

# Stars over Sisters

By Ron Thorkildson  
Correspondent

The magnificence of last month's total solar eclipse will likely stay with, perhaps for a lifetime, the many thousands of Central Oregon residents who witnessed it.

Though the weather was mostly cloud-free, obscuring smoke from wildfires hung in the air in many areas. For those in the path of totality, the event delivered on all that was promised, and right on time. When the moon completely hid the face of the sun, Sol's corona popped into view, along with a few reddish-colored prominences that thrilled onlookers. It is hoped that those who live in the Beaver state did all they could to observe the total solar eclipse, because the next opportunity won't come again to Oregon until 2108.

We know there won't be a solar eclipse in September because it's not listed in any eclipse tables. But let's see if we can figure out why such an event can't occur.

Solar eclipses always happen during a new moon, in other words when both the

sun and moon have the same celestial longitude. But they don't happen on every new moon because the sun, moon and the earth don't always lie along a straight line (a condition called "syzygy"). The reason for this is that the moon's orbit about the earth is inclined about 5 degrees to the plane of Earth's orbit round the sun, known as the ecliptic. Such an alignment can only occur when the sun and moon are very close to one of the two nodes, or places where the ecliptic and the moon's orbit intersect.

Even when all the ingredients for an eclipse are there, a total solar eclipse is still not guaranteed. In its monthly orbit around the earth, the moon comes within about 225,622 miles (perigee) of our home planet and moves to as far as 252,087 miles (apogee.) When it is near apogee, the size of moon isn't quite big enough to completely cover the sun, resulting in a ring or halo around the moon. This is called an annular eclipse.

Why no eclipse in September? New moon occurs at 10:29 p.m. PDT on

September 19. If an eclipse were to occur, it would appear on September 20 to inhabitants somewhere on the other side of the world from Central Oregon. The moon's distance from the earth on September 19 will be approximately 237,266 miles, slightly less than its average distance. The size of the moon's disk, therefore, would likely be large enough to produce a total eclipse somewhere.

The problem, then, must be in the syzygy alignment. And indeed it is. The celestial latitude of the moon on September 20 is 4 degrees, 39 minutes, while that of the sun is 1 degree, 6 minutes. This means that the moon's shadow overshoots the sun (is above it) by more than 3 degrees. And since both the sun and moon measure only about half a degree of the sky, this is not nearly close enough to produce an eclipse.

The dwindling daylight hours this month signal an upcoming change of season. At 1:02 p.m. PDT on Friday, September 22, autumn will arrive in the Northern Hemisphere as the sun slips across the celestial equator on its journey south toward the Tropic of Capricorn. When this happens the duration of day and nighttime hours will be roughly equal everywhere on the earth.

The celestial sights on tap for September can't begin to compare to the August eclipse; few, if any, can. Still, there are a couple of very fine early autumn objects worth mentioning.

Globular clusters M2 in Aquarius and M15 in Pegasus are both considered by experienced observers to rank in the top dozen bodies of their type in the northern sky. These spherically shaped clusters are normally



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Globular star cluster M15, found in the constellation of Pegasus, lies at a distance of about 33,600 light-years.

comprised of very old stars that are thought to have formed shortly after the universe came into being some 13.8 billion years ago.

At a diameter of 175 light-years, M2 is one of the largest known globular clusters. It is rich, compact, somewhat elliptical and lies about 37,500 light-years away at the outer edge of our Milky Way galaxy. M15 is some 33,600 light-years distant and is one of the most densely packed globulars. Astronomers believe it has undergone a contraction known as "core collapse" and contains an enormous number of stars surrounding what may be a central black hole. Both clusters are thought to

be approximately 13 billion years old.

To learn more about the night sky, or to share your knowledge with others, consider attending the next Stars over Sisters Star Watch to be held on Saturday, September 23. Proceedings begin at 7:30 p.m. with a presentation in the Sisters Park & Recreation District (SPRD) building. After the talk, all are invited outside to observe the night sky through telescopes provided by local amateur astronomers. The event is free.

On Tuesday, September 19, the Sisters Astronomy Club will hold its monthly meeting at the SPRD building. It begins at 7 p.m. and all are invited.

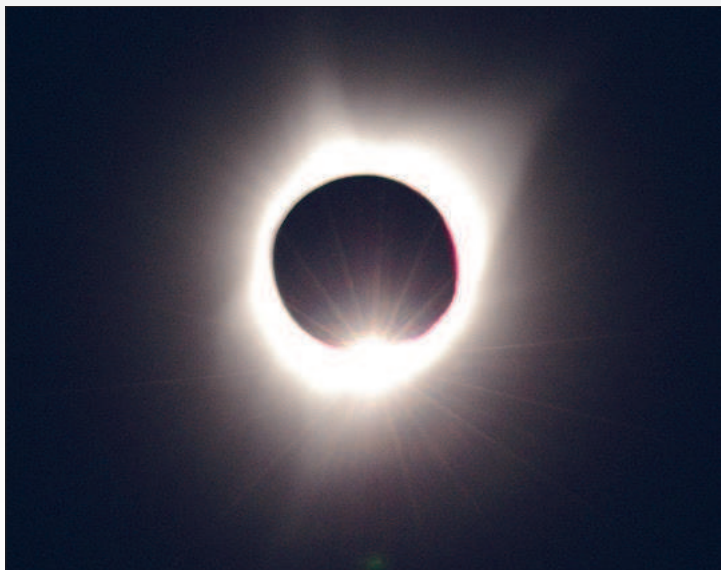


PHOTO BY JIM HAMMOND

Diamond ring effect and outer corona captured by Jim Hammond from Rimrock Ranch.

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