

ASTRONOMY

Tenth Moon of Jupiter May Have Been Found

Lick Observatory Reports Photograph of Faint Object Near Great Planet Having Motion Like Eighth Moon

THE DISCOVERY of what may prove to be the tenth satellite of the planet Jupiter was made at Lick Observatory when Dr. H. M. Jeffers of the observatory staff noticed a very faint heavenly object that has the same motion in the sky as the eighth satellite which he was photographing.

Dr. R. G. Aitken, director of Lick Observatory, wired Harvard College Observatory, the collecting center for astronomical information in this country, whence details of the observation are sent to other astronomers here and abroad. Other observatories will join in the study.

It is by no means certain that the object observed is a new and tenth satellite. Dr. Aitken simply announced the photographing of a faint object near Jupiter having daily motions similar to that of satellite eight. Its nature is still uncertain. More photographs are being secured to permit computations to decide whether the object is satellite nine of Jupiter, a new tenth satellite or a minor planet or asteroid of unusual orbit.

Very Faint

The new object is very faint and will be observable only in the largest telescopes. It is of the nineteenth magnitude, which is close to the limit of visibility.

This Jupiter's tenth satellite, if that is what it proves to be, will be one of a trio of extremely remarkable objects in the solar system, the three most recently discovered moons of Jupiter. These outer satellites move around the planet with what is called a retrograde motion, a direction opposite that of the seven inner satellites. The new object is probably only a few miles in diameter and it may be even smaller than the eighth satellite, the diameter of which is estimated at 25 miles.

Jupiter is the fifth planet from the sun and the second outward from the earth. It is the largest in diameter and, with ten satellites, it would have a greater number than any other planet.

During May Jupiter is a prominent object in the evening southern sky.

The astronomical position of the new object as of May 9.23 was right ascension 13 hours 8 minutes and 21.3 seconds; declination south 4 degrees six minutes 26 seconds. Its daily motion is 21 seconds west and one minute 20 seconds north.

Fifth Such Discovery

If the discovery by Dr. Jeffers proves to be the tenth moon of Jupiter, Lick Observatory will have continued almost a monopoly on such discoveries in modern times.

The first four satellites can be considered the first heavenly bodies discovered. Galileo saw them in 1610 when he turned his telescope toward Jupiter. The late Edward E. Barnard discovered the fifth at the Lick Observatory in 1892, and since then the Lick astronomers have contributed the sixth, seventh, ninth and tenth. The eighth was picked up by Dr. P. J. Melotte from the British Royal Observatory at Greenwich in 1908.

Dr. Jeffers' discovery was made in exactly the same manner as that of the ninth satellite in 1914. Dr. Seth B. Nicholson, now of the Mt. Wilson Observatory but then a graduate student at the University of California, was completing the studies required for his doctor's degree at the Lick Observatory. With the 36-inch Crossley reflector he photographed the eighth satellite. When he examined his plates, he found not only the eighth, but another object, which seemed to be moving in just the same way. On a single plate, the satellite looks exactly like the stars in the background, but by comparing several negatives taken at intervals, the moving objects are revealed. The motion of the strange body readily distinguished it from the stars which could be seen on the same plates. This object proved to be satellite number nine. Early this month Dr. Jeffers was photographing the eighth satellite with the same telescope, and his plates also re-

vealed another object moving along with it. Other photographs were made to confirm his discovery, and it will soon be possible to tell whether the new object is really a tenth moon. It may be a minor planet of unusual orbit.

Like numbers eight and nine, the new object seems to move around the planet backwards. That is, the first seven satellites all move around Jupiter from west to east, in the same direction that the planet moves around the sun, the same as the earth moves around the sun and as the moon moves around the earth. But moons eight, nine and ten of Jupiter all move around it from east to west, the astronomer calls this a "retrograde" motion.

Although Galileo Galilei, who was one of the first astronomers to use a telescope, saw the first four satellites when he turned his tiny instrument towards Jupiter in January, 1610, a German astronomer, Simon Marius, had seen them the previous year, but apparently had not realized what they were until after Galileo announced his discovery.

These four moons are bright enough to be seen easily in a very small telescope and it is interesting to watch them night after night, and to see their different positions as they revolve around the planet.

The smallest is about 2,000 miles and the largest about 3,500 miles in diameter. The fifth satellite, which Barnard discovered with the 36-inch refractor in 1892, is closer to the planet than any of the others, and is probably only about 100 miles in diameter. It revolves around the planet in 12 hours, faster than any of the others.

Recent Ones Small

Dr. Charles D. Perrine, now director of the Argentine National Observatory, discovered numbers six and seven in 1904 and 1905, again at Lick Observatory. These, like numbers eight, nine and ten, are all very small, probably ranging in diameter from 15 miles to 100 miles.

Further observations of the tenth moon, if such it proves to be, will be required before astronomers can determine how far it is from the planet, or how rapidly it is moving.

A tenth moon will give Jupiter the largest known family of moons. Saturn, also with nine at present ties it.

In the opinion of many astronomers, Jupiter probably has several other moons, even smaller, which may be detected as larger telescopes are used.

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