

ASTRONOMY

Meteors More Numerous

Perseid "shooting stars" will be seen at their best late on the night of Aug. 12 because the moon will set about midnight, having just passed first quarter.

By JAMES STOKLEY

► WHILE on any clear, dark night one may see a brilliant shooting star, or meteor, there are some times of year when these bits of cosmic dust that enter the earth's atmosphere from outer space are much more numerous. The early part of August is such a time, especially about the twelfth. But often the moon is then so bright that the meteors are overwhelmed in its glare. This year, however, the moon is new on Aug. 4 and is just past first quarter on the twelfth, which means that it sets about midnight. Since the meteors are most frequent in the early morning hours, the moon will be out of the way for those who want to observe them.

On the accompanying maps (which show the appearance of the skies about 11:00 p. m., daylight saving time, on Aug. 1, and an hour earlier the middle of the month) the constellation of Perseus is seen low in the northeast. This is the part of the sky from which the August meteors seem to emerge, and hence they are called the Perseid meteor shower. Late on the night of Aug. 12, these will come at about the rate of one a minute, but even earlier they will appear more often than usual.

Jupiter Brightest

The brightest planet to be seen these August evenings is Jupiter, now in the constellation of Ophiuchus, the serpent-bearer, near the bright and ruddy star Antares, which is in the neighboring constellation of Scorpius, the scorpion. In the south as the sun sets, Jupiter remains plainly visible throughout the evening. Another planet can be seen farther west, in the constellation of Virgo, the virgin, though it is much fainter. This is Mars, which sets about two hours after the sun. The cause of its faintness is its great distance. Last Feb. 17 it was shining brilliantly in the evening sky, for then it was only 62,950,000 miles from us. Now it has swung around to the far side of the sun and, on Aug. 1, its distance is 167,410,000 miles.

As for the other planets, both Mercury and Saturn are invisible in August because they are so nearly in line with the sun. Venus, however, shines brilliantly in the early morning sky, about seven times as bright as Jupiter. It rises in the east several hours before the sun.

Brightest of the stars of the August evening is Vega, almost directly overhead, in the constellation of Lyra, the lyre. Second is Arcturus, in Bootes, the bear driver, half

way up in the western sky. Then comes red Antares, in Scorpius, low in the south, which is followed by Deneb, in Cygnus, the swan, high in the east. Last of the first-magnitude stars seen these evenings is Altair, in Aquila, the eagle, high in the south.

Though several comets discovered by astronomers in recent months are now in various parts of the sky, none of them has become a conspicuous object to the naked eye. It has been nearly 40 years since a really spectacular comet has been visible, a period somewhat longer than the average over recent centuries, so perhaps it may not be long before we have another. Such comets usually have such long periods, of thousands of years, that we have no accurate records of their past appearance, and thus they cannot be predicted.

Perseid Meteors

Sometimes, however, a comet ceases to appear as such, but continues in the ghostly form exemplified by the Perseid meteors that reach their height about Aug. 12. The reason that we see these every year about the same time is due to the fact that they are moving about the sun in a long, elliptical orbit, which happens to intersect that of the earth at the position we occupy in early August. Naturally, therefore, we cannot see them at other times, though there are other meteor swarms, which we pass, for example, in April, November and December.

Thus, when these fast moving particles become visible as they are heated by their encounter with the earth's atmosphere, the paths of light which they make seem to converge in the distance. This is an effect

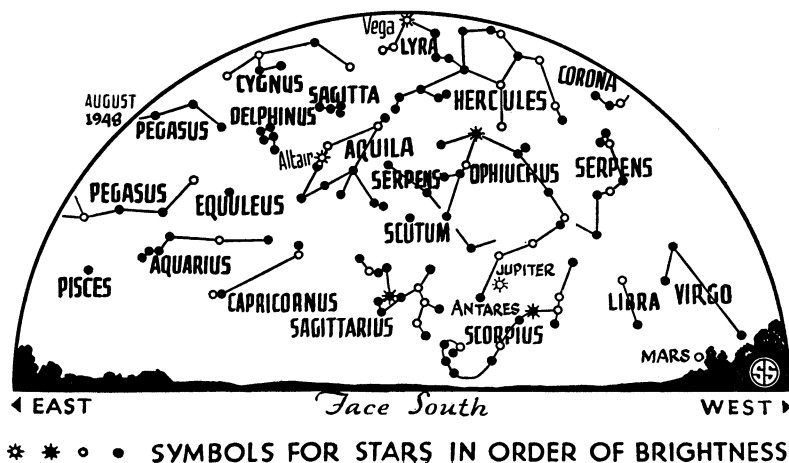
of perspective, just the same as that which makes the parallel tracks of a railroad seem to come together toward the horizon.

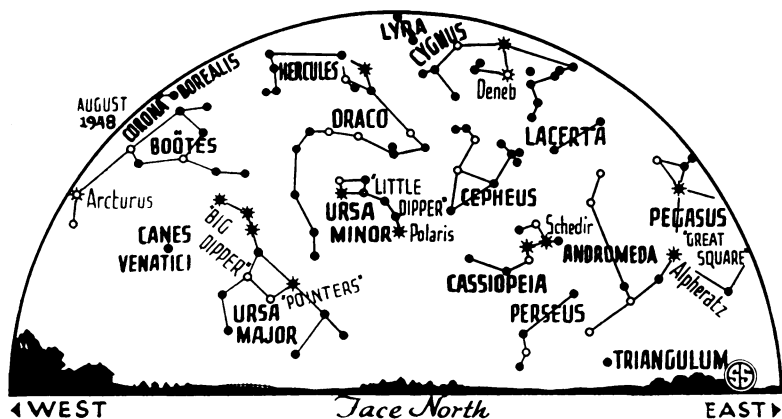
The Perseid meteors had long been observed by the year 1866, when the Italian astronomer, Giovanni Schiaparelli, was studying the orbit of a comet that had appeared a few years before, in 1862. This had been barely visible to the unaided eye, not at all spectacular. He found, however, that its orbit was practically the same as that in which the Perseid meteor swarm travelled. This, together with later discoveries of the identity of the orbits of other comets and meteor swarms, made it evident that the showers are the debris of the comets.

Leonid Shower

In some cases the meteors are concentrated at one point. This is true of the ones that we see in November, called the Leonids. Though two of the greatest showers on record were Leonids, in recent years they have been quite sparse. The Perseids, however, are very consistent, which indicates that they are quite uniformly distributed throughout their orbit.

The observation of meteors is one field in which amateurs can be of considerable assistance to the professionals. Astronomers who study meteors are anxious to get as full reports as possible of the numbers in the showers. The simplest sort of observation is simply a count of the total numbers during half-hourly periods, say from 11:00 to 11:30, 11:30 to midnight, and so on. Several people may cooperate in such counts, each taking one part of the sky. The numbers recorded may be sent in to Dr. C. P. Olivier, Director of the Flower Observatory of the University of Pennsylvania, at Upper Darby, Pa. This observatory is one of the principal centers of meteor study.





In addition to the numbers of meteors, a statement of the location, cloud conditions, names of observers, etc., should be reported. If any unusually bright meteors appear, their path among the stars should be reported, as accurately as possible. From such data, obtained at scattered locations, the real path of the meteor in the sky may be calculated.

Observers are often fooled into thinking that a meteor falls much more closely than it does. Some years ago, when I was connected with a museum in Philadelphia, a very brilliant meteor, or "fireball," flashed over the city, toward the northeast, in the early morning hours. The next day I received a phone call from a taxi driver. He said he had been returning home just as it appeared, and that it landed in the field near his house. If we wanted it, he would get it for us. Though doubting that it was so close, I assured him we would be delighted to have it. A few days later he

called again, to say that he still had not found it, but expected to do so soon, and he would keep on hunting. We never heard any more from him. This was hardly surprising, since astronomical calculations, made on the basis of reports from a number of northeastern states, showed that it had passed over Connecticut, and had fallen in the sea several hundred miles east of Massachusetts!

Time Table for August

Aug.	EDST	
2	1:28 a. m.	Moon passes Venus
5	12:13 a. m.	New moon
	4:00 p. m.	Moon nearest, distance 222,400 miles
9	12:46 a. m.	Moon passes Mars
11	3:40 p. m.	Moon in first quarter
12-13	after midnight	Perseid meteors
14	12:24 a. m.	Moon passes Jupiter
19	1:32 p. m.	Full moon
20	5:00 a. m.	Moon farthest; distance 252,600 miles
27	2:46 p. m.	Moon in last quarter
30	11:15 p. m.	Moon passes Venus

Subtract one hour for CDST, two hours for MDST, and three for PDST.

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least 90% of the cuttings will live. In a few months, erosion will be checked, and there will be at least a little fuel available for winter use. However, withes suitable for basket-weaving will not be ready before the spring of 1950.

From here the farmers have made further advances on their own. On petition to the Nanking municipal government, they have obtained ten tractors and a considerable number of modern farm machines, as well as four large power pumps. These are to take the place of farm animals, formerly rented from the mainland at considerable cost. The farmers have organized a cooperative to take title to the machinery for the community, and to pay off the loan with which it was purchased. They will also have to face the problem of buying fuel and oil to keep their machinery running.

The experiment is proving the ability of the Chinese farmers to improve their lot by cooperation, as well as the value of joint effort on the part of government and private organizations. Most important of all, if the experiment succeeds it will serve as a model to be followed elsewhere in China's big job of getting out of the hole.

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AGRICULTURE

Chinese Re-Plant Willows

► CHINESE capacity for self-help, and therewith China's chances for getting "off relief" on a world-burdening scale, are being tested on a small but encouraging scale on the island of Pa Kua Chou, in the Yangtze river about six miles downstream from the city of Nanking.

A population of about 10,000, mostly farmers, support themselves on the island, which has approximately 10,500 acres of farmland and some 1,200 acres of swamp. They would probably never have needed to ask help from anyone, but for a crisis produced by the war.

When the Japs moved into this part of China, they cut the island off completely, forcing the inhabitants to use up for fuel the willow-trees that had formerly lined its dykes and shores. This had two disastrous effects: the islanders could no longer weave baskets, and rapid erosion began to rob them of their soil.

To set the people of Pa Kua Chou back on their feet again, a cooperative project

for planting more than 2,000,000 willow cuttings was undertaken by a group of Chinese and foreign agencies, including the Extension Commission, the National Forestry Research Bureau, the China Relief Mission and the Food and Agriculture Organization of the United Nations.

The cuttings were made from willows elsewhere along the river, the work being done by refugee labor paid for by the China Relief Mission.

From here on, however, the islanders took over. As most of the cuttings were brought to Pa Kua Chou, they became the property of the farmers, who planted them on their own land. Some of the cuttings, planted on public lands, became public property and will be administered by a committee representing the cooperating agencies and the farmers' organizations. The farmers have agreed among themselves not to indulge in premature cutting.

FAO experts, who have served as advisers throughout the project, estimate that at

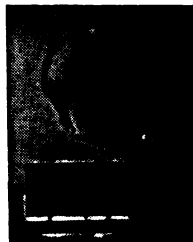
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