

ASTRONOMY

The Comet Still Shines

Astronomers Have Great Interest in Tracing Path Of Peltier's Find Across the Summer Skies

By JAMES STOKLEY

TO THE ancient astronomers, seeking to find a reasonable explanation for the phenomena they observed above, the motions of some of the heavenly bodies were particularly puzzling. This month we can appreciate some of their difficulties when we watch both Peltier's comet and Jupiter. A few months ago the comet was far out in space, a "shovelful of gravel thrown through the air," a swarm of relatively small particles, but with wide spaces between them. As it came nearer the sun, it became brighter, as comets always do, partly because of the greater intensity of the illumination, but mostly because the sun's rays caused the material to give off gases which it contained. These gases in turn were excited to luminescence.

Found in May

In May, Leslie Peltier, the Ohio amateur astronomer, discovered it, thus getting his name attached. Then it came even closer to the sun, and still brightened. On July 8 it was about ten million miles farther from the sun than the earth and was then of greatest brightness. But it was still about two-thirds as far from the earth as the sun's distance, 93,000,000 miles.

It is still getting nearer to us, and while its intrinsic brightness is diminishing, its apparent brilliance is increasing. On August 4 it will be closest to the earth, only 15,800,000 miles distant. Shortly before this approach it will appear most brilliant, about the magnitude of the faintest stars in the Great Dipper. Then it will recede again into outer space, and in a few months will be lost even to powerful telescopes.

As it passes closest to the earth, its motion through the sky will be most rapid. During the eight days from July 3 to 11, for instance, it was in the constellations of Cepheus and Cassiopeia, and moved only a little more than three degrees, or about six times the apparent diameter of the moon. But during the same period of time from July 27 to August 4, it will move from Lacerta, the lizard, a little group near Cygnus, into

Aquarius, a distance of about 47 degrees. The next eight days will take it more than fifty degrees farther south. On August 12 it will be in Indus, the Indian, a star group so far to the south that it is never visible from most of the United States. Then its motion across the sky will slow once more. From the 20th to the 28th it will move only seven degrees, through the constellation of Pavo, the peacock.

Same Effect With Train

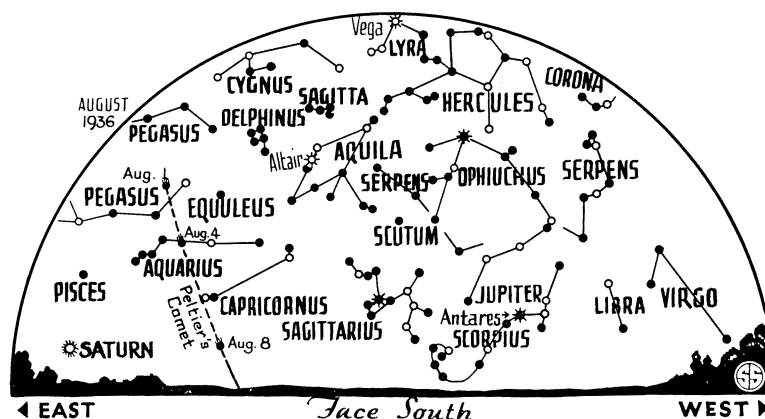
Whenever you watch an express train pass on a nearby track, or a speeding automobile on a long straight road, you see an exactly similar effect. Five miles away, three miles, two miles, one, a half, a quarter, the train still is in almost the same direction, and the head need not be turned to follow it. But now it is a thousand feet away, a hundred, and the head turns sharply. Now it is half a mile down the track, and the head is again almost still. Since it was nearest the sun the comet's speed has actually been slowly decreasing, but when it passes nearest to us, its direction from us changes most rapidly, and it seems to be moving fastest.

Another celestial motion, much slower in producing a change in direction, can be seen in the case of Jupiter. During

the year the sun apparently moves around among the stars from west to east. Actually the earth is going around the sun, once every year, and during different months, when we are in different directions from it, we see it against a different starry background. The planets also, in general, move around the sky from west to east, and in the case of Jupiter for example, we see it farther east now than we did the year before. But if you have been watching it carefully during the last few months, you will have seen it moving to the west, nearer and nearer to Antares. About August 11 it will seem not to move at all among the stars. By the end of the month it will be moving eastward.

Observed Motion Composite

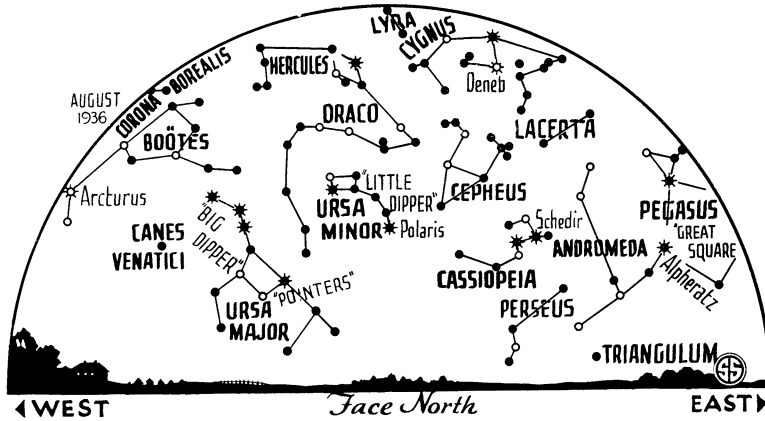
This is due to the fact that the motions we observe in the sky are composites of the motion of the particular body with that of the earth itself. The nearer a planet is to the sun, the faster it moves in its orbit. At our distance of 93,000,000 miles we travel at a speed of more than 18 miles a second, while Jupiter, 483,200,000 miles out, covers only eight miles a second. Once every year we dash around on the same side of the sun as Jupiter, and overtake it, as an express might overtake a freight train on a parallel track. And just as the freight train, to a passenger on the express, may seem to be moving back-



☆ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

COMET'S PATH

With the aid of this map, you may follow the path of the heavenly visitor through the August skies.



NORTHERN STARS ARE FAMILIAR

wards, so does Jupiter seem to travel backwards, or "retrograde," when we are going by. Then, when we begin to move away from that planet, there is a position where it seems to stand still, and then to move in its actual direction.

It is easy to explain today, but the Greek philosophers invented an elaborate system of cycles and epicycles, circles whose centers moved in other circles, and so on until, as Sir Arthur Eddington has said, "the music of the spheres was lost in the whirl of machinery." But this all became unnecessary when, in 1543, the Polish astronomer Nicolaus Copernicus revived the suggestion of the Greek Aristarchus that the earth is but one planet, revolving with the others around the sun.

Jupiter Still Brightest

During August the planet Jupiter is still the brightest object in the evening skies, shining in the southwest in the constellation of the Scorpion. Nearby, to the right, is red Antares, the brightest star in that group, though greatly inferior to the planet. Directly overhead is the most brilliant star of the summer evening. This is Vega, in Lyra, the lyre. Next, to the east, is Cygnus, the swan, often called the Northern Cross. The bottom of the cross points a little to the west of south, at the top is the first magnitude star Deneb. This name is from an Arabic word meaning "tail" and it marks the tail of the swan. The bird's wings are formed by the arms of the cross, while the foot indicates his long neck, stretched ahead as he flies through the sky.

To the south of Cygnus is another bird, the eagle, Aquila, in which appears the star Altair. Still farther south, left

of Jupiter, is Sagittarius, the archer, a figure resembling a tea-pot, the spout to the right, the handle to the left, and the lid (as it should be) above. The stars of the handle and the lid also make up a little dipper, sometimes called the Milk Dipper, to distinguish it from the Great and Little ones, in the northern sky.

The Great Dipper, best known of all the star groups, is in the northwest, the handle pointing up and to the left. Actually, this is part of Ursa Major, the great bear. As most people know, the stars of the bowl of the dipper opposite the handle are the pointers. Follow their direction up and to the right, and you soon come to the pole star, Polaris, which stands close to the north celestial pole, the point of the sky over the earth's north pole, and the one around which all the stars seem to revolve once a day, because of the earth's rotation on its axis. Polaris is at the end of the handle of the Little Dipper, which in turn is part of the little bear, Ursa Minor. Winding his snaky lengths between the two dippers is Draco, the dragon, his head a diamond of stars northwest of Vega.

Bear Driver

Directly west at the times for which these maps are drawn (10:00 p.m. standard time on Aug. 1, 9:00 p.m. on the 15th and 8:00 p.m. on the 31st) is Arcturus, in Boötes. This group is also called the bear-driver, as it represents the figure of a man with two dogs on a leash, driving the bears onward in their constant circuit of the sky. Next above Boötes is a semi-circle of stars, Corona Borealis, the northern crown, a delicate little group that the Indians said was a council of chiefs around a campfire.

Between Corona and Lyra is Hercules, the great hero of mythology, who is represented as kneeling on the dragon. According to ancient lore, this beast represents the one that stood watch over the gardens of the Hesperides, which Hercules killed in his eleventh labor, in order that he might secure the golden apples that grew there. Six of the brightest stars in Hercules form the figure of a butterfly, its body east and west, one wing to the south, the other to the north.

Another Giant

South of Hercules is Ophiuchus, another giant, who is holding a great serpent, and standing upon the scorpion. Sometimes he is identified with Aesculapius, the famous physician of antiquity. The snake, perhaps because of its wisdom, has long been associated with the medical profession. This is shown even today by the collar device worn by army doctors—the caduceus, the winged staff with its two intertwined serpents.

In the eastern sky another planet can be seen quite low. This is Saturn, as bright as a first magnitude star. Higher and farther north, is the great square, resting on one corner. The star at the right corner is in Andromeda, and the other three are in Pegasus, the winged horse, a group just below Cygnus. In the northeast is Cassiopeia, the queen, the stars forming a letter W. Her royal spouse, the King Cepheus, is directly above.

"Whose Dust Is Gold"

To a person away from the city's glare, August evenings afford a good opportunity to see the Milky Way, Milton's "broad and ample road whose dust is gold and pavement stars." Extending from Cassiopeia through Cepheus, Cygnus and Aquila to Sagittarius, this consists of the combined light of countless millions of stars, each so distant, and therefore so faint, as to be imperceptible to the unaided eye. But so great are their numbers that their light combines to give the effect that we see.

During the first part of August, the eastern sky will have a special attraction—Peltier's comet, the first since 1910, year of Halley's comet, to become easily visible without telescopic aid. The dotted line on the map shows its path through Pegasus, Aquarius and Capricornus in the first ten days of the month, after which it passes out of view to northern observers. The comet will be of about the fourth magnitude.