

## ASTRONOMY

# Jupiter and Saturn Now in View

The planet Jupiter can be seen in the southeast during July and is brighter than any star in the sky. Saturn rises earlier but is fainter, James Stokley reports.

► BRILLIANT JUPITER has now come into view. Fainter, but still prominent, Saturn has also appeared.

Both of these planets are in the southeastern sky, as shown on the accompanying maps. These show the heavens as they look about 10:00 p.m., your own kind of standard time (add one hour for daylight saving time) at the first of July. They have the same appearance an hour earlier at the middle of July, and two hours earlier at the end.

Jupiter is in the southeast, in Capricornus, the horned goat. Brighter than any other planet, or any star, it is easy to identify. It rises in the east about the time the sun is setting in the west. By the time the sky is dark it is well in view.

Saturn is a little farther west, in Sagittarius, the archer, and rises somewhat earlier than Jupiter. Although Saturn is equal in brilliance to a bright first magnitude star, it is only about one-eleventh as bright as its neighbor.

## Summer Constellations Appear

Extending across the southern sky, some of the characteristic and prominent constellations of the summer evening can be seen.

The most conspicuous of these is Scorpius, the scorpion, which is one constellation that has some resemblance to the thing after which it is named. A scorpion's tail does curl around in the same manner as the stars in the part of the figure toward the horizon. Farther up in Scorpius is the star called Antares. This name means "rival of Mars," and was given because both star and planet have a similar red color.

To the left of Scorpius is Sagittarius, the archer, in which Saturn now stands. It is hard to see an archer among these stars, but you can easily make them into a teapot. The spout is next to the scorpion's tail, and the handle to the left (just over the R in the name of the group on the star map). It can also be seen as the figure of the "milk dipper." The handle of the teapot is the bowl of the dipper, while the handle of that implement extends upward into the teapot's lid.

Libra, the scales, is on the right-hand side of Scorpius. Still farther to the right is Virgo, the virgin, with the first magnitude star called Spica. Continuing to the right of this group, you come to Leo, the lion, which is shown on the map of the northern skies. And in Leo you will find the third planet of our July evenings—Mars. However, it is so far away (nearly 200,000,000 miles, more than twice as far as the sun) that it has become quite faint. Its low altitude makes it appear even fainter.

In addition to Antares and Spica, there

are several other first magnitude stars visible these July evenings. Directly above Virgo is Bootes with brilliant Arcturus. And high in the east, shown half on the northern sky map and half on the southern, is Lyra, the lyre, with Vega. Below (shown on the northern map) is Cygnus, the swan, with Deneb. And to the right (on the southern map) is Altair, in Aquila, the eagle.

There are two planets not already mentioned, which are sometimes visible to the naked eye; both of them come into view during July in the early morning hours. First of these is Venus. It appears above the northeastern horizon about two hours before sunrise, in Taurus, the bull. In brightness, it just about matches Jupiter. Second is Mercury, innermost of all the planets. On June 19 it is farthest east of the sun. For a few days around this time it also will be visible low in the northeast before sunrise, but not until the sky is already brightened with the dawn.

Now that Jupiter and Saturn have returned to the evening sky after an absence of many months, it might be of interest to see why these planets do not become visible at the same time every year.

Jupiter has a year of 11.86 of our years: that is, it takes that long for Jupiter to go once around the sun. When the earth, with its faster movement, overtakes Jupiter we say

that planet is in "opposition," in other words, it is directly opposite to the sun. This will happen July 25 and then Jupiter will be at its closest for the year, at a distance of about 380,000,000 miles.

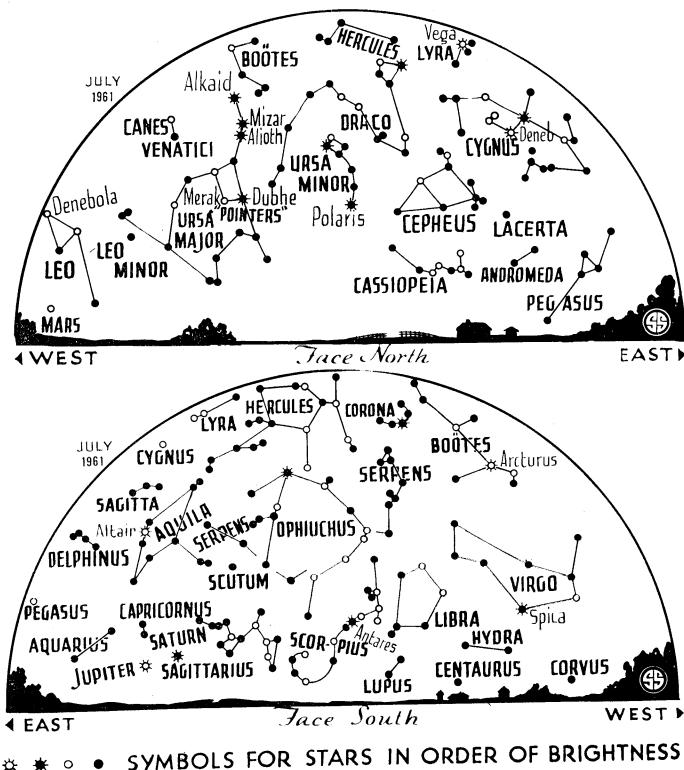
On July 25, 1962, earth will have made a complete circuit of its orbit, but Jupiter will then have moved about a twelfth of the way around its circular path. Not until Aug. 31 will we catch up to Jupiter next year, and so then that planet will be farther east among the background stars. The movement of Jupiter, like that of earth and other planets, is easterly.

But if you watch Jupiter from night to night, you will find that now it is moving toward the west—from the constellation of Capricornus into Sagittarius. Its motion is now "retrograde:" its usual movement to the east is "direct."

## Ancient Astronomy

In ancient times, when even astronomers thought that the sun, the moon and the planets all revolved around the earth, they had to devise a complicated mechanism to explain why Jupiter and other planets do not progress steadily eastward. The orbit of Jupiter, they said, was primarily a circle, which they called the deferent. But this was not the path along which the planet moved. Instead it moved in a small circle (called an epicycle), the center of which moved uniformly around the deferent.

When this failed to explain all the observed motions they added additional



epicycles on top of the first ones. Finally, as a famous English astronomer, Sir Arthur Eddington, once observed: "The music of the spheres was lost in the whirl of machinery."

After acceptance of the modern idea that the planets, including earth, revolve around the sun, in elliptical rather than circular orbits, the idea of epicycles and deferents was abandoned. Jupiter now seems to be going backward simply because we are going past at a higher speed. Perhaps you have seen the same effect when you have been riding on a train and it has overtaken a slower freight train on the next track. Even though it is going the same direction as the passenger train, it may look, to the passengers, to be going backwards.

### Saturn Moves Slower Than Jupiter

A similar effect, of course, occurs with Saturn, which moves more slowly than Jupiter, taking nearly 30 years for one circuit of its orbit. Saturn will be at opposition on July 19, its distance about 836,000,000 miles. The 1962 opposition will occur on July 31.

So, with Jupiter and Saturn in opposition in July, both planets rise at sunset and are visible all through the night. For the rest of 1961 they will continue to be prominent. But, as the sun's apparent movement through the sky toward the east brings that orb nearer and nearer to them, the planets will set earlier and earlier. Next Jan. 22, for Saturn, and Feb. 8, for Jupiter, they will be in the same direction as the sun and not visible. A few months later they will shine in the eastern sky before sunrise and, by late summer of 1962, they will again be in the evening sky, as they are now.

### Celestial Time Table for July

4	10:33 p.m.	Moon in last quarter
5		Earth farthest from sun, distance 94,451,000 miles
12	2:12 p.m.	New moon
15	6:00 a.m.	Moon farthest, distance 252,300 miles
16	9:00 p.m.	Moon passes Mars
19	4:00 a.m.	Mercury farthest west of sun, visible for a few days about now low in east before sunrise
	6:00 a.m.	Saturn opposite sun and nearest earth, distance 836,100,000 miles
20	6:14 p.m.	Moon in first quarter
25	6:00 a.m.	Jupiter opposite sun and nearest earth, distance 380,400,000 miles
27	2:00 a.m.	Moon passes Saturn
		noon Moon passes Jupiter
	2:51 p.m.	Full moon
28	4:00 a.m.	Moon nearest earth, distance 222,200 miles

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

### Know the Sky

These star maps showing the positions of stars and planets can help you locate satellites when they flash briefly across the sky. Familiarity with the constellations and their relative positions makes locating artificial moons much easier whenever they are visible from your area.

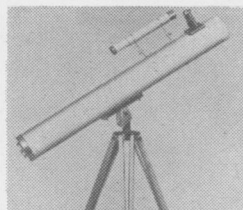
• Science News Letter, 79:392 June 24, 1961

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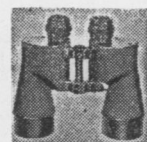
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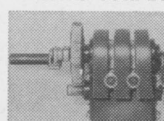
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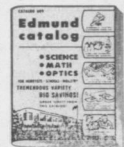
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