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# 自然世界探秘

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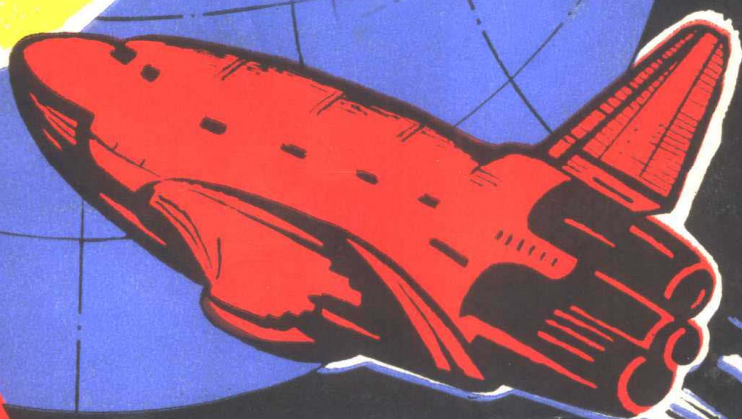
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科技英语通俗读物

## 自然界探秘

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刘曙刚

审订 卢思源

上海外语教育出版社

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## 自然界探秘

孙廷生 刘曙刚 注释

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上海外语教育出版社出版  
(上海西体育会路119号)

江苏大丰印刷二厂印刷  
新华书店上海发行所发行

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787×1092毫米 1/32 4.75印张 106千字

1986年12月第1版 1986年12月第1次印刷

印数: 1—3,000册

统一书号: 7218·216 定价: 0.80 元

## 编 者 的 话

《自然界探秘》取材于美国作家 Ackady Leokum 所著 *Tell Me Why* 一书。本书共选短文六十篇，内容丰富，文字流畅，语言规范，图文并茂，具有很强的知识性、科学性和趣味性，是一本理想的科技英语通俗读物，可供大专院校学生、科技人员、英语自学者以及具有一定基础的英语爱好者阅读。

本书的注释部分不仅注意了语言结构和语法现象，而且对难句进行了翻译，旨在帮助读者理解其意，同时，书后附有总词汇表，便于读者查阅。

编 者

1986.9.

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## 1. WHY IS THE SOLAR SYSTEM THE WAY IT IS<sup>①</sup> ?

As far as<sup>②</sup> we know, there is no reason why the solar system is arranged exactly as it is. It might have been arranged differently, just as there are other solar systems in the universe arranged differently. This has to do with<sup>③</sup> the way it originated. But man has discovered certain laws of nature that seem to keep the solar system in its present pattern.

Earth, like the other planets, follows its path, or orbit, around the sun. The period of time that the earth takes to go around the sun is called a year. The other planets have orbits larger or smaller than the earth's.

How this solar system came to<sup>④</sup> be and how the planets came to have the size, location, and orbits they have, astronomers cannot fully explain. But they have two main types of theories. One type of theory suggests that the formation of the planets was a part of the gradual change of the sun from a whirling mass of hot gas to its present size and brilliance. The planets formed as small

① Why is ... it is? : 本句为省略句, the way 之前省略了介词 in, 之后省略了 in which, the way = as. ② as far as = so far as (表示程度、范围)就...而言. ③ has to do with = has something to do with: 和...有关. ④ come to (+不定式): 逐渐(开始)...

whirling masses in the giant gas and dust cloud as it turned.

Another group of theories is based on the idea that at some time there was a near-collision between the sun and another star passing nearby. Large pieces of the sun were pulled away and began to revolve around the sun at different distances. These are now planets.

No matter which theory is right, the solar system came to be as it now is more or less by chance<sup>⑥</sup>. Why does it stay this way? Kepler's Laws<sup>⑦</sup> of Planetary Motion state that all planets travel about the sun in an elliptical (oval) path; that a planet moves faster in its orbit as it nears the sun; and that there is a relation between its distance from the sun and the time it takes to make an orbit. Newton's Law of Gravitation<sup>⑧</sup>, of which Kepler's three laws were an indispensable part, explained how two objects attract each other. So the solar system remains as it is because certain laws of nature maintain the relationship of the sun and the planets.

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⑥ No matter ... by chance: 不论是哪一种理论正确, 太阳系变成象现在这种状态是有点意外的。No matter ... right, 为让步状语从句。⑦ kepler's laws: 开普勒定律 (即行星运动所遵循的定律)。开普勒 (Johannes kepler, 1571—1630) 德国天文学家。⑧ Newton's Law of Gravitation: 牛顿的万有引力定律。

## 2. WHAT KEEPS THE SUN SHINING?

It may be hard for you to believe, but when you look at the stars that shine at night and the sun that shines by day, you are looking at the same kinds of objects!

The sun is really a star. In fact, it's the nearest star to the earth. Life as we know it depends on the sun. Without the sun's heat, life could not have started on earth. Without sunlight, there would be no green plants, no animals, no human beings.

The sun is 93,000,000 miles from the earth. The volume, or bulk, of the sun is about 1,300,000 times that of the earth!① Yet an interesting thing about the sun is that it is not a solid body like the earth.

Here is how we know this: The temperature on the surface of the sun is about 11,000 degrees Fahrenheit. This is hot enough to change any metal or rock into a gas, so the sun must be a globe of gas!

Years ago, scientists believed that the reason the sun shone, or gave off light and heat, was that it was burning. But the sun has been hot for hundreds of millions of years, and nothing could remain burning for that long.

---

① The volume ... earth: 太阳的体积大约为地球体积的 130 万倍。

Today scientists believe that the heat of the sun is the result of a process similar to<sup>②</sup> what takes place in an atom bomb. The sun changes matter into energy.

This is different from burning. Burning changes matter from one form to another. But when matter is changed into energy, very little matter is needed to produce a tremendous amount of energy. One ounce of matter could produce enough energy to melt more than a million tons of rock!

So if science is right, the sun keeps shining because it is constantly changing matter into energy. And just one per cent of the sun's mass would provide enough energy to keep it hot for 150 billion years!

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② similar to ... : 与...相似。为形容词短语作后置定语，修饰先行词 process。

### 3. WHY DO SUNSETS LOOK RED ?

A beautiful red sunset, the colors warm and glowing, is one of the loveliest sights we can imagine. And sometimes, when we look at it we might say, "See how red the sun is!"

But, of course, we know that the sun itself hasn't become red or changed in any way. It merely looks that way to us at that particular time of day. In fact, at that very moment people are looking at that same sun thousands of miles to the west and it doesn't look red to them at all.

What produces the colors of a sunset is the distance that the sunlight must travel through our atmosphere. The lower it is, the more of our earth's atmosphere does that light travel through.

But first, let's remind ourselves that sunlight is a mixture of light of all colors. Normally,<sup>①</sup> this mixture of light appears as white to our eyes. But the atmosphere has molecules of air, dust, water vapor, and other impurities present in it. As the light passes through them,

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① Normally: 相当于 In general 或 Generally speaking, 修饰后面整个句子。

different colors are scattered by these particles. Now, it so happens our atmosphere scatters out violet, blue, and green light more than it does the reds and yellows. So when the sun is low, this scattering leaves more reds and yellows for us to see and we have a reddish sunset.

By the way, this scattering of light also explains why the sky looks blue. Violet and blue light have short waves and are scattered about 10 times more than red light waves by our atmosphere. This means that the red rays go straight through our atmosphere, while the blue waves don't come through directly but are scattered by the air, water, and dust particles. It is this scattered light that we see as the blue sky when we look up.②

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② It is ... look up: 本句为强调句型结构, 强调主句中的宾语 this scattered light. 变成一般句型结构为: We see this scattered light as the blue sky when we look up.

#### 4. WHAT IS THE EARTH MADE OF ?

Man is now preparing to explore the moon and other planets — and he still doesn't know exactly what his own earth is made of!

A sort of rough answer to this question would be: The earth is a big ball, or sphere, made mostly of rock. Inside the earth the rock is melted, but the outside cover is hard rock. Less than one-third of the earth's surface is land and more than two-thirds are water.

Now let's consider this in a little more detail. The outside of the earth is a crust of rock about 10 to 30 miles thick. This crust is sometimes called "the lithosphere."<sup>①</sup> The high parts of this crust are the continents, and the low parts of it hold the waters of the oceans and the great inland seas and lakes. All the water on the surface, including the oceans, lakes, rivers, and all the smaller streams, is called "the hydrosphere."<sup>②</sup>

Men have been able to examine only the outermost part of the crust of rock that forms the outside of the earth, which is why it's so hard to know what the earth is like on

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① "the lithosphere": 岩石圈。由地壳和上地幔顶部坚硬岩石所构成。

② hydrosphere: 水圈。地球表面水体的总称。

the inside<sup>③</sup>. In drilling wells and digging mines, it has been found that the deeper the hole is made, the higher the temperature becomes. At two miles below the surface of the earth, the temperature is high enough to boil water.

But scientists have also been able to find out about the inside of the earth from studies of earthquakes. They believe that the temperature does not increase as rapidly deep down as it does in the crust. So they think that at the core or center of the earth the temperature may not be more than 10,000 degrees Fahrenheit. Of course, that's plenty hot — since a temperature of 2,200 degrees would melt rocks!

The crust of the earth has two layers. The upper layer, which makes the continents, is of granite<sup>④</sup>. Under the layer of granite is a thick layer of very hard rock called "basalt<sup>⑤</sup>." Scientists believe that at the center of the earth is a huge ball of molten iron, with a diameter of about 4,000 miles. Between the central ball and the rocky crust is a shell about 2,000 miles thick called "the mantle<sup>⑥</sup>." The mantle is probably made of a kind of rock called "olivine<sup>⑦</sup>".

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③ which is why ... on the inside: 为非限制性定语从句, which 指代前面整个句子, 在从句中作主语。

④ granite: 花岗岩, 花岗石分布最广的深层酸性岩。

⑤ "basalt": "玄武岩", 一种分布最广的基性喷出岩。

⑥ "the mantle": "地幔", 也称"中间层"。

⑦ "olivine": "橄榄岩", 一种超基性侵入岩。

## 5. WHY ARE ECLIPSES<sup>①</sup> SO RARE ?

When the moon in its journey around the earth passes directly between the earth and the sun, it casts its shadow on the surface of the earth, and an eclipse of the sun takes place.

An eclipse of the sun occurs only when the moon is new, for then the moon is on that side of the earth facing toward the sun.<sup>②</sup> Then why isn't there an eclipse of the sun every time there's a new moon? The reason is that the path of the moon around the earth does not lie directly in line with the orbit of the earth about the sun. In its 29-day trip around the earth, the moon passes sometimes above and sometimes below the path of the earth.

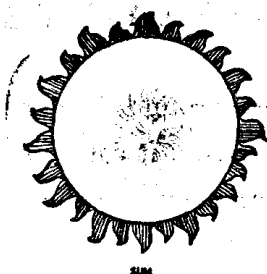
An eclipse of the sun can be total, annular, or partial. If the moon hides the sun completely, the eclipse is total. But the moon is not always the same distance from the earth. Often, it is too far from the earth to hide the sun completely. Then, when an eclipse takes place, the moon is seen as a dark disk which covers the whole sun except a narrow ring around its edge<sup>③</sup>. This thin circle of light is called "the

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① eclipse: (日、月) 蚀。在朔日, 月球运行到地球和太阳之间。跟太阳同时出没, 地球上看不到月光称之为月蚀。 ② facing toward the sun: 为现在分词短语作后置定语, 修饰名词 side。 ③ Then, when ... its edge: 于是, 当日蚀发生时, 我们所看到的月亮就象一只黑色的圆盘。除了在它的边缘留下一圈狭窄的光环外, 它遮住了整个太阳。

annulus," meaning "ring." This is an annular eclipse.

*Eclipse of the Moon*



An eclipse is partial whenever only part of the disk of the moon comes between the sun and the earth.

An eclipse of the moon occurs only when the moon is full, for then it is at the opposite side of the earth from the sun. When the moon comes directly behind the earth, as seen from the sun, it passes gradually into the great shadow-cone cast by the earth and disappears from view. A total eclipse of the moon then occurs. A partial eclipse takes place when the moon enters only partly into the shadow.

In some years, no eclipses of the moon occur. In other years, there are from one to three. Every year, there must be at least two solar eclipses, and there may be as many as five. At any one place on the earth's surface, a total solar eclipse will be visible only once in about 360 years.