

ASTRONOMY

# Saturn Rides High

## November Is a Good Time to View Planet With Its Interesting Rings, Which This Year Disappeared

By JAMES STOKLEY

WITH Saturn high in the evening sky this month, it is a good time to look at it through a telescope. Most observatories connected with colleges in various parts of the country have certain nights when their instruments are available for the public. And for people who live in the vicinity of Philadelphia, New York, Chicago, or Los Angeles there are telescopes associated with the planetaria in these cities. Saturn is always one of the most popular objects displayed to the visitors to these institutions, because of its unique rings. These form a huge system, the outside diameter about 171,000 miles. There is a space of about 7,000 miles between the inner part and Saturn's equator. The diameter of Saturn itself, through the equator, is about 74,000 miles. These rings are not solid structures, as might be supposed at first glance through a telescope, but are a vast swarm of tiny moons, all revolving around Saturn so close together that they appear continuous from the distance of earth.

Huge though it is in diameter, the ring system is exceedingly thin, not more than 10 miles in thickness. As Saturn goes around the sun every 29½ years, there are two periods when the earth passes through the plane of the rings. Saturn, on the average, is 885,900,000 miles away, and a thing only 10 miles in diameter at that distance can hardly be seen with even the biggest telescope. On such an occasion, therefore, the rings disappear as seen in practically all our instruments, but only for a few days, for then they spread out enough to be seen as a straight line, crossing the planet's disk.

### 3 Times in 15 Years

If Saturn were revolving around the earth as a center every 29½ years, there would be just one occasion, each 15 years, when the rings would thus vanish. But the planet is going around the sun, and so are we, though in a much smaller circle. However, this means that ordinarily there is a group of three occasions when they vanish each 15 years. The

earth passes through their plane, then we swing around in our orbit, and come back far enough to cross the plane again, then we swing forward, as seen from Saturn, and cross for the third time. By the time we swing back again the next year, Saturn has itself advanced so far that we do not reach the ring plane.

### Back and Forth

To picture the situation, we might imagine a man walking in a peculiar manner—ten feet ahead, five feet back, ten feet ahead, five feet back, and so on. Suppose his advance took him two feet past a doorway. He came through the portal, on his return he passes through it for a second time, and as he advances once more, he goes through for the third time. But now, picture him instead just reaching the doorway on his first advance. He is then in the "plane of the door," even though he does not go through. Then he goes back, and on his next advance he does reach the other side. In this way, he has only been in the doorway twice.

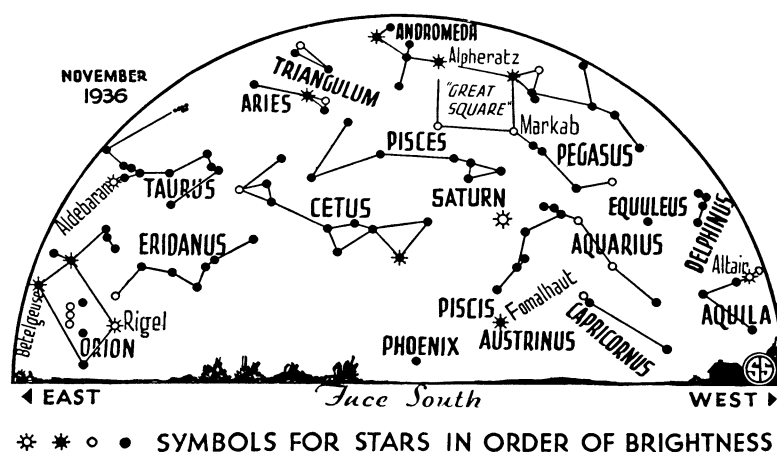
That is very much what is happening with the earth and Saturn this year. On June 28 we just reached the plane of the

rings, and they disappeared from view. Now we have retreated and they are sufficiently spread out that they appear as a thin line crossing the planet's disk—like an orange with a knitting needle stuck through it. About the middle of this month, the earth will have swung back as far as it will go this trip, the rings will be spread out to their maximum (which will still not be very much) and we shall then start approaching the ring plane again. Next Feb. 20 we shall actually go through the ring plane, and after that, for 15 years, the southern surface of the rings will be exposed to our view.

During the past 15 years the northern surface is the one we have been seeing.

### Orion Appears

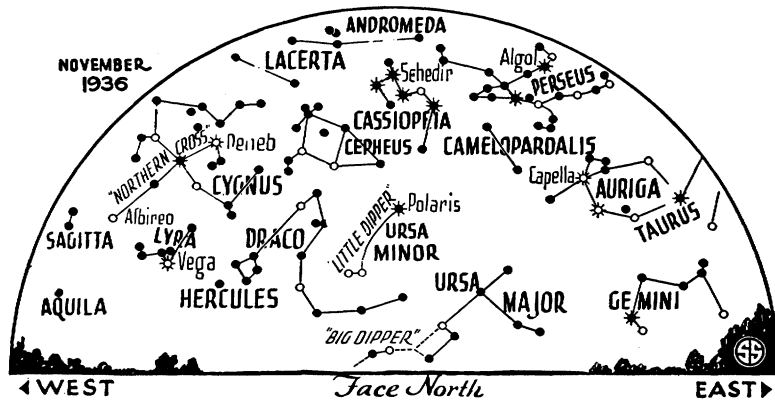
For the first time since April, the maps accompanying this article show the appearance in the evening sky of what is generally considered the finest of the constellations visible from the United States—Orion, the great warrior. At the hours for which they are drawn (10:00 p. m., Nov. 1; 9:00 p. m., Nov. 15; and 8:00 p. m., Nov. 30) it is almost directly east, and can easily be recognized by the three stars in a vertical row, which form the giant's belt. As the stars rise about four minutes earlier each night, this group, and its brilliant neighbors, will become more easily vis-



### BACK IN VIEW

For the first time since April, Orion, with its easily found belt of three stars in a vertical row, takes its place among the fine constellations visible during the evening hours.





FOUR NOVAE

You can locate the constellations of three of the four novae now visible by means of this map. Lacerta, Aquila, and Hercules are shown here; Sagittarius does not appear. But you will need some optical aid to look at the novae themselves.

ible during the coming months, until in January and February they will be seen throughout the evening. The two brightest stars in Orion are Rigel, to the right of the belt, and Betelgeuse, to the left.

Directly above Orion is the bull, Taurus, which has a V-shaped group of stars, the Hyades, outlining his face. A smaller cluster, the Pleiades, are still higher, in his shoulder. The brightest star of the Hyades, Aldebaran, represents the eye. North of Taurus is Auriga, the charioteer, with the first magnitude star Capella. Above Auriga is Perseus, the famous mythological hero.

**Dipper Low**

The Great Dipper, this month, is in its poorest position of the year, for it is just barely above the northern horizon. But Cassiopeia, next most familiar of these northern circumpolar constellations which never go below the horizon for most parts of the United States, is now at its best evening position. It has the shape of the letter M, and is nearly overhead, to the north. Half way between this and the Great Dipper is the Little Dipper, with Polaris, the Pole Star, at the end of its handle.

High in the west is the northern cross, part of Cygnus, the swan, in a nearly vertical position. Deneb is the brightest star in this configuration. It marks the top of the cross. Below the cross, and a little farther north, is Lyra, the lyre, with Vega, the brightest star visible at present, until Sirius rises late in the evening. South of Lyra is Aquila, the eagle, with another bright star, Altair.

Toward the southern skies, the great square of Pegasus is now in a prominent position. Only three of the four

stars are in this group, however, for the one at the upper left hand corner, Alpheratz, is part of Andromeda. Immediately below the square is part of Pisces, the fishes, and below these stars the planet Saturn is visible. Another fish is still nearer the horizon, Piscis Austrinus, the southern fish, and a star called Fomalhaut.

In addition to Saturn, two other planets can be seen in the evening sky this month, though they set before the times of the maps. As dusk begins to fall, Venus will be visible in the southwest, near the horizon. It is so brilliant, about magnitude minus 3.5, in the astronomer's scale, that it will be the first star or planet to appear. Jupiter, inferior only to Venus in grandeur, is nearby. At the beginning of the month, it will be to the left of Venus. At 7:00 a. m., E. S. T., on Nov. 13, Venus will pass Jupiter, nearly four times the moon's apparent diameter to the south. After that, of course, Venus will be to the left. A fourth planet, Mars, is seen in the east later in the night, rising about 2:30 a. m., local standard time.

**Moonlit Thanksgiving**

The phases of the moon for November are indicated below. In the last half of the month we shall have moonlit evenings. The moon will be in apogee (farthest from earth) on the 12th, at 5:00 a. m., E. S. T., with a distance of 252,550 miles, and in perigee (nearest earth) on the 27th at 9:00 a. m., E.S.T., when it will be 222,400 miles from us. During the night of Nov. 16 the moon, a crescent three days past new, will pass Jupiter and Venus, so on that evening as well as the next the three conspicuous objects will furnish a beau-

tiful spectacle as they appear lined up in the west. The moon passes a short distance to the north of Jupiter at 9:49 p. m., E. S. T., after it has set for the eastern part of the United States. It passes Venus at 6:00 a.m.

**Phases of the Moon**

E. S. T.

- Last Quarter . . . . Nov. 5, 8:28 P. M.
- New . . . . . Nov. 13, 11:42 P. M.
- First Quarter . . . . Nov. 21, 8:19 P. M.
- Full . . . . . Nov. 28, 11:12 A. M.

*Science News Letter, October 31, 1936*

ENTOMOLOGY

**Pests**

"The awakened interest in forestry has manifested itself in renewed efforts in forest conservation and in the reforestation of denuded areas. Along with this there has, of course, been an ever increasing interest in the insect pests of our forests, for we now know that the insects rank with fire as important destructive factors in many of our large forest areas."—Doane, Van Dyke, Chamberlin and Burke in FOREST INSECTS (McGraw-Hill).

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