

ASTRONOMY

Bright Comet Coming

First Since 1910, Younger Generation Will Have an Astronomical Treat as Object Shines in Western Sky

By JAMES STOKLEY

IF YOU are thirty years old, or less, you will be able during December to see something in the sky that you never saw before.

This "something" is a bright naked eye comet, Cunningham's comet, to be specific, discovered in the middle of September by Harvard astronomer Leland E. Cunningham, after whom it is named. Ever since then it has been approaching closer both to sun and the earth. In early December it will begin to be seen by the naked eye. By Christmas, astronomers expect, it will be conspicuous in the western sky after sundown.

A dozen or more bright comets appeared during the 19th century, but the 20th thus far has been considerably behind its quota. In 1910 there were two. One was the famous Halley's, on one of its regular 75-year visits. The other is recorded as 1910a, since it was the first to be discovered that year.

150 Comets Since

Since then, about 150 times astronomers have watched a comet as it swept around the sun. A third of these were returns of periodic visitors, and the rest were unheralded. Many of these are periodic, too, but their cycles are so long, counted into thousands of years, that no one had known how to calculate their motions when they were last here.

Not more than half a dozen in recent years reached the brightness needed for

visibility without a telescope. One of these was discovered by an Ohio amateur, Leslie C. Peltier, in 1936. The following year a Swiss, Dr. P. Finsler of Zurich, found one. And in 1939 came a third, discovered independently by observers in Norway, Canada, Russia and elsewhere. But none of these were conspicuous. Each could be seen as a hazy blob of light, if the sky was clear and dark, and you knew where to look. People who remembered Halley's in 1910 felt justifiably disappointed.

Best Since Halley's

Even Cunningham's comet may not rival Halley's but at least it will do better than any since. Early in its visit a tail began to appear, and this has been enlarging. In a few more weeks you will see it pointing away from the sun, as a comet's tail always does.

In the northwestern sky, in the early evening, shines a bright star, Vega, in Lyra, the lyre. Almost directly west is Altair, in Aquila, the eagle. This star has a fainter one to the right, and another to the left. These will help you to find it. Between the lyre and the eagle, and a little higher, is a group shaped like a cross. Often called the northern cross, it is really part of Cygnus, the swan. A bright star, Deneb, marks the top of the cross, a fainter one, Albireo, the foot.

Around December 9, as the comet begins to be visible easily, it will pass near Albireo; at Christmas time it will be in Aquila, underneath Altair. By early

January it will be entering the figure of Capricornus, the sea goat, but then it will be close to the sun. Despite the fact that it will then be reaching greatest brilliance, it will be lost to view. By the beginning of February it will be drawing well away from the sun again, but will be so far south that we will not see it. People in the southern hemisphere then will find it in the east before sunrise.

At the time Mr. Cunningham discovered it in early September, it was some 220,000,000 miles from the sun and 170,000,000 miles from the earth. Its December first position is only 116,500,000 miles from the sun and 115,000,000 miles from the earth. By Christmas day it will have moved a distance of 63,500,000 miles from the sun, and 73,500,000 miles from us.

Even though this comet may become quite conspicuous, it is a pretty flimsy sort of thing after all.

Light Shines Through Them

Sometimes one passes right in front of a star, but there is no eclipse. Instead, the star light shines through with undiminished brightness.

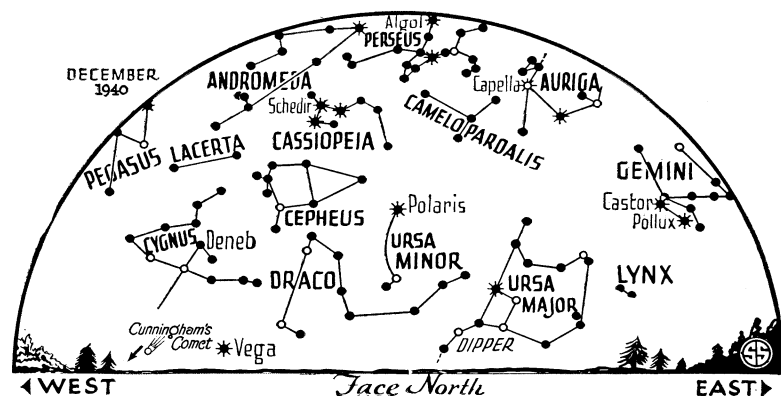
A comet has been compared with a shovelful of gravel, tossed through the air. It consists of a lot of separate particles some, perhaps, as large as big boulders, but the distances between these pieces are large compared to their diameters. Dr. Henry Norris Russell, of Princeton, has estimated that the brightness of Halley's comet could be explained if in every cubic mile of its volume there were a dozen bodies as big as small marbles, and nothing else!

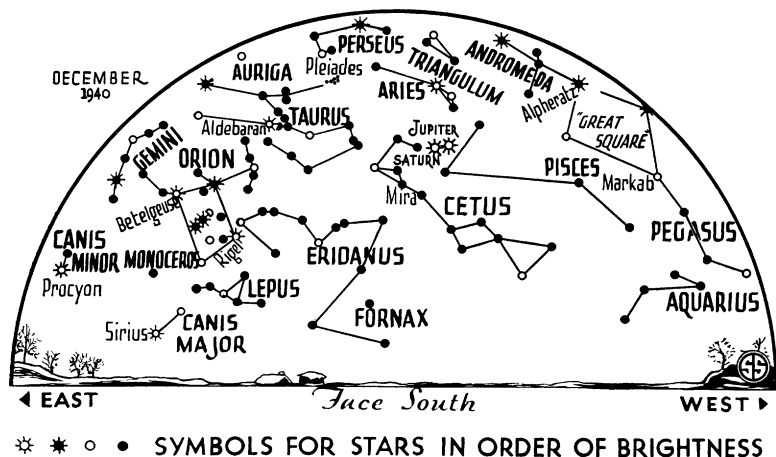
ESSAYS ON THE NEW VORTEX ATOM

by Carl F. Krafft
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Comets have passed close to the moons of Jupiter, and have had their paths radically changed, yet not the slightest effect could be detected on the moons. Compared to them, therefore, the comet's mass is insignificant.

Enough to Fill Canal

Still, this allows for a lot of stuff. If you could bring Cunningham's comet to earth, it might weigh as much as a hundred million tons. Piled in one place, it might be roughly equal to the amount of rock and soil excavated in digging the Panama Canal. A comet is nothing to be afraid of, unless one should hit the earth. Small comets have doubtless hit the earth in the past, but the chance of one doing so is extremely remote.

As the comet comes in toward the sun some yet unknown force, perhaps resulting from an excitation by the sun's rays, drives finely divided dust, and gases, out of the head. Then another force operates. This is the actual pressure of the sun's light. So small is this pressure that we cannot feel it. At earth's distance, the

pressure of sunlight over a square yard is only a hundred thousandth of an ounce. But out in space this is enough to push on the dust and gas like wind. That is why the comet's tail always points in the direction away from the sun. As it approaches the sun, the tail is behind. Leaving the sun, the tail is ahead: it backs away, like a commoner from an audience with royalty. Far out in space again, the force that ejects the tail disappears.

It seems likely that comets are actually members of the solar system, like the planets, and are not, as some have suggested, bodies that have entered the system from outside. Probably they were formed in the same way, whatever it was, as the planets themselves.

Thus, with a comet giving off some of its material each time it rounds the sun, it seems as if they cannot go on forever. Millions and millions of years ago the sky may have been much more peopled with them than now; millions of years in the future they may be gone. But that time has not yet come, and we can enjoy Cunningham's comet with the feeling that it may be the herald of even finer comets that are on the way—comets to rival the greatest seen in the 19th century.

Planets Still Visible

Our maps, as usual, show the sky's appearance at 10:00 p.m. on December 1, 9:00 p.m. on the 15th and 8:00 p.m. on the 31st.

In addition to the comet, the planets Jupiter and Saturn are seen, still close together in the constellation of Aries, high in the south. Jupiter, the more brilliant of the pair, is easily recognized. On Tuesday, Dec. 10, the moon, four days before it is full, will pass near Jupiter, to the south. Later that night it will pass even closer to Saturn. In the southern part of the United States, south

of latitude 36 degrees, there will be an occultation of Saturn, that is, the moon will actually pass in front of the planet.

Most brilliant of the stars seen on December evenings is Sirius, the dog star, in Canis Major, the big dog. Above it is the group of constellations that make the skies of winter so glorious. These are Orion, the warrior, with Betelgeuse and Rigel; Taurus, the bull, with Aldebaran; Canis Minor, the lesser dog, with Procyon and Capella, in Auriga, the charioteer. To the northwest are seen two other stars of the first magnitude. These are Deneb, in Cygnus, the swan, and, near the horizon, Vega, in Lyra, the lyre.

Celestial Time Table for December

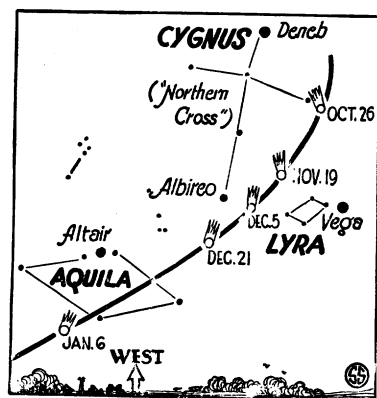
Monday, Dec. 2, 7:00 a.m., Venus passes Mars (both morning stars). **Thursday, Dec. 5,** 12:19 a.m., Algal at minimum. **Friday, Dec. 6,** 11:01 a.m., Moon at first quarter. **Saturday, Dec. 7,** 9:08 p.m., Algal at minimum. **Monday, Dec. 9,** 3:00 a.m., Moon farthest; 251,700 miles away. **Tuesday, Dec. 10,** 5:57 p.m., Algal at minimum; 7:33 p.m., Moon passes Jupiter. **Wednesday, Dec. 11,** 12:56 a.m., Moon passes Saturn. **Saturday, Dec. 14,** 2:38 p.m., Full moon. **Saturday, Dec. 21,** 6:55 p.m., Sun farthest south, winter commences; 8:45 p.m., Moon in last quarter. **Wednesday, Dec. 25,** 1:00 a.m., Moon nearest; 228,400 miles away; 2:03 a.m., Algal at minimum; 12:59 p.m., Moon passes Mars. **Thursday, Dec. 26,** 1:04 p.m., Moon passes Venus. **Friday, Dec. 27,** 10:52 p.m., Algal at minimum. **Saturday, Dec. 28,** 3:56 p.m., New moon. **Monday, Dec. 30,** 7:42 p.m., Algal at minimum. **Tuesday, Dec. 31,** 9:00 a.m., Jupiter changes from westward to eastward motion.

Eastern Standard Time throughout.

Science News Letter, November 30, 1940

South Africa, which may buy more dyes from the United States, prefers to import primary colors and to manufacture its own tints and shades.

Huge "defrosters" are being installed at Grand Coulee Dam to prevent ice from freezing tight the gates that control the Columbia River's flow over the dam.



PATH OF COMET

This map shows the arrangement in the western sky of the constellation around 7:00 p.m., on December 1 and about an hour earlier on December 15.

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