

The Martian



INTRODUCTION

BRIEF BIOGRAPHY OF ANDY WEIR

Weir was born the same year that NASA's last two Apollo missions took place. He grew up in California, and, as the son of a particle physicist and an electronics engineer, he was interested in science and technology from an early age. Weir attended UC San Diego, where he studied computer programming and began writing fiction in his free time. After college, he worked as a computer programmer, but continued to write science fiction and fanfiction on his website. He also wrote *Casey and Andy*, a semi-autobiographical web comic. Weir currently lives and writes in California. He is afraid of flying.

HISTORICAL CONTEXT

In *The Martian*, Weir references the Apollo 11 moon landing in 1972, when astronauts Neil Armstrong and Buzz Aldrin became the first people to walk on the moon. NASA's 1997 Mars *Pathfinder* mission, which landed an unmanned roving probe on Mars in 1997, also plays a role in the events of the novel.

RELATED LITERARY WORKS

In *The Martian*, protagonist Mark Watney reads several Agatha Christie novels, including *Evil Under the Sun*.

KEY FACTS

- **Full Title:** The Martian
- **When Written:** 2009-2011
- **Where Written:** California, USA
- **When Published:** 2012
- **Literary Period:** 21st Century Popular Fiction
- **Genre:** Speculative Fiction / Science Fiction
- **Setting:** The events of *The Martian* take place on Mars, Earth, and in outer space. The novel is set around the year 2035.
- **Climax:** When Watney's modified Ares 4 MAV launches him into space and the drag from the flapping canvas on the front of the ship slows his ascent. As a result, *Hermes* is no longer on track to intercept the MAV and rescue Watney. On Earth, NASA scientists watch this crisis unfolding, but are unable to help. The Ares 3 crew on *Hermes* successfully rescues Watney by speeding up the ship and then intentionally breaching *Hermes'* airlock to slow the ship in time to intercept the MAV.
- **Point of View:** Much of the novel is told from Mark Watney's

point of view; these passages take the form of Watney's log entries during the Mars mission. Weir alternates between the log entries and passages narrated from third-person omniscient and third-person limited perspectives.

EXTRA CREDIT

Publication History. Weir originally published *The Martian* in serial form on his website—a fact that explains why many of the novel's chapters close with cliff-hanger endings. In 2012, Weir self-published the novel as an ebook on Amazon. After becoming an Amazon bestseller, *The Martian* was picked up by Random House Book's Crown Publishing imprint. It went on to become a #1 New York Times bestseller.

Film Adaptation. A star-studded film adaptation of *The Martian* was released in 2015. The cast includes Matt Damon as Mark Watney, Jessica Chastain as Commander Lewis, Kristen Wigg as Annie Montrose, and Jeff Daniels as Teddy Sanders. The film won a Golden Globe for Best Motion Picture, and Damon won a Golden Globe for Best Performance.



PLOT SUMMARY

The Martian opens with the Sol 6 log entry of astronaut Mark Watney, who is the resident botanist and engineer on NASA's Ares 3 mission to Mars. Watney explains that, while the crew was supposed to spend a month on Mars, they were forced to abort the mission early. This was due to a sandstorm with violent winds that threatened to damage the MAV (Mars Ascent Vehicle), which the crew needed to return to their ship, *Hermes*. As the crew moved from the Hab to the MAV, the Hab satellite communications dish was blown through the air and its antenna punctured Watney's EVA suit and cut into his side; Watney passed out. Believing him to be dead, the rest of the crew returned to *Hermes*, leaving Watney behind on Mars with no way to communicate with the ship or with NASA. After regaining consciousness, Watney returned to the Hab (the mission's base on Mars), tended to his wounds, and began to make a plan that would allow him to survive until NASA could orchestrate a rescue.

Watney rations his meals and finds a way to grow food on Mars. As the mission's botanist, Watney brought a small amount of Earth soil with him. He begins saving his feces and the leftovers from his meals to use as "compost," then he mixes the compost with Martian soil and Earth soil, converting it all to crop soil. While most of the mission's meals are freeze-dried, NASA sent a few whole **potatoes** that the crew planned to use for a Thanksgiving dinner; instead, Watney cultivates the potatoes in

the Hab and in two emergency pop-tents attached to the mission's rovers. To entertain himself, Watney browses through the media files that the other members of the crew brought with them. He starts watching Commander Lewis' collection of dated 1970s television shows and listening to her disco music.

In order to irrigate the crops, Watney needs to make water. He uses the Hab's oxygenator to convert carbon dioxide from the MAV's fuel plant into oxygen. Then, he converts hydrazine fuel into nitrogen and hydrogen in order to slowly burn the hydrogen in the presence of oxygen, which makes water. At first, Watney seems to be making water successfully, but he soon realizes that not all of the hydrogen has reacted to make water—some of it is lingering in the Hab's atmosphere. Since hydrogen is highly flammable, this is very dangerous; Watney has turned his habitat into a giant bomb. Watney solves this problem by tricking the Hab's oxygen regulator into pulling all the oxygen out of the Hab. While wearing a space suit, he uses an oxygen tank to burn off the hydrogen in controlled bursts.

The novel then shifts to a third-person omniscient narrator on Earth, where NASA director of Mars operations Venkat Kapoor and NASA Administrator Teddy Sanders have just attended Watney's memorial service. Venkat wants to assess the damage and see if some of the leftover supplies from the Ares 3 mission could be used for a future, not-yet-funded Ares 6 mission. Teddy initially refuses, explaining that images of Watney's body would only bring more bad press coverage, but Venkat counters that the images could actually sway public opinion (and thereby, Congress) in favor of a sixth mission to Mars that could recover Watney's body. Teddy agrees.

When SatCon employee Mindy Park doesn't see Watney's body in the photos, she realizes that he is still alive. She notifies Venkat, who calls a meeting with Teddy and director of media relations Annie Montrose. They decide they'll take the news public in 24 hours. Teddy decides not to inform Commander Lewis; the news could distract the Ares 3 crew, and Teddy is not prepared to risk their safety. Though they cannot communicate directly with Watney, NASA begins tracking him with Satellite imagery and starts developing a rescue plan. CNN launches *The Mark Watney Report*, a daily show covering the story. It's the biggest news story on the planet.

The novel once again takes up the log-entry structure. Watney has developed daily routines and is successfully growing potatoes. His new goal is to find a way to get to the Ares 4 MAV at the Schiaparelli crater, 3200 km away. He'll have to cross the relatively flat Acidalia Planitia, and then the remaining, more rugged territory. To do so, he'll need to modify the rover for a long trip. After some short test drives, Watney decides that he'll heat the rover using the **RTG** (radioisotope thermoelectric generator), a box of highly unstable radioactive plutonium. NASA uses RTGs to power unmanned probes, and, on the Ares missions, to power the MAV before the crew arrives. Upon the Ares 3 crew's arrival, Commander Lewis removed and buried

the RTG. Watney digs it up and moves it to the rover. With the rover modifications complete, Watney starts planning for a twenty-day trip. Watney tells us he has a specific goal for the trip, but he doesn't say what it is.

On Earth, Mindy attends a meeting with NASA's top management, including Teddy, Venkat, Annie, JPL director Bruce Ng, and Ares 3 flight director Mitch Henderson. Mitch challenges Teddy's decision not to inform the Ares 3 crew that Watney is alive, but Teddy does not change his mind. The team discusses their plan to keep Watney alive long enough for rescue by speeding up the process of making the Ares 4 pre-supply probe and sending it to the Ares 3 site. Later, after reviewing satellite images and mapping Watney's coordinates, Mindy and Venkat realize that Watney is headed to *Pathfinder*, an unmanned probe that NASA lost contact with in 1997. If Watney can get its communication system online, he can talk to NASA.

The novel shifts back to Watney's log. He reaches *Pathfinder*, loads the small Sojourner rover and the larger *Pathfinder* probe (the part with the radio) onto the rover. After he returns to the Hab, Watney successfully repairs the *Pathfinder* and Sojourner. *Pathfinder* acquires a signal. On Earth, NASA's staff celebrates. Watney and NASA begin exchanging messages using a complicated system relying on *Pathfinder*'s camera. Soon, software engineer Jack Trevor finds a way to hack *Pathfinder*'s software so that Watney can send and receive emails in the rover. Teddy gives Mitch permission to inform the Ares 3 crew that Watney is alive.

Weir shifts the novel back in time to the morning of Sol 6, showing readers the rest of the Ares 3 crew's experience of the sandstorm and Watney's apparent death. Then, Weir moves back to the "present," where the crew on *Hermes* receive a voice message from Mitch, telling them Watney is alive. Most of the team is overjoyed, but Lewis blames herself for giving the order to abandon Watney.

Though Watney is glad to be able to communicate with NASA, he now feels that NASA is micromanaging his work. On Sol 119, as Watney exits the Hab through Airlock 1, the Hab canvas breaches, and the Airlock is torn from the rest of the Hab. In the following days, Watney manages to repair the Hab, but the soil and young potato plants are now dead. The supply probe will arrive Sol 856, but, with the potatoes dead, he only has enough food to last until Sol 600. Back at NASA, the usually-cautious Teddy decides that in order to get the Iris supply probe to Watney in time, they'll skip standard inspection procedures. By doing so, they launch the probe with a faulty bolt that comes loose, throwing the probe off-balance. Iris crashes into the ocean.

Guo Ming, director of the China National Space Administration reaches out to Teddy and offers to allow NASA to modify the Chinese probe Taiyang Shen to send supplies to Watney.

Meanwhile, astrodynamicist Rich Purnell has found a way to get *Hermes* back to Mars in time for a flyby on Sol 549. The “Rich Purnell Maneuver” uses Taiyang Shen to send *Hermes* a resupply probe. Watney would have to get to the Ares 4 MAV, modify it, and use it to reach *Hermes*. Teddy has to choose between the Purnell Maneuver and Iris 2 (the plan to send Watney food on the Taiyang Shen). Though the Purnell Maneuver is more likely to succeed than Iris 2, it risks 6 lives rather than 1. Teddy chooses to stick with Iris 2. Mitch, convinced Teddy has made the wrong choice, leaks the Purnell Maneuver to the *Hermes* crew. The crew decides to go against NASA’s orders and executes the Purnell Maneuver.

NASA informs Watney of the new plan, and Watney begins modifying both rovers in preparation for his trip to the Ares 4 MAV: he turns one into a trailer so that he can carry the “Big Three” (the atmospheric regulator, oxygenator, and water reclaimer) with him. While working on the modifications, Watney accidentally sends an electrical charge to *Pathfinder*’s hull and fries its electronics. There is no way to get *Pathfinder* back online. Watney spells out Morse code messages to NASA using rocks and continues on with the rover modifications.

Meanwhile, on *Hermes*, the Taiyang Shen resupply probe successfully docks, and Johanssen and Beck are falling in love.

Once Watney connects the rovers, he builds a “bedroom” tent out of canvas that attaches to the rover’s airlock. Then, he sets out for Schiaparelli and the MAV 4 site. Venkat realizes that Watney’s path will take him through a **dust storm** in Arabia Terra that will block eighty percent of sunlight, leaving him without enough energy to even run life support. The change will be so gradual that Watney likely won’t notice until he’s fairly far into the storm. Watney begins to notice that his batteries aren’t holding a charge as well as usual, and he eventually realizes that he’s in the dust storm. Watney determines that the storm is north of him and moving west; he can avoid the storm by traveling south, then east. Since Schiaparelli is to the southeast, Watney won’t have to go too far out of his way.

Watney successfully circumnavigates the dust storm, but as he drives into the Schiaparelli crater, the rover rolls, and the trailer breaks loose and flips. Within three days, Watney manages to get the rover and trailer upright and replace the tow hook. He continues to the Ares 4 MAV. Once there, he can use the MAV’s radio to communicate with NASA and with *Hermes*. Bruce and Venkat instruct Watney on how to modify the MAV and electrolyze his water and urine to create more hydrogen fuel. To lighten the MAV, Watney removes all nonessential gear, backup comm systems, and all life support—he will wear his EVA suit for the launch. Martinez will pilot the MAV remotely, so Watney removes the controls. Finally, Watney removes the nose of the ship and covers the hole with Hab canvas. During the launch, the canvas breaks free and begins to flap, slowing the MAV’s ascent. On *Hermes*, Johanssen tells Lewis the MAV

will reach orbit, but the distance at intercept will be 68 km. They are 39 minutes away from intercept. They can use the ion engines and altitude thrusters to bring them close enough to the MAV to reach Watney at intercept, but they’ll be traveling much too fast. As NASA scientists listen in, unable to help, Lewis orders Martinez to use the ion engines and altitude thrusters. Then, the *Hermes* crew seal the bridge and reactor room. Vogel builds a pipe bomb and uses it to breach the vehicular airlock on the nose of the ship. The thrust from the escaping air slows the ship enough to make the rescue risky, but possible. When *Hermes* reaches intercept, Beck leaves the ship on a tether and reaches Watney. The two men return safely to the ship.

On Earth, people celebrate around the world. In Chicago, Watney’s parents embrace. Teddy prepares to brief the press. Back on *Hermes*, Beck bandages up the ribs that Watney broke during the ascent, and Watney greets the rest of the crew. Watney may be tired, smelly, injured, and hungry, but it’s the happiest day of his life.



CHARACTERS

MAJOR CHARACTERS

Mark Watney – Watney is *The Martian*’s protagonist, and he narrates large sections of the novel. A NASA astronaut on the Ares 3 mission, Watney is accidentally left behind on Mars by the rest of the crew and must find a way to survive on the planet alone. As the mission’s botanist and engineer, Watney is the lowest-ranked member of the crew, but his botany and engineering background give him the skills he needs to survive on Mars. Watney avoids writing about his emotions—instead, he cracks jokes. Over the course of the novel, he mentions a few things about his childhood and his family (for example, he grew up in Chicago and he considers Martinez to be his best friend), but for the most part, Watney avoids writing about his emotions. Instead, he cracks jokes and keeps himself occupied with work and the media files his crewmates left behind on Mars.

Commander Melissa Lewis – As commander of the Ares 3 mission, Lewis takes her responsibility to protect her crew extremely seriously. She is also the crew’s geologist. She was previously in the navy and is still considered military personnel. Lewis and her husband Robert collect 1970s memorabilia together, and (much to Watney’s chagrin) Lewis brought an extensive collection of files containing disco music and 1970s TV with her into space.

Major Rick Martinez – A former Air Force pilot, Martinez is still military personnel but is now the pilot for the Ares 3 mission. His precision as a pilot is noted repeatedly by Watney and other characters throughout the novel. Martinez and his wife Marissa have a young son, David. Late in the novel, the

usually-stoic Watney describes Martinez as his best friend.

Beth Johanssen – A “computer geek” and career software engineer, Johanssen’s coding skills enable the *Hermes* crew to override NASA controls and perform the Rich Purnell Maneuver without authorization. She likes the Beatles and Agatha Christie novels. Blonde, petite, and conventionally beautiful, Johanssen’s good looks have made her a poster-girl for the Ares missions, earning her many admirers on Earth. Over the course of the mission, she and Beck fall in love.

Teddy Sanders – As NASA Administrator, Teddy has the final word on all decisions at NASA. He knows that the public sees him as accountable for both NASA’s successes and failures, and he takes this responsibility seriously. Even more so than other top managers, Teddy tends to be unwilling to take risks that might damage NASA’s reputation.

Mindy Park – A low-level employee who processes Satellite images at NASA Satellite Control (Sat Con), Mindy is the first person on Earth to realize that Watney is still alive. She quickly becomes involved in conversations with upper-level NASA officials on how to track Watney’s progress, make contact with him, and eventually rescue him.

Annie Montrose – As Director of Media Relations at NASA, Annie is responsible for keeping the public and the media informed on developments with Watney and the Ares 3 mission. Part of her job is to “spin” stories in a way that creates a positive public image of NASA. One of the few women in NASA’s upper levels, Annie’s candid, tough persona seems to have helped her break into the “boys club” of NASA administration.

Mitch Henderson – As Flight Director for Ares 3, Mitch has strong opinions about how to communicate with the Ares 3 crew. He clashes with Teddy over the decision not to tell the crew that Watney is still alive, and he strongly advocates the risky Ralph Purnell Maneuver. He is likely responsible for leaking the plans for the Ralph Purnell Maneuver to the Ares 3 crew, which resulted in the *Hermes* mutiny. Though at times abrasive, Mitch’s stubbornness and rogue willingness to take risks ultimately proves to be an asset.

Dr. Irene Shields – As flight psychologist for the Ares missions, Shields knows Watney and the other Ares 3 crew members relatively well. She appears several times on the *Mark Watney Report* to discuss the psychological impact of space travel and isolation. Late in the novel, Shields asks Watney to write letters to his crewmates in order to maintain his connection to life on earth.

Watney’s mother – Watney doesn’t reveal much about his mother, except that, when he complained about shoveling snow as a kid, she told him not to be a “wuss.” When she writes a letter to him after he regains contact with NASA, he reads it over and over again. She lives in Chicago with Watney’s father.

MINOR CHARACTERS

Alex Vogel – The only non-American member of the Ares 3 crew, Vogel is a German representing the EU on the mission. He is also the mission’s official chemist.

Beck – Beck is the Ares 3 crew’s resident doctor, biologist, and EVA specialist. During the fly-by, it is his responsibility to leave *Hermes*, reach Watney, and bring him back to the ship. During the mission, he and Johanssen fall in love.

Venkat Kapoor – Venkat is the Director of Mars Operations and one of NASA’s top managers. He tends to support Teddy’s decisions. While he initially underestimates Mindy’s abilities as a scientist, he also promotes her and advocates for her in front of other NASA managers.

Chuck – Chuck works on radio communications at NASA. He is a colleague of Morris.

Morris – Morris works with Chuck on radio communications at NASA.

Cathy Warner – CNN reporter and host of the *Mark Watney Report*, a daily half-hour special covering Watney and the effort to rescue him.

Bruce Ng – Director of NASA’s JPL (Jet Propulsion Laboratory) in Los Angeles.

Bob – Director of Satellite Control and Mindy’s boss.

Marcus Washington – A US Postal Service official, Washington is interviewed by Cathy Warner on *The Mark Watney Report* about the discontinuation of Mark Watney commemorative stamps.

Tim – Tim runs the communications console at the *Pathfinder* control center at JPL.

Marty West – Reporter for NBC news.

Jill Holbrook – Reporter for BBC.

Jack Trevor – A software engineer at NASA, Jack finds a way to implement code that allows *Pathfinder* and Watney’s rover to “talk” to each other, which significantly improves the efficiency of communications between Watney and NASA.

The President – The US president calls NASA managers several times.

Rich Purnell – An astrodynamist at NASA, Purnell independently develops the risky Rich Purnell Maneuver, which allows the *Hermes* ship to change course and rescue Watney in a “fly-by” before returning to Earth with all six members of the Ares 3 crew.

Mike – Rich Purnell’s boss, Mike works in NASA’s astrodynamics department.

Maurice Stein – Maurice was scheduled to be the pad leader for the EagleEye 3 mission. When NASA decides to use the EagleEye 3 booster for the Iris probe, Maurice becomes the pad leader for the Iris launch.

Dr. Keller – A NASA nutritionist who advises top management on Watney’s food supply, particularly on his risks of starvation and malnutrition.

Guo Ming – Director of the China National Space Administration. Guo is just as frustrated by the CNSA’s bureaucratic procedures as Watney is with NASA’s.

Zhu Tao – Under Director of the China National Space Administration.

Brendan Hutch – An up-and-comer at NASA, Hutch is in charge of Mission Control from 1am to 9am. He is the first person on Earth to learn of the *Hermes* mutiny.

Robert – Commander Lewis’ husband. Robert shares his wife’s love of disco and 1970s pop culture.

Su Bin Bao – A CNSA employee, Su serves as Teddy and Venkat’s guide and translator while they are in China.

Helena – Vogel’s wife, a teacher at a grammar school in Bremen.

Eliza – Vogel and Helena’s daughter.

Victor – Vogel and Helena’s son.

Vogel’s mother – Though she does not appear in the novel, Vogel and Helena reference her in conversation.

Amy – Beck’s sister.

Marissa – Martinez’s wife. She and Martinez have known each other since they were fifteen.

David – Martinez’s son.

Johanssen’s father – Johanssen’s father works as the district sales manager of a napkin factory. He’s both incredibly proud of his daughter, and incredibly worried about her.

Johanssen’s mother – Johanssen’s mother never appears in the book, but according to her husband (Johanssen’s father) her worries over her daughter’s life and safety are having a strong negative effect on her own mental health and quality of life.

Randall Carter – Martian meteorologist at NASA.

Watney’s father – Watney doesn’t reveal much about his father, except that he made him shovel snow as a kid, and that he drove really slowly on the freeway. He lives in Chicago with Watney’s mother.



SCIENCE, HUMAN INGENUITY, AND THE FIGHT TO SURVIVE

In the closing pages of *The Martian*, Watney declares that, to the public, his story of survival represents “progress, science, and the interplanetary future.” This is true: *The Martian* is indeed a story of scientific progress on a grand scale. However, Wier’s detailed descriptions of how Watney uses basic chemistry, biology, math, botany, and engineering to survive on Mars makes it clear that science is only as powerful as the logic, creative thinking, human ingenuity, and determination of the people who wield scientific knowledge.

If *The Martian* were simply a story of “progress” and “science,” then it would probably be a pretty boring story. But the novel makes clear again and again that, though Watney’s scientific background in botany gives him a critical base of knowledge from which to work, his ability to survive rests more on his ability to plan ahead, to creatively develop solutions to the issues he encounters, to tolerate risk, and his determination to do everything he can to stay alive. Without realizing that he could grow the **potatoes**, and without conceiving and executing a plan to retrieve the *Pathfinder* radio, for example, Watney’s survival and rescue would have been impossible.

Similarly, the Purnell Maneuver that results in Watney’s rescue is not just a matter of science, but one of ingenuity and creativity. If it were just a matter of science, then anyone could have come up with it. In order to develop a solution for Watney’s rescue, though, NASA needed a creative thinker like Ralph Purnell, an outsider who wasn’t assigned to work on the problem but who was determined to tackle it anyway. Time and again, the novel makes clear that, while the public might see the “interplanetary future” as the inevitable result of scientific progress and the curiosity of the human spirit, this progress, in fact, requires a messy and risky marriage of science, curiosity, ingenuity, and adventure.



BUREAUCRACY VS. HUMAN ENDEAVOUR

Throughout *The Martian*, Watney and other characters complain about the limitations that bureaucratic oversight places on their work. The novel shows that NASA’s many safety checks, official protocols, and layers of supervision are designed to protect scientists and astronauts, but they can also result in inefficiency. More troublingly, NASA’s bureaucrats are often willing to sacrifice one individual’s autonomy in the name of protecting the organization itself. The novel shows this dynamic in part through Watney’s interaction with NASA.

In the early chapters of *The Martian*, Watney is presumed dead by NASA and the *Hermes* crew, and Watney has no way to contact them. During this period, Watney finds a way to



THEMES

In LitCharts literature guides, each theme gets its own color-coded icon. These icons make it easy to track where the themes occur most prominently throughout the work. If you don’t have a color printer, you can still use the icons to track themes in black and white.

manufacture water, creates a new food source by cultivating **potatoes**, modifies the rover for multi-day trips, and eventually obtains the radio from *Pathfinder*. The techniques Watney uses to create water are undeniably risky, but the risks he takes pay off, giving him a way to survive on Mars, and, ultimately, a way to return to Earth. Once Watney uses *Pathfinder*'s radio to contact NASA, however, he suddenly has supervisors. NASA discourages Watney from doing anything dangerous—ironically, the discouraged activities involve just the kind of risk-taking that has enabled Watney to survive on Mars and acquire the radio in the first place. NASA tends to micro-manage Watney in ways that limit his progress. For example, though Watney feels that he can safely do 10-hour EVAs, NASA insists that he stick to the standard 8-hour EVA normally recommended on Ares missions—a regulation that seriously shortens Watney's work days. In his log entries, Watney frequently expresses frustration with NASA's rules and regulations; nonetheless, he mostly follows them.

The interaction between bureaucratic cautiousness and the more "humanistic" issues of loyalty, morality, and basic human care play out in more complicated ways between NASA and the crew of *Hermes*, which allows the novel to explore the sorts of moral quandaries that arise when bureaucracies, and the individuals within those bureaucracies, are in crisis situations.

An example of this dynamic comes when NASA discovers that Watney is still alive, and Mitch, Venkat and Teddy spar over whether notifying the crew of *Hermes* will boost or hurt morale. It's possible that the knowledge that the *Hermes* crew abandoned Watney alive would be so emotionally painful that it would become a dangerous distraction for them, impairing their ability to get home safely. NASA's leaders pragmatically weigh the value of protecting the crew's safety against the moral value of giving them the information that they would desperately want to know. Another example of the morally complex interaction of bureaucracy and humanity is in NASA's decision not to carry out the Purnell Maneuver because it risks six lives in order to save only one. Mitch feels strongly that NASA should let the crew decide whether to risk their lives to save Watney. However, Teddy, as leader of the NASA bureaucracy (who has a responsibility to all of the people in NASA and for the reputation of NASA itself) feels compelled to make the safe choice, one that won't result in more lives lost or destroy NASA's reputation if it goes wrong. In making this decision, though, he is also purposely choosing to not allow the crew their full autonomy. Mitch's decision to break rank and leak the details of the Purnell Maneuver to the crew is one of the most complex choices in the book: first, it will likely mean the loss of his job; second, and more personally, it makes him somewhat responsible if the crew decides to go through with the maneuver and disaster happens. At the same time, though, Mitch's decision can be described as deeply moral, in that it allows the crew to make their own choices with full information

about the possible risks and rewards.

Though the reader understands why Teddy was unprepared to risk six lives in order to save one, the novel is also clear about presenting Mitch and the *Hermes* crew as having made the right decision in carrying out the Purnell Maneuver. It's a choice that exhibits loyalty and bravery, and it is also a moral choice in that it is a choice made by human beings directly facing risk with full knowledge of the complexity and danger involved. The novel suggests that this type of voluntary risk-taking and free decision-making is necessary if humans are to follow through on their natural desire to learn and explore.



SOLITUDE AND THE HUMAN NEED FOR CONNECTION

Watney is utterly alone on Mars, and for long sections of the book, he is unable to contact NASA.

While the work of surviving in this new environment initially keeps him occupied, his days and nights soon become repetitive, boring, and empty. Though Watney rarely says so, many of his actions reveal his desire for human connection.

The sections of *The Martian* told from Watney's perspective are written as log entries. Watney hopes that NASA and other people on earth will someday read his log—even if he dies on Mars before help reaches him or without anyone even realizing he was still alive, he hopes to leave a record that can be recovered by future astronauts. In this way, the structure of the novel itself reveals Watney's innate need to connect with other human beings.

During his solitude, Watney goes through media files on his crewmates' laptops and zipdrives, reading Agatha Christie novels, watching 1970s sitcoms, and listening to Lewis's disco music. At first this may just seem like entertainment for Watney, but, in fact, by reading his crewmates' books, listening to their music, and watching their TV shows, Watney stays connected to them, even in their absence. This is made most clear in the way that Watney, after discovering Lewis's love of disco and 1970s pop culture, complains about her taste in music as a sort of running in-joke between Watney and the imagined future readers of his log. Watney, through his complaints, creates a kind of imagined camaraderie, both with Lewis and with the future log reader: he creates connections for himself.

On his Sirius 4 mission to reach *Pathfinder*, Watney reveals that he wants the radio not only to arrange his rescue, but also so that he can regain human connection. With the radio, he writes in the log, "I could be reconnected with mankind before I even die." In an interview with CNN, NASA psychologist Dr. Irene Shields makes a similar point: "When facing death, people want to be heard. They don't want to die alone. He might just want the MAV radio so he can talk to another soul before he dies." Wier uses these comments to show that, while Watney's

actions are motivated primarily by his fight for survival, human connection is, like water, oxygen, or food, a key component of human life.

After the failed launch of *Iris 1*, Dr. Shields asks Watney to write personal notes to the *Ares 3* crewmembers; these messages appear sporadically throughout the second half of the novel, giving the reader insight into Watney's relationships with the rest of the crew. In his message to Martinez, Watney writes, "She says it'll keep me tethered to humanity. I think it's bullshit. But hey, it's an order." Watney's reluctance to admit that he does, in fact, need human contact may be a survival mechanism. In spite of his cavalier attitude about remaining "tethered to humanity," Watney occasionally admits to loneliness, and he does so with greater frequency as the possibility of rescue becomes more and more likely; this suggests that he denied his own loneliness as a defense against the fact that he feared he would be alone for the rest of his life. Just before his rescue, when Watney finally has direct contact with his *Ares 3* crewmembers on *Hermes*, he writes, "I've really missed you guys."



THE BETRAYAL OF THE FAMILIAR

Stuck alone on Mars for far longer than intended, Watney finds himself in an inhospitable environment where, unlike on Earth, his body is not designed to survive. Naturally, Watney comes to rely on technology to keep himself alive, such as the Hab, the rovers, and EVA suits. While this technology keeps him alive, its very strength conceals two dangers: First, the technologies' apparent reliability allows Watney to fall into a series of familiar routines that mask just how different, and dangerous, Mars is for him. Second, because the technology is so helpful, it is easy for Watney to underestimate how vulnerable the technology is to damage, and to forget just how dependent he is on this technology in order to survive.

In fact, Watney faces many of the novel's greatest challenges when he fails to account for the differences between the Earth and the Martian environment, or when a seemingly minor mistake damages his equipment. Nowhere is this better illustrated than in Watney's nearly disastrous attempt to make water by separating hydrogen gas out from hydrazine fuel. During the process, Watney inadvertently leaves enough hydrogen in the air to risk an explosion. While removing the hydrogen from the air, he nearly suffocates by inhaling too much nitrogen. He then pulls on an oxygen mask, but, when he exhales, he adds enough oxygen into the air to cause an explosion in the Hab. Breathing oxygen and exhaling a combination of oxygen and carbon dioxide is, on earth, the most natural thing in the world. Yet on Mars, in the Hab, oxygen is dangerous—the very things Watney needs to survive could kill him.



THE MEDIA

Watney's apparent death, the discovery that he is alive, and the effort to rescue him are, for the duration of the novel, the biggest news story on Earth. People from around the world are caught up in the story of his against-all-odds survival, and CNN dedicates a new show, *The Mark Watney Report*, to keeping the public up-to-date on Watney's life on Mars. NASA is keenly aware of the news coverage and the public's emotional investment in the story. As events unfold, the news media put pressure on NASA to bring Watney home safely; in doing so, they hold NASA (a publicly-funded organization) accountable to the public.

Throughout the novel, Annie Montrose, NASA's director of media relations, tries to balance her responsibility to keep the public informed of ongoing events and her duty to "spin" stories so that the public's confidence in NASA remains high. As NASA Administrator, Teddy Sanders is the public face of the organization in a different way from Annie; he is well aware that both the public and the US government see him as responsible for both NASA's successes and failures. What's more, he knows that, since NASA is a publicly funded government organization, public opinion plays a critical role in whether or not future NASA missions receive funding. The American public has to believe that Mars explorations are worthwhile, or else NASA will cease to operate. It's Teddy's job, then, to make sure that news coverage and the public's concern for Watney allow him to secure the emergency funding from Congress that the rescue mission needs.

While the funding for the rescue mission is an instance in which NASA and the news media's interests align, their interests are more at odds when NASA's top managers meet to discuss potential rescue strategies for Watney. Instead of simply pursuing the strategy that would be best for Watney, Teddy sees it has his job to make choices that do not further endanger NASA's reputation. While he feels genuine concern for Watney, he also wants to make choices that avert any possible PR disaster, particularly because of the high-profile nature of the case. Teddy is unwilling, then, to risk the lives of the *Hermes* crew to save Watney, both because he would rather save five lives than one, and because the death of six astronauts would be worse for NASA's reputation than the death of one astronaut. Mitch, the *Ares 3* Flight Director sees Teddy's preoccupation with NASA's public image as cowardly, but Venkat, Director of Mars Operations, tends to support Teddy's more cautious decisions. Ultimately, Weir suggests that only the *Hermes* crew can make the decision to risk their own lives in order to save Watney, though Weir is not unsympathetic to the difficult position that Teddy is in regarding NASA's public reputation.

At first, Watney's apparent death bodes poorly for the future of *Ares* missions, but by the end of the novel, his survival and rescue come to symbolize the pinnacle of hope, exploration,

and scientific achievement. In *The Martian's* final chapter, Weir describes people around the world gathering around televisions and in public places to watch news coverage of Watney's rescue; spontaneous celebrations break out when the public learns that Watney is safely aboard *Hermes*. Watney himself marvels at how many people have been rooting for him during his year and a half on Mars, and Weir shows how media coverage not only keeps NASA accountable to the public, but creates the kind of collective cultural moment that occurs when Watney is rescued.



SYMBOLS

Symbols appear in **teal text** throughout the Summary and Analysis sections of this LitChart.



THE POTATOES

For most of his time on Mars, Watney subsists on his crop of potatoes. It's fitting that the potatoes he uses to sow the crop were intended for the Ares 3 crew's Thanksgiving dinner; Thanksgiving celebrates the pilgrims' survival in a new land, and just as the Native Americans' generosity and humanity saved the pilgrims from starvation, Watney is saved from starvation in a strange new place by the supplies for a Thanksgiving dinner. The potatoes were intended by NASA's psychologists to foster a sense of fellowship among the astronauts, and this nod to the importance of humanity and community turns out to sustain Watney in a much more physical sense. In this way, the potatoes symbolize the tenacity of life, even in the face of overwhelming odds.



THE RTG

In order to keep the Rover warm during two long journeys (the trips to *Pathfinder* and to Schiaparelli), Watney recovers the RTG (Radioactive Thermoelectric Generator) that had powered the Ares 3 MAV before the Ares 3 Crew arrived on Mars. The RTG is essentially a box of unstable plutonium, and it's highly dangerous for Watney to handle. NASA uses RTGs as power sources for unmanned missions, but they are not willing to risk explosion or exposing their astronauts to high levels of radiation by using the RTG on manned missions. However, in order to survive on Mars, Watney must take the kind of risks that NASA cannot condone—he must recover the RTG from the place where Lewis buried it a safe distance from the Hab and use it in order to keep himself warm enough to stay alive. The RTG exemplifies the narrow margin of error that Watney confronts time and again. As long as the RTG remains intact, it's relatively safe; if it's damaged, it will become deadly. Regardless, though, if Watney doesn't at least try to use the RTG, he will certainly die.

In this way, the RTG is emblematic of all of the risky, lose-lose choices that Watney must make on Mars.



THE DUST STORM

The dust storm that Watney must circumnavigate on his way to Schiaparelli represents the danger of the unknown. Watney does not notice when he enters the storm, and the further he drives into the storm, the less power he gains from his solar cells. Once the solar cells' efficiency drops to a certain level, Watney's life support will fail. NASA scientists are powerless to alert him to the storm, and they know that once he is deep within it, their satellites will be unable to track him. Though Watney does notice the storm soon enough to change his course, his limited knowledge continues to threaten to his safety. He is able to determine the direction in which the storm is moving, but he can't know the exact shape or size of the storm. Usually, Watney is able to identify what he doesn't know and seek out answers. The dust storm is a different situation entirely; it emphasizes that when Watney is unaware that he is missing a key piece of information, the unknown is potentially deadly.



QUOTES

Note: all page numbers for the quotes below refer to the Broadway Books edition of *The Martian* published in 2014.

Chapter 1 Quotes

☞ LOG ENTRY: SOL 6 I'm pretty much fucked. That's my considered opinion. Fucked. Six days into what should be the greatest month of my life, and it's turned into a nightmare. I don't even know who'll read this. I guess someone will find it eventually. Maybe a hundred years from now.

Related Characters: Mark Watney (speaker)

Related Themes:  

Page Number: 1

Explanation and Analysis

When Weir opens *The Martian* with these sentences, the reader doesn't yet know exactly what is happening. Watney's profanity grabs our attention and indicates that he is in distress. At the same time, Watney's quip, "that's my considered opinion," introduces readers to his glib sense of humor.

The log's use of "sol" rather than "day" as a time-marker suggests that Watney is not part of the ordinary life on Earth that readers know, but we don't learn that he is on

Mars until several paragraphs later. From his assertion that no one will read this log for maybe a hundred years, we can guess that he is alone somewhere remote and that no one will come looking for him.

These first lines offer us just enough information to raise questions and encourage us to keep reading: we don't know yet who he is, where he is, or what has happened to transform his life into a "nightmare."

Chapter 3 Quotes

☛ Why did NASA send twelve whole potatoes, refrigerated but not frozen? And why send them along with us as in-pressure cargo rather than in a crate with the rest of the Hab supplies? Because Thanksgiving was going to happen while we were doing surface operations, and NASA's shrinks thought it would be good for us to make a meal together. Not just to eat it, but to actually prepare it.

Related Characters: Mark Watney (speaker)

Related Themes:  

Related Symbols: 

Page Number: 21

Explanation and Analysis

By Chapter 3, Watney has worked out a way to extend his food supply: he has created "compost" out of Earth soil samples, his feces, and Martian soil, and he has transformed the Hab into a greenhouse where he can grow potatoes. Astronauts usually eat freeze-dried food, so it's a stroke of luck that he has potatoes that he can plant.

It's significant that the potatoes were sent so that the Ares 3 crew could prepare a Thanksgiving meal. Thanksgiving celebrates how early American colonists avoided starvation; now Thanksgiving potatoes save Watney, a colonist on Mars, from starvation, too. The meal was intended to give the crew a chance to bond with one another and to allow them to share in the holiday their families and friends were celebrating at home. Watney is now gaining physical sustenance from something intended to preserve his emotional health, reminding readers that Watney's survival depends on his remaining symbolically and practically connected to life on Earth.

Chapter 6 Quotes

☛ Today was the memorial service for Mark Watney. The President had given a speech, praising Watney's bravery and sacrifice, and the quick actions of Commander Lewis in getting everyone else to safety [...] The administrator had given a speech as well, reminding everyone that space flight is incredibly dangerous, and that we will not back down in the face of adversity.

Related Characters: Teddy Sanders, Venkat Kapoor, The President, Mark Watney

Related Themes:   

Page Number: 49

Explanation and Analysis

This passage opens Chapter 6, and marks readers' first glimpse of events on Earth. Weir uses flat, declarative sentences to create an authoritative tone that gives readers the sense that they are hearing the "official" account of events, the version of the story that will appear in history books and government documents. The narrator summarizes the president's speech in a way that makes it seem impersonal; as a dead national hero, Watney has become two-dimensional. Readers know him as funny, nerdy, and resourceful, but to the public, he is simply brave and self-sacrificing, like any other dead national hero.

The narrator's summary of the speech given by the NASA administrator (Teddy Sanders, whom readers will soon meet) also seems like a series of clichéd stock-phrases. This speech is not so much about Watney as it is about the future of space-travel. Reading between the lines, we can see that Teddy is afraid that the tragedy of Watney's death will make people question the wisdom of sending astronauts on dangerous missions. He is encouraging the public and US government not to "back down in the face of adversity" because he fears that, in light of Watney's death, future NASA missions will suffer from lack of public support.

☛ "Okay, consider this: Sympathy for Watney's family is really high. Ares 6 could bring the body back. We don't say that's the purpose of the mission, but we make it clear that would be part of it. If we framed it that way, we'd get more support in Congress. But not if we wait a year. In a year, people won't care anymore."

Related Characters: Venkat Kapoor (speaker), Teddy Sanders, Mark Watney

Related Themes:   

Page Number: 52

Explanation and Analysis

Here, Venkat (Director of Mars Operations) attempts to convince Teddy (NASA Administrator) to approve his request for satellite images of the Ares 3 site. Venkat wants to see what equipment is still intact because, as the Ares 3 crew left much earlier than intended, their remaining supplies could be used for a yet-to-be-funded Ares 6 mission. Teddy is hesitant because he knows that Watney's body will show up in the images, and Watney's death has already resulted in bad press for NASA.

Weir uses this passage to show the complexity of NASA's relationship to the public, the press, and the federal government. NASA is a publicly funded organization, so their missions need to be approved by Congress, and Congress responds to public opinion. Venkat's argument for taking photos of the site (and of Watney's body) takes into account how public opinion, the media, and the news cycle, influence politician's decisions. Venkat knows that there's a limited window of time in which people will be engaged with Watney's story. During that period, NASA be able to use the story to their advantage.

☞ This was going to be rough and Annie knew it. Not only did she have to deliver the biggest mea culpa in NASA's history, every second of it would be remembered forever. Every movement of her arms, intonation of her voice, and expression of her face would be seen by millions of people over and over again. Not just in the immediate press cycle, but for decades to come. Every documentary made about Watney's situation would have this clip.

Related Characters: Mark Watney, Annie Montrose

Related Themes:  

Page Number: 60

Explanation and Analysis

After satellite images of the Ares 3 site show that Watney is actually alive, NASA has to make a public statement. Weir uses the omniscient 3rd person narrator to give readers a glimpse of Annie's thoughts as she prepares for the press conference.

Through Annie's thoughts, Weir reminds readers that a press statement can be just as historic as the event that that

statement is describing. News media in the present and historians in the future will analyze not only what happened to Watney and why, but also how NASA handled the event. The way that Annie makes this announcement will influence public perceptions of NASA and of Watney's story for years to come.

Chapter 7 Quotes

☞ The RTG is a generator. It's a paltry amount of power, compared to what the rover consumes, but it's not nothing. It's one hundred watts. It'll cut an hour off my total recharge time. Why not use it? I wonder what NASA would think about me fucking with the RTG like this. They'd probably hide under their desks and cuddle with their slide rules for comfort.

Related Characters: Mark Watney (speaker)

Related Themes:  

Related Symbols: 

Page Number: 77

Explanation and Analysis

The RTG is a radioactive core that had powered the Ares 3 MAV while it waited on Mars for the crew to arrive. Shortly after landing, Commander Lewis detached the RTG and buried it a safe distance from the Hab. Now, Watney has dug up the RTG and is using it to heat the rover and partially charge the rover's battery. Watney knows that NASA would disapprove of him using the RTG in this way—after all, it's considered risky to even place the RTG too close to astronauts—but he mocks their caution, portraying them as timid, nerdy bureaucrats.

Weir uses this scene to show how Watney's isolation on Mars also gives him freedom from the oversight of NASA's bureaucracy. He can take risks that NASA would not ordinarily permit. What's more, this kind of risk-taking is essential to his survival: without the RTG, he would freeze in the rover. Through Watney's snide remarks about NASA management, Weir points out that bureaucratic structures can stymie individuals like Watney who take risks and think creatively.

Chapter 8 Quotes

☞ “What about the RTG? Does the public know about that yet?” Teddy asked. Annie leaned forward. “So far, so good,” she said. “The images are public, but we have no obligation to tell them our analysis. Nobody has figured it out yet.” [...] “How dangerous is it?” Teddy asked. “As long as the container’s intact, no danger at all.”

Related Characters: Venkat Kapoor, Annie Montrose, Teddy Sanders (speaker), Mark Watney

Related Themes:   

Related Symbols: 

Page Number: 84

Explanation and Analysis

NASA has been tracking Watney using satellite images, so they know that he has dug up the RTG and that he is using it in the rover. Earlier, Watney imagined that NASA would cower in fear and horror if they knew he was using the RTG, but in this scene, we see that they are relatively unconcerned. Teddy, Annie, and Venkat know that the RTG is unlikely to endanger Watney—they are more concerned with public perceptions of nuclear power and radiation.

Weir uses this scene to show that NASA’s tendency to err on the side of caution is actually the result of pressure from the media and the public. Of course, Teddy wants to keep NASA astronauts safe, but he also wants to avoid any action that might appear to endanger an astronaut (even if it is actually relatively low-risk). In this way, the public and the media protect astronauts and act as a check on NASA—but NASA’s awareness of public opinion can also prevent the kind of risk-taking on which Watney’s survival now depends.

☞ “When facing death, people want to be heard. They don’t want to die alone. He might just want the MAV radio so he can talk to another soul before he dies. If he’s lost hope, he won’t care about survival. His only concern will be making it to the radio. After that, he’ll probably take an easier way out than starvation. The medical supplies of an Ares mission have enough morphine to be lethal.”

Related Characters: Dr. Irene Shields (speaker), Cathy Warner, Mark Watney

Related Themes:   

Page Number: 90

Explanation and Analysis

At this point in the novel, NASA believes that Watney is modifying the rover so that he can drive to the Ares 4 MAV, where there’s a radio he can use to contact NASA. In an interview with Cathy Warner, anchor of CNN’s *The Mark Watney Report*, NASA flight psychologist Dr. Irene Shields gives an analysis of the emotions that Watney is likely experiencing.

Watney rarely references his own emotions, and when he does, he tends to play them off as inconsequential, so his feelings are almost as much of a mystery to the reader as they are to CNN’s studio audience. In an earlier log entry, Watney has already mentioned that he would rather take a lethal dose of morphine than starve to death, so Dr. Shield’s mention of this possibility gives credence to the rest of her analysis, including her assertion that hope is essential for human survival.

Weir uses the scene to emphasize that connection with other people is a basic human need, and that the human capacity for hope can push people to survive in seemingly impossible circumstances. This basic desire to be heard may, in fact, explain why Watney is keeping a detailed log that he knows may never be found.

Chapter 9 Quotes

☞ “It’s a strange feeling. Everywhere I go, I’m the first. Step outside the rover? First guy ever to be there! Climb a hill? First guy to climb that hill! Kick a rock? That rock hadn’t moved in a million years! I’m the first guy to drive long-distance on Mars. The first guy to spend more than thirty-one sols on Mars. The first guy to grow crops on Mars. First, first, first! I wasn’t expecting to be first at anything. I was the fifth crewman out of the MDV when we landed [...] Man, I miss those guys. Jesus Christ, I’d give anything for a five-minute conversation with anyone. Anyone, anywhere. About anything. I’m the first person to be alone on an entire planet.”

Related Characters: Mark Watney (speaker)

Related Themes:  

Page Number: 99

Explanation and Analysis

As Watney makes his way towards the *Pathfinder* probe, he contemplates the fact that he is the first person ever to make this journey—and the first to do many other things. Through a turn of bad luck, Watney has become a person who gets to make history, again and again and again. Making

history is supposed to be exciting, but Weir uses the repetition of the phrase “first guy to…” to create the sense that Watney no longer feels a thrill at the idea of being an explorer in an uncharted land. He is first at everything because he is alone, and like the isolation of life on Mars, the title of “first guy to…” is becoming tiresome.

Through this scene, Weir shows the reader how desperately Watney misses contact with other humans. Watney’s wish for a five-minute conversation reminds us of Dr. Shield’s warning that Watney could be looking for a radio simply so that he can speak to another person before he dies. As the first person to be alone on an entire planet, Watney is the test case for how long a person can last in utter isolation.

Chapter 10 Quotes

☞ For the first time, I think I might get off this planet alive. With that in mind, I’m taking soil and rock samples every time I do an EVA. […] It just feels nice to be an astronaut. That’s all it is. Not a reluctant farmer, not an electrical engineer, not a long-haul trucker. An astronaut. I’m doing what astronauts do. I missed it.

Related Characters: Mark Watney (speaker)

Related Themes:  

Page Number: 105-106

Explanation and Analysis

After recovering Pathfinder, Watney begins his long drive back to the Hab. Though he does not yet know if the radio will work, he feels a renewed sense of hope. Watney’s faith that he will survive this ordeal seems to show that he is not seeking the radio only so that he can speak to someone before committing suicide, which is a possibility that Weir has allowed to hover over the novel’s events since Dr. Shields’ interview with Cathy Warner in Chapter 8.

Through Watney’s comment that he is finally “an astronaut” again, Weir reminds readers that, ever since he was abandoned on Mars on Sol 6, Watney’s days have been entirely focused on guaranteeing his own survival. Now, taking samples gives Watney a purpose beyond mere survival: he can share his scientific findings with other people if he’s able to return to Earth.

Chapter 11 Quotes

☞ Earth is about to set. Resume 08:00 my time tomorrow morning. Tell family I’m fine. Give crew my best. Tell Commander Lewis disco sucks.

Related Characters: Mark Watney (speaker), Commander Melissa Lewis

Related Themes:  

Page Number: 120

Explanation and Analysis

Once Watney gains contact with NASA through the repaired Pathfinder radio, they exchange a series of messages in which Watney explains how he survived and updates them on his status. This is his final message during that first conversation: a rather terse series of greetings to be passed on to his family and the Ares 3 crew.

Throughout the novel, Weir makes it clear that Watney loves his parents and misses them, but he is self-conscious about expressing his emotions, particularly when it comes to his parents. Here, his message to his family is even more emotionally neutral than his message to the crew: while he sends the crew his “best,” he only tells his family that he is “fine.” Watney often copes with emotional situations through humor, and, true to form, the most personal message he sends is to Commander Lewis, but this message is an in-joke about Lewis’ taste in music. Watney could say, “I don’t blame you for leaving me behind.” Instead, he says, “Disco sucks.”

☞ “I need something, Venkat,” Annie said. “You’ve been in contact for twenty-four hours and the media is going ape shit. They want an image for the story. It’ll be on every news site in the world. […] This is all anyone cares about right now. In the world. This is the biggest story since Apollo 13.”

Related Characters: Annie Montrose (speaker), Mark Watney, Venkat Kapoor

Related Themes:   

Page Number: 124

Explanation and Analysis

The day after NASA makes contact with Watney, Annie asks Venkat to get Watney to do a photo-op. Venkat thinks this is absurd—the communication process is already slow, and asking Watney for a photo will use up valuable time that

could be spent discussing more substantial issues. Nonetheless, Venkat ultimately agrees to do a photo. Weir uses Annie's fervent insistence that a photo is necessary to show just how much pressure NASA is under from the media. When Annie says, "This is the biggest story since Apollo 13," she references a 1970 mission in which astronauts had to improvise repairs to the ship's life-support mechanisms—a heroic story that inspired a 1995 film and laudatory news coverage for NASA. Favorable news coverage of Watney's story is good for NASA's reputation, and Annie is well aware that the photos taken of Watney will become iconic images representing NASA's success and the human ability to persevere against all odds.

Chapter 12 Quotes

☞☞ "Holy shit," Beck laughed. "Holy shit! Commander! He's alive!" "I left him behind," Lewis said quietly. The celebrations ceased immediately as the crew saw their commander's expression. "But," Beck began, "we all left together—" "You followed orders," Lewis interrupted. "I left him behind. In a barren unreachable, godforsaken wasteland."

Related Characters: Commander Melissa Lewis, Beck (speaker), Mark Watney

Related Themes:  

Page Number: 145

Explanation and Analysis

Now that NASA has gained contact with Watney, Teddy finally gives Mitch permission to inform the *Hermes* crew that Watney is alive. In this scene, Weir uses dialogue to show the contrast between the crew's celebratory mood and Lewis's sense of guilt and grief at the realization that she gave the order to leave Watney behind. Beck seems to laugh out loud with joy, and Weir highlights his emotion through his use of profanity and short, fragmented sentences punctuated with exclamation points. In contrast, Lewis speaks quietly and in complete sentences. She is introspective, a world away from the happy, laughing people around her.

Lewis's reaction to the news shows that she holds herself accountable for her crew's safety, so much so, that she blames herself for Watney's death, even when no one else (including Watney) does. In this way, Weir shows that true leadership can mean taking on emotional burdens as well as practical responsibilities.

Chapter 13 Quotes

☞☞ Now that NASA can talk to me, they won't shut the hell up. They want constant updates on every Hab system, and they've got a room full of people trying to micromanage my crops. It's awesome to have a bunch of dipshits on Earth telling me, a botanist, how to grow plants. I mostly ignore them. I don't want to come off as arrogant here, but I'm the best botanist on the planet.

Related Characters: Mark Watney (speaker)

Related Themes:   

Page Number: 146

Explanation and Analysis

Watney spent months longing for human contact, but during that time he grew accustomed to making plans and solving problems on his own. He is happy to have contact with NASA again, but he is frustrated by NASA's constant instructions and requests for new information. Watney's hostility to NASA reads as an overreaction, but Weir uses Watney's frustration with NASA management to show that, though regaining contact with NASA is a net gain for Watney, it comes with drawbacks, too.

Under NASA supervision, Watney is no longer free to take the kinds of risks that he could before. Organizations like NASA make enormous scientific advances like space travel possible, but bureaucracy can stifle the creativity, risk-taking, and independent thinking that is essential to scientific progress.

☞☞ But my favorite email was the one from my mother. It's exactly what you'd expect. Thank God you're alive, stay strong, don't die, your father says hello, etc. I read it fifty times in a row. Hey don't get me wrong, I'm not a mama's boy or anything [...] It's totally manly and normal for me to cling to a letter from my mom. It's not like I'm some homesick kid at camp, right?

Related Characters: Mark Watney (speaker), Watney's mother

Related Themes:   

Page Number: 147

Explanation and Analysis

Now that Watney has hacked the rover to "talk" to NASA through *Pathfinder*, he receives daily "data dumps" of emails,

just like the Ares 3 crew on *Hermes*. This includes fan mail and letters from friends and family. Watney is, understandably, moved to receive a letter from his mother, but he is self-conscious about admitting how much the letter meant to him.

Watney attempts to downplay the importance of the letter by describing its contents as routine: “exactly what you’d expect.” His assertion, “I’m not a mama’s boy or anything” has the defensive tone of a child trying ward off a bully’s joke by making the same self-deprecating joke first. Part of this self-consciousness may come from the fact that he knows his log will be read by many people in the future. Throughout the novel, Watney routinely avoids or downplays his emotions in an attempt to portray himself as “strong” and traditionally masculine.

Chapter 16 Quotes

☞☞ Guo Ming, director of the China National Space Administration, examined the daunting pile of paperwork at his desk. In the old days, when China wanted to launch a rocket, they just launched it. Now they were compelled by international agreements to warn other nations first.

Related Characters: Guo Ming

Related Themes:  

Page Number: 192-193

Explanation and Analysis

Weir opens Chapter 16 with this passage, which introduces the reader to Guo Ming for the first time. Weir uses the “daunting pile of paperwork” on Guo’s desk to symbolize the burden placed on scientists by bureaucratic governmental structures.

Before this scene, readers have only seen the detrimental effects of bureaucracy on American scientists, but Weir now makes it clear that this is a problem that reaches beyond a single nation. Chinese scientists must also work within the constraints of bureaucratic protocols, and many of those protocols are determined by international agreements. Guo’s nostalgia for “the old days” is not so different from Watney’s longing for the freedom he had before he regained contact with NASA.

☞☞ “If this becomes a negotiation by diplomats, it will never be resolved. We need to keep this among scientists. Space agency to space agency. I’ll get a translator and call NASA’s administrator. We’ll work out an agreement, then present it to our governments as a *fait accompli*.”

Related Characters: Guo Ming (speaker), Teddy Sanders, Zhu Tao

Related Themes:  

Page Number: 195

Explanation and Analysis

CNSA under-director Zhu Tao suggests to Guo Ming that the booster from the CNSA probe Tiayang Shen could be used to rescue Watney, but Guo tells him that there’s no way that the Chinese and American governments would be able to negotiate a deal in time to save Watney. Instead, he says, they’ll need to negotiate directly with NASA scientists. By bypassing the bureaucracy of international diplomacy, the scientists may be able to overcome national barriers and create an effective rescue plan.

Even Guo and Teddy, who are at the top of their respective organizations’ bureaucratic hierarchies, recognize that formal protocols can hold back scientific progress. Weir uses this scene to highlight the dangers of state bureaucracies, but he also uses it to show how science and a common humanitarian cause can bring people together—even when they are people who perpetuate damaging bureaucratic structures.

☞☞ “Space travel is dangerous,” Mitch said. “We can’t make this a discussion about what’s safest.” “I disagree,” Teddy said. “This is absolutely a discussion about what’s safest. And about how many lives are at stake. Both plans are risky, but resupplying Watney only risks one life while the Rich Purnell Maneuver risks six.”

Related Characters: Teddy Sanders, Mitch Henderson (speaker), Rich Purnell, Mark Watney

Related Themes:  

Page Number: 204

Explanation and Analysis

Now that NASA has access to the CNSA probe Tiayang Shen, they have two options. The Tiayang Shen booster could either be used to send a supply probe to Watney, or to

send a supply probe to *Hermes* (allowing the Ares 3 crew to rescue Watney using the Rich Purnell Maneuver).

When the top NASA managers meet secretly to decide which rescue plan is best, Mitch argues that the Ares 3 crew should be allowed to decide whether or not to do the Purnell Maneuver. Teddy believes that, as NASA administrator, he is accountable for the astronauts' safety, and that he should therefore choose whichever rescue plan endangers the fewest people.

This disagreement between Teddy and Mitch echoes their earlier conflict over whether or not to tell the *Hermes* crew that Watney was alive. While Teddy feels an obligation to "protect" the crew (and NASA's reputation) in every way he can, Mitch believes that there is a moral imperative to be honest with the crew and to involve them in critical decisions. Weir represents Teddy's views as reasonable, but Mitch's views as correct: when it comes to space travel, it's foolish to play it safe. Risk taking is essential to progress.

Chapter 17 Quotes

☝☝ There's still soil everywhere. No point in lugging it back outside. Lacking anything better to do, I ran some tests on it. Amazingly, some of the bacteria survived. [...] it only takes one survivor to stave off extinction. Life is amazingly tenacious. They don't want to die any more than I do.

Related Characters: Mark Watney (speaker)

Related Themes:  

Related Symbols: 

Page Number: 224

Explanation and Analysis

Watney's potato plants died when the Hab canvas breached in Chapter 14. Watney was able to mend the Hab, but he had assumed that all of the bacteria in the soil had died, too. Now, discovering that the bacteria is alive is a seemingly miraculous surprise. Watney does not often wax poetic, but here he sees the bacteria's survival as an analogue to his own situation. It's a fluke of luck that he, like the bacteria, is still alive on Mars—and yet, somehow, they've managed it. Weir uses the bacteria as a symbol for the persistence of living things, suggesting to readers that, like bacteria, human beings are driven by a basic instinct to survive against all odds.

Chapter 20 Quotes

☝☝ Since Sol 6 all I've wanted to do was get the hell out of here. Now the prospect of leaving the Hab behind scares the shit out of me. I need some encouragement. I need to ask myself, "What would an Apollo astronaut do?" He'd drink three whiskey sours, drive his Corvette to the Launchpad, then fly to the moon in a command module smaller than my Rover. Man those guys were cool.

Related Characters: Mark Watney (speaker)

Related Themes: 

Page Number: 268

Explanation and Analysis

Watney has finished modifying the rover for the trip to Schiaparelli. He still plans to do some test runs before he leaves for the long drive to the Ares 4 MAV, but the reality that he will soon be leaving the Hab (and, with any luck, Mars) is starting to set in.

Watney admits that this idea frightens him, and true to his pattern of ignoring or dismissing any emotion as soon as he acknowledges it, he looks for a way to distract himself. This time it is by imagining how an Apollo astronaut would have coped with his fears. Watney admires mid-century astronauts (and, perhaps, aspires to mid-century ideals of masculinity, which praised men who did not show their emotions).

Watney's allusion to the Apollo Missions echoes Annie's Chapter 11 comment that Watney's situation is "the biggest story since Apollo 13." Watney may look up to the Apollo astronauts, but Weir gives us a subtle reminder that everyone back on Earth sees Watney as a hero.

Chapter 22 Quotes

☝☝ "The edge of the storm isn't a magic line. It's just an area where the dust gets a little more dense. [...] It'll be really subtle; every day will be slightly darker than the last. Too subtle to notice." Venkat sighed. "He'll go hundreds of kilometers, wondering why his solar panel efficiency is going down, before he notices any visibility problems. And the storm is moving west as he moves east. He'll be too deep in to get out."

Related Characters: Cathy Warner, Venkat Kapoor (speaker), Mark Watney

Related Themes:   

Related Symbols: 

Page Number: 287

Explanation and Analysis

CNN reporter Cathy Warner is interviewing Venkat on *The Mark Watney Report* when she asks him about the dust storm that Watney is driving towards. Once Watney enters the storm, his solar panel efficiency will begin to gradually decrease, and NASA has no way to warn him about it.

The dust storm is one of the last major problems that Watney must solve before he reaches the Ares 4 MAV, but it's set apart from the other challenges he's faced while on Mars because he likely will not know that the problem exists until it's too late to solve it. The true threat to Watney is not the storm itself, which would be easy to drive around if Watney knew about it, but the limitations on what he knows and what he can observe.

For all his problem-solving skills and creative thinking, Watney is helpless in the face of his own ignorance. Weir uses the dust storm to emphasize how helpless NASA is, too. Without any way to contact Watney, the NASA team can make all the observations and perform all the analysis they could dream of, and they still won't be able to come to Watney's aid.

Chapter 23 Quotes

☞ If I could get *Opportunity's* radio working, I'd be in touch with humanity again. NASA would continually tell me my exact position and best course, warn me if another storm was on its way, and generally be there watching over me. But if I'm being honest, that's not the real reason I'm interested. I'm sick of being on my own, damn it!

Related Characters: Mark Watney (speaker)

Related Themes:  

Related Symbols: 

Page Number: 306

Explanation and Analysis

Watney is now just a few days' drive from the Ares 4 MAV when he realizes that, if he made a short detour, he could reach the site of the lander *Opportunity*, which has a radio much like *Pathfinder's*. Watney begins to rationalize why this would be a practical choice—NASA could warn him about dust storms—but soon decides that he'll head straight to the

Ares 4 MAV.

Weir uses this passage to show us how desperate Watney is for human contact. Watney knows there's little practical advantage to adding several days to his trip in order to pick up and repair a radio when he'll be at the Ares 4 MAV and its radio in a few days anyway. Watney is self-aware enough to recognize that he's only considering the detour because he really wants to speak to another person again.

In this passage, Watney doesn't seem ashamed to admit that the isolation of life on Mars has had an emotional impact on him. This uncharacteristic lack of self-consciousness emphasizes just how lonely he feels.

Chapter 26 Quotes

☞ They gathered. Everywhere on Earth, they gathered. In Trafalgar Square and Tiananmen Square and Times Square, they watched on giant screens. In offices, they huddled around computer monitors. In bars, they stared silently at the TV in the corner. In homes, they sat breathlessly on their couches, their eyes glued to the story playing out.

Related Characters: Mark Watney

Related Themes:  

Page Number: 342

Explanation and Analysis

In the opening to the final chapter of *The Martian*, Weir uses the repetition of "they gathered" to build the sense of an event touching the lives of people in homes, offices, and public spaces around the world. The image of people gathering to watch the news coverage of Watney's rescue emphasizes the momentousness of the event, while drawing the reader deeper into the story; like the people watching around the world, the reader is waiting with bated breath to see what will happen next.

Through this passage, Weir once again reminds the reader that *The Martian's* story is much bigger than Watney; it's also the story of the scientists and astronauts who arranged his rescue, the reporters and media outlets that kept his story in the public eye, and the people who see him as a symbol of human courage, resourcefulness, persistence, and scientific progress.

●● I think about the sheer number of people who pulled together just to save my sorry ass, and I can barely comprehend it. [...] Part of it might be what I represent: progress, science, and the interplanetary future we've dreamed of for centuries. But, really, they did it because every human being has a basic instinct to help each other out.

Related Characters: Mark Watney (speaker)

Related Themes:  

Page Number: 368

Explanation and Analysis

Weir closes *The Martian* with Watney's final log entry, written after the Hermes crew successfully brings Watney aboard the ship. Watney is tired, wounded, and dirty, but he is nonetheless supremely happy to be safely reunited with

the crew, as well as grateful to all the people who made his rescue possible.

Weir uses Watney's reflections on his rescue to highlight a few of novel's key themes. For millions of people, Watney himself has become a symbol of hope and progress, and his story shows how people from around the world are willing to unite in the name of science, new knowledge, and exploration.

Watney writes that people have "a basic instinct to help each other out," a comment that reveals the novel's absolute faith in humanity. Watney, like just about every other character in *The Martian*, is generous, brave, and selfless, indicating that, in Weir's eyes, these are not uncommon traits: perhaps they are even the qualities that make us human.



SUMMARY AND ANALYSIS

The color-coded icons under each analysis entry make it easy to track where the themes occur most prominently throughout the work. Each icon corresponds to one of the themes explained in the Themes section of this LitChart.

CHAPTER 1

The novel opens with the Sol 6 entry of Mark Watney's log. Watney doesn't know who will read his log, but he hopes that someone will eventually find it. He knows that the rest of his crew (and therefore, everyone on Earth) thinks he died earlier that day, and he believes he will eventually die on Mars. Watney explains that he is the lowest-ranked member of the Ares 3 crew. The Ares Program has sent three groups of people to Mars so far, and the crews of Ares 1 and Ares 2 returned home safely. Leaving a message for his crewmates in case his log is recovered within their lifetimes, Watney writes that he doesn't blame them for leaving him behind, and that he is glad they survived the trip to Mars.

Addressing future readers, Watney explains that the Mars missions use a ship called *Hermes*. *Hermes* reaches Earth's orbit, then begins accelerating towards Mars, a trip that takes 124 days. Once the Ares 3 crew reached Mars' orbit, they took the MDV (Mars descent vehicle) to Mars' surface. By the time the crew reached Mars, the supplies they would need to survive there had already been delivered to the surface. This included the MAV (Mars ascent vehicle), which the crew eventually used to get back to *Hermes*, leaving Watney behind.

Watney explains that while the Ares 3 crew was supposed to spend a month on Mars, a violent sandstorm began on the sixth day of the mission. The crew sheltered in the Hab, but when the winds grew high enough to risk damaging the MAV, NASA ordered the crew to return to *Hermes* early. As the crew moved from the Hab to the MAV, the Hab satellite communications dish was blown through the air and its antenna punctured Watney's EVA suit and cut into his side; Watney passed out.

By announcing that Watney is doomed to die on Mars, the opening paragraphs of Watney's "log" grab our attention and demand our sympathy, even though we don't yet know Watney or understand how he became stranded on Mars. Watney's decision to write a log entry shows that he believes his story is important and is likely to be recovered in the future. His lack of resentment towards the crewmates who abandoned him shows that he is a good-natured and selfless person.



*Weir uses Watney's explanation of events to give readers a basic understanding of how space travel to Mars works in the world of the novel. *Hermes*' gradual acceleration, the functions of the MDV and MAV, and the way NASA uses pre-supply probes to prepare for a landing on Mars will be important later.*



Watney continues to provide the context we need in order to understand how he became stranded on Mars. The sandstorm and Watney's injury highlight how, in space travel, a relatively small but unexpected incident can lead to disaster. In spite of the crew's intensive training and expertise, they can still suffer from the consequences of truly bad luck.



In Mars' atmosphere, the blood from Watney's suit dried quickly, and together the antenna and the blood sealed the hole in the suit—which allowed the suit to re-pressurize. Eventually, the suit's CO2 filters ran out. When Watney came to, the sandstorm had passed, but his suit was filling with pure oxygen—if he hadn't acted quickly, he could have died from oxygen toxicity. Watney pulled the antenna out of his side and quickly used his suit's "breach kit" to patch the hole in his suit. Then made a beeline for the Hab and the MAV. Though the Hab was undamaged by the storm, the MAV was gone—Watney immediately knew that the crew had left him behind. Without the satellite communications dish, Watney was unable to talk to *Hermes* or Earth.

Although Watney nearly died due to bad luck and Mars' unusual atmospheric conditions, he survived because of good luck. This episode shows readers that on Mars, Watney cannot take even basic things like breathing or atmospheric pressure for granted—his body is not designed to survive there. He needs the EVA suit or the Hab to breathe, and if this technology malfunctions or is not used properly, it could kill him. And though he needs oxygen, too much oxygen could kill him, too.



In the Hab, Watney tended to his wound and examined his damaged EVA suit. He realized that the antenna damaged the suit's bio-monitor. The broken monitor would have made his vital signs go flat—the rest of the crew naturally assumed that he was dead and left his body behind. The Hab is designed to last only 31 days, and Watney has a limited amount of food. Though he is not yet dead, Watney assumes he will die on Mars.

Once again, the damaged EVA suit reveals how malfunctioning technology can threaten Watney's life: it was the suit's broken bio-monitor that likely led the crew to abandon him. It's clear just how dependent his life is on technology like the Hab.



CHAPTER 2

On Sol 7, Watney assesses his odds of survival. The crew evacuated the Hab while wearing flight spacesuits, so Watney's EVA suit (and 5 other EVA suits) remain in the Hab. The satellite dish is nowhere to be seen. The MAV's landing stage (including its fuel plant) remains on Mars. The MDV is seriously damaged, but could be used for parts. Both rovers are unharmed and the solar cell array still works. The Hab is unharmed and the oxygenator and water reclaimer are working perfectly. If he rations his food, Watney has 400 days of meals, plus extra vitamins. He also has enough morphine to commit suicide, so he won't have to starve to death.

Watney's first log entry began with the panicked realization that he would likely die, but he now approaches his situation in a more rational way: his methodical approach to problem-solving is beginning to take over. Though he has access to a fatal dose of morphine, Watney does not consider suicide, so we know that he hopes he can still survive. Weir also uses this passage to give readers information on the solar cell array, oxygenator, and water reclaimer.



Watney begins to develop a long-term plan for survival and rescue. The Ares 4 mission is slated to arrive in four years at the Schiaparelli crater, about 3200 km away. Though Watney knows it's possible that NASA will cancel Ares 4 after his apparent death, he hopes that if he can figure out a way to communicate with Earth, it may be possible to arrange for a rescue. His first goal is to fix the satellite radio.

Just one day earlier, Watney believed he would die on Mars, so his new plans and his hope for survival show us how quickly he has bounced back from the shock of being left behind by the crew. Industrious, hopeful, and determined, Watney is eager to get to work.



Sol 10. After spending several days searching the surrounding area in the rover, Watney gives up on finding the communications dish. Watney has enough CO2 filters to last him for about 1500 hours of EVAs, so Watney decides to start "rationing" his EVAs as well as food.

*Readers now know that Watney has no hope of communicating with Earth or the *Hermes* ship. Watney's decision to ration food and EVAs shows that he plans to be on Mars for some time. It also emphasizes the urgency of a rescue.*



Watney begins thinking about ways to grow food. As the mission's botanist, he was going to see if he could grow anything in Martian soil and in Martian gravity. Martian soil is similar to Earth soil, but doesn't have the bacterial activity or organic nutrients that living soil on Earth does, so Watney brought a small amount of Earth soil with him, and seeds for ferns and grasses. Watney isn't yet sure how to turn this into a food source.

Sol 11. Watney writes one sentence: "I wonder how the Cubs are doing."

Sol 14. Watney has begun saving his feces and the leftovers from his meals to use as "compost." He plans to mix all this organic matter with Martian soil and Earth soil—the bacteria living in the Earth soil will spread through the rest of the soil and compost, converting it all to crop soil. Then, he'll cover the floor of the Hab (92 square meters) with crop soil and plant beans, peas, and **potatoes**, which he has found in the Hab food supply. Since he has vitamins, he just needs his food to provide calories.

Sol 16. Watney realizes that the Hab does not have enough water to irrigate the crops he plans to grow. Adjusting his plan, he decides to he'll ultimately cover only 2/3 of the Hab's floor (62.5 square meters) with soil. This will save 50 liters of water, which he can then cycle through the water reclaimer, for himself. For now, he's making a "planter" of just 5 square meters in order to test the process.

While he works, Watney starts thinking about his family in Chicago. Today is Thanksgiving, which means his parents would normally be hosting a dinner, but they're probably still in the midst of mourning Watney's death. He wishes he could tell them that he's alive.

Sol 22. Watney has now covered 2/3 of the 62.5 square meter area with soil. The soil is developing well. He has also been listening to his crewmate Johanssen's Beatles music, which she left behind in the evacuation. Doing some math, Watney realizes that the **potatoes** he grows on his 62.5 square meters will only feed him for 90 days. This means he now has food supplies through Sol 490, but the next planned Mars mission, Ares 4, won't land until Sol 1412. He needs more food.

Though Watney's botany expertise and the fact that he has Earth soil (which can sustain life) offer readers the hope that he can find a way to grow food, Watney's own uncertainty about how to do this leaves us in suspense. It is unclear how long he'll be able to survive on Mars.



Watney might really want to know how the Cubs are, but his decision to ask this in the log highlights his tendency towards snarky, glib humor.



Watney's plan to use compost, Martian soil, and Earth soil gives readers new hope that he'll be able to grow food. Though his survival is far from guaranteed, it seems that he has a plan that might keep himself alive until the Ares 4 mission.



A new problem has arisen, but Watney soon finds a way to solve it by making his water use more efficient and scaling down the area that he'll cover with soil. This pattern of finding and the solving a problem will continue to drive much of the novel's action



This is the reader's first glimpse of Watney's life on Earth. His reticence to write about his family may show just how much he misses them—perhaps he's not allowing himself to think about them too much.



Watney finds another flaw in his plan to grow potatoes, which shows that his fight for survival is far from over. For Watney, listening to music seems to be more than just a way to pass the time—readers can infer that the music helps him stay connected to life on Earth and to his memories of his crewmates and friends.



CHAPTER 3

Sol 25. Watney does some calculations. He needs 1387 sols, or 1425 days, of food. To survive until Ares 4 lands, he needs to eat 1500 calories per day. If he covers the entire floor of the Hab, the 5 unused bunks, and the emergency pop-tents from the rovers with soil, he'll have 126 square meters of farmable land. With this, he can grow about 850 calories of food per day. At this level of sustenance, he'll starve, but survive. But to make this work, he needs another 250 liters of water more than he has. 10000

Sol 26. Watney continues bringing Martian soil into the Hab to grow his supply of crop soil, and starts his seed crop of **potatoes**. Watney explains that NASA sent twelve whole potatoes so that the crew could make and eat a "Thanksgiving dinner" together on Mars. He cuts them up, plants them, and raises the temperature in the Hab so they'll grow faster. 10100

Looking for something to kill time, Watney finds Commander Lewis' data-stick, and discovers she brought many seasons of dated TV shows. He decides to watch *Three's Company*. 00100

Sol 29. Watney still has no source of water, but works on setting up the pop-tents (emergency shelters attached to the rovers) and preparing them to become farmable land. Watney attaches the pop-tents' air lines to the Hab so that the air-levels in the pop-tents will remain stable, then he moves arable soil into the pop-tents. The day's work done, he watches another episode of *Three's Company*. 10100

Sol 30. Watney decides he's going to make water from hydrogen and oxygen (an incredibly dangerous thing to do). Due to this, Watney will use the Hab's oxygenator to convert carbon dioxide from the MAV's fuel plant into oxygen. All he needs is hydrogen. Because the pilot of the Ares 3 mission, Martinez, made a smooth landing with the MDV, he didn't use all of the hydrazine fuel that was on board. Watney plans to turn the hydrazine into nitrogen and hydrogen (plus a bit of ammonia). This is a reaction that generates a lot of heat, so Watney will have to be careful not to cause an explosion. Watney glibly proclaims that he can't wait to watch the next episode of *Three's Company*. 10110

Watney's calculations highlight the desperation of his situation. While his plan to grow crops was a breakthrough, he'll grow, at most, enough to barely sustain himself until the Ares 4 landing. And at present, he doesn't have enough water to do this. This unsolved problem builds suspense.



The fact that the Thanksgiving potatoes were meant to serve as a morale boost and maintain the crew's sense of connection to life on Earth adds symbolic meaning to the fact that they offer Watney the best chance of surviving long enough to return to Earth.



Watney mocks Lewis' taste in TV but he watches the show anyway—like music, TV is a way to pass time and stay connected to other humans.



Even though Watney's plan is incomplete without water, he continues to work towards his goal of planting a large crop of potatoes. The pop-tents were intended for a different kind of emergency, but they are still helping Watney survive in an emergency situation.



*Watney has developed a creative solution to the problem of not having enough water. Yet, ironically, the only way Watney can avoid death by starvation is to make water through a process that easily could kill him. Watney's ongoing references to *Three's Company* read as jokes that he has written in for the log-reader's benefit. We can also read these jokes as a coping mechanism—rather than betray the fact that he is worried his next experiment could kill him, Watney makes a joke about TV.*



CHAPTER 4

Sol 32. Every twenty hours, Watney plans to vent 10 liters of carbon dioxide from the fuel plant into the Hab; the oxygenator will then turn it into oxygen. Then, Watney will separate the hydrazine into nitrogen and hydrogen, and gradually burn the hydrogen in as controlled a way as possible. The hydrogen and oxygen in the air will make water, which will remain in the Hab's atmosphere as humidity. Then, the water reclaimer will pull the water out of the air and store it. Watney finishes the day with an episode of *Three's Company*.

Sol 33. Watney prepares to make water. He removes the hydrazine tanks and iridium reaction chamber from the MDV and brings them into the Hab. He has already vented one tank of carbon dioxide into the Hab's atmosphere. He copies the log to both rovers for future astronauts to find, in case the Hab blows up and kills him.

Sol 33 (2). Watney dons protective clothing and an oxygen mask. He uses duct tape and clear plastic Hefty bags to cover his work table, where he has set up the hydrazine and the bowl-like iridium reaction chamber. He creates a "chimney" with a small hose. Next, he creates a "pilot light" using the only flammable thing in the Hab—splinters of wood from a religious cross that belonged to Martinez—and ignites it using an electric spark and pure oxygen. Watney turns on a slow stream of hydrazine, and his contraption works! He starts making water. Watney stays up all night converting 50 liters of hydrazine. By the time he goes to sleep, mid-way through Sol 34, the Hab is incredibly humid, and he has begun storing water in Johanssen's space suit.

Sol 37. Watney tells us he is going to die. He has fled the Hab and is now writing from the Rover 2. After making water for several days, he realizes that while he should theoretically have 130 new liters of water, he has only collected 70 liters. After checking the oxygenator, he realizes he's been gaining oxygen—which means that he hasn't burned off all of the released hydrogen. After testing the atmosphere, he realizes the Hab's atmosphere is now 64 percent hydrogen—the Hab is now a bomb waiting for a spark.

*Watney has spent the day making a meticulous plan for how to turn oxygen and hydrogen into water as safely as possible. Weir takes the time to explain each step of the process to the reader—this novel takes care to show feasible science, not the kind of nonsensical solutions of many sci-fi movies. Watney's new routine of watching *Three's Company* shows that life on Mars is becoming a bit predictable.*



Watney's precaution of copying the log over twice reveals to the reader just how important it is for him to believe that someone will eventually read his story. By ending the log entry right before Watney makes water, Weir builds suspense.



The very fact that a second log entry for Sol 33 exists tells readers that Watney has survived the process of making water. Weir gives readers a step-by-step account of how Watney converts the hydrazine into water: this attention to detail creates a heightened sense of realism. Watney's decision to use wood from Martinez's cross highlights how a sense of faith—in science and in himself, if not in God—is essential to Watney's survival. Yet hope alone will not help Watney survive—he relies on creativity and science.



Watney opens this entry of the log with a sense of urgency and panic paralleled only by the first sentences of his very first log entry. It's a very different tone from the logical, self-assured voice in the previous log entry. For both Watney and the reader it's unsettling to realize that producing something as basic and essential to life as water could have unintended and deadly consequences.



CHAPTER 5

Sol 38. Watney comes up with a way to get the hydrogen out of the Hab: Hydrogen only burns in the presence of oxygen, so he'll trick the Hab's oxygen regulator into pulling all the oxygen out of the Hab. While wearing a space suit, he'll use an oxygen tank to burn the hydrogen in controlled bursts. However, the absence of oxygen will kill the bacteria in the soil. Watney takes a break, planning to listen to whatever music he finds from Commander Lewis' personal USB drive. He signs back in for a log entry, Sol 38 (2), to inform us that the music is, disastrously, disco.

Sol 39. Watney realizes the soil bacteria will be OK if he lowers the Hab temperature enough to trick them into hibernating due to the wintry temperatures. He'll leave the Hab at 1 percent oxygen content—enough to keep the bacteria alive, but not enough to maintain a fire. The cold will kill the **potatoes**, though, so Watney needs to put them in bags of soil and move them to the rover, where they'll stay warm.

Sol 40. The first steps of Watney's plan work, but he's only able to lower the oxygen content to fifteen percent. This keeps the atmospheric pressure tolerable, so Watney decides to wear multiple layers of clothing and put on an oxygen mask instead of a space suit, which allows him more mobility. Watney cuts the power to the oxygen regulator and starts burning hydrogen. Then, he's suddenly knocked backwards by an explosion. His oxygen mask comes off.

Watney manages to turn the regulator back on, and the Hab's oxygen returns to a normal level. From his burnt outer layers of clothing and the Hab's computers, which show a rapid temperature spike in the Hab, Watney realizes that he survived a very hot explosion, but he isn't sure what happened. He decides to spend the night in the rover and check the Hab's equipment in the morning.

Though Watney relies on the Hab's life support technology, he will, ironically, have to intentionally cause the oxygen regulator to malfunction in order to make the Hab habitable again. Once again, a solution gives rise to another problem: how to keep the soil alive? Watney's second log entry is another nod to the running joke he's creating between himself and the reader.



Weir uses this log entry to show how Watney thinks through the details of his plan in order to avoid another life-threatening mistake. Temperature and atmosphere—aspects of daily life people on Earth take for granted—are now critical variables in Watney's plans.



Many "safety features" of NASA equipment are now working against Watney. The oxygen regulator can't be "tricked" into removing all oxygen from the Hab, but this actually makes Watney's current situation riskier. The EVA suit is designed to keep astronauts safe, but it's also too cumbersome to work in. The reader is just as shocked by the explosion as Watney is.



Watney usually has clear, scientific explanations for the problems that arise—and he often anticipates those problems before they occur. Now, this unexpected explosion makes it clear to readers that even with careful planning, Watney is not safe from the consequences of human error.



Sol 41. Watney is relieved to find that the oxygenator, atmospheric regulator, and the Hab's other important equipment are still working perfectly. The soil is still alive, too. He realizes that he caused the explosion by wearing an oxygen mask, not a space suit, while burning off the hydrogen. Humans exhale a mixture of carbon dioxide and oxygen, so every time, Watney exhaled, his mask leaked a bit of oxygen into the system—in the presence of this extra oxygen, the hydrogen combusted. Watney is lucky to have survived, but the Hab is now once again safe. He settles in for an episode of *Dukes of Hazzard* from Lewis' memory stick. On Sol 42, Watney moves the **potato** plants back into the Hab. He still has to make another 470 liters of water, but he'll do so more cautiously, taking breaks to burn off all the excess hydrogen.

*Watney's intricate precautions earlier in the chapter may have seemed like overkill, but the fact that the explosion was caused by Watney's hasty decision to breathe through the oxygen mask rather than the EVA suit shows exactly why careful planning is necessary. In order to survive on Mars, Watney must think through the consequences of things even as seemingly simple as breathing. Watney's reference to *The Dukes of Hazzard* can be read as a play on words, highlighting how he himself is mastering the occupational hazards that come with living on Mars.*



CHAPTER 6

The novel shifts to a third-person omniscient narrator on Earth, where director of Mars operations Venkat Kapoor is sitting in his office at the Johnson Space Center complex. He has just left Mark Watney's memorial service. Venkat declined to give a speech, but NASA administrator Teddy Sanders gave a speech reminding the public that, though "space flight is incredibly dangerous, we will not back down in the face of adversity."

For the first time in the novel the reader is not on Mars, nor is the reader experiencing events through Watney's eyes. Weir uses this shift in perspective to create a sense of dramatic irony—while people on Earth are mourning Watney's death, the reader knows that he's alive. Teddy's speech implies that Ares 4 will take place—good news for Watney.



Teddy soon arrives in the office, and Venkat asks him to authorize satellite images of the Ares 3 site. Venkat wants to assess the damage and see if some of the leftover supplies from the Ares 3 mission could be used for a future, not-yet-funded Ares 6 mission. Teddy refuses, explaining that the images would likely show Watney's body. NASA images are in the public domain, and Teddy doesn't want more bad press coverage. He hopes that, after Watney's memorial service, the public and the media will lose interest in the story. Venkat counters that an Ares 6 mission could recover Watney's body; the images could actually sway public opinion (and thereby, Congress) in favor of a sixth mission to Mars. Teddy agrees.

Venkat and Teddy's conversation reveals the role that the media and public opinion play in NASA's decision-making. News coverage of Watney's apparent death could work to NASA's advantage or its disadvantage: depending on how the news is covered and how NASA presents information, Watney could inspire further exploration on Mars, or his story could deter Congress from funding new missions. Weir uses the scene to show how news "spin" can determine an event or person's legacy.



The scene shifts to Mindy Park, a junior staffer with a master's degree in engineering, who is working the night shift at SatCon when Venkat's images of the Ares 3 site come through. She realizes that Watney's body is not in the images. She calls Venkat Kapoor at home, and he comes in to SatCon. Venkat assumes Mindy has called him in because she's upset by images of Watney's body, but is shocked when she explains that Watney's body isn't visible, that the rover pop-tents have been activated and lined up twenty meters away, and that the solar cells have been cleaned of sand. Watney is still alive.

Readers already know that Watney is alive, which creates a sense of dramatic irony and suspense as Mindy and Venkat arrive at the same conclusion. Readers know that Mindy is well-educated and astute, but Venkat initially dismisses Mindy's abilities as a scientist and the urgency of her call. His assumption that she's acting on emotion rather than reason may be based on the fact that she's a woman holding a lower-level job.



The scene shifts again. Venkat has just told Teddy and NASA's director of media relations Annie Montrose that Watney is still alive. Annie knows this will be a PR nightmare. Venkat explains Mindy's findings, including images showing that the MAV fuel plants have been removed—something Commander Lewis would never have done before the MAV took off.

Annie suggests contacting Lewis just to be sure, but Venkat and Teddy argue that the news could distract the Ares 3 crew and make them less likely to safely fly the *Hermes* back to Earth. Though the crew would want to know, Teddy is not prepared to risk their safety. NASA will censor communication between the *Hermes* crew and Earth.

Annie decides that NASA will take the story public in 24 hours, when they're required to release the images. They'll make an official statement. In the meantime, Teddy will visit Watney's parents in Chicago and fill them in. Though they'll be happy to hear Watney's alive, Teddy will also have to explain that Watney is unlikely to survive long enough to be rescued.

The scene shifts again. Venkat's new task is to find a way to communicate with Watney, but his team is unable to come up with a solution. Chuck and Morris explain that, though Watney has a radio, he doesn't have a satellite dish, so he can't pick up a signal.

In NASA's pressroom, Annie ruminates that her announcement will make history, and she is determined to get it exactly right. Annie announces to the pressroom that Watney is still alive and explains that she will give a full press conference in an hour.

The novel then jumps a week forward in time. Watney's miraculous survival is the top news story in the world. At a press conference, Teddy reiterates that NASA will keep the public informed, and announces that CNN will have a daily show covering Watney's status. NASA is using satellite imagery to track Watney's activities and gauge his health. All of NASA is now focused on bringing Watney home.

Venkat and Teddy meet to discuss next steps. Venkat summarizes the Jet Propulsion Lab's current rescue plan, in which the Ares 4 crew, when it arrives at Mars, could rescue Watney using a modified MDV, then fly to the Ares 4 site, complete the mission, and return with Watney to *Hermes* in the Ares 4 MAV that's already in place. Teddy thinks this plan is too dangerous, and encourages Venkat to explore further solutions.

Once Venkat realizes Watney is alive, NASA's director of media relations is one of the first people he informs. This decision—and Annie's horrified reaction—highlight once again how important favorable press coverage and good public opinion are to NASA.



Teddy's decision not to tell the Ares 3 crew on Hermes that Watney is still alive shows that, as head of NASA, he holds himself accountable for astronauts' safety and he is willing to prioritize safety over empathy or openness.



While NASA is not obligated to announce their findings, they are obligated to release all satellite images. It's better for Annie to make a statement to the media than for a reporter to find the images and piece the story together—this way NASA appears to be in control.



Venkat, Chuck, and Morris confirm what Watney (and readers) already suspected—there's no clear way for NASA to communicate with Watney.



Through Annie's reflection on the historic impact of her press statement, Weir emphasizes how news "spin" and media coverage of an event shapes the way that it is remembered.



By cutting from Annie's initial announcement to Teddy's press conference a week later, Weir shows us that the story of Watney's survival has become only more important with the passage of time. Like us readers, the media, the public, and NASA are all focused on Watney.



Even to readers unfamiliar with space travel, Venkat's explanation of the proposed rescue plan—and Teddy's reaction to it—makes it clear that NASA scientists are grasping at straws. Once again, Teddy's concern with safety shows his desire to protect both his astronauts and NASA itself.



Teddy wonders aloud what Watney must be thinking and how alone he must feel. Weir cuts to Watney's Sol 61 log entry. Watney writes, "How come Aquaman can control whales? They're mammals! Makes no sense."

With Watney's log entry, Weir uses dramatic irony to comic effect: as Teddy imagines Watney waxing philosophical, Watney is thinking about superheroes. The joke breaks the tense tone of much of chapter six.



CHAPTER 7

The novel once again takes up the log-entry structure. It is Sol 63. Watney has finished making water and the **potatoes** are growing. He describes things as "stable." His new goal is to find a way to get to the Ares 4 MAV at the Schiaparelli crater, 3200 km away. He'll have to across the relatively flat Acidalia Planitia, and then over the remaining, more rugged territory. To do so, he'll need to modify the rover for a long trip—he'll need a way to carry solar cells to recharge the battery, and bring oxygen, food, and water. He decides to use Rover 2.

Watney often uses the log to work through the problems that he's solving. His decision to record his problem-solving process and not just the solutions suggests that he finds it helpful to write out the ideas as he brainstorms and that he is invested in giving future readers of the log a detailed record of the scientific and engineering aspects of his time on Mars.



Watney can double Rover 2's battery life by wiring Rover 1's battery into it. Watney decides that, since the Rover is well insulated, he'll just rely on his own body heat, which will avoid spending battery life on heating. He'll drive for about three and a half hours each day during twilight, then recharge during the sunny part of the day. To recharge the batteries, he'll need to bring fourteen solar panels.

After assessing his situation and identifying his goals, Watney begins to problem-solve. His first problem to solve is his lack of power: the batteries only have a limited charge, and this lack of electric energy highlights Watney's metaphorical powerlessness as well.



Sol 64. Watney begins modifying Rover 2. Using extra canvas and resin meant for Hab repairs, Watney makes "saddlebags," which he uses to carry the Rover 1 battery. When one battery runs out, he'll plug the other battery back in.

Watney's problem solving once again requires him to use his limited supplies in unconventional ways—his survival depends on creative, innovative thinking.



Sol 65. Watney begins disassembling the solar cell array. Since there's only Watney in the Hab now (not a crew of 6), it needs less energy—removing 14 solar cells won't cause problems. Watney straps the 14 cells onto the roof. When charging, he'll spread them out on the ground beside the rover. Returning to the Hab, Watney digs up the **potatoes**, cuts them up into pieces with one eye each, and reseeds them. At the end of the day, he relaxes by reading an Agatha Christie e-book from Johanssen's laptop.

Watney is able to survive because he is stranded on Mars alone. It would be impossible to stretch food supplies or repurpose solar cells and space suits in the way that he does if he had been somehow stranded on Mars with the rest of the Ares crew. In this way, his solitude is a stroke of good luck.



Sol 66. Watney decides that he'll call his trips with the rover Sirius missions (it's a dog pun). For his first mission, he'll do a three-hour test drive, staying within a short walk of the Hab at all times. Sol 67. Watney explains that Sirius 1 didn't go as well as planned—without the heater, the rover got very cold, very quickly. Watney ended the trip after an hour.

"Rover" is a common name for a dog, and Sirius (known as the dog star) is part of the constellation Canis Major (Greater Dog). Watney's pun shows that he is writing his log with future readers in mind—he wants to be likeable.



Sol 68. Watney decides that he'll heat the rover using the **RTG** (radioisotope thermoelectric generator), a box of highly unstable radioactive plutonium. NASA uses RTGs to power unmanned probes, as well as using them on the Ares missions to power the MAV before the crew arrives. Upon the Ares 3 crew's arrival, Commander Lewis removed the RTG from the MAV, buried it 4 km south of the Hab, and marked it with a flag. The **RTG** will put out more than enough heat to keep the rover warm; on Sirius 2, Watney is going to go dig it up.

Watney has already used NASA equipment in creative and unconventional ways, but in deciding to use the RTG as a heat source, he is making a choice that is both unconventional and risky. NASA keeps its astronauts as far from RTGs as possible and surely would not approve of this choice. Yet Watney needs to take this risk in order to survive in Mars' cold climate.



Sol 69. Driving towards the **RTG**, Watney is out of sight of the Hab for the first time. He is struck by how utterly alone he is. These feelings make him uncomfortable, so he tries not to think about them. Watney digs up the RTG, puts it in the rover, turns off the heater, and drives back to the Hab. The RTG makes the Hab uncomfortably warm; Watney will have to remove some insulation.

Watney rarely uses the log to reflect on his feelings, so this entry gives readers rare insight into how he is responding to total solitude. Yet Watney's insistence on hiding his feelings from the log's readers could suggest his fears and uncertainties are too painful to admit even to himself.



Sol 70. Watney tests the Rover using the **RTG** for heat and uses its 100 watts to boost the battery power; it works beautifully. Watney knows that if NASA knew he was using the RTG, they'd have a fit.

Watney's inability to contact NASA may be an advantage in that he doesn't need official approval to take risks like using the RTG.



Sol 71. Watney starts planning for Sirius 4, which will be a twenty-day trip. He can easily bring food and water for a few days. He decides he'll use oxygen and carbon dioxide filters to breathe, and moves one of the Hab's liquid oxygen tanks into the rover. Watney reveals that he has a specific goal for the trip: it's not just to test the Rover in preparation for the drive to the Ares 4 MAV, but he doesn't yet say what it is. To keep the **potatoes** alive, he'll make the Hab very humid and vent in carbon dioxide from the MAV fuel plant before he leaves.

When outlining a plan, Watney usually records all the details in the log, but here he doesn't explain what his goal is for the trip. Perhaps Watney does not want an official record of the trip's goal in case he fails to accomplish it—but whatever Watney's reasoning might be, Weir uses this omission to build a sense of suspense for the reader. As chapter seven closes, we're left wondering where Watney is going.



CHAPTER 8

Weir shifts the novel's focus back to earth, where CNN reporter Cathy Warner is interviewing Venkat on the *Mark Watney Report*. Venkat explains that NASA and the European Space Agency are using satellite images to track Watney's EVA activities. They've noticed that Watney is preparing for a trip to the Ares 4 MAV site. Reaching the MAV would allow Watney to communicate with NASA, but it's a dangerous trip. NASA hopes Watney will stay safely at the Hab until they can arrange a rescue. Venkat affirms that NASA is doing everything they can to bring Watney home alive.

Weir uses Cathy's interview with Venkat to create suspense and dramatic irony. Though NASA believes that Watney is heading for the Ares 4 MAV site, readers know from chapter seven that Watney is headed somewhere else. Readers know a bit more than Venkat and Cathy do, but it is still unclear to everyone what Watney's plan is or what will happen next.



The scene shifts again, and the narrator uses a third person limited point of view that follows Mindy's thoughts. She's in a meeting with NASA's top management, including Teddy, Venkat, Annie, JPL director Bruce Ng, and Ares 3 flight director Mitch Henderson. She's extremely nervous—she feels out of place. Mindy has been put in charge of tracking Watney using satellite imagery. Mitch wants Bob, the director of SatCon, to be in charge of the project, but Venkat expresses support for Mindy, and then tells Mitch not to make Mindy feel bad.

The managers discuss the **RTG**—from satellite images, they've realized that Watney is using it for heat, but they decide not to make this analysis public. The RTG *sounds* more dangerous than it actually is, and the news that Watney is using radioactive materials could cause bad press.

Bruce explains that JPL is still working on a way to use the Ares 4 MDV to rescue Watney and then fly to the Ares 4 MAV site. Teddy asks Mindy to adjust satellite trajectories to improve imagery of the Ares 3 site.

Though Teddy and Venkat have already decided not to tell the Ares 3 crew that Watney is alive, Mitch challenges this decision. He argues that the information would improve morale, and claims the decision is within his jurisdiction as flight director. Teddy, whose rank as administrator gives him the final word, tells Mitch they'll wait to tell the crew until NASA has a clear plan for how to rescue Watney. Mitch fumes.

Next, the team discusses how to keep Watney alive long enough for rescue. The best option is to send the Ares 4 pre-supply probe to the Ares 3 site—this means building the probe in three months instead of six. They'll also need to steal the fuel booster from the Eagle Eye 3 Saturn probe, delaying that mission.

The perspective of the novel shifts into third-person limited from Venkat's point of view. He is in his office, writing a letter to ask a congressman to support emergency funding to help rescue Watney. Mindy knocks at the door. Venkat notes to himself that her outfit isn't very put-together—she must be stressed. Mindy apologizes for bothering Venkat, then tells him Watney has driven due south, 76 km from the Hab. Based on his direction, he's not going to the Ares 4 site.

This scene highlights the “boy’s club” workplace dynamic at NASA. Annie is brash and confident (traits often associated with masculinity), and Mindy is nervous and quiet (qualities often considered feminine). While Mitch respects Annie, he is dismissive of Mindy, and when Venkat stands up for Mindy, he does so in a condescending way, emphasizing that her feelings need to be protected.



We learn that RTGs aren't used on manned ships, not because they're too dangerous, but because the public sees nuclear energy as inherently unsafe. This shows how the media and public opinion influence NASA's decisions.



Teddy's request to Mindy signals that, in spite of Mitch's objections, she is being promoted to play a more active role in monitoring Watney's activities on Mars.



This conflict between Teddy and Mitch highlights the roles that bureaucracy and media play in decision-making at NASA. Teddy knows that the public sees him as responsible for the Ares 3 crew's safety, and he considers it his duty to prioritize the crew's safety, even if it means concealing information from them.



With this conversation, the reader realizes that, like Watney, NASA is racing against the clock, trying to problem-solve fast enough to keep Watney alive and get him home.



The detail of Venkat's letter to a congressman reminds us that NASA is publicly funded. Venkat's assessment of Mindy's outfit once again reveals subtle workplace sexism—an ideal female employee is not only capable, but also stylish. Mindy's news reveals to Venkat what the readers already knew. Now Mindy, Venkat, and the reader are wondering where Watney is going.



In CNN's studios, Cathy is interviewing Marcus Washington from USPS. He explains that the post office issued commemorative stamps when Watney was first believed dead, then discontinued them when he was found alive. Watney is the first person to have a commemorative stamp printed during his lifetime. Thousands were sold.

Cathy's interview with Marcus Washington serves the same purpose in the novel as it does on Cathy's show—the anecdote about the stamps is bland but amusing filler that occupies us and increases our suspense while we wait for critical news on Watney.



The *Watney Report's* next guest is Dr. Irene Shields, flight psychologist for the Ares missions. She tells Cathy that Watney is intelligent, resourceful, a good problem solver, and a positive thinker. He copes with stress through jokes and humor. The Ares crew, Dr. Shields notes, still doesn't know he's alive. Cathy asks how a man like Watney responds psychologically to being completely alone with no apparent signs of help. Dr. Shields explains that if he gives up hope, he likely won't survive. She believes that, if Watney has indeed lost hope, he may be headed to Ares 4 not to wait for rescue, but rather in hopes of speaking to another person before he dies. No one wants to die alone, she says, adding that if Watney believes he will not be rescued, he would likely choose to overdose on Morphine rather than starve to death. Cathy cuts to a commercial break.

Dr. Shields' comments reveal to the reader that Watney's quips about seventies TV and the rover/Sirius pun may be a coping mechanism. Though we know from earlier chapters that Watney tries not to dwell on how alone he truly is on Mars, Dr. Shields gives readers—as well as Cathy—some insight into the kind of thoughts Watney might not be willing to record in the mission log. Her words emphasize the importance of hope and human connection, themes that Weir addresses throughout the novel. When Dr. Shields mentions suicide, Cathy cuts her off—the public wants to see this as a story of hope and perseverance, too.



Venkat is in his office, on the phone with Bruce. Bruce explains that when the pre-supply probe lands, its comm system will broadcast its location to the rover and EVA suit. As it lands, the probe will drop a bunch of bright green ribbons that say, "MARK: TURN ON YOUR COMM." When Watney finds one, he'll turn on his radio and be able to find his way to the pre-supply probe full of food. Bruce notes that if Watney is really headed for Ares 4, he won't have a Hab, which will make it difficult for him to survive long enough to be rescued.

Venkat and Bruce's low-tech solution to communicating with Watney when the pre-supply probe lands shows that, even at NASA, creative thinking can be just as critical as high-tech gadgets. At the same time, Bruce's comment about the Hab reminds us that Watney is relying on technology for basic life-support. Readers know that Watney is not headed for Ares 4, so Bruce's comment creates a sense of dramatic irony.



Soon after the call, Mindy notifies Venkat that Watney is continuing his trip. As they examine his coordinates, Venkat realizes that Watney is headed to *Pathfinder*, an unmanned probe that NASA lost contact with in 1997. If Watney can get its communication system online, he can talk to NASA. Venkat calls Bruce with the good news.

Mindy and Venkat's discovery resolves the question that has hung over all of chapter eight—where is Watney going? The discovery that Watney may soon be able to communicate with NASA gives Mindy, Venkat, Bruce, and the reader a new sense of hope.



CHAPTER 9

Weir returns to Watney's log. It's now Sol 79, and Watney has been driving for eight days. He's saving his urine and feces in plastic boxes—when he gets back to the Hab, he'll run the urine through the water reclaimer and compost his "manure" for the **potato** farm. The **RTG**, the solar cells, and batteries are working as planned. While the solar cells charge for twelve hours each day, he reads Poirot novels and watches Lewis' seventies TV shows. The days are becoming repetitive and routine.

Weir juxtaposes Watney's sense of boredom with the far-from-ordinary fact that he is driving on Mars. This renders Watney's matter-of-fact log entry slightly surreal. Watney maintains his connection to the more mundane routines of life on earth by reading Poirot and watching Lewis' TV shows.



Sol 80. Watney is 100 km from *Pathfinder*. He had hoped to navigate by landmarks, but the landscape is too uniform, so instead he navigates by the star Phobos, which rises and sets twice a day. On Sol 75, he reached a valley and decided to name it after Lewis. On Sol 77, he reached an unnamed small crater that's on his map, and he named it Lighthouse of Alexandria. From here on out, he'll use the Lighthouse and Hamelin crater to navigate.

Sol 81. Watney has run out of battery power just 22 km from *Pathfinder*. While waiting for the panels to recharge the battery, he takes a walk and thinks about how he's the first human to walk here, the first to spend more than 31 sols on Mars, and the first to grow crops on Mars. He was the seventeenth person to set foot on Mars, the fifth member of the Ares 3 crew to do so. He admits that he misses the crew—he'd give anything, he says, to have a five-minute conversation with another human. Watney realizes that he's the first person to be alone on a planet. Then, pulling himself together, he reminds himself that the log is a conversation with his future readers—someone will know what he thought and experienced, even if he dies on Mars. And if he recovers *Pathfinder's* radio, he'll be reconnected with other people before he dies.

Sol 82. Watney has found the *Pathfinder* lander and the Sojourner rover that accompanied it to Mars. He'll bring both back. The whole lander is too big to bring back, but he is able to use a crowbar to remove the probe (the part with the radio), and he digs and pulls it out of the sand. The probe is heavy, and Watney now needs to get it on the roof. He stacks the solar panels into one (rather than two) stacks on the roof to make room. He'll move the probe onto the roof the next morning before he leaves. Watney explains that Sojourner is useful to him because it has six independent wheels, which NASA could control—they could potentially work out a communication code using the moving wheels.

Sol 83. To get the *Pathfinder* lander onto the roof, Watney builds a ramp out of rocks and sand next to the rover. Then he carries the lander up the ramp and ties it to the roof. The grueling part of the process is moving rocks while wearing the heavy EVA suit. Then, he takes apart the ramp. Tomorrow, he'll start the drive back to the Hab.

Watney's ability to navigate by the star Phobos shows, once again, that, though his specialties are botany and engineering, he has a lot of other practical knowledge, too. Watney's decision to name a valley after Lewis shows that, even in their absence, Watney thinks about and cares about the rest of the crew.



Watney doesn't often take time to think about what it means to him to be alone on Mars, and though he mentions members of the Ares 3 crew often, he rarely says outright that he misses them, or even that he misses human contact. In the context of Dr. Shields' earlier comments, Watney's acknowledgement that the log connects him to the people who will eventually read it and his hope that he will connect with another person before he dies seem to show that Dr. Shields' assessment of Watney's likely mental and emotional state was accurate.



The process of digging up the probe shows that creative thinking and physical labor play just as important a role in Watney's bid for survival as the complicated technology of the rover, probe, and Sojourner do. Watney's mention of using the Sojourner's wheels to develop a communication code highlights that, even if he gets the comm systems back online, exchanging messages with NASA is likely to require some ingenuity.



The fact that the process of moving the probe onto the roof of the Rover is made even more arduous by the EVA suit shows how the technology that allows Watney to survive on Mars can simultaneously make his work harder.



CHAPTER 10

Sol 90. Watney has followed his rover tracks back through Lewis Valley, but now that he is in Acidalia Planitia, his outgoing tracks have been blown away. He plans to navigate by Phobos until he picks up the Hab's beacon signal. Watney is feeling positive, and he's begun taking soil and rock samples in case he makes it back to Earth. Collecting the samples makes him feel like a true astronaut again—he's not just surviving, he's doing his job.

On Sol 92, Watney gets the Hab's signal for a moment, then loses it. He notes that he's still watching Lewis' 1970s TV shows. On Sol 93, he gets a steady signal—he's 24,718 m away, which puts him within a day's travel. Watney's back is aching, and he imagines Beck heckling him for not stretching and doing exercises. The cramped conditions of the rover remind Watney of a simulation in which the Ares 3 flight crew spent three days in an MAV. Watney wishes he were with his crewmates now.

Sol 94. Watney is thrilled to be back in the Hab, where he has room to move around. The **potatoes** are growing well, and he adds his "manure" to them. Watney turns the Hab oxygenator and atmospheric regulator back on, adds his urine to the water reclaimer, and returns the cells to the solar array. He checks on the Hab's electrical equipment. Watney removes the *Pathfinder* from the rover and leaves it outside, where it can communicate with NASA. Then he returns the **RTG** to the place where Lewis had buried it.

Sol 95. Watney spends the day cleaning and repairing *Pathfinder* and Sojourner. He suspects NASA lost contact with them because *Pathfinder*'s solar panels became covered with dust and its battery ran down. Watney hooks the lander up to Hab power and uses Rover 1's heater to warm up the lander's electronics. When he wakes up the on Sol 96, the lander isn't yet working—when it is, the antenna will change its angle to pick up signals from Earth. Sojourner also isn't working. Watney tries not to worry. Then, the novel switches to a new format: the old *Pathfinder* Log, which is accessible since, unbeknownst to Watney, the battery has filled, and the lander acquired a signal.

CHAPTER 11

Bruce, Venkat, and other NASA staff celebrate in a cobbled-together *Pathfinder* control center at the JPL. Tim, who's running the communications console, informs Venkat that *Pathfinder*'s transmission time is 22 minutes, and the lander's camera is working—they'll take a panorama as soon as possible.

Watney's decision to start collecting rock samples shows that, unlike Dr. Shields feared, he has not given up hope of rescue. Up until this point, all of his energy has been focused on surviving on Mars, but in collecting samples (and, in Chapter 9, naming places) he's doing the work of exploring a new land.



Watney continues to maintain a sense of connection to life on earth by watching TV shows. Now, as he reminisces about the Ares 3 trainings and Beck's insistence on proper exercise, Watney reveals a sense of nostalgia for his crewmates' company and even for the less-than-ideal moments of the Ares 3 mission.



Back at the Hab, Watney goes from one set of routines to another—instead of driving and recharging the battery, he is now tending potatoes and checking the Hab life support. Though Watney earlier scoffed at NASA's caution around using the RTG, he returns it to the place where Lewis buried it, suggesting that his apparent lack of concern about using a nuclear core may have been bravado.



*So far, Watney has successfully solved every problem he's faced, so when he starts cleaning *Pathfinder*, Weir has set up the reader to expect that dusting off the solar cells and recharging the battery will be enough to fix it. When it isn't working the morning of Sol 96, the reader worries along with Watney—is this the one problem he won't be able to solve? Then, with the change in structure, Weir creates a sense of dramatic irony and suspense: we know *Pathfinder* is working, but does Watney?*



*By cutting from the *Pathfinder* Log at the end of Chapter 10 to the JPL control center, Weir continues to build suspense through the use of dramatic irony. Like Venkat, Bruce, and Tim, the reader does not know what the panorama will show.*



Sol 97. Watney sees that the lander’s antenna angle has changed and knows *Pathfinder* is working. Even if he is never rescued, he is no longer alone. Watney finds himself weeping, and is overwhelmed by a sense of calm. Realizing that people really will read the log, he vows to take his record-keeping more seriously—he’ll cut out the funny and embarrassing stuff. But for now, his priority is to talk to NASA.

Watney’s relief at knowing he will not die alone without any way to talk to another human hints that he has perhaps felt an intense distress about his abandonment on Mars, but has refrained from writing about it. Watney’s self-consciousness about his tears shows that he wants to others to see him as tough and fearless.



Back at the JPL pressroom, Venkat announces that *Pathfinder* is online. He takes questions from Cathy Warner, Marty West of NBC News, and Jill Holbrook of BBC. Venkat explains that Watney can write notes and hold them up to the lander’s camera, but they need to develop a way to send messages back to him using the lander’s moving parts. Communication will be a slow process. Venkat hurries out of the pressroom to avoid any more follow-up questions.

Weir uses Venkat’s press announcement to communicate key information to the reader. The scene also reminds us, after chapters centered on events on Mars, that the press plays a crucial role. Their reporting on Watney’s story keeps him in the public eye, placing pressure on Congress and on NASA to bring him safely home.



Back at the communications console, Venkat, Tim, and Bruce receive a panorama from the lander showing a note from Watney that says, “I’ll write questions here—Are you receiving?” Another note to the side says, “Point here for yes.” NASA points the camera to “yes” and starts taking photos at ten-minute intervals, eagerly awaiting Mark’s next message.

As Watney’s first message comes through, both the JPL team and the reader know that, though Watney’s rescue is still far from certain, they’ve broken the first major barrier to engineering a rescue.



Sol 97 (2). Watney is overjoyed to receive NASA’s “yes.” He starts thinking about communication techniques. The most efficient technique is to use ASCII code (Johanssen’s laptop has an ASCII table). Watney will place paper cards with hexadecimal digits representing digits 0 to 9 and letters A-F around the camera. At the start of every hour, NASA will use the camera to point to the cards, and Watney will decode the messages. 20 minutes later, they’ll take a photo of Watney’s reply note. In a series of messages, Watney explains that he is healthy, the Hab is working, and he’s growing **potatoes**. He emphasizes that the Ares 3 crew was not at fault for leaving him behind, and asks NASA to tell his family that he is well and to tell Lewis “disco sucks.” The Sojourner is not responding to NASA, but they tell Watney they’re working on it.

Watney once again uses his wide range of knowledge and creative problem-solving skills, finding an effective way to communicate with NASA. Watney succinctly updates NASA on his status—while they surely have questions about the potatoes, his focus is on relaying messages to the people who matter most to him. His emphatic message that the Ares 3 crew was not at fault shows that he is aware that his abandonment could have official consequences for other crew members. His message to Lewis is an in-joke that even Lewis isn’t quite in on. Until now, Watney’s complaints about disco have been between him and the reader.



Back at JPL, Jack Trevor, a software engineer, approaches Venkat with an idea: NASA can update *Pathfinder*’s operating system and instruct Watney on how to hack the Rover software so that the rover will be able to talk to NASA via the *Pathfinder*.

While Watney’s idea to use ASCII was a good one, Jack’s plan reminds us that having a team of world-class scientists will help Watney problem-solve even more effectively.



Annie calls Venkat asking for a photo of Watney. Venkat says this is ridiculous—it's a waste of time and energy, and because Watney will be in his EVA suit, it won't even show his face. But Annie insists: the press is demanding a photo, and Watney is the biggest story in the world. Venkat acquiesces.

Annie's insistence on getting a photo of Watney once again shows how important media coverage of Watney's story is to NASA. NASA needs strong public support in order to fund the very expensive rescue mission.



Sol 98. Watney receives instructions on how to hack the Rover and decodes them. Then, for Annie's photo-op, he poses in front of the camera with a thumbs-up and a note that says "Ayyyyy!" In an homage to Lewis' 1970s TV shows, he's posing as the Fonz from *Happy Days*.

Watney's photo-op reference to Lewis' TV shows projects a goofy, carefree image to the public, and builds on the inside joke between Watney, future readers of the log, and (ostensibly) Lewis.



Venkat meets with Jack to further discuss hacking the rover. This could happen faster, Jack says, if Johanssen could radio Mark and explain the process; *Hermes* is much closer to Mars than Earth is, so the communications would arrive more quickly. Venkat explains that this is impossible, since the Ares 3 crew still doesn't know about Watney. Statistically, Venkat says, the Ares 3 crew is in more immediate danger than Watney—Watney is on a planet, but the crew is in deep space—and speeding up the hack is not worth risking their safety.

Weir uses Venkat and Jack's conversation to remind readers that the Ares 3 crew still does not know that Watney is alive. Venkat reiterates Teddy's argument against telling the crew, and here, we see that Teddy's caution is slowing down communications with Watney. The NASA team must evaluate the trade-offs between safety and efficiency.



Sol 98 (2). Watney tries taking a laptop outside to speed up the process of decoding messages, but the computer dies immediately. Instead, he traces messages into the sand and photographs them.

This episode reminds the reader just how different the Martian atmosphere is from Earth's. Like Watney's body, the laptop is not made to survive on Mars.



Jack, Tim, and Venkat patch in the new code for the rover, and the system goes online. Then the structure of the novel shifts again—this time, to messages between JPL and Watney. The messages are formatted with time stamps. Venkat informs Watney that JPL is adjusting Ares 4's MDV so they can pick Watney up and fly on to the Ares 4 site, and that NASA is planning to send a supply probe to keep Watney alive. Watney repeats that the crew was not at fault in abandoning him and says, "Hi, Mom!" He updates Venkat on his **potato**-growing plan, explaining that he now has food through Sol 900. When Venkat tells him that the crew doesn't know he's alive, Watney swears and encourages NASA to tell the crew. Venkat asks Watney to watch his language (the messages are public) and Watney replies with a cheekily inappropriate message.

Weir could have given readers an account of the conversation between Venkat and Watney via the third-person narrator or Watney's log entries, but by shifting the novel's structure to directly show readers the messages they exchange, Weir creates a sense of urgency and immediacy that drives the chapter forward. Watney's reaction to the news that the crew doesn't know he's alive supports Mitch's argument in earlier chapters—that on moral and empathetic grounds the crew should be informed. Venkat's comment on Watney's profanity reminds readers that Watney is now also part of NASA's public-relations dance.



Just as Teddy gets off the phone with the president, Mitch knocks on the door and, once again, makes his case that NASA should inform the crew that Watney is alive. There's hope of rescuing Watney now, and Mitch insists that, as flight director, this should have been his call, not Teddy's, from the beginning. Teddy gives Mitch permission to tell the crew.

Mitch's argument that NASA ought to tell the Ares 3 crew has even more credence now that Watney has made the same point. Watney's comments (which the press could find) may have influenced Teddy to agree to tell the crew.



CHAPTER 12

Though Weir has previously structured the novel chronologically, here he takes the reader back in time to the morning of Sol 6, the day that the Ares 3 crew evacuated Mars. Watney complains about waking up early and cracks jokes. Lewis tells the crew that there's a dust storm coming, but they'll have time to do surface ops before it arrives. Watney will be working on soil experiments. Only Beck is concerned about the storm.

This flashback allows readers to see Watney interacting with the rest of the crew for the first time in the novel. Watney's jokes position him as the "class clown" of the bunch. While the reader knows that the dust storm will lead to Watney's abandonment, the crew was not worried on the morning of Sol 6. This contrast builds suspense through dramatic irony.



The storm moves faster than the crew anticipated. They return to the Hab and don their flight space suits in case of an emergency takeoff. The winds reach 125kph, well above the abort wind speed. The crew leaves the Hab—they plan to wait out the storm in the MAV, or do an emergency takeoff if ordered by NASA. Just as they reach the MAV, Watney is hit by the satellite antenna and is carried away by the wind. Johanssen's computer shows that Watney's suit decompressed and then went offline—he's likely dead. While the crew prepares for takeoff, Lewis searches for Watney's body. The MAV is starting to tip, making takeoff dangerous. Lewis finally makes it back to the MAV and, after a moment of hesitation, gives the order to launch. The launch goes well, but no one feels like celebrating.

As the third-person narrator describes these events, they don't come as a surprise to the readers—we already know how Watney came to be abandoned on Mars. Yet earlier in the novel, we learned about the events only from Watney's log entries. This flashback allows readers to see how the rest of the Ares 3 crew searched for Watney, how saddened they were by his apparent death and how reluctant they were to leave his body behind. Lewis' determination to find Watney's body and her reluctance to give the launch order shows that Watney's death weighs on her.



Weir flashes forward to four months later—"present day" in the novel. The Ares 3 crew is on *Hermes*, waiting for their daily "data dump" with emails from home. Today's includes a voice message from Mitch informing the crew that Watney is alive and a rescue plan is in progress. Mitch emphasizes that the crew was not at fault. Most of the team is overjoyed, but Lewis blames herself for giving the order to abandon Watney.

By placing this present-day scene directly after the flashback to Sol 6, Weir contrasts the Ares 3 crew's sorrow at Watney's death with their joy at discovering that he is alive. It emphasizes, too, that just as Lewis earlier blamed herself for Watney's death, she now blames herself for leaving him behind on Mars.



CHAPTER 13

The chapter opens with another flashback, an italicized passage describing how workers at Deyo Plastics are working double shifts to make the Hab canvas for Ares 3.

Weir's technique of shifting narrators and narrative structure keeps the reader engaged throughout the novel and builds a sense of intrigue.



Sol 114. Watney complains that NASA is micromanaging his work on Mars. However, Watney enjoys reading emails from friends, family, and members of the public. Watney says he's reread his email from his mother over and over, even though she doesn't say anything too surprising. After writing this, he's quick to add that he's "not a mama's boy" and "totally manly." Watney also informs us that he's learning Morse code and that the Ares 4 rescue plan is going great.

Weir includes another italicized flashback explaining another step in the process of making Hab canvas. In his Sol 114 entry, Watney writes that he has enough food to last to Sol 900, and that NASA is working on a supply probe that will arrive around Sol 856. In an email exchange, Lewis blames herself for Watney's situation. Watney replies saying that Lewis did the right thing. Another italicized flashback shows the finished Hab Canvas being flown to JPL.

Sol 116. Watney harvests, freezes, and stores his **potatoes**. Watney receives an email from Venkat advising him to listen to NASA's advice on botany, denying a request for non-disco music files, and informing him that NASA is starting an investigation to see if any avoidable mistakes led to his being stranded. Watney writes back to Venkat insulting the members of the investigation and stating that he will refute any blame placed on Lewis.

In an italicized flashback, the Ares 3 pre-supply probe (carrying the Hab canvas) reaches Mars safely. On Sol 117, Watney writes that the water reclaimer is slowing down. He's not too concerned, but NASA is very worried. Watney is frustrated by how they are micromanaging his efforts to repair the water reclaimer. In another italicized flashback, Lewis and Beck successfully set up the Hab. On Sol 118 NASA denies Watney's request to take apart the water reclaimer and check for a clog. He takes it apart anyway, finds a clog, and fixes it. In an italicized passage, the third person narrator explains that the windstorm that led the Ares 3 crew to leave Mars weakened the Hab canvas. Every time Watney leaves through Airlock 1, the canvas stretches and tightens, weakening a bit more.

Sol 119. A minor sandstorm hit the Hab the previous night. Watney gets ready to clean sand off of the solar cells, and as he does so, he reminisces about shoveling snow with his father when he was growing up in Chicago. The story shifts to third person narration. As Watney exits through Airlock 1, the Hab canvas breaches, and the Airlock is torn from the rest of the Hab. The faceplate of Watney's space suit shatters—it will no longer effectively supply him with oxygen. He hears a hissing sound—the airlock has a small breach and is slowly leaking air.

Watney's frustration with NASA's bureaucracy shows that making contact with NASA comes with both disadvantages and advantages. Watney's self-consciousness about reading and rereading his mother's letter shows how concerned he is with appearing unemotional and thereby "manly," even when it's clear that an emotional reaction is completely reasonable.



The purpose of the italicized flashbacks is to build suspense. Lewis's email exchange with Watney shows that Lewis is agonizing over the realization that she left Watney behind on Mars. Watney's response once again shows his compassion and utter lack of resentment towards Lewis and the crew.



Watney's email exchange with Venkat indicates that Watney resents bureaucratic oversight and has been pushing back against NASA's micro-managing advice. His hostility toward NASA's investigation into his abandonment on Mars shows he truly doesn't blame Lewis for what happened and remains fiercely loyal to her.



Weir once again uses an italicized flashback to bring the reader's attention to the Hab canvas, but it's not yet clear why the canvas' journey to Mars and its initial setup are so important. Watney's successful water reclaimer repair vindicates his conviction that NASA's micromanaging is unnecessary. This is also one of the few times he deliberately disobeys NASA orders. The next italicized passage makes clear why Weir is emphasizing the Hab canvas' importance: it's slowly weakening, and Watney, like the reader, has been taking its strength for granted.



Watney's memory of shoveling snow with his father gives us a rare glimpse of Watney's past back on Earth. He rarely mentions his family, but it seems he misses them. By comparing shoveling Martian sand to shoveling snow in Chicago, Watney makes the activity seem like a safe, humdrum routine. Because of this, it's more shocking when the Hab breaches, creating a sudden, life-threatening crisis.



CHAPTER 14

The structure of the novel switches to an audio log transcript of Sol 119. Watney curses the airlock, the Hab, and Mars. Then he pulls himself together gets to work finding a way to stay alive. Watney doesn't know what went wrong with the Hab, but the rover is likely fine. Watney needs to find and patch the leak in the airlock. To find the leak, Watney uses static electricity to set a piece of his hair on fire, then watches the path of the smoke. He duct-tapes it closed.

Watney's next task is to find a way to patch his EVA suit. He has a patch kit, but it's not big enough to fix his broken faceplate. Instead, he'll cut off the left arm of the suit, use the material to seal the faceplate, and then glue the smaller arm hole together—he'll have to tuck his left arm along his side, but he'll be able to breathe and the suit will withstand Martian air pressure. With the suit mended, Watney calculates how much oxygen the suit has left—he realizes he'll only have four minutes of air after he leaves the airlock. Watney assesses the situation. He needs to fix the Hab, but in order to do so, he'll need a functional EVA suit, so he'll have to get a new suit before retreating to the rover. Watney decides to roll the airlock closer to the Hab by repeatedly slamming his body against one wall. Overnight, he rolls it within 10 meters of the Hab.

Sol 120. Watney is back in the rover and once again writing in the standard log. As he made his way into the Hab in his patched EVA suit, he relied on his arm camera to see. He finds Martinez's suit, but it's pinned under a table that he can't lift with just one arm. Watney settles for Martinez's helmet and patch kit, and just makes it to the Rover within his four minutes of air. Pathfinder is offline because it relies on the Hab's power, but Watney will deal with that tomorrow. He goes to sleep.

Sol 121. Watney refills the EVA suit's oxygen tanks, replaces the patched helmet with Martinez's helmet, returns to the Hab, and brings the rest of Martinez's suit back to the rover. Sol 122. Watney uses rocks to spell out 'OK' for NASA—they'll read it in the satellite images. Assessing the damage, Watney sees he'll be able to patch the Hab using seal-strips and spare canvas. Once he does, he can get *Pathfinder* back online. His real problem is that the soil and young **potato** plants are now dead. The supply probe will arrive Sol 856, but he now only has food to last until Sol 600.

Watney's decision to use the EVA suit's audio recorder to explain his situation highlights how important it is to him for people in the future to have a record of his time on Mars. Should the worst occur, he wants someone to know how he died.



Once again, Watney shows his ability to problem-solve creatively. His method of patching the EVA suit's broken faceplate requires him, once again, to misuse NASA equipment (or, rather, to use it in ways it was not intended to be used). Watney often solves the most immediate problem first (in this case, the leaking airlock), only to discover a secondary problem (his suit's limited air supply). Weir uses this pattern of resolving an urgent problem then discovering a secondary problem to drive the novel's plot forward.



This log entry opens with Watney in the rover, so even before he describes how he went from the airlock to the Hab to the rover, the reader knows that he managed to make it back to the rover safely. Even so, as he describes himself rushing to find Martinez's EVA suit, the reader knows that he is literally racing the clock, which creates a sense of urgency.



Once again, Weir uses the pattern of introducing a serious secondary problem just after Watney has solved a more immediate problem. In this case, the secondary problem is that the potato "farm" is dead. While this doesn't pose an immediate threat to Watney's well-being, it is a life-threatening problem—Watney now has an even more limited food supply.



CHAPTER 15

The chapter begins with an exchange between Watney and Venkat—*Pathfinder* is back online. Watney explains he's patched the Hab and re-pressurized it, but the farm is dead. He'll start starving on Sol 584. Venkat guesses that the Hab breached because of fatigue on Airlock 1 canvas and tells Watney to alternate evenly between Airlocks 2 and 3.

Back at JPL, Bruce meets with his staff. The dead **potato** farm has changed their timeline: for a supply probe to reach Watney by Sol 584, JPL will have to make it in 48 days. The probe will use a booster from the EagleEye 3 Saturn mission, and they'll borrow some parts from an Ares 4 pre-supply mission that's still being built. The probe, *Iris*, will only carry food.

The scene moves to astrodynamist Rich Purnell, who has just finished calculating potential courses for the Iris probe. Because of the current position of Earth and Mars, it will take 414 days to get the probe to Mars. This strikes Rich as inefficient.

The scene moves to a meeting of NASA managers, led by Teddy. Annie explains she's giving daily press updates, and that CNN's *The Watney Report* is the number one show in its time slot. Teddy sees the public's focus on Watney as beneficial—it puts pressure on Congress to give NASA emergency funding.

Maurice Stein, pad leader for the Iris launch, gives an update on the booster being used for Iris. Bruce explains that the team building Iris is behind schedule—they need about 15 more days. Teddy asks Maurice to skip standard inspections in order to cut 10 days of time; Watney will spend 4 days on starvation rations. Both Maurice and the nutritionist, Dr. Keller, protest. Teddy explains that, while procedures are designed to minimize risk to both astronauts and to NASA, they are now in a position where taking risks is the only way to save Watney's life.

In the astrodynamics department, Rich is being reprimanded by his boss, Mike, for working on a personal side-project rather than his assigned work. Rich announces he's taking his vacation time—then remains at his desk, working on the side-project.

While Watney has solved the most immediate problem he faces (patching the Hab), the lack of a solution to his food problem creates suspense. Due to the earlier italicized flashbacks, the reader knows that Venkat is right about the cause of the breach.



During the JPL meeting, we watch Bruce and his team crunching numbers and scrambling to create a plan that will get the supply probe to Watney in time. The scene heightens the reader's sense of urgency and suspense as NASA scientists race against time.



Weir gives us our first glimpse of Rich, who will play a critical role in the rescue mission. Here, though, he appears as one of many people at NASA working to get Watney safely home.



Annie and Teddy's comments on CNN once again remind readers of the crucial role that the media plays—not only in keeping NASA accountable to the public, but in pushing Congress to fund Watney's rescue.



Maurice and Dr. Keller are afraid to agree to skip inspections or stretch the rations further because, if these decisions harm Watney, they will be to blame. The fact that Teddy, who usually prioritizes safety, now sees this kind of unprecedented risk-taking as necessary shows just how desperate Watney's situation is. Teddy would rather the launch fail or Watney become malnourished than not attempt the launch at all.



It's not yet clear what side-project Rich might be working on. Weir uses this scene to characterize Rich as smart, but stubborn and lacking in interpersonal skills.



After 63 days, the Iris probe is completed. At a press conference, Annie announces the scheduled launch. Cathy Warner asks what NASA will do if the launch fails; Annie dodges the question. Another reporter asks if there's a spending limit on the mission. Annie emphasizes the value of human life, but adds that Watney has now spent more time on Mars than any other person—there's a lot to learn from his mission.

Mitch, Venkat, Teddy, and Annie all watch the Iris launch. On *Hermes*, the Ares 3 crew is listening in. At his desk, Rich is absorbed in his calculations. The probe starts to shimmy, and as it does so, it liquefies the protein cubes it carries. The liquid shifts to one side of the compartment, throwing the probe off-balance. The force of the liquid hitting the back of its container knocks a bolt out of place and NASA loses signal. A naval ship spots debris falling from the sky—the Iris launch has failed.

Teddy prepares to give a speech. In his office, Venkat feels a deep sense of failure. He ignores a call from his wife, and looks at his computer, where he sees a message from Watney: "How'd the launch go?"

CHAPTER 16

The chapter opens with a message from Watney to Martinez. Dr. Shields has asked Watney to send personal messages to each crewmember in order to stay connected to humanity. Watney scoffs, but asks Martinez to visit his parents in Chicago and talk to them about the Mars mission if he dies. Watney says he doesn't want to sound "lame," but adds that Martinez is his best friend.

At the China National Space Administration, director Guo Ming sorts through paperwork. He is frustrated by all the bureaucracy created by international agreements and by the Chinese government itself. He's planning for the launch of Taiyang Shen, an unmanned probe. His under-director, Zhu Tao, arrives and tells him the booster for Taiyang Shen has enough fuel for a Mars injection orbit—the probe could be modified to send supplies to Watney. Because of the Chinese government's security protocol, NASA doesn't know that the CNSA has a booster that could save Watney.

Weir uses Annie's refusal to answer Cathy's question to suggest to readers that NASA does not have a secondary plan: if the launch fails, they will be out of options, and Watney will likely die. The second question suggests that NASA could even be forced to stop rescue attempts if the cost of the mission increases too much.



By showing Rich working at his desk on his mysterious personal project while other NASA staffers watch the launch, Weir again indicates that Rich is anti-social. As soon as the bolt comes loose, readers realize the probe failed because Teddy chose to skip inspections. His risk taking, in this instance, did not pay off.



Weir only shows Teddy and Venkat in the moments before they tell the public and Watney that the launch has failed, leaving us to imagine the public reaction.



Watney's skepticism about the importance of staying connected to humanity and his insistence that expressing one's feelings is "lame" belies how much he really cares about his parents, Martinez, and the rest of the crew. He seems afraid to express emotions lest he become overwhelmed by them.



The paperwork Guo is sorting through acts as a symbol for the bureaucratic infrastructure that slows the CNSA's work, and reminds us of Watney's frustration with NASA's bureaucracy. Zhu's news about Taiyang Shen gives readers hope that Watney may still be rescued, and because Watney and NASA do not yet know this, Weir uses the news to create suspense through dramatic irony.



Guo knows that if American and Chinese diplomats are responsible for negotiating an agreement, it won't be resolved in time to save Watney. He decides to contact NASA and negotiate with them directly. In exchange for the booster, Guo will ask NASA to include a Chinese astronaut in the Ares 5 Mars mission. Guo calls Teddy.

Guo's decision to bypass US and Chinese diplomats shows that bureaucratic procedures can create obstacles not just within a single institution or government, but on an international scale. His willingness to aid NASA affirms Weir's message that it's human nature to help others.



Watney says very little of substance in his note to Johanssen. He asks her how she can be both beautiful and a brilliant computer nerd, then gives her tips on how to be "more cool." He adds that Lewis had forbidden male crewmembers from "hitting on" Johanssen.

By showing that Watney sees Johanssen's beauty as contradictory to her intelligence, Weir once again captures the insidiousness of workplace sexism.



Bruce updates the JPL staff on Taiyang Shen. They have to finish the probe in 28 days; it will arrive six weeks after Watney runs out of food. Meanwhile, Rich finds Venkat and tells him that he has found a better way to save Watney—one that uses the Taiyang Shen booster in a different way. Venkat reads the plan.

After Bruce's announcement, keeping Watney alive until rescue seems hopeless. Yet, unbeknownst to the JPL team, Rich has developed a solution. This is presumably the side-project he took vacation time to complete.



In his message to Vogel, Watney reminisces about training, when Vogel bought him a beer for breakfast. He jokes that Vogel has all the hallmarks of a supervillain: he's a German chemist with a base on Mars.

Watney's note is mostly a series of jokes about Vogel's being German, giving us the impression that, while he and Vogel get along, they likely are not very close.



Venkat calls a secret meeting with Annie, Mitch, Teddy, and Bruce under the name "Project Elrond"—a Lord of the Rings reference. He explains that Rich has found a way to get *Hermes* back to Mars in time for a flyby on Sol 549. The "Rich Purnell Maneuver" uses Taiyang Shen to send *Hermes* a resupply probe. Watney would have to get to the Ares 4 MAV, modify it, and use it to reach *Hermes*. Teddy has to choose between the Purnell Maneuver and Iris 2 (the plan to send Watney food on the Taiyang Shen).

Weir uses this scene to introduce readers to the content of the plan Rich has been working on, resolving the mystery that has been built around it. Venkat presumably keeps the meeting about the "Rich Purnell Maneuver" secret because the plan is zany enough that it could make NASA appear lost or desperate if it were to be leaked to the press.



Mitch believes it's Lewis's right to make the decision, and he is almost certain she will say yes to the *Hermes* fly-by. Venkat and Teddy insist that it's NASA's responsibility to choose. If the *Hermes* flyby goes wrong and the Ares 3 crew dies, it would be the end of the Ares Program. Teddy is unwilling to risk six lives when he could make a choice that only risks one life. Mitch argues that it's wrong to assess the options in terms of safety and risk—space travel is always high risk. The meeting ends without a decision. To avoid leaks to the press, the Purnell Maneuver is not to be discussed elsewhere.

Mitch's case for telling the Ares 3 crew about the Purnell Maneuver is similar to his case for telling them Watney is alive: they should be given all information that is relevant to them. Teddy's argument relies on the "greater good" principle—keeping five people safe and risking one life is better than risking six lives. Teddy's caution may also be the result of the Iris probe's failed launch: the last risk he took did not pay off.



In his note to Beck, Watney advises him to “tell Johanssen how you feel” once the Ares 3 mission is over. Watney doesn’t know if Johanssen reciprocates Beck’s feelings, but it’s clear that Beck is in love.

The next day, Venkat, Mitch, Teddy, Bruce, and Annie meet again. Teddy announces that they’ll send the Iris 2 food supply to Mars, vetoing the Purnell Maneuver. Six lives are more valuable than one. Mitch is furious. He calls Teddy a coward and accuses him of trying to cut NASA’s losses rather than attempting to save Watney’s life. In any case, Mitch argues, the crew should have the right to decide whether or not to risk their lives for Watney. Mitch storms out. Teddy apologizes for the scene, telling Annie that men are sometimes fueled by testosterone. Annie stops Teddy and tells him she thinks Mitch is right: he is a coward.

In Watney’s message to Lewis, he tells her once again not to blame herself for leaving him behind. She made a difficult decision, but she made the right one—she protected the rest of the crew. Then, he teases her about her love of disco music.

In the daily data dump, Vogel receives a corrupted data file that appears to be from his wife. When Johanssen manages to open the file, they find instructions for the Rich Purnell Maneuver. Vogel explains the maneuver to Lewis and the crew, and they discuss whether they should mutiny and carry out the maneuver against NASA’s orders. To do the maneuver, Johanssen will have to hack the ship’s control panels. Martinez and Lewis would likely be court-martialed upon their return. Lewis asks the crew to take 24 hours to think about it—but she knows everyone will say yes.

Brendan Hutch, working the night shift at NASA Mission Control receives an unscheduled status update from *Hermes* announcing they’re performing the Purnell Maneuver. Brendan has no idea who Purnell is or why *Hermes* is changing course.

Teddy calls Mitch into his office and tells him that though he has no proof, he knows Mitch sent *Hermes* the maneuver and will fire him the minute he has evidence. Mitch points out that Annie is going to tell the press that NASA gave the order for the maneuver—they don’t want the public to know that the crew mutinied—which will make it difficult to fire him or court-martial Lewis and Martinez.

Watney’s note to Beck alerts readers that a romance could be taking place on Hermes, raising the question of whether or not Beck and Johanssen will get together.



Teddy and Mitch’s fight over the Purnell Maneuver recalls their disagreement over whether or not to tell the Ares 3 crew that Watney is alive—but this time, the stakes are much higher. Through Teddy’s apology to Annie, Weir once again captures (somewhat benign) workplace sexism: Teddy doesn’t apologize to the men in the room, but he is worried that a woman will be shocked by conflict. Her reply turns the tables: by calling him a coward, she implies that she’s tougher than he is.



Watney’s insistence that Lewis not blame herself for leaving him behind shows that he knows her well enough to know that she would feel responsible for what happened.



The odd formatting of the file containing the Rich Purnell Maneuver makes it clear to the Ares 3 crew—and to readers—that the crew is not supposed to have this information. Yet the crew’s lack of hesitation to execute the maneuver—even knowing that a mutiny will have serious consequences when they return to Earth—reveals that their fierce loyalty to Watney is stronger than their loyalty to NASA.



*Once again, Weir employs dramatic irony: when Hutch receives the message, he has no idea what it means, but the reader knows that *Hermes* is circling back to rescue Watney.*



*Though Mitch does not admit that he leaked the maneuver to *Hermes*, his lack of a denial suggests that he is indeed responsible. NASA’s official line (that they ordered the Purnell Maneuver) shows how important it is that they appear in control of the situation.*



CHAPTER 17

Sol 192. Watney is moved to learn that the *Hermes* crew has turned around to rescue him, and he turns his attention to preparing for the rescue. He needs to make the 50-day trip to the Ares 4 MAV at Schiaparelli, then spend 45 days modifying the MAV. He'll need to start the trip on Sol 449. Before then, he needs to modify the rovers, turning one into a trailer so that he can carry the "Big Three"—the atmospheric regulator, oxygenator, and water reclaimer—with him. To do this, he'll need to use the rock sample drill to cut a large hole in the hull of the 'trailer,' which he'll later cover with Hab canvas. The rock sample drill is not made for this kind of work, so it will take 21 days to cut the hole in the hull.

Sol 193. Watney wires the drill to Hab power and marks the line he's going to cut onto the rover that will become a trailer. He starts drilling a series of small holes along the line—he'll eventually chisel out the bits between them. The drill overheats, so he leans it against the 'workbench' holding *Pathfinder* to let it cool off.

Sol 194. Watney spends his entire day drilling. He wants to spend ten hours a day working, but NASA insists he stick to standard eight-hour EVAs. He decides his theme song for his time on Mars is "Stayin' Alive" by the Bee Gees. Sol 195. Watney keeps working on the trailer. In the evening, he runs tests on the soil inside, and is encouraged to find that some of the bacteria are alive. He writes, "Life is amazingly tenacious. They don't want to die any more than I do."

Sol 196. Watney opens the log entry by telling us he's made a potentially deadly mistake. He spent the morning drilling holes, set the drill aside to cool, and took a lunch break. When he went back to work, the drill wouldn't start. He reset the breakers and it started up again. Then, that evening, when he sent a message to NASA, he didn't receive a reply. He checks *Pathfinder*'s status and sees that it has been offline since about 13:30, the same time the drill died. Watney follows troubleshooting instructions and realizes that when he leaned the drill against the workbench, it touched *Pathfinder*'s Mylar balloons, which conducted an electrical charge to *Pathfinder*'s hull and fried its electronics. There is no way to get *Pathfinder* back online. Watney is on his own.

Watney now has a reasonable hope of rescue, and a lot of work to do. We've seen in earlier passages that Watney's morale is highest when he's busy applying his botany and engineering skills. Modifying the rovers will be a time-consuming process, and, once again, he will need to repurpose tools and materials designed for other uses in order to complete the project. While Watney certainly needs to think creatively here, he also has the brainpower of other NASA scientists supporting him.



Watney usually recounts each step of his work in the log, but here, Weir is careful to mention that Watney has to frequently lean the drill against the workbench to let it cool when it overheats. This detail becomes important later in the chapter.



By mentioning that NASA insists that Watney only work eight-hour days, Weir once again points out how bureaucracy can lead to inefficiency. Watney's new theme song shows us that he's still listening to music to stay connected to life on Earth. His observations about the tenacity of life connect to the novel's larger examination of the human will to survive against all odds.



*Watney opened his first log entry by announcing that he was going to die, and he hasn't yet, so readers initially have reason to doubt that whatever new problem Watney is facing is really so serious. But when Watney explains that *Pathfinder* is offline, it seems he has essentially returned to where he was on Sol 6: he is alone with no way to contact another person. The fact that something as minor as leaning a drill against a balloon could have such serious consequences reminds us that Watney is often most at risk when he assumes all is well and begins to settle into a routine.*



CHAPTER 18

Sol 197. Watney writes that he keeps endangering himself through his own “stupidity.” He decides he’ll continue with the trip to the Ares 4 MAV and do the rover modifications without NASA’s help. Once he’s at the MAV, he’ll be able to communicate with them again. To run the “Big Three” he will need energy: 69.2 kilowatt-hours per sol. Watney decides he’ll refer to kilowatt-hours per sol as “pirate-ninjas.” Since he has enough water to last through the trip, he can cut that back on energy by not using the water-reclaimer to process urine.

Sol 198. Watney realizes that because he is one person, not six, the oxygenator is only working one-sixth as hard as it’s supposed to and doesn’t require as much energy as he’d thought. Most of the 21.5 “pirate-ninjas” that the atmospheric regulator uses is spent heating the Hab’s air. Sol 199. Watney decides he’ll conserve energy by running the oxygenator only on designated rest days—not while driving. He’ll use the **RTG** to heat the Hab’s air so that the atmospheric regulator doesn’t work as hard.

Sol 200. Watney loads the rover and “trailer” with rocks and tests how much weight they can haul and how many pirate-ninjas they use. He calculates that it will take him 92 sols to get to the Ares 4 MAV. Sol 201. Watney has pulled something in his back, but takes Vicodin and drives out to retrieve the **RTG**. Back in the Hab, he experiments with wrapping plastic tubing around the RTG and running water through it—it heats the water to a consistent temperature. Watney uses the hot water to take a bath.

Sol 207. Watney has spent a week resting his back. He figures out that if he can take 28 solar panels and two of the Hab’s batteries on the trip, he can make it to Schiaparelli in just 45 days. Sol 208. Watney experiments with different ways to carry the panels, and decides he’ll build “shelves” attached to the Rover’s undercarriage, then stack and tie down the panels. Sol 209. Watney successfully builds the shelves.

Sol 211. Watney cleans out the rovers, removing everything he won’t need on the trip, then moves in two of the Hab’s batteries. Watney knows the *Hermes* resupply probe will be launched in two days, and he hopes that it goes smoothly—he’ll feel to blame if his crewmates die in their attempt to rescue him.

Watney’s comment highlights how taking his surroundings for granted frequently puts him at risk. He can no longer afford to be careless. Yet his decision to proceed with the rover modifications and the trip to Ares 3 shows that he is far from losing hope. In inventing the new unit of measurement, “pirate-ninjas,” Watney once again uses humor to cope with a stressful situation.



Once again, Watney finds a way to use the fact that he is the only person on Mars to his advantage: the tactic of running the oxygenator only on rest days wouldn’t work if all six members of the Ares 3 crew had been stranded. Watney’s decision to use the RTG again shows that he is as willing as ever to take risks in order to make it back to Earth.



The first time Watney dug up the RTG, he was fairly cautious about using it (after all, he returned it to the place where Lewis had buried it). Now, Watney is a bit more cavalier—or, perhaps, months on Mars have made him more pragmatic. He has little to lose and everything to gain from using the RTG—why not use it to take a bath?



While Watney has become less cautious in some ways, he has become more cautious in others—it’ll be hard for him to do anything if he’s injured, so he takes the time to let his back heal. Yet even while he’s resting, Watney’s mind is at work, finding new ways to solve problems and modify the rovers.



Watney worries about his crewmates, but the reader knows that if this probe launch fails, Watney won’t know until he reaches the Ares 4 MAV site. Weir once again builds suspense using dramatic irony, and this time, Watney is the one in the dark.



CHAPTER 19

Lewis and her husband, Robert, get to have a five-minute video chat. Robert tells Lewis he knows she's doing the right thing, but he misses her. He adds that he's found an original 1976 eight-track of Abba's Greatest Hits.

The scene shifts briefly to Teddy and Venkat, who have just arrived in Beijing and are waved through security by their CNSA guide and translator, Su Bin Bao. The three share a joke about how difficult Mitch—who is already at Jiuquan—can be.

Weir cuts back to another video chat, this one between Vogel and his wife, Helena. They talk about their children, Eliza and Victor, and Vogel's mother, who is ill.

At Jiuquan's mission control center, Guo Ming welcomes Teddy and Venkat. Teddy comments that science transcends international and cultural borders.

Beck video chats with his sister, Amy. He explains that if the probe doesn't dock correctly, it's his job as EVA specialist to go out and physically bring it onboard the ship.

Weir gives readers a brief glimpse of Mitch, Venkat, and Teddy at work in a Jiuquan office, then cuts back to a video chat between Martinez, his wife Marissa, and their young son, David. Marissa is angry that Martinez volunteered to extend the mission, but they have been together since they were 15 and know that they can get through anything.

On *The Mark Watney Report*, Venkat is speaking live from China. Venkat explains that Martinez will remotely guide the supply probe to *Hermes*, and that Beck will do an EVA if necessary.

This scene explains the 1970s music and TV shows that Watney loves to mock: Lewis collects 1970s memorabilia with her husband. We can guess that the music is her way to stay connected to her husband while in space.



This scene helps orient readers in time: if Teddy and Venkat are in China for the launch, this scene (and the video chats between the Ares 3 crew and their loved ones) is set just before Watney's most recent log entry.



This scene gives us new insight into Vogel's personal life. He and his wife are tender with one another, and it's clear that he misses his family.



Teddy's comment clearly states one of the novel's key ideas: that science and the desire to help others bring people together.



Beck's conversation with his sister gives readers a better understanding of how the resupply probe works and how it could go wrong.



Martinez's conversation with his wife shows how astronauts' missions can weigh on their relationships with loved ones. Missions to Mars take a long time, and astronauts and their families are making an enormous sacrifice for science.



Venkat gives the public—and the reader—a clearer idea of how the supply probe will work, adding on to Beck's earlier explanation to Amy.



Weir cuts to Johanssen's video call with her father. He's clearly anxious and tells her that her mother is too worried to eat or sleep. He tells her that he's proud of her scientific prowess and hard work, but that he wishes she weren't so selfless.

Johanssen tells her father that even if everything goes wrong, she will make it back to Earth alive. The crew has chosen her to survive because she is youngest and smallest—she needs less food. If the probe fails, the rest of the crew will commit suicide. She'll ration all remaining food supplies and resort to cannibalism if necessary. Johanssen asks her father to just tell her mother she'll make it back alive.

At Jiuqan Mission control, Taiyang Shen launches successfully, and the American and Chinese engineers celebrate together. Zhu Tao tells Venkat that, though he's glad that Watney will survive, he's saddened that the exploratory probe he spent years building will likely never launch, since the State Council won't fund a booster to replace Taiyang Shen. The supply probe docks at *Hermes* without any complications.

CHAPTER 20

Sol 376. Watney has finished the rover modifications to move in the "big three." Sol 380. Watney makes a heat reservoir by sealing the **RTG** inside a bag, submerging it in water, and running air through the hot water. Sol 383. Watney has been studying a satellite map of Mars and planning his drive to Schiaparelli. He'll go through the flat Acidalia, the more dangerous Arabia Terra, and then through the Mawrth Vallis valley before descending into Schiaparelli.

Sol 385. Watney starts designing a 'bedroom' that he'll attach to one of the rover's airlocks using one of the pop-tents and canvas that he will cut from the Hab—it'll give him enough space to stand up, move around, and stretch. Sol 387. Watney figures out exactly how much canvas he'll need to cut from the Hab and sets aside five meal packs for special occasions: the day he leaves for Schiaparelli, the journey's halfway point, the day he arrives, a reward for handling an emergency, and another for the day he launches. Sol 388. Watney depressurizes the Hab, cuts the canvas he needs for the 'bedroom,' glues the Hab back together, and re-pressurizes it. Sol 389. Watney assembles the 'bedroom' inside the Hab, where he doesn't have to wear the EVA suit, then he rolls it up and takes it to the Rover, where he sets it up and tests it briefly. He'll run an overnight test later.

Like Martinez's call with his wife, Johanssen's call with her father shows how space travel can put an emotional burden on astronauts' loved ones. Johanssen's revelation that she has been chosen to survive should the mission go wrong is more disturbing than it is comforting, both to the readers and to her father. Watney may think of Johanssen as the sexy blonde but this scene reveals just how brave and how tough she really is.



The image of American and Chinese engineers celebrating together underlines the idea that science unites people across cultural barriers. Zhu's comment to Venkat reveals just how difficult it can be for scientists to convince their governments to fund new research projects.



Watney's log entries have become more sporadic, updating readers on his work every few days. Though this is partly a way for Weir to speed up the novel's narrative, it also suggests that Watney is now more focused on his work (and on guaranteeing his survival and rescue) than he is on creating a record of that work for posterity.



The fact that Watney is designing a bedroom suggests that he feels confident that he has more than enough time to prepare for his journey to Schiaparelli. He doesn't really need a bedroom—instead, it's an amenity that will make his journey more comfortable and convenient. And, if Watney has time to spare, it seems likely that he'd rather spend that time designing a bedroom and working out ways to execute the design than sitting around. Watney doesn't like having time to think or get emotional, so building the bedroom may be a manifestation of this coping mechanism.



Sol 390. The rover is fully prepared for the trip to Shiaparelli, leaving Watney with 59 sols to run extra tests. He reflects on the fact that, though he desperately wants to leave Mars, the idea of leaving the Hab and trekking alone to the MAV is frightening.

Now that the rover is fully prepared, Watney has time to reflect. His thoughts frighten him. Once again, Watney shows that he deals with fear by repressing his emotions.



CHAPTER 21

Sol 431. Watney works on packing efficiently, placing the things he most needs in the rover. Weir cuts to NASA, where Venkat tells Mindy that she is to focus solely on watching Watney—other people will do the satellite course corrections and alignment that are usually her job. Mindy feels this is make-work; since they can't communicate with Watney, watching his every move won't help anyone. Venkat agrees, but he explains that they need to provide the media, congress, and the president with frequent updates.

NASA wants to have detailed information on Watney's movements, not because knowing what Watney is doing will make it possible for them to help him, but because they want to appear to be somewhat in control of the situation. Mindy is not collecting this information for scientific purposes—it's information that will keep the public, the press, Congress, and the president happy.



Sol 434. Watney moves the “big three” into the rover and leaves them running overnight to test that they're working correctly. The Hab has enough oxygen to last through the night. Sol 435. Watney tests the bedroom, and one of the seams breaks—he patches it up with spare canvas. Sol 436. Watney tests the bedroom again, and it holds.

Watney encounters his first minor problem since losing contact with NASA, but he easily fixes it. His work seems to be humming along with little reason for him (or readers) to worry.



At NASA, Teddy, Venkat, Mitch, Annie, Mindy, and Martian meteorologist Randall Carter meet. Mindy explains that Watney has modified the rover and built a room that attaches to the rover's airlock—she and Venkat think it's a workshop. Randall explains that a small **dust storm** is picking up in Arabia Terra (which Watney has to drive through). It will block out sunlight, making the solar panels charge slowly, and limiting the distance Watney can drive each day. They can't warn him to change course, and he'll likely miss the *Hermes* flyby. What's more, once he enters the storm, NASA satellites won't be able to track him.

Readers know that Mindy and Venkat's analysis of Watney's activities is inaccurate—he's building a bedroom, not a workshop. Weir uses the news of the dust storm to create perhaps the most drastic instance of dramatic irony and suspense in the novel: NASA (and now, the readers) know that Watney is driving into a dust storm that will slow his journey enough to prevent him from reaching the MAV site in time to be rescued, but there's no way for anyone to warn him.



On *Hermes*, the crew meets for a status update. The ship is having some minor problems—it's designed for a much shorter trip—but the crew can easily repair most of them. The climate control in Martinez's bunk room and Watney's old room isn't working—it's too hot to sleep in. When Lewis suggests that Beck move into Johanssen's room, Beck and Johanssen are surprised that she has noticed their developing romance. Lewis gives them her blessing and warns them not to let their relationship interfere with their official duties.

*Weir uses this scene to keep readers updated on the *Hermes* crew and to move the romantic subplot between Beck and Johanssen forward. Lewis's support for their relationship also signals that this mission is so far from ordinary that military-trained, by-the-book Lewis is willing to throw out the rulebook entirely. Professionalism has become less important than love.*



Sol 444. Watney has now packed the rover and spent five sols test-driving near the Hab. The bedroom is working well—Watney can set it up and stow it again relatively quickly. He eats a **potato** for breakfast and does an EVA to gather and stow the solar cells. He drives for four hours until he loses power, then does another EVA to set up the solar array. The rest of the day is spent charging the panels. On the fifth day—his “Air Day”—he sets up the panels and runs the oxygenator.

Sol 449. Watney is about to leave for Schiaparelli. To avoid eating raw **potatoes**, he’s microwaved them all and frozen them again. Watney shuts down the Hab following the original procedure for the last day of the Ares 3 mission. Without the whirring of the Hab’s machinery, it’s eerily quiet. Watney is struck by how silent Mars is. After a moment of reflection, he sets off for Schiaparelli.

CHAPTER 22

Sol 456. Watney has reached Mawrth Vallis! He has settled into a routine. Every day, he folds up the bedroom, stows the solar cells, drives four hours, sets up the solar cells and bedroom, checks his equipment, then spells out a status report with Morse Code. “Air Days” like today are days off—he’s watching 70s TV. Having left Acidalia Plantacia behind forever, Watney wonders if he’ll ever feel nostalgic for the Hab.

On the *Mark Watney Report*, Cathy asks Venkat if Watney is doomed—the **dust storm** in Arabia Terra will block eighty percent of sunlight, leaving him without enough energy to even run life support. Watney will enter the storm on Sol 471, but the change will be so gradual that he likely won’t notice until he’s far into the storm. Venkat tries to strike a hopeful note, saying that Watney is an expert at surviving on Mars. Nonetheless, the odds are slim.

Sol 462. Watney’s journey is going smoothly. He’s finding his latitude using a homemade sextant to navigate by the star Deneb. He calculates longitude based on the time of day that Phobos sets. Back at NASA, Mindy reads Watney’s most recent Morse code status message and emails it out, noting “five days until **dust storm** entry.”

Ever methodical, Watney tests out the rover for five days before leaving on his trip. Once again, Watney maintains a sense of normalcy and certainty by preparing for his journey and by following his procedure of test-runs.



Watney’s final log entry before leaving the Hab offers readers another rare moment of reflection. The now-silent machinery had kept Watney alive for over a year, but its white noise created a sense of comfort. Now, Watney faces the fact that he is truly alone.



Rather than write daily log entries, Watney waits until his air day to write a new entry. 1970s TV is still keeping him connected to life back on earth and to Lewis. Watney’s remark that he’ll never return to the Hab or Acidalia Plantacia suggests that his days off give him time to think—something he usually avoids.



*By setting this scene on *The Mark Watney Report*, Weir creates a scenario in which everyone on Earth knows about the storm, but Watney still has no idea. We now learn that if he drives too far in, he could die, and there’s little chance that Watney will avoid this.*



By setting Watney’s routine, worry-free log entry alongside Mindy’s message counting down the days until Watney enters the dust storm, Weir continues to use dramatic irony to intensify readers’ sense of suspense.



Sol 466. It's Watney's fourth air day. He has entered Arabia Terra, which has rocky terrain and quite a few large craters that he has to drive around carefully. He'll need to navigate by landmarks, latitude, and longitude to stay on course. Sol 468. Watney is almost halfway through his trip. Even though he knows that the MAV will have to carry as little as possible, he has been collecting soil and rock samples along the way.

Aboard *Hermes*, Lewis and Martinez are discussing the fact that Watney entered the **dust storm** the day before. Lewis is worried, but Martinez tells her he thinks Watney will make it—he's survived worse odds already. Sol 473. It's Watney's fifth Air Day, and he's feeling confident. Once he passes the Marth crater, he'll have a direct path to Schiaparelli. He notices that the batteries are charging slower and the solar cells aren't producing as much wattage as usual, but attributes it to the equipment's age. He just charges a bit longer to compensate.

Sol 474. Watney has navigated badly and ended up on the ridge of the Marth Crater. He decides to end the day's drive early—he can navigate, plan a new course, and give the solar cells more time to charge. Sol 475. After calculating his location, Watney does an EVA and walks to the peak of the rim in order to get a better sense of where he is. He can't see the far side of the crater—the air is full of dust—and turning back to the rover, the view is clear. Watney realizes that he's several sols into a **dust storm**—one that gets thicker closer to Schiaparelli. He'll have to go around it. Back on Earth, Mindy gets a Morse code message from Watney: DUST STORM. MAKING PLAN.

CHAPTER 23

Sol 476. Watney decides he'll measure how far he is into the storm in terms of "percent power loss"—right now, he's at 3 percent power loss. The deeper into the storm he goes, the less energy he can budget towards driving. The storm won't threaten his life support until he's at 19 percent power loss. Watney sets out to calculate how fast the **dust storm** is moving, and in what direction. To do this, he'll set up three solar cells, each 40 km away from the other. By comparing how many watts each cell collects in one day, he can see which way the storm is moving and redirect his path accordingly.

Weir continues to build suspense by placing Watney's sporadic log entries closer together, allowing readers to track his progress as he slowing (and unknowingly) approaches the dust storm.



*Weir increases the magnitude of dramatic irony surrounding the dust storm as the *Hermes* crew, too, knows that Watney is in the dust storm. When Watney notices a change in wattage, it raises our hopes that Watney will suspect a dust storm. Instead, he shrugs at the change and continues on.*



Watney's navigation error turns out to be life-saving, showing how errors can create opportunities for important new insights. Though he doesn't yet have a plan for how to circumnavigate the storm, he now knows that he has a problem—and if we know anything about Watney, it's that he's a good problem-solver. For the reader, Watney's realization that he is on the brink of a disaster is a cause for hope.



The first steps of Watney's problem-solving process are to assess what information he has and what information he needs to find. Then, he develops a way to collect that information. In this way, Watney's response to the dust storm epitomizes how his level-headedness and creative thinking have allowed him to face challenge after challenge on Mars.



Sol 477. Watney will record the solar cells' wattage per day by attaching a power meter to each cell and using spare EVA suit cameras to record the power meter. Sol 478. Watney sets up the solar cells and power meter, then eats his "halfway to Schiaparelli" meal. Sol 479. After collecting the solar cells and checking the recordings, Watney determines the storm is north of him. Since it's moving west, he can avoid the storm by traveling south, then east. Schiaparelli is to the southeast, so Watney won't have to go too far out of his way.

Sol 480. Watney is on his way out of the storm—his percent power loss each day is decreasing. Even so, he won't arrive at Schiaparelli on Sol 494 as planned—he'll have less time than he thought to modify the MAV. Sol 482. Watney spends the "Air Day" reading Johanssen's ebook of Agatha Christie's *Evil Under the Sun*. Sol 484. Watney is finally out of the storm. Schiaparelli is about 1030 km due east, so he'll arrive around Sol 498—only four sols late.

Sol 487. Watney realizes he is within four sols travel of the Mars exploration rover *Opportunity*—he could potentially use its radio to contact NASA. This idea appeals to Watney not so much for practical reasons, but because he misses talking to Earth. He's tired of being alone. But he decides against it. He'll be at the MAV, which has a radio, in eleven sols—the *Opportunity* radio is not worth the detour.

Sol 492. Watney starts thinking about a way to leave the bedroom set up all the time once he reaches the MAV (right now, it's attached to the airlock, so he can't exit the rover without folding it up). A moment later, he realizes that in order to make plans like this, he has to really believe he's going to make it to the MAV. Watney decides that once he gets to the MAV, he'll seal off the "bedroom" and use it to house the oxygenator and atmospheric regulator, then use the trailer as his "bedroom" and workshop.

Sol 497. It's an Air Day, and Watney will be at the entrance to Schiaparelli tomorrow. He is elated. In the next passage, Weir changes to a third person narration to describe patterns of erosion in the Schiaparelli crater. The "Entrance Ramp" which Watney will drive down, is a slope of compressed sand—but the sand is not evenly compressed. The narrator describes how, as Watney descends the slope in the rover, he hits a patch of soft sand. The rover rolls, and the trailer breaks free and flips. The solar cells go flying. Luckily, the rover's pressure seal does not breach. Watney is still alive.

Earlier, Watney spaced out his log entries during periods of time when events on Mars became routine. Now that he is in the midst of a crisis, he is making careful records that show his methodology for determining the location, direction, and speed of the storm. This affirms his tendency to record more when he feels he is in peril, perhaps in order to give others information about what went right and wrong.



Watney continues to make frequent log entries as he drives out of the storm. The title of the Agatha Christie novel Watney reads in his free time seems to hint that something ominous is about to transpire, but Watney makes it out of the storm safely.



*Now that he's out of the storm, Watney's log entries become more infrequent. In admitting that he considered a detour to the *Opportunity* rover because he misses human company, Watney offers readers a rare moment of vulnerability.*



During Watney's moment of self-reflection, it becomes clear to him (and to the reader) that his habit of planning ahead is a symptom of his inextinguishable hope that he will survive. This observation recalls Dr. Shields' earlier remark to Cathy Warner that hope is paramount to Watney's survival.



By this point in the novel, the reader knows that when Weir suddenly switches to a third-person narrator (as he does earlier when describing the Hab's weakening canvas), something is about to go wrong. As a result, Weir uses this change in point-of-view to build suspense. By closing the chapter at the moment of crisis, Weir gives readers a "cliff-hanger" ending that urges them to read on.



CHAPTER 24

Back at NASA, Mitch, Mindy, Venkat, and Bruce examine satellite images of the crash for any sign that Watney is alive. Watney's Sol 498 log entry reveals that he is not injured, and nothing in the rover seems to be broken. He does an EVA to check out the damage. The trailer's inflated roof, miraculously, did not pop. The rover's tow hook is ruined, but Watney has a spare. Some of the solar cells are trapped under the rover, but Watney collects the rest and sets them up to charge the batteries. He writes a message for NASA: Rolled. Fixing now. Back on Earth, Mindy and Venkat groan at the lack of information.

Sol 499. Watney connects a long power cable to the rover, then uses the sample drill to anchor the other end of the cable to a rock. The power cable provides enough leverage for Watney to tip the rover back onto its wheels. Sol 500. Watney digs a hole downhill of the trailer, then uses the rover to drag the trailer towards the hole. The nose of the trailer catches, and the trailer flips upright. Sol 501. Watney checks out the trailer. The atmospheric regulator and oxygenator are working perfectly. Watney refills the RTG's water tank, which spilled when the trailer rolled, reconnects the hoses between the rover and trailer, and uses the spare tow hood to connect the trailer to the rover. He'll start traveling again tomorrow.

Back on Earth, Mindy informs Mitch, Bruce, Venkat, and Annie that Watney's Morse code message indicates he's fixed everything. Venkat asks Bruce about the plan for MAV modifications, but Bruce says he'll fill Venkat in on them in private. Mindy informs them that Watney should reach the MAV on Sol 504 or Sol 505.

Sol 502. Watney reminisces about how slowly and cautiously his father used to drive. Now, to avoid rolling again, Watney is driving even more slowly than his father used to. He reaches the Shiaparelli Basin and eats his "survived something that should have killed me" meal pack.

Sol 504. Watney's radio briefly catches a signal from the MAV. Weir switches to the third-person narrator, who describes Watney's rover approaching the MAV and parking outside. Watney emerges from the rover in his EVA suit, leaps and pumps his fist, then enters the MAV.

Weir once again moves between NASA and Watney's log entry to build suspense and to remind readers that, though NASA is observing Watney, they cannot help him. Though Watney has often been unlucky, here he is fortunate that the rover was not more damaged by the crash. His terse message for NASA implies a confident, matter-of-fact approach to this new problem. Watney has dealt with much worse already.



Once again, Watney is able to solve the problem at hand by thinking creatively and re-purposing the tools that NASA sent with him to Mars. While many of Watney's previous problems have required him to apply principles of chemistry or botany, here he's dealing with physics. Once again, his background in the sciences does not fail him. Readers are aware, though, that Watney is lucky that the damage is not more severe—he does not have the same resources with him that he did back at the Hab.



Weir uses this scene to give readers information and to build suspense. Mindy's announcement tells us just how close Watney is to the end of his journey, and Bruce's comment leaves readers wondering why he avoids discussing the MAV.



Earlier in the novel, when Watney thought he might never see his family again, he rarely mentioned them. But now that he is closer to the MAV and to rescue, he seems more comfortable writing in the log about his emotions.



Usually, when Weir switches to the third-person narrator, disaster strikes—but here, that pattern changes. Instead, readers watch from the narrator's removed perspective as Watney celebrates his arrival at the MAV.



CHAPTER 25

Sol 505. Watney is writing from the rover. He has already run a systems check and a boot-up in the MAV. He's attached hoses from the rover to the MAV to feed it oxygen and nitrogen. Once the MAV has functioning life support, Watney will go back inside and use the radio. The narration switches to a transcript of a conversation between Houston mission control and the MAV. Watney gives NASA a status update. NASA instructs Watney to preserve all his water (he has 550 liters) and to start storing his urine again.

Back on Earth, Bruce and Venkat meet to discuss MAV modifications. They'll have Watney electrolyze his 550 liters of water and turn it into 80 kg of hydrogen. To lighten the MAV, they'll remove all nonessential gear, backup comm systems, and all life support—Watney will wear his EVA suit. Martinez will pilot the MAV remotely, so they'll remove the controls. Finally, Watney will remove the nose of the ship and cover the hole with Hab canvas. The narration then switches to a transcript between NASA and Watney—Watney is shocked. He jokes he's going to space in a convertible.

Aboard *Hermes*, Lewis is telling Martinez, "You killed Watney." It quickly becomes clear that Watney is not actually dead—Lewis and Martinez are running a simulation to prepare for Watney's rescue. While Johanssen trains Martinez on the simulation, Lewis checks in with Vogel and Beck on their roles in the rescue.

Sol 526. Watney has been busy modifying the MAV following NASA's instructions. Sol 529. Watney is turning his water supply into hydrogen to help fuel the MAV. NASA has him disconnect the hoses between the rover and trailer. Watney makes hydrogen in the trailer, and, after stopping the atmospheric regulator's safety mechanisms, uses the regulator to pull all of the oxygen out of the trailer. Finally, he fills the airlock tank with hydrogen and transfers it to the MAV's hydrogen tank.

The narration shifts to a transcript between Johanssen on *Hermes* and Watney in the MAV. NASA has approved direct communication between Watney and the *Hermes* crew. Watney tells Johanssen he misses the crew.

Watney works efficiently to set up the MAV and he now finally has the radio contact with Earth that he's been craving for weeks. When NASA asks Watney to start conserving water, readers aren't sure why—we still haven't learned what the MAV modifications are going to involve. Watney had been so sure he no longer needed to save his urine—so what does NASA need extra water for?



Bruce and Venkat's meeting finally gives readers the inside scoop on MAV modifications. We learn that the water is needed to make hydrogen fuel. We knew the MAV would need to lose weight, but Bruce's plan is as shocking to the readers as it is to Watney. Throughout the novel, NASA's priority has been safety, but now, they are literally removing all safety gear. The rescue plan sounds absurdly dangerous.



*The opening line of dialogue tricks readers into thinking we've jumped forward in time and the launch has failed—but this is not the case. Watney is still on Mars, and the *Hermes* crew is doing all they can to prepare for Watney's rescue.*



As NASA instructs Watney on how to make water into hydrogen and fill the Ares 4 MAV tanks, readers are reminded of the fact that Watney previously turned hydrogen from the Ares 3 MAV into water so that he could farm potatoes. The transformation of hydrogen to water and water to hydrogen are symmetrical events that bookend the novel.



In spite of Watney's general guardedness about his emotions, he says he misses the crew. Again, he is more open with his feelings now that rescue seems imminent.



Sol 543. Watney has finished the MAV modifications. He notes that the MAV is now far more dangerous than the infamously accident-prone Soviet space ships. Meanwhile, Lewis and the *Hermes* crew review the rescue plan. Martinez will pilot the MAV while Johanssen monitors the computer systems. Beck and Vogel will wait in Airlock 2 with the outer door open. Once they reach intercept, Beck will leave the ship on a tether and get Watney, who will likely have lost consciousness during the launch due to the intense g-force on the MAV. Vogel will pull Beck and Watney back on board.

At NASA, Brendan Hutch, the Flight Director, tells a very anxious Mitch to get some sleep. Annie tells Venkat that the pressroom is overflowing with reporters from around the world. Venkat tells her that, if something goes wrong, it will happen too fast for Mission Control to help the *Hermes* crew.

Sol 549. Watney is sitting in the MAV in his EVA suit, awaiting the launch. He's leaving behind his remaining **potatoes** and the soil and rock samples he collected on his journey. He knows that, if anything goes wrong, he'll die. If he misses intercept, he plans to cut off his own oxygen supply. After a year and half on Mars, he can't quite believe that, whether he lives or dies, this is his last day on the planet.

CHAPTER 26

Weir opens the chapter by describing how people around the world have gathered around computers and TVs to witness Watney's rescue. In Chicago, Watney's parents are watching, a NASA representative standing by to answer their questions. The *Hermes* crew and Watney give the "go" command for the MAV to launch.

At NASA Mission Control, Mitch listens to the launch. On *Hermes*, Beck and Vogel wait in the airlock. Beck tells Vogel that if he can't reach Watney, he wants Vogel to release his tether so he can go a bit further. Vogel refuses—Lewis has told him not to.

Weir's third-person narrator describes Watney's experience of the launch. As the MAV accelerates faster than any other manned ship in the history of space travel, Watney struggles to breathe. He sees the Hab canvas tied across the open nose of the ship flapping. It's not supposed to do that. On *Hermes*, Martinez can't figure out why the MAV is moving slower than it should. Lewis radios Watney, but he doesn't reply. As Watney loses consciousness, the canvas tears further and stops fluttering, stretching back towards Watney.

*Watney knows that the MAV is a death trap, but it's also his only hope of survival. The scene on *Hermes* familiarizes readers with the rescue plan: with Martinez piloting the MAV and Beck and Vogel physically moving Watney out of the MAV and onto the ship, Watney's life will be literally in the hands of the *Hermes* crew. The crew knows this, and they are determined to complete the rescue.*



*Weir uses this scene to show that the whole world is watching the rescue unfold. While NASA scientists are under immense pressure, they have now done all they can. The rest is up to the *Hermes* crew.*



Throughout the novel, Watney has exclaimed, "I'm going to die!" many times—it has always been an overreaction to a problem he can solve. But now, he faces the possibility of death more solemnly. For the first time, Watney writes about death in a way that feels real, not hyperbolic.



Weir shows how people around the world have come to see Watney as a symbol of human courage and tenacity. And for the first time, we see Watney's parents outside of Watney's own memories. To them, Watney is not a symbol; he is their son.



Beck and Vogel's conversation shows just how much Beck is willing to risk for Watney—the rescue is already dangerous, and without the tether, there is no guarantee Beck would make it back to the ship.



Weir's third-person narrator once again signals to readers that something is about to go wrong. Yet, in this scene the narrator serves another practical purpose, too: Watney passes out, so Weir's narrator is the only witness as the canvas pulls free from the MAV and the MAV speeds through space. Martinez doesn't know why the MAV is accelerating slowly, but we know the canvas is creating drag.



On *Hermes*, Martinez is relieved to find the MAV is now steadying. Johanssen tells Lewis the MAV will reach orbit, but the distance at intercept will be 68 km. They are 39 minutes away from intercept. They can use the ion engines and altitude thrusters to bring them close enough to the MAV to reach Watney at intercept, but they'll be traveling much too fast. Lewis orders Martinez to use the ion engines and altitude thrusters; they'll find a way to slow down once they're within the intercept range.

In the MAV, Watney comes to. He can see Mars through the hole in the front of the ship, and radios *Hermes* to tell them the canvas has ripped. Lewis tells him they have a problem with intercept velocity. Watney suggests that he could poke a hole in the glove of his EVA suit, then use the escaping air to fly towards the ship. Lewis vetoes this plan, but the idea of using atmosphere as thrust sparks a new plan. The *Hermes* crew will seal the bridge and reactor room, then blow the vehicular airlock on the nose of the ship. The escaping air will thrust the ship in the opposite direction. Martinez calculates that this would slow the ship enough to make the rescue risky, but possible. Lewis informs Mission control of the new plan. Venkat, Mitch, and Annie are shocked. Annie goes to inform the press that the *Hermes* crew is going to deliberately breach the ship.

On *Hermes*, Lewis asks Vogel, the resident chemist, to make a bomb that will blow the inner airlock door. They'll open the outer door first so that it can later be closed to restore the ship's aerodynamic shape. Johanssen will use a lighting panel next to the airlock to make a remote trigger for the bomb. Vogel uses sugar, liquid oxygen, and a thick glass container to make a pipe bomb. As Beck goes to set up the bomb, Johanssen pulls him aside, kisses him, and tells him to be careful. Then she gets to work setting up the lighting-panel trigger.

With the bomb ready for detonation, the *Hermes* crew members go to their stations. They are 20 seconds from intercept. At NASA, Teddy gets off the phone with the president. He, Venkat, and Mitch feel totally helpless. Johanssen activates the bomb, breaching the airlock doors, and the thrust of the escaping air slows the ship. Beck jumps out of the airlock. He can see the MAV, and uses his thruster to move towards it. He grabs onto the canvas. Vogel radios that Beck will run out of tether in 8 seconds. Beck clips his suit to Watney's. They float out of the MAV and Beck uses his thruster to accelerate towards *Hermes*. When he runs out of fuel, Vogel carefully uses the tether to pull Beck and Watney back onto the ship.

*With the canvas no longer slowing the MAV, readers momentarily think that Watney is out of the woods—but we soon learn that the slow launch will prevent the *Hermes* crew from reaching the MAV at intercept. With little time to act, Lewis decides to speed up *Hermes*, even though she doesn't yet have a way to slow down in time to intercept Watney.*



*After Watney comes to and radios *Hermes*, he begins to brainstorm with the *Hermes* crew, looking for a way to bring the ship and the MAV close enough to each other for a rescue. Lewis's plan to slow *Hermes* down by breaching the ship's airlock is risky and completely unprecedented—but so was Watney's stripped-down MAV. It's clear that, in the extreme circumstances the crew now faces, it will be impossible to rescue Watney without taking enormous risks. Back at mission control, the NASA team watches events unfold and relays information to the press, but is powerless to help.*



*On Mars, Watney was able to survive by taking risks, thinking creatively, and frequently misusing or repurposing his supplies. Now, the *Hermes* crew is using the same technique to rescue Watney. Astronauts are not supposed to build bombs, but Vogel's bomb is now essential to the rescue. As Beck and Johanssen kiss, we are reminded that love (like hope) persists even in moments of crisis.*



Throughout this passage, Weir tracks the time to intercept and the time till Beck's tether runs out, giving readers a sense of urgency and immediacy as the rescue unfolds. Weir also builds suspense by cutting between the rescue scene and NASA mission control. Like the reader, the NASA team and people around the world are waiting to see if the rescue will succeed. The crew's last-minute plan pays off and Watney safely makes it onto the ship, showing that, in extreme situations, taking risks is often necessary.



In a message broadcast all over Earth, Lewis radios *Hermes* to announce that all six of the Ares 3 crew are safely aboard *Hermes*. The NASA control center bursts into applause. While people celebrate around the world, Watney's parents in Chicago embrace one another. Mitch and Venkat look at each other and sigh with relief. Teddy takes a blue folder out of his briefcase and prepares to brief the press.

Log Entry: Mission Day 687. It's Sol 549 on Mars, but Watney is now making log entries in reference to mission days. Watney explains that he broke two ribs during the MAV ascent. When Beck, the crew medic, removed Watney's suit, he was shocked by how Watney smelled—after all, Watney hadn't bathed in weeks. Beck ran X-rays and bandaged Watney's chest, and then the crew came into the temporary sick bay to greet Watney. Now, Watney writes, he's thinking about just how many people worked together in order to rescue him: the crew, the staff at NASA and JPL, and the China National Space Administration. His rescue was extraordinarily expensive, too. Watney sees this as evidence of humanity's dedication to scientific progress, but also their instinct to help and protect one another. Most people really care about one another. Watney may be tired, smelly, injured, and hungry, but, he says, this is the happiest day of his life.

By showing scenes of people celebrating all over the Earth, Weir reminds readers that Watney's story is bigger than just himself (and even bigger than the scientific progress it represents for NASA). For millions of people, Watney's survival is a symbol of hope and the tenacity of the human spirit.



Watney's log entry shows us that the practicalities of the rescue weren't all that glamorous—he's tired, wounded, and smelly. Yet none of that really matters. Watney's gratitude to all of the people who helped rescue him reminds readers how much is possible when people collaborate with one another. Weir explicitly conveys one of the novel's central themes through Watney's assertion that people are essentially good and they are united by their compassion and their thirst for new knowledge. Watney is happy because he is finally safe, but more importantly because he has been reunited with some of his closest friends. Weir uses this scene to show how much humans need one another.





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