

21世纪电力专门用途英语 (ESP) 系列

复旦大学出版社规划教材

总主编 赵玉闪



# 电力 英语阅读教程

English for Electric Power:  
A Reading Course

本册主编 王欣



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English for Electric Power: A Reading Course

本册主编 王欣

编者 姜雪 余青兰 司微

 復旦大學出版社

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2015年3月28日,国家发展改革委、外交部、商务部联合发布了《推动共建丝绸之路经济带和21世纪海上丝绸之路的愿景与行动》。2015年10月24日,国务院又印发了《统筹推进世界一流大学和一流学科建设总体方案》,请各省、自治区、直辖市人民政府以及国务院各部委、各直属机构认真贯彻落实。如果高等教育是为了满足国家对外语能力的需求,那么我国高校大学英语教学的定位就有了极大的改变。传统的大学英语教学的目的是帮助学生提高英语水平和文化素质修养,它在一个与国际交往不多的时代还是可行的。但是在一带一路和双一流建设的背景下,在我国实现走出去战略的背景下,我国大学英语必须转到满足国家需要,具体地说就是满足大学生的专业学习需求上来。

专门用途英语的理论之一就是满足特殊群体的需要。英语虽然是国际学术、科技和经济的通用语,但即使是用英语撰写的文献、报告和期刊论文,即使是用英语进行交流的各种学术和工程领域,英语表达方式也是因学科而异的。任何一门学科的理论 and 知识都是通过特有的语言方式构建和传播的。我们的学生如果不掌握其所在学科里特定的语言交流方式(如语篇结构、修辞手段和语言特征)是不可能进入该学科的话语社团的,这样也就不可能具备与他们该学科内的科学家和工程技术人员同行进行最基本的国际交流的能力,更不可能在他们学科领域内有国际话语权。这种学科领域里的交流能力就是专门用途英语能力。

很长时间以来,影响我国专门用途英语教学发展的观念是:学生只要英语基础扎实、英语水平高就可以胜任毕业后的涉外工作。事实证明这种观点是片面的。专门用途英语能力不是通过通用英语的不断学习而能够自然获得的,也不是通用英语高级阶段学习的必然结果,而是必须经过有针对性的学习和艰苦训练才能掌握的。正因为如此,专门用途英语具有强大的生命力,专门用途英语教材获得越来越多高校的青睐。

通用英语教材不能替代专门用途英语教材,因为后者在高等教育中发挥着重要作用,不可替代的除了有特殊领域的术语和表达方式、有相关的人文和宏观知识背景,更主要的是,后者训练学生在特殊领域里的语言技能,如特定工作场景(包括合同文本、施工说明、

学术交流等)里要使用的听、说、读、写技能以及表达方式。这就是专门用途英语的真实性原则。

我们欣喜地看到,华北电力大学致力于这方面的研究,他们的大学英语教师应用专门用途英语理论开发了电力英语方面的系列教材,从内容到形式上都进行了大胆的尝试。我国大学生具有很大的创新潜能。我们相信,只要我们给他们插上专门用途英语的翅膀,他们一定能够冲向世界,在国际学术、科技和工程领域的上空自由翱翔。这是一项伟大的事业,是我们大学英语教师在高等教育中、在实现国家重大战略中能真正体现自我价值的地方。我们必须珍惜,必须为之而奋斗。是为序。

蔡基刚

中国专门用途英语教学研究会副会长  
亚洲专门用途英语教学研究会副会长  
中国学术英语教学研究会会长  
复旦大学教授博导

2017年3月10日

# Foreword

## 前 言

教育部最新版《大学英语教学指南》将“专门用途英语”、“跨文化交际英语”和以往的“通用英语”并列为大学英语课程体系的三大类课程,注重培养学生在今后工作中实际应用英语的能力。同时,新《指南》也提出大学英语课程设置应结合各校人才培养目标,面向各校实际,服务学校教学和国家需求。

本教材就是以新的《大学英语教学指南》为指导思想并结合电力相关专业内容进行编写的。作为电力相关专门用途英语(ESP)阅读教程,本教材可供以下人员使用:电力专业学生可以将本教材作为专业英语基础教材并在此基础上进行更深入的专业英语学习;非电力英语专业学生通过学习本教材可了解基本电力专业基础知识及常识,掌握一定的电力专业英语术语及表达;从事电力相关专业的人员可通过本教材熟悉电力专业英语相关词汇及表达,提高专业英语阅读能力。

本书采用“泛读+专业”的编写理念,在注重培养学生阅读能力的同时融入专业知识,提升学生的专业英语阅读能力。全书共12个单元,每单元结合一个专业相关内容分四个部分:第一部分阅读理解(Reading Comprehension),为两篇与本单元专业内容相关的课文,每篇课文后编写相关练习帮助学生理解课文,并通过阅读课文对本单元专业知识有一定的了解;第二部分词汇训练(Word Drills),针对课文中出现的常用专业术语以及通用词汇,以不同形式的练习进行有针对性的训练,帮助学生在了解专业知识的同时,丰富英语词汇,提高专业英语阅读理解能力;第三部分词汇拓展(Extending Your Vocabulary),列出30个与本单元主题相关的表达,帮助学生拓展专业信息;第四部分阅读技巧(Reading Skills for Sci-Tech English),主要涉及科技英语阅读时需要了解和掌握的阅读技巧,包括构词法、句法、篇章、逻辑以及科技相关表达式等方面。另外,每单元最后附一篇与本单元内容相关的补充阅读(Extra Reading),帮助学生课后进行扩展阅读。

本书1—12单元的课文及补充阅读文章由王欣搜集资料并整理编写。课后练习和词汇训练部分,1—3单元和10—11单元由王欣编写,4—5单元由司微编写,6—7单元由余青兰编写,8—9单元和12单元由姜雪编写。科技英语阅读技巧部分,1—3单元和7—8

单元由王欣编写,4—6单元由姜雪编写,9—10单元由余青兰编写,11—12单元由司徽编写。为方便教学,本教材配有课文相关译文及练习相关答案。全书编写完成后,由王欣对全书进行了统稿和修改。

由于本书编写人员水平有限,且编写时间仓促,书中难免出现一些错误和不足之处,恳请各位使用者批评指正。

编者

2016年10月

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# Unit 1 Electricity

*It seems that life is dependent on electricity which we need for almost anything. Any appliances that we use in our daily life such as household appliances, office equipment and industrial equipment take electricity. Without electricity, the world would certainly be a different place. Therefore, we should understand electricity.*

## Part I Reading Comprehension

### Text A

#### History of Electricity

We use electricity on a daily basis. Electricity lights up our homes, cooks our food, powers our computers, television sets, and other electronic devices. Electricity from batteries keeps our cars running and makes our flashlights shine in the dark. When we need it, we do not have to go to a store or wait in a queue. We just plug in and it's here. But it wasn't always like that.

The history of electricity, that is the human understanding thereof, dates back to the ancient Greek. In around 600 B.C., a mathematician by the name of Thales discovered that when rubbing amber with silk it attracted feathers and light objects. This ability to attract (and also to repel, as it was later discovered) other objects is due to electric charge. The phenomenon itself came to be called static electricity. Others may have noticed the phenomenon before, but it was the ancient Greek who was the first to record his discovery. "Electron", the Greek word for amber, is where we get the word electricity, electronic and other words that begin with "electr-". The phenomenon of static electricity remained a mystery for more than 2,000 years until the reaction of amber and magnets was examined at the end of the 16th century by William Gilbert. It was him who used the word "electricity" for the first time and was regarded as the "father" of electrical engineering and electricity and magnetism. Gilbert's experiments led to a number of other experiments and discoveries.

In 1752, Benjamin Franklin, an American physicist as well as a statesman, who

helped draw up the famous *Declaration of Independence* and *The US Constitution*, proved that the lightning and the spark from amber were one and the same thing — electricity. The story of this famous milestone is a familiar one, in which Franklin fastened an iron spike to a silken kite, which he flew during a thunderstorm, while holding the end of the kite string by an iron key. When lightning flashed, a tiny spark jumped from the key to his wrist. The experiment proved Franklin's theory but was extremely dangerous for he could easily have been killed. Moreover, he presented the idea that electricity had positive and negative elements. He also showed that the flow was from positive to negative, though today we know that the opposite is true — electricity flows from negative to positive. Basically, Franklin's most famous experiment with a lightning rod was the first practical application of electricity.

Of course, the discovery of electricity and its use today cannot be credited to one person, but to many others. Some of important inventors along the way are Alessandro Volta who invented the first electric battery called voltaic pile in 1799, Hans Christian Oersted who discovered magnetic effects of the electric current in 1820 and André-Marie Ampère who in the same year derived a mathematic formulation of the law of addition of electro-dynamic forces which is today the basis of the international definition of the unit of the electric current which carries the name of Ampère. The most important theoretical idea was Ampère's that all magnetic phenomena have their origin in electric currents, which contributed to the change of thinking in physics.

In 1827, Georg Simon Ohm discovered that the electric current is directly proportional to the voltage between the conductor ends. The relation between the voltage, current and resistance is expressed by the Ohm Law. The unit of the electric resistance was named in his honor.

Later, here comes Michael Faraday who looked for a process to produce electric current by a magnet. In 1831, he discovered electromagnetic induction — when a magnet is moved inside a copper coil, electric current starts to flow inside. Nowadays, Faraday's electric generator might seem primitive as it generated only small value currents but it was the first method of electricity production by the movement in a magnetic field. Today, it is still a basis of electricity generation.

Soon, electricity started to be used for many practical purposes, like telegraph, electric motor, arc light, telephone, etc. Maybe one of the greatest inventors is Thomas Edison, who is best known for the invention of the incandescent light bulb in 1879. He wasn't the first to discover that electricity was able to produce light. In 1878 Joseph Swan invented the incandescent filament lamp, and Edison discovered that by using a carbon filament in a glass globe devoid of oxygen, he could make a continuous light. Swan and Edison later set up a joint company to produce the first practical filament lamp. Edison used his DC generator to provide electricity to light his



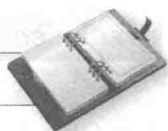
laboratory and later to illuminate the first New York street in September 1882. Edison's electric lighting systems were basic by today's standards but bold at the time — they not only threatened the existing gas lighting industry but radically challenged the status quo by introducing people to an entirely new type of energy.

One of Edison's employees, Nikola Tesla, tried to develop an alternating current motor. However, Edison did not agree. He considered alternating current dangerous. Therefore, Tesla opened his own laboratory and in 1888 he developed the motor. His patent was bought by George Westinghouse, who spread the invention around the whole country. Even Edison's Electric Company — today General Electric — switched to alternating current. The invention enabled long distance current transmission. All today's motors in fans, air conditioning or refrigerators are based on Tesla's principle. He also set the current transmission frequency standards. The development continued by the construction of the first electric railway in England and America. In 1884 trolley cars came to towns and cities and in 1891 the first electric iron appeared.

Efforts to understand, capture and tame electricity began in the 18th century. For the next 150 years, dozens of “natural scientists” in England, Europe, colonial America, and later the United States analyzed electricity in nature, but producing it outside of nature was another matter. That didn't happen on any large scale until the late 19th century. Setting the stage for widespread commercial use of electricity were international researchers engaged in pure scientific research and entrepreneurial businessmen who made their own major discoveries or produced, marketed and sold products based on others' ideas.

Today, electricity remains a growing industry. New vistas for electricity will always be there for people to discover, thus inspiring new inventions in future. Also, electricity stands for modern life. Without access to reliable power, our lives would be much more like they were before the industrial revolution, being “solitary, poor, nasty, brutish, and short.” Nearly every feature of modern civilization depends on affordable and reliable electricity and the things it powers — lamps and heaters to safely keep our homes well-lit and comfortable, smart phones to stay in touch with loved ones, and always-on data centers to give us a reliable Internet, among countless others. It is so crucial to modern life, in fact, that the history of electricity is really the history of the modern world.

### Cultural Notes

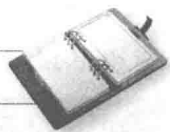


1. William Gilbert: 威廉·吉尔伯特(1540—1603),英国皇家科学院物理学家,主要贡献在电学和磁力学方面。吉尔伯特在1600年出版的《磁石论》是物理学史上第一部

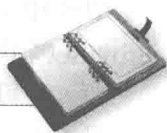
系统阐述磁学的科学专著,为电磁学的产生和发展创造了条件。

2. Benjamin Franklin: 本杰明·富兰克林(1706—1790),美国著名政治家、外交家和发明家,进行过多项关于电的实验,发明了避雷针。
3. Alessandro Volta: 亚历山德罗·伏打/伏特(1745—1827),意大利物理学家,“伏打电堆”发明人。“伏打电堆”是第一个可以产生稳定、持续电流的装置,为电学研究开创了新局面,使电学从对静电的研究进入到对动电的研究。后人为纪念这位物理学家,把电压的单位规定为 Volt (V)。
4. Hans Christian Oersted: 汉斯·克里斯蒂安·奥斯特(1777—1851),丹麦物理学家、化学家,1820年发现了电流的磁效应,证明了电能和磁能可以相互转化,为电磁学的发展打下了基础。
5. André-Marie Ampère: 安德烈-玛丽·安培(1775—1863),法国物理学家、化学家和数学家,发现了电流的相互作用规律,发明了电流计。电流的国际单位“安培(A)”以其姓氏命名。
6. Georg Simon Ohm: 乔治·西蒙·欧姆(1787—1854),德国物理学家,发现了电阻中电流与电压的正比关系,即著名的欧姆定律。电阻的国际单位“欧姆( $\Omega$ )”以他的名字命名。
7. Michael Faraday: 迈克尔·法拉第(1797—1867),英国物理学家、化学家。1831年首次发现电磁感应现象,发明了世界上第一台发电机,提出了电场和磁场的概念,总结了电解定律,为电学的进一步发展做出了卓越贡献。
8. Thomas Edison: 托马斯·爱迪生(1847—1931),美国著名发明家、企业家,被誉为“发明天才”。他发明的留声机、电影摄像机、电灯对人类文明生活产生了极大影响。
9. Joseph Swan: 约瑟夫·斯旺(1828—1914),英国物理学家、化学家和发明家,1878年获得第一个白炽灯专利,其居所是世界第一个用电灯照明的私人住所。
10. Nikola Tesla: 尼古拉·特斯拉(1856—1943),塞尔维亚裔美籍发明家、物理学家、机械工程师、电气工程师,被认为是电力商业化的重要推动者。在19世纪80—90年代的“电流之战”(the War of Currents)中,特斯拉主持设计的现代交流电系统取代了爱迪生的直流电系统,成为工业、商业和民用电的唯一选择。磁感应强度的国际通用单位“特斯拉(T)”以他的名字命名。
11. George Westinghouse: 乔治·威斯汀豪斯(1846—1914),美国发明家、实业家,1869年建立威斯汀豪斯电气公司,率先将高压交流电引入美国的输电系统,打破了爱迪生直流电输电系统一统天下的局面。

## Technical Terms



**The Ohm Law:** 欧姆定律,即在同一电路中,导体中的电流跟导体两端的电压成正比,跟导体的电阻成反比。该定律是由德国物理学家乔治·西蒙·欧姆(George Simon Ohm)提出,电阻的国际单位“欧姆( $\Omega$ )”以其名字命名。



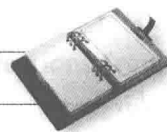
## Words &amp; Expressions

amber /'æmbə/ *n.* 琥珀  
 repel /rɪ'pel/ *v.* 排斥; 相斥  
 charge /tʃɑ:dʒ/ *n.* 电荷 *v.* 充电  
 static /'stætɪk/ *adj.* 【物】 静电的; 静止的  
     static electricity 静电  
 magnet /'mæɡnɪt/ *n.* 磁铁; 吸铁石  
 magnetism /'mæɡnətɪzəm/ *n.* 磁性; 磁力  
 statesman /'stertsmən/ *n.* 政治家  
 spark /spɑ:k/ *n.* (电)火花; 火星  
 milestone /'maɪlstəʊn/ *n.* 里程碑; 转折点  
 spike /spaɪk/ *n.* 长钉; 尖状物  
 lightning rod 避雷针  
 voltaic /vɒl'teɪk/ *adj.* 伏打(式)的; 电流的  
     voltaic pile 伏打电堆(池)  
 magnetic /mæɡ'netɪk/ *adj.* 有磁性的; 磁的  
     magnetic effects 磁效应  
 formulation /fɔ:mju'leɪʃ(ə)n/ *n.* 【数】 方程式, 公式  
 proportional /prə'pɔ:ʃ(ə)nəl/ *adj.* 成比例的; 相称的  
 resistance /rɪ'zɪst(ə)ns/ *n.* 电阻; 阻力; 抗力

electromagnetic /ɪ,lektərə(ʊ)mæɡ'netɪk/ *adj.* 电磁的  
 induction /ɪn'dʌkʃ(ə)n/ *n.* (电磁)感应(现象)  
     electromagnetic induction 电磁感应  
 coil /kɔɪl/ *n.* 线圈  
 primitive /'prɪmətɪv/ *adj.* 原始的; 发展水平低的  
 incandescent /ɪnkæ'nɪdes(ə)nt/ *adj.* 白炽的; 耀眼的  
 filament /'fɪləmənt/ *n.* (电灯泡的)灯丝; 丝状物  
 devoid /dɪ'vɔɪd/ *adj.* 缺乏的; 空的  
 illuminate /ɪ'lumɪneɪt/ *v.* 照亮, 照明  
 status quo 现状  
 alternating current 交流电  
 patent /'pæɪt(ə)nt/ *n.* 专利; 专利权  
     *v.* 取得专利  
 trolley /'trɒli/ *n.* (有轨)电车; (购物、运送行李的)手推车  
 tame /teɪm/ *v.* 驯服; 使易于控制  
 colonial /kə'ləʊniəl/ *adj.* 殖民(地)的  
 vista /'vɪstə/ *n.* 远景; 展望  
 solitary /'sɒlɪ(ə)rɪ/ *adj.* 独自的, 单独的  
 nasty /'nɑ:stɪ/ *adj.* 令人厌恶的; 极差的  
 brutish /'brʊtɪʃ/ *adj.* 残忍的; 粗野的

## Notes for Sentences

1. The story of this famous milestone is a familiar one, in which Franklin fastened an





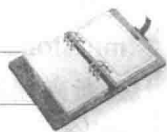
iron spike to a silken kite, which he flew during a thunderstorm, while holding the end of the kite string by an iron key.

本句为多层复合句,第一层复合句的主要结构为主句+定语从句。其中,主句为 The story of this famous milestone is a familiar one,不定代词 one 指代前面出现的可数名词 story,后接 which,即第一个 which 引导的定语从句。该定语从句的先行词为 one,关系代词 which 在从句中做介词 in 的宾语。第二层复合句是在第一个 which 引导的定语从句中,该层复合句的主句为 Franklin fastened an iron spike to a silken kite,后接 which 引导的定语从句,which 在从句中做 flew 的宾语,其先行词是 silken kite。在第二层复合句中,while holding the end of the kite ... 一句中动词 hold 的施动者是该层主句的主语 Franklin,因此使用现在分词结构。

2. In 1827, Georg Simon Ohm discovered that the electric current is directly proportional to the voltage between the conductor ends.

短语 be proportional to 的意思为“与...成比例”。本句中,be directly proportional to 意为“与...成正比”。相反,“与...成反比”的表达是 be inversely proportional to。

## Understanding the Text



### I. Answer the following questions briefly.

1. What did ancient Greek find when rubbing amber with silk?
2. What is the meaning of “electron” in Greek?
3. What did William Gilbert do that made him significant in the history of electricity?
4. In which direction does electricity flow between positive and negative elements?
5. What is expressed by the Ohm Law?
6. What kind of current, direct or alternating, did Edison power his laboratory?
7. According to Text A, why did Edison reject Tesla’s proposal to develop an alternating current motor?
8. What kind of standard did Tesla set for current transmission?

### II. Decide whether the following statements are TRUE or FALSE according to Text A.

1. \_\_\_\_\_ Electric charge has the ability to repel or attract other objects.
2. \_\_\_\_\_ The ancient Greek has known the principle behind static electricity.
3. \_\_\_\_\_ Franklin’s experiment proved that the lightning and the spark from amber were two different things.
4. \_\_\_\_\_ Franklin presented the idea that electricity had positive and negative elements and electricity flow was from negative to positive.
5. \_\_\_\_\_ Faraday’s electrical generator works not as well as today’s generator.