



## PHONE DR. MARC ARCHIVES!

September 2002 -

### Do constellations ever break apart or change?

Our friends at the Cable Natural History Museum in Cable, Wisconsin, ask whether constellations ever break apart or change. To answer this, first let's think about what the constellations are, and then we can see whether they change.

When we look at the night sky, we see distant stars shining like faint lights. Now we know they are really brilliant lights, like the Sun, that are incredibly far away from us and from each other. Astronomers have used some wonderfully inventive methods to discover the distances to the stars, but to our eyes, they all look as if they are pinpoints of light at the same distance. As an extreme example of this, the red planet Mars is tens of millions of times closer than the red star Antares (Greek for "Rival of Mars"), but you certainly can't tell that just by looking at them when they appear near each other in our skies.

It's normal for us to find patterns in natural arrangements of things. For example, most people can imagine they see faces or other familiar objects in some clouds or rock formations. It's the same with the stars. Ancient observers, without the benefit of our modern understanding of the nature of stars and space, saw these patterns and thought they might be important symbols. Cultures throughout history have created different names and descriptions for the arrangements of stars. The constellations most of us are familiar with were created by people living in the Mediterranean and the Middle East. Many of the stories of the constellations tell us about the myths and legends of the people who gave them names thousands of years ago, but they tell us nothing about the stars themselves.



If stars never changed, then constellations wouldn't change. But the stars, including the Sun, travel in their own separate orbits through the Milky Way galaxy. The stars move along with fantastic speeds, but they are so far away that it takes a long time for their motion to be visible to us. You can understand this by moving your finger in front of your eyes. Even when you move it very slowly, it may appear to move faster than a speeding jet that is many miles away.



Andromeda Galaxy. At about 2 million light years away, it is the nearest major galaxy to our Milky Way galaxy.

**Andromeda Galaxy.** At about 2 million light years away, it is the nearest major galaxy to our own Milky Way galaxy. Astronomers think our own galaxy looks ery much like this one.

Even the fastest stars take a long time to travel a noticeable distance. A faint star named Barnard's Star moves the fastest through our skies. Still, for it to change its position only by an amount equal to the width of the moon would take about 180 years. The constellations surely change shape, but seeing the changes would require superhuman patience!

The person who discovered that the stars move was the great British astronomer Edmond Halley, who also has a famous comet named after him. Almost 300 years ago he noticed that a few stars in charts made by Greek sky watchers were not in quite the same location anymore. Those charts were more than 1600 years old then, and even over that time, the bright stars Sirius, Arcturus, and Aldebaran had shifted position only slightly. Still, it was enough for Halley to realize that those stars must have moved.

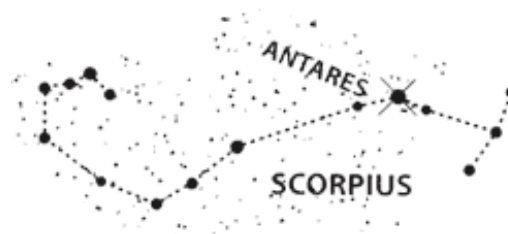


Edmond Halley, 1656-1742

If you waited long enough, the patterns of stars you would see in the sky would change completely. The Big Dipper is the easily recognizable part of a constellation called Ursa Major, or the Great Bear. The star at the end of the handle and the one at the far tip of the bowl happen to be moving in the opposite direction from the other stars in the Big Dipper. In the future, the handle will appear to be more bent, and the bowl will spread out. To me, the shape in 50,000 years will be more like that of a tadpole than a dipper.



Besides their motion, the appearances of stars change as they age. Take my favorite constellation Scorpius, for example. A couple of years ago, the middle of the three stars that make the head of the scorpion became brighter. The constellation now has a new look!



The constellations are a very convenient way to locate objects in the splendid night sky, making a kind of natural map. If you knew the names of the constellations, you could follow directions to all sorts of beautiful and interesting objects, just as if you knew the names of streets, you could follow directions on how to get to a friend's house. To make your own star finder and learn some of the constellations, go [\[here\]](#) to The Space Place Web site at [spaceplace.nasa.gov](http://spaceplace.nasa.gov) and click on "Make spacey things." Then I hope you will go outside to look at the stars, and use the constellations to find your way around. Remember, though, that what's important is not these patterns themselves, but rather the richness of the universe they will help you discover.

Thanks again for calling Dr. Marc here at The Space Place.

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Last Updated: March 17, 2005  
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