ASTRONOMY

Saturn Shines in South

The planet Saturn, visible all night in the southeast, and the brilliant star Vega, directly overhead, brighten the summer evening skies.

By JAMES STOKLEY

➤ FOR THE FIRST TIME since last winter, the planet Saturn is now on easy view in the evening sky, shining as brightly as a first-magnitude star and visible all night. On Aug. 24 it will be directly opposite the sun. Its distance from earth will then be 815 million miles.

Saturn's position in the southeast, in the constellation of Aquarius, the water carrier, is shown on the accompanying maps. These depict the sky as it looks about 11:00 p.m., your own kind of daylight saving time, at the first of August; an hour earlier at mid-month and two hours earlier at the end.

Farther right, almost directly south, are two characteristic constellations of the summer evening. To the left is Sagittarius, the archer, and to the right Scorpius, the scorpion, with the bright red star called Antares. This, by the way, is a supergiant star of low density. Its diameter is approximately 480 times the sun's, which is 864,000 miles.

Vega Directly Overhead

Directly overhead shines the brightest star of the summer evening: Vega, in Lyra, the lyre. Just below, toward the east, is Cygnus, the swan, with Deneb the brightest star. Both these constellations are shown partly on the northern and partly on the southern sky maps. High in the south—about half way from Vega to Saturn—is another bird. This is Aquila, the eagle; in it is the bright star Altair.

All these stars rank as first magnitude on the astronomical scale of brightness. And one more of similar brilliance shines in the west. This is Arcturus, in Bootes, the herdsman. A good way to find this star is first to locate the "big dipper," in the northwest. Perhaps you know the "pointers" whose direction guides you to Polaris, the pole star. Following the curve made by the handle of the dipper brings you to Arcturus.

Coming into view in the east is a well known stellar grouping in Pegasus, the winged horse. Although not a constellation, the "Great Square," is a striking star figure. The star called Alpheratz which marks one of the corners, is actually, in the next-door constellation of Andromeda. A little to the left are Cepheus and Cassiopeia. These three are linked in a famous myth, for Cephus and Cassiopeia were the king and queen of ancient Ethiopia, and Andromeda was their daughter.

By midnight in the middle of August, Jupiter is well into the sky, in Taurus, the bull. The planet is about 12 times brighter than Saturn. About two hours after midnight two more planets appear, in Gemini, the twins. One is Mars, less than half as bright as Saturn; the other, brilliant Venus.

Low in the northeast, just below Cassiopeia, part of the constellation Perseus is shown on our northern sky map. Mythologically, this represents the great hero who rescued Andromeda after she had been chained to a rock on the sea-coast, to provide a snack for a sea monster.

In the evening Perseus is so low that you cannot see it to advantage, but later in the night it climbs higher into the eastern sky. During August this area has a special interest, for that is the region from which the August meteors seem to radiate.

A meteor is commonly called a shooting —or falling—star. Actually it is a small bit of cosmic dust, seldom larger than a pinhead, moving through space at high speed. When one enters the earth's atmosphere, it encounters many air molecules, which are relatively numerous even at such high altitudes. Friction with these molecules heats the meteor until it evaporates. Then the evaporated atoms collide with more air atoms, which give off light. These form the visible part—the luminous streak that flashes briefly across the sky and that has a diameter much larger than the original solid meteoric particle.

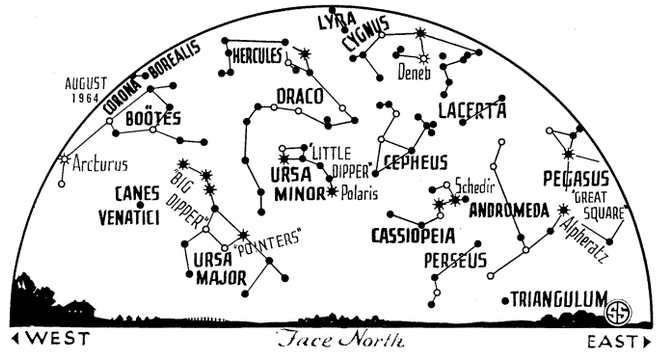
Generally a meteor first appears about 80 miles above the ground, and disappears at about 50 miles. The length of the visible path may be as much as several hundred miles, depending on the angle at which the meteor enters the atmosphere. The meteor's speed is usually around 20 miles per second but varies above and below depending on whether it meets the earth head-on, or has to catch up with it.

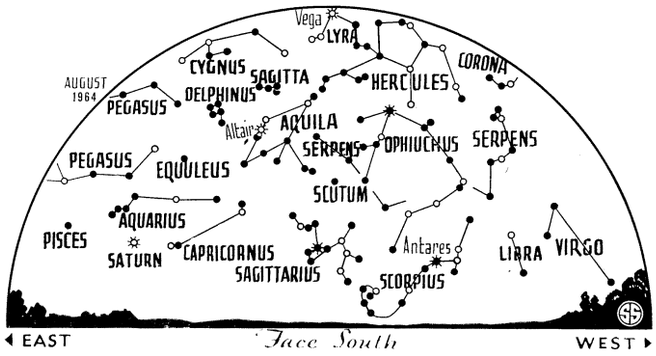
Random Meteors Visible

On any dark night, if you watch long enough, you will see a few random meteors. But at certain times of the year, particularly about Aug. 12, you may see many more—perhaps one every minute or two. There are always more after midnight than before. Then the earth is head-on, sweeping up all in its path. In the evening only those meteors moving fast enough to catch up with the earth are visible.

Sporadic meteors, seen throughout the year, may move across the sky in any direction. But those we see in August seem to radiate from the constellation of Perseus —hence they are called the Perseid meteors. At other times of the year they seem to radiate from other constellations, as, for example, the Leonids, that appear in mid-November, apparently originating in Leo, the lion.

Actually this effect is one of perspective, for the meteors are moving through space in parallel paths. Like the parallel tracks of





SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

a railroad, these seem to converge in the distance; this happens in August to be in the direction of the stars of Perseus.

To see the Perseids at their best, you need a dark sky, preferably away from the glare of a city. Sometimes the moon interferes. If it happens to be a few days past the full phase, it will be shining brightly in the sky when you want to see the meteors. Its glare will blot out all but the brightest.

But this year the moon is new on Aug. 7, so on the 11th it will still be a crescent, setting in the west well before midnight. So take advantage of this opportunity if you can on the night of the 10th, or even later. It takes several days for the earth to go through the shower.

Celestial Timetable for August

AUG.	EDT	
1	11:00 p.m.	Moon passes Jupiter
4	noon	Moon passes Venus
5	11:00 a.m.	Moon nearest, distance 225,600 miles
	3:00 p.m.	Mercury farthest east of sun
7	3:17 p.m.	New moon
9	10:00 a.m.	Moon passes Mercury
12	early a.m.	Perseid meteors visible
14	11:20 p.m.	Moon in first quarter
17	8:00 a.m.	Moon farthest, distance 251,400 miles
23	1:26 a.m.	Full moon
	3:00 a.m.	Moon passes Saturn
24	4:00 p.m.	Saturn opposite sun, 815,000,000 miles distant from earth
28	7:00 a.m.	Venus passes Mars
29	6:00 a.m.	Venus farthest west of sun
	9:00 a.m.	Moon passes Jupiter
30	5:16 a.m.	Moon in first quarter

Subtract one hour for CDT, two hours for MDT, and three hours for PDT.

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SPACE

Stars Grounded By Test Cockpit

➤ SPACE ENGINEERS will soon be watching stars, planets and other space objects fly by their windows, without ever leaving the ground.

A six-foot "star globe" will provide a background of distant stars on the view screens of a simulated cockpit. The globe has five television cameras at its center that look out at hundreds of tiny light sources on the inside of the sphere. A rotating mask will provide an artificial horizon.

A second group of cameras, mounted on rails in a darkened "model room," will project the image of a scale model of whatever planet or space vehicle the "pilot" is approaching in his simulated mission.

An electronic computer will coordinate the system, produced by Douglas Aircraft Company's Missile and Space Systems Division, Santa Monica, Calif., so that the images will move about, or grow or diminish in size, as the "pilot" varies the speed and direction of his spacecraft.

Called OLAFS (Orbiting and Landing Approach Flight Simulator), the system will be ready for use in August. It will first be used by Douglas engineers investigating control systems for a manned orbital research laboratory.

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