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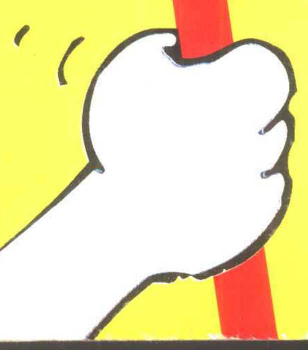

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大学科技英语

主　编：罗英豪　杨松青
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湖南科学技术出版社

大学科技英语

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前　言

《大学科技英语》是供大学生在完成基础英语学习进入专业英语阅读阶段而编写的。

搞好专业英语的教学是提高学生英语整体素质的重要一环。市场经济的发展需要学生有较宽的知识面。根据多年来的教学实践，我们编写了这本具有实用和科技特色，可供文、理、工科学生使用的教材。全书共15单元，分为实用和科技两部分。实用部分的课文内容有保险公司的保险条款、外资合同的订立、银行信用卡、旅行支票和旅行信用证、涉外信函、专利代理机构、关贸总协定、管理科学以及联合国教科文组织等。科技部分的课文内容有数学、科学研究的本质、宇宙旅行、激光和全息照相技术、未来计算机趋势与预测、遥感以及世界废料危机等。为了帮助学生参加全国大学英语六级统考和研究生考试，本书除附有与课文内容紧密有关的问答题、理解题、汉译英、英译汉和阅读材料等练习外，还编写了多项选择、改错、综合填空等。本书另配有教师参考用书和课文录音磁带。选材大致相当于四级到六级的水平。通过本书的学习，不但对基础英语知识有巩固和提高的作用，而且又有扩大知识面的作用。

参加本书编写的有殷志云（第一单元）、杨松青（第二、三、四、十三单元及附录）、罗英豪（第八、十四、十五单元以及第一、二、三、四、九、十三单元的练习Ⅴ、Ⅵ、Ⅶ）、吴慰先（第五、六单元）、赵显富（第九单元）、张从益（第十、十一单元）、梁奕昌（第十二单元）、盛之（第七单元）。出版前由杨松青校订一次。

由于历史的原因，英语已成为国际间的工作语言，而且不同国家甚至一个国家的不同地区的英语表达方式也有所不同，本书注意选择不同风格、不同体例、具有一定代表性文章，并加以必要的注释，以利读者学习。

由于时间仓促，水平有限，经验不足，本书缺点和错误恳请读者不吝赐教。

中南工业大学教务处、校专业外语课程建设委员会领导整个编写工作。对此，我们特表示衷心的感谢。

编　者

1995年4月于

中南工业大学

CONTENTS

Unit One

Before Reading

1. Look up the following words in your dictionary:
   qualitative, quantitative, postulates, deductions.
2. Read the passage and underline the following information in the text:
   (1) In what sense mathematics is called the language of science?
   (2) What is the difference between a scientific theory and its correlated mathematical system?
   (3) "Discoveries in science sometimes advance so rapidly that an adequate mathematical system lags behind." What is your understanding of the sentence? Cite an example in point.

Text

MATHEMATICS AS A LANGUAGE OF SCIENCE[1]

A branch of science deals with a class of things, the changes in the members of the class, and the relations between these members. Thus the ideal form of a natural science is the same as that of mathematics. The objective in natural science is to discover relations which assert that when an event P is present in a situation, then the event Q also present. As a branch of science advances from a descriptive and qualitative stage to one where the relations can be expressed in a quantitative and explanatory manner[2], the science assumes a mathematical form. Astronomy at one time was a descriptive science, but work of Kepler and Newton established foundations, by means of which the laws of the motions of the heavenly bodies[3] could be expressed mathematically. It is in this sense that[4] mathematics is sometimes called the language of science. When the postulates of a branch of science satisfy the requirements of the postulates of a branch of mathematics, then the hypothetical propositions of that branch and the deductions from them can be used in the verification of prediction of the propositions of the corresponding branch of science.

One difference between a scientific theory and its correlated mathematical system is that, if the mathematical deductions predict phenomena which conflict with experiment, then some or all of the initial postulates of the scientific theory must be modified or discarded[5]; but though the physical theory has failed, the mathematical system is not discredited, remaining as consistent as ever[6]. It has served one of its purposes in bringing to light the inadequacy of the scientific hypotheses.

At times, developments in mathematics have far exceeded the needs of any concrete science, properties of conic sections discovered by Appollonius, a Greek mathematician, were not applied until Kepler made use of ellipses to describe the motions of the planets around the sun. On the other hand, discoveries in science sometimes advance so rapidly that an adequate mathematical system lags behind. Important mathematical theories, developed as abstract sciences from apparently quite arbitrary sets of postulates, have later proved to be useful tools in applications of mathematics. It was from a study of algebraic equations that mathematician was led to predict that only 32 types of crystals would be found in mineralogy. Conical refraction of light was predicted by Hamilton from his mathematical study, before it was observed in the laboratory.

Mathematical deductions suggest experiments and also mathematical tools developed for the purposes of science have turned out to be powerful stimulus for growth in pure mathematics. The study of the flow of heat in a metal plate led the physicist Fourier to the invention of a series which not only solved complicated problems in the study of heat but also gave great impetus to the development of pure mathematics.

Science and mathematics advance in paralleled columns each assisting and stimulating the other-the hypothetical propositions of mathematics are called into play when the generalizations of science take on a quantitative form and frequently suggest new experiments; while, on the other hand, complexities in observed data of science stimulate the development of mathematics and broaden its foundation.

New Words and Phrases

postulate ['pɔstjuleit] *n.* & *v.* 公设，假设，假定

proposition [prɔpə'ziʃən] *n.* 定理

verification [verifi'keiʃən] *n.* 证明，证实

correlate ['kɔrileit] *v.* 使互相关系

modify ['mɔdifai] *v.* 变更，缓和

discard [dis'ka:d] *v.* 丢弃，废除

discredit [dis'kredit] *v.* 怀疑

as ever 仍旧，照常

bring sth. to light 使某事显露出来，揭露某事

conic section ['kɔnik] *n.* 圆锥曲线，二次曲线

ellipsis (pl. ellipses) [i'lipsis] *n.* 椭圆

crystal ['kristl] *n.* 结晶体，水晶

mineralogy [ˌminə'rælədʒi] *n.* 矿物学

conical ['kɔnikəl] *a.* 圆锥(体、形)的

refraction [rif'rækʃən] *n.* 折射

stimulus ['stimjuləs] (pl. stimuli) *n.* 刺激，促进因素

impetus ['impitəs] *n.* 推动力，原动力，促进，推动

call into play 使动作，使活动//发挥，发扬，调动，发动

take on 呈现(新面貌等)；具有(特征等)

datum (pl. data) ['deitəm] *n.* 数据

Notes to the Text

(1)本课文选自《数学专业英语文选》，南京大学外语系公共英语教研室编，商务印书局，1979年。

(2)As a branch of science advances from a descriptive and qualitative stage to one where the relations can be expressed in a quantitative and explanatory manner.

Where clause 是关系分句。where 是关系副词，含义相当于 in which。除 where，还有 when 和 why。这些关系副词在意义上都相当于一定的"介词＋which"结构。

(3)…but work of Kepler and Newton established foundation, *by mean of which* the laws of the motions of the heavenly bodies…

科技文章的特点之一是使用关系分句较多。关系代词(主要是 which)可以与介词或复合介词(如 by means of, as a result of 等)搭配。介词的选择既要注意与其后的词，也要注意与其前的词的搭配关系，如：

The material *of which* the apparatus is made is a good non-conductor of heat.

The speed *at which* the coding can be done depends on the speed *at which* the operator can work.

上述第一例用 of，是与后面的 is made 有关；第二例用 at，是与其前的 the speed 有关。

(4)It is (was)…that 系强调句型。被强调的成分除谓语动词外，还可以是名词、形容词、副词等，也可以是介词短语或从句。如

It is *in this sense* that mathematics is sometimes called the language of science. (正是在这种意义上，数学有时被称为科学的语言。)

It was *from a study of algebraic equations* that mathematician was led to predict that ……

It was *when she was about to go to bed* that the telephone rang.

必须区别分裂句主语 it 和为形式主语的先行词 it。试比较：

It is surprising that Mary should have won the first place. (形式主语)

It is Mary that has won the first place. (分裂句主语 it)

还要区别分裂句中的 that-分句和用作关系分句的 that-分句。试比较：

It is money *that is most needed*. (分裂句中的 that 分句)

This is the money *that is most needed* . (关系分句)

(5)… then some or all of the initial postulates of the scientific theory *must be modified* or *discarded*; …

科技文章一般描述客观事物，不宜以人为主语。因此在科技文章里，被动语态使用得较多。这又是科技文章的特点之一。

(6)… remaining as consistent as ever(分词短语作状语，表示伴随动作。)

科技文章的又一特点是大量使用非谓语动词(动名词、分词、不定式)，作主语、表语、宾语、定语、状语、宾语补语等。

to be powerful stimulus(不定式短语，作表语)

each assisting and stimulating the other (独立主格分词结构，作状语)

Exercises

Ⅰ. **Answer the following questions:**

1. Why is mathematics called the language of science?
2. What is the ideal form of a natural science? why?
3. What is the objective in natural science?
4. What does the science assume?
5. What do mathematical deductions suggest? Why?
6. Why do science and mathematics advance in paralleled columns?

Ⅱ. **True or False? If you think a statement is false, correct it and make it a true one:**

1. As a branch of science advances from a descriptive and qualitative stage to explanatory and quantitative one, the science assumes a mathematical form.
2. The law of the motions of the heavenly bodies could be expressed mathematically.
3. If the postulates of a branch of science fulfil the requirements of the postulates of a branch of mathematics, the hypothetical propositions of that branch and the deductions from them can be used in the verification of prediction of the propositions of the corresponding branch of science.
4. If the mathematical deductions predict phenomena which conflict with experiment, some or all of the initial postulates of the scientific theory must be changed and get rid of.
5. Properties of conic sections were discovered by Appollonius and were not applied when Kepler made use of ellipses to describe the motions of the planets around the sun.

Ⅲ. **Translate the following into English:**

1. 我们花了不止一个小时看完这本数学书。这本书不但是某些知识的积累，而且也提供了一种观察和解决问题的方法。
2. 数学有时被称为科学的语言，行星的轨道必定是个椭圆这个事实早已用数学证明了。
3. 数学是一门自然科学，许多场合下，数学原理和体系的发展已远远超过它们的实际应用和任何一门具体科学的需要。
4. 解一个方程式(equation)就是求出未知项的值。要做到这一点，我们当然必须移项(term)，直到该未知项单独在方程式的一边，从而使这未知项等于方程式另一边的数值。

Ⅳ. **Translate the following into Chinese:**

Mathematics Comes from Practice

Engels said: "Like all other science, mathematics arose out of the needs of men." From the very beginning, mathematics was the direct or indirect attempt to satisfy a definite need in production.

In his social practice, man began to feel the need of counting things and calculating the volume of a container. From this early need came the concepts of number and shape. Then, geometry developed out of problems of measuring land, and trigonometry came from problems of surveying. To make calculation simpler, man learned to use symbols too, and algebra came into being as a result.

In elementary mathematics, we deal with constants only. With the rapid development of industry in 17th century, calculating with constants could on longer satisfy the needs of production. Many new problems in production called for a solution. To solve these problems, man began studying variable quantities and motion. This leap from constants to variable quantities brought about a new branch of mathematics-calculus.

In a word, mathematics comes from man's social practice. In studying mathematics, we must combine theory with practice. We must make mathematics serve socialist construction of our country.

Ⅴ. **Multiple Choice**:

1. The Millers live ________ 1614 Maple Street.
   A. on　B. at　C. in　D. of
2. I don't know what I'd have done if I ________ to make that decision.
   A. would have　B. had had　C. have had　D. did have
3. I wish that I ________ to the concert last Friday.
   A. could go　B. could have gone　C. have gone　D. went
4. I helped with the Johnson report because I was in charge of the work ________ on it.
   A. did　B. doing　C. being done　D. that did
5. The examination wasn't very difficult, but it was ________ long.
   A. too much　B. so much　C. very much　D. much too
6. That house was expensive. It cost ________.
   A. a fortune　B. expensive　C. expensively　D. highly
7. The day's work ________, Mary and Mable are playing cards.
   A. are done　B. doing　C. done　D. did
8. My wife bought the blue rug, but I ________ bought the brown one.
   A. will rather have　B. rather had
   C. would rather have　D. would have rather
9. The Roxy Theater is ________ Fourth Avenue.
   A. at　B. on　C. down from　D. across
10. He tried many times to sneak across the border to a neighbouring country, ________ each time.
    A. having been caught　B. only to be caught
    C. always being caught　D. unfortunately caught

11. Fred seems very clever. His ideas led to ________ a pay raise.
   A. his awarded
   B. his being awarded
   C. him to award
   D. him to be awarded
12. Someone will have to teach Helga ________ tennis.
   A. how to play
   B. how play
   C. play
   D. plays
13. I'll walk ________ the corner with you.
   A. until
   B. at
   C. as far
   D. as far as
14. It ________ everyday so far this month.
   A. is raining
   B. rained
   C. rains
   D. has rained
15. The kerosene lamp, ________ its chimney to help control air currents, was a big improvement over the candle.
   A. but
   B. which
   C. with
   D. has

Ⅵ. Error Correction:

1. Rumor (A) has this (B) that (C) there will be a (D) strong earthquake.
2. Upon (A) a receipt (B) of your reply (C) we will forward (D) the package.
3. Our country is quite fortunate of having (A) very large potential (B) energy reserves (C) in (D) coal and uranium.
4. People will be able to fly from one planet to another (A) in nasty little (B) arrow-shaped tubes. I say (C) "people" because I have no intention to be (D) one of them.
5. The more subtle (A) message is that the president has succeeded in guaranteeing (B) a smooth transfer of power to his equal pragmatic (C) chosen (D) successors.
6. Rumors that (A) the First Lady is (B) ill have circulated (C) since she had begun (D) to lose weight noticeably last year.
7. He told me that he had been (A) lame (B) ever since he had been (C) knocked off his bicycle fifteen years ago. (D)
8. Compared (A) with (B) coal burners, (C) nuclear power plants generate fewer (D) waste.
9. The public (A) chief concern (B) about (C) nuclear energy revolves (D) around the waste problem.
10. There were probably as many facts known (A) about Reagan's life and career when (B) he took office than (C) any recent President's. (D)

VII. Cloze:

In 1953, a diver in the South Pacific went deeper into the ocean than he had ever done before, in an attempt to break the world record. He came to a ledge(礁石), near ___1___ was a great hole in the ___2___ bed. The hole looked dark and ___3___. Close behind the diver was a shark, fifteen feet ___4___, which had been watching him. Now the diver ___5___ something else moving. It was a great flat creature ___6___ anything he had ever seen before, brown ___7___ colour and with ragged edges.

This creature glided from the ___8___ of the hole up towards the shark. It reached the shark and, ___9___ moment later, the shark had vanished, ___10___ up by this awful creature. The ___11___ stood very still, careful not to attract its ___12___. He watched it sink slowly downwards ___13___ the depths of the hole.

In the ___14___ of the Pacific Ocean, off the coast of Australia, many divers have ___15___. Their bodies have never been found. Perhaps, ___16___ that shark, they have been swallowed ___17___ by dreadful creatures from the ___18___.

___19___ such strange creatures exist, perhaps there are ___20___ things as sea serpents too.

1. A. it	B. which	C. by	D. him
2. A. stone	B. water	C. sea	D. flowers
3. A. frightening	B. deadly	C. awkward	D. harsh
4. A. long	B. large	C. high	D. deep
5. A. heard	B. saw	C. thought	D. realized
6. A. just like	B. bigger than	C. as big as	D. much big than
7. A. of	B. in	C. with	D. for
8. A. opening	B. end	C. base	D. darkness
9. A. some	B. another	C. that	D. one
10. A. beaten	B. raised	C. swallowed	D. caught
11. A. diver	B. shark	C. thing	D. creature
12. A. notice	B. attention	C. concentration	D. interest
13. A. from	B. through	C. into	D. by
14. A. center	B. waves	C. waters	D. bed
15. A. missed	B. disappeared	C. escaped	D. lost
16. A. for	B. by	C. with	D. like
17. A. in	B. together	C. up	D. before
18. A. coast	B. land	C. depths	D. waters
19. A. Though	B. Even	C. If	D. When
20. A. such	B. same	C. those	D. many

Reading Materials

I. Measurement

In the development of the physical sciences, we observed a rapid increase in scientific achievements after man began basing his conclusions upon experimental facts instead of upon inference. Experimentation, however, shows a quantitative study of some aspect nature, and the important part of such a study is the measurement of the things with which it deals. Measuring any quantity means comparing it with an accepted unit as a standard, and finding out how many times larger or smaller it is than the standard unit. The length of an object is measured by finding how many times longer it is than some standard unit of length. For example, if this book were taken as a standard, and laid end to end five times along a desk surface, we know that the desk is 5 book-lengths long. If this book is laid down end to end five times and it does not quite reach the other end of the desk, we say that its length is a little over 5 books. In scientific work this "little over" part is not accurate enough. To be more accurate, we must measure what fractional part of the book the desk exceeds 5 book-lengths. If we measure the desk to be 1/5 of a book longer than the 5 book-lengths, we say its length as $5\frac{1}{5}$ or 5.2 book-lengths. A more accurate measurement could be made by subdividing the book into ten equal parts. We would measure the desk to be a little more than 5.2 books long. Again we would have to measure the fractional part of the subdivision by which the desk is longer than 5.2 book-lengths. If we found the fractional part as 1/2 a subdivision, we would write down a length of 5.25 books. The last measurement is obviously far more accurate than those for the larger units. The greater the accuracy needed, the smaller the subdivision must be.

The weight of an object is similarly determined by finding how much heavier it is than some accepted standard weight unit. For example, if a piece of copper is four times as heavy as a standard pound, its weight is 4 pounds. Also, the smaller the subdivisions we have for the standard weight, the more accurate the weighing can be made.

Answer the following questions:

1. What does man base his conclusions upon?
2. What does measuring any quantity mean?
3. How is the length of an object measured? Cite an example in point.
4. How is the weight of an object determined? Cite an example in point.

II. Why Do We Count Things in Groups of Ten

Why do we count things in groups of ten? The reason is that we have ten fingers. Long ago, when people had to count many things, they matched them against their fingers. First they counted out enough things to match the fingers of both hands. Then they put these things aside in one group. If there were more than ten things to count. they formed more groups. We might call our numbers two-handed numbers, because they grew out of counting things on two hands.

Some people had one-handed numbers, too. Because there are five fingers on one hand, they counted things out in groups of five. One-handed numbers were used by the people who lived in Italy over two thousand years ago. We call their written numbers Roman numerals, which we use even today. In Roman numerals, I stands for one, and V stands for five . To write six, the Romans wrote VI, which means five and one. A long time ago, when people did not wear shoes, they could use their toes for counting, too. So some people had a barefoot arithmetic. They counted things out in groups of twenty.

Sometimes people counted things in groups of twelve. We still use the twelve-in-one-group system for some purposes. When we measure time with a clock, we count the hours from one to twelve, and then start with one all over again. The twelve-in-one-group system has left its mark on the English number-names, too. In English there is a word for each number from one to twelve. To name higher numbers above twelve, ten-in-one-group system is used.

Thousands of years ago there was a tribe who used to count things in groups of sixty. And we still use the sixty-in-one-group system when we measure time. There are sixty seconds in a minute, and there are sixty minutes in an hour.

Answer the following question:

1. Why do we count things in groups of ten?
2. How many ways did people count things long ago?
3. What might we call our numbers? Why?
4. Who used one-handed numbers?
5. What are Roman numerals?

Unit Two

Before Reading

1. Make sure you know the meaning of the following words. If there are any you are not sure of, look them up in your dictionary and make a note of their meanings.
   pioneer, embryo, starship, generation, opera.
2. Before reading the passage, work in small groups to discuss the purpose of a space travelling and what a starship would be like.

TEXT

SPACE TRAVEL

The history of space travel is the history of man's age-old dreams of flight. However not until the middle of the 20th century did it become possible to send man's tools and man himself outside his planetary home, the earth, to investigate the space environments.

The chief difficulties that had to be overcome in space travel were: how to escape the earth's gravitation pull, how to stay in orbit and how to return safely to earth. Among others the last one you might thnk is more important. But why should man return back to earth, how about the idea that flights to other planets or stars of our galaxy by manned starship but not return?

The two slow methods for reaching the stars are the starship where the crew sleep for centuries of thousands of years, and the 'generation' starship.

As regards the first system, you may already have read how it has not been possible to freeze animals (including humans) successfully for more than very short periods of time. There does not seem, therefore, to be much hope of this system being used, although it is possible that some system where body processes are slowed down rather than stopped completely *could be applied*.

But the most interesting form of 'slow' travelling takes place on a generation starship. The philosophy of *this kind of travel* is 'What's the hurry?'. If life on the ship is pleasant enough, why should *it* not be thought of as an actual world, where whole generations of crew members live and die just as they would have done back on Earth[(1)]? A thousand—year voyage to new worlds orbiting other stars would come to seem quite realistic in *these*