

Introduction

1.1. Myths and Science

There has been an old Chinese myth about Pangu separated earth and heaven for thousands of years.

Long long ago, the earth and heaven were at chaos. It cannot be identified where is the earth and where is the heaven. Pangu was in deep sleep inside the chaos. One day, Pangu woke up and felt very stivy, so he roared and raised the heaven with his hand and stamped the earth with his feet. Then mountains, rivers and all living things appeared gradually. This is a story formed by observations and imaginations from Chinese ancestors and passed down by many generations, see **Figure 1.1**.

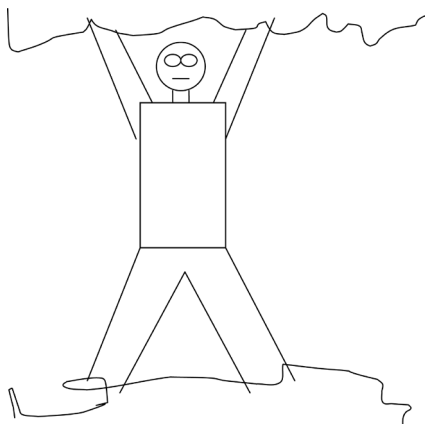


Figure 1.1. Pangu separating earth and heaven.

Along with the development of history, scientists got more realistic view about the cosmos by the improvement of observing machines and methods.

Zhang Heng (78-139) in the Eastern Han Dynasty invented armillary sphere, see **Figure 1.2**. It reflected the view of heaven and earth of the people at that time: the earth is like an egg yolk, the sky is like an egg shell, the sun, the moon and all stars move along the sky. Therefore, people can see sun arise from the east, traverse the sky and set in west.

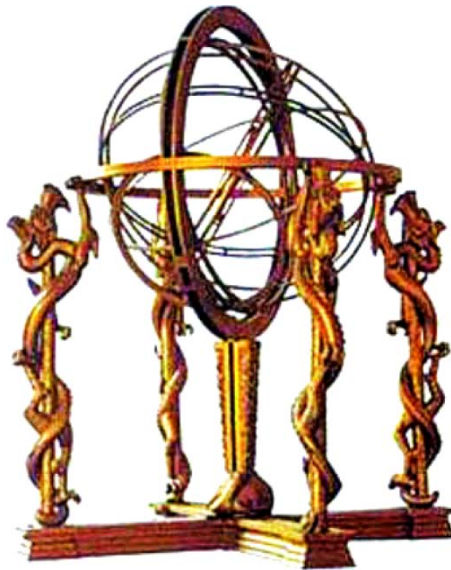


Figure 1.2. Armillary sphere.

This theory is in fact a geocentric theory. In Western Medieval, the general idea of geocentric theory is that the earth is at the center of the cosmos, the sun, the moon and all stars move around the earth.

Copernicus (1472-1543), an astronomer in the 15th century, proposed the heliocentric theory: It is not the sun revolves around the earth but the earth revolves around the sun, it takes a year for the earth to revolve the circle. It seems the sun rise and set because the daily rotation of the earth on its own axis.

The heliocentric theory is a revolutionary change in astronomy. It opened up a new stage for the scientific development.

Today we know, beside the earth, there are another eight stars revolving around the sun. We call them planets. According to the distance from the sun, from the nearest to the farthest, they are Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto. The earth is between Venus and Mars. This is an asteroid belt between Mars and Jupiter which contains thousands of asteroids. Big planets always have satellites revolving around them. The moon is a satellite of the earth. One revolution of the moon around the earth takes less a month. There are lots of comets pass through the planets. The sun, the planets, comets and satellites etc. constitute the solar system (**Figure 1.3**).

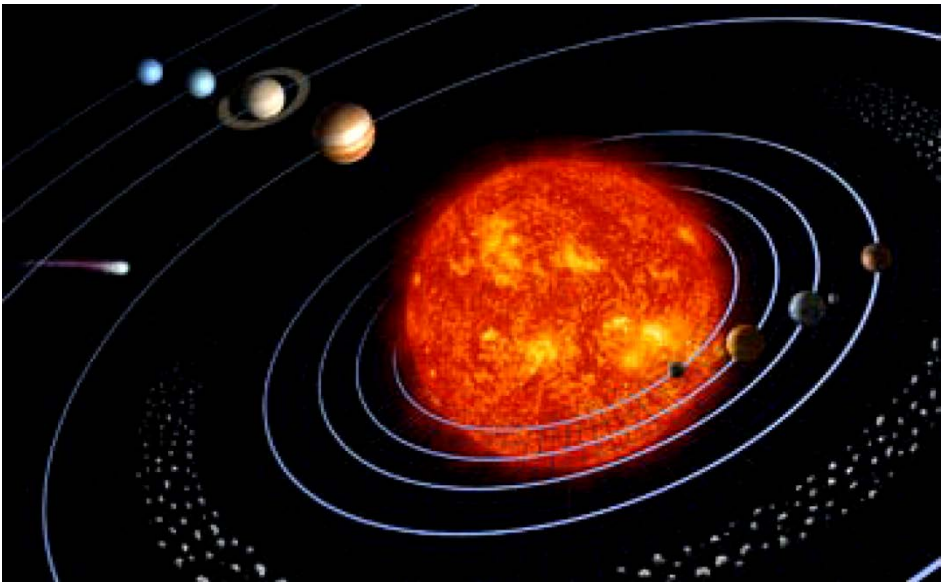


Figure 1.3. The solar system.

The sun is a big fire ball. Its surface temperature is about 5600 K. Its mass is about 2×10^{33} gram, about 300 thousand times of the earth. The radius of the sun is about 7×10^8 meter, about 100 times of the earth (**Figure 1.4**).