ASTRONOMY

Five Planets Now Visible

Brightest of these is Venus which appears long before any other star or planet. Annular eclipse of the sun is expected this month.

By JAMES STOKLEY

➤ ALL of the five planets that are ever visible to the naked eye—Mercury, Venus, Mars, Jupiter and Saturn—can be seen on evenings of May, though not simultaneously. Brightest of the quintet is Venus, which stands high in the west in the constellation of Gemini, the twins, at sunset. On May 18 it reaches greatest brilliance, magnitude minus 4.2 in the astronomical scale, about 120 times as bright as an average star of the first magnitude. Because of its splendor it appears long before any other star or planet, so there is little difficulty in locating it.

The position of Venus, nevertheless, is shown on the accompanying maps. These depict the sky as it appears at 11:00 p.m., your local kind of daylight saving time on May 1, an hour earlier in the middle of the month and two hours earlier at the end. By May 31, however, sunset is so late that it is not yet dark at 9:00 p.m. (8:00 p.m. standard time).

Toward the southwest, in the constellation of Leo, the lion, and Cancer, the crab, appear two more planets. Mars, red in color, is close to the star Regulus and passes about a degree north of it on May 15. It is now of magnitude 1, slightly brighter than the star. A few degrees to the west of Mars, just across the border in the next-door group of Cancer, is Saturn, of magnitude 0.6, which makes it about half again as bright as Mars.

Jupiter Second in Brightness

A planet that is second in brightness only to Venus (which exceeds it about seven times) appears in the east about an hour later than the times for which the maps are drawn. This is Jupiter, in Sagittarius, the archer, the group next to Scorpius, which is partly visible on the maps at the southeastern horizon.

Last of our planets is Mercury, which moves in the orbit nearest the sun. Thus it never remains visible long after sunset, but on May 28 it is in the best position of the year. It will then be in Taurus, the bull, just below Gemini, and its magnitude will be minus 0.7. As the sun goes down, it will be about 18 degrees above the horizon (it is 90 degrees to the zenith) and soon after that it may be glimpsed in the gathering dusk. By the time the sky is completely dark it will be gone from view.

Vega, in the constellation of Lyra, the lyre, in the northeast, is the brightest star visible these May evenings. Second is Capella, in Auriga, the charioteer, toward the northwest. High in the south, marking the figure of Bootes, the bear-driver, is Arcturus, third in our list. Below this group stands Virgo, the virgin, with Spica, another star of the first magnitude. Next to the right-hand end of that area we see Leo, the lion, with the star Regulus and the planet Mars, already noted.

Gemini Is Brightest Star

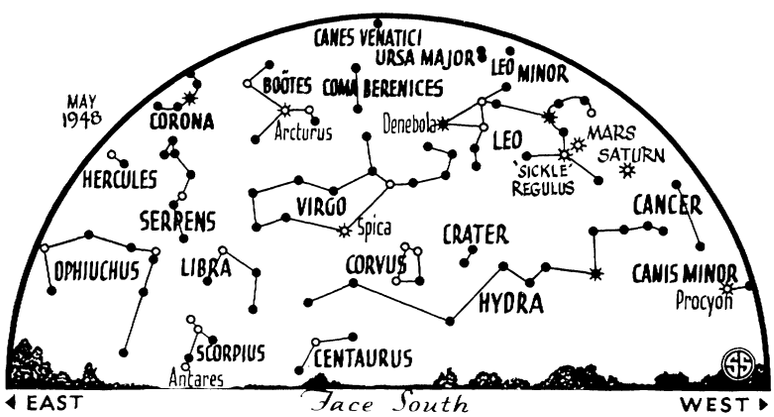
The brightest star in Gemini, where we see Venus, is Pollux. The star Castor, which marks the other twin, is second magnitude. Procyon, in Canis Minor, the lesser dog, seen low toward the west, is another of the first magnitude, as is Antares, in Scorpius. This, however, is so low in the sky, that its brightness is greatly dimmed.

Like the same month a year ago, May brings an eclipse of the sun, but there are important differences. That of May 20, 1947, was total. Because the sun is so much larger than the moon—864,000 miles as compared with 2,160—the shadow of the moon is conical. It tapers to a point at an average distance of 232,100 miles from the moon's center. As the actual distance between sun and moon changes, its length is altered also. Thus it can be as short as 228,200 miles or as long as 236,000 miles. The distance between moon and earth varies from 221,463 to 252,710 miles. Therefore the shadow does not always reach as far as the earth. It did last May, when the tip of its shadow swept across South America and Africa, and persons along that path saw a total solar eclipse with the sun completely hidden by the moon.

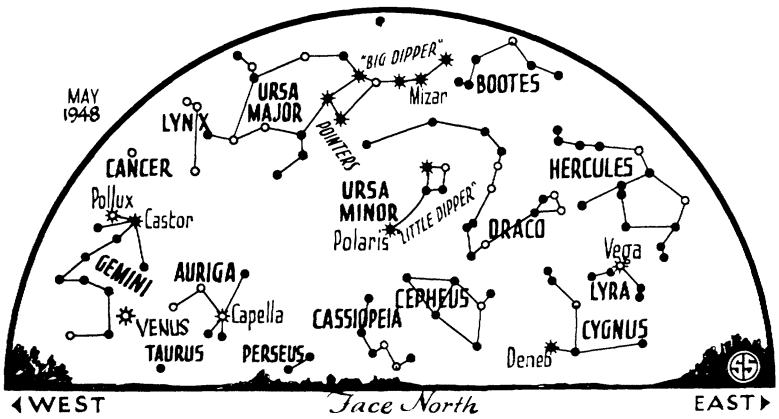
Annular Eclipse of Sun

Every time the moon is new it is nearly between sun and earth. On most such occasions, the lunar shadow passes either south or north of our planet and there is no eclipse, such as occurred in May, 1947. This year, on May 8, the moon is new, and again it is in line with sun and earth, only this time the shadow does not quite reach us. The result is an "annular," rather than a total, eclipse. Even along the path on the earth traced out by the direction of the shadow the sun is not completely covered. A ring of solar surface, called the annulus, remains visible around the lunar disk.

The path along which this occurs starts in the Indian Ocean, crosses Siam, China, the Sea of Japan, Japan, the Sea of Okhotsk, the Kurile Islands, the Pacific Ocean and the Aleutian Islands. At a point in the Sea of Japan, according to calculations, the tip of the shadow will be only five miles above the ocean. Since



☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



the computations are subject to this much uncertainty, it may be that from this position there will just barely be a total eclipse, with the sun's disk completely covered, but if so, it will be very brief.

A total eclipse permits complete observation of the sun's outermost layer, the corona, as well as other effects visible only at such a time. The remaining ring of sunlight prevents these at an annular eclipse, so ordinarily astronomers pay little attention to them. This time, however, the National Geographic Society, in collaboration with the State Department, the Coast and Geodetic Survey, the National Bureau of Standards, the Army, Navy and Air Force, will make observations from a number of locations along the path. Their aim will not be more knowledge of the sun, but of the earth. If the observations are successful, and made with sufficient precision, their analysis will yield the most accurate determination ever made of the size and shape of our globe. These should permit relative positions on the earth to be pinpointed within 150 feet or less. Now, in some cases, the precision of determination of a place may be in error by as much as several hundred feet up to a mile. In case of a war using long range missiles guided by automatic means, this increased precision might mean the difference between a hit and a miss on a vital target.

A rather curious feature of this eclipse, which is true of any that starts in the eastern hemisphere and ends in the western, is that it ends the day before it starts! The beginning of the 5,320-mile path is west of the International Date Line, at 180 degrees longitude, where it is already Sunday, May 9. But on the eastern side of the line it is still Saturday, May 8. By Eastern Daylight Saving Time, the eclipse will begin, at the western end of its path, at 8:45 p.m., and will reach the eastern end at 12:06 a.m. Over most of Asia, the northern part of the Pacific Ocean, Alaska and northwestern Canada, a partial eclipse will be seen, but nothing of this will be visible from the United States.

Time Table for May

May	EST	
1	8:00 p. m.	Moon farthest, distance 251,-200 miles
4	early a. m.	Meteors coming from direction of constellation of Aquarius
8	9:30 p. m.	New moon—annular eclipse of sun
12	4:33 a. m.	Moon passes Venus
15	3:14 a. m.	Moon passes Saturn
	11:00 a. m.	Moon nearest, distance 229,-800 miles
	7:55 p. m.	Moon in first quarter
16	12:15 a. m.	Moon passes Mars
18	4:00 a. m.	Venus at greatest brilliance.
22	7:37 p. m.	Full moon
24	5:57 p. m.	Moon passes Jupiter
28	8:00 p. m.	Mercury farthest east of sun, visible for a few days around this date shortly after sunset
29	3:00 p. m.	Moon farthest, distance 251,-200 miles
30	5:43 p. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Add one hour for the corresponding Daylight Saving Time.

Science News Letter, May 1, 1948

ATOMIC ENERGY

Uranium Is too Scarce for Use as Source of Fuel

➤ THE atomic bomb element, uranium, is so scarce it should not be used as a major source of fuel or power, a famous phvsicist warned.

Dr. Robert Andrews Millikan, Nobel prize winner in physics and retired head of the California Institute of Technology, declared that the world's supply of uranium is "easily exhausted."

He discussed atomic energy as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Uranium, he pointed out, is only six parts in a million in the earth's crust. It is "not quite as rare as gold, but it is exceedingly rare."

Even with other heavy elements as