

# The Universe in my pocket



## Figures in the sky



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This 17,000 year old painting from the Lascaux cave in France shows the stars of what is now called the Pleiades cluster.

This disc found in Germany and thought to have been made almost 4000 years ago shows the Sun, the moon and several stars, among which are the Pleiades.



'Starry Night over the Rhône' is a famous painting by the great Dutch artist Vincent Van Gogh, where one can

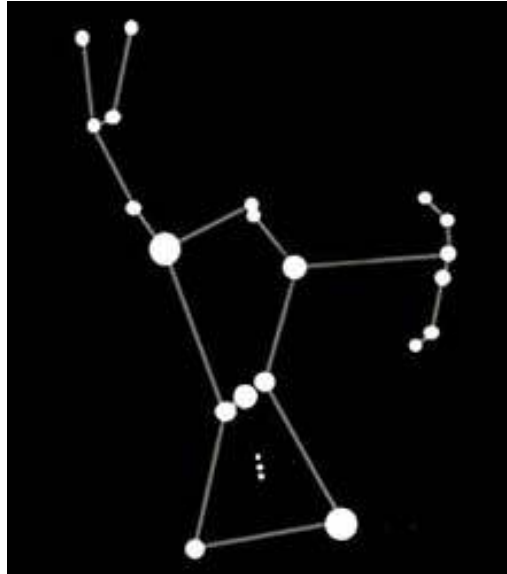
see the constellation of the Great Bear.

If you look at the sky on a clear night, you will see that the stars seem to draw figures.

These figures, called constellations, remain identical during the night and do not change from one night to another. But the whole pattern moves: like the Sun, constellations « rise » in the east and « set » in the West. The whole pattern gradually shifts from one night to another but is found in the same place after exactly one year has passed.

It is not surprising that ever since the oldest times, people of all cultures have paid close attention to the sky, which served to orient them both in space and in time.

This is how Astronomy started.



The stars of the Orion constellation with imaginary lines connecting them.

Above: Orion as represented in 1687 by the Polish Astronomer Johannes Hevelius in his Sky Atlas.

Right: a detail of the Dunhuang Map, a 7th century Chinese star chart, showing the Orion constellation.



## Orion: a famous constellation

Since the earliest times people have given names to the constellations - mostly of animals or of gods - and built legends around them.

For example, the constellation we know today as Orion was given this name by the ancient Greeks . Many myths tell about Orion, a handsome demigod.

Ancient Chinese astronomers knew Orion as Shen, a great hunter or warrior.

Well before that, the ancient Egyptians related this constellation with their god Osiris.

The first people to name it were the Sumerians; the name was Uru Anna, meaning ` Heaven's light '.

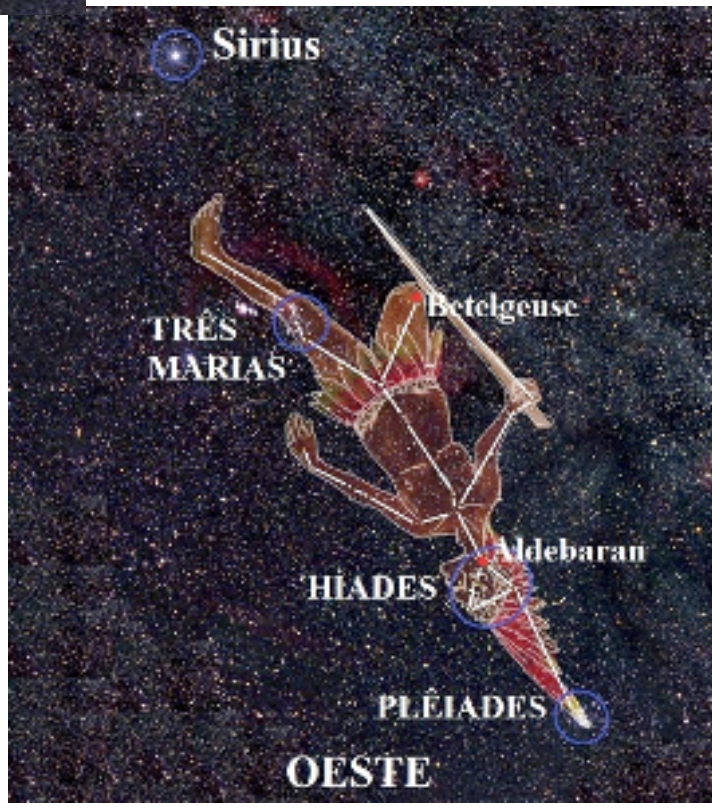
The Orion constellation seen from the southern hemisphere, where it looks upside down.

Superimposed is the representation of the myth of an Australian people associated to this constellation.



The Old Man is an indigenous Brazilian name for a constellation formed by a combination of the Orion and Taurus constellations.

(Image from the museum of Amazonia.)

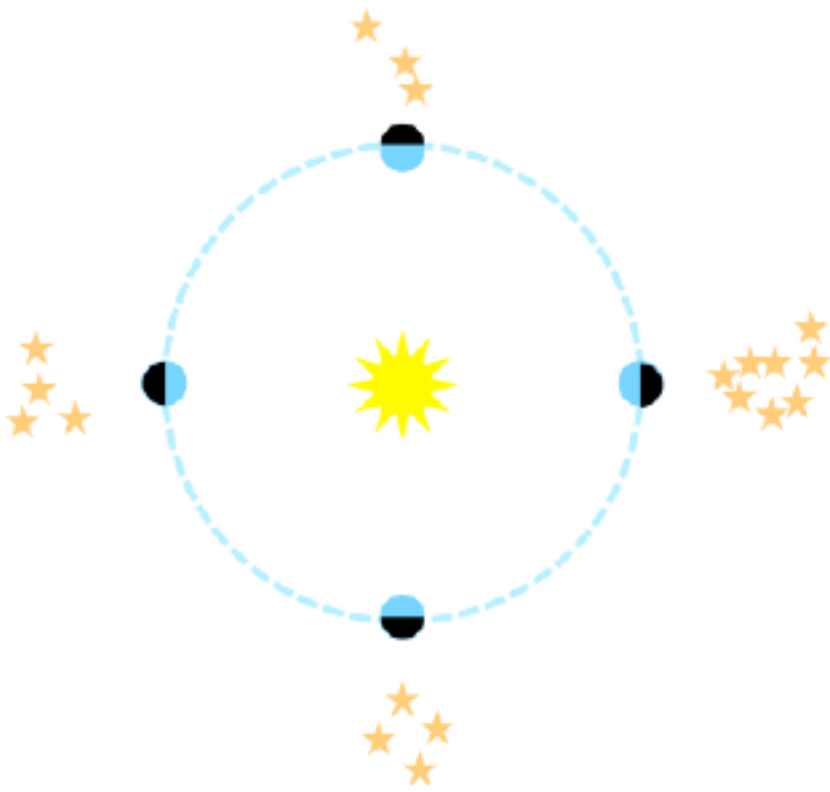


## Orion « upside down »

Myths from other cultures are very different.

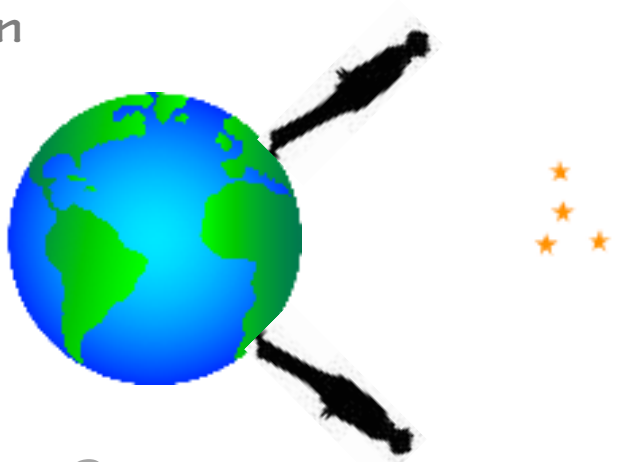
For the Yolngu, an aboriginal people from Australia, Orion is a canoe with three brothers who went fishing. One of them ate a fish that was forbidden. In anger, the Sun-woman created a waterspout that carried the canoe with the three brothers into the sky.

A very different story is told by indians from Brazil: The constellation of the Old Man represents a man whose wife was interested in his brother. She killed her husband and cut off one of his legs. The gods felt sorry for him and transformed him into a constellation.



The Earth's orbit around the Sun. Different constellations are visible in the night sky during the year.

People standing in opposite hemispheres of the Earth are upside down with respect to each other, and have inverted views of the same constellation.





# The sky in different seasons

Stars can be seen only at night: during the day, they are outshone by the Sun.

In the course of a year, the Earth revolves around the Sun so that different parts of the sky are seen in different seasons (see the drawing on the opposite page).

The celestial sphere is an imaginary sphere centered on Earth on which all the stars are projected and seem to move.

The apparent path of the Sun on the celestial sphere is a circle that crosses those constellations that are close to the plane of rotation of the Earth around the Sun. This path is called the Zodiac.



6th century mosaic representing the wheel of the zodiac with Greek motifs.



Chinese zodiac, used for divination, very different from the occidental zodiac.

# Astronomy and Astrology

The word zodiac is very well-known because of its relation with horoscopes, which pretend to predict your future according to the position of the Sun in the zodiac at the time of your birth. People writing horoscopes are called Astrologers, not to be confused with Astronomers!

Astronomy is a science that describes and tries to understand the objects beyond the Earth's atmosphere (planets, stars, galaxies). Astrology is not a science. It assumes that there is a link between the position of the Sun and planets and people's lives. But there is no reason for this to be true. On the contrary, there is much evidence that this is wrong.

Constellations are often represented on State Flags, proving the importance of the sky for mankind, even in modern times.

In 1927 a contest was held to choose the flag of Alaska. The winner was Benny Benson, a 13 year-old Alaskan boy. He wrote: ` The North Star is for the future state of Alaska, the most northerly in the Union. The Dipper is for the Great Bear — symbolizing strength `.



The flag of Brazil. Its 27 stars represent the 27 states and are arranged in the same pattern as in the night sky over Brazil.



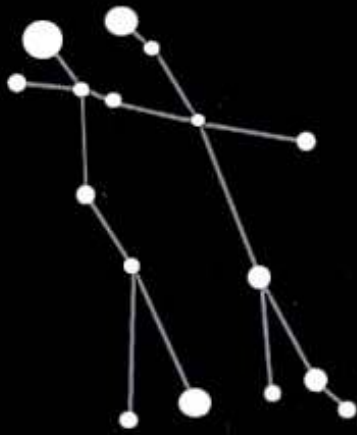
# Constellations and Astronomy

A few thousand stars are visible to the naked eye. Over the years, they have been catalogued in many sky atlases with beautiful illustrations depicting the constellations.

Nowadays astronomers know how to measure the distances of stars. In a single constellation the stars are usually very far from one another and are not physically linked. But we still like to recognize the constellations in the sky.

With telescopes, we can find many more stars. In 2014, using the Isaac Newton Telescope on the Canary Islands, astronomers released a catalogue of 219 million stars.

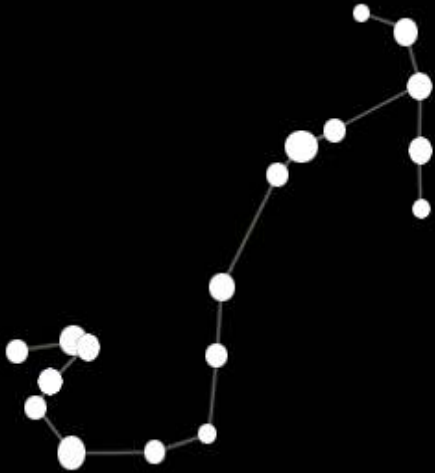
# Some famous constellations



The Twins



The Lion



The Scorpion



The Swan

The Twins, in a 1537 Persian copy of *The Wonders of Creation*, written by al-Qazwini around 1250.



The Lion, in the *Uranometria* of the German astronomer Johan Bayer (1603).



Scorpio, in the *Treaty of spheres* by Andalo di Negro around 1330.



The Swan, in the *Celestial Atlas* of the English astronomer John Flamsteed (1729).



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This booklet was written in 2015 by Grażyna Stasińska from Paris Observatory (France) and revised by Stan Kurtz from the UNAM Radio Astronomy Institute in Morelia (Mexico).

The cover image represents the "Emu in the sky", a constellation present in many aboriginal Australian cultures. It is not defined by stars but by the dark patches visible against the Milky Way background.



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