

ASTRONOMY

Three Planets Now on View

Three planets, Venus in the west, Jupiter in the east and Saturn higher and farther to the south will appear in the July evening sky, James Stokley reports.

➤ FOLLOWING the early part of 1962, when no planets were on view in the evening sky, we now have three that are easily visible. These are shown on the accompanying maps, which give the appearance of the skies at about 10 p.m., your own kind of standard time, an hour earlier at the middle of the month and two hours earlier at the end. (Add one hour for daylight saving time.)

The brightest of the trio is Venus, which remains visible low in the west for about two hours after sunset. Venus is now so brilliant (magnitude minus 3.6 on the astronomical scale) that it appears long before any other star or planet.

Later in the evening, as Venus is about to descend below the western horizon, Jupiter appears above the eastern. It is about a quarter as bright as Venus, which still makes it many times brighter than any of the other planets. Later during the night Jupiter will be more easily seen as it climbs higher in the sky, in the constellation of Aquarius, the water carrier.

A little higher than Jupiter and farther south—across the border in the next-door constellation of Capricornus, the sea-goat—the third planet of July evenings is visible. This is Saturn, now about a fiftieth as bright as Venus. Even so it equals a bright first-magnitude star.

Antares Appears in South

As for the stars, which shine by their own light (unlike the planets which are visible because of the sunlight they reflect to us), one that is very characteristic of evenings in summer appears low in the south. This is Antares, in the group called Scorpius, the scorpion. The red color of the star makes it easy to identify. To the right of this group is a rather faint constellation—Libra, the scales—and to the right of it is Virgo, the Virgin. Here there is another bright star, also first magnitude, called Spica. And above Virgo, in Bootes, the herdsman, is still another: Arcturus.

High in the eastern sky—nearly overhead, in fact—is brilliant Vega, in Lyra, the lyre. Below it, and a little to the right, is Deneb, in Cygnus, the swan. Both of these stars are shown on the map of the northern sky. But near them, to the left of Deneb, and shown on the southern map, is Altair, in Aquila, the eagle. Vega, Altair and Deneb form a large and conspicuous triangle in the eastern sky these evenings.

Look to the northwest to see the familiar group of seven stars in Ursa Major, the great bear, called the great dipper in the United States and Charles's Wain in England. Alkaid, Mizar and Alioth (none as bright as the first magnitude) form the

handle of the dipper. Dubhe and Merak form the bowl. They are called the pointers, because they indicate the direction of Polaris, the pole star, which is in Ursa Minor, the little bear.

On July 1 Mercury is farthest west of the sun, and can be seen above the eastern horizon for a few mornings around this time just before sunrise.

Mars is now approaching earth and has reached first magnitude brightness. It is in Taurus, the bull, and rises in the east about three hours ahead of the sun.

Neptune is closest in July, at a distance of 830,700,000 miles on the 31st, when it will be directly opposite the sun. But although it is in Libra, its magnitude is 7.7, too faint to be seen with the naked eye.

And on July 4 the earth is at "aphelion," or farthest from the sun for the year, at a distance of 94,453,000 miles. Despite this we are now having summer in the Northern Hemisphere, because the sun now climbs high into our sky and its rays fall more directly on the ground than they do in winter. And it takes longer from sunrise to sunset, which also increases its heating effect.

Although July brings two eclipses, prob-

ably few of our readers will see either of them. The first, on July 17, is a "penumbral" eclipse of the moon. The second comes July 31, when there is an "annular" eclipse of the sun.

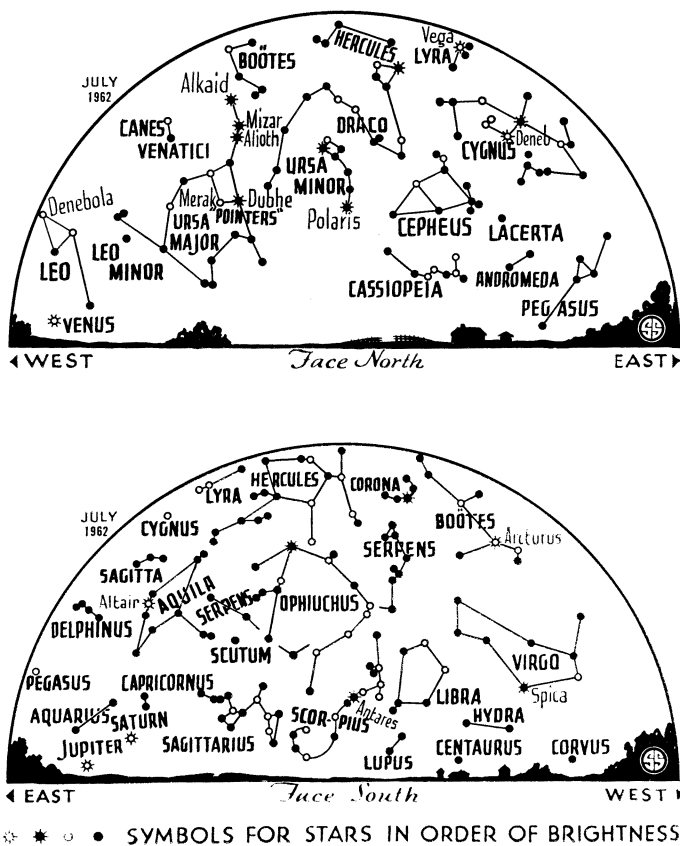
The shadow of the earth, and the moon as well, is in two parts. In the center is the dark "umbra," where the earth would completely block the sun's light on the moon. Around this is the "penumbra," where the planet blocks out only part of the sun's light.

Full Moon Opposite Sun

Every time the moon is full, it is in the opposite part of the sky from the sun. Then its entire sunlit half is visible to us. Generally, however, it passes completely above or below the shadow. Sometimes, however, as it does in July and August, it enters the penumbra, but not the umbra, and this is a penumbral eclipse.

On other occasions, part of the moon enters the umbra, which causes a partial lunar eclipse. And sometimes there is a total eclipse, when it is completely immersed in the umbra. With an umbral eclipse, either partial or total, the shaded part of the moon is noticeably darkened. But when it enters the penumbra, as it will on July 17, there is still so much sunlight falling upon it that it shines almost as usual. Only a keen eye can detect that it is somewhat dimmed.

The moon's shadow, too, has both an



umbra and a penumbra. The former has the shape of a cone; it tapers to a point at about the distance of the earth from the moon. At the phase of new moon, it is always in the same direction from earth as the sun, but generally the shadow, both umbra and penumbra, passes either north or south of our planet and there is no eclipse.

But even when the point of the conical umbra is aimed directly toward the earth, there may not be a total solar eclipse. However, sometimes the tip of the shadow does reach our globe. Then it traces out a band, perhaps a hundred miles wide and several thousand miles long, where the total eclipse is visible. Around it is a much larger region, where the penumbra touches earth, in which people can see a partial eclipse of the sun.

But at other times—such as July 31—the tip of the inner shadow is pointed toward the earth but does not reach us. In other words, the moon is far enough away that its apparent disc is smaller than the sun's. And even though the moon may come in front of the sun, that body is not completely hidden. A ring of the solar surface remains visible around the lunar disc. The Latin for ring is "annulus," so this is called an annular (not annual) eclipse.

On July 31, the path of the annular eclipse starts as the sun is rising in the interior of Venezuela. It passes eastward, over Brazil and the Guianas, the Atlantic Ocean and Central Africa, ending just east of Madagascar at sunset. A larger area will experience a partial eclipse. This includes northern South America, Florida (where the sun will rise eclipsed), the Atlantic Ocean, all of Africa, the Mediterranean Sea, Spain, Sicily, part of Arabia, and the western Indian Ocean.

Celestial Time Table for July

July	EST	
1	7:00 a.m.	Mercury farthest west of sun
	6:53 p.m.	New moon
4		Earth farthest from sun, distance 94,453,000 miles
5	2:00 a.m.	Moon passes Venus
8	7:00 a.m.	Moon farthest, distance 251,300 miles
9	6:40 p.m.	Moon in first quarter
17	6:41 a.m.	Full moon (penumbral eclipse)
20	5:00 a.m.	Moon nearest, distance 227,000 miles
	1:00 p.m.	Moon passes Jupiter
23	11:19 p.m.	Moon in last quarter
26	11:00 p.m.	Moon passes Mars
29	early a.m.	Meteors visible radiating from constellation of Aquarius
31	7:24 a.m.	New moon (annular eclipse)
	2:00 p.m.	Neptune nearest earth, distance 830,700,000 miles

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

• Science News Letter, 81:394 June 23, 1962

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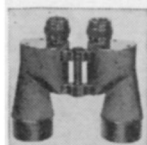
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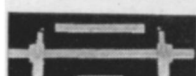


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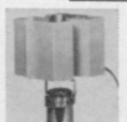
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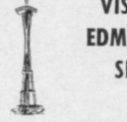
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