



Venus becomes prominent

by James Stokley

With the arrival of November, Venus is becoming prominent in the south-west after sunset.

On Friday evening, Nov. 22, the crescent moon, two and a half days after new, will pass south of Venus. When closest, about 9:00 p.m., EST (8:00, CST; 7:00 MST & 6:00 PST), the moon will be about three degrees, or six times its own diameter, away from the planet.

At the end of November, Venus sets more than three hours after the sun but this is earlier than the times for which the maps above are prepared. They show the skies as they look about 10:00 p.m., local standard time, at the first of November. They appear similarly an hour earlier at midmonth—and two hours earlier on the 30th.

The planet shown high in the south in the constellation of Pisces is Saturn, about a fortieth as bright as Venus al-

though it equals a first magnitude star.

Eight stars of this magnitude appear on the maps, but several are so low that absorption by the earth's atmosphere dims them.

Brightest is Vega, toward the northwest in Lyra. Above it is the Northern Cross, part of Cygnus. Deneb is at the top of the cross. And low in the west, to the left of Lyra, stand Aquila and Altair.

In the northeast is Capella, in the charioteer Auriga. To the right of that group is Taurus, with the reddish star called Aldebaran. Orion is lower, with Rigel and Betelgeuse, two of the stars somewhat dimmed because they are low in the sky. Similarly dimmed is Fomalhaut in the southern fish, Piscis Austrinus, low in the southwest.

A group of stars that are prominent even though not of the first magnitude form the 'Great Square' in Pegasus.

Alpheratz, the star in the upper left-hand corner, is in Andromeda, named for the mythological princess who was chained to a rock.

Nearby to the north are her father and mother: Cepheus, to the right and Cassiopeia, with five stars forming a letter M, just below Andromeda.

CELESTIAL TIMETABLE FOR NOVEMBER

November	EST	
3	7:00 a.m.	Moon passes north of Saturn
4	11:25 p.m.	Full moon
6	3:00 a.m.	Mars passes north of Jupiter
7	2:10 a.m.	Algol (variable star in Perseus) at minimum brightness
8	4:00 a.m.	Moon farthest, distance 252,300 miles
9	11:00 p.m.	Algol at minimum
12	7:50 p.m.	Algol at minimum
13	3:54 a.m.	Moon in last quarter
16	early a.m.	Meteors of Leonid shower appear
	4:00 a.m.	Moon passes south of Jupiter
	noon	Moon passes south of Mars
20	3:02 a.m.	New moon
22	9:00 p.m.	Moon passes south of Venus
26	6:31 p.m.	Moon in first quarter
30	12:50 a.m.	Algol at minimum
	9:00 a.m.	Moon passes north of Saturn



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Still lower is the Little Dipper, part of Ursa Minor. Below that is Ursa Major. The Big Dipper, part of this constellation, is so low on November evenings that it's poorly seen.

The three other planets which may be visible to the naked eye also appear during the night. Mercury, farthest west of the sun Oct. 31, will be low in the southwest just before sunrise in the first week of November. Mars rises in the east about four hours ahead of the sun. It's moving from Leo into Virgo, and is now rather faint of the second magnitude.

The very bright object in the east about 5:00 a.m. is Jupiter, which passes to the south of Mars on Nov. 6. It's about 20 times as bright as Mars.

November, about the 16th, brings one of the most famous showers of meteors, or shooting stars, the Leonids. While there is no chance of a spectacular display, like that seen in 1966 from the southwestern U.S., there'll probably be many more meteors than on ordinary nights.

A meteor is not a star. Typically, we believe, it's a rather fragile flake of stony or dust-like grains a small fraction of an inch in diameter. It moves in its own orbit around the sun until it happens to encounter the earth (or another planet). Entering our atmosphere, at several miles per second, it encounters air molecules. Atoms are knocked from its surface. These collide with each other—and with the air atoms—and the gases are made to glow. The moving globe of glowing atoms, many feet in diameter is what we see as the shooting star.

At night it becomes visible at a height of 60 to 70 miles. A dozen or so miles lower it's completely burned out. Very rarely a larger meteor, inches or even feet in diameter, may survive the aerial passage and land on the ground.

There has, in the past, been some confusion as to terms. The official terminology is that of the International Astronomical Union, adopted in 1961. The particle that moves through interplanetary space is a meteoroid. The glowing globe of gas that becomes visible is the meteor, and the object that lands on earth is a meteorite.

Many meteoroids arrive during daylight and are not visible. However, the broken-up, or ionized, atoms that emit light also reflect radio waves. Many daytime meteors are now observed by radar.

In addition to stray meteoroids scattered around the solar system, others move in swarms or streams. Such streams generally follow the orbits of comets; apparently they are cometary debris. Some streams cross our orbit and there is a meteor shower.

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