

通俗科技英语

活页文选

1

南京大学外文系公共英语教研室编

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商务印书馆出版

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编 者 的 话

为了帮助具有初步英语基础的科技人员、理工科学生,以及其他英语读者尽快掌握英语,我们选编出版《通俗科技英语活页文选》。

我们从英美出版的通俗科技书刊中选材,力求内容多样。每篇文章后,附有词汇、短语、重要句型和较难句子的注释和翻译。此外,还适当介绍有关的英语常识。希望能帮助读者扩大词汇量,加深对语法的理解,逐步熟悉科技英语,进而能阅读专业书刊。

“攻城不怕坚,攻书莫畏难。

科学有险阻,苦战能过关。”

我们对编辑工作缺乏经验,希望能得到读者的热心帮助。

编 者

How Do Bees Find Their Way?

Beekkeepers know that bees find their way by means of the sun. But what do they do on a cloudy day? They can still sense where the sun is in the sky by means of polarized light. This is light that can be seen better from one direction than from others. Even behind the clouds, the sun still sends it down. Ultraviolet light, too—the same invisible rays^① that cause a sunburn—guides the bees. And their huge compound eyes make out the shape of familiar trees and houses. They find their way by the colours of flowers, too—all but one colour.^② The bees are colour-blind to red.^③

词 汇

bee [bi:] *n.* 蜜蜂

beekeeper ['bi:ki:pə] *n.* 养蜂人

cloudy ['klaudi] *a.* 多云的

sense [sens] *v.* 觉察, 感觉

polarize ['pəuləraiz] *v.* 偏振; 极化

ultraviolet ['ʌltrə'vaiəlit] *a.* 紫外的

ray [rei] *n.* 射线; 光线

sunburn ['sʌnbə:n] *n.* 晒黑; 日炙

compound ['kəmpaʊnd] *a.* 复合的

compound eye 复眼

colour-blind ['kʌləblaɪnd] *a.* 色盲的

短 语

(to) find one's way 认识路

by means of 依, 依靠

(to) make out 辨认出

注 释

① ...the same invisible rays: 就是那个看不见的光线。

- ② ...all but one colour: 除一种颜色外的所有颜色。这儿 but 是介词, 等于 except。
- ③ The bees are colour-blind to red. 蜜蜂是红色色盲。

How Long Is a "Light Year"?

We use the speed of light as a measuring stick in studying the universe. Some of the distances from earth are small enough that we can talk about them in miles.^① For example, the moon is about 240,000 miles away from the earth;^② the sun is about 93,000,000 miles away from the earth.

However, when we begin to measure distances to the stars, we find that we have to work with very large numbers. Just as scientists developed a special unit of measurement for the waves lengths of the different colors, so have scientists developed a special unit for measuring distance in space.^③ It is a LIGHT YEAR.

A light year is the distance that light travels in a single year. This is a large number considering that light travels about 186,000 miles per second.^④ A light year is roughly 6,000,000,000,000 (six trillion) miles. Alpha Centauri, the nearest brilliant star, is more than 4 light years away.

词 汇

stick [stik] *n.* 杆, 棒
 universe ['ju:nivə:s] *n.* 宇宙
 length [lenθ] *n.* 长, 长度
 considering [kən'sidəriŋ] *prep.*
 考虑到, 就……而论

roughly ['rʌfli] *ad.* 粗略地
 trillion ['triljən] *num.* 万亿 (美制)
 Alpha Centauri ['ælfəsən'tɔ:rai]
 半人马座 α

短 语

(to) *have to* 不得不, 必须

as ... so 如同.....一样

注 释

- ① *in miles*: 以英里计。
- ② *the moon is ... away from the earth*: 月亮离地球有.....。
- ③ *Just as scientists developed ..., so have scientists developed a special unit for measuring distance in space.* 正如科学家使用一种特别(测量)单位来测定各种不同颜色的波长一样, 科学家也已经使用一种特殊的(测量)单位来测定空间的距离。*so* 是副词, 为了强调, 放在句首, 因而把助动词 *have* 放在主语前, 构成句子部分倒装。
- ④ *considering that light travels about 186,000 miles per second:* *considering* 是介词, 后面跟一名词从句作它的宾语。其中 *that* 是引导名词从句的连接词。

Numbers and Mathematics

It is said that^① mathematics is the base of all other sciences, and that arithmetic, the science of numbers, is the base of mathematics. Numbers consist of whole numbers (integers). They are formed by the digits 0,1,2, 3,4,5,6,7,8 and 9 and by combinations of them. For example, 247—two hundred and forty seven—is a number formed by the combination of three digits. Parts of numbers smaller than 1^② are sometimes expressed in terms of fractions, but in scientific usage they are given as decimals. This is because it is easier to perform^③ the various

mathematical operations if decimals are used instead of fractions. The main operations are: to add, subtract, multiply and divide; to square, cube or raise to any other power; to take a square, cube or any other root and to find a ratio or proportion between^④ pairs of numbers or a series of numbers. Thus, the decimal, or ten-scale, system is used for scientific purposes throughout the world. The other scale in general use nowadays is the binary, or two-scale. In the binary system numbers are expressed by combinations of only two digits, 0 and 1. Thus, 2 is expressed as 010, 3 is given as 011, 4 is represented as 100,^⑤ etc. This scale is perfectly adapted to the “off-on” pulses of electricity, so it is widely used in electronic computers. Because of its simplicity it is often called “the lazy schoolboy’s dream”!

Other branches of mathematics such as algebra and geometry are also extensively used in many sciences. More specialized extensions, such as probability theory and group theory, are now applied to an increasing range of activities.^⑥ Finally, a knowledge of statistics is required by every type of scientist for the analysis of data.

词 汇

mathematics [ˌmæθiˈmætiks] *n.*

数学

arithmetic [əˈriθmətik] *n.* 算术

integer [ˈintɪdʒə] *n.* 整数

combination [ˌkɒmbiˈneɪʃən] *n.*

组合, 结合

digit [ˈdɪdʒɪt] *n.* 数字(指从 0 到 9 的任何一个数字)

fraction [ˈfrækʃən] *n.* 分数

decimal [ˈdesɪməl] *n.* 小数, *a.*

十进位的, 小数的

operation [ˌɒpəˈreɪʃən] *n.* 运算, 操作

nowadays [ˈnaʊədeɪz] *ad.* 现今

pair [peə] *n.* 一对, 一双

series [ˈsiəriːz] *n.* 数列

scale [skeɪl] *n.* 进位制; 大小, 尺度

ten-scale 十进位制

binary [ˈbaɪnəri] *n.* 二进制, *a.*

二进制的

off-on ['ɔf-ɔn] *a.* 开关, 断连

pulse [pʌls] *n.* 脉冲, 脉动; 脉搏

computer [kəm'pjʊ:tə] *n.* 计算机

algebra ['ældʒibrə] *n.* 代数(学)

geometry [dʒi'ɒmitri] *n.* 几何(学)

probability [ˌprəbə'biliti] *n.* 概
率

range [reɪndʒ] *n.* 范围; 区域

statistics [stə'tistiks] *n.* 统计

analysis [ə'næləsis] *n.* 分析 ([复]
analyses [ə'nælisi:z])

data ['deɪtə] *n.* 资料 ([单]
datum ['deɪtəm])

短 语

(to) consist of 由.....组成
in terms of 用, 依, 据
instead of 代替

(to) adapt ... to 使适合, 使适应
(to) apply ... to 把.....应用于

注 释

- ① It is said that: 大家都说, 据说。that 后面接名词从句。这种结构在科技英语中很常见, 已成为一种固定用法。类似的用法有: It is well known that, It is reported that, It was recorded that 等。
- ② Parts of numbers smaller than 1: 小于1的数。smaller than 1 是形容词短语作定语, 修饰 parts of numbers。
- ③ it is easier to perform: 这里 it 是形式主语, 不定式短语 to perform..... 是句子的真正主语。
- ④ to add, subtract, multiply and divide: 加, 减, 乘, 除;
to square, cube or raise to any other power: 求平方, 求立方, 求多次方;
to take a square, cube or any other root: 求平方根, 求立方根, 求多次方根;
to find a ratio and proportion between: 求.....之间的比率和比例。
- ⑤ 2 is expressed as 010, 3 is given as 011, 4 is represented as

100: 2 以 010 来表示, 3 以 011 来表示, 4 以 100 来表示。这里 as 是介词, 作“如同”, “作为”, “以”讲。express, give 和 represent 三个动词在这儿表示同一意义。

- ⑥ More specialized extensions, such as ... to an increasing range of activities: 更为专门化的部门, 如概率论和群论, 也应用到日益增多的活动范围中去了。

Earthquakes

Some countries have large numbers of earthquakes. Japan is one of them. Others do not have many; for example, there are few earthquakes in Britain^①. There is often a great noise during an earthquake. The ground vibrates. Houses fall down. Railway lines are broken. Trains run off the lines. Sometimes thousands of people are killed in different ways. About 60,000 were killed in 1783 in South Italy. The volcano Krakatoa caused a terrible earthquake in 1883 and 35,000 people were killed.

Earthquakes often happen near volcanoes, but this is not always true. The centres of some are under the sea. The bottom of the sea suddenly moves. The powerful forces inside the earth break the rocks. The coast is shaken and great waves appear. These waves travel long distances and rush over the land when they reach it. They are strong enough to break down houses and other buildings; sometimes they break more buildings than the earthquake itself.

Fires followed the great earthquakes in San Francisco (1906) and Tokyo (1923). At San Francisco the earthquake broke the gas-pipes. The gas escaped, and soon large numbers of fires

were burning in the city. The water-pipes were also shaken and broken; so it was not possible to put the fires out. There was no water.

The Tokyo earthquake of 1923 happened just before the middle of the day. People were cooking meals on their fires at that time. When the ground shook, the fires shook too. Hot materials were thrown on different parts of the houses, some of which were made of wood. Soon 134 fires were burning in the city.

On November 1st, 1755, a great earthquake was felt in Lisbon, Portugal. Its centre was under the sea to the west of Lisbon.^② Its results were felt far away in other places: in Spain, France and North Africa. Three of the worst shocks brought down all the houses in the lower part of Lisbon. Great waves were formed in the sea, and some of them were 40 feet high. Unusual waves were noticed in many countries far away.

Another terrible earthquake happened in Assam, India, in 1896. The ground near Shillong suddenly moved $1\frac{1}{2}$ feet to one side. Then it moved back again. It continued to act like this 200 times a minute:^③ more than three times a second! Few buildings can stand up when that is happening. Trees were broken off near the bottom, and the great stones there flew four feet up into the air.

What kind of building stands up best in an earthquake? A building with concrete walls is perhaps the best. A steel frame will make it even stronger^④. The frame holds the different parts together, and the walls do not easily fall. There is less chance of fire because concrete and steel do not burn. The Americans carefully studied the results of the earthquake at San Francisco, and they believe that this kind of building is the safest.

词 汇

earthquake ['ə:θkweik] *n.* 地震
vibrate [vai'breit] *v.* 震动, 摇动
railway ['reilwei] *n.* 铁路
volcano [vɒl'keinəu] *n.* 火山 ([复数] volcanoes)
rush [rʌʃ] *v.* 冲, 闯, 奔
Krakatoa 克拉卡托(印尼火山名)
coast [kəust] *n.* 海岸, 海滨 (区域)
San Francisco [ˌsæn frən'siskəu] 旧金山 (美国港市)
Tokyo ['təukjəu] *n.* 东京

Lisbon ['lizbən] *n.* 里斯本(葡萄牙首都)
Portugal ['pɔ:tjuɡəl] *n.* 葡萄牙
Spain [spein] *n.* 西班牙
shock [ʃɒk] *n.* 震动, 冲击
Assam [ə'sæm] *n.* 阿萨姆(印度地名)
Shillong [ʃi'lɒŋ] *n.* 西隆(印度地名)
concrete ['kɒŋkri:t] *n.* 混凝土
frame [freim] *n.* 结构, 骨架

短 语

(to) **fall down** 倒塌
 (to) **run off** (火车等)出(轨)
 (to) **break down** (使)倒塌
 (to) **put fires out** 灭火

(to) **be made of** 用……制造
far away 在远处
 (to) **bring down** 使倒塌
 (to) **stand up** 站得住; 经受得起

注 释

- ① there are few earthquakes in Britain: 本句中 few 意为“很少”。注意 few 和 a few 的区别。few 意思是“几乎没有”, “很少”, 表示否定; a few 意思是“有一些”, 表示肯定。
- ② Its centre was under the sea to the west of Lisbon. 它的中心在里斯本以西的海底。to the west of ... 在……的西边。
- ③ It continued to act like this 200 times a minute: 大地不停地这样来回摆动每分达 200 次。本句中 like this 是介词短语, 作状语, 200 times a minute 也是状语, 都修饰 act。
- ④ make it even stronger: it 是宾语, stronger 是形容词比较级作宾语补足语。

Solids, Liquids and Gases

Most people would describe water as a colourless liquid. They would know that in very cold conditions it becomes a solid called ice, and that when heated on a fire it becomes a vapour called steam.^① But water, they would say, is a liquid.

We have learned that water consists of molecules composed of two atoms of hydrogen and one atom of oxygen, which we describe by the formula H_2O . But this is equally true of the solid called ice and the gas called steam. Chemically there is no difference between the gas, the liquid, and the solid, all of which are made up of molecules with the formula H_2O . And this is true of other chemical substances; most of them can exist as gases or as liquids or as solids. We may normally think of iron as a solid, but if we heat it in a furnace it will melt and become a liquid, and at very high temperatures it will become a gas. We normally think of air as a mixture of gases, but at very low temperatures it becomes a liquid, and at lower temperatures still it becomes a white solid.

Nothing very permanent occurs when a gas changes into a liquid or a solid.^② Everyone knows that ice, which has been made by freezing water, can be melted again by being warmed;^③ and that steam can be condensed on a cold surface to become liquid water. In fact it is only because water is such a familiar substance that different names are used for the solid, liquid and gas.^④ For other substances we have to describe these different states directly. Thus for air we talk about liquid air and

solid air. We could also talk about gaseous air, but, since this is the normal thing, we usually just describe it as air.

What, then, do we mean when we say that water is a liquid, air is a gas, and salt is a solid? We mean nothing more than that this is the usual condition of things on our earth. On one of the outer planets all three substances would be solids, and on the sun all three would be gases. Most substances are only familiar to us in one state, because the temperatures required to turn them into gases are very high, or the temperatures necessary to turn them into solids^⑤ are so low. Water is an exception in this respect, which is another reason why its three states have been given three different names.^⑥

The fact that a liquid like water can be changed to solid ice and back again to water, just by changing the temperature, would lead us to suppose that the very strong bonds between the atoms in the H_2O molecules have not been greatly changed, and examination of water, ice, and steam shows that this is true, and that all of them consist of H_2O molecules.^⑦ The difference between these three different forms of water lies simply in the arrangement of the H_2O molecules or their position with respect to each other.

词 汇

solid ['sɒlɪd] *n. & a.* 固体; 固体的

liquid ['lɪkwɪd] *n. & a.* 液体; 液体的

colourless ['kʌlələs] *a.* 无色的

vapour ['veɪpə] *n.* 汽, 蒸气

molecule ['mɒlɪkjʊ:l] *n.* 分子

hydrogen ['haɪdrədʒən] *n.* 氢

oxygen ['ɒksɪdʒən] *n.* 氧

formula ['fɔ:mjʊlə] *n.* 式

normally ['nɔ:məli] *ad.* 正常地, 平常地

iron ['aɪən] *n.* 铁

furnace ['fɜ:nɪs] *n.* 火炉

melt [melt] *v.* 融解

mixture ['mɪkstʃə] *n.* 混合物

permanent ['pə:mənənt] *a.* 永久的, 持久的, 不变的

freezing ['fri:ziŋ] *a.* 结冰的, 凝固的

outer ['autə] *a.* 外的, 外面的
planet ['plænit] *n.* 行星

exception [ik'sepʃən] *n.* 例外

bond [bɒnd] *n.* 结合

examination [igzæmi'neiʃən] *n.* 检查

lie [lai] (*lay* [lei], *lain* [lein], *lying*) *v.* (抽象事物)存在, 所在

短 语

(to) describe ... as 把……说成,
把……描绘成

(to) be composed of 由……组成

(to) be true of 对……适用; 符合于

(to) be made up of 由……组成

(to) think of ... as 把……看

成作是; 认为……是

nothing more than 不是别的而是

(to) be familiar to +(名词) 为……所熟悉的

with respect to +(名词) 关于, 对

注 释

- ① They would know that in very cold conditions it becomes a solid called ice, and that when heated on a fire it becomes a vapour called steam. 助动词 *would* 表示推测, 意为“大概会”。*called ice* 与 *called steam* 是过去分词短语作定语, 分别修饰前面的 *solid* 和 *vapour*。when heated on a fire 是带有一个连接付词 *when* 的过去分词短语, 作状语。
- ② Nothing very permanent occurs when a gas changes into a liquid or a solid. 在气体变成液体或固体时, 不会出现什么持久的东西。very permanent 是 nothing 的定语。
- ③ by being warmed: being warmed 是动名词 warming 的被动形式, 作介词 *by* 的宾语。
- ④ In fact it is only because water is such a familiar substance that different names are used for the solid, liquid and gas. 事实上, 正是因为水是这么熟悉的物质, 所以才用不同的名字来表

示其固体,液体和气体。such that 的意思是“这样……以致”, that 引导的是结果状语从句。

- ⑤ necessary to turn them into solids: 这是形容词短语修饰它前面的 temperatures。
- ⑥ why its three states have been given three different names: 关系副词 why 引出的定语从句, 修饰前面的 reason。
- ⑦ The fact that a liquid like water can be changed to solid ice and back again to water, just by changing the temperature, would lead us to suppose that the very strong bonds between the atoms in the H_2O molecules have not been greatly changed, and examination of water, ice, and steam shows that this is true, and that all of them consist of H_2O molecules.

这是一个并列主从复合句。在并列的第一个分句中 that a liquid like water ... the temperature 是 fact 的同位语从句, that the very strong bonds ... have not been greatly changed 是 suppose 的宾语从句。在第二个分句中, that this is true 和 that all of ... H_2O molecules 都是 show 的宾语从句。

Isaac Newton

Newton was born in 1642 (the year in which Galileo died) in Lincolnshire. As a boy he went to King's School, where his name, cut with his own hands upon a window-sill, is still proudly shown today.① At school he was taught Latin and grammar, and showed few signs of his future genius. Indeed, he was considered dull until, having been kicked by a bigger boy who was above him in class, he gave the fellow a good beating and set

to work to beat him in his studies too.^② We are told, however, that he was very mechanically minded and fond of making wind-mills and model machines.^③ This is of special interest^④ in view of his experimental skill in later years.

At the age of nineteen he entered Trinity College, Cambridge, where he began the study of mathematics and science, in which his great discoveries were made. In accordance with the tradition which he founded, Cambridge has maintained to the present day its position as the home of British science.

While still an undergraduate^⑤ he discovered the Binomial Theorem in algebra. Just after he had taken his B. A. degree, he did some famous experiments on the breaking up of white light into colours, and invented a new branch of mathematics known as the calculus.^⑥

At the age of twenty-six he became professor of mathematics, a post which he held until he was fifty-four. During this period his greatest discoveries were made. In 1696 he gave up his scientific work. He died in 1727, at the age of eighty-five.

It was customary in Newton's time for the great mathematicians of Europe to spend months on solving a problem and then offer it as a challenge to all others.^⑦ Newton always solved such problems within twenty-four hours.

He never sought fame, and many of his discoveries had to be drawn from him years after they had been made.^⑧ His chief work, the *Principia* (written in Latin), was published by the persuasion of his friend Halley, who paid the cost.

Many stories are told of his absent-mindedness.^⑨ On one occasion a friend ate his dinner, and Newton remarked, "Dear me,^⑩ I thought I had not dined, but I see I have."

On another occasion he is said to have left his guests at

dinner to fetch more wine,¹¹ and when after a long interval he did not return, the guests went to seek him. They found him hard at work in his study, having entirely forgotten their presence in his house.¹²

One of his most-quoted sayings is his own criticism of his discoveries: "I know not what the world may think of my labours,¹³ but to myself it seems that I have been but as a child playing on the sea-shore; sometimes finding some prettier pebble or more beautiful shell than my companions,¹⁴ while the unbounded ocean of truth lay undiscovered before me.¹⁵"

词 汇

Galileo [ˌɡæliˈleɪəʊ] *n.* 伽利略
(1564—1642, 意大利物理学家
及天文学家)

Lincolnshire [ˈlɪŋkənʃɪə] *n.* 林
肯郡(英格兰东海岸)

window-sill [ˈwɪndəʊsɪl] *n.* 窗槛

Latin [ˈlætɪn] *n.* 拉丁文

genius [ˈdʒiːnjəs] *n.* 天才, 天
资, 天赋; 才华

dull [dʌl] *a.* 迟钝的; 呆笨的

mechanically [miˈkænik(ə)li] *ad.*
具有制造或使用机械的技能;
机械地

minded [ˈmaɪndɪd] *a.* 有...思想
的; 有...倾向的; 有...心的

windmill [ˈwɪndmɪl] *n.* 风车

trinity [ˈtrɪnɪti] *n.* 〔宗教〕三位
一体(圣父、圣子、圣灵)

Cambridge [ˈkeɪmbrɪdʒ] *n.* 剑
桥(英国城市, 剑桥大学所在

地)

found [faʊnd] *v.* 创立; 建立

undergraduate [ˌʌndəˈɡrædʒuɪt]
n. 大学肄业生; 尚未取得学位
的大学生

binomial [ˌbaɪˈnəʊmjəl] *a.* 二项
式的

theorem [ˈθiərəm] *n.* 定理; 原则

B. A. = Bachelor [ˈbætʃələ] of
Arts 文学士

degree [diˈɡriː] *n.* 学位

calculus [ˈkælkjʊləs] *n.* 微积分
(学)〔复〕calculuses 或 calculi
[ˈkælkjulai]

post [pəʊst] *n.* 职位

customary [ˈkʌstəm(ə)rɪ] *a.* 常
例的, 习惯的; 惯例的

challenge [ˈtʃælɪndʒ] *n.* 要求证
明、解释; 挑战

seek [siːk] *v.* 追求; 探找; 寻找