机不能做任何事情，除非人们告诉它做什么并且给它一些恰当的信息；但是因为电子脉冲能够以光速运动，所以计算机能够瞬间执行大量算术—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。

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 directly control 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，都具有三种基本功能。第一，计算机有执行算术运算的电路系统，如加、减、乘、除和取幂。第二，计算机有与用户交流的方法。毕竟，如果我们不能输入信息并取回结果，这些机器也就不会有太大用处。然而，某些计算机（通常是小型计算机和微型计算机）被用来直接控制物体，如机器人、飞机导航系统、医疗设备等。第三，计算机有能够做出判断的电路系统。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“谁是世界上最富有的人?”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，表达上的清晰与精练，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，尽量避免使用旨在加强语言感染力的各种修辞格。

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 onto the specimen, and the objective lens provides the primary magnification. The final images in the electron microscope must be projected onto 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总体设计与光学显微镜的设计是一致的。产生电子束的电子“枪”相当于光学显微镜的光源。电子被高压（通常为 40,000 伏—100,000 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，并由物镜提供主要的放大倍率。电子显微镜的最终成像被投射到磷光屏上，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被称为“投影镜”。

通过以上讲解，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认识，但要真正翻译好科技文章，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. Translate the following sentences into Chinese. While translating, pay more 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.

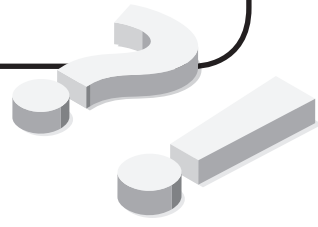
(8) This is an electrical method, which is most promising when the water is brackish.

(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 among the electrical pressure that makes a current flow, the rate at which the electricity flows and the resistance 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.



Part B Reading

Pure and Applied Science

As students of science[1], 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.[2]

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.[3] 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[4], 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 one's control over his environment, thus leading to the development of new techniques, processes and machines.[5] 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