Iowa Science Teachers Journal

Volume 22 | Number 1 Article 4

1985

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On October 16, 1982, astronomers at Palomar Observatory, using an electronic camera attached to the 200-inch telescope, detected a dim 24th magnitude speck. Seventy-one years after it was last seen, Halley's comet had been recovered.

During the last three years, as public interest has grown, the comet has been slowly brightening. It is now approaching a magnitude that can be detected in large amateur telescopes. Soon millions of people who have hardly ever looked up at the night sky will be searching the predawn for some sign of the comet. Exactly what is it that they are looking for? And what will they see?

What they are looking for is, in truth, an iceberg floating in space. It's not a terribly large iceberg — perhaps a couple of miles across. Made mostly of water ice, it also contains frozen carbon dioxide, ammonia, methane and a few other more exotic compounds. When this iceberg comes to within a few hundred million miles of the Sun, it begins to melt (or more properly "sublimate"). This forms a gaseous atmosphere, called a coma. As the comet comes to about the distance of Mars from the Sun, this atmosphere begins to stream back, away from the Sun. It is being pushed in that direction by the solar wind. The comet has now formed a tail. This is the feature that most people see when they observe a comet. Comet tails are very tenuous. An average volume of space in a cometary tail contains fewer atoms than a similar volume in a good vacuum chamber here on earth. And yet, since some cometary tails stretch more than 100 million miles in length, they are the most prominent characteristics of a comet.

Occasionally, the earth passes through the tail of a comet. This happened in 1910 when Halley's comet last appeared. Interestingly enough, five years before, it had been discovered that cyanogen was one of the minor constitutents of a comet's tail. A few "entrepreneurs" played on the public's ignorance and made a quick fortune selling gas masks and anti-comet pills. Others, realizing a good time when they saw one, organized "End of the World" parties. This time around, we'll have to find our entertainment elsewhere, for the earth will pass nowhere near the comet's tail.

In fact, many astronomers are even warning the public not to expect too much from Halley's comet. For this apparition, the earth is not favorably positioned for observing the comet. As luck would have it, when the comet is closest to the Sun (and usually brightest), we are on the opposite side of the Sun. Yet there will still be times when the comet is visible. It just won't be as spectacular as it has been at times in the past.

So what can we expect? There will be two prime times to observe the comet. The first covers the period from November to mid-January. The second runs from March until May. For a variety of reasons, the second time span will offer more favorable viewing. Most observers will not see the comet until about the beginning of November. Then, it will start to be noticeable in small telescopes and binoculars. One good way to locate it will be to look a couple of degrees south of the Pleiades cluster at mid-month. It might begin to have a small tail by this time. For those who know their constellations, the comet's location at this and during the succeeding months can be found by referring to Figure 1.

Figure 2 is a composite drawing showing the location and appearance of the comet on several different dates. The diagram represents a 180° panorama of the sky from east through south and into the west. Note that the vertical axis is marked in 5° intervals. To get an idea of the scale of the drawings, remember that the size of a fist held at arm's length is approximately 10°. So on March 26, when the drawing indicates that the comet's tail will probably be about 20° in length, you should be able to verify this by comparing it to the size of two fists. The numbers in parenthesis next to the date represent the magnitude expected for the comet.

This diagram begins in January 1986 since that should be the first time the comet will become visible to the unaided eye. Look into the western sky about an hour and a half after sunset. You should be able to detect the comet as a dim, fuzzy-looking "star" at the positions indicated on the right side of the diagram. Note that the cometary positions are plotted for the end of astronomical twilight. As the evening passes, the comet will be setting slowly, due to the earth's rotation. Even though the comet should be visible to the unaided eye, it might not be a bad idea to have a pair of binoculars at hand.

Eventually, in late January, the comet will be lost in the glare of twilight as it approaches the Sun. When it reaches perihelion on Febrary 9, 1986, it is invisible from earth due to its placement on the far side of the Sun. Not until the first week of March will we see it again, and then it will be a morning sight.

You'll have to get up early in the morning, about an hour and a half to two hours before sunrise. But it should be worth it because the comet will have developed an unmistakable tail, as shown on the left side of the diagram.

Look for it on March 7th, a few degrees north of the waning crescent moon. It will be about 5th magnitude. Over the next few weeks it will continue to move away from the rising Sun and toward the south. Eventually, on April 11th, when it is at its closest to the earth (39 million miles away), it will be 47° below the celestial equator. This is why the best viewing of the comet will then be in the Southern Hemisphere. At this time, for those far enough south to see it, the comet should have a tail 20° to 30° in length. Many people at our latitude will discover that the comet is actually below their horizon with its tail sticking 10° to 20° into the sky.

In mid-April, the comet shifts back to the north, and onto our diagram once again. As it slowly moves upward in the southern sky, it will begin to fade from visibility. By the end of April, binoculars or a telescope will be needed to see it. In

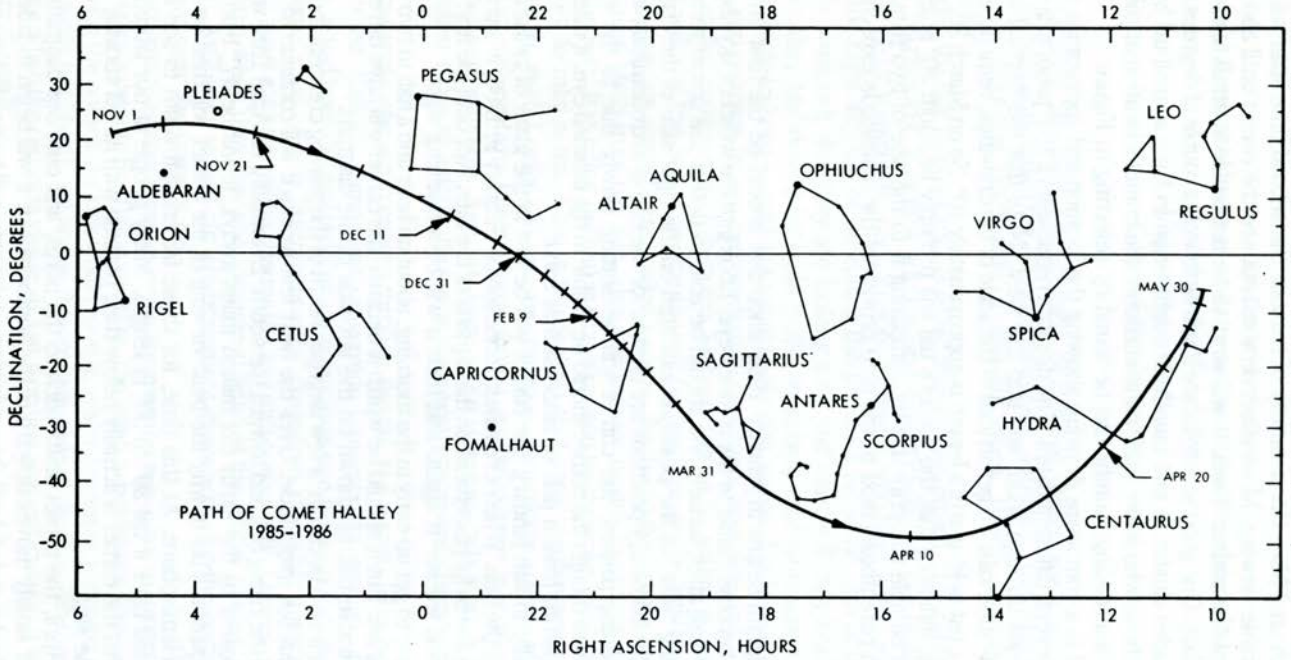

Figure 1
Path of Halley's Comet from November 1985 to May 1986. (NASA diagram)

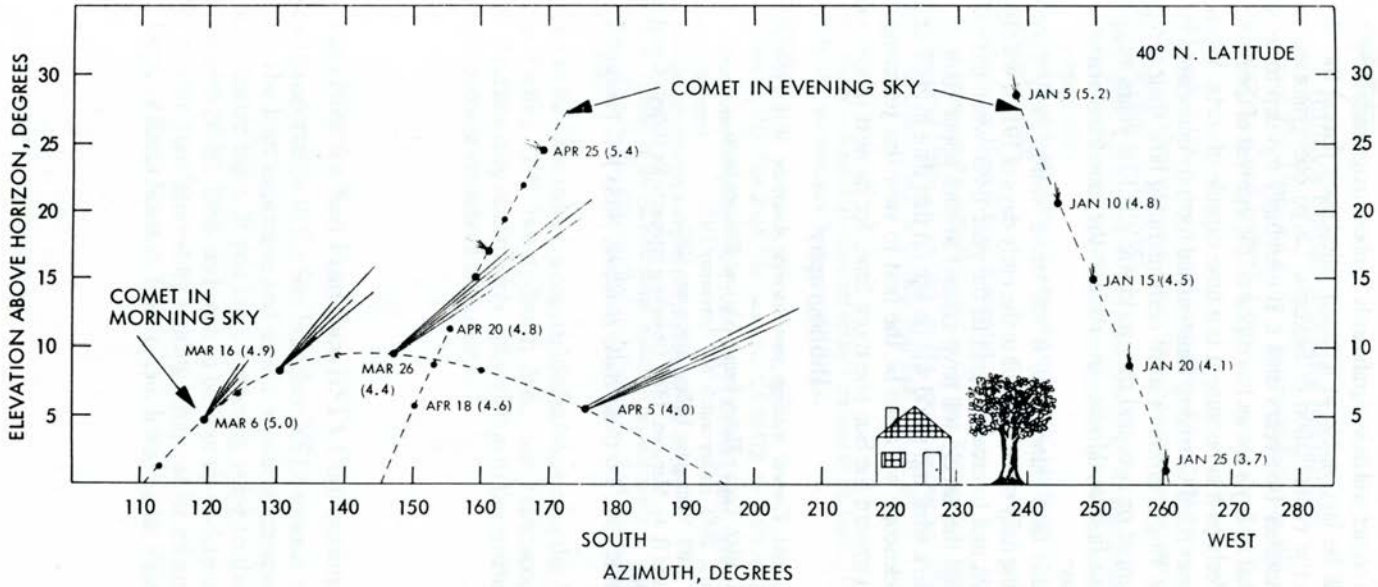

Figure 2
Halley's Comet observing conditions in 1986 for observers located at 40° north latitude. (NASA diagram)

May, Halley's comet will fade significantly to about magnitude 7 by the end of the month. It will be last visible in amateur telescopes during the summer as it recedes into the constellation of Sextans. Large observatories will probably follow it for another two years until it is eventually too dim to be seen.

Why is it that Halley's comet has captured the interest of the public in the way that it has? Perhaps it is because it is a time capsule of sorts. When it was last seen, the Kaiser ruled Germany, Einstein had recently enunciated his Theory of Relativity, the Wright brothers were demonstrating how their aeroplane might carry a passenger or two, and the world was still four years away from being plunged into its first world war. An article at the time from *Scientific American* had this to say:

> After this date (June 1910) it will move swiftly away from the earth, becoming daily more faint, till in the early days of 1911 it will disappear into the night, not to emerge again till the year 1985, when the most of those who read this article will have ceased to care about comets.

One wonders what the world will be like on that date in 2057 or 2058 when some large telescope will again be the first to view this returning comet as it heads back in toward the Sun one more time, for its next rendezvous in 2061.

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