ASTRO-CHAT

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Upcoming events

Oct.	25th.	Comet Hartley-Good, in Aquila, large and difuse. R.A 19hrs 40min, Dec.-1.6 degrees.
	28th.	Full Moon, Hunters Moon.
Nov.	3rd.	S.Taurid meteors.
	8th.	Observing at Bob's.
	8th.	NFCAAA Banquet, Niagara Falls, Mike's going.
	11th.	Venus 0.8 N. of Moon.
	11th.	Council meeting at Jim's.
	13th.	Public observing night (Halleys Comet)
	14th.	New Moon. Total eclipse of the Sun down under.
	15th.	Observing again at Bob's.
	17th.	Leonid meteors.
	22nd.	Regular meeting, room 213 C.K.S.S.
	27th.	Full Moon.

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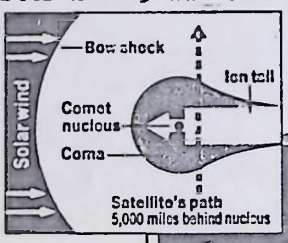
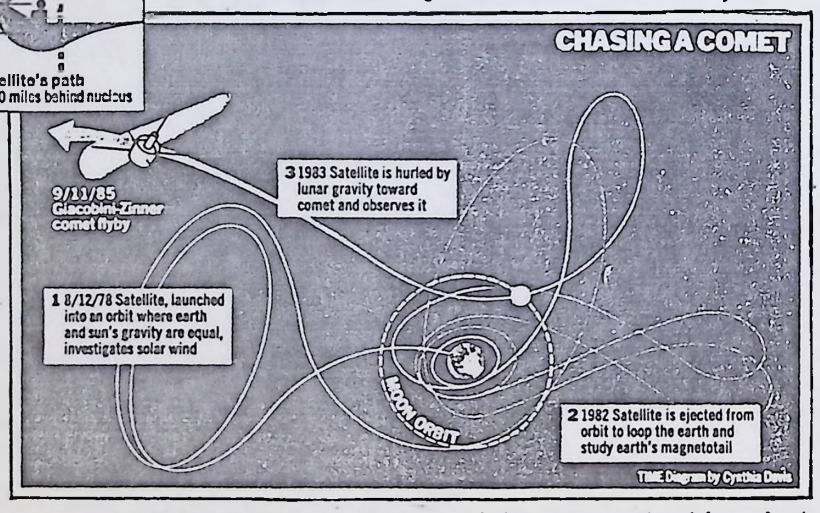
ENCOUNTER WITH A COMET Robert Cattrysse

On the morning of Wednesday,September II,I985,the International Cometary Explorer(ICE)zipped through the turbulent dust and debris tail of comet Giacobini-Zinner 70.8million kilometers away.The tiny spacecraft was launched on August I2,I978,by a Delta rocket into earth orbit to study the solar wind.It was one of three vehicles in the International Sun Earth Explorer project and was named ISEE-3.It was placed in the Sun-Earth LI libration point where the gravity fields of the Earth and the Sun interact in such a way that a third body can stay in their vicinity with only small propulsive impulses.ISEE-3 was the first libration point satellite.On June I0,I982, ISEE-3 was sent on a series of slingshot orbits around the Moon to gather speed, then headed toward the Sun,en route to the comet G-Z,as NASA scientists call it.G-Z was originally observed by Michel Giacobini in I900 and rediscovered by Ernst Zinner in I9I3.The dusty comet has been seen at eleven apparitions and returns to the inner solar system every 6.5 years. After ISEE-3 was sent hurtling towards the comet it was renamed ICE.



The 454 kilogram satellite was never designed to encounter a comet.Instead the satellite is covered with solar cells,has no cosmic dust detector and has no camera to take pictures of the comet,which has a tail



believed to be about 748000 kilometers long.Without a protective dust-shield the solar cells were vulnerable to dust and debris in the comet's tail.Particles from the size of a fist to a bowling ball could have damaged the satellite if they collided.The tail also consists of plasma,made up of protons and electrons or charged particles.Said Dr Stephen Maran of NASA's Goddard Space Flight Centre(GSFC) "We think there's a fair chance,but not a large chance,that we would be damaged by the high speed dust particles that come of the nucleus,come backwards and be striking us at 74000km per hour".Scientists consider comets dirty snowballs that were formed with the Sun and planets about 4.5 billion years ago.

When Japan,Russia and the European Space Agency were planning satellite encounters with Halley's comet for March I986,NASA had no funds for its project.The more ambitious American effort would have cost somewhere in the neighbourhood of 300 to 600 million dollars,possibly hitting one billion. After budget cuts forced the cancelation,disappointed scientists lead by Dr.Robert Farquhar of the GFSC devised the ingenious plan using ISEE-3.

"The craft was custom made to measure plasma waves",Farquhar explained, "and that's exactly what you find at the back of a comet".Its cost was only $3 million and after Farquhar began petitioning NASA officials to spend the meager $3 million,he was surprised that the allocation was approved before he had figured out how to divert the craft."It may have turned out not to be possible",he said,"but at that point there was no backing out".Dr. Maran said,"We only had to spend a few million dollars to upgrade the antennas on earth to track these great distances,and those antennas were scheduled to be upgraded eventually".ICE was not sent to Halley's Comet because of the great distance for its faint radio signals. ICE beat the Halley's Comet encounters by a good six months.

"We wanted to make sure the U.S.didn't take a backseat to anyone", said NASA spokesman James Elliot,"and we've done it".

After a I.6 billion kilometre,seven year voyage the space probe entered the yellow tail just after 7-00a.m. Wednesday and escaped unscathed I8 minutes later."I guess I was a lot more pessimistic about this last phase of it,"said Dr.Farquhar in a news conference Wednesday at the GFSC. "In retrospect I don't see what I was worried about,it seemed pretty easy." The passage through the tail was expected to take only 5 minutes.This and the satellite indicated that the tail is much wider than originally thought. It's believed to be about 22530 km wide,three times what was anticipated. ICE passed I0000 km behind the comet's nucleus.

Eight instruments on board ICE sent back a wealth of information.Scientists at the GFSC boasted that it was a remarkable achievement."There's been a lot of apprehension associated with this mission on our parts,"said Tycho von Rosenvinge of NASA."We were concerned about whether we would be able to survive the dust hazard,whether we might miss the tail,whether the results might be interesting.We've never been to a comet before and it wasn't clear whether we were going to be able to make significant measurements of the comet.For example we might be getting too brief a look.I think that today we can say the anxiety that we had has been relieved.We are excited about the data that we've got.We're very happy for it."

The scientists said it was to early to discuss specific findings,but they did offer some initial observations.Said Dr.Edward Smith from NASA's Jet Propulsion Laboratory,Pasadena California,"I think it's fair to say from the human perspective,from the project's point of view,and from the scientific perspective that mankind's first encounter with a comet has to be ranked as an unqualified success."And though no cameras filmed this very close encounter the information could change science books.They learned comets have less dust than anticipated and more turbulence but generally confirmed their theories.On the outside of the tail,electrons generated temperatures up to 500000 degrees,but inside they were only about I0000 degrees Sensors on board the craft showed that the tail of a comet disturbs the void of space with massive amounts of magnetic and electrical turbulence reaching hundreds of thousands of kilometres beyond the comets orbit.The tail is a rich mixture of water,carbon monoxide and gas.

"It is significant indeed and we're proud of it,"said NASA administrator James Beggs."It exemplifies the best of what we do here at NASA."About the Halley's venture Beggs said,"We would have enjoyed the Halley's encounters more if there had been an American spacecraft in that armada."

Roald Sagdeev of the Soviet Institute for Space Research congratulated USA scientists "on your great success."

After leaving G-Z,ICE will pass near Halley's Comet on October 3I,I985 but will be I50 million km from the comet.On March 28,I986 ICE will pass even closer,coming as close as 30 million km to the comet.NASA is hoping to bring the satellite back to Earth so they can examine the particles it collected to see what a comet is really made of and to display the probe at the National Air and Space Museum of the Smithsonian Institute in Washington D.C.Scheduled arrival date here: August 2, 20I2.