

英汉对照 科普读物

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ENGLISH FOR ENGINEERS

工程技术人员英语读本

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译 者 的 话

本书是英国梅休因教育出版社为外国工科学生和工程技术人员出版的一本英语读本。初版发行于1968年，十年中再版了五次。书中课文全部选自当前英、美比较流行的科技书刊。内容涉及电信、汽车、冶金、石油、通风、焊接和混凝土等工程技术专业，分成七章，讲的都是些基本知识，实际上是一本科普读物。这些篇章经过编者 Clive Brasnett 整理加工，文字纯朴流畅，通俗易懂，编排由浅入深，繁简恰当。它既适合具有基础英语知识的工程技术人员和理工科学生作为进修英语的读本，也适合具有高中以上英语水平的知识青年和其他同志作为自学科技英语的读物。

为了方便自学，我们将本书课文全部译成汉语，直接附在原文之后，供学习参考。译文尽可能采取直译，以便和原文对照。原书每节课文附有疑难词汇、词组的注解，我们全部改用了汉语注释，对其中的生字加注了国际音标，并根据我国读者情况，增加了许多注释。每节课文后面的习题，也附上部分答案，供自学者核对作业时参考。

译文和注释有不妥之处，希望读者提出意见，以便改正。

译 者

1979年8月1日

Preface

The passages in this book were devised during the course of three years' work with students of the Technological Institute of Damascus. It was found that although a limited amount of material on purely scientific subjects adapted into English suitable for foreign students was available, very little could be found to meet the interests and requirements of students intending to specialise in one of the applied sciences. Passages were, therefore, chosen from works dealing with various aspects of engineering and technology and rendered into an English suitable for students whose knowledge of the language was initially fairly elementary.

However, the level of difficulty, as far as the language is concerned, is carefully graded throughout the book, as a comparison of the vocabulary and structures used in the earlier and later passages will readily reveal. For this reason, although it is possible to select for study certain sections which are of particular interest to particular groups of students, since each section has a unity of its own, particularly with regard to the recurrence of certain technical terms, teachers may find that the greatest benefit is to be gained by proceeding through the passages in the order in which they appear in the book.

前 言

本书各章节是在大马士革工学院三年教学过程中编写的。当时发现虽然有少量纯理论科学方面的资料已改写成适合外国学生阅读的英文，可供教学使用，但对于专攻一门应用科学的学生来说，却几乎找不到适合他们的兴趣和需要的英语教材。因此，从论述工程技术各个领域的著作中选择了这些章节，改写成适合初步具有基础英语知识的人阅读的英语课文。

不过全书课文的难度，就文字而言，是经过精心编排，逐步加深的。这只要将前后各章节中所用的词汇和语法结构加以比较就易于发现。虽然每章节自成单元，特别是由于每一章节各有其多次出现的某些技术词汇，从而有可能选出适合学生特殊兴趣的某些章节供他们学习，但由于上述原因教师们会发现只有按照各章节在本书中的顺序进行教学，才能取得最大的收获。

Words and phrases which may be expected to cause students difficulty are printed in **bold type**, and a glossary of these is provided immediately after the passage in which they have occurred. This arrangement is made for ease of reference, but these words and phrases are also indexed at the end of the book so that the student can readily find the page on which they were first explained. For the most part, explanations given are contextual. A term whose meaning may vary to some extent as it is used in different branches of science is explained according to its particular usage within the passage. However, where there is some affinity between the use of a term in a scientific context and in another context which may already be familiar to the student, as with current, for example, attention is drawn to this affinity.

Permission from authors and publishers to make use of printed and illustrative material is gratefully acknowledged. The title of the work adapted will be found at the end of each passage, and it is hoped that students will be enabled and encouraged to go on to read these and similar textbooks in their original form. I am also grateful to successive teaching colleagues at the Technological Institute of Damascus, Mr Abdul Hadi Abla, Mr Muhammad Mohie ed-Deen, Mr Abdullah Hassoun, and Mr Teyssir Kamleh, all of whom have given me valuable advice in the light of their experiences making use of these and similar texts in teaching English to various groups of students. Warm thanks are also due to Mr Youssef Joubaily, who was kind enough to comment on the

可能会使学生感到困难的某些单词和词组用黑体字印刷(注), 每节后面直接附有该节中出现的这类词汇、词组的注释。这样编排是为了便于查考。书末还编有这些单词和词组的索引(注), 使学生能很快地找到它们初次是在哪一页上注解的。注解绝大部分都是根据上下文的含意写出的, 一个字用于不同的学科其意义可能有所不同, 我们按照它在本文中的特殊用法进行注解。不过当某一字, 例如象 *current* 这样的字, 在某一节科技文献中的用法, 和在另一段文章中可能已为读者所熟悉的用法, 二者之间有某些相近之处, 就指明其相近之处, 引起注意。

原著作者和出版商同意我们引用这些文字和插图, 谨在此表示谢意。改写作品的原名附在每节课文后。希望学生们学过本书后将会有能力有兴趣进一步读此书或同类教材的原著。我也非常感谢继续在大马士革工学院任教的同事们: 阿普杜尔·哈地·阿普拉先生, 末汗默德·默希·埃德迫恩先生, 阿普杜勒·哈桑先生, 特西尔·卡姆勒先生。他们根据使用这些课文或同类教材对不同学生进行英语教学的经验, 都给我提了宝贵意见。我还热忱感谢约瑟夫·朱贝利先生, 他从一个实际操

presentation of material in certain passages from the point of view of a practising engineer, and to Miss Aida Adham, for unremitting work in the preparation of typescript throughout a series of changes and additions.

Clive Brasnett 1968

作的工程技术人员的观点出发，对某些章节材料的表述方法进行了评论。还要热忱感谢爱德·埃得汉姆小姐，她在原稿进行一系列修改增补的过程中，不停地工作，打印样稿。

Clive Brasnett 1968

附注：疑难词汇、词组在译注本中改用数字标志，书末索引省略未印。

译者

Communications

1. Messages by Electricity

Electricity completely changed communications¹. Once² it was discovered³ that an electric current⁴ would flow along a wire, it seemed possible that it could be used for messages⁵. As long as⁶ two places were connected by a wire, they could send electric currents to each other. They could send over hills and round corners, and they could send them with the speed of light. The question was how could electric current make words?

Real telegraphs⁷ were not possible until it was proved that electricity and magnetism were connected. A Dane discovered this. He was called Hans Oersted. He found in 1819 that he could make a needle of a compass move by putting it near a wire with a current flowing through it.

Then a Frenchman named Ampère thought about this discovery. He reasoned like this. A compass needle is a magnet. If a wire carrying a current could move it, then the wire must be a magnet too. This he found to be true⁸. He also found that the magnetic force round the wire could be concentrated⁹ by coiling¹⁰ the wire. He had, in fact, made an electromagnet.¹¹

通 讯

1. 电讯

电彻底改变了通讯体系。电流沿着导线流动这个事实一经发现，它就象是可能用来传送讯息的。两个地方只要用一根导线接通，就可互相传送电流到对方。电流可以送过山丘，绕过弯角，而且能以光速传送。问题是，电流怎样才能变成言词？

直到电、磁之间的联系被证实之后，才可能有真正的电报（机）。一个丹麦人发现了电和磁的联系。他叫做汉斯·奥斯德。他在1819年发现，将罗盘指针放在通电导线附近，能使指针转动。

接着，一个叫做安培的法国人对这个发现进行了思考。他是这样推想的：罗盘上的指针是一个磁体。如果通电导线能使它转动，那末这根导线必定也是个磁体。他发现这个想法是符合实际的。他还发现将导线绕成线圈能使导线周围的磁力线集中起来。实际上他制造了一块电磁铁。

A lot of people began to see how electro-magnets could be used to send messages. Two men, called Wheatstone and Cooke, laid a telegraph line¹² between Euston Station and Camden Town, in London. The way they used electricity to send messages was to have five compass needles swinging in the centre of wire coils at each end of the telegraph line. (See figure I.) Their movements showed letters of the alphabet. When Cooke, in Camden Town, sent a current along one of the wires it went through a coil in front of Wheatstone, in Euston. The magnetic force made the needles swing. Wheatstone read the letter the needles pointed to and gradually¹³ got the message.¹⁴ Then he switched the current through to Cooke by pressing a 'key' and sent a reply.

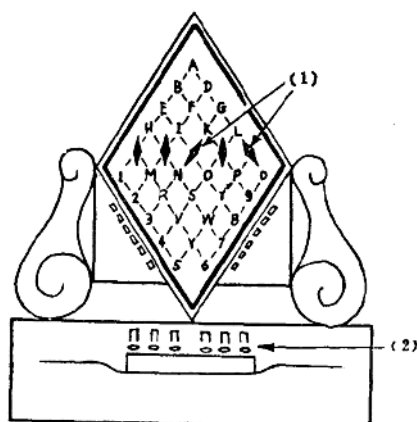


Figure 1

(1) needles indicating letter G (2) sending-keys

不少人开始看出怎样才能用电磁铁来传送讯息。有两个人，一个叫惠斯登，一个叫库克，在伦敦的尤斯登车站和卡姆登镇之间装设了一根电报线。他们用电传送讯息的方法是在电报线两端线圈中心悬放五根指南针(见图1)。指针的转动指示着字母表中的各个字母。库克在卡姆登镇沿着一根导线送出电流，电流流过尤斯登车站惠斯登前面的线圈。线圈磁力使指针摆动。惠斯登读出指针所指出的字母，逐字收到发来的讯息。于是他按压电键，转换电路，接通通向库克的电流，送出回信。

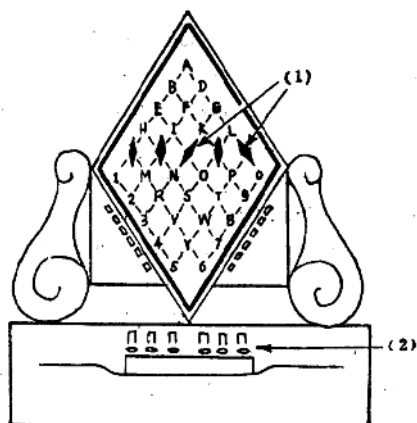


图 1

(1) 指针指示字母 G (2) 指键 (发送电键)

But one of the most famous people of all in communications is Samuel Morse. He **invented**¹⁵ the Morse code. This code is still used in **signalling**¹⁶ all over the world. His idea was simple. He thought of using time, sending current along a wire for a long time or a short time. **Combining**¹⁷ different sets of these 'impulses',¹⁸ just using the long or short, he made a code for the whole alphabet, and the numbers from 0 to 9. For instance, E is the most commonly used letter in the alphabet, so Morse used the **simplest** signal for it—a short impulse, which is called a 'dot'. T is the next most commonly used letter. Morse used the next simplest signal—a long impulse, which is called a 'dash'. He went through the alphabet in this way, making up signals for all the letters, in 'dots' and 'dashes'. Here are some of the letters,

A.— B—... C—.... D—.. E. F.—. G——. Everyone knows the Morse code for S O S, which is the distress signal for ships in serious trouble. It is ...———... It is the simplest¹⁹ signal to make in times of dangerous disaster.²⁰

The Morse code **simplified**²¹ sending messages. It was also very fast. With practice, Morse code can be read at 30 words a minute or more. It became by far the most widely used code because it was the easiest to understand and the fastest to **transmit**.²² By 1871, for instance, there were 6,000 telegraph stations in the United States, all working on the Morse code system.

The telegraph meant that at last people could send messages a long way at great speed. Soon people wanted to send

不过塞缪尔·莫尔斯才是从事通讯工作最著名的人物之一。他发明了莫尔斯电码。这种电码仍在全世界用于发送信号。他的设想很简单，就是利用发报的时间，沿着导线或长或短地输送电流。他将这些不同组合的脉冲编组起来，只用长短两种脉冲讯号，编制成了代表全部字母和从0到9的数字的一套电码。例如E是一个最常用的字母，莫尔斯就用一个最简单的讯号短脉冲来表示，这个讯号叫一“点”。T是仅次于E的最常用的字母，莫尔斯就用次一最简单的讯号，一个长脉冲来表示，这个讯号叫一“划”。他就这样用“点”和“划”编制了所有字母的讯号。下面是一些字母的表示方法：

A.— B—... C.—.— D—.. E. F.—.— G—.—.

大家都知道莫尔斯电码中的SOS讯号，即船只遇难时用来呼救的讯号。这个讯号就是“...———...”。这是在危难时使用的一种最简单的信号。

莫尔斯电码简化了讯息的传送。传送速度也很快。经过练习，莫尔斯电码可以一分钟读出30个字或者更多一点。由于莫尔斯电码最易理解，传送最快，因而成为最广泛使用的一种电码。例如，到1871年，美国就有6000个电报局全部使用莫尔斯电码系统。

电报意味着人们终于能够以极快的速度传送讯息到远处。

messages even farther.

If two places on land, say, London and Manchester, could be connected²³ by wire, why could not the lands themselves—England and America, for instance—be connected by wires under the sea? This was a question quickly answered after the telegraph was proved to work. There were some problems about this, however. The main one was insulation, which means protecting the wire so that the electric current does not leak away.²⁴ Dry air is a good insulator, but sea water is not. If a wire was laid under water, the current would all leak away. In any case,²⁵ all the insulating substances known up to then could be damaged by sea water. But in 1847 gutta-percha was introduced²⁶ as an insulating material. Gutta-percha²⁷ is a gummy substance²⁸ obtained from trees, like rubber, and it does not allow electricity to flow through it easily.

After several unsuccessful attempts, in 1866 Britain and America were linked²⁹ by underwater cable³⁰ by the famous cable-laying ship the *Great Eastern*. After that cables were laid the world over, and nowadays³¹ it is possible to telegraph from almost everywhere.³²

Adapted from *Over to You* by Roy Herbert
(Brockhampton Press)