

ASTRONOMY

Saturn "Eclipsed" by Moon

The stars, Vega, Deneb and Altair form a bright triangle overhead and the three planets, Venus, Jupiter and Saturn add splendor to the September sky, James Stokley reports.

▶ ALTHOUGH SEPTEMBER evening skies are not notable for their brilliant display of stars, the month this year brings three bright planets to give an unusual splendor.

Two of these, as well as the stars, are shown on the accompanying maps. The maps depict the heavens as they appear about 10 p.m., your own kind of standard time, at the first of September (add an hour for daylight saving time); about 9:00 p.m. at the middle of the month and 8:00 p.m. at the close.

Venus Brightest of Trio

Brightest of our planetary trio is Venus, which is visible low in the west soon after sundown—and long before any other star or planet appears. However, Venus sets a little after eight at the first of September and an hour earlier at the end of the month so it has disappeared by the times for which the maps are drawn.

On the astronomer's magnitude scale Venus now ranks at minus 4.1, which is about 100 times the brilliance of an average bright star of the first magnitude.

The other two planets appear on the map of the southern sky. The brighter is Jupiter, toward the southeast, in the constellation of Aquarius, the water carrier. Its magnitude is minus 2.4, about a fifth as bright as Venus, but still exceeding any other planet, or star.

And toward the south, in Capricornus, the sea goat, is Saturn. Although this is the faintest of the three planets, it still outshines a typical first magnitude star. On Sept. 10 Saturn takes part in a rare phenomenon, when the moon passes in front of it. This happens around ten o'clock in the evening in the eastern part of the country, but in the far west it occurs before sunset, and will hardly be visible.

These planets, of course, are bodies like the earth; visible because of the sunlight they reflect. The other objects are stars—each a distant sun, shining with its own light because it is so hot. And of these, the brightest is Vega, in Lyra, the lyre. It is high in the west, shown on the northern sky map.

Directly overhead you can see Cygnus, the swan, with the star called Deneb. Part of this constellation is now in the northern half of the sky, part in the southern. Below it, toward the southwest, stands Aquila, the eagle, with first magnitude Altair. These three stars—Vega, Deneb and Altair—form a large and conspicuous triangle in the sky, which helps to identify them.

Three other stars which are about as

bright as these also appear on our maps, but all are near the horizon and therefore much fainter.

When a star is low in the sky, its light has to pass through a much greater thickness of air than when it is overhead. Hence much of its light is absorbed and it may appear several times fainter than it would if higher.

This is particularly true of Arcturus, in Bootes, the herdsman, which is close to the northwestern horizon. Similarly for Capella, in Auriga, the charioteer, low in the northeast. This star will be seen better in the evenings of the next few months, while Arcturus is disappearing until next spring.

And over in the south, in Piscis Austrinus, the southern fish, you see Fomalhaut. This constellation is located in a far southerly position in the sky, so we never see it much higher than it is at present.

About midnight, Mars rises in the east, in the constellation of Gemini, the twins; then it remains visible the rest of the night. It is as bright as a first magnitude star, and its red color will help you to identify it.

Mercury, innermost of the planets, will be a little above the western horizon just after sunset around Sept. 10. However, it

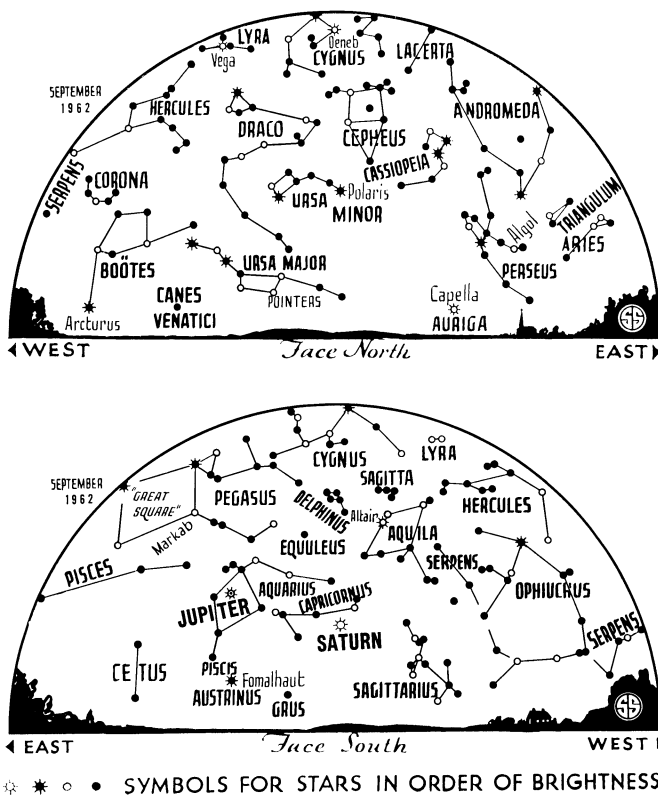
will set before the sky is dark enough for it to be seen.

When the moon passes in front of the sun, we call it a solar eclipse. But the moon may also pass in front of a star or a planet. That is called an occultation. These events are not uncommon; there are plenty of stars along the moon's path in the sky, so every night a few are thus occulted. Generally the stars are faint—not even bright enough to be seen without the help of a telescope. An occultation of a very bright star is much more unusual, and so is an occultation of a planet.

However, the moon occults Saturn on the evening of Sept. 10, and it will be visible all over the United States and Canada. At least the moon will be up when it happens, but in the states and provinces along the West Coast the sun will not yet have set. This will make it impossible to observe without a telescope.

During September the moon moves around the sky from west to east. It takes 27 days 7 hours 43 minutes for a complete trip; this period is called the sidereal month. It takes a little less than an hour—about 55 minutes on the average—for the moon to advance its own diameter.

Thus, if the moon's diameter passes directly in front of the star, the occultation will last about an hour. It will be less if only the edge of the moon occults the star or planet. Since the planets also are moving in the sky, a planetary occultation may last a little longer, or shorter time, depending



on whether the planet is moving eastward or westward. Saturn, however, is now virtually stationary.

The time and duration of the occultation of Saturn varies in different parts of the country, but the following table gives the times for several regions. In nearby places they would not be very different. As the moon will be only three days from full, it will be quite bright, so it will be rather hard to see the planet so close to it. If you use binoculars or even opera glasses, you can see it much more easily. Immersion, when the moon hides the planet, occurs at the dark edge, while the reappearance, or emersion, is from behind the bright edge.

(All times are p.m.)	Immersion	Emersion
Massachusetts	9:56 EST	10:48 EST
Washington, D. C.	9:50 EST	10:39 EST
Toronto	9:40 EST	10:42 EST
Alabama-Georgia	9:38 EST	10:19 EST
Illinois	8:17 CST	9:23 CST
Texas	8:08 CST	8:54 CST
Denver	6:53 MST	7:59 MST
Oregon	5:37 PST	6:36 PST

Celestial Time Table for September

September EST		
1 2:00 p.m.	Moon farthest, distance 252,500 miles	
2 9:00 p.m.	Moon passes Venus	
3 2:00 p.m.	Venus farthest east of sun	
7 1:45 a.m.	Moon in first quarter	
10 6:00 p.m.	Mercury farthest east of sun	
10:00 p.m.	Moon passes in front of Saturn	
12 11:00 p.m.	Moon passes Jupiter	
13 11:12 p.m.	Full moon. Harvest moon	
14 11:00 a.m.	Moon nearest, distance 222,000 miles	
20 2:36 p.m.	Moon in last quarter	
22 8:00 a.m.	Moon passes Mars	
23 7:35 a.m.	Sun directly over equator; autumn commences in Northern Hemisphere, spring in Southern Hemisphere	
28 2:40 p.m.	New moon	
8:00 p.m.	Moon farthest, distance 252,700 miles	

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

• Science News Letter, 82:122 August 25, 1962

Questions

ASTRONOMY—In what direction does the moon move around the sky during September? p. 122.

ASTROPHYSICS—What probably causes the dark and light bands seen around Saturn? p. 117.

ENTOMOLOGY—What new method is used to control of the khapra beetle? p. 119.

GERONTOLOGY—What proportion of men and women over 65 have health problems? p. 120.

MEDICINE—Which monkeys succumb to diseases soonest? p. 114.

SPACE—How many scientific experiments will Mariner II carry? p. 115.

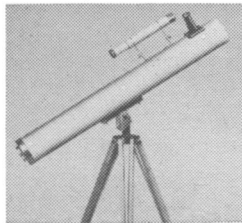
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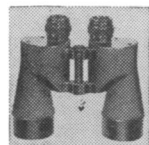
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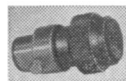
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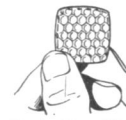
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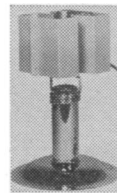
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