



[www.astrosociety.org/uitc](http://www.astrosociety.org/uitc)

**No. 3 - Fall 1985**

© 1985, Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112

# A Special Issue on Halley's Comet

**Editor's Note:** We have now entered what comet expert John Brandt of NASA has called "the golden year of comet exploration." The *International Cometary Explorer (ICE)* spacecraft has now had a close encounter of the best kind (the real kind) with Comet Giacobini-Zinner and has returned a host of useful scientific information. Telescopes on Earth (and aboard several spacecraft) will be turning more and more frequently toward the faint fuzzy patch in the sky which is Halley's Comet, approaching us from the realm of the outer planets.

This issue is devoted to the coming of the comet and to how you can prepare yourself and your students for finding, observing, and — most importantly — understanding the most famous of all celestial visitors. In this year of incredible "Halley hype," teachers will have an even greater responsibility than usual to help the students bring the real science and exploration into focus. The astronomers who work on this newsletter very much hope we can be of some small assistance to you in this important task.

## Comets Events Schedule: 1985-86

Sep. 11, 1985

The U.S. Spacecraft *ICE* flew through the tail of Comet Giacobini-Zinner, becoming the first man-made craft to encounter a comet.

Oct. 20-21, 1985

Peak of the Orionid meteor shower, when the Earth encounters the dusty debris left along the orbit of Halley's Comet from its previous passes. (View from a dark site after midnight.)

Oct. 29, 1985

Anniversary of Edmond Halley's birth (in 1656)

Nov. 27, 1985

Halley's Comet will be closest to the Earth on its journey *inbound* toward the Sun. (However, this will not be one of the best times to see it!)

Jan. 1, 1986

Halley's Comet "crosses" the Earth's orbit on its way toward the Sun. (It is north of the plane of the planets' orbits as it does this.)

Jan. 24, 1986

While Halley's Comet is too close to the Sun for observation, we can turn our attention to the Voyager 2 spacecraft's closest encounter with the planet Uranus.

Feb. 9, 1986

Halley's Comet perihelion (its closest point to the Sun). The comet is 88 million km (55 million mi) from the Sun, between the orbits of Mercury and Venus.

[During March of 1986, five spacecraft will fly by the comet and study the nucleus (the dirty snowball, just a few miles across which is the main body of the comet), the coma (the much larger cloud of evaporated

gas and dust, formed by the Sun's radiation), and the tail (the long streamers of comet material pushed away from the nucleus by the Sun's radiation and wind). Several of the spacecraft are equipped with excellent cameras that will send back historic first photographs of what a comet looks like close-up, as well as a steady stream of other scientific data.

Note: All the spacecraft encounter dates below are tentative and subject to minor revision.]

Mar. 6, 1986

Expected date of closest flyby of *VEGA 1* (U.S.S.R.), the first spacecraft to reach Halley's Comet. Flyby distance will be about 10,000 km (6,000 mi).

Mar. 8, 1986

Planet A spacecraft (Japan) has its closest fly-by of Halley's Comet; distance = 100,000 to 200,000 km (60,000 to 120,000 mi)

Mar. 9, 1986

*VEGA 2* has its closest flyby of Halley's Comet. Will try to get within 3,000 - 6,000 km (2,000 - 4,000 mi) of nucleus.

Mar. 10, 1986

Halley's Comet passes through the plane of the Earth's orbit traveling southward. This is why all the flyby's are occurring this week; it takes less energy if a spacecraft doesn't have to fly above or below that plane.

Mar. 11, 1986

*Sakigake* spacecraft (Japan) has its closest flyby of Halley's Comet (at a significantly greater distance than the other craft.)

Mar. 14, 1986

*Giotto* spacecraft (European Space Agency) has its closest flyby of Halley's Comet. Its designers hope it will come within 500 km (300 mi) of nucleus, if spacecraft can survive that close an approach, traveling at a speed of about 150,000 mph relative to the comet.

Mar. 7 - 14, 1986

Astro 1 payload aboard the Spacelab module on the space shuttle. Complex series of instruments observe Halley's Comet (and other astronomical objects) from orbit.

Apr. 11, 1986

Halley's Comet passes closest to the Earth on its outbound journey (and the closest it comes during this passage). Comet will be 63 million km (39 million mi) from us. [Its closest known approach was 3 million mi on Apr. 10, 837 A.D.]



The European Space Agency's Giotto spacecraft (above) will, if all goes well, come within 500 km of Comet Halley's nucleus on March 14, 1986.

\*\*\*\*\*

July 28, 2061

Perihelion during the next pass of Halley's Comet (calculated by Donald K. Yeomans, JPL)

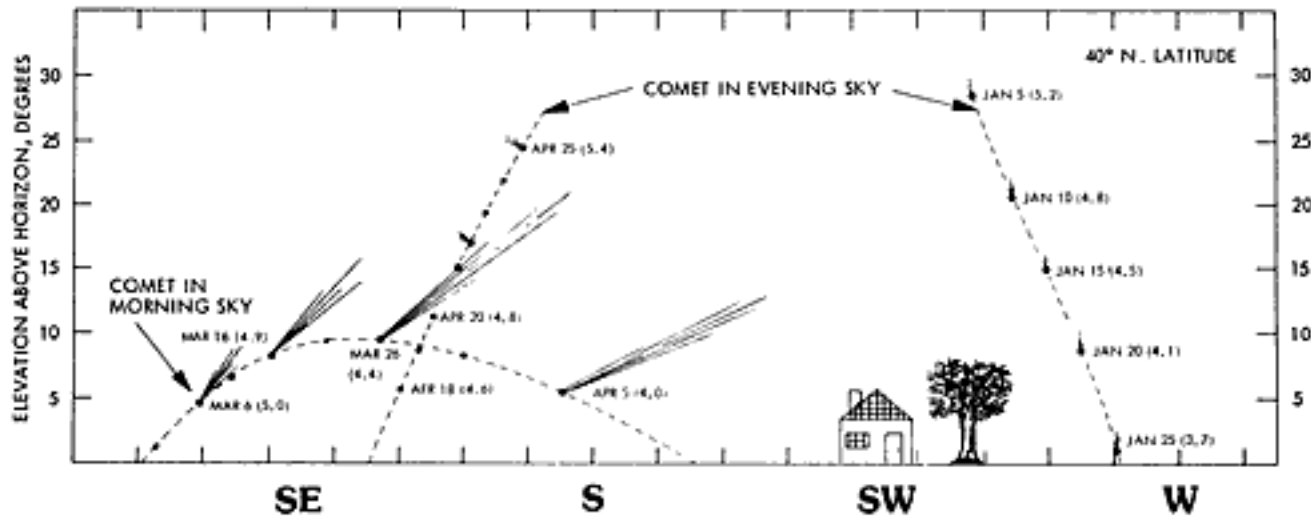
March 27, 2134

Perihelion during the following pass of Halley's Comet (D. Yeomans)

May 7, 2134

Halley's Comet will get within 13.9 million km (8.6 million mi) of Earth; should be spectacular in the sky! (D. Yeomans) [Students should be sure to leave word for their great-great-grandchildren.]

## Where to look for Halley's Comet



This diagram shows where Halley's Comet will appear in the sky as seen from mid-northern latitudes. For January and late April, the comet is shown where it will be at sunset; for late March to early April, it is shown at sunrise. The tail is shown pointing in the proper directions, but its length is an estimate only (for clear, moonless, and very dark skies away from city lights.) (Chart adapted from one in The Comet Halley Handbook by D.K. Yeomans.)

## Best Times to See Halley's Comet (from the Northern Hemisphere)

As many of you may have heard by now, this will be the worst pass of Halley's Comet in 2000 years as far as viewing the comet is concerned. (Just our luck!) From most urban areas, the faintness of the comet in the sky and the brightness of city lights will conspire to make the comet impossible to see with the naked eye. Also the comet will be low on the horizon from most of the U.S., so you will need to find a location with a clear view of the horizon (not generally an easy task, since even low buildings and trees may get in the way.) See the accompanying Halley observing chart.

Our suggestion is that families should try to find a good dark, country location to view the comet on a weekend camping trip, for example. The best instrument will usually be a pair of binoculars, since most typical telescopes restrict your field of view too much to be useful for comet viewing.

Dec. 30, 1985 - Jan. 10, 1986

Comet visible through a good pair of binoculars in the constellation of Aquarius in the evening's Southwestern sky, above the bright planet Jupiter. The Moon's light will not interfere during this period, but the comet tail will not be all that impressive.

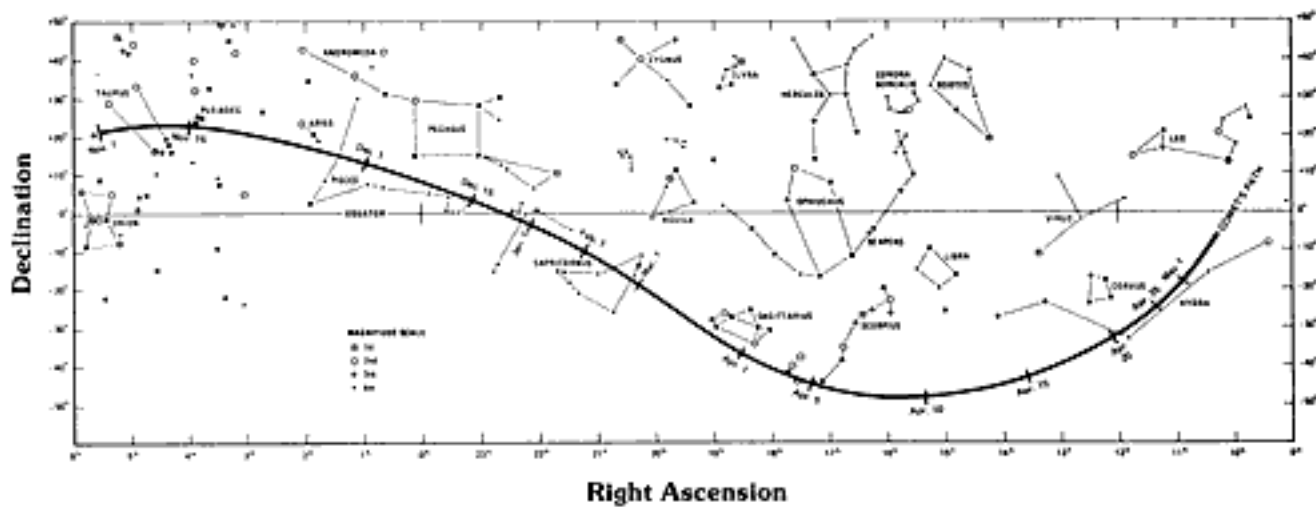
Mar. 15 - 20, 1986

Comet is very low in the morning sky towards the southeast. Must look in the morning twilight before sunrise. Comet appears to be "in line" below Saturn and Mars and may have longest tail. View is better the farther south you are!

Apr. 6 - 10, 1986

Comet is very, very low towards the south in the morning sky; you must have an unobstructed view of the horizon towards the south. (Not visible from the Northern parts of the U.S. at all; better the farther south you are.) The comet will be at its brightest during this time (still not very bright).

## Path of Halley's Comet Between November 1985 and May 1986



This chart shows the path of Comet Halley through the constellations from November 1985 through May 1986. We should note that current estimates are that the comet may not be visible to the unaided eye in most areas before January or after April. Also, during February the comet will be behind the Sun and thus not visible from Earth.

Declination, the north-south coordinate, is expressed in degrees north ( + ) or south ( - ) of the celestial equator. Right Ascension, the east-west coordinate, is expressed in hours (24 hours all the way around) eastward from the point in Pisces where the Sun crosses the celestial equator at the spring equinox.

(Chart adapted from one in The Comet Halley Handbook by D.K. Yeomans.)