ASTRONOMY

Jupiter Brightest Object

It is 5.75 times as bright as the brightest star now visible, Vega. This giant planet will shine in the southwest during September evenings.

By JAMES STOKLEY

➤ EXCEPT for the moon, the brightest object to be seen in the evening skies during September is the giant planet Jupiter. This great orb, with its diameter of nearly 89,000 miles, as compared with the earth's 7,918 miles, shines in the southwest, in the constellation of Ophiuchus, the serpent-bearer. This is shown on the accompanying maps, which give the aspect of the skies at 11 p. m. daylight saving time, at the beginning of September and an hour earlier on the 15th. On the astronomical scale of brightness, its magnitude is minus 1.8. This is 5.75 times the brilliance of the brightest star now visible—Vega, in Lyra, the lyre, a little west of the zenith. The magnitude of Vega is plus 0.1.

Second brightest star of the September evenings is Capella, in Auriga, the charioteer, which is appearing in the northeast, just above the horizon. Because it is so low it does not show its full brilliance. This is also true of the third brightest star, Arcturus, in Bootes, the bear driver, which is now descending behind the horizon in the northwest.

Altair High in South

In a much better position is the fourth brightest star, Altair, in Aquila, the eagle. This is high in the south. With Vega, and Deneb, in Cygnus, the swan, directly overhead at the time of the maps, it forms an easily located triangle which makes a good guide in studying the constellations.

A sixth first-magnitude star is visible, but like Capella and Arcturus, its brightness is dimmed by its lowness. It is Fomalhaut, in Piscis Austrinus, the southern fish, shown low in the south. This is a star which is now nearly as high as it ever gets for observers in the United States. For countries in the southern hemisphere, however, it rises high overhead.

Although Jupiter is the only planet shown in the maps, some more are visible at other times during the night. Mercury will be farthest east of the sun on Sept. 25. Only about six degrees above the western horizon at sunset, it will be very difficult to locate. Mars, far away and quite faint, is in the constellation of Libra, the scales, and sets about an hour after the sun.

Venus is now a brilliant morning star, of magnitude minus 3.8, which makes it nearly 16 times as bright as Jupiter. In the constellation of Cancer, the crab, it rises several hours before the sun, and is some 40 degrees high at sunrise. Saturn, in Leo, the lion, is close to the bright star Regulus, seen low in the east just before sunrise.

When the moon comes in front of the sun, we call it an eclipse, but it also may "eclipse" a star or planet. Then the phenomenon is termed an "occultation." While occultations of stars are common, it is much more rarely that a planet is occulted, but such an event happens in September. Unfortunately the planet Mars is not very bright, and is low in the sky at the time. However, with clear weather, and possibly with some optical aid such as binoculars, it should be possible to observe it, particularly for people in the eastern part of the country. Farther west the occultation occurs during the afternoon.

The moon at the time is about 3.5 days past new, so it will appear as a crescent. Moving through the sky from west to east, the dark edge will hide the planet. When the moon is thus nearly new, it shows the effect of "earth-shine," commonly called "the old moon in the new moon's arms." The whole moon can be seen faintly, its outline continuing the arc made by the crescent. The reason is that while the crescent consists of part of the lunar hemisphere on which the sun shines brightly, sunlight reflected from the earth shines on a section of the dark side, thus illuminating it for us. "Immersion" is the name given to the disappearance of the planet, while "emersion" is its reappearance, from the bright edge, the one toward the direction of the sun.

In the following table are given the times of immersion and emersion of Mars on Sept. 6, for Washington and four other locations in various parts of the United States, as computed at the U. S. Naval Observatory. These are: 1. western Massachusetts, about 15 miles north northeast of Northampton; 2. western Illinois, about 25 miles east of Quincy; 3. Texas, about 25 miles southwest of Austin; 4. southern California, about 30 miles south of Fresno.

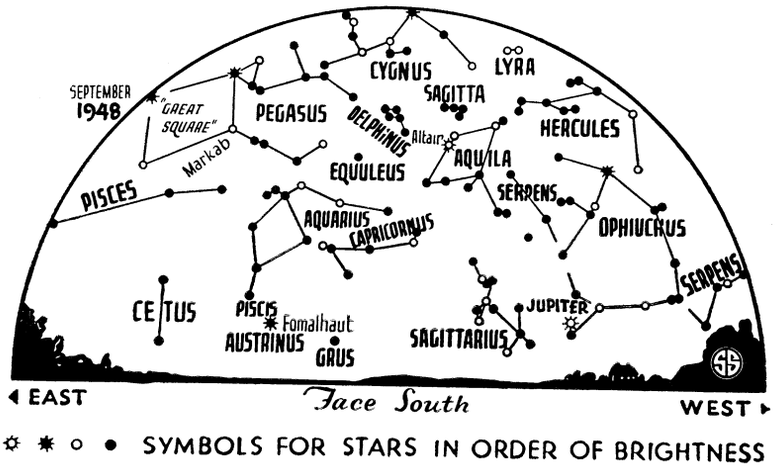
Location	*Kind of time*	*Immersion*	*Emersion*
Washington	EDST	6:07 p.m.	6:57 p.m.
1.	EDST	6:17 p.m.	6:49 p.m.
2.	CDST	4:31 p.m.	5:42 p.m.
3.	CDST	4:24 p.m.	5:51 p.m.
4.	PDST	1:52 p.m.	2:59 p.m.

Even if you cannot see the actual occultation in either of its phases, look for the moon on the evening of Sept. 6 as soon as it gets dark, and you should have little difficulty seeing the planet close to it.

"Harvest Moon"

The full moon which occurs on Sept. 18 at 5:43 p.m., EDST, is known as the "harvest moon." The peculiar thing about it is the slight difference between moonrise on successive nights. Thus, at 40 degrees north latitude and on the central meridian of the time belt (i. e. 75th meridian for Eastern time, 90th for Central, 105th for Mountain and 120th for Pacific), the moon rises on the 17th at 6:03, standard time; on the 18th at 6:24 and the 19th at 6:44, only about 20 minutes difference daily. In contrast, six months ago, for the same locations, the nightly delay at the time of full moon was an hour and a quarter. Since the September full moon comes up at nearly the same time for several nights in a row, it supposedly gives the farmers light to do their harvesting in the evening; hence the name.

Reason for the harvest moon is found in the angle made with the horizon by the ecliptic—the path along which the sun, moon and planets seem to move, which is really the projection in the sky of the plane of the orbit of the earth. Each day, at all times of year, the moon advances about the



same distance — about 12 degrees — along this line. In March it happens that when the full moon is rising the ecliptic makes a very steep angle. Thus, the moon's daily motion takes it well below the horizon from one day to the next and thus causes the maximum difference in moonrise.

In September, on the contrary, the ecliptic makes a low angle with the horizon, and the moon's daily motion does not take it much farther below. It does shift it toward the south, and causes a considerable difference in the point of the horizon where the moon rises, but there is a minimum delay in the time of rising. In October, conditions are nearly the same, and again there is little daily difference. This is called the hunter's moon.

Time Table for September

Sept.	EDST	
2	9:04 a. m.	Moon passes Saturn
	12:00 p. m.	Venus farthest west of sun
3	2:00 a. m.	Moon nearest, distance 222,000 miles
	7:21 a. m.	New moon
6	5:51 p. m.	Moon passes Mars and occults it
10	3:05 a. m.	Moon in first quarter
	8:34 a. m.	Moon passes Jupiter
16	7:00 a. m.	Moon farthest, distance 252,400 miles
18	5:53 a. m.	Full moon
22	11:22 p. m.	Sun crosses equator, autumn commences in northern hemisphere
25	6:00 a. m.	Mercury farthest east of sun
	EST	
26	12:07 a. m.	Moon in last quarter
29	8:04 a. m.	Moon passes Mercury
	11:35 p. m.	Moon passes Saturn

Subtract one hour for CT, two hours for MT, and three for PT.

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ELECTRONICS

Machine Plays Chess

➤ A MACHINE now can solve business problems, write your letters or play you—and beat you—in games of gin rummy or chess.

The "thinking machine" costs approximately $175,000, not counting what you will lose if you play gin rummy against it.

UNIVAC, the universal automatic computer, was described at a symposium on modern calculating machinery held at the University of California at Los Angeles by Dr. John W. Mauchly, who together with J. P. Eckert of the Eckert-Mauchly Computer Corporation, Philadelphia, designed the machine.

Feed the machine a form letter along with instructions on how to write it and personalized letters, no two alike, will roll out of UNIVAC in an endless paper parade.

It plays chess and gin rummy so perfectly that no human opponent has a chance against it.

In a more serious mood it can work on statistical analysis, business problems, classification of weather observations and complex aeronautical problems. It can solve tricky problems of traffic control over airports.

In speed, flexibility and versatility it surpasses earlier calculating machines, declared the scientists.

The earlier ENIAC was pretty smart but the UNIVAC is even smarter. The ENIAC, which was also designed by Dr. Mauchly and Mr. Eckert, could store in its internal memory 20 numbers of 10 digits each and could multiply these numbers 300 times a second. UNIVAC can store 1,000 numbers of 12 digits each in its vastly improved memory and can multiply them 500 times a second.

It is the first machine which can take instructions along with the numbers fed to it and can even change its own instructions. Coded instructions are fed into the machine on slim reels of magnetized tape.

This "thinking machine" is smaller than any of its predecessors. It measures only three by eight by six feet while ENIAC has 40-foot panels eight feet high. This new compactness is made possible by more efficient design which requires only 1,500 vacuum tubes as against nearly 20,000 for ENIAC.

UNIVAC is scheduled for delivery within the next 18 months.

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