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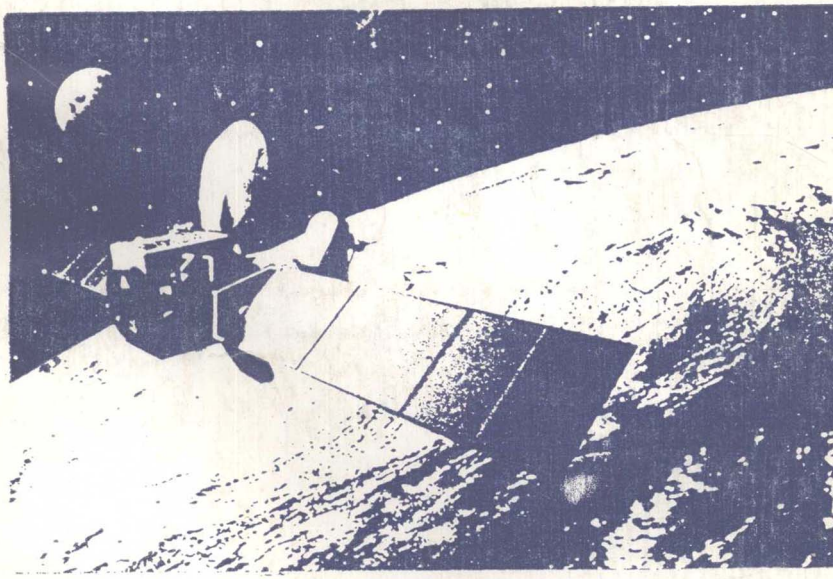
太空旅行



Travel In Space

武汉测绘科技大学出版社

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藏书章

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1. *Our Place in Space*

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. We are all Earthmen. 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.

The old ideas of men should not surprise us. Most of us only believe what we see. 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. 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 1510 Copernicus, the great Polish astronomer, found proof that the Earth goes round the sun. 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. His punishment was being sent to prison. 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 reach out into the universe. With our minds we can learn about things we cannot see. We can discover how to control forces outside our Earth. Perhaps we can make our 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. A star is a body of burning gas travelling in space. But

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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 galxy 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.

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! 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.

space in light-years than in miles.

The nearest star in our galaxy is 24,000 000 0 00 0 00 miles away—or four light-years. A space-ship travelling at twenty five thousand miles an hour will have been travelling for 120 0 00 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?

I. Vocabulary

human [ˈhju:mən] *n.* human being 人类
pl. humans

planet [plænit] *n.* a large body in space that moves round a star, esp. round the sun 行星

astronomer [əˈstrɔnəmə] *n.* a person who studies the stars scientifically 天文学家

punish [ˈpʌniʃ] *v.* to cause someone to suffer for 惩罚
punishment *n.*

universe [ˈju:nivəs] *n.* all space and the matter which exists in it 宇宙

solar system ['səulə sistəm] the sun together with the planets going around it 太阳系

orbit ['ɔ:bit] *n.* the path of one heavenly body round another (天体等)运行轨道

galaxy ['gæləksi] *n.* the large group of stars in which our own sun and its planets lie 银河系

measure ['meʒə] *v.* 测量

measurement *n.*

prefer [pri'fə] *v.* to choose (one thing or action) rather than another 宁愿选择

rocket ['rɔkit] *n.* a machine driven by burning gases and carrying its own oxygen, used as a form of power for aircraft engines, and for space travel 火箭

I. Notes

Copernicus: *Nicolaus Copernicus 1473—1543, Polish astronomer; enunciated the principle of helicentric planetary motion*

Galileo: Galileo Galile 1564—1642, Italian scientist and philosopher, performed fundalmental observations experiments and mathematical analysis in astronomy and physics

light-year: the distance that light travels in one year

the Sahara Desert: 地名，撒哈拉沙漠

2. *The Earth Family*

Our own solar system is very small among the galaxies of space. Our distance from the other planets is almost neighbourly. Visits to our own planet-family cannot be impossible. But even in the solar system distances are huge. Let us consider whether visits to other members of the family will ever be possible.

Of course we can never visit the sun. The sun, like all the stars, is made of burning gases. Everything which goes too near must melt in its heat. But it is not really the sun's fire that warms and lights the solar system. We know now that atomic energy is coming out of the sun all the time. This is what warms and heats our world. The sun is like a huge atomic bomb exploding in space. We are lucky that there is enough gas in the sun to explode for millions of years. So there is no danger that the sun will soon disappear.

What about the other planets? Can we ever visit them?Shall we be travelling between planets as we now travel between countries? Or will that be impossible?

You will see that our nearest neighbours are Venus and Mars. Further away are Mercury and Jupiter. The furthest planets are Saturn, Uranus, Neptune and Pluto. Pluto was only discovered in 1930. It is so far from the sun that it is probably in complete darkness. Its journey round the sun lasts 248(two hundred and forty-eight) years.

These are the only planets that we have yet discovered. But there may be others hidden in space or near the sun. Astronomers often discover new bodies in space. But finding one planet is like finding one bird amongst millions of birds.

Can we ever visit the planets we know?

When we examine the other planets we find that most of them are very uncomfortable places for humans. We used to think, for example, that there could be life upon Venus. It is the brightest planet in the sky — brighter than anything except the sun and the moon. But we know now that Venus is much too hot for human life. It is so hot that perhaps we shall never be able to visit the planet.

Most of the other planets probably don' t contain any life. Jupiter and Saturn are very far from the sun and they are as dark and as cold as death. Mercury is too hot by day and too cold by night. It has no water and no air that men could breathe.

Mars is one planet where there may be life. We know more about Mars than about any other planet. But astronomers are still guessing about many things. For example, we think that on Mars there may be changes of weather during the year. Our own weather changes from winter to summer. Perhaps it is the same on Mars. In Mars' mid-summer we can see brown places on the planet. In mid-winter these places are white. So some scientists believe that plants grow on Mars during mid-summer and change colour in the winter. They do not say that there are green fields on Mars. But perhaps there is some kind of life.

Mars has very little water. Perhaps it has none. But astronomers can see strange narrow lines upon the planet. These lines are sometimes called 'canals', like the narrow waterways made by men on Earth. Some people believed, in fact, that these were real canals for carrying water from one part of Mars to another. So, these people said, there must be life on the planet — creatures with minds like ours. Most astronomers are sure that this is not true. They do not think that creatures like

us can live on Mars. But many scientists do accept the idea that simple plants may grow on Mars.

There are strong forces holding all the planets around the sun. It is not by accident that we follow our fixed paths or orbits. This is controlled by several things. The strongest force controlling us is called gravity. This is a force pulling everything on or around a star or planet towards its centre. The gravity of the sun is the strongest gravity in our solar system. It holds the planets in their paths, so they do not wander away into space.

But planets are not the only bodies which move around in the solar system. There are other bodies travelling with us. Some of these move round the planets in fixed orbits. The reason is that planets have their own gravity. This controls smaller bodies and keeps them circling round the nearest planet. These bodies are called satellites or moons.

Jupiter, the biggest planet, is very grand. It has twelve moons travelling round it. Saturn has nine moons. Some of these moons are as big as the smaller planets like Mercury and Mars.

Of course the moon which is familiar to us is our own moon, travelling with the Earth. We only have one moon. but it is very important to us. It deserves a special chapter because it is our closest companion in space.

As well as the sun and its planets and the planets' satellites there are other bodies moving in the solar system. There are, for example, asteroids, comets and meteors.

Asteroids are pieces of rock which travel round the sun like planets. Perhaps they are pieces of a planet that fell apart in space.

The comets are easy to recognise. They have a great tail of

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fire burning behind them as they rush across the sky. When a comet appears it can sometimes be watched crossing the sky for days or weeks. The bigger comets are very grand and bright. All the astronomers keep watch on a comet as soon as it appears. At last it disappears and it may not be seen again for many years. But astronomers know when each comet will be travelling again across the sky. The movements of the comets are as fixed as the movements of the planets. This makes it easy to find them.

Halley' s Comet, for example, appears every seventy-six years. Its last appearance was in 1986, after 1910.

People used to believe that the appearance of a comet warned us of some terrible coming event. Halley' s comet in 1066 warned the English that their enemies were going to attack them. Now that we know more about comets they do not frighten us. In fact when Halley' s Comet comes again we shall be sending men into space to examine it more closely.

Meteors are pieces of mineral travelling in the solar system. There are countless meteors in the solar system, and millions of them are pulled towards Earth by the Earth' s gravity. When they reach the ground most meteors have become tiny pieces of sand or dust. They have been burned away as they fall. A few are big enough to make a hole when they hit the ground. In America there is a hole nearly a mile wide. It was made by a meteor which fell a thousand years ago. It is lucky that most meteors burn up before reaching Earth. Our lives would always be in danger if meteors fell like rocks.

When meteors fall to Earth at night they sometimes burn brightly in the sky. They shoot across the sky on their way down. So they are sometimes called shooting stars, although they are not really stars. We can often see them in a clear sky,

falling in bright pieces.

Ⅰ. Vocabulary

atomic energy [ˈtomikˈenədʒi] 原子能
explode [iksploud] *v.* (esp. of a bomb or other explosive) to blow up or burst 爆炸 explosion [ikˈspləuʒən] *n.*
gravity [ˈgræviti] *n.* the natural force by which objects are attracted to each other, esp. that by which a large mass pulls a smaller one to it 引力
satellite [ˈsætəlait] *n.* a heavenly body moving around a large one 卫星
companion [kəmˈpæniən] *n.* a person who spends time with another, because he is a friend or by chance 伙伴
now that *conj.* since 既然

Ⅱ. Proper Names

Venus [ˈviːnəs] 金星
Mars [maːs] 火星
Mercury [ˈməːkjuri] 水星
Jupiter [ˈdʒuːpitə] 木星
Saturn [ˈsætən] 土星
Uranus [juˈreinəs] 天王星
Neptune [ˈneptjuːn] 海王星
Pluto[ˈpluːtəu] 冥王星
asteroid [ˈæstərɔid] (火星和木星轨道间的)小行星
Comet [ˈkɔmit] 慧星
Halley's Comet 哈雷慧星
meteor [ˈmiːtiə] 流星

Ⅲ. Reading Comprehension A

Answer the following questions in English according to the text:

1. What is the sun made of ?
2. What planets have been discovered?
3. Don' t you think our Earth is more comfortable than other planets?
4. What is Halley' s Comet ? Did you have any experience of it?

Reading Comprehension B

Fill in the following blanks with the information given in the context:

1. There is enough _____ in the sun to explode for millions of years. So there is no danger that the sun will soon disappear.
2. _____ and _____ are the Earth' s nearest neighbours besides Earth.
3. _____ is one planet where there may be life besides Earth.
4. _____ is the force pulling everything on or around a star or planet towards its centre.
5. _____ is our closest companion in space.
6. Halley's Comet appears every _____ years.

Ⅳ. Reading Comprehension

Read each of the following statements carefully and say whether it is true or false, according to the passage you have read.

( )1. The Earth is the centre of everything from where we stand.
( )2. At present we know nine planets moving.
( )3. The sun is the greatest star.
( )4. There are many galaxies in the universe.
( )5. A light year is six million million miles in one year.
( )6. Copernicus was punished for his discovery that the Earth goes round the sun.

3. *Our Own Planet*

Men travelling in space have described the beautiful appearance of our own planet. They have a good view from there of blue seas, high mountains, green land and brown land, gold fields and silver rivers. All these can be seen through a veil of cloud.

Other planets are covered by dry ranges of hills without life or colur. The great empty mountains of the moon are very beautiful. But we have not yet found anything in space as lovely as the Earth. Because it is familiar we do not value our own planet. But in many ways we are lucky that the Earth is our home.

For example, we are lucky that Earth' s gravity is comfortable for human life. All planets are alike in having gravity. But the strength of gravity is not the same on all of them.

What is the effect of this gravity? Its force is so familiar that we hardly think about it. Every time we lift a foot we are pulling against gravity. Gravity pulls the foot back to earth as we step forward. Gravity brings a ball back to us when we throw it in the air. It is the fault of gravity when we drop something and it is broken.

Gravity is so strong on some planets that it would be very difficult to move our feet or lift a ball. It is so weak on other planets that we should float off the ground.

Our own Earth' s gravity is not too strong and not too weak. We can move freely. It is easy to lift things and put them down safely. Our gravity does another important thing. It holds the atmosphere (the air) like a veil around the Earth. Without gravity our air would disappear into space. But we could not live

without the oxygen contained in this precious atmosphere. Our whole lives are lived within it. Sometimes we leave the safety of oxygen when we swim underwater or climb high mountains or fly in space. But we cannot live without the protection of our atmosphere. Hence we must carry oxygen with us to support us. Otherwise we should die like fish out of water.

The atmosphere is important in another way. It stops the sun' s heat from burming us up. It is a protection against the heat. It also stops the world from drying up in the sun. Clouds forming in the atmosphere bring the rain which stops our Earth from becoming a desert.

Other planets do not have the protection of this veil of atmosphere. This is one reason why most planets cannot support human life.

In another way we are more lucky than other planets. As we go round the sun the Earth turns all sides towards it. Most of the Earth gets a share of heat and a share of cold. So men can live almost everywhere on Earth.

Mercury is not so lucky. One side is turned always to the sun. That side suffers heat all the time and the other side suffers cold.

The Earth is also lucky that it is the right distance from the sun. For this reason we can usually enjoy its heat in comfort. Planets nearer the sun, like Mercury and Venus, are too hot. The farther planets are too cold. Only Mars shares our comfortable place.

It is also our good fortune that the Earth contains so much water. More than half the Earth is covered with water. We could not support the many millions of men without this water. Water is as important to us as oxygen.

We do not know of any other body in the solar system which

is as comfortable as Earth. Human life is easy here. Many people think that there is everything here that we need. They doubt that we have made the most of the precious things of this planet.

But humans are never satisfied. We have hardly explored our own Earth and already it is too small for us. The number of people on Earth is growing very fast. In 1850 there were about one thousand million people on Earth. In 1930 there were two thousand million people. By the year 2000 there will be more than six thousand million people! And people are becoming very anxious!

What about places for us to live? What about food for this great number of people? Humans are beginning to look anxiously outside the Earth for answers to these questions.

The Earth also seems smaller because travel is now very quick. In 1850 we could travel as fast as a horse. In 1950 our planes could fly at one thousand miles an hour (1000 m. p. h). In 1970 we can fly at 25 000 m. p. h. Who knows how fast we shall be travelling in the year 2000?

We know that we shall be making our future history in space as well as on Earth. Humans have done great things on Earth. But we have not made the best of our good fortune. Perhaps our future in space will help us to do more on Earth. We are lucky to live in a time when men are taking their first steps in space. We have not yet gone far. Nobody knows how far we shall go. But the old teacher said:

'The longest journey starts with one step.'

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