ASTRONOMY

# Lunar Eclipse

## Not Total, But Interesting, Is Sight Scheduled For November 17, Leonid Meteors Due on the Fifteenth

By JAMES STOKLEY

FOR the first time since July, 1935, an eclipse of the moon, visible over the entire United States and Canada, is on our program for the month of November. It is not a total eclipse, but is enough to make the moon look very different from its usual appearance when full. The night of November 17 is the date.

Any eclipse is caused by one body getting between a bright object and something else. The eclipse of the sun last June occurred when the moon passed between the earth and sun. This month the earth passes between the sun and the moon. The latter then partly enters the earth's shadow, and the sunlight, which alone makes the moon visible, is partially cut off. This is the time of full moon, for a lunar eclipse can only occur then. Whenever the moon is full, it is nearly in line with the earth and sun, but not quite, it is either above or below the shadow. But then the entire lunar hemisphere on which the sun is shining is turned to our view, and we see the moon as a complete circle.

Because the sun is so much bigger than the earth, with a diameter of 864,000 miles as compared with 8,000 miles, the earth's shadow is conical, tapering off to a point about 859,000 miles away. This is well past the moon's distance of about 240,000 miles. This shadow is the so-called "umbra"—the region where the earth completely hides the sun. But around it is a larger region, the "penumbra," where the sun is only partially covered.

### Just After One

At 1:09 a. m., eastern standard time, on November 18, the moon enters the penumbra, at first producing no noticeable change in its appearance. But as it moves nearer the umbra, and the light from less than half the sun's disc is shining upon it, it will assume a darker color. At 2:37 a. m., E. S. T., the moon first makes contact with the inner shadow. Imagine the moon to be a clock dial, with 12 toward the Pole Star—the point of the contact is at approximately seven. At 3:19 a. m. the moon has gone as far into the shadow as it will go, about 15 per cent of its diameter being covered.

The earth's shadow, thus projected on the southern part of the moon's disc, will be seen as an arc of a circle. It is always thus, excellent proof that the earth is a sphere, for nothing else could invariably cast a round shadow. Also, the shadow is not black, but a coppery red. This is because the earth's atmosphere acts as a prism to bend some sunlight into the shadow, shining on the moon even during a total eclipse. As the light passes through the atmosphere, some of its blue rays are scattered, and the remaining light is reddish. This reaches the eclipsed moon.

Then come the final phases of the eclipse. At 4 a. m. the moon is completely out of the umbra, at 5:29 a. m. it is out of the penumbra, and the eclipse is over.

### Famed Leonids

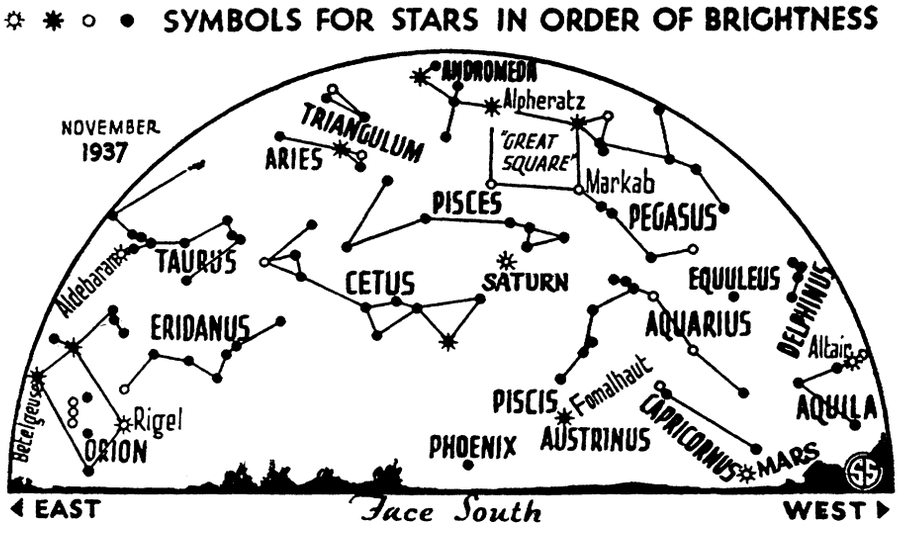
Besides the eclipse, November brings us one of the year's best showers of meteors, or "shooting stars," though its splendor will be rather lessened by the fact that it comes just a few days before the full moon, and the glare during most of the night will permit only the brighter ones to be seen. These come in greatest numbers on the night of November 15, for then the earth crosses the great elliptical swarm in which the meteors, small things about as big as grains of sand, are moving around the sun. As they enter the atmosphere, the friction heats them, and they vanish in the flash of light that we see.

### Illusion

Because their paths are parallel, they seem to converge in the distance, in the direction from which they came. This happens to be towards the constellation of Leo, the lion, which rises about midnight, and they are called the Leonid meteors. Meteors are always seen in greater numbers after midnight than before, since then we are on the advancing side of the earth, and meet them head on. Were it not for the moon, one might see as many as one meteor a minute in the early morning hours of the 16th.

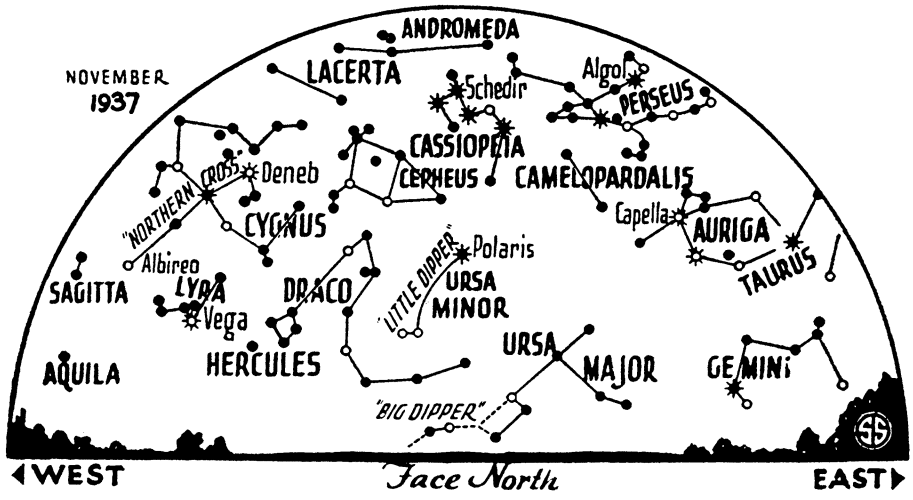
If you remain up during the month until nearly sunrise, either to see the eclipse or the meteors, you will be able also to see another planet. Venus is now a "morning star" rising about two hours before the sun, when it is seen low in the southeastern sky, still so brilliant that one need have no doubt as to its identity.

November marks the return to the evening sky of the finest of the winter




THE BELT

*The row of three stars in Orion is a guide to other heavenly bodies.*




*THE DIPPERS*

*The two, big and little, are familiar favorites.*

constellations, Orion, the warrior, which can be recognized from the three stars in a vertical row, forming his belt, seen low in the east. In the same group is Betelgeuse, north of the belt, and Rigel, to the south. Above these is Taurus, the bull, with red Aldebaran to indicate the eye of the animal. Further north, about as high, is Capella, in Auriga, the charioteer, and below him are the twins, Gemini.

All these, and others, are shown on the accompanying maps, in which the heavens are displayed as they appear at about 10 o'clock on the evening of November 1, 9 o'clock on the 15th and 8 o'clock at the end of the month. It will be seen that two planets are visible, Saturn high in the south, in Pisces, the fishes, and Mars, low in the southwest, in Capricornus, the sea-goat. Jupiter can also be seen in November, a little earlier in the evening. It is in Sagittarius, the constellation next to Capricornus to the west, which has descended by 10 p. m. on the first of the month. It is very bright, and there should be little difficulty in locating it.

### First Magnitude Stars

Capella, Aldebaran, Betelgeuse and Rigel are all stars of the first magnitude. Four others are also shown. Low in the south is Piscis Austrinus, the southern fish, with Fomalhaut. Standing proudly erect in the west is the "northern cross," the constellation of Cygnus. the swan, in which Deneb shines at the top. Below, and to the right is Vega. in Lyra, the lyre. To the left, almost directly west, is the eagle, Aquila, with brilliant Altair.

Two other conspicuous figures, though containing no stars of the first magnitude, are seen, one in the north, the other in the south. The former is Cassiopeia, shaped like an inverted W. The four stars of the "great square" of Pegasus, so called despite the fact that one, Alpheratz, is in Andromeda, are high in the south. In addition Aquarius, the water carrier, can easily be located just above Fomalhaut. A little Y-shaped group, supposed to form a jar which the man is holding, is typical of this figure. Nearby, to the left, is Cetus, the great whale, in which an easily found quadrilateral of stars marks the animal's body.

The phases of the moon are shown on the table below. From about the 10th to the 20th of the month the evenings will be well supplied with moonlight. On November 6, at 5 a. m., the moon is farthest from the earth, or at "apogee." Its distance is then 252,300 miles. "Perigee," the time when it is closest of the month, comes at 8 a. m., E.S.T., on the 18th when it is but 222,190 miles away.

**Phases of the Moon**

| | | E. S. T. |
|---|---|---|
| New | Nov. 2 | 11:16 p. m. |
| First Quarter | Nov. 11 | 4:33 a. m. |
| Full | Nov. 18 | 3:10 a. m. |
| Last Quarter | Nov. 24 | 7:04 p. m. |

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PHYSIOLOGY

## Chandler Lecturer Reports Clue to Old Age Riddle

A NEW clue to the riddle of why men grow old was presented to science by Dean William deB. MacNider of the North Carolina University Medical School.

Many complex tissues of animals, and