Comet Halley: A Close Look on a Hot Day

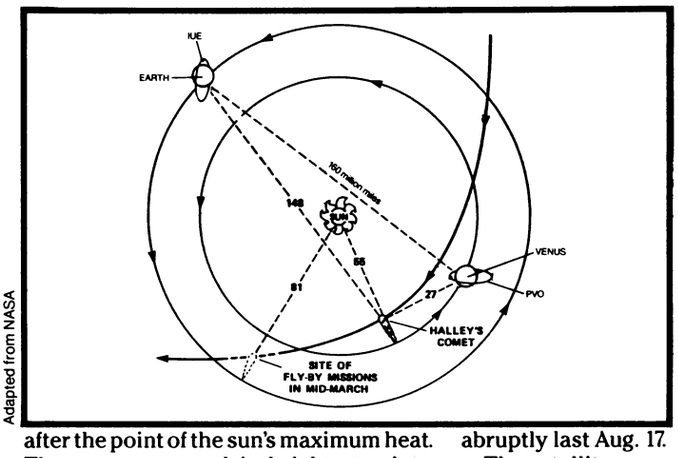
Although no U.S. spacecraft belongs to the multinational fleet of probes heading for close encounters with Comet Halley in early March, there is one U.S. craft that will have the best seat in the house during what should be literally the hottest part of the comet's trip around the sun, less than a month from now. When the various Soviet, European and Japanese probes fly by — with the European Space Agency's Giotto getting as near as 300 miles to the comet's icy nucleus — the comet will be about 81 million miles from the sun, already heading away. On Feb. 9, however, it will be at a distance of only about 55 million miles, just "turning the corner" to begin its retreat. And looking on, from its orbit around the planet Venus, will be the U.S. Pioneer Venus Orbiter (PVO).

From 27 million miles away, PVO will not have exactly a ringside seat for the comet's perihelion. But calculations by Jet Propulsion Laboratory in Pasadena, Calif., indicate that the distances of the still-approaching Halley-bound probes will range at the time from about 97 million to 109 million miles. In addition, PVO will have the advantage of watching from a direction that does not put the sun in its peripheral vision.

"Vision" is not, strictly speaking, the correct term, since the craft will be monitoring the comet not with a camera but with an ultraviolet spectrometer, which measures light reflected from the comet's hazy "coma" and tail as dust and gases are released from the nucleus by the heat of the sun. The data will, in fact, be used to generate at least two images, says Ian Stewart of the University of Colorado in Boulder.

The instrument began observing the comet on the day after Christmas and continued through Jan. 4, and will resume again (after the sun is out of the way) on Feb. 3 — just six days before perihelion. Thereafter, it will stay on the job until March 6, as the actual Halley probes are arriving, representing a vital span of continuous coverage during perhaps the most important stage in a comet's life.

Preliminary analysis of data from the just-completed span of observations, says Stewart, indicates that the comet was giving off, or "outgassing," about 11 tons of water per second by the beginning of the year and increasing in activity. This is equivalent, he says, to about 3.7×10^{29} molecules per second. Spectra from the instrument showed the presence of at least oxygen, carbon and hydrogen. PVO's coverage through perihelion should give scientists a data base from a single instrument about the comet's changing behavior before, during and after the point of the sun's maximum heat. The comet may reach its brightest point a week or two after perihelion.



Adapted from NASA

The U.S. Pioneer Venus Orbiter (PVO) will be the closest spacecraft to Comet Halley during the comet's Feb. 9 perihelion. Also on watch from space before and after (though not during) perihelion will be the earth-orbiting International Ultraviolet Explorer satellite (IUE).

Another long-term look at the comet from outside earth's atmosphere is being provided by the earth-orbiting International Ultraviolet Explorer satellite (IUE). It first aimed its own ultraviolet spectrometer Halley-ward last April, though the comet was apparently too faint for the instrument at the time. On Sept. 11, however, it radioed back what IUE officials call "the first image of Halley's comet ever recorded from space."

A more intensive cycle of Comet Halley observations began last month, and will continue until after (though not during) perihelion.

IUE was launched eight years ago, on Jan. 26, 1978, and has been on the job ever since. However, it is only because of IUE's engineers at the NASA Goddard Space Flight Center in Greenbelt, Md., that the satellite's working lifetime did not end abruptly last Aug. 17.

The satellite was equipped with three stabilizing gyroscopes and three more as "backups." The first main gyro failed shortly after launch, another in March of 1982 and a third in July of 1982. With all the backups in use, the project's personnel hit on a plan of using IUE's position-finding "sun sensor" as yet another back-up gyro — just in case. The plan took six months to develop, plus another year to modify the craft's computer software. And on Aug. 17, 1985, with Comet Halley still out of IUE's range, gyro #4 failed.

Fortunately, the new software worked, with part of the proof of the pudding being IUE's image of the comet, taken less than a month later. The welcome that greeted the successful repair can be judged from the fact that European and U.S. scientists on IUE's peer review panel have allotted more than 250 hours of the satellite's much-competed-for observing time to Comet Halley. — *J. Eberhart*

Common-cold preventive

As the sniffles season starts, medical researchers have found a way to fend off the common cold. The treatment — a nasal spray containing interferon — was shown to limit cold transmission within families.

But the spray, which has been submitted to the federal government for marketing approval, is not the ultimate cold preventive, nor is it without side effects. It worked only against one type of cold and caused minor nasal bleeding in about 10 percent of the recipients.

Metered spray devices containing alpha$_2$-interferon or a placebo were supplied to 97 Australian families and 60 American families, with instructions to use them once a day for a week at the first sign of a cold in any family member.

In the U.S. study, only 1.3 percent of the interferon-sprayers caught rhinovirus-caused colds compared with 15.1 percent of the placebo users, and there were 86 percent fewer rhinovirus colds in the Australian interferon users. But because the medication didn't prevent other types of colds, the treated group still had 60 percent of the control group's cold incidence.

Previous studies have shown interferon's cold-preventing effectiveness, but the high-dose, long-term administrations used caused unacceptable levels of nasal bleeding. The new studies, reported in the Jan. 9 NEW ENGLAND JOURNAL OF MEDICINE, were done at the University of Virginia in Charlottesville and the University of Adelaide in Australia, and were supported by the Schering Corporation of Kenilworth, N.J., which manufactures the inferferon used. □

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