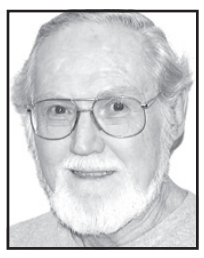
Partial eclipse, transit of Venus expected



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● Stargazer

Come May 20, we will be treated to a partial eclipse over much of the western half of the U.S.

On June 5, an even rarer event will be visible over the entire North American continent as millions of people – with safe and proper equipment – will be witness a transit of Venus. When the planet passes directly between the Sun and Earth, it appears as a tiny black dot creeping across the face of the Sun.

While the transit won't be as dramatic as the "ring of fire" of an annular eclipse, it is far rarer. Transits of Venus occur in eight-year-apart pairs with each pair occurring less than once each century. This 2012 transit is paired with the 2004 transit which didn't get as much notice since it was not positioned well for viewing in the U.S. The previous pair occurred in 1874 and 1882, and the next pair won't come around until 2117 and 2125 – long after we're gone – so it's now or never for us.

A transit and a solar eclipse are similar as both involve a solar system object passing between our planet and the Sun. Yet they are quite different in effect. With a solar eclipse, the Moon comes in between, and given its nearness to us, all or much of the Sun is dramatically eclipsed (covered) briefly. However, Venus, although larger than the Moon, is much further away and thus covers only a tiny percentage of the Sun, not even enough to be noticed by casual observers.

Venus Transits in History

Indeed, there is no known record of an observation of a transit of Venus until British astronomer Jeremiah Horrocks' accomplished the feat in 1639. In the early 1600s Johannes Kepler discovered that planetary (and other) orbits are elliptical rather than circular; he published his Rudolphine Tables of planetary motions in 1627 and predicted there would be a Venus transit in 1631. Unfortunately, he died in 1630, and the few others who knew about it were in the wrong part of the world to see it. Eight years later when the second of the paired transits occurred, Horrocks was one of only two – other being his friend, William Crabtree – who reported viewing the 1639 transit.

The next time around, in 1761 and 1769, astronomers were better prepared. And by then, thanks to British astronomer Edmond Halley, of Halley's Comet fame, they realized the potential scientific importance of Venus transits. Halley pointed out that if precisely measured from several different parts of the world, a far more accurate value for the mean distance between the Earth and Sun (a measure known as an "astronomical unit") could be calculated using basic geometry.

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The engraving on this marker reads, "The people of Tahiti built this memorial to CAPT. JAMES COOK RN, who observed the Transit of Venus from near this site on 3 June 1769 during his first Pacific voyage, and gave the name Point Venus."

Captain Cook in Tahiti

During our recent trip to New Zealand, we spent four days in Tahiti on the way home. While on a tour around the scenic island, we made a stop at a place named Point Venus where there was a beautiful 1800s lighthouse. Almost casually the tour guide mentioned that it was also the site from which Capt. James Cook observed a transit of Venus in June 1769.

In 1760, the world powers, notably Britain and France, set out to organize expeditions in both 1761 and 1769 to make observations, one expedition being that of Cook and Charles Green to the South Pacific.

They benefited from cooperative weather and did indeed observe the transit, yet their measurements – like those of other expeditions – were confounded by unforeseen problems. A major issue was the blurring effect of Earth's atmosphere which made it difficult to ascertain the exact moment of Venus' contact with the edge of the Sun – and precision was essential to success. So the results of all these efforts, while not complete failures, were disappointing to the astronomical world. (The astronomical unit has since been measured with great accuracy by far more sophisticated means.)

Seeing the Transit of Venus

At least part of the nearly seven-hour June 5 transit of Venus will be visible from the entire U.S., and like with the May 20 solar eclipse, the further west one is, the longer it will be visible. Most of the middle U.S. will see the first half before the sun sets, but this should be enough to enjoy the view.

Two things to note about the following contact times – they are geocentric, calculated for the center of Earth, thus actual times for specific locations can vary a few minutes, and they are given in Central Daylight Time.

Venus first touches the edge of the Sun (Contact 1) at 5:10 p.m. and is totally within the Sun's disc (completely surrounded by sunlight – Contact 2) at 5:28 p.m. It reaches mid-transit at 8:30 p.m. which is around sunset for most of the central U.S. Although it will already be below the horizon for the continental U.S., Contact 3 and 4 occur at 11:32 p.m. and 11:45 p.m., respectively.

The usual precautions about viewing the Sun apply to viewing transits as well as solar eclipses. In addition to visible light, the Sun emits invisible ultraviolet, infrared and other rays which, even if not painful at the moment, can still cause serious and permanent eye damage. As fascinating as transits and solar eclipses are, they not worth losing one's eyesight, so never view the Sun, even for a few seconds, without proper protection, such as approved solar glasses or No. 14 welder's glass.

The safest way to view the transit (and eclipse) is by using binoculars or a telescope – not to look through directly, but to project an image of the Sun on a piece of white cardboard. This is also a more fun method, as a group can simultaneously watch the event. Venus' apparent diameter is only about 1/30 that of the Sun, so its silhouette will appear quite small, somewhat like a darker and perfectly round sunspot gradually easing across the Sun.

Paul Derrick is an amateur astronomer who lives in Waco, Texas. His website (www.stargazerpaul.com) contains an archive of past Stargazer columns and other basic stargazing information. Contact him at paulderrickwaco@aol.com or (254) 723-6346 or write 918 N. 30th St., Waco, Texas, 76707.

Thomas County under drought watch

The winter conditions and spring climate for Kansas led Gov. Sam Brownback to update the Drought Declaration for Kansas counties. The update involves 91 counties either in a warning or watch status.

"Despite recent rains, the overall dry conditions that have persisted for more than a year now require us to continue to monitor the situation," Gov. Brownback said. "Meeting the needs of crops is a concern as moisture demands increase with the growing season."

The updated drought declaration has 16 counties in a warning status and 75 in watch status. This action was recommended by Tracy Streeter, Director of the Kansas Water Office and Chair of the Governor's Drought Response Team.

"While 14 counties have been removed from the monitor, the overall total moisture for the past year is below normal and temperatures are projected to be above normal this year again," said Streeter. "It is important we monitor conditions for the state as they could deteriorate quickly with no reserves."

This Executive Order shall remain in effect for those counties so identified until rescinded by Executive Order or superseded by a subsequent Executive Order revising the drought stage status of the affected counties. Effective immediately:

• Declare a Drought Emergency, Warning or Drought Watch for the counties identified below;

Drought Watch: Gove, Logan, Ness, Norton, Rawlins, Sheridan, Sherman, Thomas.

• Authorize and direct all agencies under the jurisdiction of the governor to implement the appropriate watch or warning level-drought response actions assigned in the Operations Plan of the Governor's Drought Response Team.

The governor's drought response team will continue to watch the situation closely and work to minimize the effects the drought has on Kansans.

For detailed information about current conditions, see the Kansas Climate Summary and Drought Report on the Kansas Water Office website at www.kwo.org.