

## ASTRONOMY

# Venus Becoming Prominent

A total eclipse of the moon, the prominence of Venus as well as Jupiter and the beginning of winter are important events on the celestial timetable for December.

By JAMES STOKLEY

► VENUS WILL JOIN Jupiter as a prominent planet in the evening sky. Winter will begin in the Northern Hemisphere on Dec. 22, as the sun reaches its farthest south position. And in the early morning hours of Dec. 30 there will be a total eclipse of the moon, visible generally over North America.

These are some of the principal events on the astronomical calendar for December. And the skies, of course, will begin to show their brilliant winter appearance.

On the accompanying maps you can see how the skies will look during December—about 10:00 p.m., your own kind of standard time on the first, 9:00 p.m. on the 15th and 8:00 p.m. on the 31st.

Only one planet appears on the maps although it happens all five that are visible to the naked eye will be in the sky at the same time this month. Unfortunately, two of them are so close to the sun that you will probably not be able to locate them.

## Jupiter Brightest Object

Brighter than any other planet—or any star—is Jupiter, shown high in the southwest in the constellation of Pisces, the fishes. Below this figure and farther right is Aquarius, the water-carrier. Below Aquarius is Capricornus, the sea-goat, which is below the horizon at the times for which the maps are drawn. An hour or more earlier, however, it is still visible, and in it you will see Saturn, considerably fainter than Jupiter.

Since the end of August, Venus has been an "evening star." That is, it has set after the sun—but so soon afterwards that you probably have not seen it. But in December it begins to come into view in the southwest soon after darkness falls.

On Dec. 1 Venus sets about an hour and a half after the sun. Night after night it draws farther east of the sun: by the 31st it sets some two and a half hours after sunset, so then it will be easily visible. In astronomical magnitude Venus is three times as bright as Jupiter, but it looks fainter because it is so low in the sky that much of its light is absorbed by the atmosphere.

Mars is also low in the west after sunset, but is now very faint, because of its distance. This, and the fact that it sets so early, even before Venus, makes it very hard to locate. The same thing is true of Mercury, which reaches its position farthest east of the sun on Dec. 18.

The most conspicuous stars of December shine toward the east and southeast. You can easily find Orion, because of the row of three stars that form his belt; with one

bright star, Betelgeuse above, and another, Rigel, below. Above Orion stands Taurus, the bull, with the brilliant red star Aldebaran. Below Orion is Canis Major, the great dog, with the brightest of all the stars of night—Sirius.

To the left and a little higher is Procyon, in Canis Minor, the lesser dog. Above this stand the twins, Gemini. In this group are two prominent stars, Castor and Pollux; the latter of the first magnitude. Still higher is Capella, in Auriga, the charioteer.

December's lunar eclipse, third of the year, will occur just before the sun rises on Dec. 30. Along the East Coast, in fact, the moon will set before the total eclipse is over. If you live in more westerly parts of the nation, you will be able to see it all.

An eclipse of the sun occurs when the moon comes between sun and earth. The lunar shadow tapers to a point. Even at best, when it falls on earth, the shadow is not more than a hundred miles or so in diameter. This happened last July 20, when the shadow passed over Alaska, Canada and Maine. There the total eclipse was visible; over a larger region including all of North America, the moon partially eclipsed the sun.

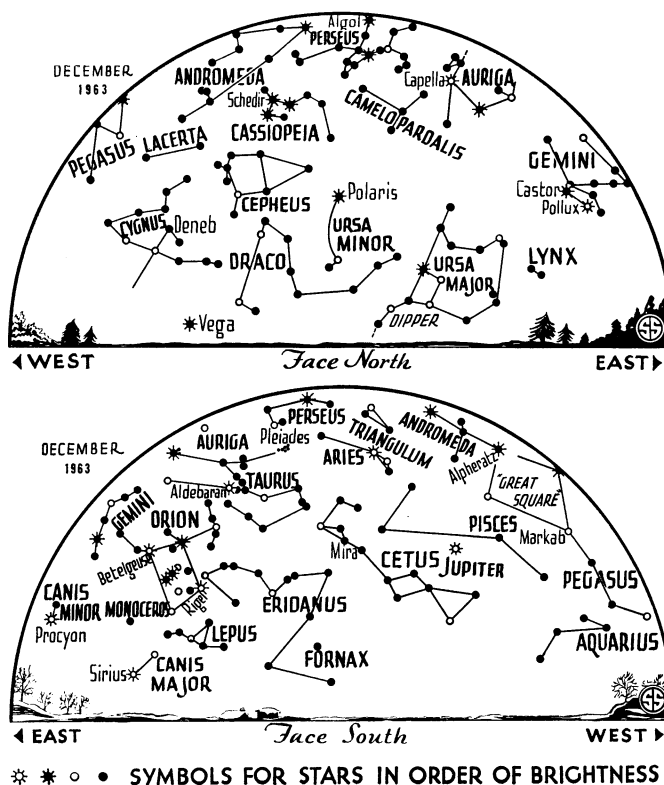
This month the earth comes between sun and moon. Because earth is so much bigger than the moon, its shadow is much bigger and extends farther out into space. Result: the moon may be completely engulfed in the terrestrial shadow, something quite impossible for the earth in the moon's shadow.

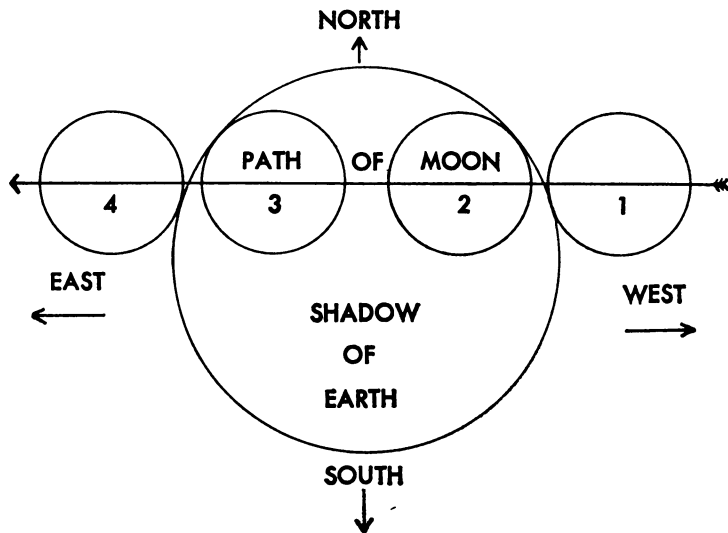
With a total solar eclipse, you must go to the path of totality, traced out by the tip of the lunar shadow, to see the sun completely hidden. But a lunar eclipse is different. Wherever the moon is visible at all, people can see the eclipse. This region covers more than half the earth for the eclipse lasts more than an hour. As the earth turns, people in the eastern part of its visible area (like those along the East Coast on Dec. 30) can see only the beginning. But to the west, the turning of the earth brings into the area others who missed the start but can see the end.

## Lunar Eclipse

The diagram on p. 331 shows the phases of the lunar eclipse on Dec. 30. The large circle represents the shadow of the earth at the moon's distance. Moving from west to east in the earth's shadow, the moon follows the path set by the long arrow.

Circle No. 1 represents the moon as it first makes contact with our shadow. This happens at 4:25 a.m., EST (3:25 CST, 2:25 MST, 1:25 PST). After this the edge of the terrestrial shadow will be visible, creeping across the face of the full moon. The beginning of the total eclipse (2) comes at





5:28 EST (4:28 CST, 3:28 MST, 2:28 PST) and ends (3) at 6:47 EST (5:47 CST, 4:47 MST, 3:47 PST). Again there is a partial eclipse as the edge of the shadow again moves across the moon. At 7:50 EST (6:50 CST, 5:50 MST, 4:50 PST) the moon has emerged from the shadow (4) and again is shining brightly as a full moon.

A total eclipse of the moon cannot occur except at the full phase. Then the moon is opposite the sun, and only then can it enter the earth's shadow. But every full moon does not bring an eclipse. Usually the moon goes above or below the shadow of earth.

Even though the moon enters the earth's shadow, it does not vanish. During the total eclipse it has a dull, coppery-red color. The earth's atmosphere acts as a prism, and bends some rays of sunlight into the shadow. As they pass through the atmosphere some of their blue light is scattered, giving us the familiar blue color of the daytime sky.

With blue removed, the light that is bent around into the shadow, and falls on the eclipsed moon, is redder than it was before. This gives the eclipsed moon its characteristic color.

**Celestial Time Table for December**

DEC.	EST	
6	10:00 p.m.	Mercury passes Venus
7	4:34 p.m.	Moon in last quarter
12	12:59 a.m.	Algol (variable star in Perseus) at minimum brightness
13	4:00 a.m.	Moon farthest, distance 252,500 miles
14	9:48 p.m.	Algol at minimum
15	9:07 p.m.	New moon
17	6:38 p.m.	Algol at minimum
18	7:00 a.m.	Mercury farthest east of sun
	9:00 a.m.	Moon passes Venus
20	9:00 a.m.	Moon passes Saturn
22	9:02 a.m.	Sun farthest south, winter begins in Northern Hemisphere, summer in Southern Hemisphere
23	2:55 p.m.	Moon in first quarter
28	7:00 p.m.	Moon nearest, distance 223,800 miles
30	6:04 a.m.	Full moon, total eclipse of moon

Subtract one hour for CST, two hours for MST, and three hours for PST.

• Science News Letter, 84:330 Nov. 23, 1963

**ASTRONOMY**

**Radar Shows Mercury Has Rugged Surface**

► THE EXPRESSION "smooth as mercury" means rather rough, if you are referring to the planet Mercury.

The surface of that hottest of planets is much more rugged than that of Mars and twice as rugged as that of Venus, analysis of an intricate series of radar experiments indicates.

The findings also confirm that Mercury's rotation period is 88 days and corroborates the belief that Venus undergoes a slow backward rotation.

The experiments were conducted with an 85-foot parabolic antenna at the Jet Propulsion Laboratory's Goldstone tracking station in the Mojave desert of California.

Dr. Richard M. Goldstein and Roland L. Carpenter of the Jet Propulsion Laboratory in Pasadena, reported the findings in Science, 142:381, 1963.

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**ENTOMOLOGY**

**Fruit Fly Destroyed On Pacific Island**

► A NEW TECHNIQUE of using an irresistible chemical, mixed with poison, has wiped out all male fruit flies on the isolated island of Rota, 37 miles north of Guam.

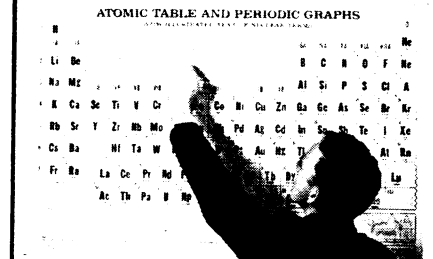
The synthesized chemical, methyl eugenol, attracts the male oriental fruit fly, which eats it avidly. The chemical was mixed with the insecticide naled, which kills the flies after they ingest only a tiny amount.

The pilot test was carried out by the U.S. Department of Agriculture, in cooperation with the U.S. Navy and the Trust Territory of the Pacific Islands.

Since the tests were conducted, no males have been trapped and no infestation has been found in preferred hosts such as mangoes and breadfruit for the past five months, announced the USDA.

• Science News Letter, 84:331 Nov. 23, 1963

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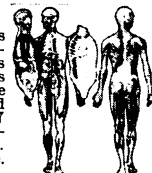


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