

ASTRONOMY

Saturn Is Evening Planet

Venus disappears from view during the coming month. Low in the west, many of the brilliant constellations of winter are now making their last stands.

By JAMES STOKLEY

► THE CONSTANT drama of the skies brings a new actor into the center of the celestial stage during April. This is Saturn, which is seen to the southeast in the constellation of Virgo, the virgin.

A little below and to the right of the planet is the star Spica, about half as bright. Higher and farther left, however, is Bootes, the bear-driver, with the brilliant star Arcturus, which is about 20% brighter than the planet Saturn.

The planet, which shines by reflected illumination from the sun, has a steadier light than the glowing and distant stars, which show the characteristic twinkling of these bodies.

All these objects are shown on the accompanying maps, which depict the heavens as they appear around ten o'clock, your own kind of standard time, at the beginning of April, about nine at the middle of the month and eight at the end.

At midnight between April 13 and 14, Saturn will be in opposition—that is, directly opposite—to the sun. This means that it is near the eastern horizon about sunset and near the western horizon about sunrise, thus remaining visible through the night.

Venus Not Visible

Venus, on the other hand, which has been so conspicuous in the western evening sky during recent months, will be in "inferior conjunction"—between sun and earth—on the 13th. Thus it will both set and rise with the sun, and will not be visible at all.

However, during the first few days of April it may be possible to get a glimpse of Venus, shining brilliantly low in the west as dusk is falling. Perhaps by the end of the month, and certainly by the middle of May, it will be seen low in the eastern sky before sunrise.

Jupiter is still visible and is shown on the maps, low in the northwest in the constellation of Taurus, the bull. He is bowing out, for at the end of April he will set only about an hour and a half after the sun, just as twilight is ending, and in another month he, too, will be gone from the skies of evening.

On April 27, during morning hours, Jupiter will be close to Mars, which remains in the evening sky, though it is only as bright as a second magnitude star, and is not conspicuous.

As April comes and we begin to get well into spring, there is a characteristic change in the stars seen in the evening skies. Arcturus and Spica, which are near Saturn, have already been mentioned. They are taking the place of the brilliant constellations of winter, which are now making their last stand, low in the west. There is Orion, with the three stars in a row forming this warrior's belt, and first magnitude Betelgeuse above.

To the left of Orion is Canis Major, the great dog, with Sirius, the dog-star. Above this is the lesser dog, Canis Minor, with Procyon. Ascending still higher, and to the right, we come to Gemini, the twins, with brilliant Pollux. Castor, the other twin, is alongside, and somewhat fainter.

Vega Can Be Seen

Below this group, and farther right, stands Auriga, the charioteer, with Capella, and below this is Taurus, the bull, in which Jupiter is seen, along with the first magnitude star Aldebaran.

High in the south is Leo, the lion, with the star Regulus. This marks the end of the handle of a smaller group known as the sickle. Still another star of the first magnitude, though it does not look it, is shown low in the northeast. This is Vega, in Lyra, the lyre.

As low as this the absorption of its light by the atmosphere dims it greatly, but later in the night, as it climbs higher, it will shine more brilliantly. During coming months Vega will become more and more conspicuous, until by summer it will stand high overhead, the most brilliant star in the evening sky.

The planet Saturn, now with us through the night, is one of the most interesting of the heavenly bodies. At a distance from the sun of 886,000,000 miles, compared with 93,000,000 for the earth, it is the farthest of the planets visible to the naked eye, and was the most distant known planet until Uranus was discovered in 1781.

A year on Saturn is equal to about 29.5 of our years, since that is the time it requires for a complete revolution about the sun. It is second only to Jupiter in size, among the planets, with a diameter of 71,500 miles, compared to earth's 7,913 miles.

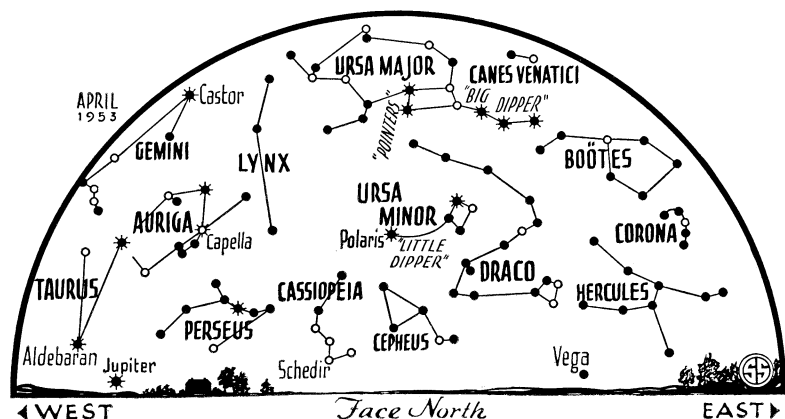
One of Giant Planets

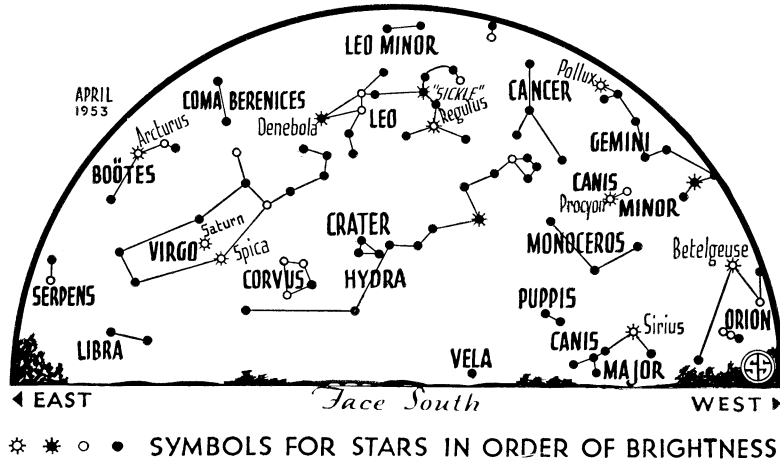
In structure Saturn resembles Jupiter, as well as Uranus and Neptune, which are the giant planets of the solar system. At the heart of the planet there seems to be a rocky-metallic core, less than 30,000,000 miles in diameter. Around this is a layer of ice—a frozen ocean—some 6,000 miles deep. This is surrounded by an atmosphere about 15,000 miles deep, consisting largely of hydrogen, ammonia and methane, which is the chief constituent of natural gas.

Much of the ammonia is condensed into clouds, and what we see when we look at it is the tops of these clouds. We cannot penetrate the dense atmosphere, but studies, with the spectroscope, of the light reflected by the planet's atmosphere tell us something of its composition.

With so much of its volume consisting of atmosphere, Saturn is the least dense of all the planets. Whereas the earth is about 5.5 times as heavy as an equal volume of water, and Jupiter about 1.3 times, Saturn is less than three-quarters as heavy as if it were made of water. If a big enough ocean could be provided, Saturn would float upon it, while all the other planets would sink!

The most amazing feature of Saturn, however, is the ring-system that encircles





the ball. No other planet is so equipped. With an outside diameter of 171,000 miles, the innermost ring is about 6,000 miles above the planet. Yet the thickness of the system is very small, perhaps not more than ten miles. They are much thinner, relatively, than would be a disk ten inches in diameter cut of thinnest tissue paper.

Rings Not Solid

However, the rings are not solid—and if they were they would not hold together. Actually they consist of a swarm of myriads of tiny moonlets, no larger than good-sized rocks, but all going around Saturn together.

The pieces are so small that from the earth we cannot separate them with the most powerful telescope, and the rings look solid, at least until they happen to pass in front of a distant star. Then the star shines through them, giving a clue to their nature.

No one knows exactly what caused the rings, but astronomical theory has demonstrated that within a certain distance of a planet, known as Roche's limit, a satellite could not hold together. The rings are well within this limit of Saturn while the closest of its nine large moons is outside it.

Some have supposed that a tenth moon once ventured too close and was broken to bits to form the rings. Indeed, it is believed that in the remote future our moon will get too close to the earth and suffer a similar fate. However, it seems more likely that the rings of Saturn represent material which, had it been farther out, might have gathered together to form a satellite.

In any event the rings, which are visible with a moderate-sized telescope, make Saturn one of the most beautiful objects to be seen in the heavens.

Celestial Time Table for April

- April EST
- 6 11:58 p.m. Moon in last quarter.
- 12 2:00 a.m. Moon nearest, distance 224,100 miles.
- 13 3:00 a.m. Venus between earth and sun.
- 3:09 p.m. New moon.
- 12:00 midnight Saturn opposite sun and nearest earth, distance 808,800,000 miles.

- 15 5:00 a.m. Mercury farthest west of sun, rises before sunrise.
 - 11:03 a.m. Moon passes Mars.
 - 8:37 p.m. Moon passes Jupiter.
 - 20 7:40 p.m. Moon in first quarter.
 - 24 3:00 a.m. Moon farthest, distance 251,800 miles.
 - 27 11:00 a.m. Mars passes Jupiter.
 - 11:00 p.m. Moon passes Saturn.
 - 28 11:20 p.m. Full moon.
- Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, March 28, 1953

CHEMISTRY

Rum Taste Told By Chemical Tests

➤ RUM RESEARCH in Puerto Rico has turned up eight "chemical methods" for tasting rum that supplement the personal opinions of tasting panels.

The chemical methods were developed over the last eight years at the University of Puerto Rico's Agricultural Experiment Station, which is expanding the facilities there with the addition of a distilling unit designed by Arthur D. Little, Inc., Cambridge, Mass.

The methods will be used to determine the quality of a test run of rum, advises Victor Rodriguez-Benitez, technical director of the pilot plant. Other tests will be conducted to reveal the suitability of waste products for other purposes, such as making cattle feed or fertilizer from the fermentation mash after the rum has been distilled from it.

Rum making is a multi-million dollar business in Puerto Rico. During a recent four-year period, rum revenues and taxes to the Puerto Rican government amounted to about \$215,000,000. This sum was split into funds for education, health services, hospitals, hydro-electric power, agricultural agencies, road building, aqueduct service, coffee crops, public works and social services.

The pilot plant at the University's experiment station aims to help Puerto Rican distillers build up the rum business even more.

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CHEMISTRY

Fundamental Structure For Protein Materials

➤ ONE FUNDAMENTAL pattern repeated with variations makes up most protein materials from gelatine to blood.

The pattern is that of a coiled spring, and the variations are found in whether the spring coils in the right-hand or left-hand direction and in how many fibers, themselves twisted, curl around one another to form the fibrous threads that make up the protein substance.

Reporting on two years of work on protein structure, Dr. Linus Pauling of the California Institute of Technology, told members of the American Chemical Society meeting in Los Angeles that hemoglobin, serum albumin from blood, an enzyme from egg white, and insulin, body chemical whose lack causes diabetes, have the same coiled form he had previously identified in horn, hair and skin. (See SNL, March 7, p. 150.)

Gelatine and collagen are simpler proteins whose structure also seems to follow the pattern. Three twisted chains appear to make up their fibers, although Dr. Pauling believes some modification of this structure will appear as his studies progress.

Silk fibers have a somewhat different structure, more like a pleated sheet than a twisted rope, the California experiments show.

Science News Letter, March 28, 1953

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