ENGLISH FOR SCIENCE AND TECHNOLOGY

21世纪科技英语

（上册）

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高等教育出版社
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内 容 提 要

《21世纪科技英语》是大学英语后续课程的系列教材之一，旨在帮助大学生完成从基础英语到专业英语的过渡，从而提高其在实际生活中的英语应用能力。《21世纪科技英语》的选材以科普文章为主，内容涵盖理、工、医、农等基础类学科，同时紧扣当前科技发展的前沿成果和科研方向，是一套为理工科大学生设计的通用性强、使用面广的专业基础英语教材。本教材分上、下两册，可供一年使用。

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前 言

国家教育部颁发的《大学英语教学大纲》对大学英语的后续课程——专业英语提出了明确的要求。《大纲》将专业英语规定为继大学英语四级之后的一门正式课程。大学英语四、六级阶段的教学主要侧重于传授语言基础知识与培养基本的语言技能，而能否使学生的语言知识转化成较强的专业应用能力，则在很大程度上取决于英语后继课程的教学是否成功。因此，提高学生的英语应用能力，已成为各高等院校共同面对的课题。

然而，在从普通英语向专业英语的过渡阶段，当前高校学生尤其是理工科大学生仍缺乏一套可以反映近年来世界科学信息的系统教材，我们特此编写《21世纪科技英语》，旨在提供一种通用性强、便于理工科各专业使用的教材。

本书的选材以近年来发表的英文科普文章为主，有些直接由因特网上下载。我们注重趣味性、信息性、可思性和前瞻性，同时也注重语言的规范性和文体的多样性。语言富有科技英语的语言特色，含有丰富的通用与专业科技英语词汇和科技英语语法结构。语言地道、措辞简洁，难度略高于大学英语四级水平。内容广泛，涉及领域既包括了理、工、医、农等常用的基础类学科，又紧扣当前科技最新的技术成果和未来的科研方向，如生命科学、数字电路、基因工程、纳米技术等。使用对象为理工科高年级学生或广大科研人员。

全书共分上、下册，共有20个单元。每单元分 Text A 和 Text B。Text A 为精读，文章后面配有练习。我们编写时尽量使其形式新颖、实用，有利于达到提高专业英语应用能力之目的。Text B 为泛读，每篇文章均有详细注解，有助于同学们课外自习。此外，本书还摘录了一些有关科技工作者如何书写科技论文、口头进行科技报告的技巧与方法以及科技英语方面文体风格的短文，语言风趣、幽默。相信研修本教程的学员定有耳目一新的感觉。

在本教材编写过程中，周海英、刘剑、雷亮华、计颖等老师在材料的搜集及文字打印等方面做了不少工作，在此一并致谢！

由于时间紧迫，加之我们水平有限，书中错误在所难免，敬请读者不吝赐教。

编　者

2002年秋

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Contents

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Unit 1

Text A

Bill Gates' Speech to Tsinghua University (12 December, 1997) ①

1 It's great to be here and have a chance to share some of my excitement with you.

2 I got involved with computers at 18, and the computer was a very limited teletype that had to be connected through a phone line up to a mainframe-like computer but my friends and I became fascinated with understanding what the computer can do, what was the future, and how it would be used. When we found out about chip technology, and the miracle of being able to improve the power of the chip exponentially, we realized that computers had a very bright future. We spent a lot of our time writing software because we loved writing software, because we thought that the software being written by a lot of big hardware companies wasn't as good as what we could do.

3 I was 19 when I realized that if I wanted to be the first to do a software company for these new cheap computers, I needed to get my friends together and start right away, so Microsoft became the first company doing software for these new machines. Our vision was a computer on every desk and in every home. In the last 20 years, that vision is certainly becoming a reality. If we had to change it today, we would simply add that now we also want to have a computer in every pocket, every car — many other places that we had not thought about when we first started doing development. I believe software is the key element that really unlocks the power of all this

technology, and the idea of making it easy to find information, easy to create information, easy to communicate with other people. Software is at the center of that, and so software will be the fastest growing industry in the world and one that will create lots and lots of great jobs. Certainly here in China the opportunity for hundreds of thousands of great jobs should be very exciting because there is a global shortage in terms of computer skills.

4 The personal computer revolution got started in 1975, that's when I left college and started Microsoft. These last 22 years have really been amazing, every prediction we've made about improvements have all come true. As we look ahead, that pace of innovation is not slowing down, in fact if anything it's speeding up. Very high speed processors like 300 MHz Pentiums, or new 64-bit processors that we're already developing Windows NT for; incredible storage capacity, which will let us store, not just data, but also digital video as well; great screen technology to create a tablet-like device that would be good enough for reading and writing; advanced graphics and now the ability to connect computers together at very high speed.

5 The Internet is the way that all these machines can be connected together. And those standards, and the improvement of those standards, are very important. Some people like to think about how the computer industry compares to other industries. I've shown before what the cost of the typical car was in 1980 in US, and that rose up to be about from 8,000 to 19,000 today, and likewise cereal has increased in price. How does that compare to PCs? If the same model was followed for PCs, you can buy a car for 27 cents and cereal for less than one cent, so there's no other area of the economy that has this rapid improvement, and people just aren't used to it. You almost have to tell people "What would you do if Internet computing power was free," because that's what we'll be able to deliver with all these improvements.

6 Microsoft's vision of computing is global computing. We see PCs connected to the Internet making the world a smaller place, and that's positive in so many ways: to build understanding between peo-

ple, to share research in key science areas, including medicine, to allow world commerce to work very well. And the Internet is driving this already. Microsoft has set up operations around the world, and we are very pleased with the success we're having here in China. We are doing significant software development on products here, and that will continue to increase, and key for us is having very high quality software people, and we've been lucky to hire a great number of people from this university. Really I'd say that the core of the teams we've put together have come from here, and I've listed some of those employees here, and we certainly hope that in the future this list will increase dramatically, and the quality of our work continues to rise.

7 Microsoft believes in doing a lot of research because the software of today is not adequate for tomorrow. It's come a long way, such as the graphics interface, the application, and the way we deal with linguistics; it's much better than it was a year ago. Building the Internet into the software has come a long way. Some of the more ambitious things, like teaching the computer to speak or listen or see, still require a lot of software work that's not yet done, and so we've been investing in research, and building the number of research locations which will be increasing in the years ahead. One advance is teaching the computer to pick up sentences and understand them, and not just think of them as a series of characters.

8 Here we have an example where the word processor is looking at an English sentence, and suggesting that the grammar is not correct, and showing exactly how the grammar might be fixed. That kind of thing has proven to be extremely popular, and it's just a step on the road to getting computers to actually understand what's going on, in the same way that humans do. That pursuit of artificial intelligence is the most exciting thing in computer science. Although the progress in that has been fairly slow, I'm confident that that will be accelerating quite a bit.

9 Another interesting area that I think people aren't expecting is computer vision. The actual digital cameras that allow you to have an image and scan that image are going down in cost, and software to recognize users, see what they're looking at, what kind of gestures they're making; that kind of software is coming along quite well. In fact I brought a short little film of a demonstration that someone from our vision group did, so let's take a quick look at some of the progress that's been made.

[Demo video] ②

10 That just gives you a glimpse of one area that is expected to make the personal computer really disappear into the environment and connect up in a rich way. Tomorrow's PC will be quite different from what we have today, tomorrow's Internet will be much better than what we have today, but it will all evolve out of this technology that we have right now.

11 It's clear that the reason we refer to this as the information age is that the capabilities available in the information age will let people reach out and get what they need, whether it's business, learning, or for entertainment. Microsoft feels in a very lucky position to be helping to drive these things, and key for us is working with other software companies so that they can build other applications on top of the system. Every industry needs a lot of software work there, and so I talk about the software industry creating so many great jobs in the years ahead. I think you picked a great field to be in and we look forward to working with you.

Thank you.

(1,316 words)

New Words and Expressions

Bill Gates [bɪl geɪts]		比尔·盖茨
teletype [ˈtelɪtaɪp]	n.	电传打字电报;电传打字电报术
mainframe [ˈmeɪnfreɪm]	n.	[电脑]主机
fascinating [ˈfæsɪneɪtɪŋ]	a.	迷人的
exponentially [ˌɪkspəʊˈnenʃəlɪ]	ad.	从指数上
innovation [ˌɪnəʊˈveɪʃən]	n.	革新,改革
processor [ˈprəʊsesə]	n.	处理器
Pentium [ˈpentɪəm]		奔腾

tablet [ˈtæblɪt]	*n*.	碑,匾;药片
cereal [ˈsɪərɪəl]	*n*.	谷类,谷类植物
positive [ˈpɒzətɪv]	*a*.	积极的,确实的,实际的
graphics [ˈgræfɪks]	*n*.	制图法;图解计算法
interface [ˈɪntəfeɪs]	*n*.	分界面;两个独立体系的相交处
linguistics [lɪŋˈgwɪstɪks]	*n*.	语言学
accelerate [ækˈseləreɪt]	*v*.	加速,促进
evolve [ɪˈvɒlv]	*v*.	演化,使发展

Notes

1. 美国前总统克林顿(Bill Clinton)曾呼吁国人要"Speak plain English"。其本人的演讲即以语言洗炼、平实、幽默、充满激情见称于世。而比尔·盖茨于 1997 年 12 月 12 日在清华大学所作的演讲也颇具此风格,很值得我们品味和学习。
2. "demo video"意指"示范录像"。demo 系 demonstration 的缩写。

Exercises

I. Answer the following questions.

1. According to the text, what was the computer at the time when Bill Gates was a young man?
2. What was he eager to know about the computer?
3. Why did he think that computers had a very bright future?
4. When did he set up Microsoft and what was his vision?
5. Why is software the key element?
6. What progress has been made in the computer technology?
7. What benefits has the Internet brought to people?
8. What kind of research work has Microsoft done? What are Microsoft's ambitious programs?
9. According to the text, say something about the word processor and computer vision.
10. Why do we refer to our age today as the information age?

II. Translate the following words and phrases.

A. From Chinese into English

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1. 芯片技术 ____________________
2. 软件 ____________________
3. 硬件 ____________________
4. 高速处理器 ____________________
5. 数字视频 ____________________
6. 屏幕技术 ____________________
7. 数据 ____________________
8. 全球计算机化 ____________________
9. 计算机视觉 ____________________
10. 图形界面 ____________________

B. From English into Chinese

1. to be fascinated with ____________________
2. teletype ____________________
3. to communicate with other people ____________________
4. at the centre of ____________________
5. in terms of ____________________
6. to speed up ____________________
7. 64-bit processor ____________________
8. incredible storage capacity ____________________
9. to share research in key science areas ____________________
10. to come a long way ____________________
11. to deal with ____________________
12. a series of ____________________
13. to scan an image ____________________
14. demonstration ____________________

III. Translate the following passage into Chinese.

I view Web TV as in its early stages. As the hardware improves, as the speed of connections improves, the concept of something simpler than the PC, but still interactive, is shared by Sony and Microsoft. We're brainstorming together on that.

I think parallel to the personal computer revolution there's an explosion of digital cellular. Today's digital cellular technology can only handle the transmission of voice and simple text data. From around 2001 the next-generation mobile communications service, called IMT-2000, will become available. This will be able to handle transmission of moving pictures.

Today's technology is vertical, I think we need collaboration between Microsoft and Sony, so as to reform the passive viewing habits by computer-based technology. Of course, before a total solution is possible, we need a lot of companies' collaboration, not only Sony and Microsoft, but also operators of cable and satellite TV.

[brainstorm *v*. 集中每人的智慧解决(难题)/digital cellular "数字式蜂窝电话"/cable and satellite TV 有线电视和卫星电视]

Text B

*US Plans Large Funding Boost to Support Nanotechnology Boom*①

1 The US government plans to launch a major, inter-agency nanotechnology initiative to nurture what officials describe as explosive growth in scientific interest in the behaviour of materials at the nanometre scale.②

2 The National Science Foundation (NSF), which supports most university research in nanoscience and is likely to lead the initiative, reports that it can fund only 13 per cent of the grant applications it receives in the field, compared with the 40 per cent success rate in many disciplines at the agency.

3 Competition for funds in the field is "absolutely ferocious," says Stan Williams, head of basic research at Hewlett-Packard and a keen supporter of the initiative. Williams prefers the term nanoscience to nanotechnology because the latter term bas become tarred by fanciful claims on its behalf.

4 "Part of the problem is that nanotechnology has been over-hyped," he says, noting that "we have to fight against the distaste" that some feel, associating the term with visions of a factory housed in a matchbox.

5 Instead, a growing understanding of materials at the nanometre scale, where dimensions are comparable to the lengths of individual molecules, is likely to transform large-scale products and processes. "This doesn't need to be about small things, it could be about parts in a car," explains Mike Roco of the NSF's engineering directorate, who chairs an inter-agency working group that is planning the initiative. "The utilization of nanotechnology is very broad, but all fields of it use the same tools and methods."

6 Perhaps the most commercially spectacular application so far is the use of giant magnetoresistance—discovered in 1988—in the reading heads of most computer disk drives. The related phenomenon of tunnelling magnetoresistance will shortly allow production of fast and compact random-access memories for computers.

7 But, as Williams points out, imminent applications of nanotechnology extend far beyond the computer industry. Kodak, he says, is developing nanoscale particles called "dygments"—a cross between powder pigments and molecular dyes—for use in printing images. Tyre manufacturers plan to mix nanoparticles of clay with tyre rubber, tying up loose ends of polymer molecules and greatly extending tyre life. And the four-fifths of possible drug therapies that can't be tested in patients because they are insoluble in water could be produced as nanoparticles sitting in a suspension in water, and could therefore become viable therapy candidates.

8 All of this potential is attracting attention in Washington, where support for a research initiative is growing. In the annual budget guidelines circulated to agencies in May, Jack Lew, the director of the Office of Management and Budget at the White House, and Neal Lane, director of its Office of Science and Technology Policy, identified nanotechnology as an area ripe for special inter-agency attention. Last month, hearings in both the House and the Senate outlined the special potential of the field.

9 All of this points to the inclusion of a major nanotechnology initiative in the budget proposal for the 2001 fiscal year, which President Bill Clinton presents to the Congress next February. A report soon to be released by the inter-agency group calls for the initiative to double government spending on nanotechnology research from $250 million to $500 million over three years. Officials involved in planning the initiative hope that Clinton himself will announce it, possibly as early as September.

10 The NSF will spend $80 million this year on nanotechnology research, while the Department of Defense spends $60 million and the Department of Energy $54 million. These figures suggest that total US government spending has doubled since 1997, when a study by the World Technology Division of Loyola College estimated total government spending at $116 million. Japan spent $128 million in 1997 and Western Europe $120 million, according to the study. But Rico says that spending in each region of the world has grown sharply since then.

11 "The European Union, Germany and Japan each have very focused efforts in nanotechnology," Williams says, adding that the US government research effort has lacked coordination, so that "some areas of research are being ignored completely".

12 However, the Loyola study found that the United States led the world in the synthesis and assembly of nanostructures, and in high-surface-area materials. It shared the lead with Europe in coatings and biological applications, while Japan led in "nanodevices" and consolidated materials.

(720 words)

New Words and Expressions

nanotechnology [ˈnænəʊtekˈnɒlədʒɪ]	*n.*	纳米技术
boom [buːm]	*v.* & *n.*	激增，迅速发展
initiative [ɪˈnɪʃətɪv]	*n.*	积极性，首创精神；主动的行动
nurture [ˈnɜːtʃə]	*v.*	养育，培养
nanometre scale [ˈnænəʊˌmiːtə skeɪl]		纳米刻度
nanoscience [ˈnænəʊˌsaɪəns]	*n.*	纳米科学
discipline [ˈdɪsɪplɪn]	*n.*	学科；纪律
ferocious [fəˈrəʊʃəs]	*a.*	残忍的，凶猛的
Hewlett-Packard [ˈhjuːlɪtˈpækɑːd]		惠普（公司）
fanciful [ˈfænsɪful]	*a.*	爱空想的，怪诞的

over-hyped [ˈəʊvə haɪpt]	a.	过分刺激，过分热烈
distaste [ˌdɪsˈteɪst]	n.	不喜欢，厌恶
directorate [dɪˈrektərɪt]	n.	理事会；董事会
spectacular [spekˈtækjʊlə]	a.	壮观的，引人注意的
magnetoresistance [mægˌniːtəʊrɪˈzɪstəns]	n.	磁致电阻
dygment [ˈdaɪgmənt]	n.	染色精
imminent [ˈɪmɪnənt]	a.	迫近的，危急的
insoluble [ɪnˈsɒljʊbl]	a.	难以溶解的
suspension [səsˈpenʃən]	n.	悬挂，暂停
viable [ˈvaɪəbl]	a.	可行的
circulate [ˈsɜːkjʊleɪt]	v.	流通，传播，循环
coordination [kəʊˌɔːdɪˈneɪʃən]	n.	同等，调整，协作
synthesis [ˈsɪnθɪsɪs]	n.	合成；综合
coatings [ˈkəʊtɪŋz]	n.	涂层；上衣衣料
nanodevices [ˈnænəʊdɪˈvaɪsɪz]	n.	纳米器件
consolidated materials [kənˈsɒlɪdeɪtɪd məˈtɪərɪəlz]		合成材料

Notes

1. 本文只是对在纳米技术迅速发展阶段，美国如何计划大投资，为纳米技术高潮推波助澜的某个侧面进行了描述。关于该技术本身的实际应用等问题，请关注本教材下册 *Nanometer and New Super-conductive Material* 一文，相信读后会有所启发的。
2. 句中 initiative 一词系名词，在句中作宾语；后面的不定式短语"to nurture what officials describe as..."则是它的定语。initiative 一词在本文出现了八次，请注意其用法。

STYLISTICS

Features of EST in Style and Structure (1)

EST — English for Science and Technology

Our era is the age of machines, electronics and computers. Only by obtaining a good knowledge of science, can we live successfully in modern society.

With the development of science and technology, scientists and engineers strive to exchange their ideas, discoveries and inventions, collect information and data, interpret concepts and theories, comment on the latest scientific advances and write reports based on experimental procedures, etc. The need increases day by day for scientists and engineers to have a swift, economical, efficient, impersonal and sometimes international means of communication.

When language teachers first used the phrase "EST", they were content to deal superficially with scientific discourse. Instead of investigating the authentic language of science, they relied on popularized accounts of technical subjects as are found in encyclopedias or books intended for general readers. Lately, however, textbooks have been appearing that attempt to reflect the nature of the language actually used by scientists and the function it serves.

However some people still ignore the existence of EST altogether, while others are quite indifferent to it. They draw a simple formula like this:

EST= General English Grammar + Technical Words

They thought that they would be able to understand EST by simply knowing grammatical rules in addition to some technical words. Unfortunately, this judgment gives no fruitful comprehension about the nature of EST. They do not seem to be aware that EST presents linguistic varieties with its own characteristic features.

Since scientists and engineers try to be impersonal in narrating the natural phenomena and facts, their process, properties and characteristics, EST must be evidently precise, concise, clear and restricted and includes many mathematical equations, formulae, diagrams, tables, etc. Scientists also prefer some typical sentence patterns and a large number of technical and semi-technical terms, which make EST different to a very wide extent from ordinary English.

Furthermore, we can categorize EST literature according to its form and content.

There are spoken and written forms.

Like many other natural unscripted speeches, EST in spoken form or spoken EST for short has many features (hesitation, pauses, incomplete utterances, sudden changes of direction, encouraging noises from the listener and repetitions). The words and phrases used are to some extent informal and colloquial. In addition to all these, spoken EST consists obviously of a number of technical and semi-technical terms.

You may find EST in spoken form when you listen to a lecture, a radio or television programmer or a film on a scientific or technical subject. Sometimes you'll have the

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