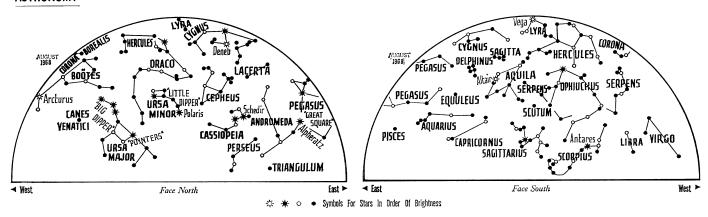
#### **ASTRONOMY**



# Vega shines overhead

By James Stokley

Although no planets are easily visible on August evenings, the brightest star is overhead, at the times for which our maps are made.

These show the skies as they look about 11:00 p.m., local daylight saving time, at the beginning of the month. They appear similarly at 10:00 p.m. in the middle and at 9:00 p.m. as September begins.

Vega, the brightest star, is at the zenith in Lyra, the lyre. Just to the east (shown partly on each map) is Cygnus, the swan, with the star called Deneb. It is about a third as bright as Vega. High in the south, in Aquila, the eagle, stands Altair. This star is between the other two in brilliance.

The constellation of Scorpius, the scorpion, is near the southern horizon. Its bright star is red Antares. so low that atmospheric absorption dims it.

In the west (shown on the northern sky map) stands Bootes, the herdsman, with Arcturus. This is just to the left of the familiar Big Dipper in the great bear, Ursa Major. A good way to find Arcturus is to follow the curve of the Dipper's handle to the left.

No planet appears on the maps, but

you can see Jupiter earlier in the evening, especially at the the beginning of August. Then it sets about an hour after the sun. It appears as a very bright star, near the western horizon, soon after sunset. Venus also is now in the evening sky, but it sets about half an hour after the sun. Thus, it is very hard to see, because the sky is still very bright.

You'll enjoy moonlit evenings for about the first 10 days of August and the last two. On Aug. 1 the moon will be at first quarter, setting about midnight. It will be full on the eighth, remaining visible all night. By the 10th, moonrise comes about 9:30 p.m., as twilight is ending. New moon comes on the 23rd. By the 28th it will be a large crescent, setting about 10:00 p.m. On the 30th first quarter comes again.

The principal changes that one can ordinarily see on the moon occur as sunlight strikes its surface at various angles. At new moon it's in the same direction as the sun. The illuminated half is turned away from us. A few days later it has moved east of the sun and remains above the horizon, low in the west, for an hour or more after

sunset. A narrow sliver of the bright half is turned to our view, so we see it as a narrow crescent.

Moving farther and farther from the sun toward the east, the crescent enlarges and become a half moon at the phase of first quarter, about a week after new moon.

Then another week passes. It is opposite the sun, so it rises about at sunset and sets at sunrise. The entire sun-



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## CELESTIAL TIMETABLE FOR AUGUST

August	E.D.	T.	
1	2:35	p.m.	Moon in first quarter
4	11:00	p.m.	Moon nearest, distance 227,600 miles
7	7:00	a.m.	Mercury behind sun
8	7:33	a.m.	Full moon
13	6:00	p.m.	Moon passes north of Saturn
15	10:14	p.m.	Moon in last quarter
16	11:00	p.m.	Moon farthest, distance 251,200 miles
18	3:00	a.m.	Venus passes north of Jupiter
23	7:57	p.m.	New moon
25	6:00	a.m.	Moon passes north of Venus
30	7:35	p.m.	Moon in first quarter
	10:00	p.m.	Moon nearest, distance 229,800 miles

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lit half is now toward us so we have full moon. Then the moon "wanes." It goes through the phase of last quarter when it rises about midnight. After that it becomes a crescent, which narrows as the bright hemisphere turns away. About four weeks (actually 29.5 days) after it was new it is new again. The cycle starts over.

The dark areas that form the face of the "man in the moon" are called "seas." Early observers mistakenly thought them to be large bodies of water. With a telescope you can see other lunar features such as craters and mountain ranges. A good pair of binoculars will show some of the larger craters-100 miles or more in diameter.

Astronomers once thought that the lunar craters were similar to those of volcanoes on earth, but now many think they resulted from meteorites which hit the moon at high speed and exploded. This would produce a crater like that produced on earth by an aerial

Of course, meteorites contain no explosive, like the TNT of a bomb, but they don't need it. Falling at high speed, they have tremendous energy. When they hit, they penetrate only a short distance before they stop.

Their energy does not just disappear; it is converted to heat. There's enough heat to vaporize the meteorite itself as well as much of the ground around it. This sudden generation of large volumes of expanding gas make the explosion. Much solid matter is thrown upwards and some falls back into the crater. The rest forms a wall around it. A number of craters on earth were similarly formed.

However, there may be some volcanic activity on the moon. Many astronomers have reported on bright spots that appeared briefly on the dark part of the moon during the past four centuries. But such reports were seriously questioned, for the moon was supposedly a dead world, where nothing ever happens.

1n 1958 a Russian astronomer, N. A. Kozyrev, reported such spots and he was followed by others. Two astronomers at the Lowell Observatory in Arizona said they saw such spots in the fall of 1963. Later they saw them again, and so did other astronomers.

In the United States astronomers have started the "Moon Blink" program to watch the moon carefully, with special equipment, to detect such events.

Not enough is yet known to explain these effects, even though their reality seems clearly demonstrated. Probably a discharge of hot gases from beneath the lunar surface is involved. This is something else that astronauts will have to investigate when they get to the moon

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