

英汉对照科技读物

# 探索宇宙

江苏科学技术出版社

EXPLORING SPACE

探 索 宇 宙

(英汉对照科普读物)

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# 前 言

为满足广大初学英语的同志提高英语阅读能力的需要，我们译注了美国琼·麦辛托希(Joan Macintosh)所著的《探索宇宙》(EXPLORING SPACE)一书(英国麦克米伦教育有限公司1975年版本)。

本书为科普读物。全书共分十三章，简要地介绍了宇宙(主要是太阳系)和航天飞行方面的知识，通俗浅显，富有趣味，并附有图片。译注时，每章后均附有短语、注释，书末附有人名对照。由于近年来观测技术和宇航技术的进步，探测资料证明原著中某些内容已经有了新的发展，例如：宇航探测未发现火星上有生命的迹象；木星和土星都发现了新的卫星。我们的译文仍忠于原著，未加改动。

由于水平所限，缺误和不当之处，请读者批评指正。

译 注 者

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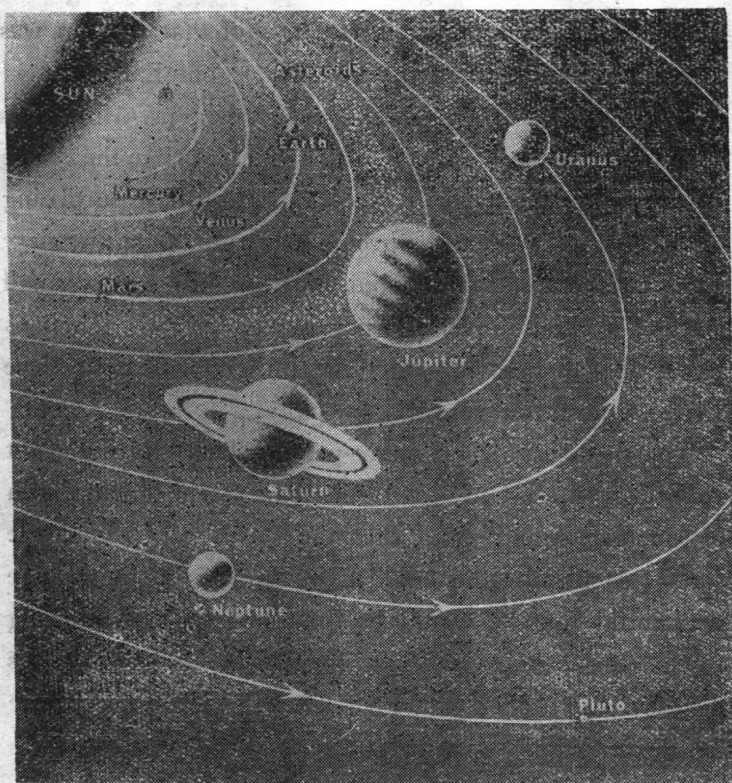
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# *I. Our place in space*

## **The solar system**



The people on Earth belong to many different countries. We speak many different languages and have different ideas. We do not look alike and we do not talk alike. But we are all alike in one way. We are all humans born on Earth.<sup>(1)</sup> We are all Earth-men. All of us live and die on this planet. We have never known any other home.

Men believed for thousands of years that the Earth was the centre of everything. They believed that the sun and the stars moved around us. It was said that the sun was put in the sky to give light and heat to our Earth.<sup>(2)</sup>

The old ideas of men should not surprise us. Most of us only believe what we see.<sup>(3)</sup> The Earth looks like the centre of everything from where we stand. It is more surprising that a few great men discovered the truth. One discovery after another proved that our Earth is only a very small part of a great universe. They proved that the Earth is one little planet moving round the sun.<sup>(4)</sup> We do not believe that we are the centre any more.

The truth frightened many people. They did not want to believe it. But in 1540 Copernicus, the great Polish astronomer, found proof that the Earth goes round the sun.<sup>(5)</sup> At first he did not dare to say this in public. He was afraid that he would be punished for not showing respect to God—the maker of our Earth. So he wrote his discoveries in a book which was printed a few weeks before he died.

It was too late to punish Copernicus after he was dead.



Others were not so careful. Galileo, an Italian astronomer, made a great new telescope soon after 1600. With this telescope he proved that Copernicus had been right. Galileo talked bravely about his many discoveries. He wanted everyone to hear him.<sup>[6]</sup> His punishment was being sent to prison.<sup>[7]</sup> He stayed there until at last he said in public that he had been wrong. But among his friends he continued to talk openly about his discoveries. He found out more things about the universe with his new telescope. He proved that the sky around us is full of bodies which follow fixed movements.

Many people began to believe the new ideas. They saw that the universe was more wonderful than our old ideas about the Earth. Some people worried that men might become less important in this huge universe which the astronomers were discovering. But men have minds that can reach out into the universe. With our minds we can learn about things we cannot see.<sup>[8]</sup> We can discover how to control forces outside our Earth. Perhaps we can make out homes in space as well as on Earth.

Our knowledge of space has grown since Galileo. What do we know about the place of our Earth in space?

We know that we are a planet moving among other planets round the sun. At present we know of nine planets moving round the sun. This family of the sun and its planets is called the **solar system**.

The sun controls the regular movement of all the planets

moving round it in the solar system. It controls the planets moving at different speeds along different paths or **orbits**. An orbit is the path of a planet round the sun—or the path of any body in space around another body.

The sun gives each planet all the heat and light it receives. The sun is, in fact, a star big enough to hold over a million Earths.<sup>[9]</sup> A star is a body of burning gas travelling in space.<sup>[10]</sup> But our familiar sun is not the greatest star. It only looks big because it is the nearest star. Many stars are bigger. The sun is only one star amongst 100,000 million (one hundred thousand million) other stars in our **galaxy**.

A galaxy is a great family of stars moving through space together. Try to think of 100,000 million stars. It is impossible. With the strongest telescope we can only see a few stars in our galaxy. We cannot count them exactly. But our instruments tell us that they are there.

Our own galaxy is so huge that we cannot see all of it. But our galaxy is not the end of things. We know by radio telescope that there are 100,000 million other galaxies. In fact we know that there are many more that cannot be seen at all by any of our instruments. Many galaxies are much bigger than ours.<sup>[11]</sup>

All these galaxies move in the universe. We do not know how far the universe reaches or where it ends or whether it has an end. Many astronomers believe that it is endless. Endless? Our minds are not big enough for that idea.

Men prefer to think of distances which they can measure.

But our Earth measurements are too small to measure the distance between stars. We cannot measure the distance of space in miles. It would be as stupid as measuring the distance from London to Tokyo in inches! [12] So now we have a new measurement called a **light-year**. This is used to measure distance in space.

A light-year is the distance that light travels in one year. Light travels 186,000 (one hundred and eighty-six thousand) miles in one second. So it travels six million million miles in one year. That is the measurement of one light-year.

Here is an example showing that it is more easy to measure space in light-years than in miles.

The nearest star in our galaxy is 24,000,000,000,000 miles away—or four light-years. A space-ship travelling at twenty-five thousand miles an hour will have been travelling for 120,000 years when it arrives there!

It is difficult to think easily about these distances and these figures. The whole history of man has not been long enough for one journey to the nearest star. The place of our Earth in the universe is less than one tiny piece of sand in the Sahara Desert. Humans need courage to look at that huge universe without despair.

Are there other creatures living somewhere who can also see the edge of the universe in which we live? Do other creatures in our galaxy also look at the stars and think about them? Do they have minds like ours? Can we ever

meet them in space? In the future shall we be travelling between planets as we now travel between cities?

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## Phrases and Expressions

in one way	在某一点上; 在某种程度上
it is (was) said that...	据说...
in public	公开地; 当众
show respect to(介词)...	对...表示尊敬
be too + 形容词 + to 动词	太...而不能...
不定式	
be sent to prison	被投入监狱
at present	现在; 目前
in fact	实际上
by radio telescope	通过无线电望远镜
in miles	以英里为单位(测量)
without despair	不陷于绝望

## Notes

[1] We are all humans born on Earth.

born 为(过去分词)形容词, 被动态, 修饰 humans; on Earth 为介词短语, 作状语, 修饰 born; 全句相当于 We are all humans who were born on Earth.

[2] It was said that the sun was put in the sky to give light and heat to our Earth.

It 为形式主语, that 从句为真实主语; to give... 至句末为动词不定式短语, 作目的状语, 修饰从句中的谓语动词 was put; to our Earth 为介词短语, 修饰 to give; to give sb. sth. 和 to give sth. to (介词)... 为 to give 的两个常用句型。

〔3〕 Most of us only believe what we see.

what 为连接代词, 在宾语从句中作谓语 see 的宾语, 兼有连词的功能; 整个从句 what we see 是 believe 的宾语, 称作宾语从句。

〔4〕 ...the Earth is one little planet moving round the sun.

moving round the sun 为现在分词短语 (修饰 planet), 可扩展为定语从句: which is moving round the sun, 意思不变。

〔5〕 But in 1540 Copernicus, the great Polish astronomer, found proof that the Earth goes round the sun.

the great Polish astronomer 为 Copernicus 的同位语; that 从句是 proof 的同位语从句; 从句讲的是一般真理或事实, 动词用一般现在式 goes.

〔6〕 He wanted everyone to hear him.

everyone 为 wanted 的宾语, to hear him 动词不定式短语, 作宾语补足语; everyone to hear him 为 wanted 的复合宾语。

〔7〕 ...was being sent to prison.

was being sent 为过去进行式被动态。

〔8〕 ...learn about things we cannot see.

things 后面省略了关系代词 that (或 which). we cannot see 为 things 的定语从句。

[9] The sun is, in fact, a star big enough to hold over a million Earths.

in fact 插入语; big 为 a star 的后置定语; to hold over a million Earths 为动词不定式短语, 作状语, 修饰表语 a star big enough.

[10] ...a body of burning gas travelling in space.

burning 为现在分词, 作 gas 的定语; travelling in space 为现在分词短语, 也是 gas 的定语; burning gas travelling in space 作 of (介词)的宾语。

[11] ...than ours.

ours 为名词性物主代词, 这里相当于 our galaxy. 注意: ours 等所有名词性物主代词后面不能再加任何名词。

[12] It would be as stupid as measuring the distance from London to Tokyo in inches!

it 的含意为: measuring the distance of space in miles; as...as (跟...一样), 第一个 as 为副词, 第二个 as 为连词。

## 1. 我们在宇宙中的位置

地球上的人分属于许多不同的国家。我们使用许多不同的语言，有着各不相同的思想。长相和言谈也不尽相同。但是，有一点是相同的：我们都是出生在地球上的人，都是地球人。所有的人都在这颗星球上生存、死亡，从来不知道还有其它什么家。

几千年来，人们一直认为地球是天地万物的中心，太阳和星星围绕着我们运行。据说，太阳是为了给我们地球提供光和热而放置于天空的。

对于前人这些古老的观念，我们不应该感到奇怪。我们大多数人只有见到了的东西才会相信。从我们站着的地方看，地球象是天地万物的中心。更使人感到惊奇的是，少数伟人发现了这样的真理，并给一个接一个的发现所证实：我们的地球只不过是宏伟宇宙的一个很小的部分，是围绕着太阳运转的一颗小行星。从此，我们不再相信地球是天地万物的中心了。

这一真理曾吓坏了许多人，他们不愿去相信它。但是，波兰大天文学家哥白尼于1540年发现了地球围绕太阳运转的证据。起初，他不敢公开谈论这一发现，怕亵渎了上帝——地球的创造者而遭到惩罚。于是，他把他的发现记录在书本中，直到临终前的几个星期这本书才印刷出来。

哥白尼死后，对他进行惩罚已为时太晚了。其他的人并不这么小心翼翼。1600年之后不久，意大利天文学家伽利略

制造了一架巨大的新的天文望远镜。他借助于这架天文望远镜，证实了哥白尼是正确的。他大胆地谈论自己的许多发现，想让所有的人都知道。伽利略遭到了惩罚，被投进了监牢，直到最后他公开承认他以前错了才出狱。但是在朋友中间，他继续公开谈论他的发现，他用他的新望远镜发现了有关宇宙更多的情况，证实了在我们周围的天空中充满着作固定运动的物体。

很多人开始相信这些新的见解了。他们明白了，宇宙比人们对地球的古老观念要奇妙得多。有些人担心，在天文学家正在发现的巨大的宇宙中，人类的作用有可能变得不那么重要了。但是，人类是有智能的，它能使人进入到宇宙中去。凭着我们的智能，我们可以学习我们无法目击的东西。我们能够发现怎样控制我们地球外面的力量，也许能够同时在地球上和在宇宙空间安家。

自从伽利略以来，我们对宇宙的认识有了增长。对于我们地球在宇宙空间的位置，我们又知道些什么呢？

我们知道，我们的地球是和其它行星一起围绕太阳运转的一颗行星。现在，我们知道有九颗行星围绕太阳运转；太阳及其行星的这个家庭就叫做太阳系。

太阳控制着这些行星以不同的速度沿着不同的运行道路或轨道在太阳系内围绕着它作有规律的运行。轨道是行星围绕太阳运行的道路，或者说，它是宇宙空间任何一个物体围绕另一个物体运行的道路。

太阳给每一颗行星提供它所能接受的全部的光和热。事实上，太阳是一个大到能装下一百万个地球的恒星。恒星是宇宙空间运动着和燃烧着的气体物。然而，我们所熟悉的太阳不是最大的恒星。它之所以看上去大，仅仅因为它是离开



我们最近的一颗恒星。许多恒星都比它大。太阳只不过是我们在银河系内所有100,000,000,000(一千亿)颗恒星中的一员。

星系是一起穿行于宇宙空间的恒星的巨大家庭。试想看看，一千亿颗恒星！真是无法想象！用功率最大的天文望远镜，我们也只能看到银河系中的几颗恒星。我们无法精确地给它们进行计数，但是仪器告诉我们，它们确实存在。

我们所在的银河系如此之大，无法看到它的全貌。然而，它不是天地万物的终点。我们通过射电天文望远镜得知还有一千亿个其它的星系。我们知道，事实上还有很多的星系用我们的仪器是根本无法看到的。很多星系都比我们的星系大得多。

所有这些星系都在宇宙中运动。我们不晓得宇宙到底有多远，也不晓得终点在什么地方，或者是否有终点。很多天文学家认为，宇宙是无边无际的。无边无际吗？我们的脑袋还不够大，装不下这个见解。

人们倒是往往想到自己能够测量的距离。但是，我们地球上的测量单位用来测量恒星之间的距离时，就显得太小了。我们不可能用“英里”来测量宇宙空间的距离，要是这样测量，就等于用“英寸”测量伦敦到东京的距离一样愚蠢。于是，我们找到了一个新的测量单位，叫做**光年**，用它来测量宇宙空间的距离。

光年，就是光在一年中所走的距离。光每秒钟走186,000(十八万六千)英里，一年要走6,000,000,000,000(6兆)英里。这就是一光年的测量单位。

这儿举一个例子，说明用“光年”测量宇宙空间比用“英里”测量要容易得多。

我们银河系中最近的一颗恒星离我们有24,000,000,