

ASTRONOMY

Jupiter, Saturn Shine in South

Two bright planets, Jupiter and Saturn, join the stars for a fine evening show. Also brightening August skies is a meteor shower, due about the eleventh.

By JAMES STOKLEY

THE EVENING SKIES of summer generally are not as spectacular as those of winter because there are not as many bright stars in the part of the sky now visible. But this August there is a display that rivals a January evening at its best, for two bright planets have joined the stars.

The planets are Jupiter and Saturn. Their positions are shown on the accompanying maps, which depict the skies as they look about 10:00 p.m., your own kind of standard time (add one hour for daylight saving time) at the first of August, an hour earlier at the middle and two hours earlier at the end of the month.

Jupiter is the most prominent, with a brightness of minus two on the astronomer's scale of magnitude. It stands in the constellation of Ophiuchus, the serpent-bearer. To the right is Scorpius, the scorpion, which extends to the curved line of stars just below Jupiter. Antares, distinctly red in color, is the brightest star in the group. Although a first-magnitude star, it is only about a fifteenth as bright as Jupiter.

To the left of Jupiter is the constellation of Sagittarius, the archer. While it takes a vivid imagination to see his figure, the stars of this group do form a rather good teapot. Its spout comes close to Jupiter and its lid is a little farther to the left. Still farther are the four stars that mark the handle, and to the left of them shines the other planet, Saturn. Its magnitude is 0.4, somewhat brighter than Antares, but less than a quarter as bright as Jupiter.

Almost directly overhead, for the times of the maps, is another star of the first magnitude: Vega, in Lyra, the lyre. Just below it, toward the east, is Cygnus, the swan, with the star called Deneb. This is shown on the map of the northern half of the sky. And high in the south, between Cygnus and Sagittarius, flies the eagle, Aquila. In this is still another first-magnitude star, Altair.

The Pointer Stars

To the northwest is the most familiar of all star groups, the great dipper, which is part of Ursa Major, the great bear. In the bowl of the dipper, which is downwards, are the two stars known as the pointers. Upwards and to their right is Polaris, the pole star. This is at the end of the handle of the little dipper which, in turn, is part of Ursa Minor, the lesser bear.

By following the curve of the big dipper's handle toward the west, the last of our first magnitude stars now visible can be found. This is Arcturus, in Bootes, the bear-driver.

Directly west of Lyra is the large constellation of Hercules, which represents the famous strong man of mythology. To his west is a little semicircle of stars: Corona, the crown.

And between Cygnus and Aquila are two interesting small constellations. One is Delphinus, the dolphin, formed of five rather faint stars. This group is sometimes called "Job's Coffin." The other, to the right, is Sagitta, the arrow. It is composed of four faint stars that really are arranged in the figure of an arrow.

An hour or so after midnight, toward the east, Taurus, the bull, rises into view. This is one of the constellations that make the summer skies so brilliant. In it now shines a third bright planet, ruddy Mars, which is about equal to Jupiter in brightness.

By looking toward the eastern horizon just as day is breaking and the sun is about to rise, around Aug. 5, Mercury may be seen. This planet is the nearest of any to the sun, and is never visible except just after sunset or, as now, before sunrise.

Venus, the only one of the naked-eye planets not mentioned thus far, is now following the sun across the sky, but it is so low in the west at sunset that it is difficult to locate.

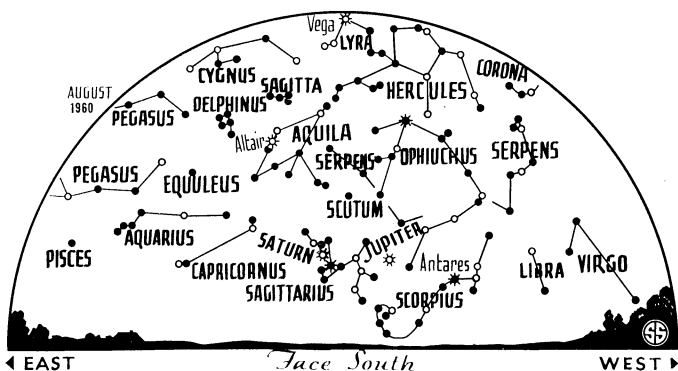
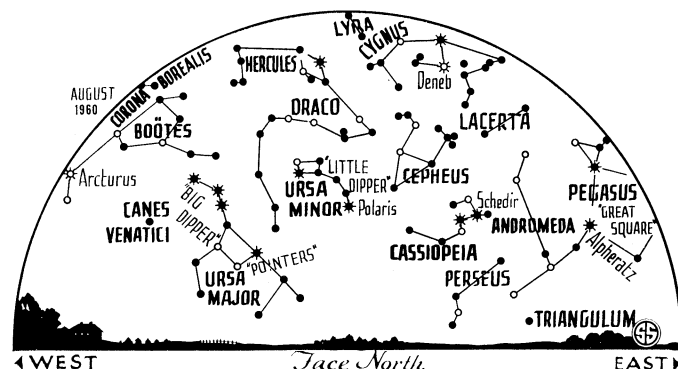
On any dark, clear night, if you watch the sky long enough, you will see a "shooting star," a moving point of light that suddenly appears and quickly vanishes. Actually it is not a star at all, but a tiny granule of cosmic dust that enters the earth's atmosphere at high speed. Then it is quickly heated by friction with the air, and there is the flash of light which you see.

August Meteor Shower

On the average, during the year, one observer can see about seven of these meteors in an hour. But at certain times they are much more numerous, as earth encounters a meteor shower. This will occur about Aug. 11, and that night you may be able to see as many as 50 meteors an hour.

Some of these will be strays that happened to arrive at this time, but those of the shower will all seem to radiate from the same part of the sky—the constellation of Perseus—which is shown on the northern sky map, low in the northwest. Actually, these meteors are moving in parallel paths, and they seem to come together in the distance because of perspective. It is the same effect that makes the parallel tracks of a long straight railroad line seem to converge toward the horizon.

The Perseid meteors are moving around the sun in a huge elliptical orbit, in which they are quite uniformly distributed. Their orbit crosses the earth's orbit at the point



* * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

the earth reaches about Aug. 11. So every year, as the earth passes through the swarm's orbit, the Perseid shower appears. The meteors we see, of course, are destroyed but there are so many in the swarm that the shower will continue to appear every August for a long time to come.

There are always more meteors after midnight than before, because of the way the earth turns. If you were far away from the solar system, toward the north star, and looked toward the sun, you would see that the planets were going around the sun in a counter-clockwise direction, and that the earth itself was rotating in the same way.

That means that, from noon to midnight, we are on the rear of the advancing planet, and any meteors we see in the evening hours have to catch up to us. But in the early morning hours, we are on the front and we run into meteors. On Aug. 11 this year the moon rises in the late evening. After that, its light may keep you from seeing some of the fainter meteors.

Astronomers have made many studies to determine the speed of meteors when they end their existence as "shooting stars." The average is about 45 miles per second, to which must be added, or subtracted, the earth's speed in its orbit around the sun. This is about 18.5 miles per second. Thus a meteor which would be seen after midnight, hitting our planet head-on, might have an apparent speed of 60 to 65 miles per second. But one that has caught up to us, seen in the evening, might seem to be moving at only 25 miles per second, which is still about 50 times the speed of a bullet from a high-powered rifle.

The faster a meteor moves, the more friction it causes as it hits air molecules. This makes it hotter, and bluer in color, as well as brighter. One that weighs only a thousandth of an ounce, coming in at high speed, might shine for a moment as brilliantly as a first magnitude star. Coming in more slowly, it might reach only the fifth magnitude, which is barely visible to the naked eye.

Dr. Fletcher Watson of Harvard University has estimated that several billion meteors reach earth every day, with the vast majority well below naked-eye visibility. Their total mass seems to be at least a thousand tons, or perhaps ten times that much. This might mean an increase in the earth's "weight" of a million tons a year.

Celestial Time Table for August

Aug.	EST	
3	1:00 p.m.	Moon passes Jupiter
4	8:00 p.m.	Moon passes Saturn
5	2:00 p.m.	Mercury farthest west of sun; visible for a few days near eastern horizon before sunrise
	3:00 p.m.	Moon nearest earth; distance 223,500 miles
6	9:41 p.m.	Full moon
11	Early a.m.	Perseid meteors
14	12:37 a.m.	Moon in last quarter
15	9:00 a.m.	Moon passes Mars
17	8:00 p.m.	Moon farthest, distance 252,000 miles
22	4:16 a.m.	New moon
29	2:23 p.m.	Moon in first quarter
30	7:00 p.m.	Mercury behind sun
	8:00 p.m.	Moon passes Jupiter

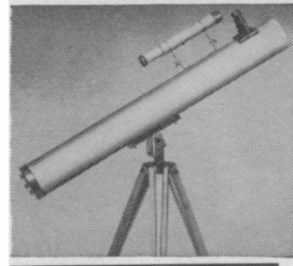
Subtract one hour for CST, two hours for MST and three for PST.

Science News Letter, July 23, 1960

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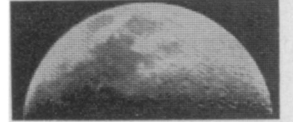
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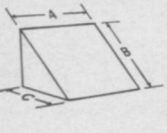


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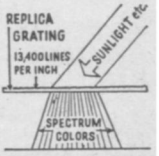


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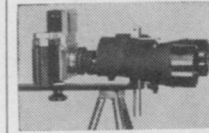
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