



Event of the Month

by Bill Larson

Venus Shows its Crescent Phase

What phenomena did Galileo observe which overthrew the Ptolemaic model of the solar system? Most likely you think I am referring to his discovery of the moons of Jupiter; but that was not his most conclusive observation. The moons did show that not all bodies revolve about the Earth but the Earth could still be the main center. Although one of the major obstacles to acceptance of the Copernican model was philosophical and the moons were just the kind of evidence needed to remove such an objection, another revelation from Galileo's telescope offered even more conclusive evidence.

The perceptive reader has probably guessed already from the title of this article that I am referring to Galileo's observation of the phases of Venus. To see why they offer such conclusive evidence let us review the Ptolemaic model for a moment. The Earth was the unmoving center. Around it was a perfectly circular path called a deferent. The center of a second circle, the epicycle, then revolved uniformly along the deferent while the planet followed a path along the epicycle.

The problem is that this model simply cannot account for the phases of Venus. When Venus is near superior conjunction - on the other side of the sun from the Earth, it appears full. In the Ptolemaic model Venus can exhibit various crescent phases but it cannot exhibit a full phase when near the sun. (Unless its epicycle is large enough to cross the orbit of the sun. Fortunately crossing orbits was philosophically unacceptable and never seriously proposed as an explanation.) Never-the-less a full Venus is what Galileo saw and crash went the Ptolemaic model crystalline spheres and all.

Most of the time Venus exhibits the nearly full phase that Galileo saw. This month however you have an opportunity to observe the less common and more visually interesting, albeit historically less important, crescent phase. Already less than 30% illuminated at the start of the month, Venus will display a progressively thinner crescent as it approaches inferior conjunction on November 7.

At magnitude -4 , Venus is easily found low in the west and somewhat left of the sun at sunset. Because of its proximity to the

sun you should observe it as soon as the sun sets or perhaps even before. Any telescope will show the crescent.

Or if you don't care to set up your telescope, select someone in whom you have a romantic interest and then, while watching the sun and then Venus set, expound upon the arts over which the goddess Venus holds sway. Good luck which ever course you choose.

MINUTES

Minutes of the regular meeting of the Twin City Astronomy Club held Tuesday, Sept. 5, 1978, at the Science Museum of Minnesota.

The 6" Cassegrain optics won by the TCAC at the Boulder convention have arrived. The club is soliciting a person to put together a 'scope using this set of optics. The estimated cost is \$200-\$250.

The lecture for the evening was presented by Jim Fox. His topic was grazing occultations.

Fox said there are three measurements of the moon's location: distance from Earth, point in orbit, and distance from the ecliptic. The distance from the ecliptic is measured utilizing grazing occultations.

Occultations are measured to 1/10 sec. for a total occultation and 1/2 sec. for the time of multiple events during a grazing occultation using a tape recorder and WWV time tones. An audible signal is made by the observer at the time of the occultation and the observer's reaction time is later subtracted. The observer's reaction time, or personal equation, is usually .4 to .6 sec.

Fox and others planned to meet Sept. 22 for a favorable graze of ZC667 Tauri (75 Tauri), a magnitude 5.3 star. This graze was to occur at 1:45 a.m. CDT near Henriette, Minn. There is a path about one mile wide where a grazing occultation may be observed. Above or below that path a near miss or a total occultation will be observed (unless the observer is far distant, in which case nothing will be observed except the moon and some stars).

Those interested in observing grazing occultations should refer to "Shadow of the Moon" in the July *Gemini* for data on upcoming events.

GEMINI

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The next meeting of the TCAC will be Tuesday, Oct. 3, at the O'Brien Observatory, Marine-on-St. Croix. K. Michael Merrill of the University of Minnesota will present the 30" telescope at that observatory. The meeting is at 8 p.m. There will be club members at the Science Museum of Minnesota until 7:20 p.m. to guide members to the observatory site, which is half a mile back on County Road 7, just inside the Marine-on-St. Croix city limits. (If you hit dirt road, you have gone too far.)

The next star party will be Friday, Oct. 6. The alternate night is Saturday, Oct. 7.

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