

ASTRONOMY

Milky Way Now at Its Best

Great Zone of Hazy Light Seen to be Composed of Billions of Stars When Examined With Telescope

By JAMES STOKLEY

WITH no naked-eye planets shining in the evening sky during August, we have the opportunity of appreciating better more permanent features of the heavens. For instance, at this time of year, we can best see the Milky Way, to which Milton referred as "a broad and ample road whose dust is gold and pavement stars." This description is not only poetic, but accurate as well. The Milky Way does consist of the combined light of countless billions of distant stars. Each one is so far that we cannot see it separately with the naked eye, but all combine to form the band of light. With a telescope, or even a pair of opera glasses, some of the stars are made visible.

Bright in Sagittarius

The brightest part of the Milky Way, that is, the part where there are most stars, is toward the constellation of Sagittarius, the archer, which is low in the south on August evenings. It is indicated on the maps. These give the appearance of the skies about 10:00 p. m., standard time, on August 1, or 9:00 p. m., August 15. Sagittarius is to the left of Scorpius, the scorpion, in which one finds the ruddy star Antares.

From the south, the Milky Way extends upwards, to a point nearly overhead. In one of its most brilliant parts we find Cygnus, the swan, better recognized, perhaps, as the northern cross. The vertical part of the cross is in the line of the Milky Way with a first magnitude star, Deneb, at the top.

South of the cross is Aquila, the eagle, with the star Altair. West of the cross one finds the most brilliant star seen on summer evenings, Vega, in Lyra, the lyre. Continuing, to the northeastern horizon, we encounter Cassiopeia, the queen, a group with the shape of a letter W.

Only one other first magnitude star is above the horizon these evenings. This is Arcturus, in Bootes, the bear driver, to the west. A good way to locate it is to look first for the great dipper, in the northwest. The bowl is to the left, and in it are the pointers, which, followed upwards, bring us to Polaris, the pole

star. Following the handle of the dipper to the left, we come to Arcturus.

Though no planets are seen in the evening, several appear later. First to rise is Jupiter, which comes up before midnight, in the constellation of Aries. It is so bright that it is easily found. In the first part of the month, this is followed by Saturn, though Jupiter passes Saturn on the 15th, and after that will be second.

Several hours before sunrise Venus ascends, and is far brighter than the others. In fact, on Aug. 2 it is of greatest brilliance, and then can easily be followed into the sky after sunrise. About Aug. 10, one may possibly get a glimpse of Mercury, just above the horizon, shortly before sunrise. Mars, however, is now too near the sun to be seen at all. Incidentally, a pretty sight will be on view in the early morning sky of Aug. 24, when the moon will be near to Jupiter and Saturn.

Problem to Philosophers

The Milky Way was a great problem to early philosophers. Before 400 B. C., Democritus suggested that it was made up of faint stars, but this was really only a surmise. In 1610, however, Galileo looked at it through his first little telescope, and found that this was indeed the correct explanation. Another great step was made in 1783, when Sir William Herschel first gave the modern in-

terpretation. He showed that the stars are arranged in a great disc-shaped system like a grindstone, and that we are inside it. When we look to the sides of the grindstone, there are relatively few stars; when we gaze to the edge, they are much more abundant. This concentration around the edge gives the effect of the Milky Way.

Modern astronomers have found that this disc includes some 30,000,000,000 stars, and that it is so big that light takes nearly a hundred thousand years to travel across, at the speed of eleven million miles a minute. This system is called the Galaxy, and outside are millions of other galaxies, visible through great telescopes.

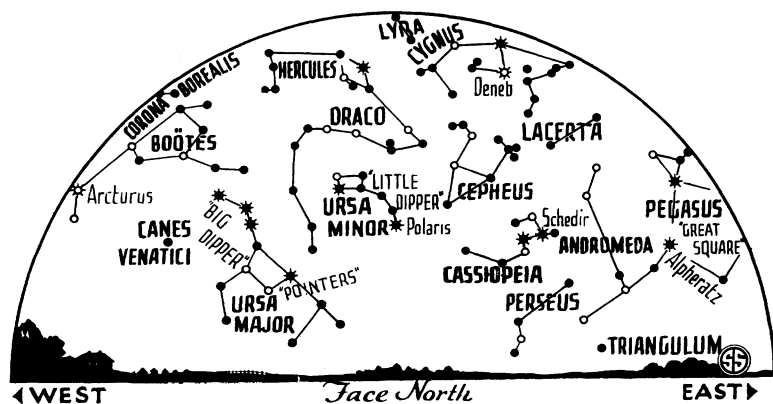
Month of Meteors

August, usually, is the best time of year to see meteors, or shooting stars, especially about Aug. 11. This is the approximate date of the shower of shooting stars which seems to emerge from the constellation of Perseus. For this reason it is called the Perseid shower.

Actually the meteors, each one scarcely larger than a grain of sand, are moving around the sun in parallel paths. Like the parallel tracks of a railroad, these seem to converge in the distance, and this happens to be towards Perseus.

Every August the earth crosses the swarm, and then meteors are particularly numerous. Vast numbers of them hit our atmosphere, but the friction burns them up, and they disappear in the flash of light commonly called a "shooting star." When they vanish, they are about 70 miles above the ground.

On an ordinary dark night, during



the second half of the year, an average of about a dozen meteors per hour may be seen, but around Aug. 11 they come at the rate of about one a minute.

Sometimes the bright light of the moon seriously interferes, but that will not happen this year. The moon is at first quarter on Aug. 10, when it sets about midnight.

The best display of meteors always comes after midnight, for then we meet them head on. Those we see in the evening must catch up to the earth to be visible, for then we are on the rear of the planet as it hurtles through space.

Celestial Time Table for August

Times are given in Eastern Standard. Subtract one hour for Central Standard, two hours for Mountain Standard, and three for Pacific Standard. Add one hour for the corresponding Daylight Saving time.

Friday, Aug. 2, 11:00 a.m., Venus greatest brilliancy. **Saturday, Aug. 3,** 3:09 p.m., new moon. **Monday, Aug. 5,** 10:00 p.m., moon nearest, 225,800 miles from earth. **Saturday, Aug. 10,** 5:00 a.m., Mercury farthest west of sun, morning star; 7:00 a.m., moon at first quarter. **Sunday, Aug. 11,** Perseid meteors visible. **Thursday, Aug. 15,** 8:00 a.m., Jupiter passes Saturn. **Saturday, Aug. 17,** 6:02 p.m., full moon. **Wednesday, Aug. 21,** 5:00 p.m., moon farthest, 252,000 miles from earth. **Saturday, Aug. 24,** 10:53 a.m., moon passes Saturn; 11:33 a.m., moon passes Jupiter. **Sunday, Aug. 25,** 10:33 p.m., moon in last quarter. **Thursday, Aug. 29,** 2:56 p.m., moon passes Venus.

Science News Letter, July 27, 1940

RADIO

Two-Way Communication On Ultra-Short Waves

ULTRA-HIGH frequency radio waves were successfully used in two-way communication over a considerable distance for the first time in experiments by the Mt. Washington Observatory staff. Using a frequency of 225 megacycles, or about 1.3 meters, communication was established at a distance of 90 miles. Hitherto two-way ultra-high frequency radio has been limited to a few miles only. In the present experiments both voice and code were satisfactorily transmitted.

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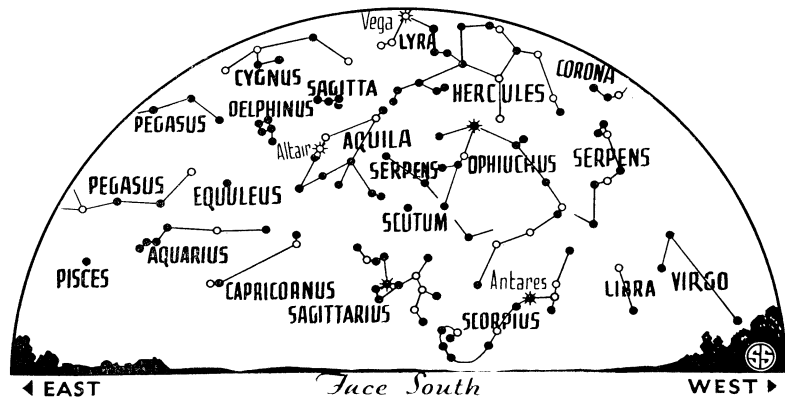
Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Sunday, July 14, 1:52.7 a.m., EST

In the Aleutian Island region. Latitude 52 degrees north. Longitude 176 degrees east. Moderately strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Feb. 24.



ASTRONOMY

University of Pennsylvania Acquires Cook Observatory

THE MOST fully equipped amateur astronomical observatory in America will assume professional standing, when the University of Pennsylvania soon takes over the Cook Observatory, at Wynnewood, Philadelphia suburb. Dr. Charles P. Olivier, director of the University's Flower Observatory and professor of astronomy, announced that this bequest by Dr. Gustavus Wynne Cook, its founder who died June 4, had been accepted. Important observational programs which he began will be carried out, said Dr. Olivier.

A complete photographic map of the Milky Way, on plates 20 by 24 inches, was one of Dr. Cook's most ambitious tasks. This was being done with the world's largest "star camera." Photographs have already been made of a little more than half of the Milky Way which can be seen from this location. This will be continued by Lewis I. Tabor, who made the previous exposures, and has now been added to the University's staff, on a part-time basis.

Cooperating with American and foreign observatories in an international program, I. M. Levitt has been observing the sun with special instruments, including a spectrohelioscope, which shows the sun in the light of a single glowing element. Mr. Levitt, of the astronomical department of The Franklin Institute, has also been made a part-time member of the staff of the University, so his work will continue.

Another important instrument is a 15-inch horizontal refracting telescope, with

which Dr. A. M. Skellett, of the Bell Telephone Laboratories, recently succeeded in observing the sun's corona by television. Until recently, it has only been possible to observe the corona at a total eclipse of the sun. The observatory also has a 28½-inch reflecting telescope, which is combined with a 9-inch refractor. The reflector is equipped with a powerful spectrograph, for analyzing starlight, and will be used for special problems. A 14-inch Schmidt camera, a new and powerful tool for stellar photography, acquired shortly before Dr. Cook's death, will be used for star observations, and also for meteor photography.

To work with these instruments, two other members have been added to the University's staff. One, full time, is Dr. P. H. Taylor, who has just completed

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