

ASTRONOMY

# Two Planets Shine

## Jupiter and Saturn Now Visible in Evening Skies; Former Now Leads in Number of Her Known Moons

By JAMES STOKELY

**V**ENUS is now the most brilliant star or planet in the evening sky, but it is so far south that it is not easy to see, and sets about an hour after sunset. Thus, it does not appear on the accompanying maps, which show the appearance of the heavens at 10:00 p. m. on October 1, 9:00 p. m. on the 15th and 8:00 p. m. on the 31st. However, if you look towards the southwest soon after the sun goes down, you should be able to see it in the accumulating dusk.

But even without Venus, evenings of the present month bring us two planets. Towards the south, in the constellation of Capricornus, the sea-goat, shines Jupiter, second brightest planet, of magnitude minus two, about a sixth the brilliance of Venus. The other planet is Saturn, which is in the southeast, in the figure of Pisces, the fishes. Its magnitude is 0.4, only about a tenth the brightness of Venus, but brighter than any star now seen, with one exception. This is Vega, in the constellation of Lyra, the lyre, high in the west. Vega, of course, shines with its own light, while the planets are dark bodies, revolving around the sun, whose reflected light makes them visible.

Of the two remaining naked-eye planets, Mercury is this month too close to the sun to be visible at all. Mars, now distant and faint, might be glimpsed in the east before sunrise, in the group of Leo, the lion.

### Vega Brightest

Vega is the brightest star now seen. Above it is Cygnus, the swan, with first magnitude Deneb. Nearby, to the south, is Altair, in Aquila, the eagle. Low in the northeast is Capella, of Auriga, the charioteer. Next to this group, to the right, is part of Taurus, the bull, with Aldebaran. A sixth first magnitude star of the October evening is Fomalhaut, of Piscis Austrinus, low in the south.

Visitors looking through the telescopes of an observatory find the planets Jupiter and Saturn probably the objects of greatest interest, with the possible exception of the moon. Jupiter has the ever-changing belts of cloud which seem to

duplicate the imaginary parallels of latitude on a globe of earth.

The very remarkable system of rings of Saturn is its most attractive feature. These are a swarm of tiny moonlets, perhaps the remains of a larger moon that the planet once had. According to theory, this unfortunate satellite ventured too close to the planet, the attraction of which set up inside it enormous tidal forces. With the part nearest Saturn pulled far more than the other hemisphere, the moon was torn asunder, and the rings, now revolving in the old orbit of the moon, are the remains.

This may forecast the ultimate fate of our own moon, for this same theory supposes that it will, in the distant future, approach too closely to us, and similarly disintegrate into a ring system around the earth.

### Would Leave Lovers Bereft

This would then leave us moonless. Saturn was better able to afford the loss of one of its satellites, for it has nine others that can still be observed. Until last year, in astronomers' tables, it was tied with Jupiter, which also had nine moons, but now that planet has forged ahead. Two new Jovian moons were discovered during the past summer.

The history of the discovery of these moons makes an interesting epitome of the progress of astronomical observation. Jupiter itself was known to the ancients,

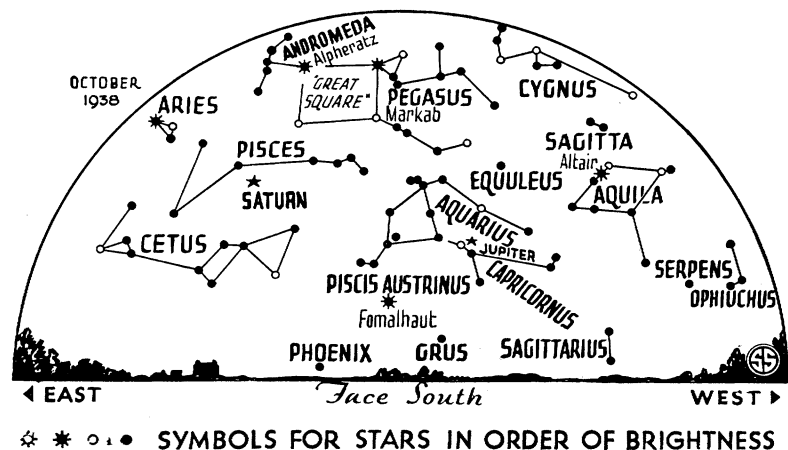
but they had no idea that it had any such attendants. During the first decade of the 17th century, the telescope was invented by a Dutch spectacle maker, who, however, seems never to have realized that it might have astronomical possibilities.

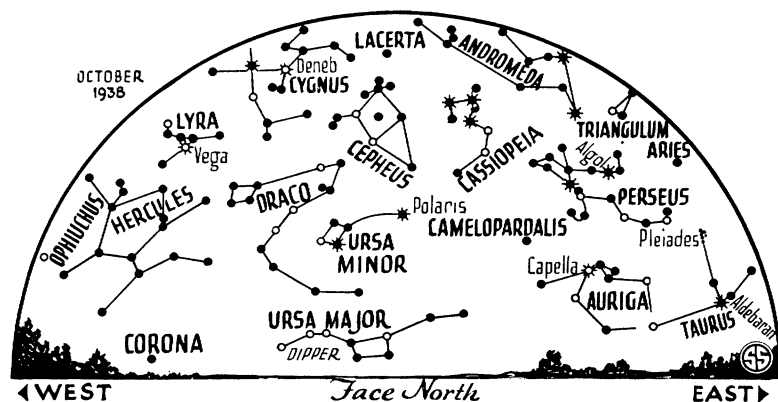
### First Discovery

At the end of 1609, Galileo Galilei, an Italian astronomer, heard reports of this device. From his own knowledge of optics, he figured out how to make one, which differed somewhat from the Dutch instrument. On Jan. 7, 1610, he turned his little instrument, only about two feet long, on Jupiter, and found near it what he first supposed to be faint stars. But, as he looked on succeeding nights, he found that these objects, four in number, seemed to be moving around Jupiter. This proved that they were not stars, but satellites, and so the first astronomical discovery with the telescope was made.

Later they were given names, Io, Europa, Ganymede, and Callisto, in order of distance from Jupiter. They are about the sixth and seventh magnitudes, too faint to be seen with the naked eye, especially in the glare of the bright planet.

After Galileo announced his discovery, a German astronomer, Simon Marius, tried to take the credit. It seems that he had actually secured a telescope a year or more before Galileo made his, and with it had observed the satellites. But, he did not realize what they were until after Galileo's publication of his discov-





ery. Accordingly, history's verdict gives Galileo undisputed credit.

The following years brought the discovery of eight moons of Saturn, four of Uranus, two of Mars, and one of Neptune, but Jupiter had to remain content with four until the building of the Lick Observatory in California. In 1892, Dr. Edward E. Barnard took a photograph with one of that institution's great telescopes, which revealed the fifth satellite. No name has ever been given to this little body, which is much smaller than the four of Galileo, and is only about half as far from the planet as Io. Its magnitude is 13, so that a good-sized telescope is needed to see it.

In the winter of 1904-5, Lick Observatory again contributed, when Dr. C. D. Perrine found two more, known merely as six and seven. Their magnitudes are 14 and 16, still fainter than Barnard's No. 5. In 1908, England scored for the first time, when Dr. P. J. Melotte, at the Royal Observatory, Greenwich, found No. 8, of magnitude 17.

The eighth proved very difficult to see, and satisfactory observations of it were very meager. In 1914, Seth B. Nicholson, a graduate student at the University of California, was doing work for his doctor's degree at the Lick Observatory, and decided to make the eighth satellite the subject of his thesis. Therefore, he had to photograph it, and when he did he found a strange object on one of the plates. This turned out to be satellite No. 9, of magnitude 19. The following year he received his doctorate, and joined the staff of the Mt. Wilson Observatory.

There, the sun, and studies of the heat radiation of the stars and planets, have engaged his attention for most of the time. But during the past summer he returned to his old love, Jupiter, and made a survey of the planet and its moons. The eighth satellite, elusive as ever, had been "lost" for many years,

but he found it again at the end of July, using the 100-inch telescope, the world's largest.

Then, as he studied his plates, he found several strange objects. One turned out to be an asteroid, one of the family of tiny planets moving between Mars and Jupiter. But two others proved to be new Jovian satellites, numbers 10 and 11! They also are of the 19th magnitude, so that only a very few of the world's telescopes are capable of showing them. There is no doubt but that they are real moons. Thus, Dr. Nicholson's score is now only one behind that of Galileo, while Jupiter easily leads in the size of its retinue.

As for our own moon, the table below indicates its phases. Twice this month it will recede from the earth to its greatest distance, when we say that it is at apogee. On Oct. 2, at 6:00 a. m., E.S.T., it will be 251,200 miles away, and on Oct. 30, at 2:00 a. m., E.S.T., it will be at a distance of 251,300 miles. But on the 16th, at 3:00 a. m., it will be at perigee, only 230,000 miles distant. On the night of Oct. 30, also, persons throughout the United States, except in the western part, will see it hide, or "occult," the third magnitude star beta Capricorni. It will then be almost at first quarter. At Washington, the star will pass behind the bright edge of the moon at 11:53 p. m., E.S.T., while it will emerge from the dark edge at 1:13 a. m., E.S.T., on the 31st. For other parts of the country, the times will be a little different. A telescope, or a pair of binoculars, will help reveal the star when close to the moon.

#### Phases of the Moon

	E.S.T.
First quarter	Oct. 1 6:45 a. m.
Full	Oct. 9 4:37 a. m.
Last quarter	Oct. 16 4:24 a. m.
New	Oct. 23 3:42 a. m.
First quarter	Oct. 31 2:45 a. m.

Science News Letter, September 24, 1938

#### PSYCHOLOGY

### Expert Asks Why Reading Should Be Taught to All

WHY learn to read?

Modern invention is fast minimizing the need for ability to recognize the printed word. The radio has done away with need for reading the newspapers; even the comic strip is presented over the air. Fiction comes to you in sound movies.

You can now buy excellent magazines containing whole stories in pictures. Even if you are a historian, important events are recorded for you in motion pictures. The voices of great men may bring their messages to you on sound film or phonograph records.

Even the letters of friendship or business may soon be outdated by mailable dictating machine records on which the sender can speak directly to his correspondent.

Seriously, it is proposed by Dr. Arthur Lichtenstein, of the Johns Hopkins University, who has had the problem of teaching reading to those who cannot learn, that we modify the school curriculum so as to lighten the burden for those lacking in literary aptitude.

The story of Rae is told by Dr. Lichtenstein in *School and Society*, where this revolutionary proposal is made.

Rae was a "nice, friendly boy, making every effort to succeed, and a great help around the home."

#### Normal IQ

Rae's troubles were due to the fact that at ten years he was unable to pass the second grade reading test. Despite this handicap his intelligence was normal. Every effort was made to teach him to read.

Four years later his IQ had dropped 15 points. He had gained 18 months in mental age in the four years and in silent reading he had lost two months.

"The time spent in attempting to make a reader of Rae was wasted," comments Dr. Lichtenstein. "Fortunately, no greater harm to his personality appeared to result than the development of a marked inferiority feeling and dislike and apprehension in the presence of a reading situation.

"Had reading been relegated to a minor place in his program instead of the all-powerful bugbear it became, he would be just as well off educationally and far better off from a mental hygiene point of view."

Science News Letter, September 24, 1938