ASTRONOMY

Two Planets Prominent

Two planets, Jupiter and Saturn, shine brightly in the October evening sky, while in the northeast, Vega, the brightest star, outshines Saturn.

By JAMES STOKLEY

➤ TWO PLANETS—Jupiter and Saturn—will shine brightly in the evening skies of October. Jupiter, by far the brighter, is in the constellation of Pisces, the fishes. Saturn is farther west, in Capricornus, the sea-goat.

Both are shown on the accompanying maps, which depict the sky as it looks about 11 p.m., your own kind of daylight saving time (or 10 p.m., if you use standard time) at the beginning of October. They look the same way an hour earlier at the middle of the month, and two hours earlier at the end.

The brightest star is Vega, in Lyra, the lyre, visible in the northwest. Of magnitude 0.04 on the astronomer's scale, it is considerably brighter than Saturn, whose magnitude is currently 0.8. Jupiter's magnitude is minus 2.5.

Cygnus Above Vega

Directly above Vega, high in the northern sky, is Cygnus, the swan, with the star called Deneb. Part of this group is shown on the southern sky map. To the left of Lyra is Altair, in Aquila, the eagle, also shown on the southern map.

Low in the northeast is Capella, in Auriga, the charioteer. Just to the right—almost directly east—stands Taurus, the bull. Aldebaran is the bright star in this group. Although it is of first magnitude, its low altitude and consequent absorption of its light by our atmosphere makes it look fainter.

The same is true for Fomalhaut, in Piscis Austrinus, the southern fish, seen low in the south. Now it is about as high as we ever view it, but at Porto Alegre, in Brazil, it shines brilliantly, directly overhead.

A group of stars that is rather prominent, even though none is of the first magnitude, is the "great square" in the constellation of Pegasus, the winged horse. This is just above the eastern end of Pisces, the fishes, in which Jupiter now stands. Actually only three of the stars that make up the square are in Pegasus. The one in the upper left-hand corner, Alpheratz, is in the neighboring constellation of Andromeda.

In addition to Jupiter and Saturn, the planet Venus is also in the evening sky, but it is difficult to see. Venus is only a little to the east of the sun, so it sets about half an hour after sunset, while the sky is still very bright. By Christmas it will be conspicuous, setting some two hours after the sun. Mars is also in the evening sky, but it is so low in the southwest at sunset that it can be seen only with difficulty.

On Oct. 5 Mercury will be farthest west of the sun, so it will rise more than an hour ahead of sunrise. Thus it will be visible low in the east as dawn is breaking.

Generally, whenever you see them, the stars shine with about the same brightness. But there are some that change in brilliance—some vary regularly and some irregularly. One of the former is now visible in the northeast in the constellation of Perseus, the champion. It is called Algol, which comes from an Arabic word meaning "demon." Evidently the Arabs recognized something strange about it, for usually they gave complimentary names to the stars.

Generally, Algol is of the second magnitude (actually 2.3). It remains at that brightness for about 59 hours, or a little less than 2.5 days. Then, in about five hours, it drops to about a third of its former brilliance. But in five hours more it is back where it was before. The complete period is about 69 hours, or 2.87 days.

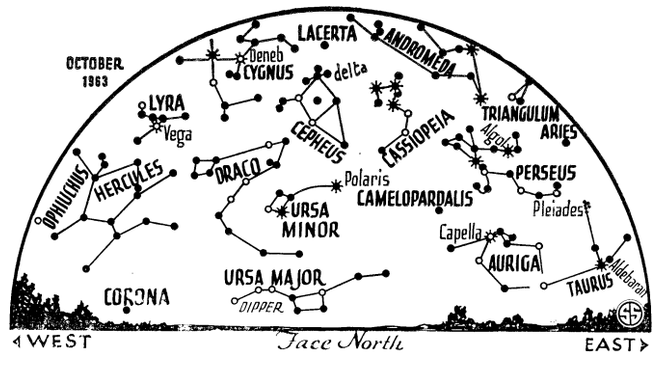
Actually Algol is not one but two stars, each revolving around the center of gravity of the system. One of these stars is much brighter than the other, although even the fainter body is some ten times as bright as the sun. It happens that the plane in which they revolve is almost in our direction. Hence once every 69 hours the dark star passes in front of its bright companion. This produces a partial eclipse and causes the principal reduction in light. But half way between there is a smaller diminution in brightness, which occurs when the darker body is partly covered by the brighter one. This shows that the fainter one is not completely dark. If it were, there would be no change in total light at this point.

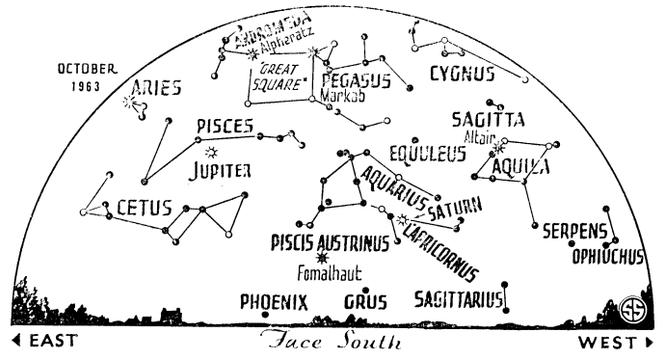
The Celestial Time Table at the end of this article gives the times of the principal minima of Algol that occur in evening hours. One of these, for example, is at 8:50 p.m., EDT, on Oct. 12. On that evening, therefore, you will see that it is considerably fainter than it appears on the 11th or 13th.

"Eclipsing Binary"

Algol is classed as an "eclipsing binary." It is not really variable, that is, the light emission from its two stars does not change. But high in the north, in the constellation of Cepheus, the king, you can see the star marked delta, which actually varies in brightness. At maximum its magnitude is 3.3, or a little brighter than Algol at minimum. In about 3 days, 19 hours, it drops to magnitude 4.5, to about a third of its former brilliance. Then, in about 1 day, 13½ hours, it returns to maximum. The entire period, accurate to within a couple of seconds, is 5 days, 8 hours, 47 minutes and 27 seconds.

The spectroscope, which reveals the move-





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

ment of a star toward us or away, shows that it is approaching when it is getting brighter and receding when the diminution in brightness takes place. We cannot see the far side of the star, so this is a movement of the side nearest us. That is, the star is pulsating. As it gets bright it swells, as it dims it shrinks.

Many Cepheid variables, as this type of star is called, are known to astronomers. And they have found that the brighter they are, on an average, the longer is the cycle of variation, which ranges from about half a day to 20 days. When an astronomer sees a Cepheid, and recognizes it from the way it brightens rapidly and dims more slowly, he only has to measure the period to tell how bright it actually is. A distant star looks fainter than one that is nearer but of the same brightness, in accordance with a well-known law.

Thus the three factors—distance, real brightness and apparent brightness—are all related, and if you know two of them you can find the third. With a Cepheid you can tell how bright it looks, the period tells how bright it is, and then you can find the distance. By such basic methods, somewhat modified, astronomers have found the Cepheid variables valuable tools as measuring rods for the universe.

Celestial Time Table for October

OCT.	EDT	
3	12:44 a.m.	Full moon, hunter's moon
	8:00 a.m.	Moon passes Jupiter
4	11:00 a.m.	Moon nearest, distance 223,800 miles
5	4:00 p.m.	Mercury farthest west of sun, visible for a few days in east before sunrise
7	3:12 a.m.	Algol (variable star in Perseus) at minimum
8	7:00 a.m.	Jupiter behind sun, 367,200,000 miles from earth
9	3:28 p.m.	Moon in last quarter
10	12:01 a.m.	Algol at minimum
12	8:50 p.m.	Algol at minimum
15	5:39 p.m.	Algol at minimum
17	8:43 a.m.	New moon
19	10:00 p.m.	Moon farthest, distance 252,500 miles
25	1:21 p.m.	Moon in first quarter
26	4:00 p.m.	Moon passes Saturn
30	noon EST	Moon passes Jupiter

Subtract one hour for CDT, two hours for MDT, and three hours for PDT.

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Do You Know?

Christmas trees are now being considered as a possible rotation crop for *tomatoes.*

On the average, throughout the United States *women* spend more time in school than men.

By growing an *apple tree* upside-down for two months when it is young, it is possible to improve its shape.

A new kind of median strip screen to block the *glare* of approaching headlights is composed of thin aluminum strips that deflect headlights, although motorists can still see through the strip during the daylight hours.

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