

## ASTRONOMY

# Look for Jupiter Early

Jupiter can still be seen in the evening sky during November in the constellation Capricornus. The winter constellations are making their appearance, James Stokley reports.

► THE PLANET Jupiter is still prominent in the evening sky during November, but you have to look soon after the sky darkens. Only two months ago it was visible until midnight, and even into the early morning. But at the beginning of November it sets soon after 10:00 p.m., your own kind of standard time; and about 8:30, at the end of the month.

If you look earlier in the evening—even before the sky is entirely dark—you will see it in the southwest, in the constellation of Capricornus, the horned goat. It is so much brighter than any other planet or star now visible (magnitude minus 1.8 on the astronomer's scale) that it appears first. And a little ahead of Jupiter, toward the right, stands another planet—Saturn. It is about an eleventh as bright as Jupiter, although still equal to a first magnitude star.

Neither Jupiter nor Saturn are shown on the accompanying maps of the November evening skies. These depict the heavens as they look about 10:00 p.m. at the first of November, about 9:00 at the middle of the month and 8:00 at the end. Thus, these planets are just below the southwestern horizon. But the stars make a brilliant display, for we are beginning to see some of the constellations that make the evening skies of winter so glorious.

For example, look over toward the east. There, a little above the horizon, you will see three moderately bright stars in a vertical row, with brighter stars to the right and left, and another quite a bit above.

The three stars in a row mark the belt of Orion, the warrior. Of the two bright stars, the one to the right, which was placed in one of his feet in the old star maps, is called Rigel. The one to the left is Betelgeuse, in his shoulder. When he is seen in this part of the sky, Orion is on his back. He is upright when he climbs higher in the south.

The star above, which is distinctly red in hue, is Aldebaran, part of Taurus, the bull. And farther to the left (on the map of the northern half of the sky) is Capella, in Auriga, the charioteer. Below this constellation is a group called Gemini, the twins, whose brightest stars are named Castor and Pollux. Castor is of the second magnitude, and Pollux of the first. Both, however, are considerably dimmed because they are so near the horizon, and their light is absorbed by the atmosphere.

Turning toward the northwest two more bright stars are visible. The lower is Vega, in Lyra, the lyre, while the one above is Deneb, in Cygnus, the swan. Farther to the left, a little lower than Vega, is Altair, in Aquila, the eagle. Here again we have three stars in a row, but there is little chance of

confusing them with Orion's belt, in which all three are of similar brightness. Altair, in the middle, is considerably brighter than its two companions.

Low in the southwest stands another first magnitude star, called Fomalhaut. This is about all that you can see of Piscis Austrinus, the southern fish. But the people in Buenos Aires see it much better, for it passes directly overhead.

Low in the north you can see the great dipper, which is part of Ursa Major, the larger bear. At this time of year the group is in its poorest evening sky position.

Above it is Polaris, the pole star, which is a part of the smaller bear, Ursa Minor. And still higher stands Cassiopeia, the queen, whose principal stars now form the letter M.

In addition to Jupiter and Saturn there are three other planets that can ever be seen with the naked eye. Two of them are visible in November before sunrise. Venus appears low in the southeast about an hour before the sun. It is even brighter than Jupiter, so is easy to see—if you look at the correct time and place.

On Nov. 7 Mercury reaches "greatest western elongation," the position farthest west of the sun, and so rises a little before

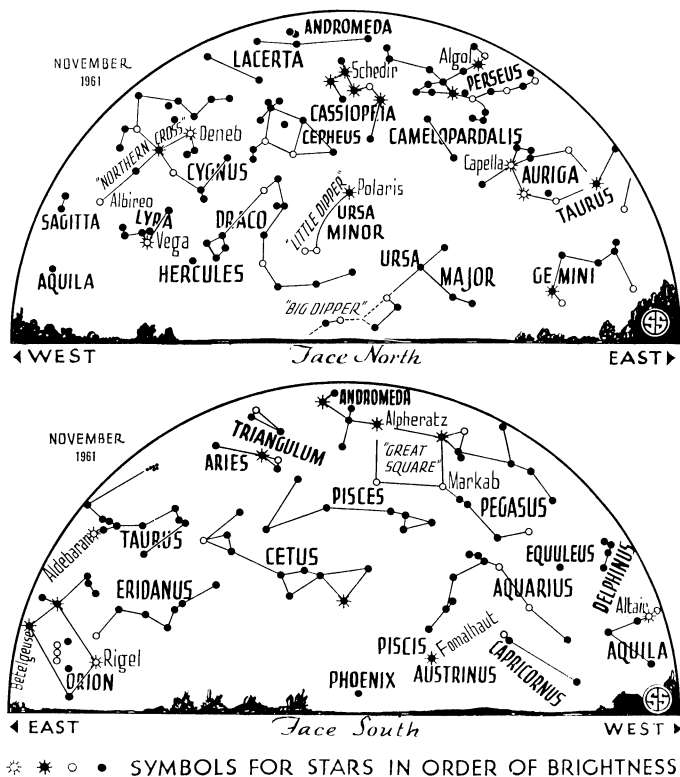
sunrise. For a few days around this date you may be able to see it, near Venus and considerably fainter, as dawn is breaking. Mars, the third planet, cannot be seen at all this month because it is too nearly in the same direction as the sun.

Mid-November is the time of one of the most famous of meteor showers, the Leonids. On any clear, dark night, if you watch the sky for a while, you will see a meteor, or shooting "star." Actually these are not stars at all—merely small bits of cosmic debris that enter the earth's atmosphere from outer space where they encounter so much friction that they burn up in the flash of light one sees.

During any night a single observer can see about seven such meteors per hour, on the average. There are always more after midnight than before; in the early morning hours we meet them head on, while those seen in the evening have to be moving fast enough to catch up to the earth.

These sporadic meteors may move in any direction across the sky. At certain times of year, as around Nov. 16, many meteors seem to radiate from one particular region. For the November meteors this is the constellation of Leo, the lion, which now rises around midnight.

The effect is actually one of perspective, for the meteors are moving around the sun in a huge swarm that follows the orbit of a comet last seen in 1866. The orbit of this swarm crosses the earth's path in mid-November.



Thus, every year at this time, we meet them coming into the earth's atmosphere in parallel paths. But, just as the parallel tracks of a railroad seem to converge in the distance, so do the tracks of light made by the meteors seem to converge. It happens that the point of apparent convergence is toward Leo, and that is why they seem to radiate from that part of the sky. They are therefore called the Leonid shower of meteors.

In some places the Leonid swarm is much more concentrated and when the earth encountered these in past years, there was a shower of meteors of extraordinary brilliance. One of them was in 1833, the "year the stars fell on Alabama." This year, however, about Nov. 16, you should see an average of 15 to 20 meteors an hour, including the strays that do not belong to the shower. There will be more after midnight. Not only will we then be able to meet them head-on, but the moon will then have set. It is at first quarter on the 15th, when it sets about midnight.

### Celestial Time Table for November

Nov.	EST	
1	9:00 p.m.	Moon farthest; distance 251,300 miles
6	11:00 a.m.	Moon passes Venus
	1:00 p.m.	Moon passes Mercury
7	10:00 a.m.	Mercury farthest west of sun; visible for a few days around this date in southeast just before sunrise
8	4:59 a.m.	New moon
12	3:30 a.m.	Algol (variable star in Perseus) at minimum brightness
13	8:00 a.m.	Moon passes Saturn
	7:00 p.m.	Moon passes Jupiter
15	12:19 a.m.	Algol at minimum
	7:13 a.m.	Moon at first quarter
16	early a.m.	Leonid meteor shower at best (see text)
	12 midnight	Moon nearest; distance 229,700 miles
17	9:08 p.m.	Algol at minimum
20	5:57 p.m.	Algol at minimum
22	4:44 a.m.	Full moon
29	5:00 p.m.	Moon farthest; distance 251,200 miles

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

• Science News Letter, 80:290 October 28, 1961

## Questions

**ASTRONOMY**—On what date does Mercury reach its greatest western elongation? p. 290.

**NEUROLOGY**—What substances were injected into the brain during surgery for epilepsy? p. 283.

**SPACE**—How much will the first Saturn rocket weigh? p. 287.

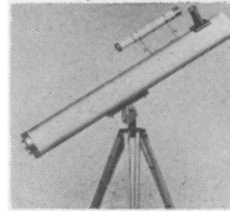
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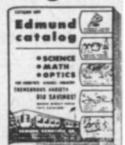
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