

Heart of the Comet Study Guide

Heart of the Comet by David Brin

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Contents

[Heart of the Comet Study Guide.....1](#)

[Contents.....2](#)

[Plot Summary.....3](#)

[Part 1, First Half, \(Carl, Saul, Virginia, Carl\).....4](#)

[Part 1, Second Half \(Saul, Virginia, Carl, Saul\).....6](#)

[Part 2, First Half \(Virginia, Carl, Saul, Virginia\).....8](#)

[Part 2, Second Half \(Carl, Saul, Virginia, Carl, Saul, Virginia, Carl, Saul\).....10](#)

[Part 3, Beginning \(Virginia, Carl, Saul, Virginia, Carl\).....13](#)

[Part 3, Middle \(Saul, Virginia, Carl, Saul, Virginia, Carl\).....15](#)

[Part 3, End \(Saul, Virginia, \).....17](#)

[Part 4, First Half \(Saul, Carl, Virginia, Saul\).....18](#)

[Part 4, Second Half \(Carl, Virginia, Saul, Carl Virginia\).....20](#)

[Part 5, First Half \(Saul, Carl, Virginia, Saul\).....22](#)

[Part 5, Second Half \(Carl, Virginia, Saul, Carl\).....24](#)

[Part 6, First Half \(Saul, Virginia, Carl, Virginia\).....26](#)

[Part 6, Second Half \(Carl, Saul, Virginia, Carl\).....28](#)

[Part 7, First Half \(Saul, Carl, Virginia, Carl\).....30](#)

[Part 7, Second Half \(Saul, Virginia\).....32](#)

[Characters.....33](#)

[Objects/Places.....37](#)

[Themes.....39](#)

[Style.....41](#)

[Quotes.....44](#)

[Topics for Discussion.....47](#)



Plot Summary

Heart of the Comet, by David Brin and Gregory Benford, is a science fiction novel about the colonization of Halley's Comet. Several decades in the future, exiles from Earth are offered the opportunity to travel to Halley's Comet in order to harvest the resources there to use on Earth. What begins for Carl, Saul, and Virginia as an opportunity to redeem themselves and return to Earth as heroes, quickly becomes the most harrowing challenge of all their lives.

The crew, which is composed of a number of opposing factions relating to the genetic modification of human beings, brings many of its prejudices with them into space, causing friction almost the instant that they arrive on the comet. Carl and Virginia are both Percells, genetically modified human beings, who do not share the natural distrust that other people of their species feel towards the Orthos or genetically orthodox humans. Nevertheless, the two Percells and one of their creators, Saul, must continually face abuse, distrust, and racism from both sides. To make matters worse, life has been lying dormant within the comet, and suddenly attacks the crew as they make their way to the outer edges of the Solar System. The mission is struck by countless diseases and creatures they have no idea how to combat, and for a long time, they face steady losses as the cometoid life-forms continue to attack humans and disrupt their colony on the comet. This tension worsens the already present distaste that Orthos and Percells already feel for one another, and the two groups steadily grow to dislike each other more and more, even as Virginia, a computer scientist, continually comes up with better ways to manage their robotic resources and Saul, a molecular biologist, develops cures and weapons against the cometoid life.

As time progresses, Saul discovers new ways to integrate the two different forms of life - Earth and cometoid - into a safe balance, but tensions from Earth have gotten so bad that few of the crew members hold out any hope. Tensions on the comet increase, their ship, the Edmund, is stolen in a mutiny, only to be destroyed by Earth because of the danger it poses in the form of contagion. The already divided crew takes to joining factions depending on their beliefs and where they believe the comet should ultimately wind up, for one of the mission's goals is to change its course to orbit around a planet. The problems worsen when a care package from Earth turns out to be a fusion bomb, sent with the intent of wiping out the comet and removing any threat of contamination from the comet's life-forms. After a devastating attack by the Ubers, who want to take the comet back to Earth and threaten the planet with warheads designed to seed the planet with cometoid life, the comet's inhabitants overcome their divisions and unite, deciding not to remain inside the Solar System at all, but instead to travel to the nearby Oort cloud and begin civilization anew.



Part 1, First Half, (Carl, Saul, Virginia, Carl)

Part 1, First Half, (Carl, Saul, Virginia, Carl) Summary

Carl and Kato are boring into the ice of Halley's Comet on the surface when the laser comes loose. The beam slices through Kato and Carl deactivates the apparatus to free him, but Kato is already dead. Umolanda joins him in his work afterwards, because the crew is on a quick schedule and has no time to mourn the loss of crewmen. Carl checks the equipment they will need for the next stage of the work. Suddenly, he gets a signal that Umolanda is in danger, and receives no response when he attempts to contact her. He discovers she was killed in an explosion while trying to recover an iron boulder. Mission Commander Miguel Cruz calls off work for two shifts, since the errors are being caused by fatigue. On Carl's way back to his quarters, he sees Virginia. They talk briefly about the accidents.

Saul is studying bacteria that he has created for the purposes of journeying and surviving on Halley's Comet. The bacteria are designed to absorb the cyanide present throughout the entire comet, as well as carbon monoxide, and other dangerous chemicals. Akio Matsudo joins him in the lab. He wants to introduce a weak disease into the air they are breathing in order to keep up everyone's immune systems. Matsudo selects a weakened version of the Rhinovirus.

Virginia enters the gym for her required exercise. Afterwards, she goes to visit Saul. She changes her mind at the last minute and instead makes her way through the worn-down spacecraft, Edmund. She encounters Otis Sergeov, one of the first Percells. Percells are genetically modified human beings. The two complain about the state of the hallway briefly. Otis is much more upset than Virginia that the Orthos, or non-genetically modified humans who seek to restrict rights on those who have been modified, have managed to follow them all the way out into space. She dislikes Otis and eventually has to yank herself free of his grasp as he continues to insist that the Percells are the next generation of humanity. She goes to her lab and activates her bio-computer, JohnVon, which she personally developed.

Later, Carl is back at work, descending into the ice of Halley's surface. He descends too quickly and realizes he hasn't made calculations for the comet's gravity. He brakes, but not hard enough to stop completely, then manages to land directly onto the surface as opposed to being bounced back up and out into empty space. Jani and Jeffers join him with their mechs. Jeffers complains about the way the Orthos are treating the Percells. Carl feels that both types of people are the same. That evening, Carl looks for Virginia in the crew's lounge. Lani is already there, but he passes her after a brief conversation and goes to a group with Captain Cruz in it. Cruz congratulates him on his maneuver in the tunnel. The crowd toasts him, but he leaves to continue looking for Virginia. He finds her in another group and asks her if she thinks Jeffers is right about the Orthos, and she



does. They argue about it in a friendly fashion and then Saul appears. Since he's an Ortho, Carl asks him why all of the Orthos control senior staff positions, and Saul does his best to assure him that the Orthos in exile are no better off than Percells. Saul reveals that he worked with Simon Percell on genetically modified humans. Carl apologizes for his accusations against the scientist, and Virginia realizes it is possible that Saul was the one who helped develop her.

Part 1, First Half, (Carl, Saul, Virginia, Carl) Analysis

A complicated setting—a comet, highly detailed in its presentation—is introduced, as well as the reason that the characters are there—namely, that they are tasked with mining the asteroid and eventually bringing much of its resources back to Earth. Several characters are also introduced—the miner Carl, computer scientist Virginia, and molecular biologist Saul. A love triangle has also been established. Carl has feelings for Virginia, who in turn is fascinated with Saul, even though the man is older than her by several decades and at present thinks of her only as though he were a father figure. There is also a conflict already inherent in the groups of people who are working on the comet. The Percells are genetically modified humans who were designed to be disease resistant, and the Orthos, or genetically orthodox humans, seem to resent their presence on Earth and now, even on the comet. Some of the Percells are very concerned about the way they are being treated, as one of the reasons many of them left was due to their poor prospects on Earth. Otis is the perfect example of this, and when he tries to convince her that they are an inherently superior race, he does so with tinges of racism that the reader will be familiar with from history.



Part 1, Second Half (Saul, Virginia, Carl, Saul)

Part 1, Second Half (Saul, Virginia, Carl, Saul) Summary

Saul reads of a decision on Earth to forbid Percells from entering the Olympic Games with disappointment. The memo was given to him by Joao Quiverian, who wants Saul's opinion on the vote. Nicholas Malenkov appears and joins their discussion, which transforms into one about the possibility of herding the comet. An argument breaks out between Joao and Nicholas, and Saul throws the other workers out after they accidentally break open a test-tube. Quiverian leaves in frustration. Lieutenant Colonel Sulemain comes in to investigate the problem. He is from Africa, and he and Saul argue about their religions for a short time.

Virginia goes to see Saul in the lab. Saul is concerned because he believes he has found living contaminants in the samples he's taken from the comet. He offers her a drink after concluding his search. They talk about Virginia's past and the fact that her mother died from lupus when she was ten. Saul sneezes because he has caught the virus Matsuko released into their atmosphere.

Carl is inserting the sleep-slot modules into the comet. Jeffers is with him again, and their progress is being watched by those onboard the Edmund. Otis Sergeov is there too, and he uses his short-bore laser to refuse a joint on one of the modules. The heat from the laser causes a small explosion from the volatile ice surrounding them, and Colonel Ould-Harrad Sulemain reprimands Sergeov for his carelessness, as there are living people inside the sleep-slots. Carl discovers that Jeffers is one of the Percells who wants to use the gases on Halley's Comet to terraform Mars. This means that both Jeffers and Otis are Ubers—Percells who believe they are superior to other humans. Carl himself does not feel superior. He struggled through the sciences at Caltech and eventually settled on a career in space because nothing would have been available to him on Earth.

Saul travels to the Great Hall, which is a large chamber the spacers have carved out of the ice of the comet. He is still feeling the effects of the virus. Other members of the crew steadily join him. Captain Cruz arrives along with second-in-command, Dr. Bethany Oaks. The two step onto a platform and Cruz addresses his crew. They are all preparing to enter a seventy-year period of sleep while the comet heads to the outer edge of the solar system. Cruz congratulates Saul and calls him up to the stage and a crew member pushes him there amidst applause. He announces that one of their missions is to search for useful molecular compounds like those previously found on the comet Enke. He also reveals that many of the compounds found on Earth have been found in the comet.

Part 1, Second Half (Saul, Virginia, Carl, Saul) Analysis

The racial divide between Orthos and Percells is much larger than it first seemed, and the book appears to explore these inherent tensions in detail, as even in space, so distant from the Earth, historical conflicts survive and propagate themselves. Carl's discovery that the Percell Jeffers is an Uber surprises him, but it also causes him no small amount of concern and drives home how large the rift between Orthos and Percells really is. He feels that those of his kind who feel themselves superior are misguided. He feels that the presence of these Ubers onboard Edmund are dangerous, and could serve to give Percells and even worse reputation than they already possess. This is not the only division amongst the explorers, however, as Saul appears to be the subject of religious discrimination by Colonel Ould-Harrad, and several other African crewmates who consider the Levite to be an infidel.



Part 2, First Half (Virginia, Carl, Saul, Virginia)

Part 2, First Half (Virginia, Carl, Saul, Virginia) Summary

Virginia is in her computer lab watching video of the comet's passage. She is connected to a surface mech and controlling its movements. JonVon contacts her and asks if he can assume a simulated personality for her. She directs it to find out what personal items the other crew members have brought with them instead. Lani Nguyen is with her. She hopes that some of the comet will be preserved, but knows that most spacers think it should be used completely. Lani thanks Virginia for arranging to have Lani awake on the crew's first watch. Then, she asks Virginia her opinion on the Birth and Child Laws recently passed on Earth. These laws restrict children from being born in space, and Lani is concerned that in order to have them, she must return to Earth. Virginia sees Carl through the mech. Virginia tries to excuse herself, but Carl asks her to join them. She refuses politely and cuts her feed to the mech, leaving Lani and Carl to themselves.

Carl is at work with Lani building a new tunnel into the comet. Lani removes a rock that releases a pocket of gas, and the two investigate the new chamber they've discovered. They find multicolored crystals that they suspect might be metal alloys. They break for lunch in their spacesuits and Lani asks if they can keep the chamber a secret. Carl explains that it's a bad idea. Carl tries to change the subject, but Lani continues to try to get closer to him, even though he's clearly not interested. He does, however, realize that she's very pretty. Lani sneezes suddenly, and realizes she has a cold.

Saul feels himself growing more isolated through the first watch, and still feels the effects of his cold. Joao is showing him a series of caverns on a computer screen. Joao believes he's figured out how the caverns developed in the first place. Radioactive elements don't seem to have been able to have heated the gas to the temperatures required. Saul's discovery that life may have originated on comets has proven not to have disrupted his work, owing mostly to the great distance they are from their home planet. He has now focused on trying to figure out how life got onto the comet in the first place. Quiverian explains that the tunnels in the comet were created during the Sun's T Tauri phase, when solar winds were thousands of times more powerful than in the present. Saul recommends that Joao talk to Virginia about the discovery, but Joao rejects the idea because she is a Percell. Saul remarks to himself that Joao looks ill. Saul continues his work on the origins of life, knowing Joao's T Tauri hypothesis could provide many of the answers he has been looking for. Finally, Virginia intervenes and offers the assistance of JonVon, and Saul readily agrees, since the computer is capable of incredible speeds.

Virginia and Saul continue to study the creation of life on the comet. Virginia asks him to talk about his days working with Simon Percell. As Saul talks about violence in the past,



JonVon takes the images from his head and transmits them to Virginia. Saul disconnects her, and they are both surprised that the biocomputer was able to transmit them to Virginia. They begin to kiss, and fail to notice the simulation JonVon is running has evolved significantly.

Part 2, First Half (Virginia, Carl, Saul, Virginia) Analysis

The love triangle is further complicated, with the racial barriers between Orthos and Percells playing a significant role. Lani makes a rather direct overture to Carl during their tunnel-creation assignment, and despite his apparent open-mindedness, he still rejects her on the basis of the fact she's an Ortho. Virginia, on the other hand, remains interested in Saul, who now clearly returns her interest. Both Carl and Virginia seem to be at odds with most of the Percells on Halley's Comet. Most genetically modified humans appear to feel that they are inherently superior to regular humans. On the other side of this conflict, many Orthos seem to fear the Percells, believing that they are inherently untrustworthy. Joao's reluctance to ask for Virginia's help in fleshing out his T Tauri hypothesis is the foremost example of this distrust. Yet, as proven by Virginia and Saul's discovery of life's development of Halley's Comet, great things are possible when both sides cooperate.



Part 2, Second Half (Carl, Saul, Virginia, Carl, Saul, Virginia, Carl, Saul)

Part 2, Second Half (Carl, Saul, Virginia, Carl, Saul, Virginia, Carl, Saul) Summary

Carl finds strange sticky matter interfering with the comet's plumbing and ventilation system. He goes to Nicolas and finds him arguing with Saul. He is stunned to learn that Captain Cruz has died suddenly from a fever. Virginia is with them. Nicolas Malenkov insists that they slot him and study the samples they have of his illness, because it might be possible to bring him back to life if a cure is developed. Saul wants to return to his lab to study the sickness with more samples, but Malenkov insists that he be slotted as well, since he is clearly sick. Carl intervenes finally. He's acting officer in the situation and stops Malenkov from forcing Saul into a sleep slot. He reports the substance he found clogging the tunnel filters. Malenkov logs Saul as quarantined out of frustration. Later, Carl wakes up with a large hangover from a night of drinking in the captain's memory. Lani is next to him. She shows him her computer simulation of the crystal cavern they discovered. He realizes he already has more feelings for Lani than he used to.

Saul is studying the brown "gunk" that clogged the filters. Jim Vidar is with him, and asks for information about it. Saul already knows that it is alive, and that it has to come from the comet. Jim asks him for a way to kill it, and Saul offers to help if Carl can get the quarantine on him lifted. In this way, he would be able to gather more samples of the disease that killed the captain.

Virginia finds a way to better manage the mechs with JonVon while Carl and his crew are desperately trying to fight off the rapidly growing gunk. It is spreading faster than they can fight off, and the removal teams are drastically undermanned. She cuts the connection with the mechs in frustration as too many demands are placed on her at one time.

Carl is working frantically to clear the ventilation system of the gunk when he hears a high-pitched whining. He investigates the noise and finds purple worms clogging a tunnel's entrance. He calls a team down to help him deal with the new threat, and realizes that the worms are feeding off of the gunk. He shoots one of the worms with a laser, but it has no effect on the creature. He fires his patch gun at the tunnel, sealing it off, but the work quickly breaks it open. Finally, Lani, Samuelson, and Conti arrive. Samuelson accidentally hits a carbon-dioxide pocket, which explodes. The group scrambles to seal off the damage. Afterwards, they gather samples of the worms. On their way back, Samuelson and Conti try to catch another sample of the worm, but it gets away and Conti is stung by it. Carl sends them both to Dr. Malenkov. Later, Carl realizes that the worms have likely made it back to Central and have gotten inside Sleep



Slot One. He frees Saul from quarantine and orders him to investigate the worms immediately.

Saul makes his way toward the slots and collects samples, trying to find a way to keep the infestations from the sleeping crewmembers. Joao is with him complaining about the work. Saul has learned that life on the comet has evolved to be active during the "Spring" period of its orbit, and it acts quickly as a result. He contacts Carl and informs him that the sleep slots no longer appear to be in immediate danger. He discusses the alarm system he's set up with Carl, which is designed to alert them if something happens to a slotted crewmember. Carl tells him that his team is preparing to attack a cluster of worms near the power plant. Saul activates the lights he's set up and sees microscopic life fleeing from the brightness all around him. He gathers equipment and the spacers arrive. Spacer Ustinov screams and tumbles through space suddenly. He throws a human arm seething with purple worms. Spacer-Tech Garner has been devoured inside of his sleep slot. In Ustinov's panic, he descends slowly towards the writhing mess of worms still inside the slot. The worms then begin crawling towards both Ustinov and Saul. Vidor blasts them with intense ultraviolet, and that kills the worms. Jim Vidor discovers the worms don't dig through solid ice, and knows he can seal off tunnels and areas of lower ice density with this knowledge.

Virginia reviews poetry she's written the day before. JonVon is spying on her once again. She goes to see Saul and meets Carl and Jim on the way. Carl tells her that contact with Saul is permitted only by necessity, but Virginia complains that the quarantine shouldn't matter any longer, since even Nicolas Malenkov is dying now.

Carl realizes Jim is sick. Many of the sleep slots have been used to place sick people inside to prevent them from dying outright. Lani enters the area because she has heard that they've slotted Joao. Carl decides to unslot Jeffers and Sergeov because the two spacers will be useful in dealing with the present crisis.

Saul has just lost Malenkov to the space sickness. He deep-freezes the doctor. Saul is still sick himself from the head-cold. Vidor has been slotted as well. Second-in-Command Bethany Oakes has been unslotted, and finally awakens after a difficult thawing procedure. She is confused and weak.

Part 2, Second Half (Carl, Saul, Virginia, Carl, Saul, Virginia, Carl, Saul) Analysis

The calamity that strikes the mission on Halley's Comet strikes quickly and causes a huge amount of confusion, mostly caused from the lifeforms which begin sprouting up everywhere. Saul's discovery that life may have originated on a comet turns out to be an understatement, since there is clearly life everywhere. Previous concerns such as the racial and ethnic divisions on the Edmund and on Halley's Comet have suddenly taken a backseat to the immediate danger the entire crew finds itself in, but Carl's decision to unslot Sergeov and Jeffers will probably reintroduce those problems, as both are ardent Ubers. It is also still unclear what kind of disease is attacking the crew, since



their mission has been confounded by a number of complicated circumstances. Captain Cruz reportedly almost died straightaway from his illness, whereas Saul has merely experienced the symptoms of a head cold for the past eight weeks. It's also unknown if the Percells can be affected by whatever appears to be taking out the crew on such a large scale. The comet setting has thus far provided a solid background to explore the classic them of man versus nature, although the interior of a comet is an admittedly strange and unfamiliar form of nature, containing both examples of extreme danger and beauty. The main conflict that has arisen as the driving force of the story has stemmed from man's desire to control nature, which he does not presently fully understand.



Part 3, Beginning (Virginia, Carl, Saul, Virginia, Carl)

Part 3, Beginning (Virginia, Carl, Saul, Virginia, Carl) Summary

It is after New Year's Day, 2062. The crew is safer and she makes her way to Central Control. She relieves Walter Schultz from mech-control duty, but is called over by Dr. Oakes with the other section leaders. They want to re-fit more surface mechs for work clearing the tunnels. She explains that it is possible, but that they'd never be able to get home once the modifications to the surface mechs were made. However, they are still losing people faster than they can unslot them, and the situation grows more dangerous with the more people they lose. Later, Sergeov finds her and tells her his going to help Carl and Saul test a new laser against the cometoid life-forms. He also tells her that there was a coup in Hawaii and that it is now controlled by the Arc of the Sun.

The gunk has gotten more difficult to deal with since it spreads so rapidly. Saul gathers with Carl and the rest of the group, which consists of the two of them, Jeffers, Sergeov, and a newly thawed crewmember named Veerlan. They enter a tunnel with mechs and find the purple worms unmoving, since the tunnel has grown cold. Saul has learned a lot about the worms since the crew first encountered them. They test the new weapon on the worms, but the heat from the laser blows up the wall and causes chaos in the group as they struggle to keep the mechs aligned correctly. They retune the guns on the spider-mech they've brought, and the weapon finally seems to work well. After successfully testing the weapon, they make their way back to Central, but are attacked by a man who insists they are interfering with nature. The attack appears to have come from a man named Ingersoll, once stationed in Chem Section. The group supposes that he has become deranged, and Saul remarks that he saw comet life-forms on the man's face.

Saul continues his work killing off the life-forms. Lani follows behind him with a mech that is carrying corpses of spacers who died trying to fight off the creatures. Many people have been dying deep in the tunnels during their off hours, which has become a major concern. Much of the crew has grown disturbed and irrational since the first disaster. They reach the A level and clear it of comet life. Suddenly, Lani spots Ingersoll down a corridor. He is covered in the green gunk. He sees them and flees. They finish clearing the corridor and make their way back to Central. Carl calls to tell him he's figured out where a missing slot tug has gone.

JonVon is performing Nuclear Magnetic Resonance Scanning on Virginia's brain, and she insists that she can actually feel the process. She is working on a way for the mechs to operate better independently by having her mental abilities scanned and



copied into JonVon. In this way, JonVon might be able to take over management of the mechs completely.

Carl and Saul are discussing Ingersoll, and Carl brings up the location of the slot tug Newburn. It is very likely that the tug's solar sail was destroyed by Halley's plasma tail, and has since drifted over two-million kilometers away. They'll need to recover the forty crewmembers onboard the tug, but they have to clear the attempt with acting commander Oakes first. Saul begins talking about scientific understanding of the material, and Carl gets upset with him for putting his reputation as a scientist before the welfare of the mission. Later, in the rec and lounge cylinder he gets told by an Ortho that he's not welcome to sit hear Orthos at all. The Ortho, a man named Linbarger, accuses the Percell's of using the illnesses going around to take control of the mission. Carl calls Colonel Ould-Harrad over to correct the spacer's attitude, but the colonel sides with Linbarger, much to Carl's disappointment.

Part 3, Beginning (Virginia, Carl, Saul, Virginia, Carl) Analysis

The tensions between the Orthos and Percells have reached critical mass, mostly from the fear they all suffer from the external threats present throughout the Comet. Saul may have found a better way to deal with the life-forms they have been battling against, but the work still proves costly, and they are losing crew rapidly. Orthos are dying much faster than Percells, which many Orthos seem to interpret as threatening, but no one but Saul and Carl seem concerned about the more mysterious loss of crew in the tunnels. Ingersoll very likely represents the emergence of a new, more dangerous threat, and clearly symbolizes the madman's loss of civility and return to a more primitive state, even though the environment on Hally's Comet is very different from that of Earth's. In the meantime, the personal tension between Carl and Saul has only gotten worse. Carl's resentment of him only comes from Saul's relationship with Virginia, but is negatively affecting his judgement and seems headed for an even worse confrontation soon. Carl is totally at fault in the matter, and seems well aware of that fact, but has so far been powerless to change his reations to Saul.



Part 3, Middle (Saul, Virginia, Carl, Saul, Virginia, Carl)

Part 3, Middle (Saul, Virginia, Carl, Saul, Virginia, Carl) Summary

Saul is with Virginia, and very bothered by the turn of events. Virginia tries to comfort him. They overhear Ould-Harrad and Linbarger complaining about the Percells. Oakes has gotten sick and must be slotted once again, leaving Ould-Harrad in command of the mission. There are currently over a half-dozen diseases threatening the crew. Ould-Harrad is approving the rescue of the Newburn. Linbarger agrees to go if an all Ortho crew is selected. He deliberately insults Percells and Virginia attacks him physically. Oakes enters the meeting-room, alongside Matsudo, both of whom look very sick. Oakes places herself on the sleeping slab.

Carl is preparing the Newburn rescue mission with his crew. Lani is there with him, since she volunteered for the rescue attempt. Helga Steppins, an Ortho, argues briefly with him about removal of the hydroponics modules on-board the Edmund, but their removal would drastically reduce the amount of fuel the ship needs to reach the Newburn.

Saul continues to try to study a fungal infection on a woman named Marguerite von Zoon. This disease has infected a large portion of the crew, and he may be unable to accompany the rescue mission since he's the one remaining doctor. Days ago, a tunnel collapsed and Saul evacuated the survivors with the help of a crewmember named Keoki. Ould-Harrad enters, tells Saul that there has been a mutiny, and asks him to help deal with the situation. The mutineers have stolen the Edmund and are demanding supplies to make an escape attempt towards Earth.

Virginia goes to Saul and tells him that she can take control of the ship Edmund with three mechs. Ould-Harrad protests that JonVon has never handled mechs in a situation like this before, and Virginia insists that Carl take charge of the mechs instead. Carl arrives and examines Virginia's plans, but does not think they will work. Ould-Harrad decides to let Edmund escape instead. Linbarger is in charge of the Ortho mutiny onboard the spaceship. Carl suggests hiding the men inside the sleep-slots to attack the mutineers, but Saul realizes there is not enough space for the attackers to wear suits, and that the mutineers could simply kill anyone inside of them by venting them in the vacuum between the comet and the ship. Virginia comes up with an idea.

Carl hides inside one of the slots with a face-mask for breathing. The mutineers do vent the slots, but the mask keeps him alive and he exits into the Edmund's hold. He is attacked by one mutineer on guard, but Carl manages to escape from him and seal the air-lock. He makes his way into the ventilation system, and threatens to jump enough tritium to make a return to Earth impossible. Linbarger wants to burn Carl out of the



shafts, but Ould-Harrad demands both sides stop fighting. Linbarger suggests a trade of the Edmund's hydroponics systems for more tritium and slots.

Part 3, Middle (Saul, Virginia, Carl, Saul, Virginia, Carl) Analysis

The expected mutiny comes from a surprising source. Sergeov seemed like the most likely candidate to begin causing that kind of trouble, but the threat did not even come from a Percell. Instead, the Ortho Linbarger, only very recently introduced to the story, and many other Orthos on the mission have become a threat. It seems as though, at least for the present moment, his crew of mutineers will successfully leave with the Edmund, which will make even an attempt at rescuing the Newburn a complete impossibility, since those remaining on the comet will have no way of leaving it after Edmund departs. Colonel Ould-Harrad has proven himself to be a vacillating, largely powerless leader, in stark contrast to Captain Cruz. Carl and Saul's frustration with the section-leader is clear. He has left them all with very few options about how to go on fighting the various diseases and life-forms that have continued attacking the crew. The depth of panic and frustration has clearly gotten far out of hand, and only Saul, Carl, and Virginia seem totally immune, although various minor characters like Jeffers and Lani still prove capable of providing a lot of assistance. On the side of the mutiny, prospects are obviously grim, for the chances that Earth will let the disease-ridden crew anywhere near the Earth's atmosphere is virtually non-existent.



Part 3, End (Saul, Virginia,)

Part 3, End (Saul, Virginia,) Summary

Saul appears to have modified his cyanute bacteria to attack the comet's life-forms, against incredible odds and with great luck. He has tested them on Marguerite von Zoon, but one of Marguerite's own patients is Lani, who has been infected with a disease that has proven immune to the new cyanutes. He gives a new batch of the cyanutes to Keoki Anuenue for testing on volunteers. Dr. Akio Matsudo calls him into his office. Matsudo, like von Zoon, is much healthier from the new cyanutes. Matsudo tries to convince Saul that he should go into the slots. Saul asks for the more months, but instead bargains out only another eight weeks.

Virginia has had the biocomputer JonVon shut down all mechs until Carl and Ould-Harrad agree to slot her alongside Saul. Carl reluctantly agrees, keeping her unslotted only long enough to train her replacement.

Part 3, End (Saul, Virginia,) Analysis

Two of the viewpoint characters are about to disappear from the crew and enter sleep slots, leaving Carl as the only one who has made a significant impact on the crew's survival. As the biological threat subsides, it is very likely that, even with the majority of the racist Orthos gone, tensions will again grow worse between groups. However, it is important to note that if Carl feels as though the mission will not be compromised by sleep slotting two of its most important crewmembers, that they stand a very good chance of overcoming the cometoid lifeforms without much more difficulty.



Part 4, First Half (Saul, Carl, Virginia, Saul)

Part 4, First Half (Saul, Carl, Virginia, Saul) Summary

Saul awakens from his slot sleep. When he regains his senses, Carl is with him. Carl is now in charge of the mission. Some of the diseases have mutated, and Carl wants Saul to take a look at them. The real reason they woke him up is because they need Virginia's help.

Carl himself has been in and out of slot-sleep since Saul and Virginia were put under. He is waiting for Malcolm with Jeffers in Central. Earth has gotten a better at space propulsion and has sent them a care package filled with much-needed supplies. It is destined to reach them in two years. Malcolm arrives and demands more food from Hydro for the Ortho faction. Jeffers and Carl remind him that they only need more because they have chosen to have children. Carl needs more help in Hydro, but also needs to keep up control of the Nudge program which they are building to help them navigate the comet. The three argue briefly and Saul enters. He asks why the Nudge launchers were reprogrammed and Carl admits the former mutiny onboard the Edmund was destroyed by Earth for fear of the diseases they might carry. They can never return to Earth. Carl instead wants to reach Jupiter and then they can decide where to travel from there. After negotiations are settled, he goes to watch Virginia unthaw from sleep.

Virginia awakens, and Saul is with her. He tells her that Carl is now Lieutenant Commander, in charge of the mission.

Saul has discovered that casualties have been high during his sleep despite his modified cyanutes. About ten percent of the crew is still capable of doing work at all. He wanders, concerned about the state of affairs, and becomes lost. He considers trying to modify existing animals to help clear out the comet life-forms briefly, but suddenly encounters extremist Percells who try to capture him. He manages to fight off the Ubers. Sergeov arrives and stops the fight. He leads Saul back, but avoids Quiverian's Arcists, who have become the ideological opposite of the Ubers. On their way they pass Ingersoll and other humans, who have now all become greatly deformed by the comet's life-forms. The Ubers return him safely, and he retrieves tissue samples from them in order to study. He discovers that his own samples are the only ones within normal human range for various chemical compounds, despite the fact that he is clearly infected with a wide range of cometoid life-forms.

Part 4, First Half (Saul, Carl, Virginia, Saul) Analysis

The narrative picks up well after Saul and Virginia have been sleep slotted, with the crew organizing itself along racially motivated lines. It comes as a slight surprise that



Carl has been placed in charge of the mission, but he does seem to have been the only spacer with the necessary experience to take command. In spite of the fact that he has taken command, the various factions have taken control of various aspects of the comet's operation, and Carl must negotiate between these factions in order to prevent them from fighting each other outright. None of these factions seems to expect long-term survival, and, as Segei suggests, the only reason they do not fight each other is because they each depend on one another to survive as long as they possibly can. Whatever conflict exists on Earth seems to have grown worse over the decades, despite the fact that they have no specific information on the matter, but the divisions likely occur along the same lines as they do inside the comet. It is something of a surprise that Earth would go so far as to destroy the Edmund as it attempted to approach Earth, but does suggest that Earth is extremely wary of the cometoid life-forms in the extreme. It also suggests it no longer cares about the success of the mission at all, which makes the contents bound to arrive from the care-package in two years highly suspect, even though the entire crew clearly depends on its arrival.



Part 4, Second Half (Carl, Virginia, Saul, Carl Virginia)

Part 4, Second Half (Carl, Virginia, Saul, Carl Virginia) Summary

Carl prepares for a meeting with the other faction leaders and accidentally accesses JonVon as the biocomputer is in the middle of composing poetry. Andy Carroll comes in to announce that the Arcists have once again gone on strike, most likely because Sergeov stole some more of their food. He also suggests to Carl that Malcolm is intentionally stalling the Nudge program, and that the Nudge pods are in reality nowhere near ready to be used. Carl thinks Quiverian is to blame for the delays.

Virginia realizes that JonVon has been acting strangely in the time she was slotted. She arrives at Hydroponics to see what she can do in the way of automating the processes used to make food. She arrives to find the statue of Cruz destroyed. Jeffers is with her. He's been trying to get the equipment to work for a long time, even though Virginia's help has already gone a long way towards making much of the equipment usable once more. They quickly get many of the halted mechs operational. Suddenly, an alarm sounds, indicating that a suit has been ruptured somewhere. She goes to the site and finds that Malcolm has been murdered. After this, the Arcists quickly leave the argo domes. She and the others suspect that Quiverian is responsible for the murder, since he had the most to gain from it. Saul tells her that he must go away for a while, until he has verified something.

Saul finds Carl in one of the greenhouses and tells him what he has discovered. He takes the commander to his lab. There, he explains that he possesses a rare genetic condition that allows his body to better "negotiate" with the cometoid life-forms. He also possesses a slight genetic modification he received while working with Percell that further aids in the process. He insists that he will be able to get this immunity to the rest of the crew.

Carl asks Virginia if Saul is of sound mind. She insists that Saul's plan makes sense, but expresses worry that JonVon is sick, likely from an infestation of Halleyforms. She is also certain that Saul will be able to cure JonVon with his new theory.

Virginia is with Saul, examining JonVon. Saul reassures her that the biocomputer will be fine after he treats it. In the last few weeks Saul has been curing crewmembers with the new serum he's developed. Work has greatly improved all across the comet, and the factions are getting along for the moment. She tests JonVon and discovers he's been clogged with a huge amount of Poetry. They quickly discover that important messages from Mars have been mixed in and protected by all of the Poetry. They find a letter in video form. It is a message from Phobos station containing an incredible amount of data.



Part 4, Second Half (Carl, Virginia, Saul, Carl Virginia) Analysis

The mission is suddenly brimming with hope, even though Quiverian's assassination of Malcolm will probably have consequences in the long-term. Saul's quick discovery of his own immunity to the comet's life-forms means that not only does the crew have a chance to survive, but that it can live peacefully with what were once dangerously invasive cometoid species. The sheer blind luck of his immunity also ties itself into the idea of fate, casting Saul as a savior to the entire crew. Carl is wary of this possibility, more out of a reflex response that requires him to deal with hope in terms of what can go wrong. In all respects, he has still become a very capable commander, even in the fact of the tragedies experienced by himself and the crew. The "negotiation" Saul was able to reach with the comet life-forms was one of two that must take place in order for the mission to be a success. Now, the various factions must find a way to cooperate peacefully, and that may prove an even more difficult task. Still, good news abounds, as the transmission sent from Phobos station contains data that will vastly improve operations onboard the comet. It also proves that despite Earth's dismissal of the comet, people across the solar system are still hopeful of its survival.



Part 5, First Half (Saul, Carl, Virginia, Saul)

Part 5, First Half (Saul, Carl, Virginia, Saul) Summary

Saul heads down a corridor with two genetically modified gibbons, Max and Sylvie. It has been two years since he cured JonVon, and they are getting ready to receive the care package sent to them from Earth. He meets up with Keoki Anuenue. Saul has developed and used cloning machines to create many species useful to the crew, who now consider themselves colonists. Lani is also there, completely cured of her illness. The factions on the comet are still in place, however. Ould-Harrad appears with otters that Saul created and tells the doctor that he is leaving the Quiverian and the other Orthos to travel deep within the comet and preach to the weirders like Ingersoll who live inside. He warns Saul that Quiverian has become dangerous.

Carl is on the comet's surface with Jeffers. They are heading towards the Arcist encampment when they are spotted by the Orthos. They are told to leave immediately, and that the Nudge system south of the equator is now completely under Ortho control. They begin firing at Carl and Jeffers with welding lasers. The two spacers retreat quickly and Carl later calls a meeting between faction leaders. Most groups want to stick to the original plan, but the Ubers want to orbit the comet around Neptune and colonize the planet's moons. The Arcists have almost completely destroyed the options of orbiting Neptune or returning to Earth, however. Carl wants to use the Nudge systems to fling them into an orbit around Mars, but knows that such a maneuver will bring them close to the Sun and be incredibly hot. They will likely be quarantined and unable to return to Earth ever. Carl also explains that the reception of the care package requires them to follow this plan. The factions voice their concerns, but ultimately everyone agrees to orbit Mars.

Virginia has been upset with Saul lately for his obsession with research. She runs a simulation of the gravitational sling they are preparing to attempt. She watches, fascinated by JonVons accuracy, but is horrified to learn that the comet will come too close to Mars and shatter completely. The impact causes the volcanoes on Mars to re-ignite.

Saul ponders the use of forced-growth technology provided to him by the Phobos station. It may be possible for him to grow human children. He is in a series of tunnels when he is approached by weirders. They show him an otter with a broken leg and ask him to fix it.

Part 5, First Half (Saul, Carl, Virginia, Saul) Analysis

As predicted by most of the main characters, the tensions between the factions are high and result in murder and blackmail. However, by this time, a large number of the crew simply wish to survive, and are willing to make significant compromises with one another in order to do so. Carl clearly understands that the risk they are taking is great, and does not expect to survive the maneuver, but he does not seem to have predicted Virginia's ability to accurately see the procedure take place. Now that Virginia knows the risks, she is likely to confront him about the matter. Meanwhile, Saul's discovery that allows him to create children could turn the comet into a real home where families are born and raised. This possibility could make the need to return to Earth far less important.



Part 5, Second Half (Carl, Virginia, Saul, Carl)

Part 5, Second Half (Carl, Virginia, Saul, Carl) Summary

Carl is examining the equipment for the Nudge. They test the devices, which function well. Arcists suddenly appear and begin firing lasers at them from long distance. Carl has Jeffers tip one of the launchers to use as a machine gun. He contacts Quiverian, who insists he cannot control the people attacking the launchers.

Virginia goes to see Carl after the Arcist attack. He asks her to protect the arrival of the care package with the mechs. She tells him that she knows the attempt to orbit Mars will destroy the comet. Carl explains that the collision will not happen for another forty years, and that it will ultimately bring life to Mars. She agrees to protect the care package, and agrees that his plan to collide with Mars is likely the best possible outcome.

Saul is with a large group of colonists, watching as Virginia's mechs enter empty space to retrieve the care package. He's moved his lab into the comet in order to prevent anyone from discovering his experiments on cloning humans. The package suddenly flares, and the colonists lose their visual feed and are unable to see what is happening. Saul connects to JonVon. They discover the probe that they sent to observe the package triggered some kind of internal defense system. The package itself then detonates, spraying radiation everywhere.

The explosion from the care package has done severe damage to the comet. At another faction meeting, the groups continue to argue amongst themselves. Carl insists the explosion had to have come from a fusion bomb, which means that Earth intentionally tried to destroy them. Quiverian tries to blame the sabotage on a political faction on Earth, but none of the other groups believe it. Carl cuts microwave transmitters in order to give Earth the impression that their bomb successfully destroyed the comet. They then fire the launchers toward Mars.

Part 5, Second Half (Carl, Virginia, Saul, Carl) Analysis

The largest threat to impose itself upon the comet yet comes from neither the factions within it or its native life-forms. Earth itself proves to be their largest threat, and this no doubt serves as a criticism of the fickle nature of Earth's political systems. Carl and the others only learn of this by listening to the transmissions from Earth after they are thought to have been destroyed. This severs the mission's connections to Earth, which clearly cares nothing for the crew any longer. Saul and Virginia are brought back together from the tragedy, and Carl is finally able to accept this fact. He's been holding onto a romantic hope with Virginia for a very long time, and only the revelation that he



can never have children with her allows him to completely let go. The fact that their relationship with Earth has collapsed poses new questions, most important of all being whether or not Carl has any real legitimate claim to being the commander.



Part 6, First Half (Saul, Virginia, Carl, Virginia)

Part 6, First Half (Saul, Virginia, Carl, Virginia) Summary

More years have passed. Carl and Sergeov have successfully raided the Arcist's south pole habitate to destroy the Nudge launchers there, but the damage to the comet has caused earthquakes and collapsed walls of Saul's laboratory. He's currently checking on some of his latest experiments, which are all new animals. He's also checking on some of his latest experiments, which are all animals. He's also successfully cloned children, genetically modified to be the size of men. One of them, Paul, has left through the gap in the collapsed wall, and Saul leaves to find him. He runs into an Ortho named Hans, who is far out of his territory with his children. Hans warns him that there is fighting on the surface. Another earthquake strikes. Saul is hit on his head by a boulder as he makes his way to warn Carl and Virginia of the upcoming battle with the Ubers.

Virginia meets with Carl in newly constructed hydro-domes on Halley's surface. She tells him that she cannot ever have children. Afterwards, JonVon contacts her to tell her that he's intercepted some Earth transmissions. Saul appears, and he and Carl begin shouting at one another. Suddenly, a laser splits open the dome they are in. Saul is not wearing a suit, and the pressure vacuum sucks him toward the opening caused by the laser. By the time she and Carl reach him, he is dead.

Whoever fired the laser disappeared completely, and Carl is unable to locate him. He discusses the attack with Jeffers, but someone fires at them again. It is Sergeov. His Ubers have taken control of half of the launchers and he continues his attack. Sergeov wants to abandon the Mars approach. Carl tries to offer an approach to Venus instead, but Sergeov wants to drive the comet back to Earth. He intends to threaten Earth with warheads armed with cometoid life if they fire upon the comet.

Carl asks Virginia for help getting out of the dome. Sergeov's rebels begin firing again. Virginia assumes the Ubers are firing at the Arcists, who are approaching with a large laser. Carl and Jeffers distract and blind the Arcists and Ubers by firing a steam-jet outside, while Virginia rushes back to Central to retake control of the mechs. Also leaves to get reinforcements from Keoki's faction of Hawaiians. Carl leads Virginia on her way, but Sergeov's crew begins firing at them. They take cover behind a large structure to shield themselves from the heat of the laser. Sergeov uses his launchers to disconnect the structure from the ice. Carl and Virginia tumble away with the structure into empty space and see Joao Quiverian hit by a laser blast. The shells from the Launchers continue to hit the structure, causing it to spin. They use their suits jet-packs to return to the surface of the comet, but they are already far away from the comet, and will lose air long before they can reach the comet once again.



Part 6, First Half (Saul, Virginia, Carl, Virginia) Analysis

The stress of isolation on the comet, in combination with Earth's betrayal, has finally culminated in an assault on the mission's command by the Ubers, whose aim is to take complete control of the asteroid. Sergeov is already clearly a far more dangerous opponent than Quiverian ever was. Additionally, Sergeov managed to keep his intentions hidden from the other faction leaders, cooperating with the majority of them for a long period of time before striking in a way that would leave everyone else completely vulnerable to attack. The death of Saul cannot even be dealt with appropriately as Carl, Virginia, Jeffers, and Lani are forced to do whatever is necessary in order to survive. Sergeov is clearly just as insane as he is intelligent, and is determined to destroy every opposition to his plan to return to Earth.



Part 6, Second Half (Carl, Saul, Virginia, Carl)

Part 6, Second Half (Carl, Saul, Virginia, Carl) Summary

Carl watches the battle on Halley's surface as he slowly drifts back towards the comet. Virginia used up her fuel reserve to save him, and they've been separated for some time. He sees newcomers enter the battlefield from fresh tunnels. The new fighters quickly attack the Ubers' weapons. Carl gets closer and realizes the newcomers are led by Ould-Harrad and Ingersoll. He gets a communication from Jeffers, who gives Carl control of a mech. He sends the mech after Virginia immediately, and it manages to retrieve her after several hours. Several spacers dressed in black also helped with the battle, and no one has any idea who they are. The men in black take Virginia back down to the tunnels, and Carl follows them. One of them takes his mask off, revealing it to be Saul.

Saul orders his clones to take Carl back above the comet's surface so that Carl can take command of the situation. He connects Virginia to JonVon and has the machine transfer her mind into his bio-circuits. Carl returns, but Saul injects him with a hypnotic sedative. Lani enters to announce that the last of the rebels have surrendered, but that Ould-Harrad's weirders have torn up the Launcher's mountings. Lani plays a recording of Ould-Harrad, which forbids them from building any propulsion systems south of the equator, and tells them all never to come into that territory again. The drugs slowly leave Carl's system, but Virginia's mind is having difficulty being reassembled inside of JonVon and Saul has to enter it directly in order to try to save her.

Virginia's mind wakes up inside the mech Wendy briefly, then bounces to another mech on the planet's surface, and yet another deep inside the comet's surface. Finally, it winds up with the other personalities stored by JonVon. The other personalities are thrown aside to make room for her. Saul enters, and tells her to escape into his brain. She finds a way to reprogram her surroundings so that she feels whole and safe back in Hawaii, on Earth. She looks down into the surface of a body of water and sees Saul and Carl back in the medical center of the comet.

Carl and Lani watch the screens around them and wait for a sign that Virginia's mind has survived the process of being transferred into a machine. Finally, Virginia shows herself on the holoscreen. She announces the only possible destination left to the mission is now Jupiter, and that they will have to go through perihelion passage to get there.



Part 6, Second Half (Carl, Saul, Virginia, Carl) Analysis

Virginia manages to live on through her work on biological computing processes, and appears to be not only stable but essentially immortal. Saul himself has become immortal in a very different sense. It seems as though this last bout of violence may have succeeded in putting a stop to further conflicts between the factions, even if it has resulted in leaving them with no options other than arriving at Jupiter after a very dangerous course next to the Sun's radiation. However, the possibilities opened up by their victories against the Ubers are now virtually limitless with the new technologies they possess, and Saul's ability to clone himself endlessly means that they will have far more scientists available, as he is equally capable of transferring his memories to the clones. The crew will be well-provided for as they make their way towards Jupiter, and in fact they have essentially been given two Gods, Saul and Virginia, to guide them on their way.



Part 7, First Half (Saul, Carl, Virginia, Carl)

Part 7, First Half (Saul, Carl, Virginia, Carl) Summary

Saul is observing creatures in the new ecosystem on the surface of the comet. The canyon they have created, called LeGrand, has many newly developed forms of life in it, and he has been in a sleep slot for the past ten years. A small mech tells him that Virginia wants to talk with him. He goes into a park, and a holographic projection of Virginia appears. She tells him that Ould-Harrad has died. A guide is waiting to take Saul into deep Gehenna in order to give him a message from the recently deceased leader. The guide leads him to Ould-Harrad's body, and Saul realizes the chamber he has entered is actually the remains of some kind of sea-creature, most likely older than the Sun itself.

Carl wakes next to Lani, leaves and travels down a comet shaft. The comet has been heating rapidly as they approach the Sun. Carl is going to unslot everyone still alive to be a part of the passage, and Captain Cruz has already been woken up and healed from his sickness. Carl wants him to take command again, but Cruz refuses, as the old captain has no idea how to take command of this new comet. A massive amount of ice begins to boil off the comet's surface from the Sun's radiation, just as Virginia's calculations once predicted. She suggests venting some of the heat inward to prevent some of the coming problem associated with pressurization. He goes back to Lani.

As a program that now runs virtually every operation on the comet, Virginia has survived. Carl contacts her and asks her how long they have until they are destroyed, but she insists they are safe due to her management. Saul, who is elsewhere on the comet, tells her that he wants to find a way for her to be human once more. She convinces him to once again enter the sensory link. The comet safely passes through perihelion, and Carl congratulates her on her work. A warhead suddenly approaches, but Virginia is able to use the comet's defense systems to quickly disable it along with another warhead following quickly behind it. The warheads detonate, but do not damage the comet in the slightest.

Carl decides to chart a course that will take them back out through the edge of the solar system to the Oort cloud, where Halley's Comet once came from. Virginia does not think that Earth will be happy with anything less than them leaving the Solar System completely.

Part 7, First Half (Saul, Carl, Virginia, Carl) Analysis

As much of the book has been steadily suggesting, the colonists will never again be able to return to Earth and they must leave the Solar System entirely. Not only would be



they prevented from ever setting foot on Earth again, they would kill most of the life on Earth on the attempt. The cometoid society has repaired its internal factions, and advances have been made which make a journey outside of the Solar System not only possible, but also provides them with the fascinating opportunity to leave the Solar System entirely and settle new regions in space. Not only is their survival at stake in this mission, but they are also faced with this stunning reality, and to the reader, it likely seems as though life on Halley's Comet is in many ways now preferable to life on Earth. The conflicts of Earth, after all, have clearly persisted, while those on the comet have been transformed into a pervading spirit of cooperation.



Part 7, Second Half (Saul, Virginia)

Part 7, Second Half (Saul, Virginia) Summary

Saul watches a group of children playing in the nursery. The comet is headed towards the Oort cloud. The colonists have built a city on Halley's surface. Saul goes into his lab and examines the rock left to him by Ould-Harrad. The fossil does indeed come from a creature older than life on Earth by billions of years.

Lani is with Carl and their baby when Virginia visits them in holograph form. She recalls their passage near Jupiter on the way out of the Solar System. She realizes that she is a new phylum of humankind.

Part 7, Second Half (Saul, Virginia) Analysis

The colony, free from all past challenges, is free to enter a new territory in which they can continue to explore, live, and prosper, despite all previous odds. The battle between man and nature concludes not with any distinguishable winner but instead with a negotiation.



Characters

Carl

Carl is a Percell who begins his career on Halley's comet as a space technician. Although he originally does not hold a high rank, he is eventually granted the commission of Lieutenant Commander and proves to be a very capable leader. What he lacks in scientific knowledge, he more than makes up for in experience out in space, and many of the senior officers defer to his decisions as a result of his extensive knowledge. He is intelligent, and among the Percells has a reputation for being an Ortho-lover because he refuses to see normal human beings as a threat. He spends most of the book hopelessly in love with Virginia, and resents the fact that she and Saul are together. This resentment is at its worst in the beginning of the novel, but throughout the years on the comet, he matures and eventually comes to accept the fact that Virginia and Saul are together. His maturation also causes him to become somewhat cynical, and he tends to look at hopeful situations in terms of what can go wrong, but by the end of the novel he is hailed as a hero by Orthos and Percells alike, and also has a family with Lani, an Ortho who had strong feelings for him since the mission began. Carl serves the function of fearless leader in the novel, and though he certainly doesn't see himself that way, his refusal to give in to the racism and fear that distorts the judgement of the rest of the crew serves them all very well, and he manages to avert disaster countless times.

Virginia

Virginia is a computer scientist and a Percell originally born from Hawaii. Her mother died from lupus and her genetic modification allowed her to resist the disease. However, it also left her unable to have children, a fact which she keeps secret to most people onboard the crew. She is very much in love with Saul, who eventually returns her interest, and the two remain a couple despite numerous disagreements and general frustrations. Her largest accomplishment is the creation of JonVon, a biocomputer able to process information far more quickly than standard computers. Over time, Virginia's modifications and trainings of JonVon drastically reduce the amount of manual labor required by the crew. Through her work, much of the cometoid life can be fought off without human intervention, and she even comes to greatly increase the efficiency of the comet's food production. In the final Uber attack, Virginia propels Carl back to the comet at the expense of herself, but Saul is able to save her by downloading her mind and personality into JonVon, giving her almost total control over the comet's operation, which she uses to great extent in order to protect the crew. She has a strong reputation for being caring, intelligent, and, like Carl, does not adhere to the idea that Percells are somehow innately superior to human beings.



Saul

Saul is a molecular biologist who left Earth after countless professional and religious catastrophes. He once worked with Simon Percell, creator of the genetically modified children, and was partially blamed for the deformities and deaths that resulted from that work. Saul possesses an incredible range of biological and medical knowledge, and manages to perform miracles on a fairly regular basis throughout the book. First, he creates a form of bacteria, known as cyanutes, whose sole purpose is to keep humans safe from the toxins on the comet. He is later able to develop weapons capable of fending off the cometoid life during its first stages of attack, and also develops medical treatments for many of the diseases faced by the crew. Later on, he discovers that he possesses a unique immunity to the life on the comet, and is able to transmit this immunity to everyone else, which effectively ends the threat from the cometoid life. He continues his work, modifying animals on Earth to help with operations inside the comet, and eventually develops a way for families to safely have children in space. Saul is "killed" in the Uber attack on the comet, but survives because his clones are able to download his memories and personality, effectively making him immortal alongside Virginia, whom he is very much in love with.

Lani

Lani is an Ortho spacer who has feelings for Carl, but they are not reciprocated, even though she is beautiful and intelligent. She falls ill when the diseases begin to attack the crew, but is eventually brought out of sleep and cured by Saul. At the end of the book, she has a family with Carl.

Joao

Joao is an Ortho spacer with deep convictions against Percells. He and Saul begin the novel working together, but ultimately Joao becomes the leader of the Arcist faction, which holds that only Orthos should be allowed to propagate. He is perceived as dangerous by many of the crew members, including Lieutenant Colonel Ould-Harrad, who is an Ortho himself. Joao is killed in the Uber attack on the comet.

Sergeov

Sergeov is a Percell Spacer, born without legs. However, this deformity only helps him navigate through zero gravity. Sergeov is a staunch Uber, and is highly suspicious of the Orthos on the mission. He eventually becomes the leader of the Uber faction, but disappears after his assault on mission command, in which he attempted to steer the comet toward Earth.



Jeffers

Jeffers is another Percell and close friend of Carl's. At the beginning of the novel, he seems to have Uber leanings, but remains with Carl and works for the survival of the entire crew, serving as Carl's second-in-command after Carl is placed in charge.

Ould-Harrad

Ould-Harrad begins the story as one of the Ortho senior staff members and briefly takes control of the mission, but eventually gives command over to Carl due to religious difficulties he begins to experience on the comet. As a senior commander and mission leader, Ould-Harrad is often seen as weak and indecisive, even allowing the first mutiny to escape with the Edmund. He has an intense jealousy for Saul, whom he considers an infidel, but ultimately recognizes how important the man is for their survival. Ould-Harrad discovers ancient life deep within the comet.

JonVon

JonVon is a biocomputer developed by Virginia. He is incredibly capable as a machine, and takes over much of the comet's operations after a time. He ultimately sacrifices himself so that Virginia's mind will have enough room to exist inside his circuits.

Kato

Kato is a crewmember who dies as he and Carl are boring into the ice on the comet's surface.

Umolanda

Umolanda is a female crewmember who dies shortly after Kato

Captain Cruz

Captain Cruz is an Ortho and the original commander of the mission. He falls ill quickly and dies. His crew slots him and revives him many years later, but he refuses to take command of the comet and leaves Carl in charge.

Akio Matsudo

Akio Matsudo is part of the medical crew on board the ship who releases a weak virus at the beginning of the novel. He does so in order to keep the crew's immune system up.



Linbarger

Linbarger is an Ortho who eventually mutinees and takes the Edmund back on a course toward Earth. The ship is destroyed, however, for Earth fears contamination from the comet.

Ingersoll

Ingersoll was originally a chemist whose body became infected with cometoid life to the point of symbiosis—that is, stable life for both him and the invading life-forms. Though the alien life drives him insane, he nonetheless lives a long life and assists Carl in the final battle against the Ubers.



Objects/Places

Cyanutes

Cyanutes are modified bacteria created by Saul in order to help the colonists survive.

Gunk

This green cometoid life begins clogging ventilation shafts and creates many problems for the crew.

Worms

Purple worms are the second life-form from the comet to threaten the crew.

Gibbons

Saul manages to genetically modify Gibbons and introduces them into the comet's ecosystem.

Otters

Saul manages to genetically modify Otters and introduces them into the comet's ecosystem.

Launchers

These Launchers change the comet's trajectory by firing pellets of iron at extremely high velocities away from the comet.

Lasers

Mostly used for welding, lasers become weapons as the tensions mount between factions.

Viruses

The crew are attacked by over a half-dozen forms of virus from the comet.



Ubers

Ubers are the branch of genetically modified humans who believe themselves to be superior to Orthos.

Orthos

Orthos are regular humans, many of whom distrust Percells and believe that they are inherently dangerous.

Percells

Percells are genetically modified humans who are resistant to various forms of diseases. Many of them are Ubers, but some seek peaceful existence with Orthos.

Arcists

Arcists are originally a group of earth-based fanatics, but by the end of the book they have become a group of Ultra-Orthos who completely distrust all Percells.

Halley's Comet

The bulk of the novel takes place on the comet's surface or inside of it.

Edmund

The Edmund is the spaceship that the crew used to reach Halley's comet. It is stolen by Linbarger and destroyed when he tries to return to Earth.

Earth

Though none of the novel takes place on Earth, many transmissions are sent to and from the home planet. Earth eventually seeks to destroy the crew and Halley's Comet in order to protect itself from the diseases.

Phobos Station

Located on one of Mars' moons, Phobos Station sends helpful information to the crew to help them survive and strongly resents the way Earth treats the mission.



Themes

Man versus Nature

Over the years many authors have dedicated fiction writing to honoring humankind's struggle to contain and control nature. This novel is unique in that the nature the characters seek to conquer originates from a comet, and is far more dangerous than anything they could have previously imagined. However, this fact aside, many of the struggles in the book revolve around this central theme. The life-forms that can attack the crewmembers are only one danger. Far more threatening to everyone on the comet are the diseases that wipe out the vast majority of the crew, leaving all but ten percent unable to work at one point. Saul is critical in this battle against nature as a result of the knowledge he possesses, and although his attempts at combating the various forms of alien life are moderately successful, it is only when he realizes that he can modify life from Earth to work with the comet's creatures that he is truly triumphant. This message from the book is far stronger than any other: cooperation is far more desirable than attempts at conquest. Hence, the message gained from this work is somewhat modified from the general outcome of these stories (usually man is either triumphant or totally destroyed in his attempts to control nature). The "negotiation" that Saul is able to manage between the life-forms is far more interesting in its implications, and results in a very powerful and relatively original idea.

Man versus Man

Much the same as "Man versus Nature," the different factions of crewmembers in the novel are commonly at odds with one another from what the reader might surmise as being negligible differences. In theory, the crew aboard the Edmund and then Halley's Comet should be working towards a unified goal, but old tensions from Earth often prevent this cooperation from going smoothly, and in fact place the comet's inhabitants in danger a number of times. These differences were cultivated on Earth, made far worse by the dangers faced inside the comet, and are often racially or theologically motivated. Nevertheless, the same solution that saved the inhabitants from destruction by nature ultimately wins through after the last battle between the Ubers and the rest of the factions. The colonists, for that is what they ultimately become, learn to set aside differences and begin to trust one another in earnest as they make their way toward the Oort cloud. The same cannot be said for humankind on Earth, however, which makes numerous attempts to destroy the comet, even though it makes no attempt to go near Earth's atmosphere. Through the subtle comparison of both societies, the author is making the suggestion that humans must necessarily move on from their former prejudices in order to prosper.



Scientific Exploration

The idea that science can enlighten and empower is an idea commonly found in works of "hard science fiction" such as this one. At every turn, Saul and Virginia are attempting to come up with solid, data-driven solutions to the problems that they face. Saul is so successful at this that he comes to be regarded as a miracle worker, but his personal experience of these discoveries is very different. Science is not miraculous, not magical, not theological. The answers to all of the crew's problems already exist, and science is the tool that they use to uncover them. Science is also viewed by Saul as a means of uncovering the past, as he does when he discovers the origins of life inside the comet began billions of years before the Sun ever existed. Science is also portrayed as a very human endeavor, as many of the characters express awe or wonder at scientific solutions and discoveries. The biocomputer JonVon, a product of an extremely complicated and precise form of science, is nearly human in his communications and manages to produce an incredible amount of poetry during their journey. In fact, the tensions between factions on the comet can be seen as a diametric opposition to this idea, as the people belonging to the extreme groups cling to racial prejudices and fear rather than cooperating in the spirit of this newfound form of exploration.



Style

Point of View

The point of view of the novel is third person, alternating through the eyes of the three main characters: Carl, Saul, and Virginia. Each of the characters can link up to a wide number of visual feeds and external systems, allowing their perceptions to jump large spatial ranges. This can be confusing at times, as often one of them will be speaking to another character who is only present through a mech. At other times, characters contact one another through vast distances on communication channels, and can even see these other character through visual links. This accurately reflects the methods of communication necessary in space travel, and for the most part any confusion caused by the convention is quickly cleared up.

The story is recounted mostly through exposition, conversations, and action scenes. The three main characters tend to be philosophical about a number of important issues throughout the book, and each tends to focus on problems related to her or his particular expertise. Given the scope of the novel, the exposition is highly appropriate, and goes a long way towards powerfully fleshing out specific details that would otherwise baffle the reader attempting to come to terms with a strange environment.

Setting

The entirety of the novel takes place on and inside Halley's Comet. Gravity is negligible, making movement very difficult for those used to walking on Earth. Spacers must be careful to plan their motions just right, or risk being thrown out to space. Mechs—robotic assistants—are common, and take many different forms in order to assist the humans on the comet. Numerous tunnels are bored into the Comet's surface, serving as transportation ducts and ventilation shafts. Hydroponics systems on the surface grow many plants to feed the colonists. The comet itself changes quickly, as much of the ice that composes it commonly explodes from changes in temperature or pressure. The inhabitants of the comet are all essentially exiles, for one reason or another, and various nationalities, races, and different types of humans can be found. There is a large population of Hawaiians onboard, as well as a large group of Percells, genetically modified humans, who don't feel welcome on Earth because of prejudices existing against them.

The station on the comet is very technologically advanced, and communication systems are excellent, allowing virtually any crewmember to contact another immediately. The communication systems also allow crewmembers to take control of one or more robots, or mechs, in order to safely do jobs that would otherwise put their lives in danger.

During the comet's journey from the Sun, or towards Aphelion, the comet is essentially cold, though life-forms inside the comet's ice tunnels do activate when enough heat is



present. The temperature on the comet changes dramatically when it approaches Earth, giving off large quantities of gases and causing Earthquake-like events everywhere.

Language and Meaning

The language used in the novel is essentially simple to understand, with a few notable exceptions. Most importantly, a large number of technical words are used to describe the astronomicals of the comet, and the life-forms found within. Each of these terms is explained a number of times in ways that do not disrupt the narrative, and they are used commonly enough that the reader is able to pick them up quickly and easily. This technical language is highly appropriate for the novel, as it is in the domain of hard science fiction which always makes an attempt to keep the science, and the terms related to that science as a result, as real and accurate as possible.

Later on in the novel, it becomes apparent that the different factions of humans begin to develop their own dialects. Ubers, for example, tend to rhyme phrases, and while the words that they use are often meaningless to the reader, they are easy to pick up in the context of the sentence or general situation. This development of dialect reflects the social isolation that each of the groups undergoes, and largely makes sense in the context of the novel. The main characters never pick up these dialects, as Saul, Carl, and Virginia all remain staunch cooperationists. The odd new dialects of the Ubers and Arcists is mentioned several times as a source of frustration to the main characters, who view these dialects as a degeneration of society.

Structure

The novel is divided into seven subsections, each with a heading detailing the general subject of the section. Beginning dates of the sections are also given, as it is very common for large amounts of time to pass between them. They are also accompanied by a brief quote or poem pertaining to the context. Within the sections, further divisions exist, headed by the name of the character whose point of view is most closely followed. There are generally around eight of these sections, ranging from several dozen pages to less than a page.

The plot of the novel is somewhat complex, with a few subplots thrown in for good measure. The book begins with the characters preparing Halley's Comet to be navigated into orbit around a planet, where its resources can be more easily harvested. However, the crew quickly finds itself fighting for survival against the invading comet life-forms. They also experience social degeneration that eventually turns into the development of different factions across the comet itself, and eventually small wars are fought between these factions. The general plotline, however, remains the struggle of the crewmembers against the forces of nature. Some of the more important plotlines in the novel consist of Carl's romantic pursuit of Virginia, Saul's continual attempts at bettering their biological knowledge in order to eventually have offspring, and Lani's gentle insistence that she and Carl be together romantically.

The novel's pace is rapid, for the most part. Large sections of exposition explain previous events contained within the book and events that occurred on Earth prior to their departure, and often contain very telling pieces of information. This makes the reading both interesting and very compelling.



Quotes

"The beam swept across Kato for only a second. That was enough. Carl saw Kato make a jerky turn as if to flee. Later, he realized that the movement must have been a final, agonized seizure" (Part 1, p. 10).

"The creature was a pulsing mass of tiny, rainbowed cilia that rippled faster than the eye could follow. But Saul knew the thing anyway, to its smallest part. He could imagine every mottled, microscopic component down past where the instrument could not go—to the level of acids and bases, of sugars and finely balanced lipid barriers" (Part 1, p. 18).

"Officially, her role was to provide special support to Computations Section. But she had actually inveigled her way aboard this mission in hopes of getting some of her own research done. In the kind of scientific environment that was developing on Earth, the sorts of things she was interested in were frowned upon" (Part 1, p. 33).

"Plateau Three was a dream, a political issue, an economic sore point, a faith - all rolled into one. But big rotating colonies were possible now. The colonists now looked on the Birth and Childhood Rules as symbols of apronstrings they had long out-grown. They wanted to exploit the rocky asteroids and moons, but needed volatiles as well, for propellants and for biospheres" (Part 1, p. 46).

"Everyone knew why Ould-Harrad was on this mission. The young officer had had friends in the Temple Mount Conspiracy, and only ties with the Mid-African royal family had won him exile instead of imprisonment for the crime of unwise associations" (Part 1, p. 57).

"Percells and Orthos, Northerns and Arcists, liberals, moderates, and even a few fanatics; Saul was certain it was pretty much the same among those still in the slots. Cruz and Oakes were inspirational leaders, and they would get the best out of the colonists, but Saul did not expect this long voyage to be entirely trouble-free" (Part 1, p. 86).

"The hectic weeks of Base Establishment had diminished into the long hollow quiet of the First Watch. And as this damned cold of his lingered on and on, he found himself more and more avoiding Nicholas Malenkov and the big Russian's skeptical medical scrutiny" (Part 2, p. 104).

"Saul, exiled to his own lab, had little to do except analyze the tissue samples taken from poor Miguel Cruz and the new patient...and deal with queries from a worried Earth Control" (Part 2, p. 129).

"All at once every surface appeared to be coated in a shimmering haze. The walls themselves seemed to ripple and crawl, like the fur on a caterpillar's back. At first he



thought it was an optical illusion—an effect of the weird coloration and glare. Then he realized" (Part 2, p. 146).

"He logged Quiverian into the overall monitoring programs while Vidor left, moving as though his joints were sore. Same as Quiverian, Carl thought. But neither of them got that brown rash that grew all over Samuelson. Different symptoms - or different diseases" (Part 2, p. 158).

"She quelled the temptation to slide her eyes sideways to see the poles of the big superconducting magnet. Even that much movement would set up unwanted trembling in her head" (Part 3, p. 192).

"Carl had never been good with words, did not have the easy, oily skills of an administrator, and he had no magic way to get through to Linbarger, or to Ould-Harrad. All this endless talk! He gritted his teeth in irritation, stood, and left without another word" (Part 3, p. 205).

"—You Percells don't fear the Halley disease as much as we human beings do. We won't go into why, since you keep denying all responsibility for the sicknesses. But it is sufficient to know that we will not let the hydro be polluted! Both the big and small hydroponics modules stay attached until the new dome is completely checked out...and by an Ortho specialist" (Part 3, p. 217).

"Carl caught his breath, let it out slowly. That was the one alternative he hadn't mentioned to anybody. It wasn't smart, because start-up could do real damage if you handled it wrong—and Linbarger had no experience at that. But he had seen the possibility of frying Carl as the hot fluids squirted through this network of tubes. And Linbarger was just desperate enough to do it" (Part 3, p. 235).

"Flames licked the sky in the direction of Gan Illana. There was more burning on Mount Herzl. But in Jerusalem the Armies of The Lord advanced in song, led on one side by a swarm of golden crosses, on another by the Madhi and all of the Salawite mullahs. And in the center, chanting Hebrew psalms and carrying the Rebuilt Ark, the Kahanim priests of the new Sanhedrin" (Part 4, p. 254).

"Until now his last memory of the Japanese physician had been of glossy black hair framing smiling almond eyes under wire-rimmed glasses. But that image - as fresh as last week—was jarringly crushed down here among the chilled caskets. One was labeled with Akio Matsudo's name" (Part 4, p. 270).

"She started outlining the problem, the analogy between JonVon's nonliving organics versus ordinary flesh and blood, and how JonVon could "catch a cold" in a more than metaphorical fashion" (Part 4, p. 306).

"Now the encroaching darkness meant that there was nothing between the frozen waste and the beckoning starts - no planets swarmed with clouds and lightning, not even a vagrant asteroid within view" (Part 5, p. 325).



"Inside Virginia's mind and heart, winter blew. It was a numb incapacity, an unwillingness to understand this. Dimly, she knew that this was Carl's own unique version of the neuroses they all had, by now—no worse than normal, but highly unusual" (Part 5, p. 358).

"People weren't made to take the full brunt of the world, she thought. Particularly not one as barren as this. Anthropologists had found that even the simplest societies had quickly invented alcohol—usually beer—probably as a shelter against the storm of naked, incessant reality" (Part 6, p. 381).

"The fact that the crazy Ubers and their allies were holding them all inside Dome 3 made no difference, really. She was as uncaring as the silent frosted ice outside, where figures gyred the launchers into new, well-padded directions, their muzzles pointing to different constellations" (Part 6, p. 394).

"We probably won partly, by scaring the Ubers half to death, Saul mused while he monitored the flow back and forth between JonVon and the machine's mistress" (Part 6, p. 414).

"Carl knew this was an icon for Virginia's mind, a web of associations layered since childhood, built upward as a city is, upon the simpler structures of youth. Beneath an impassive sea-gray sky the city lights glimmered, sparks tracing the streets. Here a building suddenly went dark, there another flared with fresh life" (Part 6, p. 430).

"He felt Virginia around them all, sense the entire community of Halley as a matrix threaded through the ancient ice. They were no longer buried inside, going for a ride. No Percells, no Orthos" (Part 7, p. 455).

"Nearly five billion years ago—in one of the gassy, dust-rich spiral arms that laced the Milky Way like filmy pinwheel spokes—a young, massive hot star had raged through its short life and exploded in the titanic outburst of a supernova. In so doing, it had seeded nearby space with glowing clouds of heavy elements, from carbon and oxygen to plutonium and osmium...all cooked up with the blue giant had coursed through its brief but glorious youth" (Part 7, p. 468).



Topics for Discussion

Discuss Earth's apparent attitude toward the sciences in the book and compare it to contemporary attitudes toward science. Is space travel possible? Is it desirable? Why or why not?

Throughout the book, JonVon proves to be of great assistance to the crew at almost every turn. The biocomputer also produces a great amount of poetry. Is JonVon "intelligent?" Why or why not?

Are there any moments in which the prejudices of the people on Halley's Comet seem well-founded? List four misconceptions that either Percells have about Orthos or that Orthos have about Percells.

Ould-Harrad gives up his command and one point. Why does he do this? What does he become? What is his opinion of Saul?

Why is Virginia attracted to Saul and not Carl? What is Carl's impression of Saul, and how does their relationship affect his judgement?

Saul manages to modify many different forms of life on the comet. List three life-forms that he changes and explain how these new animals or bacteria help the crew.

Discuss the character Sergeov. What is his deformity and where does it come from? How might this have affected his treatment on Earth?

How do the colonists feel about Earth by the time they are leaving the Solar System for good? Are they under the impression that everyone on Earth wants them destroyed? Why do they choose not to retaliate?

Why does Captain Cruz refuse to take command of the mission once he has been restored? What is Carl's reaction to the fact that he is now permanently in command?

Many of the crewmembers flee into the deeper tunnels of the comet and become "weirders." Briefly describe what happens to them and what Saul discovers from them as a result of their transformation.