



Elementary Scientific English Practice

英语科普文选

第一集

科学普及出版社

英 汉 对 照
英 语 科 普 文 选

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〔英〕 G. C. 索 恩 利 著

刘 兆 祥 译
易 草 木 注释

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内 容 提 要

本书包括英语通俗读物三十篇。每篇附有注释和参考译文。内容为一般科学常识和科学家小故事，涉及的知识面较广，文笔流畅，深入浅出，生动有趣，可供具有初、中级英语程度的读者阅读。

根据国际统一度量衡标准，译者将原文中的英制长度单位一律换成了公制长度单位。此外，译者将原文中部分不恰当的地方做了必要的修改。

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G.C. Thornley

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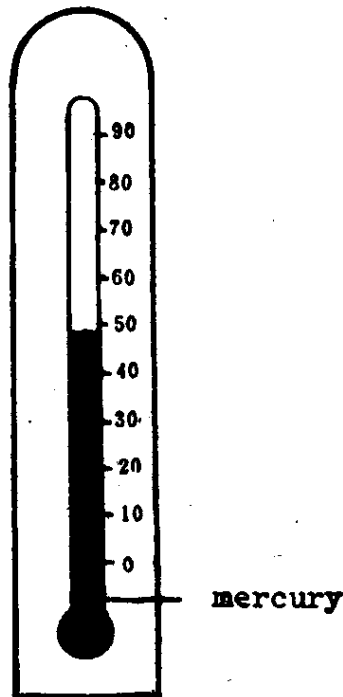
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1. Hot Metal

When we heat anything, it expands. It grows bigger than it was before. This fact is important. Metals expand a lot.

How do we find the temperature of anything? When a boy is ill, a doctor usually takes his temperature. She puts a thermometer in the boy's mouth. The boy has to keep the thermometer under his tongue. A minute later, the doctor takes it out and looks at it. Why does she do this?



a thermometer

The temperature of the boy's body usually rises when he is ill. The thermometer measures this temperature. Sometimes the temperature is quite high. This shows the doctor that the boy is very ill.

A doctor's thermometer is made of glass. There are some figures on the glass. The glass itself is a tube and there is some mercury in the tube. The boy's tongue makes the mercury warm; so it expands. The top of the mercury runs up the tube. It reaches a place near one of the figures, and stops there. The doctor can see the top of the mercury, and she can see the figure near it. This figure shows her the boy's temperature.

Some thermometers are not made of glass. These measure higher temperatures. We can measure the temperature of a fire which is heating some metal; but we cannot use a glass thermometer. We have to use something which will not melt.¹

When the mercury is heated, it expands. Other things also expand when they are heated. The rails on a railway expand on a hot day. Sometimes you may notice spaces between the ends of the rails. The wheels of the train make noises when they cross these spaces. On a cold day the ends of the two rails do not meet; but on a hot day each rail expands. Then the two ends get nearer together.

Telegraph wires expand in the summer. They get longer. Then the wire between two posts gets lower in the middle.

Very often a machine is made in different pieces. Then we have to fit the pieces together. Perhaps there is a metal ring, and the ring has to go on a tube. It is not bigger, and so it does not easily go on. But we can heat the ring first. Then it will expand. Then we can easily put it in its proper place on the tube. When it cools, it will contract. It will return to its old size, and then it will be tight on the tube. So we have only to wait until it cools;² then the work is done.

Some people once tried to drive a ring on a tube. They hit it hard, and so, of course, it broke. They got another ring and hit that harder than the other. It also broke. "Very bad metal!" they cried angrily. Another person saw them throwing³ the pieces away. He came to look, and heated another ring. It expanded, and easily went into its place on the tube. Then it contracted and held the tube tightly.

Notes

1. We have to use something which will not melt. 这是一个主从复合句。which 以后是定语从句，修饰主句中的 something.
2. So we have to wait until it cools. 这里 until 是从属连词，作“到…为止”讲。主句的动作“wait”一直延续到 until 所表示的时间为止。
3. Another person saw them throwing the pieces away.

另一个人看到他们把这些破圈子都扔了，

“see somebody doing something”是一个句型，即“看见某人做某事”。类似的句型还有“watch somebody doing something”，“hear somebody doing something”和“look at somebody doing something”等。这里 Somebody 是 see 的宾语，doing 是宾语补足语。

1. 受热的金属

任何物质受热后都会膨胀，体积要比原来的大。这一点很重要。金属膨胀得要大些。

我们怎样测定物体的温度呢？一个孩子生了病，医生通常要给他量一下体温。医生把体温表放入孩子口内，孩子把它含在舌头底下。一分钟后，医生取出表来看。为什么医生要这样做呢？

孩子生了病，通常体温就升高。体温表就是测量体温的。有时体温相当高，这就告诉医生，孩子病得很厉害。

医生的体温表是用玻璃制成的。在玻璃上刻有一些数字。体温表本身是一根细管，里面有水银。孩子的舌头使水银变热，于是水银就膨胀了，水银面沿着玻璃管向上移动，它升到靠近某个数字的地方停了下来。医生看到水银面的位置，也看到靠近水银面的数字，这数字就把孩子的体温告诉了医生。

有些温度计不是用玻璃造的。这些温度计可以测量较高的温度。我们能够测定正在加热金属的炉火温度，但用玻璃温度计不行，必须用一种不会被熔化的东西。

水银一经加热就会膨胀。其他物质受热也是如此。铁路上

的铁轨天热时就膨胀。有时你可能注意到铁轨两端之间的缝隙。火车轮子滚过这些缝隙时就会产生噪音。天冷时，铁轨的两端碰不上；天热时，由于每根铁轨都膨胀，两端就靠近一些。

电话线在夏季膨胀变长，这样，在两根电线杆中间的电线就略为下垂一些。

一部机器通常由许多不同的零件组成。我们必须将这些零件装配起来。也许有一个金属圈必须套在一根管子上，而圈并不比管子粗，因此套上去很不容易。但我们可以先把金属圈加热。它膨胀后，我们就能很容易地把金属圈套在管子的适当位置上。圈一冷却就收缩，恢复到原来的大小，便紧紧地套在管子上了。这样，我们只要等它冷却了，这项工作就完成了。

有些人曾经试图把金属圈硬套在管子上。他们用力敲打它，当然圈就被打裂了。他们又拿了一个圈，敲打得比上一个还厉害，这个圈也裂了。“金属质量太差！”他们生气地抱怨着。另一个人看到他们把这些破圈都扔了，过来看了看，并把另一个圈加热了。金属圈膨胀后很容易地套在管子上。然后金属圈缩小，就牢牢地固定在管子上了。

2. Sir Walter Raleigh¹

Doctors tell us not to smoke; but a lot of people smoke tobacco every day. Long ago, no one in Europe smoked; the tobacco plant was unknown there. It grew in America, and Christopher Columbus found it there. Later, he returned to Europe and told everyone about tobacco. He said that the American Indians often smoked it.

so the man got some water and threw it over Raleigh. He believed that Raleigh was burning. He ran out of the house and told everybody about it.

After this, smoking was not a secret. Raleigh told Queen Elizabeth about it. He added that he could weigh his smoke. She did not believe this, and she asked him to explain.

"First," he said, "I shall weigh the tobacco. Then I shall put it in my pipe and smoke it. Then I shall weigh the ashes which remain. I can take them out of the pipe and weigh them on a balance. There will be a great difference between the two weights. The tobacco must be heavier than the ashes. The difference between them must be the weight of the smoke."

It was a good plan, but Raleigh was wrong. When anything burns, it needs oxygen. It usually gets the oxygen from the air. When Raleigh's tobacco burned, it did this; but the oxygen was not in the tobacco at the beginning. It was added when Raleigh smoked his pipe. So the smoke was heavier than the difference between the two weights. The weight of the oxygen was added.

Raleigh had a sad life and died in 1618. He died bravely and quietly. He smoked a pipe just before his end.

Notes

1. Sir Walter Raleigh 雷利爵士 (1552—1618), 英国历史学家和航海家

2. stop smoking 停止吸烟或戒烟。“stop doing something” 是一个句型，作“停止做某事”讲。注意不要同“stop to do something”混同起来。“stop to do something”是“停下来做某事”，如：He stopped to look at me.（他停下来瞧着我。）
3. He used to smoke. . . .
“used to do something”表示过去习惯性的行为，又如：
Formerly people used to burn kerosene to get light.
（过去人们点燃煤油来照明。）
There used to be a meeting every Monday last month.
（上月每星期一都有会。）

2. 沃尔特·雷利爵士

医生告戒我们不要吸烟，但是每天仍有不少人在吸。很久以前，欧洲人并不吸烟，也不知道烟草这种植物。烟草生长在美洲，哥伦布在那里发现了它。后来他返回欧洲，把烟草的事儿对大家讲了。他说，美洲印第安人经常吸烟。

有这样一种吸烟的方法：美洲印第安人把一些烟叶扔在火上，然后用嘴叼着长管子的一端，将另一端放在火焰的上方，这样就能把烟吸入口中。

大约在1560年，一个叫让·尼科的法国人住在葡萄牙的里斯本。他对美洲的所有植物都很感兴趣，其中有些植物与欧洲的差异很大。他（还有其他人）常用烟叶止痛。也许一个人的腿或胳膊会痛得厉害，尼科就把烟叶敷在痛处，想用这种方法止痛。我们现在说，烟草含有“尼古丁”，“尼古丁”这个词就来自这个人的名字。

用烟草治病的方法很多。有时马病得很厉害，连路都走不稳。于是有人将烟草的烟吹入马的鼻腔，认为这样一来马的病似乎就会好些。可怜的马呀！现在再不会有人给马吹烟了。

雷利爵士在伊丽莎白女王一世时期很有名望。他周游各国，学会了吸烟。返回英国后，并没有停止吸烟。他每天在自己的房间里偷偷地吸上两袋。有人进来时，他就很快将烟斗藏起来。但是，有一天——据故事所述——他的动作不够快。一个人进来发现房间里烟雾腾腾，雷利口里直冒烟。于是这个人拿起水就往雷利身上泼，以为他着火了。这个人跑出房间，把这件事告诉了大家。

从此以后，吸烟就不再是秘密了。雷利把这件事告诉了伊丽莎白女王，并说他可以称出他所吸的烟的重量。女王不相信，就让他来解释。

“首先，”他说，“我称出烟叶的重量，再将它放入烟斗内吸掉。然后称剩下的烟灰——将烟灰从烟斗内取出，放在天平上称一下。烟叶和烟灰的重量大不相同。烟叶必定比烟灰重，二者之差一定就是烟的重量了。”

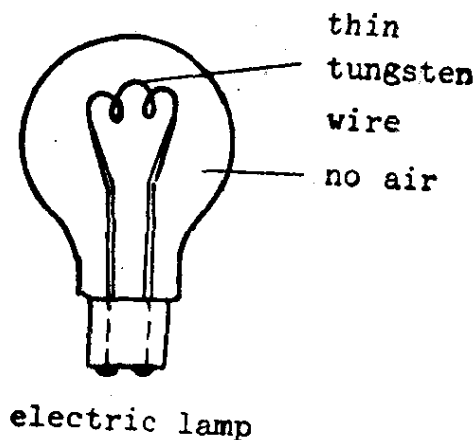
主意是好的，但雷利还是错了。因为任何物质燃烧时都需要氧，这些氧通常来自空气。雷利的烟叶燃烧时也需要从空气中得到氧，但烟叶里原来并没有氧，只是当雷利吸烟时，氧气才加了进来。因为氧气的重量加进来了，所以烟的重量就大于烟叶和烟灰二者重量之差。

雷利生活困苦，死于1618年。他死时泰然自若。就在临终前，他还吸了一袋烟。

3. Electric Wire

Electric wire is usually made of copper. Copper lets the electric current flow easily through it. We say that it has a low resistance. Some other metals also have a low resistance, but copper is the most useful. There are copper wires in millions of houses in the world.

These wires carry the current to our lamps. There is a thin wire inside an electric lamp; you can see it if you look carefully. A thin wire has a higher resistance than a thick one.¹ It tries to stop the flow of current. Then it gets very hot.



The thin wire is not made of copper; it is made of tungsten. All metals melt when they get hot. (Mercury melts at a lower temperature than our usual ones.) Tung-

sten does not melt easily. It has to be very hot indeed before it melts.

When the tungsten gets hot, it also gets bright. It shines and gives a good light. It also lasts a long time without breaking.

An American, Edison,² invented the first small electric lamp. He wanted a thin wire for his lamp, and tried to make one; but he had a lot of trouble. Thin wires easily melt if they are made of copper. He decided to use carbon because it does not melt. He tried cotton and hundreds of other materials to make his thin piece of carbon. But at first all of them broke. They were too thin and weak. They had to be thin because they had to shine brightly. Thick pieces do not have a high resistance. So they did not get hot enough, and they gave no light. Edison did not stop trying; and after a lot of trouble he made his first lamp.

Our tungsten lamps are better than the old carbon lamps. They are brighter and they last longer. The tungsten does not easily melt or break. There is not much air inside an electric lamp; we have to take it out. Air contains oxygen, and the hot tungsten could burn in it. Usually we put some gas in the place of the air.

Electric fires also have wires which get hot. These wires are thick, but they are not made of copper. They have a high resistance. A large current flows through them and makes them hot. So we can use electric fires in winter to keep us warm.

In some houses an electric current also makes the water hot. This is useful when we want a bath. The wires get hot like the wires of electric fires; but we must keep them away from the water. We have to separate the wires from the water with some special material. It is not safe to let an electric wire touch water. Water has a low resistance to an electric current. Sometimes a person touches an electric wire with a wet hand; he ought not to do this.³ He might kill himself. The water lets the current flow easily to his body. Then it can escape to the ground through his legs. The current can easily flow through his body; and it can go through his heart. Then his heart will stop beating.

Notes

1. a thick one

这里的 one 代替上文中刚提过的单数名词 wire。如果该名词是复数,就用 ones 代之,又如: This book is a good one. (这是一本好书。)

These lathes are better than those ones. (这些车床比那些车床好。)

2. Edison (1847-1931), 爱迪生 (1847—1931), 全名为 Thomas Alva Edison, 美国大科学家, 发明了电报系统、白炽灯、留声机等。

3. He ought not to do this.

ought 是情态动词,作“应该”讲,后接带有 to 的不定式,语气比 should 强,又如: You ought to answer this.