

电气和电子工程 英语

王旭 译注



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电气和电子工程英语
The Language of Electrical and
Electronic Engineering in English

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译 者 的 话

“电气和电子工程英语”是美国成套专业科技英语专著之一。这套书是以英语作为外语的学生为对象，介绍各种不同专业中的科技语言，在学完基础英语以后，作为通往专业英语的桥梁。

此书是学习电气和电子工程英语的一本好书，它是一本能体现科技英语特点的科技读物。该书介绍了有关电学和电子学的理论基础，并涉及到这门学科在今后若干年的发展和预测。内容较全面，论述精炼，难度适当。全书共分八个单元，其内容都是工科学生感兴趣的问题。它适合我国工科院校学生、专业课青年教师、工厂和科研单位的科技人员使用。

这本书的特点之一是以科技词汇为核心，有意识地反复加深核心词汇的使用和练习，所以每章配有专业术语介绍、阅读材料，并附有各种练习供笔头和口头巩固使用。

译注者对此书作了翻译、注释，对原文印错与不妥之处作了删改并提出词汇备用。其目的是便于读者记忆词汇，特别是专业词汇，加快阅读速度，提高兴趣。在注释和翻译中使读者了解普通英语和科技英语在词汇、语法及文体方面的个性和共性。使读者加深对原文的理解。

本书初稿经周之荃教授审阅，提出了许多宝贵意见，后又经曹华民副教授审定。在专业方面得到了杨叔子教授的帮助，在此表示深切的感谢。

本人水平有限，缺点和错误在所难免，欢迎广大读者提出宝贵意见。

王 旭

一九八五年八月于华中工学院

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FOREWORD

This book is one of a series of texts called English for Careers. The series is intended to introduce students of English as a foreign language to the particular language of different professional and vocational fields. The career areas covered are those in which English is widely used throughout the world—computer programming, air travel, international finance, the petroleum industry, and in this book, electrical and electronic engineering.

Each book in the series serves to give the student an introduction in English to the vocational area in which he or she is interested. The Language of Electrical and Electronic Engineering gives some of the theoretical background on which practical applications of electrical energy are based. There is also a discussion of the developments that are expected to take place in this field in the coming years.

The books in the series are intended for students at the high intermediate or advanced level, who are acquainted with a majority of the structural patterns of English. Thus, from the point of view of English as a foreign language, each book is designed to aid students in mastering the vocabulary of an area of specialization, and to

give them practice using the vocabulary in conversational situations. The goal is for students to improve their ability to communicate in English, particularly with others in their field.

Each unit of this book begins with a glossary of special terms in which words and expressions used in electrical and electronic engineering are defined. The special terms are followed by a vocabulary practice section, which tests the student's comprehension of the terms and gives practice in their use. In the reading passage, these terms are used again within a contextual frame of reference. The reading passage is followed by questions for discussion, which give the student the opportunity to use in a communicative situation both the vocabulary items and the structural patterns that have occurred in the reading.

Each unit ends with a review section of one or two exercises. Some exercises test the student's ability to recall the special vocabulary. Other exercises pose problems the student might encounter in the field—he or she might be asked to identify some of the symbols used in diagrams of electric circuits, or to discuss the advantages or disadvantages of using certain kinds of equipment. In doing these exercises, the student will again be practicing the specialized vocabulary and the structural patterns used with them.

A great deal of successful language learning comes from experiences in which the learning is largely unconscious. In offering these books, we hope that the students'

interest in the career information presented will facilitate their learning to communicate more easily in English.

EUCENE J. HALL

Washington, D. C.

前 言

这本书是一套专业英语课本中的一种。这套课本以学习英语的学生为对象，给他们介绍各种不同的专业和职业的专用语言。专业范围包括全世界广泛使用英语的那些专业——计算机编程、航空运输、国际金融、石油工业以及这本书中所介绍的电气和电子工程。

这套课本中的每一本书都用英语给学生们介绍他们感兴趣的专业范围。《电气和电子工程英语》一书介绍了一些有关电的理论及应用的基本知识。书中也论述了这门学科在今后若干年内可预测到的发展。

这套课本适用于具有中等偏上或高水平的学生，他们对大多数英语结构模式应该是熟悉的。因此，从学习英语的观点出发，每一本书都是以帮助学生掌握某一专业方面的词汇，在会话中练习使用词汇而设计的。其目的是使学生提高用英语交际的能力，特别是在他们的专业领域内使用英语的能力。

本书的每一单元都是从术语词汇开始，通过术语对电气和电子工程中使用的单词和用语给以定义。接着就是词汇练习，它是用来测验学生对术语的理解能力和运用能力的。在阅读材料中，这些名词术语在有关资料的上下文范围再次得到使用。在阅读材料之后接着是讨论提问，这种练习能使学生在交际时，对在阅读中所出现的词汇术语和句型结构得到使用的机会。

每一单元结尾有一至两个练习用来复习。有些练习用来测验学生记忆专门词汇的能力；另外一些是对学生提一些在专业

范围内可能遇到的问题，如可能要求他们识别电路图中所使用的某些符号，或者讨论某些设备的优缺点。在做这些练习时，学生将再一次使用专业词汇和句型结构。

成功的语言学习大多数来源于实践，在实践中往往是不知不觉学到的。在提供这套课本时，我们希望学生对所提供的专业信息发生兴趣，这将促使他们学会用英语更顺利地 进 行 交 际。

尤金·J·霍尔
美国首都华盛顿

UNIT ONE

THE ENGINEERING PROFESSION

Special Terms

Engineering: The practical application of the findings of theoretical science. An engineer is a member of the engineering profession. The term "engineer" is also used to¹ refer to² a person who operates or maintains certain kinds of equipment—a railroad locomotive engineer, for example. In that case³, the person referred to is a technician rather than⁴ a professional engineer.

Profession: An occupation such as law , medicine , or engineering which requires specialized education of four or more years at the university level.

Civil Engineering:⁵ The branch of engineering that deals with⁶ planning structures for civilian use such as roads, buildings, bridges, and water supply and sewage systems.

Military engineering⁷ is concerned with* similar projects for military use.

Mining and Metallurgy: The branch of engineering that deals with extracting metal ores from the earth and refining them.

Mechanical Engineering⁹: The branch of engineering that deals with machines and their uses.

Chemical Engineering: The branch of engineering that deals with the processes involved in reactions among the elements, the basic natural substances¹⁰. Petroleum engineering deals specifically with processes involving petroleum.

Electrical and Electronic Engineering: The branch of engineering that deals with the processes and devices derived from¹¹ the movement of electrons.

Nuclear Engineering: A modern branch of engineering that deals with finding practical uses for the processes that result from¹² breaking up¹³ the nuclei of atoms.

Atom: The basic particle of matter of which the chemical elements are made up¹⁴. An atom consists of a nucleus around which smaller particles called electrons orbit¹⁵. Electrons and the particles in the nucleus are called subatomic particles¹⁶. The plural of nucleus is nuclei.

Electron Microscope: A microscope is a device which

magnifies small objects so that they are visible¹⁷. An electron microscope uses a beam of electrons instead of¹⁸ light to magnify images.

Particle Accelerator: ¹⁹ A device that speeds up sub-atomic particles. It is used for²⁰ research in atomic physics.

Empirical Information: Information based on observation and experience rather than on theoretical knowledge.

Aqueduct: A structure that is used to carry water over long distances.

Quantification: Putting data (pieces of information) into²¹ exact mathematical terms.

Vocabulary Practice

1. what does engineering mean?
2. How does a railroad locomotive engineer differ from a professional engineer?
3. what is a profession? Give examples.
4. what does civil engineering deal with? How does it differ from military engineering?
5. what does mining and metallurgy deal with?
6. what is mechanical engineering concerned with?
7. what does chemical engineering deal with? Name one specialized branch of chemical engineering.
8. what is the special area of electrical and electronic

engineering?

9. what is nuclear engineering?
10. what is an atom? what are its different parts? what is a subatomic particle?
11. what is a microscope? How does an electron microscope differ from an ordinary microscope?
12. what is a particle accelerator? In what kind of research is it used?
13. what is empirical information?
14. what is an aqueduct used for?
15. what is meant by quantification?

The Engineering Profession

Engineering is as old as¹ history. One of the earliest engineers was Imhotep, who designed the stepped pyramid of Sakkhara in Egypt in the twenty-seventh century B.C.² Mankind could not have emerged from a primitive hunting and gathering existence without the engineering³ skills needed to create tools, metal refining processes, buildings, roads, and irrigation and sanitation systems. As human society has grown more complex⁴, the need for many different engineering skills has multiplied. In our era, engineering has significantly changed our daily existence. Machines, and communication and transportation systems not only do a great deal of our work but have also in-

creased our capacity for work. Indeed, the social changes that have been created by engineers are so great that our society has not yet completely come to grips with all that they mean⁵.

Engineers make practical application of the findings of theoretical, or "pure" sciences, such as physics or chemistry. A three-part distinction is sometimes made between theoretical science, applied science, and engineering.⁶ The research of theoretical science is done primarily to add to⁷ our knowledge of nature. Little consideration is given to⁸ the possible applications of research findings. Applied science is concerned with discovering ways to use⁹ the knowledge of theoretical science. Engineering carries the research one step further by devising workable processes based on the discoveries of applied science.

An example¹ of this three-part system is in the development of nuclear energy. Chemists and physicists studied the structure of the atom over a long period of time.¹⁰ They learned that atoms of uranium-235 could be split into¹¹ two nearly equal parts, releasing a great deal of energy in the process.¹² Then, under the pressures of World War II, applied science took over the research to find a military use for this release of energy. Applied scientists discovered that it was possible to create a chain reaction, a controlled release of energy that continued by itself.¹³ Then, engineers together with scientists began to work out the difficult and complex systems that made the