新编 21 世纪高等职业教育电子信息类规划教材·电气自动化技术专业

自动控制专业英语

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内 容 简 介

本教材按模块式结构编写。全书共分 3 个单元，每单元 5 课，共 15 课。参考学时数为 40 学时。各单元精心选编了包括电子技术、机电一体化技术和自动控制技术方面相关的专业文章和英语词汇，并系统地介绍了科技英语常用的语法知识和翻译技巧。教材内容由浅入深、循序渐进，每课都附有一定数量的练习和相应的阅读材料，以巩固所学知识。

本书可作为高职高专自动化类、机电类及其他相关专业的教材，也可供工程技术人员参考使用。

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前　　言

随着当今科学技术的发展，尤其是电子、微电子、信息技术和自动化技术的发展，大多数工作岗位的技术含量越来越高，对操作人员的素质和技能要求也越来越高。高职教育的目标是培养具有高等职业技能的应用型人才。专业英语的教学目的是指导学生查阅有关专业的外文专刊和文献资料，培养学生阅读英语科技资料的能力，使其能以英语为工具，获取有关专业所需的信息，从而更好地适应社会的需求。

本教材是为高职高专学生在完成了三年普通英语的学习，并具有一定的专业知识的基础上，进一步提高和巩固英语水平，特别是提高阅读科技及本专业英文资料的能力而筹备编写的。在编写过程中，重点考虑了三个方面的因素：首先是专业的宽口径要求教材有很好的通用性；其次是职业教育的应用性特征要求教材具备较强的实用性；再次是目前学生就业形式的多样化以及我国已加入 WTO 这一社会背景要求教材具有一定的前瞻性。因此，全书共分三个单元：第一单元是电子线路和计算机相关的专业英语；第二单元是机电一体化技术相关的专业英语；第三单元是自动控制技术相关的专业英语。文章选自各类书刊、杂志、科学文献，内容力求科学性、知识性和语言的规范化，并由浅入深，循序渐进。每篇课文后均配备生词表、长难句解析和一定数量的理解性练习，并附有阅读材料，以扩大学生的阅读面，训练快速阅读的能力。在翻译方面，介绍了科技英语的语法特点和翻译技巧，使学生能更准确地阅读和翻译科技英语资料。

本教材由沈宏老师（河南职业技术师范学院）担任主编，并编写了第一单元的 Lesson 1～Lesson 3 和第三单元的 Lesson 11～Lesson 15。黄俐丽老师（浙江工商职业技术学院）编写了第一单元的 Lesson 4～Lesson 5 以及全书的语法和翻译技巧，孔晓红老师（河南职业技术师范学院）编写了第二单元的 Lesson 6～Lesson 10。

由于时间仓促，编者水平有限，书中难免存在缺陷、不足和疏漏之处，恳请广大读者批评指正。

编　　者

2003 年 5 月

Contents

UNIT Ⅰ　Foundation

Lesson 1

Electrical Engineering (1)

As early as the latter part of the 16th century, experimenters were exploring the behavior of static electricity. W. Gilbert experimented with electric charges and discharges. In 1750 Benjamin Franklin proved that lightning was electrical in nature. ①Neither investigator discovered anything that was significant from the standpoint of the applications of electricity. Discovery of the presence of magnetism in certain rocks preceded the earliest knowledge of electricity. Such knowledge was common about 600 B. C. Applications of electrical knowledge were completely absent in this era.

In 1800 A. volta discovered the principle of the electric battery. ②The voltaic cell was one of the most important discoveries in the history of the electrical art , because it provided a continuous source of appreciable amounts of electric power at reasonably low voltage. It was an essential component of the early communication systems, such as the telephone and telegraph.

The first United States' patent on the electrical telegraph was obtained by J. Groat in 1800. The invention of a practical electromagnet was announced by Joseph Henry in 1827. These inventions by Groat and Henry opened the way for a still more significant invention, the electromagnetic telegraph. The principle of this forerunner of the communications industry was conceived in 1831, proven practical in 1837, and patented in 1840 by Samuel. F. B. Morse.

③Few developments have had greater impact on American life than Morse's invention. His idea paved the way for the first system of electrical communication, the telegraph. This in turn led to the telephone and later to the wireless telegraph.

The discovery of electromagnetic induction by Michael Faraday in 1831 established many principles for modern machines. Motors, generators, transformers, and many other electrical devices found in heavy electrical industry were made possible by the discoveries of Faraday. The contributions of Faraday in the electrical power industry are comparable to those of Morse in the field of communications.

One of the first important developments based on the disclosures of Faraday was the electric dynamo. English patent No.1858 describes the principle of operation. In the following years many types of DC generators were developed and used commercially. The Gramme-ring armature was one of the first used in conjunction with a commutator. This machine was somewhat inefficient, but it provided a source of relatively high voltage at a reasonably large power capacity (up to 100 kW).

With the development of the high-resistance carbon filament lamp by Thomas Edison in 1880, the DC generator became one of the essential components of the constant-potential lighting system. Commercial lighting and residential lighting became practical and the electric light and power industry were born. One of the most common uses for direct current during this period was for street lighting.

The first transformer was announced in 1883. This device probably did more to revolutionize the systems of power transmission than any other. The advantages of high-voltage low-current systems over the low-voltage high-current systems of power transmission were well-known. Following the discovery of the transformer, power could be generated at low voltages, transformed to higher voltages for transmission over great distances (several hundred miles), and then reduced by transformers to lower values for utilization.

In 1888 N. Tesla was granted a patent on the poly phase AC induction motor, which soon became the most commonly used motor for supplying large amounts of power in its improved state. It is most extensively used today.

In 1876 Alexander Graham Bell invented the telephone. This device was soon put into use and, as a result, another huge industry was established.

New Words and Phrases

1. explore [iks'plɔ:] v. **探索；研究**
2. static ['stætik] a. **静电的；静止的；静态的**
3. investigator [in'vestigeitə] n. **调查员；研究者**
4. standpoint ['stændpɔint] n. **观点；立足点；立场**
5. magnetism ['mægnitizəm] n. **磁；磁场；磁力**
6. voltaic [vɔl'teiik] a. **（由化学作用产生的）电流的；伏打（式）的**
7. appreciable [ə'pri:ʃəbl] a. **明显的；可观的**
8. electromagnet [i'lektrəu'mægnit] n. **电磁铁；电磁体**
9. forerunner ['fɔ:ˌrʌnə] n. **先驱者；祖先；先兆**
10. patent ['peitənt] n. **专利（权）；专利品**
11. contribution [ˌkɔntri'bju:ʃən] n. **贡献；影响**
12. dynamo ['dainəməu] n. **直流发电机**
13. armature ['ɑ:mətjuə] n. **电枢；转子**
14. commutator ['kɔmjuteitə] n. **换向器；整流器**
15. filament ['filəmənt] n. **灯丝**
16. somewhat ['sʌmhwɔt] ad. **稍微；有点儿**
17. transformer [træns'fɔmə] n. **变压器**
18. in turn **挨次；依次**
19. as a result **结果**
20. polyphase ['pɔlifeiz] a. **多相的**

Notes

① Neither investigator discovered anything that was significant from the standpoint of the applications of electricity.

研究人员没有发现任何立足于电流应用方面的重要线索。

② The voltaic cell was one of the most important discoveries in the history of the electrical art, because it provided a continuous source of appreciable amounts of electric power at reasonably low voltage.

伏打电池是电子技术发展史上最重要的发现之一，因为它能够在适度的低电压条件下提供可观的持续电流。

③ Few developments have had greater impact on American life than Morse's invention.

几乎没有任何进步能像摩尔斯的发明那样给美国民众带来如此巨大的影响。

Exercises

1．依据课文填空

(1) In 1750 (   ) proved that lightning was electrical in nature.

(2) In 1800 (   ) discovered the principle of the electric battery.

(3) The first United States' patent on the electrical telegraph was obtained by (   ) in 1800.

(4) The contributions of (   ) in the electrical power industry are comparable to those of (   ) in the field of communications.

(5) In 1888 (   ) was granted a patent on the poly phase AC induction motor.

2．英译汉

(1) As early as the latter part of the 16th century, experimenters were exploring the behavior of static electricity.

(2) These inventions by Groat and Henry opened the way for a still more significant invention, the electromagnetic telegraph.

(3) The principle of this forerunner of the communications industry was conceived in 1831, proven practical in 1837, and patented in 1840 by Samuel. F. B. Morse.

3．汉译英

(1) 法拉第电磁感应定律的重要应用之一就是直流发电机。

(2) 这一时期，直流电主要被用于街道照明。

(3) 众所周知，在电力传输过程中，高电压小电流要优于低电压大电流。

Translating Skills

一、翻译的性质

什么是翻译？翻译是运用一种语言把另一种语言所表达的思想内容准确而完整地重现出来的语言活动；或是把一种语言所表达的思想内容用另一种语言表达出来的语言活动，它包含着一个对原文含义的理解逐步深入，对原文含义表达逐步完善的过程。

翻译实际上是一种十分复杂的语言活动。有的学者甚至认为，翻译大概是整个宇宙进化过程中迄今为止最为复杂的一种活动。(Translating is probably the most complex type of event in the history of the cosmos.)

翻译的复杂性是由翻译活动的性质所决定的。那么，翻译活动具有什么样的性质呢？翻译作为语言意义转化的活动或过程，它突出强调：

（1）翻译这一语言活动涉及两种不同语言之间意义的对应转换，即将原语表达的信息通过译语加以传递。

（2）在实现这种语言意义的对应转换中，要做到完整准确、不折不扣。当然，在实际翻译过程中，要做到“准确”、“完整”和“意义不变”也只能是相对的。美国著名的翻译理论家尤金·奈达对翻译的定义真可谓是一语中的：Translating consists in reproducing in the receptor language the closest natural equivalent of the source language message, first in terms of meaning, and secondly in terms of style. （翻译就是在译语中用最为贴切自然的对等语再现原语的信息——首先是就意义而言，其次是就风格而言。）

二、科技英语翻译概述

科技英语（English for Science and Technology）是英语的一种语体，在词汇、语法、修辞等方面具有自己的特色。英语是世界上使用最广泛的语言之一，科技英语既然有其自身的特点，翻译时就有其不同的要求。例如，文学作品的翻译对译文讲求文采及语言和艺术形象的动人与优美，经常运用各种意象和修辞手法（如夸张、比喻、对照等）表达作品的思想内容，要求传达出原作的神韵与风姿。但科技英语则注重科学性、逻辑性、正确性与严密性。因此，从事科技英语翻译时较少运用修辞手段，而是注重事实与逻辑。一切技术概念明确清楚，逻辑关系清晰突出，内容正确无误，数据准确精密，文字简洁明了，符合技术术语表达习惯的译文，都体现了科技英语翻译的科学、准确和严谨的特征。

1．翻译的标准

（1）忠实。首先，译文必须忠实、正确地传达原文的内容，对原文的意思既不能歪曲，也不能任意增减。“忠实”还指保持原文的风格。

（2）通顺。通顺指的是译文的语言必须通顺易懂，符合汉语规范。理想的译文必须是纯正的中文，没有生硬拗口、“中文欧化”等弊病。忠实和通顺是辩证统一的关系，两者相互依存，不可分割。例如：

In certain cases friction is an absolute necessity.

（误）在一定场合下，摩擦是一种绝对的必需品。

（正）在某些情况下，摩擦是绝对必须的。

The tendency of evolving organisms to follow a trend is widespread.

（误）进化着的有机体遵循着一种趋向，这种趋向是普遍的。

（正）各种生物基本上都有共同的进化趋势。

2．理解与表达

翻译的过程主要包括理解和表达两个阶段。它们是相互联系、往返反复的统一过程。在通常情况下，理解是第一位的，表达是第二位的。正确理解原作是翻译的基础，没有正确的理解就不可能有正确的翻译。当然，虽然理解了原文，但不能用确切的汉语表达出来，词不达意，文理不通，晦涩难懂，也无法达到忠实表达原作思想内容的目的。

（1）理解阶段。科技英语的翻译关键在于透彻理解和把握住原文的内容和实质。为了透彻理解原文，应注意：

① 结合上下文，推敲词义。理解必须通过原文的上下文来进行。只有结合上下文才能了解单词在某一特定语言环境中的确切意义，否则翻译时往往容易出错。例如：

Various speeds may be obtained by the use of large and small pulleys.

（误）利用大小滑轮可以获得不同的转速。

（正）利用大小皮带轮可以获得不同的转速。

“pulleys”一般做“滑轮”、“辘轳”理解，但影响机器转速的应为“皮带轮”而不是“滑轮”。

② 辨明语法，弄清关系。科技英语的特点之一是句子长，语法结构复杂，因此，根据原文的句子结构，弄清每句话的语法关系对正确理解原文具有重要意义。例如：

Intense light and heat in the open contrasted with the coolness of shaded avenues and the interiors of building.

（误）强烈的光线和露天场所的炎热，同林荫道上的凉爽和建筑内部形成了对比。

（正）露天场所的强烈光线和酷热，同林荫道上和建筑物内部的凉爽形成了对比。

③ 理解原文所涉及的事物。对有些科技英语句子的翻译，不能单靠语法关系来理解，还必须从逻辑意义或专业内容上来判断，应特别注意某些特有事物、典故和专门术语所表示的概念。例如：

Do you know that the bee navigates by <u>polarized light</u> and the fly controls its flight by its back wings?

（误）你知道蜜蜂借助<u>极光</u>飞行，而苍蝇用后翅控制飞行吗？

（正）你知道蜜蜂借助<u>偏振光</u>飞行，而苍蝇用后翅控制飞行吗？

（2）表达阶段。表达阶段的任务就是把已经理解了的原文的内容，用汉语恰如其分地重述出来。如果说，在理解阶段必须“钻进去”，把原文内容吃透，那么，在表达阶段就必须“跳出来”，不受原文形式的束缚，要放开思路，按照汉语的规律和习惯从容自如地遣词造句。

在表达阶段最重要的是表达手段的选择，也就是如何“跳出来”的问题，这是个科技英语翻译的技巧问题。科技英语翻译的创造性也就表现在这方面。表达涉及的问题很多，这里只介绍两种基本的方法：直译和意译。

① 直译。所谓直译，是指译文采取原作的表现手法，既忠于原文内容，又考虑原文形式。也就是说，在译文条件许可时，按照字面意思进行翻译。但直译绝不是逐字死译。例如：

Industrial regions of the world suffer much more acidic fall-out than they did before the industrial revolution.

世界上的工业化地区现在遭受的酸性回落物的危害，比工业革命前要大得多。

② 意译。所谓意译，是指在译文中用创新的表现法来表现原文的逻辑内容和形象内容。当使用直译法不能使文章达到准确通顺时，就要用意译。例如：

Mankind has always reverenced what Tennyson called "the useful trouble of the rain".

直译：人类一直很推崇坦尼森所说的："雨的有用的麻烦"。

意译：人类一直很推崇坦尼森所说的这句话："雨既有用，又带来麻烦"。

在翻译实践中，应根据最能忠实、通顺地表达原文含义的原则，灵活机动地选用或替换使用这两种翻译方法。翻译时应考虑到原作的整体性，最好以"段"而不是"句"为单位，一小段一小段的翻译，这不仅有利于辨别词义而且有利于句与句的衔接，段与段的联系，使译文不致成为一个个孤立句子的堆积。

翻译虽然分为理解和表达两个阶段，但两者不是截然分开的，而是互相联系的。在理解阶段含有表达的因素，而在表达阶段又会产生更深一步的理解。

3．校对和修改

理解和表达都不是一次完成的，而是逐步深入，最后才能达到完全理解和准确表达原作反映的客观现实。因此，表达阶段还包括校对和修改译文这一步骤。校改译文是使译文符合翻译标准必不可少的一步。校改译文时，不仅要对译文做进一步的推敲，使之合乎汉语规范，而且要特别注意译文的准确性，科技作品尤其重要。因此，译文只有经过再三校改，直到符合原文时，才能最后定稿。


Free Reading

Electrical Engineering (2)

Throughout this period of development, another outstanding contributor was Thomas A. Edison. His work included research, invention, development and production. His activities extended into chemistry, electrical dynamos, systems of transmission, sound recording and reproduction, and electrical lamps.

Lee De Forest introduced the use of the third element (grid) in the vacuum tube in 1906. This development opened an entirely new field of engineering. It made possible new systems of communication and methods of control and indicated the possibility of the multi-element tube. It provided the basis for future developments in electronics.

Since 1945 great advances have been made as the result of the invention of the transistor. This solid-state device has made possible the miniaturization of many components, integrated circuits, and calculators. During this same period, research in electron optics has preceded the development of lasers and holography.

The rate of growth of research in electrical engineering was enhanced in the 1940s as a result of support from Federal agencies. Many ideas associated with the military effort of that period are now being used commercially and for research purposes. Microwaves have become part of modern communication systems. The development of semiconductors has made possible more rugged, smaller, and cheaper systems. Research in miniaturization has greatly increased the speed of modern computers. The laser has provided communication systems operative over millions of miles. Integrated circuits have reduced in size and weight and made practical interplanetary and satellite communications. Planetary radar astronomy and radio astronomy are also the result of adaptations to engineering systems of electrical components developed through research.

Lesson 2

Digital Circuits

①An electronic system is an orderly collection of interacting electronic building blocks that performs a desired task. A digital electronic system performs the tasks by dealing with discrete quantities. Discrete quantities are integral, fractional, or mixed numbers that represent, to the nearest least significant digit, some quantities in the real world such as temperature, pressure, or distance. In contrast there are analog electronic systems that represent these quantities on a continuous scale.

Many measurements may be represented in either digital or analog form. For example, time has been represented over the centuries in an analog form the angle subtended by the small and large hands of the clock provided all the information about time that was desired. For better resolution in time, a second hand was added. In the last several years a totally new method was developed to measure and display time. ②The method is based on the oscillation frequency of a quartz crystal that in conjunction with digital circuitry and digital display technology presents the time information in digital form as a number.

Digital processing of information has indeed become widespread in this decade; in addition to digital watches, clocks, and calculators, there are numerous digital controllers (microcomputers) used in home appliances and automobiles.

In digital electronic systems, information is represented by binary digits, bits. A bit may assume either one of two values: 0 or 1. A mathematical system that uses only two digits is called a binary system; its foundations were laid by the British Mathematician George Boole (1815~1864) in his classic treatise An Investigation of the Laws of Thought (1854).

The invention of the transistor may be viewed as another major breakthrough in digital information processing. ③The volume occupied by a transistor is about one hundredth of that occupied by either a relay or a vacuum tube, and a similar ratio holds for the power dissipated by the devices under comparison. The transistor also provided the technological base for the development of integrated circuits, an ensemble of many transistor that are interconnected to perform a specified function.

The first integrated circuit was developed in 1958, which is a start of a revolutionary change in the art of electronics design. In the initial stages of semiconductor technology development, the devices were classified as either discrete or integrated. A digital integrated circuit consisted of several transistors and sometimes also of passive components (resistors and capacitors) on a semiconductor substrate that were interconnected to perform a logical function. Such logical function implementing simple logic operations provided the building blocks for the realization of switching networks. Further advances in technology enabled fabrication of many transistors on one semiconductor substrate. The level of complexity increased, broadening the scope of circuits contained in one package. These new circuits could count, perform addition, subtraction, or multiplication of two binary digits, compare their binary values, and realize more complex logical operations.

Scientists and engineers engaged in the development of the transistor technology met the challenge of the next level of complexity. The individual components on a semiconductor substrate were further decreased in dimensions and similarly their power dissipation was reduced. ④Devices with some 100 000 transistors on one substrate became a reality, and practical limitations were now set primarily by the input and output terminals to the “outside world” rather than by the complexity and number of transistors on a substrate.

Digital circuits are being used in such diverse fields as information storage, medical instrumentation, process control, calculators and computers, air traffic, digital communications, and in voice and tone synthesis. Digital techniques are also beginning to be used in areas that traditionally applied analog techniques. For example, assume we desire to send temperature information from point A to point B in an industrial plant. Also assume that the information is in form of an analog voltage that is proportional to the value of the temperature that we desired to transmit. The transmission medium may be a cable or a modulated radio-frequency wave. In either case the transmission is not immune to interference that modifies the content of the transmitted message. Suppose that an accuracy of one part in 1 000 is desired. This implies that the interference must be kept below one thousandth of the transmitted (analog) quantity to satisfy our accuracy specifications. This may be difficult to realize in an industrial environment in which ample electric interference (noise) is generated by motors, arc welding, relays, and the like.

On the other hand that same information about temperature may be transmitted in digital form. Such digital transmission uses the binary system, which presents information in form of a pulse train that is suitably coded. Here we are concerned only whether during a certain time interval the pulse is ON or OFF.

Modification of the ON or OFF pulses resulting from environmental interference must be very substantial to change the information content of the transmission. Thus the digital system is much more immune to interference and is more likely to be used in many applications in which an analog system would be inadequate.

An additional area where a digital system often has an advantage over an analog system is in its power dissipation. ⑤Concurrent with the reduction in size and power consumption, there has been a considerable increase in the operating speed of the new semiconductor devices. It is sometimes difficult to appreciate fully the revolutionary changes that were made possible through the invention of the transistor and the subsequent development of integrated circuits. For example, the largest early computers occupied a volume of hundreds of cubic meters and required many tens of Kilowatts of electrical power and a sizeable air-conditioning installation to allow this amount of energy to be dissipated without raising the room temperature to unbearable values. The comparable computational capacity is obtained today in a desk-size computer that dissipates one hundredth of the former's power. Moreover, many relatively simple tasks, such as traffic lights, point-of-scale terminals, and home appliance controls are now being carried out with the help of microcomputers.

New Words and Phrases

1. discrete [dis'kri:t] a. **不连续的；离散的**
2. integral ['intigrəl] a. **完整的；整数的**
3. fractional ['frækʃənəl] a. **分数的；小数的**
4. represent [ˌrepri'zənt] v. **代表；表示；描述；描绘**
5. contrast ['kɔntræst] n. **对照；对比**
6. significant [sig'nifikənt] a. **有效的；有意义的；有效（数字）**
7. angle ['æŋgl] n. **角；角度**
8. subtend [səb'tend] v. **对着；对向**
9. resolution [ˌrezə'lu:ʃən] n. **分辨率；清晰度**
10. oscillation [ˌɔsi'leiʃən] n. **振荡；摆动**
11. quartz [kwɔ:ts] n. **石英**
12. crystal ['kristl] n. **晶体；晶粒；水晶**
13. in conjunction with **连同；连带着**
14. appliance [ə'plaiəns] n. **电气装置；电气用具**
15. binary ['bainəri] a. **二进制的；二元的**
16. treatise ['tri:tiz] n. **（专题）论文**
17. be viewed as **被看做；被认为**
18. dissipate ['disipeit] v. **损耗；消耗；浪费**
19. consist of … **由……组成**
20. passive ['pæsiv] a. **无源的；无源（元件）**
21. implement ['implimənt] v. **履行；执行**
22. fabrication [ˌfæbri'keiʃən] n. **制作；组装；装配**
23. engaged in … **忙于……；致力于……**
24. diverse [dai'və:s] a. **各种的；多变的**
25. synthesis ['sinθisis] n. **综合；合成**
26. be proportional to … **与……成比例的**
27. modulate ['mɔdjuleit] v. **调制；调幅**
28. immune [i'mju:n] a. **自由的；不受影响的**
29. in form of … **以……的形式**
30. pulse train **脉冲序列**
31. concurrent [kən'kʌrənt] a. **和……同时的**
32. appreciate [ə'pri:ʃieit] v. **评价；鉴别；意识到**
33. subsequent ['sʌbsikwənt] a. **随后的；后续的**
34. unbearable [ʌn'bɛərəbl] a. **难以忍受的；支持不住的**

35. moreover [mɔːˈrəuvə] ad. **而且；此外；加之**
36. substrate [ˈsʌbstreit] n. **基片；衬底**

Notes

① An electronic system is an orderly collection of interacting electronic building blocks that performs a desired task.

一个电子系统是用来执行某种任务的一些功能模块电路的有序集合，各模块之间有着密切的联系。

② The method is based on the oscillation frequency of a quartz crystal that in conjunction with digital circuitry and digital display technology presents the time information in digital form as a number.

这种方法是通过与数字电路相连接的石英晶体产生的高频振荡信号将时间信息以数字的形式通过数字显示技术展现出来的。

③ The volume occupied by a transistor is about one hundredth of that occupied by either a relay or a vacuum tube, and a similar ratio holds for the power dissipated by the devices under comparison.

晶体管与继电器或真空管（电子管）相比，其功耗为后者的百分之一。而且，晶体管的体积也只有后者的百分之一。

④ Devices with some 100 000 transistors on one substrate became a reality, and practical limitations were now set primarily by the input and output terminals to the “outside world” rather than by the complexity and number of transistors on a substrate.

在一个基片上集成数十万个晶体管已经成为现实，并且这种技术在应用方面的首要限制已经不在于元件集成数目的多少和复杂程度，而在于（集成电路）与外界连接的输入/输出端子数目的多少。

⑤ Concurrent with the reduction in size and power consumption, there has been a considerable increase in the operating speed of the new semiconductor devices.

新型半导体器件不仅体积小、重量轻、功耗低，而且具有更快的运算速度。

Exercises

1．依据课文填空

（1）A digital electronic system performs the tasks by dealing with (　　　　　　　　　).

（2）In digital electronic systems information is represented by (　　　　　　　　　).

（3）A bit may assume either one of two values: 0 or 1. A mathematical system that uses only two digits is called a (　　　　　); its foundations were laid by the British Mathematician (　　　　　).

（4）The first integrated circuit was developed in (　　　　　), which is a start of a revolutionary change in the (　　　　　　　　　　　　).

(5) These new circuits could count, perform addition, subtraction, or ( ) of two binary digits, ( ) their binary values, and realize more complex logical operations.

2．英译汉

(1) Discrete quantities are integral, fractional, or mixed numbers that represent, to the nearest least significant digit, some quantities in the real world such as temperature, pressure, or distance.

(2) The level of complexity increased, broadening the scope of circuits contained in one package.

(3) In either case the transmission is not immune to interference that modifies the content of the transmitted message.

3．汉译英

(1) 数字电路不同于模拟电路，它主要是用来处理离散信号的。

(2) 第一块集成电路诞生于 1958 年，它的出现代表着电子设计工艺革命性变革的开始。

(3) 我们有时很难完整地意识到这些革命性的变化正是由于晶体管的发明以及紧随其后发展起来的集成电路技术所带来的。

Translating Skills

翻译的基本技巧（一）——词义引申

在忠实原文的前提下，如何摆脱原文形式的束缚，使译文符合译文语言的规范，这是翻译的重要问题。因此，这就需要掌握一定的翻译技巧，即翻译的一般规律。

翻译时首先遇到的难题是如何确定词义，通常的处理办法是根据上下文、逻辑关系和用词搭配上的需要，把词或词组的字面意义引申，而后译出。这种改变原文字面意义的译法就叫词义引申。

由于词汇的多义性和英语汉语的词汇搭配习惯的不同，在现代英语中总有许多新形成的转义，以及在一定上下文中的引申意义，在字典中是找不到的，但万变不离其宗，它们与其原义之间往往存在着一定的内在联系，只要理解这一点，就不难从词的原义中引申出正确的词义。

词义引申时，往往可以从词义转译、词义具体化、词义抽象化、词的搭配四个方面来考虑。

一、词义转译

翻译时，遇到一些无法直译或不宜直译的词或词组，应根据上下文和逻辑关系，引申转译。例如：

(1) Zinc is easy to <u>obtain</u> from its ore.

锌容易从锌矿中提炼。(不译成“获得”)