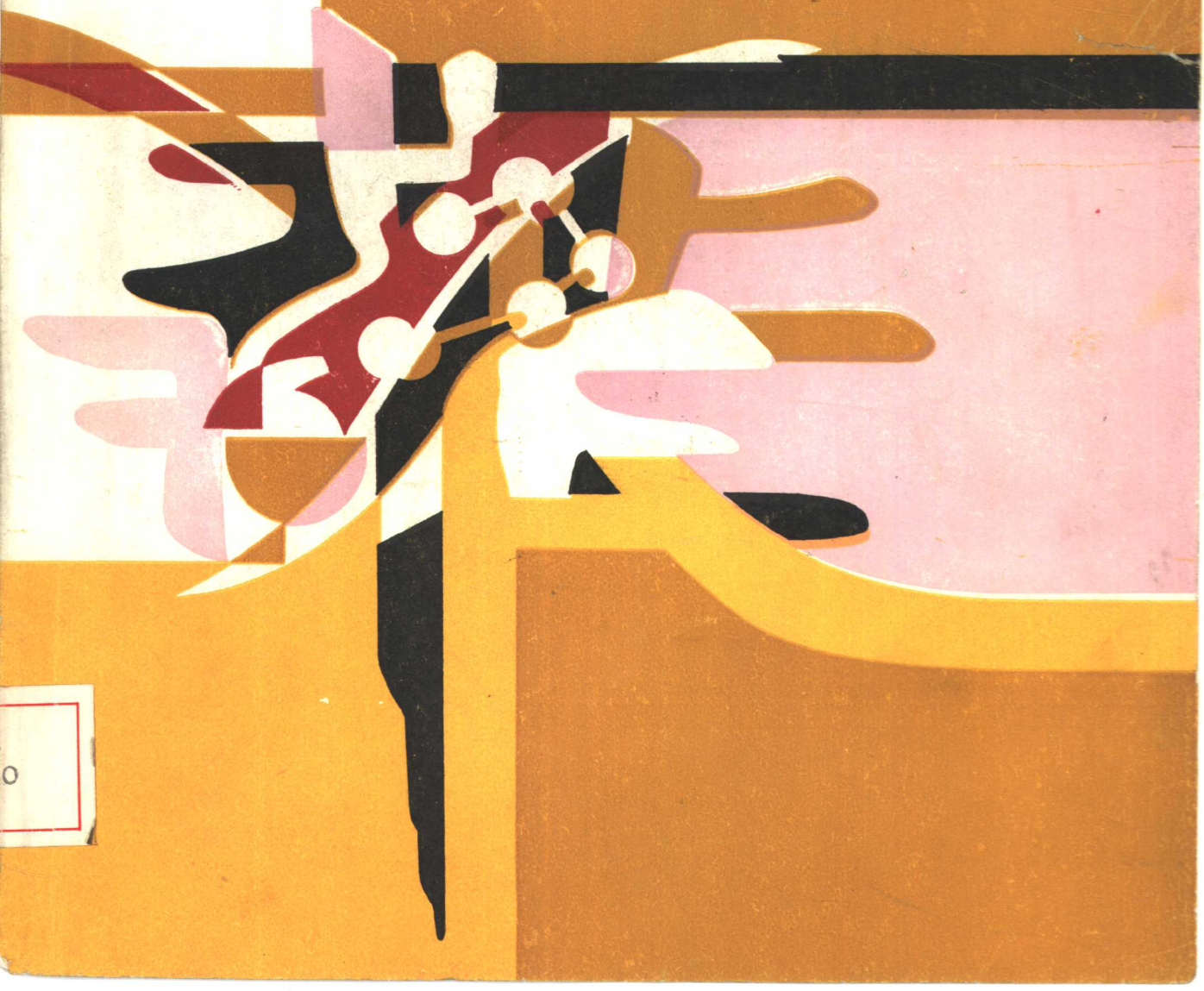
科技英语的阅读技巧

EST-READING SKILLS



EST —— Reading Skills

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AN EST COURSE FOR ADVANCED LEVEL

高级科技英语教程

戴炜华　陈文雄
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Shanghai Foreign Language Education Press

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上海外语教育出版社印刷出版
（上海西体育会路 119 号）

新华书店上海发行所发行

787×1092 毫米　1/16　16 印张　410 千字
1986 年 7 月第 1 版　1986 年 7 月第 1 次印刷
印数：1—12,000册
统一书号：7218·179　定价：2.70 元

前　言

《科技英语的阅读技巧》是综合性高级科技英语教程的第二册，旨在帮助具有中上英语水平的理工科大学生提高阅读技能。

本教程共编三册：《科技英语的特点和应用》、《科技英语的阅读技巧》和《科技英语的写作技巧》。这三册书既可依次使用，也可独立使用。

整个教程的起点是中上水平，即学员已经掌握基础英语语法以及3000左右的词汇。

本书的编写目的在于指导学生获得并提高阅读科技英语的技能和熟巧，特别是获得并提高快速阅读的技巧。本书对有关快速阅读的一些主要方法，如通读和浏览、找出段落的中心思想和主题句子、猜测生词的词义、依靠上下文线索来阅读理解复杂句子以及略读等，均作了简明的介绍。对精读和评阅的一些主要方法，本书也作了介绍。

全书共十六课，分四个单元，每个单元为四课。每个单元的最后一课用来复习本单元的主要阅读技巧，每一课有两篇课文。全书三十二篇课文均选自现代科技英语文章。尽管在每篇课文中并未出现大量的生词，但对部分学生来说，阅读中的主要困难仍可能是课文中的词汇量较大。为此，我们对某些词和短语作了注释，以帮助学生更好地理解课文。我们也希望教师鼓励学生自己查阅原版英语词典。

本书提供了大量练习。理解课文的练习主要是为了帮助学生巩固阅读技巧。此外。本书还提供了巩固词汇的练习。

本书附有练习参考答案。不提供答案的练习可能有几种答案。

在编写本书时我们参考了不少科技英语原著(见参考文献)。我们曾借鉴这些原著中的一些观点，在此谨向原作者表示感谢。

戴鸣钟教授十分耐心地审阅了本书的全部底稿并提出了非常宝贵的意见，对此我们表示十分感谢。我们也非常感谢在我系任教的美国教师富兰克林·柯尔曼先生，他十分认真地审阅了本书的手稿并提出了不少建设性的意见。

编　者

一九八四年于

上海机械学院科技外语系

Preface

EST – Reading Skills is the second volume of the advanced integrated course, designed to help science and engineering students at intermediate/advanced level improve and develop their reading skills.

This integrated EST series consists of three volumes: *EST – Features and Application, EST – Reading Skills* and *EST – Writing Skills.* The three books can be used in sequence, or independently.

The whole course starts at intermediate/advanced level. It is assumed that the learner has a fair mastery of basic English grammar and a vocabulary of about 3000 words.

This book is designed to guide the students to the acquisition and the improvement of skills and strategies of reading in scientific English, especially of practical skills in speed reading. The main methods of speed reading are introduced with simple and clear explanation, such as surveying and scanning, finding out the main idea and the topic sentence in a paragraph, guessing unknown words, learning the meaning of complicated sentences from the context, skimming, etc. The main methods of close and critical reading are also discussed.

The whole book consists of 16 lessons. There are four units in the book, with four lessons in each unit. The last lesson in each unit is designed to revise the main reading skills in the given unit. Each lesson has two reading passages. The 32 reading passages have been taken from modern English writings on science and technology. To some students, the apparent difficulty of the passages in this book lies in the relatively extensive new vocabulary though the students will not be faced with a large number of new words and expressions at one time. We have therefore provided some notes on words and expressions to facilitate better comprehension. We also wish to encourage the students to use an English-English dictionary.

The book provides a lot of exercises. The comprehension exercises seek mainly to consolidate the reading skills. In addition to the comprehension exercises, exercises on vocabulary are provided.

Suggested answers to the exercises will be found in a key. Exercises to which the key is not given can be answered correctly in a variety of ways.

In preparing the book we have utilized a lot of original writings on English for Science and Technology (See Literature). We wish to express our thanks to those authors from whom we have borrowed ideas.

We must here record our appreciation for the help given to us in the writing of this book by Professor Dai Mingzong, who has read the whole work in draft with endless patience and made many valuable critical comments. We are also grateful to Mr. Franklin Kuhlman, an American teacher

working in our Department, who has been serious enough to read the manuscript and made a lot of constructive suggestions.

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1984

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Unit I

An Introduction to Reading Skills

Lesson One Two Basic Elements in Reading Skills

English for Science and Technology(EST) which expresses theories, facts, concepts, etc. is not a different language from everyday English. But due to its special role in science and technology, EST may be considered a branch of English, with specific aspects in expression.

Technical writing is aimed at a specific reader. In this sense, technical English does differ from ordinary English. Most sentences of technical writing are in statement form. Scientist's statements are always impersonal, formal and logical. From the viewpoint of style, technical writing is characterized by its clearness, conciseness and thoroughness. It contains semitechnical and highly technical words, besides nontechnical ones. Despite all this, the basic reading skills in technical writing are, generally speaking, the same as those in ordinary English writing.

Reading is an active and comprehension process. Students of science and engineering are bound to face a sea of information written in scientific English. How can we maximize information obtained within a limited time? Does there exist any short cut in achieving this goal? That's the very purpose of designing this book.

Many aspects are confronted in reading skills. Among them, speed and efficiency are the two basic ones.

1. Speed

Many students read passages slowly with some defective reading habits. They read a passage slowly and carefully, word by word; say the words to themselves; move their lips or follow the line with their fingers or with pens; pay ardent attention to individual points, but without succeeding in getting a clear idea of the overall meaning of the passage. These habits slow the reading down to something near speaking speed, which is, of course, much slower than reading speed. It is proved to be requisite for intermediate/advanced students to read a passage as quickly as possible. The minimum speed should be 100 w. p. m (words per minute).

The essence of quick reading is to practice under timed conditions. This means that you are given a certain amount of time to read, then check the time used when you have finished the reading.

Reading fast does not necessarilly mean reading with less comprehension – in fact, usually students show a noticeable improvement in comprehension as well as a dramatic increase in speed after

they have carefully read a certain amount of passages.

2. Efficiency

Reading with efficiency is to quickly get the general idea or main information of a passage. Obviously there is little point in increasing your w.p.m. rate if you do not understand what you are reading. If a student is good at reading comprehension, he can get the maximum information from the passage in the minimum time.

Effective or proficient reading requires coordination of eyes and mind. That is to say, you should look at groups of related words (e.g., nouns and their modifiers, prepositional phrases, and participal phrases) rather than at individual words. As you read word groups, you should concentrate your mind on the idea of the topic sentence of each paragraph (it is often the first sentence).

Now read over Text One once both quickly and effectively, and then do the comprehension exercises that follow.

Text One (A)

Auto Called No. 1 Health Enemy

1) Three Yale University professors agreed in a panel discussion[1] tonight that the automobile was what one of them called "Public Health Enemy No. 1 in this country." Besides polluting the air and congesting the cities, cars are involved in more than half the disabling accidents[2], and they contribute to heart disease "because we don't walk anywhere anymore," said Dr. H. Richard Weinerman, professor of medicine and public health. Dr. Weinerman's sharp indictment[3] of the automobile came in a discussion of human environment on Yale Reports, a radio program broadcast by Station WTIC in Hartford, Connecticut. The program opened a three-part series on "Staying Alive". "For the first time in human history, the problem of man's survival has to do with his control of man-made hazards," Dr. Weinerman said. "Before this, the problem had been the control of natural hazards."

2) Relating many of these hazards to the automobile, Arthur W. Galston, a professor of biology, said it was possible to make a kerosene-burning[4] turbine car that would "lessen smog by a very large factor". But he expressed doubt that Americans were willing to give up moving about the countryside at 90 miles an hour in a large vehicle. "America seems wedded to the motor car[5] – every family has to have at least two, and one has to be a convertible[6] with 300 horsepower," Professor Galston continued. "Is this the way of life that we choose because we cherish[7] these values?"

3) For Paul B. Sears, professor emeritus[8] of conservation, part of the blame lies with "a society that regards profit as a supreme value, under the illusion that anything that's technically possible is, therefore, ethically[9] justified." Professor Sears also called the country's dependence on its modern automobiles "lousy economics" because of the large horsepower used

simply "moving one individual to work". But he conceded[10] that Americans have painted themselves into a corner by allowing the national economy to become so reliant on the automobile industry.

4) According to Dr. Weinerman, automobiles, not factories, are responsible for two-thirds of the smog in America's cities, and the smog presents the possibility of a whole new kind of epidemic, not due to one germ[11], but due to polluted environment. "Within another five to ten years, it's possible to have an epidemic of lung cancer in a city like Los Angeles. This is a new phenomenon in health concern," he said.

5) The solution, he continued, is "not to find a less dangerous fuel, but a different system of innercity transportation. Because of the increasing use of cars, public transportation has been allowed to wither[12] and degenerate, so that if you can't walk to where you want to go you have to have a car in most cities," he asserted. This, in turn, Dr. Weinerman contended[13], is responsible for the "arteriosclerosis" of public roads[14], for the blight of the inner city and for the middle-class movement to the suburbs.

Notes

1. panel discussion: discussion before an audience by a group of persons selected (to act as a team) on certain problems (公开讨论会)
2. disabling accidents: accidents causing serious injury (造成伤亡的事故)
3. indictment: the act of charging someone formally with an offence in law (控告，起诉；指责)
4. kerosene: oil made from petroleum or shale, etc. burnt for heat and in lamps for light (煤油)
5. America seems wedded to the motor car: America seems closely related to the motor car (美国人似乎与汽车有不解之缘)
6. convertible: a car with a folding and removable roof (卷蓬汽车)
7. cherish: care for (珍惜，珍爱)
8. emeritus: of a teacher, esp. a retired professor no longer holding office but still keeping the academic title (名誉的)
   professor emeritus: emeritus professor (名誉教授)
9. ethically: in connection with ethics, a system of moral behaviour (合乎道德地)
10. concede: admit (承认)
11. germ: microbe (细菌)
12. wither: disappear gradually (消失)
13. contend: argue (主张；力辩)
14. arteriosclerosis: hardening of the arteries (blood vessels) (动脉硬化)
    "arteriosclerosis" of public roads: Here public roads are compared to hardened arteries and traffic jams to poor circulation (blood jams) (公共道路的"动脉硬化")

Comprehension Exercises

I. True or False.

On a separate piece of paper, write the numbers 1 through 10 on both sides. Mark one side "Test 1" and the other side "Test 2". Read each statement and decide whether it is true or false. Write "T" in front of true statements and "F" in front of false statements under Test 1. After you have finished the comprehension check, turn Test 1 face down. Then read the article again and do the comprehension check again under Test 2. Base your answers on the information in this article only, even if you disagree with what the author said.

1. This article states the conclusions of some Harvard University graduate students.
2. Automobiles can contribute to heart disease.
3. The automobile is a natural hazard.
4. Kerosene engines are more desirable than gasoline engines because they will increase speed.
5. This article states that Americans realize the dangers of automobiles, and they are becoming less attached to them.
6. Professor Sears implied, but did not directly say, that Americans are more concerned with making money than anything else.
7. The dirty air in major cities is related to the number of automobiles in the area.
8. According to this article, factories produce more air pollution than automobiles do.
9. Smog is a type of pollution.
10. Bad public transportation in major cities forces many people to rely on their own cars to commute to work.

Reading Speed:

1st reading _____ minutes

2nd reading _____ minutes

Recommended Reading Times:

6 minutes = 81 wpm

5 minutes = 97 wpm

4 minutes = 121 wpm

3 minutes = 162 wpm

II. Multiple Choice.

1. The main idea of this article is that:
   (A) Americans are too attached to their cars.
   (B) American cars are too fast.
   (C) automobiles endanger health.
2. The best classification for the information in paragraph 1 is:
   (A) automobile: health hazard
   (B) automobile: pollution
   (C) automobile: Yale University
3. In paragraph 2, although he doesn't say it directly, Professor Galston is implying that:
   (A) people are more interested in fast automobiles than in their health.
   (B) kerosene-burning engines would pollute the environment more than gasoline-burning engines do.
   (C) Americans feel more closely tied to their cars than to their wives.
4. Galston says in paragraph 2 that kerosene-powered cars would:
   (A) reduce air pollution.
   (B) increase air pollution.

(C) not change air-pollution levels.

5. In paragraph 2, Galston implies, but does not directly say, that kerosene-powered cars would:
   (A) go faster than gasoline-powered cars.
   (B) reduce smog.
   (C) go slower than gasoline-powered cars.
6. In paragraph 2, when Galston says that every family has to have two cars, he implies, but does not directly say, that:
   (A) he agrees with this attitude.
   (B) he disagrees with this attitude.
   (C) he is neither for nor against this attitude.
7. In paragraph 3, Professor Sears is implying, but not directly saying that:
   (A) technology is always good for people.
   (B) technology is not always good for people.
   (C) financial profit is more important than technological advancement.
8. The main idea of paragraph 4 is that:
   (A) factories cause less pollution than automobiles.
   (B) an epidemic is caused by germs.
   (C) smog could cause an epidemic of lung cancer in the future.
9. Paragraph 5 implies, but does not directly say, that:
   (A) a fuel less dangerous than gasoline must be found.
   (B) people should get rid of their cars and take the bus to work.
   (C) public transportation should be improved so that people can become less dependent upon their cars for inner-city transportation.
10. Although he does not say it directly, Dr. Weineman would probabaly agree that, if public transportation were improved:
    (A) the inner city might improve.
    (B) the middle class would move to the suburbs.
    (C) public roads would get worse.

III. Interpretation of words and phrases: Circle the letter next to the best answer or to the one nearest in meaning to the italicized words.

1. Three professors took part in *a panel discussion.*
   (A) an argument or disagreement conducted in private
   (B) a television guessing game.
   (C) a discussion by several people in front of an audience.
2. Professor Sears called America's dependence on cars "*lousy* economics".
   (A) inferior
   (B) clever
   (C) necessary
3. Society regards profit as a *supreme* value.
   (A) most important

(B) important
(C) least important

4. The *inner city* is:
   (A) a city in the center of the country.
   (B) the central area of a city.
   (C) the suburbs.
5. Americans have *painted themselves into a corner* by allowing the economy to become so reliant on the automobile industry.
   (A) become painters
   (B) increased their wealth
   (C) trapped themselves
6. The public transportation systems *have been allowed to degenerate.*
   (A) haven't been maintained or improved properly.
   (B) are used by too many people during rush hours.
   (C) don't exist any more.

IV. Synonyms: From the following list, choose a synonym for the italicized word or phrase in each sentence. Rewrite the sentence using the synonym in its appropriate form.

car	crippling	deterioration
to be concerned	to crowd	to love
polluted air	danger	must
dependent		

1. Do Americans *cherish* their automobiles too much?
2. Cars are involved in many *disabling* accidents.
3. Cities are *congested* with cars.
4. The problem of survival *has to do with* man's control of man-made hazards.
5. People want to travel around in a large *vehicle.*
6. Previous problems were caused by natural *hazards.*
7. There is a lot of *smog* in the cities.
8. You *have to* have a car in most cities because public transportation is inadequate.
9. The lack of public transportation is one cause of the *degeneration* of the inner city.
10. The economy has become quite *reliant* on the automobile industry.

Text One (B)

Some Practical Uses of Radioisotopes

Hydrogen comes in three isotopes[1], with atomic weights one, two, and three. They are set apart by writing the mass number[2] after the chemical symbol for hydrogen. Thus H–1 refers to the lightest of all atoms, the light isotope of hydrogen — protium[3]. H-2 (deuterium[4]) designates[5] heavy hydro-

gen, which is twice the weight of ordinary light hydrogen. The only other isotope of hydrogen is a radioactive form called tritium[6] or H-3. To be precise, we should call this a radioisotope, but the use of the term "isotope" is commonplace.

There are 280 stable, naturally-occurring isotopes, together with 73 natural radioisotopes. In addition, man has added 960 artificial radioisotopes to nature's store.

The Meaning of Half-Life

Each radioisotope has its own distinct nuclear personality. This is revealed in the rate at which the atoms of the particular isotope disintegrate[7], as well as by the kind of radiation or rays given off by the disintegration. The term half-life is used to describe the rate at which some radioactive material loses its radioactivity[8]. It is the time required for a radioactive substance to be reduced to 50 percent of its original radioactivity.

For example, radium[9] 226 has a half-life of 1,600 years. If we start today with a fresh sample of radium-226, then in 1,600 years half of this will have disintegrated, so that we have on hand only half as much as we had originally. Tritium, another example, has a half-life of 12¼ years. A very slow-decaying or long-lived isotope is U-238 with its half-life of 4½ billion years. Some radioisotopes, on the other hand, are extremely short-lived, effectively disappearing in times measured in tiny fractions of a second.

Three different kinds of rays are emitted by radioisotopes. U-238 throws off a heavy, sluggish[10] particle called the alpha particle. Cobalt[11]-60 emits powerful gamma rays (similar to X- rays) which can penetrate[12] inches of solid lead. Tritium gives off very weak beta rays which are absorbed in such thin film of matter that one has to use a Geiger[13] counter[14] for their detection.

The disposition of the atoms—as displayed by its half-life and its radiation—makes possible a wide application of isotopes to industry, agriculture, biology, and space research. Since there are thousands of uses for radioisotopes, we shall focus[15] our attention on a few which illustrate the power of the isotope technique.

Measuring Thickness

Think of a strip of thin film-plastic, paper, or aluminum[16]—speeding through huge rollers[17]. How can the thickness of the high velocity film be determined without touching it? A neat[18] solution to this problem is found in the use of a radioactive source held below the film so that its radiation goes upward through the moving strip.

A radioisotope is selected for the job so that its radiation is substantially[19] absorbed in the particular film. On the other side of the film a detector[20] consisting of a Geiger counter or other radiation instrument monitors[21] the number of rays passing through the moving material. If the beta particles emitted by the radioactive source are stopped in the film, they cannot register[22] in the Geiger counter. Thus the sound of the counter, or the counter's output, is a measure of the film thickness. Variation in the counter's output indicates changes in thickness.

Radiation gauges[23] have been developed for many industrial applications, including the production of steel sheet, coated paper, and plastic film. Other gauges control the fill-level[24] of various liquids in containers. A number of companies use radioisotope gauges for ensuring accurate filling of beer cans,