ASTRONOMY

Saturn Rules October Evening Skies

Planet's Remarkable Ring System Can be Studied Readily With Telescope of Moderate Magnifying Power

By JAMES STOKLEY

CONSPICUOUS this month in the southern evening sky is a body that in many ways is the most interesting of astronomical objects.

The moon with its craters and mountains, Jupiter with its belts similar to the zones on a globe of the earth and with its four bright moons, a double star such as Albireo at the southern end of the Northern Cross, all these are invariably fascinating sights for the observatory visitor who first sees them through a large telescope. But even more amazing to most of those who have never seen it before is a telescopic view of the planet Saturn with its remarkable system of rings.

Nearly everyone has at some time or other seen a picture of this planet, but apparently many people believe that the pictures are exaggerated. They express surprise when they find that "it really looks that way."

Look For It Now

Saturn is now with us, and, in fact, is the only planet that can easily be seen this month in the evening. As shown on the accompanying map, it is now in the constellation of Capricornus which appears to the south. It is of the magnitude 0.8, a little brighter than the star Altair which shines in the constellation of Aquila, the eagle, above and to the west. Its steady rather yellowish glow readily identifies it as a planet, a member of our own solar system, comprising the earth and the other bodies that revolve around the sun.

Lower than Saturn and directly south as shown on the map is a bright star which is visible during only a few months of the year. This is Fomalhaut, part of the southern fish, Piscis Austrinus. It is so far south that it never rises very high into our skies, but in Valparaiso now people see the constellation directly overhead in the evening.

The Northern Cross, forming part of the constellation of Cygnus, the swan, is now high in the west, with the first magnitude star Deneb at its top. Below it is Lyra, the lyre, with the brilliant Vega. Two other first magnitude stars can be seen to the northeast. Lower, and nearer the east point of the horizon, is Aldebaran, marking Taurus, the bull. Next to it, to the north is Auriga, the charioteer, in which the bright star Capella is visible.

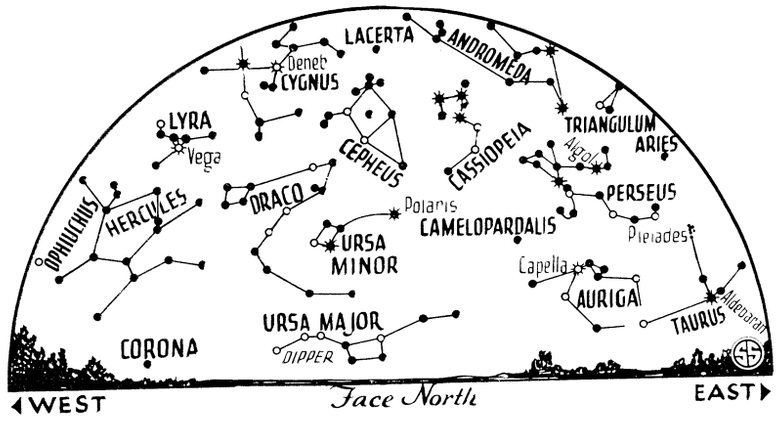
If you have access to a small astronomical telescope, or better yet, one in a regular observatory, use it to look at Saturn. A large instrument is not required to see the rings, though with one, of course, details which escape the user of a smaller glass are revealed. A telescope magnifying thirty or forty diameters will show them, and even this view will probably be better than that of Christian Huyghens, the Dutch astronomer who first observed them in the year 1655. The Italian Galileo Galilei, who in 1610 was the first great astronomer to use a telescope, saw them indistinctly but did not realize their true nature.

The rings are flat and extremely thin compared with their diameter. If you were walking on the surface of Saturn at the equator (a very difficult procedure, by the way, because the great mass of the planet would make you weigh many times what you do on the earth) the nearest part of the ring system would be 5,900 miles directly overhead. Beginning at this distance from the planet's surface they extend out for 42,741 miles. Five globes the size of the earth could roll around on the rings with room to spare between them. Yet the system of rings is only about a hundred miles in thickness. Actually there is not one ring, but several, and there are some dark spaces between them. However, all of the rings are in the same plane, which is also that of Saturn's equator.

From the time of Huyghens until 1895, the exact nature of the rings was somewhat uncertain. At first supposed to be solid as they appear with small telescopes, it was shown that no known substance would stand the stresses and strains set up in so enormous and thin a structure. Later it was also demonstrated that they could not be liquid. of course, is was out of the question to suppose them to be gaseous, for then they could not hold their form.

A Swarm of Tiny Bodies

The only other alternative was that the rings are a swarm of tiny bodies, all revolving around Saturn together, and so close to each other that from the distance of the earth they appear continuous, even through the largest telescope. Though this theory was accepted long ago it remained to be proved by an American astronomer, James E. Keeler, first director of the Lick Observatory, in 1895. By means of observations with the spectroscope attached to the great telescope at his observatory, then



THE SWAN FLIES HIGH

Cygnus, the Swan, is striking to the naked-eye view; it also shows a beautiful "double" to telescopes, in Albireo, at its northern end.

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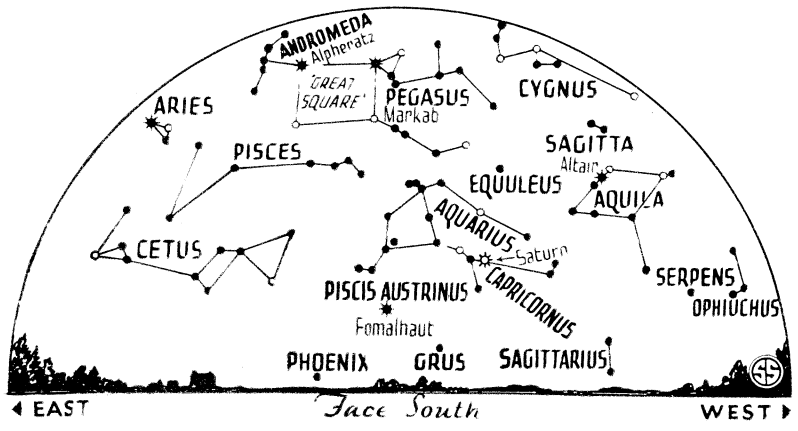
the world's largest, he showed that the outer parts of the ring revolve more slowly than the innermost sections. If the rings were solid, the opposite would be true.

Imagine a small insect sitting on a rapidly spinning flywheel. If he is only a few inches from the axle, he is travelling through space much more slowly than if he is on the rim. But when separate bodies revolve around a larger one, such as the planets around the sun, or the moons around Jupiter, or Saturn; the farther away they are from the parent body, the lower is their velocity. When Keeler showed that the velocity of the various parts of Saturn's ring system is in direct accord with this law, the theory that the rings are made of small "moonlets" became a proved fact.

In addition to the rings, Saturn has at least nine moons, of which the two largest can easily be seen with a small telescope. The largest is about the size of the planet Mercury. It is called Titan, and is 2,625 miles in diameter. Our earth's solitary moon has a diameter of only 2,160 miles.

During October our moon goes through its phases as follows:



SATURN RIDES THE GOAT

Ringed Saturn holds primacy in planetary honors in the evening skies of October. The brilliant full moon of the third will be the "harvest moon."

On the third it is full, on the eleventh at last quarter, on the 19th new, and on the 25th at first quarter.

On the 26th, at 6:34 p. m., eastern standard time, it will pass Saturn at a distance of about one moon diameter to the north of the planet. The evenings will be moonlit during the first few days of the month, and again from about the 23rd to the end.

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CHEMISTRY

Synthetic Rubber Made Equal To Natural Product

THE LATEST advances of American scientists in the laboratory battle to make this country independent of the importation of rubber from foreign sources were reported to the meeting of the American Chemical Society at Chicago. The creation of better artificial rubber substitute materials and tests of real rubber processed from plants raised in the Southwest were described. A method of strengthening inner tubes to make them more nearly blowout proof was also given.

The first synthetic materials to equal the elasticity and steel-like strength of natural rubber have been made in the laboratory of the DuPont Company at Wilmington, Del., Dr. Wallace H. Carothers, research chemist for this concern, revealed. These new materials also resemble rubber in their ability to crystallize when stretched, yet return instantly to their original amorphous condition when allowed to contract. Though not fully equal to natural rubber in most respects, the new product was said to be very greatly superior in some characteristics.

Dr. Carothers explained that this "artificial rubber" was made possible by chemical developments of the past three years that provided a new method of attack on the problem.

"Starting with vinyl acetylene, a compound made available by discoveries of Dr. J. A. Nieuwland of Notre Dame University," he explained, "our chemists have synthesized a large number of new compounds closely related to isoprene. At least two of them, chloroprene and bromoprene, are enormously superior to any other materials as starting points for the synthesis of rubber."

How to improve natural rubber to make its strength the same at any temperature from the freezing to the boiling point was told by A. A. Somerville, and W. F. Russell of the R. T. Vanderbilt Company, New York City. Commercial inner tubes, for example, become greatly weakened at high temperatures, they explained. This is the cause of frequent blowouts in hot weather and on long drives.

"By reducing the amount of sulfur used for vulcanization," their paper states, "to about one half of one per cent. on the rubber (two and one half to three and one half per cent. is the amount commonly used,) and using suitable accelerators in sufficient amount it is possible to make vulcanized rubber that shows as high tensile strength at one hundred degrees Centigrade as it does at room temperature."

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PLANT PHYSIOLOGY

Swamp Plants Grow Better When Roots Get Oxygen

SWAMP PLANTS, commonly supposed not to need air for their roots, nevertheless thrive better in aerated soils. It was demonstrated by recent researches of Dr. B. Elizabeth Dean of the University of Iowa.

Dr. Dean planted cattails, arrow-leaf, swamp hibiscus and several other wetland species in various types of soil, giving some the benefits of aeration around their roots and keeping the others in an air-lacking condition. All the plants grew, but the root-aerated ones did better than the others, developing more stem and leaf growth as well as lustier, deeper-growing roots.

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