

ASTRONOMY

Venus Enters Planetary Races

Moderate But Dependable Meteor Shower and Annular Eclipse Are Among Astronomical Events for August

THIS HAS BEEN a great year for planetary races. In May and early June, Mars and Jupiter staged such a contest in the evening sky, with the result that on June 4 diminutive Mars passed its huge plodding brother at a distance of about half the moon's diameter. This month the race is between Jupiter and Venus, and again the big planet is the loser.

For months Jupiter has been conspicuous in the evening, in the constellation of Leo, the lion. Its steady light, until recently brighter than any other in the vicinity, has made it easy to locate. But during the last month or two a rival has been creeping towards it. Rising higher and higher, night after night, in the western evening sky, is an even brighter planet.

This is Venus, which can now be seen for an hour or so after sunset. It is not shown on the maps accompanying this article because by 9:00 p. m. (standard time) in the middle of the month, which is the time represented by the maps, both Jupiter and Venus, and Mars as well, have already descended too low in the west. However, these planets are all so bright that they are quite easy to find about 7:30 or 8.00 p. m.

On the first of the month Venus is below and to the north of Jupiter, separated by about 15 degrees, which is the length of the handle of the Great Dipper. It is moving eastward at a speed of more than a degree a day. At the same time Jupiter is also moving in an easterly direction among the stars, but much more slowly; at least, his motion appears slower to us because he is so much farther away.

Venus passes Jupiter on August 17. At the moment when they are closest, Venus will be only a tenth of a degree to the south of its fainter companion. This will be about a fifth of the moon's diameter, and at that time it will take a rather keen eye to distinguish the two planets without some optical aid. Unfortunately, however, this spectacle will be of more immediate interest to the Chinese than to us, because at the time when they are closest, 6:00 a. m., east-

ern standard time, on Thursday the seventeenth, neither planet will be visible from any part of the United States.

But on the evening of the sixteenth they will be very close, separated by less than the moon's diameter, with Venus still to the north. When they appear the following evening, the latter planet will already have passed Jupiter, and will be only a little more than the moon's diameter to the other side. Then Venus will continue to draw away from Jupiter and pursue Mars. But that planet is itself moving rather rapidly, and not until October 14 will it be overtaken by the pursuer. Long before that time Jupiter will have disappeared completely from the evening sky for the season.

Brightest Planet

Venus is now brighter than any other planet can ever become, of the minus 3.4 magnitude, in the astronomer's scale. Jupiter, the second brightest of the planets, is of magnitude minus 1.2. Mars, which is now rather unfavorably situated because it is unusually far away, is only as bright as one of the fainter first magnitude stars. Its steady light and ruddy color, however, make it easy to identify.

Still brighter than Mars, though not as brilliant as the other two, is the fourth planet which decorates the eve-

ning sky of August. This is Saturn, famous for the system of rings with which it is encircled. As shown on the map, this body is in the southeastern sky in the constellation of Capricornus. Its magnitude is plus 0.4.

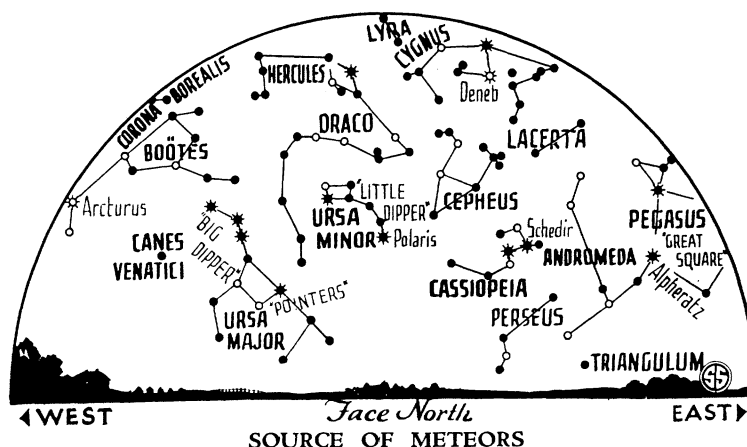
Mercury, the last of the naked eye planets, is not visible at all in the evening this month but if you want to see it you can do so if you get up before sunrise on Thursday, the seventeenth. At that time, when people on the opposite side of the world, where the sun has just set, will be able to see the conjunction of Venus and Jupiter, you will be able to see Mercury, low in the east. On that day it will be at the position called greatest eastern elongation, when it rises in the east just before sunrise.

Five first magnitude stars can be seen these August evenings, and all are shown on the charts. Brightest is Vega, which marks the constellation of Lyra, and is now at the zenith. Only three stars in the sky exceed Vega in brilliance, and only one of the three, Sirius, the dog star, which appears in the winter heavens, can be seen from the latitude of most of the United States.

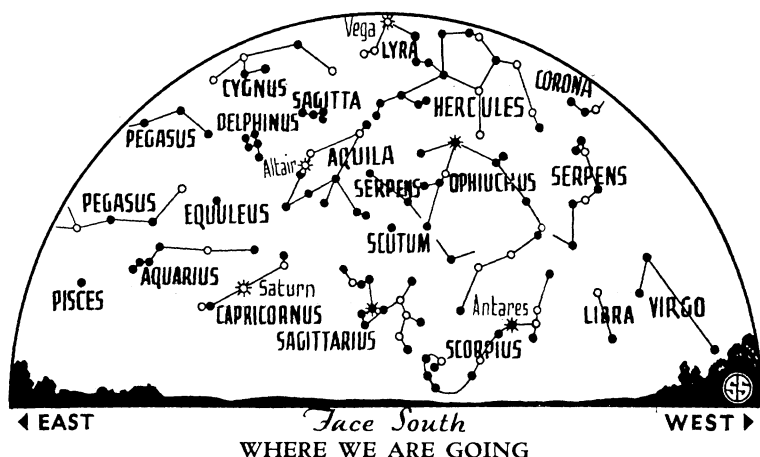
If Vega were at the distance of the sun, which fortunately it is not, it would send us fifty-one times as much light as that body. Its distance is so great that the light which reaches us from it tonight has been on the way since 1907, for the planet is 26 light years from us.

Lyra is also of interest because that is

* * • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



August's meteors on the nights of the eleventh and twelfth will appear to radiate from the constellation of Perseus.



The constellation Lyra, marked by the month's brightest star, Vega, indicates the direction the sun with all its planets is taking through the heavens.

where we are going. It is often stated that the earth moves in a circle around the sun. So it does, but the sun itself is moving along, carrying the earth and all the other planets with it, so that our real motion among the stars is a helix, like that of a corkscrew.

This motion is shown by observing how the stars seem to be moving towards or away from us. Of course, the motion of the stars is somewhat at random, but if a large number is considered, one would think, just as many would be approaching as would be receding. This is the case, but the approaching and receding stars are not uniformly distributed. In one direction, the majority of the stars are coming towards us, while in the opposite part of the sky most of the stars are receding.

The reason for this has long been known. It is that the motions are not made up solely of the stars' own movement, but are combinations of the stars' and the earth's motions. One group of stars seems to be approaching because we are approaching them. So also we are leaving behind those in the opposite part of the sky. Thus is found the speed of the solar system through space, which is so fast that in a year we travel four times 92,900,000 miles, the approximate distance from the sun to the earth.

Such studies also enable us to find the direction of this motion, which turns out to be towards the constellation of Lyra. If Vega were not itself moving, we should be there in 475,000 years. But at the end of that time, Vega will have moved on to other parts of the universe.

Second brightest star now visible is Arcturus, almost directly west. During the last few months the distance of this star has become pretty well known, for

its light, which had been travelling for forty years, was used to start the illumination of Chicago's Century of Progress exposition in May. Arcturus is in the constellation of Bootes.

Third in brilliance is Altair, in Aquila, the eagle, which appears in the southeast. High in the east is Cygnus, the swan, with Deneb to mark it. Sometimes this constellation is called the northern cross, and Deneb is at the northern end of the cross. The remaining bright star of the five mentioned is Antares, in Scorpius, the scorpion, which is low in the southwest. The realistically curving tail of the beast makes this constellation rather conspicuous.

Moon to Hide Meteors

Last November we heard a great deal about meteors. Although the shower scheduled for that month did not give a performance equalling its great appearances of the past, it did put on the best show of many years. Perhaps this November will see them in even greater numbers. But during this month of August you can see one meteor shower which can usually be depended upon for an interesting display.

On the nights of August 11 and 12, especially after midnight, if you watch the eastern sky you will see these shooting stars. On almost any clear evening you can see them at the rate of about one an hour, but on the nights mentioned they may be as frequent as one or two a minute. Some may be as bright as a first magnitude star and may even leave trails which will last for a few seconds, but most will be fainter. Unfortunately, the moon is at last quarter on the twelfth, which means that it will rise at midnight, and its glare will blot out the fainter meteors.

These are called the "Perseid meteors," because they seem to radiate from the constellation of Perseus. Actually, this is an effect of perspective. The meteors are moving in parallel paths and, when they strike the earth's atmosphere and are burned to gas in a flash of light, the paths seem to converge in the distance just like the parallel tracks of a railroad.

The meteors move around the sun in an elliptical swarm which extends out to the regions of the planet Pluto, discovered a few years ago. The stream crosses the earth's orbit at the point we occupy in mid-August and so at that time many of them enter the atmosphere and are destroyed. But there are such vast quantities of meteors that these displays are likely to continue for ages.

As usual, astronomers who specialize in the study of meteors have asked the cooperation of the public in observing them. Dr. Charles P. Olivier, director of the Flower Observatory of the University of Pennsylvania, in Philadelphia, requests such reports. The simplest report is a half-hourly count of the total number of meteors seen during that period with the time of any particularly brilliant meteor and the length of time that its path remains visible, if it persists. A person with a little more astronomical skill might plot the meteors on a star map.

During August the moon is full on the fifth, at last quarter on the twelfth, new on the twenty-first and at first quarter on the twenty-eighth. Thus there will be moonlight evenings from the beginning of the month until about the seventh, and from about the twenty-fifth to the end. Incidentally, on the twenty-first the moon comes between the earth and the sun, producing a solar eclipse, but it will attract practically no scientific interest. This is because it is an annular eclipse, happening when the moon is so far from the earth that the sun is not completely covered. Even at mid-eclipse a ring of sunlight will remain visible.

The path over which this will be seen crosses Egypt, Palestine, Persia, Indo-China, Borneo and Australia. Over central and eastern Europe, northeastern Africa, all Asia but the northeastern part and over all Australia the sun will be seen partially eclipsed with the moon covering only a slice of its face. Because the sun will not be completely covered as seen from any part of the world, the many features of a total eclipse, for which astronomers often travel thousands of miles, will not be apparent.