

Venus at inferior conjunction 2002, October 31

The planet Venus when she appears in our evening or morning skies can hardly be missed. At her brightest she is almost sixty times as bright as Vega (see previous notes) and may be seen in full daylight with the unaided eye. Unlike Mercury, Venus may be observed against a dark sky but she can never appear due south at midnight as do the so-called superior planets, Mars, Jupiter and Saturn. This is because her orbit lies inside the orbit of the Earth (see fig. 1).

Both Mercury and Venus when seen in the telescope show phases. Apart from this the two planets are very different. Physically, Venus has a dense atmosphere and is almost identical in size to the Earth; Mercury has no appreciable atmosphere and is approximately half as large again as our Moon.

The differences in physical and orbital characteristics between the two planets influences how we perceive them in the sky. Venus when in the crescent phase may not differ significantly to the unaided eye from her perceived brightness at full. Mercury, on the other hand, is brightest at full phase and very much fainter as a crescent. (Greater detail will be given next year when featuring the transit of the Sun's disc by Mercury on May 7.)

Venus at superior conjunction, when its phase is close to "full", has a diameter of a little under 10 arc seconds. At its closest to Earth (inferior conjunction) Mercury has an apparent diameter of 13 arc seconds, whereas at full it is only 4.5 arc seconds. Thus it requires a telescope capable of powers in excess of x80 to follow the phases of Mercury whereas Venus may be followed comfortably with small telescopes using powers of x30 or so. Moreover, at phases less than 50%, Mercury, because of its decreasing brightness and nearness to the Sun in the sky, becomes increasingly difficult to observe with the telescope.

On October 31 at 12 hrs (close to noon, coincidentally) Venus will pass 6° below the Sun at what is called inferior conjunction. The planet will be a mere 41 million kilometers from Earth meaning the very slender (0.5%) crescent will measure 62 arc minutes across the cusps. This is about 1/30th the apparent diameter of the Moon. In other words, a telescope operating with a power of x30 will show Venus the size that the Moon appears to the unaided eye. As indicated in a previous article, it is quite possible to observe both Venus and Mercury (though only at superior conjunction in the case of Mercury) close to the Sun provided strict precautions are taken to avoid viewing the Sun itself through the telescope. One should also avoid looking directly at the Sun with the eyes. Using a device similar to that illustrated in the first article in this series, it will be possible to observe Venus at around noon when it will have an elevation of about 11.5°. Indeed, it should be possible to see the crescent in a pair of binoculars with power x8 but this cannot be advised for fear of getting the Sun in the same field. In any case, only observers with suitable equipment and experience of observing close to the Sun should attempt the observation.

Having passed this conjunction, Venus moves rapidly westward gaining in brightness and may be seen to rise in the early morning well before the Sun by mid-month. From late November through December the planet will be a conspicuous object in the early morning skies rising in the south east nearly three hours before sunrise. Make the most of this for come February of next year the planet will to all intents and purposes disappear from our skies until its re-appearance in the evening during mid-November 2003.

When at conjunctions Venus passes significantly above the Sun it is possible to observe the planet with the eye in both the morning and evening sky. This happened on March 30 last year when Venus was some 8° above the Sun; a similar conjunction will take place on 2009, March 27.

In 2004, June 08, an even rarer event will take place when Venus appears to pass across the face of the Sun. A **transit of Venus**, as it is called, was once of great practical observational importance for determining the solar parallax.

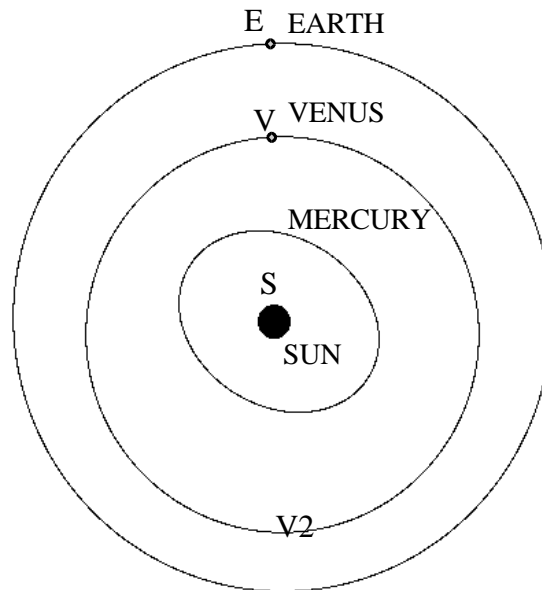
Next feature: **The Leonid Meteors.**

Table I

The apparent diameter of Venus at some forthcoming inferior conjunctions.

date	diameter
31 Oct 2002	61.57''
08 June 2004	57.74''
13 Jan 2006	62.59''
18 Aug 2007	57.88''
27 Mar 2009	59.25''
30 Oct 2010	61.44''
06 June 2012	57.78''

Fig. 1 The orbits of Mercury, Venus and Earth (not to scale).



When Venus is at point V and the Earth is at E, Venus is said to be at **inferior conjunction**. With Venus at V2 and the Earth at E, the planet is said to be at **superior conjunction**.