ASTRONOMY

Venus, Saturn Now Seen

Although Venus is becoming brighter in the evening sky, it is still retiring early from view. September will have a kind of replacement for Venus—the "harvest moon."

By JAMES STOKLEY

➤ THE PLANET Venus is gradually brightening, and becoming more prominent in the evening sky. However, it still sets about an hour and a half after the sun. This is before twilight has completely ended, and the sky has become dark. If you look toward the southwest as dusk gathers, Venus will soon appear. Of magnitude minus 3.5 on the astronomical brightness scale, it exceeds any other star or planet. It is in the constellation of Virgo, the virgin, and close to the star called Spica, which is so much fainter that it will be considerably more difficult to locate.

The accompanying maps are drawn to show the appearance of the evening sky at about 10:00 p.m., your own kind of standard time—add one hour for daylight-saving time—at the first of the month, an hour earlier at the middle and two hours earlier as September gives way to October. Thus, Venus does not appear upon them.

They do, however, show the second planet of the September evening.

This is Saturn, which stands in the constellation of Ophiuchus, the serpent-bearer. During the early evening Saturn is in the southern sky, but it moves toward the southwestern horizon and goes down, at the beginning of the month, around 11:00 p.m. by your kind of standard time.

September's Brightest Star

Brightest star of the September evening is Vega, in Lyra, the lyre, high in the west. Directly overhead is Cygnus, the swan, in which Deneb may be seen. This group is also called the Northern Cross. Deneb marks the top of the cross, toward the northeast. Moving down from Cygnus, toward the southwest, one comes to Aquila, the eagle, of which Altair is the brightest star.

Three other stars which, like these, are of the first magnitude, are also shown on the maps. These are all so near the horizon that they appear considerably fainter than if they were high overhead.

This is a result of the absorption of their light by the greater thickness of the earth's atmosphere which must be penetrated. Low in the northwest is the figure of Bootes, the bear-driver, with Arcturus. Next, to the right, is the Great Dipper, which is part of Ursa Major, the great bear. The dipper's handle extends toward Bootes, and if you follow the curve of the handle, it brings you directly to Arcturus.

Farther right, low in the northeast, is Capella, in Auriga, the charioteer, which will become prominent in the winter evenings.

High in the southeast are four stars which form the "Great Square" in the constellation of Pegasus, the winged horse. Below this is Aquarius, the water-carrier, one of the constellations of the zodiac, the path of the sun, moon and planets. And below Aquarius we find Piscis Austrinus, the southern fish, with the first-magnitude Fomalhaut, also dimmed by its low altitude. For our latitudes, it never rises much higher than it is now; you have to travel southward to see it high in the sky.

Mercury Becomes Morning Star

As for the other planets, Mars and Jupiter are now both too nearly in line with the sun to be observed. Mercury, on Sept. 9, passes nearly between the earth and the sun, but by the 25th it will be farthest west of the sun. It will rise ahead of the sun, and for a few days around that date will be visible as a morning star, in the east just before sunrise.

On Sept. 23, at 2:27 a.m., EST, the sun will be directly over the equator, at the halfway point of the southward journey in the sky which it began last June. This is the autumnal equinox which marks the beginning of autumn in the Northern Hemisphere and of spring in the Southern.

On the night of Sept. 8 the moon is full. This is the "harvest moon" and we can see what it means if we consult a table that gives the times of moonrise, and see how much later this occurs on succeeding nights, at different times of year. On Sept. 9, we find, the moon will rise (at 40 degrees north latitude) only 28 minutes later than it did on the eighth.

Next March, on the other hand, the difference will be much greater.

The moon will be full on the fifth and the difference in time of moonrise, between that night and the next, will be 74 minutes. Thus, in September and October, when the moon is full and bright, it rises about the same time for several evenings.

Harvest Moon for Farmers

As John Ferguson wrote in a book on astronomy published in 1757, explaining why this is called the harvest moon:

"The farmers gratefully ascribe the early rising of the full moon at that time of year to the goodness of God, not doubting that He had ordered it so on purpose to give them an immediate supply of moonlight after sunset, for their greater conveniency in reaping the fruits of the earth."

The reason for the differences in the delay of moonrise from one night to the next is found in the changing angle made at various times of the year by the ecliptic, the path which the moon closely follows.

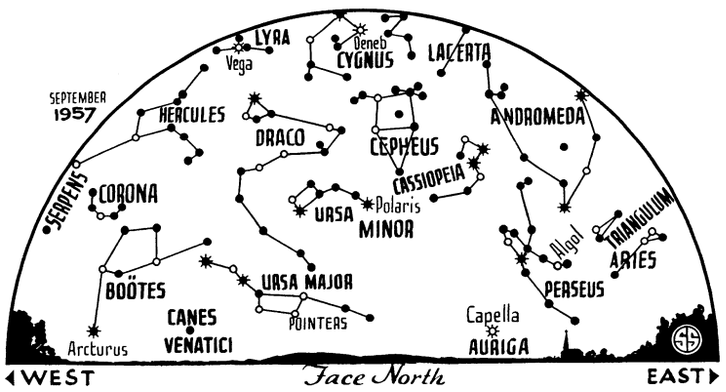
It makes a trip around the ecliptic about once a month; each night it is about a twenty-ninth of its circumference farther east. Thus, being farther east, it rises later—about 52 minutes on the average.

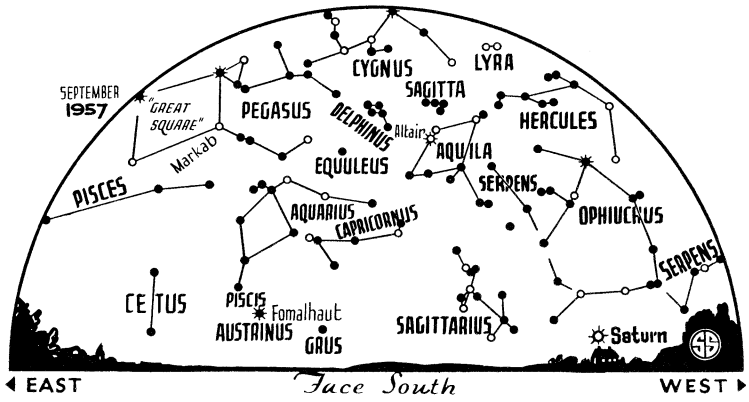
At this time of year the southernmost part of the ecliptic is in our evening sky—it passes through Sagittarius, the archer, and the line is not far from parallel to the horizon. Hence, the moon's daily eastward movement is utilized in moving it horizontally to a considerable degree. Just before moonrise it is not much farther below the horizon than it was the night before.

In March, on the other hand, the ecliptic is nearly vertical, and the same eastward movement of the moon takes that body considerably farther below the horizon, thus making the greatest changes at moonrise.

Hunter's Moon

In October, conditions will be quite similar to what they are in September. Again there will be relatively little delay in moonrise from one night to the next when it is full. This is again on the eighth, and it will rise only 30 minutes later on the ninth. This is called the "hunter's moon," since the hunter is supposed to benefit at that time.





☼ ✷ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Celestial Time Table for September

Sept.	EST	
8	12:00 noon	Moon farthest, distance 252,000 miles.
	11:55 p.m.	Full moon (Harvest Moon).
16	11:02 p.m.	Moon in last quarter.
21	10:00 a.m.	Sun and Mars in line with earth.
22	Midnight	Moon nearest, distance 222,300 miles.
23	2:27 a.m.	Sun over equator, autumn commences in Northern Hemisphere.
	2:18 p.m.	New moon.
25	2:00 p.m.	Mercury farthest west of sun; visible for a few days around this date low in east before sunrise.
26	1:12 p.m.	Moon passes Venus.
28	8:56 a.m.	Moon passes Saturn.
30	12:49 p.m.	Moon in first quarter.

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

Science News Letter, August 24, 1957

ASTRONOMY

Early Stars Were Brighter

A study of the atmospheres of the B stars leads astronomers to believe that billions of years ago the stars were much brighter than they now are.

➤ THE SKIES were adorned with much brighter stars billions of years ago than they are now and the rate of star creation then was much faster than now.

So conclude Drs. L. H. Aller and Jun Jugaku of the University of Michigan Observatory from a study of the atmospheres of the very young, hot and bright objects known as B stars. The astronomers reported results of their study, supported by the National Science Foundation, to the American Astronomical Society meeting in Urbana, Ill.

B stars are only a few million years old, very young on the astronomical time scale that dates the sun's formation as five billion years ago. They are believed formed from interstellar gas in the spiral arms of the Milky Way galaxy in which the earth and sun are found.

Since B stars consume their nuclear fuel, hydrogen, at a rate hundreds of times faster than does the sun, their lifetimes must be relatively short. By comparing the sun's composition with that of a young B star, Drs. Aller and Jugaku hoped to find the amount of element building occurring in the last four billion years.

According to the present ideas of stellar evolution, the heavier elements are produced in the dense, hot cores of massive stars, which subsequently spew these materials into interstellar space. The interstellar materiel is again collected into stars and the same process is repeated in the more massive objects.

The sun is thus, since it was formed so many millenia ago, believed to have a smaller fraction of heavier elements than has a star made only "recently" from interstellar gas.

Although the problem of comparing the sun's atmosphere with that of a young B star is very complex and not very accurate, Drs. Aller and Jugaku found that some elements, such as silicon and oxygen, do not seem to be substantially greater in the young stars than in the sun.

Therefore, they conclude, the rate of element building, and of star formation as well, must have proceeded at a much slower pace since the sun was formed than it did in the early stages of the Milky Way galaxy.

The interstellar gas from which stars are formed is being continuously renewed by an outward flow of gas from the galactic center, or nucleus, Dr. Sidney van den Bergh of Perkins Observatory, Delaware, Ohio, reported to the meeting. The present rate of gas lost from the nucleus about equals the rate at which gas is lost from the spiral arms by star formation, he has calculated.

Dr. van den Bergh based his conclusion on the recent findings that the Milky Way galaxy, as well as the Andromeda nebula, contain "surprisingly" small amounts of interstellar gas.

Science News Letter, August 24, 1957

ASTRONOMY

Minor Planet Named NORC for Giant "Brain"

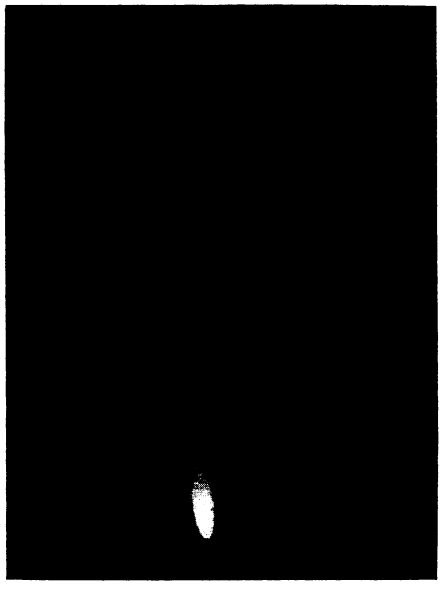
➤ ONE OF the hundreds of minor planets, or asteroids, circling the sun between the orbits of Mars and Jupiter, is now officially named NORC, in honor of the giant electronic "brain" used to calculate the orbits of these small, star-like bodies.

The asteroid NORC was discovered by Dr. S. Arend of the Royal Observatory, Uccle, Belgium, on Sept. 1, 1953. By international agreement, the discoverer names a new minor planet, but Dr. Arend has granted this right to Dr. Paul Herget, director of the Cincinnati Observatory in Cincinnati, Ohio.

NORC is short for the Naval Ordnance Research Calculator at Dahlgren, Va., one of the most powerful electronic computers in existence. It was developed at the Watson Scientific Computation Laboratory under the direction of Dr. W. J. Eckert.

Dr. Herget reports that the computer has already provided a "vast amount of computations" on minor planet orbits, with more expected in the future. Use of NORC for this time-consuming chore was made possible through the assistance and cooperation of the Naval Proving Grounds, the Office of Naval Research and the National Science Foundation.

Science News Letter, August 24, 1957



COMET MRKOS—This year's second naked-eye comet is shown here in a photograph taken on Aug. 12 at the University of Michigan's observatory at Portage Lake. Prof. Freeman D. Miller of the University took the photograph at a 15-minute exposure. Its tail is estimated at 2,000,000 miles long. Comet Mrkos was about 100,000,000 miles from the earth as seen here. Seen in the northeast, it is now receding from both the earth and the sun. (See SNL, Aug. 17, p. 103.)