ASTRONOMY

Vega Shines Overhead

The five first magnitude stars visible these midsummer evenings are Vega, Deneb, Altair, Arcturus and Antares. Perseid meteor shower gives a reliable "shooting star" display.

By JAMES STOKLEY

➤ SHINING DIRECTLY OVERHEAD on midsummer evenings is the summer night's brightest star—Vega, in Lyra, the lyre.

It is only one of five bright stars, each of first magnitude, shown on the accompanying maps. These depict the sky as it appears about 10 p.m., your own kind of standard time, at the beginning of August, or an hour earlier at the middle of the month.

Just below Vega, toward the east, is the figure of Cygnus, the swan. The most familiar stars in this group form a cross, and at the head, toward the northern horizon, is the bright Deneb.

As shown, part of Cygnus is on the northern sky map and part on the southern. It is underneath the latter section, high in the south, that we find our next star of the first magnitude, Altair, in Aquila, the eagle. One way to identify this orb is that it is attended by two fainter stars, one of which is above and the other below.

Polaris Seen in North

Turning our attention to the northwest, we see the familiar great dipper, part of Ursa Major, the great bear. In dipper's bowl are the well-known pointers, whose direction guides us to Polaris. This is the pole star, in Ursa Minor, the little bear, and also the little dipper.

Seen from the North Pole of the earth, Polaris is nearly overhead, so that is why we always see it in the north and can use it as a guide at night.

The handle of the great dipper also serves as a kind of pointer, for if we follow its curved line, we come to Arcturus, another of our first magnitude stars, in Bootes, the bear-driver. The last of the five bright stars referred to is Antares, in Scorpio, the scorpion, low in the southwest.

Just to the right of this group is Libra, the scales, in which is the only planet now easily visible. This is Saturn, readily identified because it is brighter than any of the nearby stars, and also because it shines with a steadier light.

Around the middle of August it will be possible to see one of the most reliable of the meteor showers which, at various times of the year, bombard us with "shooting stars."

Of course a "shooting," or, as it is sometimes called, a "falling," star is not really a star at all. The stars are huge globes of gas like the sun, and far larger than the earth, trillions of miles away. But a falling star, correctly called a meteor, is a bit of cosmic dust, generally no larger than a pinhead, which enters the earth's atmosphere at high speed.

The friction it encounters slows its motion, and its energy is converted into heat, so that it is quickly burned up and makes the flash of light we see.

This happens at a height of some 50 to 70 miles above the ground. Therefore, unless it is directly overhead, a typical meteor one sees flashing across the sky may be 100 to 150 miles away.

At first it may seem hard to understand how a particle no larger than a grain of sand, perhaps, can produce light that may be seen for such a distance. Astronomers, too, found it difficult as long as they thought that the light came merely from the solid particle, heated to incandescence by friction with the air. However, it now appears that not more than one percent of the light originates with the nucleus itself.

What seems to happen is that heat turns the solid particle into a gas cloud, which is still moving at high speed. As it does so, the gas atoms hit atoms in the atmosphere and are knocked apart.

Some electrons that ordinarily revolve around the atomic nuclei are removed from their usual positions. As they fall back into place, they emit light.

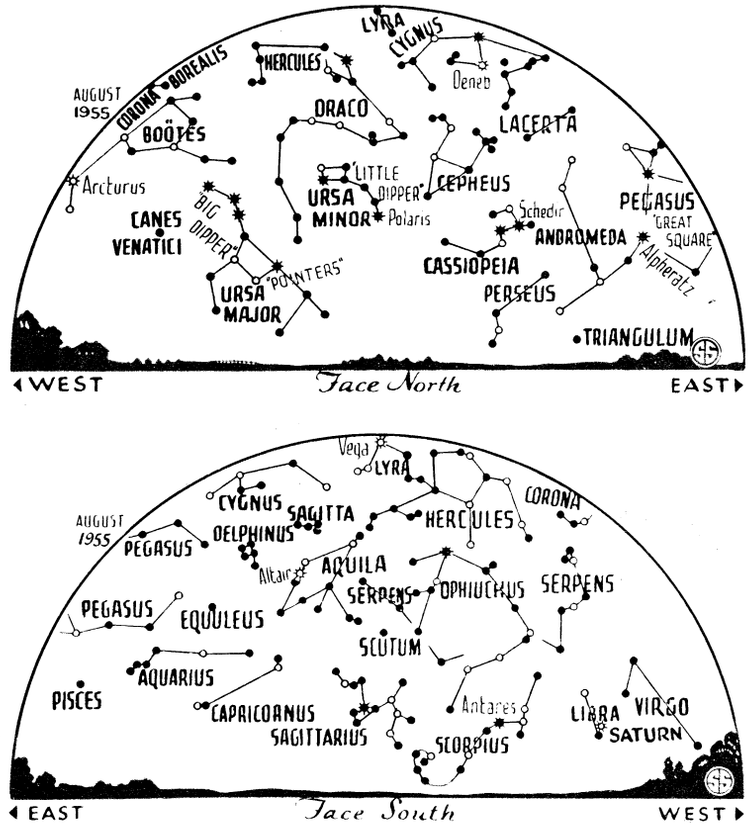
More Seen After Midnight

On any clear dark night, several meteors may be seen every hour. There are more after midnight than before, because then we meet them head-on.

From sunset to midnight we are on the rear of the earth as it moves in its orbit, and any that reach us then have to catch up to us.

In August, especially about the 12th and 13th, many more will be visible, perhaps up to 50 an hour. If you watch carefully, you will see that the bulk of them seem to be coming from a point in the northeastern sky, in the constellation of Perseus, shown on our map close to the horizon.

Actually, the meteoric particles are moving through space in a huge swarm, following the path of a comet seen in 1862, so they are believed to be the remains of that



SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

comets. When the particles are burned up in our atmosphere, the tracks are parallel, but they seem to converge in the distance, in the direction from which they appear to have come.

This is the same effect of perspective that makes a railroad's parallel tracks seem to converge in the distance. In the same fashion, the meteors seem to radiate from Perseus and so they are called the Perseid meteors.

Unlike some of the other meteor showers, which come at other times of year, the Perseids are rather constant in number, but the brightness of the sky determines how brilliantly the shower can be seen.

This year the moon is at last quarter on Aug. 10, a few days before the shower, and rises about midnight. Thus, it will be in the sky at the time of night when the meteors are most numerous, but will not interfere as much as if it were full.

Anyone who stays up late, on either the 12th or the 13th, and watches the northeastern sky, should be able to see a number of these meteors.

Celestial Time Table for August

Aug.	EST	
3	2:30 p.m.	Full moon.
4	1:00 p.m.	Jupiter on opposite side of sun from earth.
5	12:00 noon	Mercury on opposite side of sun from earth.
10	9:33 p.m.	Moon in last quarter.
12	during night	Perseid meteors
14	1:00 p.m.	Moon nearest, distance 227,400 miles.
16	10:00 p.m.	Mars on opposite side of sun from earth.
17	2:58 p.m.	New moon.
23	11:09 p.m.	Moon passes Saturn.
25	3:51 a.m.	Moon in first quarter.
26	10:00 a.m.	Moon farthest, distance 251,200 miles.

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

Science News Letter, July 30, 1955

PUBLIC HEALTH

A-Bomb Test Danger Low

➤ DANGER to the public from tests of atomic weapons in Nevada has been reduced to a minimum, an Atomic Energy Commission scientist said.

How the AEC cooperated with public health services and civil defense groups to protect the public is reported in the *Journal of the American Medical Association* (July 16) by Dr. Gordon M. Dunning, of AEC's division of biology and medicine.

Chief measure for protecting the public was the original selection of the Nevada site for atomic tests. The site covers 600 square miles, with an adjacent U.S. Air Force gunnery range of 4,000 square miles. These tracts are surrounded by wide expanses of sparsely populated land. Aerial and surface surveys insure that no persons or animals wander into the area.

Theoretical dangers from test explosions include three effects, Dr. Dunning explained, from seering light, from blast and from various radiations.

Looking directly at a fireball from nearby or through binoculars at greater distances would damage eyes. Military personnel and others viewing the shots are urged to protect their eyes with high density protective glasses.

Four Eye Injuries

Only four military persons have suffered eye injuries. In three cases, the damage was superficial. A few observers on nearby mountains who did not wear dark glasses have reported temporary blind spots.

To protect motorists who might be startled by the bright flash, traffic is halted on nearby highways in line of sight five minutes before the blast. Aircraft travel is restricted for 30 minutes before and after the shot over a circle 130 miles in diameter.

No cases of injury to humans have been reported from the blast of atomic tests.

Shock waves are of two kinds. One travels parallel to the earth's surface, and may be felt up to 6 miles from the site of the explosion. They may be strong enough to break windows or cause minor damage to buildings. A total of $44,300 has been allowed for claims for such blast damage, Dr. Dunning revealed.

Reflected Shock Waves

Other shock waves are reflected from the ozone layer of the upper atmosphere. Such reflected waves may reach 60 to 150 miles from the test site. They may be strong enough to be heard distinctly, but have not resulted in any known damage to buildings.

AEC officials constantly check atmospheric radiation levels, both near the test site and over the United States. Ninety Weather Bureau stations throughout the country collect fallout data, as do ten AEC installations.

As part of the radiation monitoring system, instruments have been set up in 30 communities around the test site as far as 160 miles away. They are connected to commercial telephone wires. An operator sitting at a control point can place a normal telephone call, receiving signals that can be translated in seconds into gamma radiation dose rates.

No cases have been reported of humans receiving radiation burns, off the test site, Dr. Dunning said. However, in 1952, some cows 15 to 20 miles from "ground zero" were burned and, in 1953, some horses were burned.

Science News Letter, July 30, 1955

To produce better *pine trees,* a hypodermic needle filled with pollen from a selected "father" tree is injected into the bag-covered flowers of an outstanding "mother" tree.

ENTOMOLOGY

Panamanian Bees Make Wax From Oil

➤ A RACE of Panamanian bees, *Trigona pallida,* uses oil to make the wax of their honeycombs.

The bees get the oil from a bucket of black crude oil used for mosquito control in Panama.

They are inhabitants of the jungle island of Barro Colorado where the Smithsonian Institution's tropical research center is located, are stingless and produce a honey that ranges from "excellent" to "nauseating," the Institution reported. Quality of the honey varies with the flowers they feed on.

They build no nests of their own, but take up squatter's rights in those of ants and termites.

The bees apparently see primarily by ultraviolet light, invisible to most animals including humans. Specimens confined in a box with several windows, each illuminated by a different light band, tried to escape toward the ultraviolet.

Science News Letter, July 30, 1955

The fulmar, a grey and white *sea-bird* of northern oceans, spits out an oily fluid at intruders approaching its nest.