The Hot Zone

INTRODUCTION

BRIEF BIOGRAPHY OF RICHARD PRESTON

Richard Preston grew up in Wellesley, Massachusetts, and then attended Pomona College and Princeton University. He became interested in non-fiction and journalism, and wrote several books and many articles before publishing an article called "Crisis in the Hot Zone" in a 1992 issue of *The New Yorker*. After deciding to expand the article into a book, he wrote *The Hot Zone*, which quickly became a bestseller. Since then Preston has continued to focus on scientific issues, and has written books about the eradication of smallpox, the Redwood Forest, and the steel industry. *The Hot Zone* returned to the bestseller list in 2014 as a result of the devastating Ebola outbreak in West Africa. Preston, too, resumed his focus on Ebola during this time, participating in many interviews about the disease and writing articles about it for *The New Yorker*.

HISTORICAL CONTEXT

The word "globalization" became widely used in the 1980s, meaning essentially, the process by which the world has become increasingly interconnected—first by railroads and steamships, and now by planes and the Internet. With globalization also came the rise of worldwide epidemics. The most notable of these is HIV/AIDS, which came to prominence in the 1980s and has since claimed about 39 million lives. Recent events, however, have made *The Hot Zone*'s discussion of Ebola even more relevant. In 2014 the Ebola epidemic that Preston prophecies in his book came to pass, infecting over 28,000 people in West Africa and killing over 11,000. Cases were also reported in countries such as the UK, Italy, and the US, and the spread of Ebola to these nations was undoubtedly the effect of globalization. In July 2015, scientists began testing an Ebola vaccine that has thus far proved extremely effective in combating the virus. This cure, however, has come far too late for the tens of thousands of West Africans who were victims of this disease.

RELATED LITERARY WORKS

Although *The Hot Zone* is nonfiction, the threat of a widespread epidemic similarly motivates many works of fiction as well. In Michael Crichton's 1969 thriller *The Andromeda Strain*, an extraterrestrial super-virus threatens to wipe out a small town in Arizona. Preston also often compares Ebola to AIDS within his book—and *And the Band Played On* by Randy Shilts (1987) explores the beginnings of the AIDS epidemic in the late 1970s. While Preston references the huge power that diseases have to shape human events, author Jared Diamond expands on this theme with his 1997 book *Guns, Germs, and Steel*, in which he places the study of epidemics within a geopolitical narrative. On a stylistic level, the author Tom Wolfe, the founder of New Journalism (in which nonfiction events are described in dramatic, vivid writing) has clearly influenced Preston's own writing. Wolfe's *The Right Stuff* (1979), about America's participation in the space race, is written in a theatrical, gripping style similar to that of *The Hot Zone*.

KEY FACTS

- **Full Title:** *The Hot Zone*
- **When Written:** 1992-1995
- **Where Written:** Hopewell, NJ
- **When Published:** 1995
- **Literary Period:** Contemporary
- **Genre:** Thriller nonfiction
- **Setting:** Reston, VA; Frederick, VA; and various African countries including Kenya, Zaire, Sudan, and South Africa
- **Climax:** US Army soldiers and veterinarians must seal off the Reston Primate Quarantine Unit and euthanize hundreds of Ebola-stricken monkeys
- **Antagonist:** The Ebola virus
- **Point of View:** Third person omniscient

EXTRA CREDIT

A Star is Born? Hollywood director Ridley Scott is currently adapting *The Hot Zone* into a miniseries for Fox; he has owned the rights to the book for over two decades.

Sibling Rivalry. Richard Preston's brother, Douglas Preston, is a bestselling writer himself. Both authors focus on thrillers and nonfiction, and Richard Preston says that the two often "talk shop."

PLOT SUMMARY

The Hot Zone opens with the story of Charles Monet, a Frenchman who lives in Western Kenya. In January 1980 he decides to explore **Kitum Cave**, a natural landmark located on a peak called **Mount Elgon**. A week later he becomes ill with a fever and vomiting, and he grows so ill that he must be flown to Nairobi Hospital. On the plane he continues vomiting, and when he reaches the hospital, he begins to hemorrhage, getting blood and vomit all over a physician named Dr. Shem Musoke. Monet dies a short time later, and soon afterward, Dr. Musoke

also becomes ill. All of his internal organs begin to fail, and his **blood** refuses to clot. His physician, Dr. David Silverstein, sends a sample of his blood to a lab in South Africa and the Centers for Disease Control in Atlanta, Georgia. They send him back a diagnosis: Marburg virus, which first broke out in Germany in 1967 after factory workers were exposed to infected monkeys.

Marburg, Richard Preston, the author, tells us, kills one in four of its victims—an immense percentage. It is part of a family called filoviruses, which also includes two deadly diseases called Ebola Sudan (which kills 50% of its victims) and Ebola Zaire (which claims 90%). These viruses attack every organ in the body, causing both massive bleeding and deadly blood clots. Like AIDS, Marburg is passed to humans by monkeys. Also like AIDS, it generally only passes through "direct contact with blood and bodily fluids."

Dr. Shem Musoke, miraculously enough, begins to get better, and no one else falls ill. His blood is sent out to laboratories all over the world so that they can study the virus. One of the institutions to receive it is the US Army Medical Research Institute of Infectious Diseases (USAMRIID), also called the Institute.

Preston takes us to 1983 and introduces us to Nancy Jaax (a Major at the time) and her husband Jerry Jaax, both of whom are veterinarians in the US Army. Nancy works in a Level 4 laboratory at USAMRIID, meaning she handles diseases that have no vaccine or cure with the protection of a **spacesuit**.

Heading research on Ebola at the Institute is Eugene Johnson (Gene), who has hunted Ebola for decades—most scientists are too scared of the virus to work with it. He injects monkeys with Ebola Zaire (using a strain taken from a now-dead nurse named Mayinga) and then attempts to cure them. It is Nancy's job, along with her superior, Colonel Anthony Johnson (Tony), to dissect the monkeys when the cures fail (as they always do). After the laborious process of putting on a spacesuit, Nancy and Tony enter the hot zone and begin their dissection. They continue until Tony notices a tear on Nancy's outer **glove** (they both wear three layers). She exits the dissection room immediately and is horrified to see that the blood has gotten to her innermost glove—but it has not touched her hand. She has just barely escaped exposure. The experiment ends soon after this incident—but not before Gene and Nancy discover that Ebola is able to mutate and make itself airborne.

Preston describes the spread of Ebola Sudan in 1976, which was made worse by the use of unclean **needles** to inject patients, and Ebola Zaire, which kill is what killed Mayinga. He recounts how a team of American doctors identified the Ebola virus and traveled to Africa to try to treat and study it.

Back in 1987, Gene Johnson receives samples of blood from a deceased Danish 10-year-old named Peter Cardinal. He finds that the blood has Marburg within it, and is surprised to learn that Peter, like Charles Monet, had explored Kitum Cave.

Clearly, somewhere within the cave, the virus lurks. Gene Johnson attempts a massive experiment to find its source in the cave, but is unsuccessful.

Meanwhile, Nancy and Jerry are both promoted, becoming lieutenant colonels. Nancy becomes chief of pathology at USAMRIID, while Jerry becomes the head of its veterinary division.

We move to Reston, VA, a suburb of Washington, DC, in 1989. In Reston there is a facility called the Reston Primate Quarantine Unit, which stores monkeys that will soon be shipped to labs across the US. It is overseen by veterinarian Dan Dalgard, who begins to notice in October that an unusual amount of monkeys seem to be dying. By November the mysterious disease is still spreading, and Dalgard decides to consult the Institute. He sends samples to a scientist named Peter Jahrling, who in turn sends them to an employee named Thomas Geisbert for analysis under a powerful electron microscope. The two are surprised to find that the cells within the samples are essentially destroyed. Checking for contamination, they take a whiff of the culture, but smell nothing. They come to believe that the virus is probably simian hemorrhagic fever, which is lethal to monkeys but harmless to humans.

When the cells are at last ready to be viewed under the electron microscope, however, Geisbert makes a startling discovery: whatever is infecting the monkeys is a filovirus, and both he and Jahrling may have been exposed. They immediately find Gene Johnson, and go with him to inform Colonel Clarence James Peters (C. J.)—although they keep their potential exposure a secret. They inform Dalgard that something may be amiss, and continue to study the virus. Eventually Jahrling makes another disturbing finding: the virus is either Ebola Zaire—the deadliest form of filovirus—or a very close relative.

The news moves up the chain of command, and the men inform Nancy Jaax, as well as Colonel David Huxsoll, the commander of USAMRIID. He in turn contacts Major General Philip K. Russell, who oversees the Institute. The group decides that they need to inform Dalgard, the local authorities, the Pentagon, and the C.D.C.

Dan Dalgard, meanwhile, remains calm, until he hears that an employee of his, Jarvis Purdy, has had a heart attack—and he fears that it may have been caused by Ebola. A USAMRIID team picks up samples and corpses from the monkey house, and then returns to the Institute. Nancy begins to dissect the bodies, while C. J., General Russell, Gene Johnson, and Dan Dalgard participate in a giant meeting to discuss what to do. After some tension with the C.D.C.—especially the talented but hot-tempered Dr. Joseph B. McCormick, one of the few men on Earth who has actually treated human cases of Ebola—the group decides that the Army will be in charge of euthanizing the infected monkeys.

C. J. contacts Jerry Jaax, who will be involved in the operation as well. Jerry begins to plan with Gene Johnson, seeking to euthanize the animals humanely while ensuring that both civilians and his team remain safe.

After a day of preparation, the operation begins in utmost secrecy, so as not to alert the press and cause mass panic among the public. Soldiers put on spacesuits and begin to euthanize infected monkeys—a dangerous process, considering the monkeys' sharp teeth and the potential for infection. Nancy dissects some of the dead animals, whose bodies have been essentially destroyed by the virus. Meanwhile another employee of the monkey house, Milton Frantig, begins vomiting—he is immediately rushed into an ambulance. Dan Dalgard decides that he must give the Army permission to euthanize all of the monkeys in the house, since any of them might be infected.

Jerry organizes a team of young soldiers to enter the building, euthanize the monkeys, and collect samples. The operation is draining, dangerous, and horrific as the soldiers trap, inject, and dissect hundreds of monkeys. Still it goes relatively smoothly, with a few close calls as news vans attempt to drive by and investigate. On the second day, however, a monkey escapes—but the next day Jerry is finally able to catch it. Peter Jahrling, meanwhile, runs tests on Milton Frantig's blood, as well as Tom Geisbert's and his own, and none of the men appear to have Ebola.

The operation ends, and a team begins to decontaminate the building, killing every life form inside of it. The entire episode has created a mystery: if this disease is indeed Ebola Zaire, why have no humans gotten sick?

Months go by, more monkeys are imported, and yet another wave of Ebola sweeps through the monkey house, exposing another employee to the virus. This time, the Army decides to let the monkeys die out, since the virus seems to pose little danger to humans. Soon after, however, it is found that Jarvis Purdy, Milton Frantig, and two other Reston employees have the virus in their blood, and yet they remain symptomless. This means that the virus can travel through the air, but does not cause harm within humans. A fourth strain of the virus has emerged: Ebola Reston. It is almost identical to Ebola Zaire, except that it can move through the air, and it does not affect humans. A tiny change in its genetic code, however, could make this virus truly deadly.

In August 1993, Preston decides to travel to Kitum Cave himself. He drives along the **Kinshasa Highway** with a guide and some friends, and describes how the building of the highway made possible the spread of HIV. In other words, AIDS is a symptom of globalization. The team reaches Kitum Cave, and the Preston puts on a rudimentary spacesuit in order to protect himself from the virus that may live inside. He explores the cave and is awed by the wonder and the mystery of the place, yet at every turn, he sees the potential for infection. He emerges and immediately decontaminates and disposes of everything he wore, yet is still terrified that he may have been infected with Marburg.

Preston contemplates the link between the emergence of tropical viruses like Ebola and HIV and the human destruction of the tropical biosphere. He wonders if maybe these viruses are nature's immune response to the parasitic "infection" of the human race, and speculates that a virus more deadly than HIV may one day emerge to wipe humans from the face of the planet.

Preston takes one last trip, this time to the abandoned monkey house in Reston. Inside he sees plants and insects, as the life cycle reemerges in a place that once harbored a deadly virus. Ebola, he thinks, has disappeared for the time being. But, he warns, "It will be back."

CHARACTERS

MAJOR CHARACTERS

Richard Preston – Although through much of *The Hot Zone* Richard Preston functions as a kind of disembodied third-person narrator, in the final section of the book, he becomes a character in his own right. In deciding to visit **Kitum Cave** in full **spacesuit gear**, Preston displays his own human curiosity and his dedication to his research. After visiting both the cave and the Reston Primate Quarantine Unit, he develops an even more personal relationship to his work, realizing how fragile his own life is, and how easily the human race could be decimated by a virus such as Ebola.

Lieutenant Colonel Nancy Jaax – A brave, dedicated soldier and scientist (trained as a veterinarian), and a woman in a male-dominated field, Nancy Jaax provides *The Hot Zone* with a compelling and relatable protagonist. A loving wife to Jerry, a dedicated mother, and a devoted daughter, Nancy has a streak of courage, stubbornness, and patriotism that drives her to risk her life over and over for the sake of the general public. During the Reston Ebola scare, she plays a pivotal role in the decision to isolate and decontaminate the Reston Primate Quarantine Unit, eventually dissecting Ebola-infected monkeys despite the great personal risk this entails.

Lieutenant Colonel Gerald (Jerry) Jaax – Like his wife Nancy Jaax, Jerry is devoted to his family, but does not hesitate to risk his life during the USAMRIID operation to contain the Ebola virus within the Reston Primate Quarantine Unit. Although he doesn't feel comfortable with his wife handling Ebola during research at USAMRIID, Jerry himself ends up leading the team that must enter the contaminated building and euthanize hundreds of infected monkeys. At every turn Jerry is courageous but cautious, consistently putting the needs of his soldiers above his own.

Eugene (Gene) Johnson – Although a civilian, Gene Johnson runs the Ebola research division of USAMRIID. He has traveled the world studying rare and deadly viruses, and has a reputation for being brilliant but unconventional. His immense knowledge of diseases such as Ebola has instilled within him a deep fear of them. Despite the fact that he has terrifying nightmares about Ebola, one of Johnson's most powerful wishes is to find the ultimate source of the disease. In an effort to do so, he headed an expedition to **Kitum Cave**, but was unable to find the virus's host organism.

Charles Monet – A Frenchman who lives in Kenya near **Kitum Cave** in 1980, Monet contracts Marburg after visiting the cave. His swift and horrifying decline is described in excruciating detail. Most terrifying of all is the fact that after he grew ill, Monet's doctors put him on a commercial flight to a hospital in Nairobi, potentially exposing millions of people across the world to Ebola through air travel. Monet eventually hemorrhages on the floor of the hospital's waiting room, infecting Dr. Shem Musoke and dying shortly afterwards.

Colonel Clarence James Peters (C. J.) – The chief of the disease-assessment unit at USAMRIID, C. J. Peters (like Gene Johnson) has traveled far and wide studying rare infections diseases. Although a military man, Peters favors Hawaiian shirts and sandals, displaying an untraditional and quirky attitude. A worldly man with exotic tastes in food (termites, for instance), Peters also sometimes makes enemies (such as CDC scientist Dr. Joseph McCormick) and has a difficult relationship with Gene Johnson as well.

Peter Jahrling – A civilian virologist at USAMRIID, Jahrling is one of the first at the Institute to realize that the monkeys at the Reston Primate Quarantine Unit are infected with Ebola. He is an expert on monkey viruses, and specializes in virus defense. Before the Reston incident, Jahrling has scrupulously avoiding Marburg and Ebola because of how deadly they are. Along with Thomas Geisbert, Jahrling puts his life at great risk by unknowingly sniffing a vial that contains Ebola virus, despite his reputation as a careful man. After this exposure, he works tirelessly to study the strain and to decontaminate the monkey house, and he does not become ill.

Thomas Geisbert – An intern at USAMRIID who specializes in using the Institute's super-powerful electron microscope, Geisbert takes the initial pictures that identify the Reston virus as Ebola. Like Peter Jahrling, he is potentially exposed to the virus when the two men sniff a vial full of it (unaware that the agent within it is Ebola).

Dan Dalgard – As the consulting veterinarian at the Reston Primate Quarantine Unit, Dalgard is the first to realize that something is very wrong with the monkey colony. Although he is a reputable and skilled veterinarian, he is incredibly hesitant about letting USAMRIID take control of his facility. Dalgard also keeps a diary throughout the events, which provides Preston with crucial information about the sequence of events leading up to the decision to euthanize all of the Reston monkeys.

Dr. Joseph B. McCormick – Chief of the Special Pathogens Branch of the CDC, McCormick has a great deal of personal enmity towards C. J. Peters, and believes that the CDC, not USAMRIID (a branch of the army), should take control of the Reston Primate Quarantine Unit after Ebola is discovered there. When Ebola ravaged Sudan in 1979, McCormick was on the scene and worked tirelessly both to research the disease and aid his dying patients. After sticking himself with a contaminated needle, he believed that he, too, would soon die of Ebola, and decided to spend his last days helping the sick. He did not fall ill, however, because the needle was actually contaminated with malaria, not Ebola. As a result, he does not believe that Ebola can be easily transmitted.

Dr. Frederick Murphy – Now the director of the National Center for Infectious Diseases at the CDC, Dr. Murphy was one of the scientists who discovered Ebola, who helped name it, and who took pictures of it with an electron microscope to help others identify it. A friend of Major General Russell's, he helps USAMRIID scientists to identify the Reston virus as Ebola by looking at the pictures taken by Thomas Geisbert.

Dr. Karl Johnson – Another co-discoverer of the Ebola virus along with Dr. Frederick Murphy, Johnson was a virus hunter who ran the Special Pathogens Branch of the CDC. He also helped research and combat the virus when it appeared in Zaire and Sudan, heading up a team of doctors from the World Health Organization. He is a famous figure in the world of virus hunting, and has discovered some of the most dangerous diseases on the planet. Unlike many other researchers, he finds Ebola beautiful as well as terrifying, and even speculates that a virus wiping out most of the human race might not be an altogether negative thing.

Mayinga N. – A young, smart, and talented nurse in the Democratic Republic of the Congo, Mayinga catches Ebola Zaire (the most deadly type of the virus) from a dying nun. Rather than immediately isolate herself, however, she attempts to hide her sickness because it may jeopardize her ability to travel to Europe on a scholarship. Her travel throughout the city at this time puts millions of people at risk of exposure, and she eventually dies in the very hospital where she once worked. After her death, her **blood** is shipped to USAMRIID for research, and later it nearly infects Nancy Jaax.

Peter Cardinal – A ten-year-old Danish boy, Peter Cardinal dies of Marburg after visiting **Kitum Cave** in 1985. No one knows, how he contracted the virus, or why his family members did not become ill. Both Gene Johnson and Preston speculate about what infected Peter within the cave, but never draw a definitive conclusion.

Major General Philip K. Russell – Russell is the commander of

the United States Army Medical Research and Development Command, and controls USAMRIID. David Huxsoll notifies him about the Ebola Reston virus, and he in turn consults his friend Frederick Murphy. A figure of authority and intensity, he helps to keep his researchers focused and calm as they attempt to decide what to do about the infection.

Bill Volt – As the colony manager at the Reston Primate Quarantine Unit, it is Bill Volt who calls Dan Dalgard to tell him that the monkeys at the facility are dying in unusually large numbers. He also delivers the infected monkey corpses to the USAMRIID scientists and soldiers after Dalgard initially refuses to let them into the building itself. He does not seem to truly understand the gravity of the situation until two of his employees fall ill, at which point he begins to panic (although neither of them ends up getting sick from Ebola).

MINOR CHARACTERS

Lieutenant Colonel Anthony Johnson (Tony) – Nancy Jaax's direct superior when she first begins working with Ebola, Tony Johnson eventually recommends her to become chief of pathology at USAMRIID. He works closely with Nancy in studying Ebola, and notes her bravery and her coolness under pressure.

Colonel David Huxsoll – The commander of USAMRIID, David Huxsoll is quickly notified by Peter Jahrling and C. J. Peters when they identify the Reston virus as Ebola. He also eventually brings Nancy Jaax into the discussion.

Dr. Peter Tukei – A scientist at the Kenya Medical Research Institute, Dr. Tukei helps his friend Gene Johnson investigate the death of Peter Cardinal, and particularly its connection to **Kitum Cave**.

Dr. David Silverstein – An American doctor with many high-profile patients in Kenya, Dr. Silverstein treats Shem Musoke and alerts the authorities to the potentially massive threat that the virus poses to the Kenyan public. He also treated Peter Cardinal.

Robin MacDonald – Preston's guide when he goes to **Kitum Cave**. Although Robin MacDonald knows little about the Ebola virus, he has a deep knowledge of the power and danger of nature.

Dr. Shem Musoke – After treating Charles Monet in Nairobi and being exposed to a huge amount of the infected man's **blood** and vomit, Dr. Musoke becomes ill with Marburg. He eventually survives the sickness, although he remembers nothing about his near-death experience.

Lieutenant Colonel Ron Trotter – A close friend of Nancy Jaax, Ron Trotter assists her in dissecting the infected monkeys from Reston.

Milton Frantig – An employee of the Reston Primate Quarantine Unit, Frantig eventually begins vomiting outside the building during USAMRIID's operation. Despite having been exposed to Ebola, however, he never falls ill.

Jarvis Purdy – Purdy experiences cardiac arrest after working in the Reston Primate Quarantine Unit, but like Milton Frantig, he never becomes ill from Ebola.

John Coleus – Another employee of the Reston Primate Quarantine Unit. Although he cuts his finger on a scalpel while dissecting an Ebola-infected monkey, he too never becomes ill from the virus.

Joel Breman – A CDC doctor who accompanied Karl Johnson during his work in Zaire.

Dr. Antonio Bagshawe – Shem Musoke's physician in Nairobe. Antonio Bagshawe treated him while he was ill with the Ebola that he'd contracted from Charles Monet.

Frederic Grant (Fred) –Preston's friend, Frederic Grant accompanies him on his expedition to **Kitum Cave** along with Jamy Buchanan.

Jamy Buchanan – Along with Fred Grant, Jamy Buchanan is a part of the Preston's journey to **Kitum Cave**.

PFC Nicole Berke – Only eighteen, Nicole Berke nevertheless is included as part of the team commanded by Jerry Jaax that is tasked with euthanizing the monkeys of the Reston Primate Quarantine Unit.

PFC Charlotte Godwin – Another young member of Jerry Jaax's team that euthanizes the Reston Primate Quarantine Unit monkeys. Charlotte Godwin eventually performs necropsies on the infected monkeys, before leaving the facility along with Rhonda Williams and hiding from reporters.

Specialist Rhonda Williams – A member of Jerry Jaax's team that takes control of the Reston Primate Quarantine Unit. Rhonda Williams becomes alarmed when her **spacesuit**'s battery begins to die (which would leave her without oxygen in the Ebola-contaminated building). After having her battery replaced, she leaves the facility with Charlotte Godwin.

Thomas Ksiazek – An Army scientist who attempts to develop a rapid test for Ebola to determine whether people are infected.

Sergeant Swiderski – A soldier at USAMRIID whom Jerry Jaax does not send into the Reston primate Quarantine Unit because she is pregnant, and he knows the devastating effects that Ebola has on pregnant women.

Charles Monet's friend – This nameless woman accompanies Charles Monet to **Kitum Cave**, and sleeps with him. It is unclear, however, whether she falls ill along with him, as no one remembers who she is.

Mr. Jones – A British veterinarian who recalls the corrupt and careless corporate practices that may have led to the 1967 Marburg outbreak in Germany.

Klaus F. – An employee of the Behring Works vaccine factory in

Germany who becomes infected in 1967 by the monkeys that the factory uses. He is the first known human victim of Marburg.

Heinrich P. – An employee of the Behring Works vaccine factory in Germany who contracted Marburg.

Renate L. – A Behring Works vaccine factory employee who broke a contaminated test tube and subsequently became infected with Marburg.

Hans O. -V. – A man who became infected with Marburg in Germany, and eventually died of a brain hemorrhage.

Margaretha Isaäcson – The doctor who cared for Mayinga N. when she contracted Ebola. Despite treating Mayinga without a mask, Dr. Isaäcson never contracted Ebola.

Patricia Webb – A CDC virologist who was once married to Karl Johnson, and who studied Ebola with him.

President Mobutu Sese Seko – The maximum leader of Zaire, the president activates his army after hearing about Mayinga N.'s infection and its potential to spread.

Curtis Dunn – Nancy Jaax's father, who falls terribly ill with cancer at the same time as the Reston Primate Quarantine Unit crisis begins. Nancy does not travel home for his death because she feels doing so would mean deserting her post.

Jaime Jaax – Nancy and Jerry Jaax's daughter, and an avid gymnast.

Jaison Jaax – Introverted and independent, Jaison is Nancy and Jerry Jaax's son.

John Jaax – A businessman from Kansas City and Jerry Jaax's beloved brother, John Jaax's mysterious murder plunges Nancy Jaax's husband into a deep and lasting depression.

Ada Jaax – Jerry and John Jaax's mother. Ada is still grieving for her son's mysterious and untimely death.

Sergeant Thomas Amen – An army buddy of Jerry Jaax's, Thomas Amen is one of the first soldiers (along with Jerry) to enter the infected Reston Primate Quarantine Facility.

Captain Mark Haines – A trusted member of Jerry Jaax's USAMRIID team that takes control of the Reston Primate Quarantine Facility, Mark (along with Jerry) is one of the first soldiers to put on a spacesuit. He is also a former Green Beret scuba diver, and is now an Army veterinarian.

Sergeant Curtis Klages – A member of Jerry Jaax's Reston Primate Quarantine Facility team, Sergeant Klages discovers a freezer full of frozen infected monkey corpses.

Roy Baron – A CDC doctor who traveled to Sudan along with Joe McCormick.

Dr. Imre Lofler – The surgeon at Nairobi Hospital who leads the operation on the infected Dr. Shem Musoke.

Schoolteacher – An employee of a Belgian mission in Zaire, and the first known victim of Ebola Zaire.

Sister M. E. – Another victim of the strain of Ebola Zaire contracted by the schoolteacher.

Sister E. R. – A friend of Sister M. E. who also contracted Ebola Zaire and died.

Yu. G. – A Sudanese shopkeeper who was the first known patient to contract Ebola Sudan.

P. G. – A co-worker of Yu. G. who contracted Ebola Sudan. Because of his popularity, he infected many others.

Mehrl Gibson – A civilian animal expert, Mehrl Gibson is a member of Jerry Jaax's USAMRIID team.

Major Nathaniel Powell – An officer on Jerry Jaax's USAMRIID team.

Captain Steven Denny – Another officer on Jerry Jaax's USAMRIID team.

Captain Elizabeth Hill – Another officer on Jerry Jaax's USAMRIID team.

Boniface – A man who died of Ebola Sudan, and whose blood USAMRIID possesses.

Iain Redmond – An expert on elephant behavior, Iain Redmond lived in **Kitum Cave** for three months to be closer to an elephant herd, but he never contracted Marburg.

Joan Rhoderick – A civilian technician at USAMRIID, Joan Rhoderick works with blood samples from Monkey O53, and notices that there is something strange about them.

Anthony Sanchez – A researcher in the C.D.C.'s Special Pathogens Branch who analyzes the genetics of Ebola Zaire and Ebola Reston along with Heinz Feldmann.

Heinz Feldmann – A researcher in the C.D.C.'s Special Pathogens Branch who analyzes the genetics of Ebola Zaire and Ebola Reston along with Anthony Sanchez.

John Weaver – John Jaax's former business partner, John Weaver is suspected of murdering Jerry Jaax's brother's.

Officer Reed Buente – The detective who investigates John Jaax's death.

Carrie MacDonald – Robin MacDonald's wife and business partner, she accompanies the group to **Kitum Cave**.

Katana Chege – One of Robin and Carrie MacDonald's safari staff on the journey to **Kitum Cave**.

Herman Andembe – One of Robin and Carrie MacDonald's safari staff on the journey to **Kitum Cave**.

Morris Mulatya – One of Robin and Carrie MacDonald's safari staff safari staff on the journey to **Kitum Cave**.

Polycarp Okuku – The Mount Elgon guard assigned to protect the Preston's traveling party from poachers.

Johnnie – Charles Monet's housekeeper.

Iain MacDonald – Robin MacDonald's father, and a famous professional hunter in Africa.

Daniel arap Moi – The president of Kenya, and a patient of Dr. David Silverstein.

Diana, Lady Delamere – An English noblewoman, and a patient of Dr. David Silverstein.

Beryl Markham – An aviator and memoirist from East Africa, and a patient of Dr. David Silverstein.

Monkey O53 – The monkey dissected by Dan Dalgard, samples from which eventually are sent to USAMRIID and examined by Peter Jahrling, Joan Roderick, and Thomas Geisbert.

Herky – An African parrot, and Nancy Jaax's pet.

Sampson – A python, and Nancy Jaax's pet. At one point he escapes and then surprises Nancy in her study.

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.

THE POWER OF NATURE

The power of nature is an ever-present theme throughout *The Hot Zone*. Ebola represents this power at its purest and most destructive—no matter how much human technology evolves, and no matter how much humans attempt to protect themselves, Ebola always finds a path for infection. In fact, Ebola even uses human innovation—in the form of faster and better modes of travel, like highways and planes—to spread faster and farther than ever before. An ancient, powerful, and incredibly simple life form, Ebola is microscopic, yet is nearly undefeatable when it attacks the human immune system. The monkeys of the Reston Primate Quarantine Unit, too, demonstrate how powerful and pervasive nature is. Deceptively strong, fast, and aggressive, the monkeys put up a fight against their human handlers (and eventually executioners) at every turn. At the end of the book, Richard Preston, the author, confronts the power of nature firsthand in the form of the menacing **Kitum Cave**. While within the cave, a source of several documented cases of Ebola, Preston senses the presence of something ancient and powerful lurking within its depths. This presence—which Preston associates with nature itself—is unknowable and unstoppable. In fact, Preston speculates at the end, nature may one day use Ebola (or a similarly powerful virus) as a kind of cure to combat the destructive and omnipresent human race.

HUMAN ERROR AND FRAGILITY

With in-depth research and excruciating detail, Preston makes clear that the spread of viruses like Ebola and HIV is often due to human error. Whether eating contaminated animal meat, spreading infections through sexual intercourse, building highways that become pathways for epidemics, or sticking themselves with infected needles, humans are constantly exposing themselves to devastating and destructive diseases. By focusing on the Ebola outbreak in Reston, Virginia—a peaceful and quiet suburban neighborhood—Preston makes clear how fragile everyday life really is, and how easily it could be wiped out by any number of emerging diseases. Even taking precautions—such as wearing **spacesuits and gloves**—does not provide a foolproof method of stopping infection. Spacesuits rip, oxygen runs out, and gloves can be punctured by syringes (or aggressive monkeys). In this context **blood**, too, becomes a powerful symbol of human fragility. Although blood ordinarily carries energy and nutrition, an infected person's blood becomes a carrier of disease, and exposure to a single drop can mean contamination and even death.

GLOBALIZATION

Throughout *The Hot Zone*, Richard Preston emphasizes how globalization has made worldwide pandemics a real and present danger for the human race. When Charles Monet falls ill at the beginning of the book, he boards an airplane, an act that could easily have spread Ebola throughout the world. Although Mayinga N. knows that she is sick, she still travels all around a populated and crowded city, another instance in which a pandemic could have begun. **Kinshasa Highway**, another emblem of progress, actively helped to facilitate the spread of HIV/AIDS. A plane, a city, a highway—all of these are common elements of modern life, and have helped to make the world feel ever smaller and more interconnected. This kind of globalization is supposed to make life easier, but when it comes to the spread of disease, it can instead extinguish life entirely. Perhaps the most powerful example of the dangers globalization poses is the monkeys in the Reston Primate Quarantine Unit. They are imported from the Philippines to Virginia, and somehow manage to bring an African virus to American shores, demonstrating the ways that Ebola has adapted to and taken advantage of the modern world.

INNOVATION AND CURIOSITY VS. HUBRIS

In *The Hot Zone*, Richard Preston chronicles the incredible medical and technological advances of the 20th and 21st centuries. Yet he also makes clear that human curiosity and advancement can go too far, and can in

fact end up aiding destructive diseases such as Ebola. While human innovation is useful and life-saving, human hubris—excessive self-confidence, in this case involving innovation and curiosity—can be destructive and deadly. The Reston Primate Quarantine Unit provides a perfect example of the double-edged sword of human innovation. The monkeys in that facility are imported so that scientists can use the primates for research, yet in the events Preston describes the monkeys actually pose incredible danger to humans, whom they could easily have infected with the Ebola that they carry. Countless examples of curiosity that verges on hubris run through the book, such as when USAMRIID scientists sniff a vial of Ebola and potentially infect themselves. At the end of the narrative, Preston himself becomes an emblem of both human curiosity and human hubris. He decides to enter **Kitum Cave**, which he knows is infected with Ebola, in order to see it for himself. Although he emerges unscathed, he acknowledges how foolish the decision was, and how fearful he was of being infected.

BRAVERY AND TEAMWORK

Although much of *The Hot Zone* is pessimistic and even terrifying, one of its few bright spots is the consistent bravery and teamwork shown by researchers of Ebola, especially the army scientists and soldiers at USAMRIID. Nancy Jaax and her husband Jerry Jaax are prime examples, putting their lives at risk and sacrificing other aspects of their lives in order to ensure that others are safe from a potential Ebola outbreak. Jerry's team of soldiers, too, displays how vital these qualities are in order to stem the spread of the virus. Although they have a hellish and terrifying job—killing hundreds of Ebola-infected monkeys—they do so with dedication and discretion, understanding that they may need to sacrifice themselves for the good of the general public. Many doctors and researchers with these values appear within the book (such as Dr. Shem Musoke, who contracts Ebola while caring for patients, and Gene Johnson, who tirelessly works to fight Ebola despite the fact that it terrifies him), and it is thanks to them, Preston implies, that the rest of us are able to live our lives oblivious to the dangerous world of pathogens all around us.

SYMBOLS

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

MOUNT ELGON AND KITUM CAVE

To Ebola experts, Preston, and the reader, **Mount Elgon and Kitum Cave** represent the center of the mystery that is Ebola. Somewhere within that cave lurks the host of the virus—the animal that doesn't become ill with the disease, but is able to infect other species with it. Despite travelling to Mount Elgon himself, at great personal risk and effort, Preston is never able to unlock the secret of Kitum Cave. A location filled with both beauty and danger, the cave marks the contradictory essence of nature. No matter how extensively humans explore Kitum Cave, they can never find the source of Ebola—similarly, no matter how long humans research the inner workings of nature, they will never unlock all of its secrets.

SYRINGES AND NEEDLES

Syringes and needles are a powerful and double-edged symbol within *The Hot Zone*. On one hand, they can deliver life-saving medicine quickly and effectively. On the other hand, a contaminated syringe is incredibly dangerous, and can infect doctors and other healthcare professionals with the very diseases they are fighting against. Near the climax of *The Hot Zone*, syringes and needles also become tools of death, as the soldiers headed by Jerry Jaax use them to lethally inject the Ebola-infected monkeys in Reston. Syringes and needles thus represent the simultaneous benefits and dangers of human technology.

SPACESUITS AND GLOVES

Multiple characters in The Hot Zone use **spacesuits and gloves** in order to protect themselves from infectious diseases, especially Ebola. Over and over again, however, Preston makes clear how fragile and unreliable these seemingly foolproof protective measures really are. At the very beginning of the book, Nancy Jaax is nearly exposed to Ebola-infected blood because of a tear in her spacesuit cuff and glove. When USAMRIID enters the infected Reston monkey house, there are several close calls involving Ebola-contaminated monkeys. At the end of the book, meanwhile, Preston takes many precautionary measures before entering Kitum Cave, and yet still warns his friends that he may be infected with Ebola. Despite humans' best efforts, Preston implies, nature will always find a way to prevail.

BLOOD AND BLEEDING

Blood is yet another multifaceted symbol within *The Hot Zone*. Although it carries life and nutrients throughout the human body, blood also acts as a carrier of infectious disease. In the case of Ebola, blood is the most dangerous and common way that the virus can be spread. Throughout the book, Ebola-infected blood appears in many different forms—it trickles from victims' eyes and noses, gushes from infected mothers during miscarriages, and threatens to overflow out of corpses during autopsies. Yet at the same time, despite its danger, infected blood is also the most useful and

constructive tool for scientists who hope to study and combat Ebola. On a microscopic level, looking at blood with Ebola in it allows researchers to identify and dissect the virus, and to understand its methods of infection. Blood, therefore, represents the ever-present danger of infection and contamination, but also symbolizes the best hope for eventually stopping the disease.

KINSHASA HIGHWAY

Kinshasa Highway, which spans the width of the continent of Africa, symbolizes the dangers of globalization and innovation. Paved in the 1970s, the increased traffic on that road greatly facilitated and sped up the spread of HIV/AIDS. In fact, Preston goes so far as to rename Kinshasa Highway "AIDS Highway" for the large role that it played in the disease's destructive toll on the human race. To Preston, Kinshasa Highway emblemizes an innovation that appeared useful and groundbreaking at the time, but ended up causing destruction and death as it helped the spread of a deadly virus. He uses Kinshasa Highway as a warning for his readers, meaning for us to understand that other elements of our modern world could easily be turned against us by ancient viruses.

QUOTES

Note: all page numbers for the quotes below refer to the Anchor Books edition of *The Hot Zone* published in 1999.

Part 1, Chapter 1 Quotes

[S]omething was making copies of itself inside Monet. A life form had acquired Charles Monet as a host, and it was replicating.

Related Characters: Richard Preston (speaker), Charles Monet

Related Themes:

Related Symbols:

Page Number: 11

Explanation and Analysis

After hiking in Kitum Cave, Charles Monet has unknowingly contracted the Marburg virus. The ominous tone that Preston strikes in this quote is appropriate, given the potentially disastrous circumstances that he is describing (and it also sets the tone for the book as a work of "non-fiction horror"). Although Marburg rarely infects humans, when it does, the results are nothing short of disastrous.

This passage brings up a pattern that recurs repeatedly in the book: that of humans as vectors for disease. Over and over again we will see people living their day-to-day lives—boarding planes, shopping at markets, going to work—unaware that they are in fact exposing others to deadly viruses. To these "life form[s]," we are nothing but excellent hosts, perfectly suited to helping them spread and replicate. As of this moment, Monet is a virus's host. Although he may not show symptoms yet, Marburg has begun incubating, and the things living inside of him will soon render him fatally ill.

When you begin probing into the origins of AIDS and Marburg, light fails and things go dark, but you sense hidden connections. Both viruses seem part of a pattern.

Related Characters: Richard Preston (speaker)

Related Themes:

Related Symbols:

Page Number: 34

Explanation and Analysis

As he often does within the book, Preston here compares the Ebola family of viruses with HIV/AIDS. The major difference, of course, is that AIDS has become a worldwide pandemic, while Ebola is (at least for now) confined to certain parts of the African continent. The "pattern" to which Preston refers is the increase of viruses that originate in animals, such as Ebola, HIV, swine flu, and Zika making their way towards infecting the human race.

Preston implies frequently throughout the book that this upswing in such viruses has to do with human globalization, and our increased encroachment on the natural environment. He believes that as humans continue to populate the globe, such outbreaks and pandemics will become more and more frequent. These diseases will only be aided by modern conveniences such as planes and trains, which make it even easier for diseases to spread quickly across continents.

The "pattern" that Preston describes is a foreboding one, especially if you believe, as he does, that it is going to occur more and more frequently in the years to come. This belief sits at the center of *The Hot Zone*, and is responsible for the book's continued relevance long after its publication.

Ebola has not yet made a decisive, irreversible breakthrough into the human race, but it seemed close to doing that. It had been emerging in microbreaks here and there in Africa. The worry was that a microbreak would develop into an unstoppable tidal wave. If the virus killed nine out of ten people it infected, and there was no vaccine or cure for it, you could see the possibilities. The possibilities were global.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 49

Explanation and Analysis

As Preston discusses the history and pathology of the Ebola virus, he notes that Ebola has yet to infect large numbers of people at once. This quote is notable because it is no longer true. *The Hot Zone* was written in 1994, a full decade before the West African Ebola outbreak of 2014-2015. Tragically, when this epidemic did hit, many of Preston's predictions were proven true. With no cure and horrific symptoms, Ebola devastated the countries of Liberia, Sierra Leone, and Guinea. Although the epidemic spurred a new wave of Ebola research, this did not come soon enough to save the lives of tens of thousands of people.

Preston's direst prediction, however—that the disease might spread on a global scale—did not come to pass. This salvation is most likely due to the fact that this strain Ebola was not transmitted through the air. Yet as Preston notes, viruses excel at mutating in order to become more contagious, and an airborne strain of Ebola could still be on the horizon.

Part 1, Chapter 6 Quotes

They were two human primates carrying another primate. One was the master of the earth, or at least believed himself to be, and the other was a nimble dweller in trees, a cousin of the master of the earth. Both species, the human and the monkey, were in the presence of another life form, which was older and more powerful than either of them, and was a dweller in blood.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 62

Explanation and Analysis

As Army scientists Nancy Jaax and Tony Johnson of USAMRIID prepare to dissect a monkey that has been purposely infected with Ebola, Preston describes them in very different terms. He makes sure to note the humans' kinship to the monkey, reminding readers that genetically, we are all primates, and therefore very similar when it comes to contracting Ebola. This fact will be particularly significant when it becomes clear that the Ebola virus infecting the Reston monkey house is fatal to monkeys, but completely harmless to humans—an unspeakably lucky genetic mystery.

Preston also takes care to emphasize how much "older and more powerful" Ebola is than either monkeys or humans. Although humans are "master[s] of the earth," taking over and studying everything that we find, we can easily be laid low by microscopic organisms such as viruses. Specifically evolved to infect and spread, viruses have existed on this planet for billions of years longer than the human race. While reading his narrative, Preston wants us always remember this fact, and to view viruses as far more dangerous and powerful than humans could ever dream of becoming.

A virus does not “want” to kill its host. That is not in the best interest of the virus, because then the virus may also die, unless it can jump fast enough out of the dying host into a new host.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 64

Explanation and Analysis

Preston here explains the difference between contagion and deadliness. Although viruses have no free will (they cannot “want” things the way that humans can), they do act in ways that are most beneficial to their survival and reproduction. If a virus kills its host very quickly, then it will have fewer chances to spread to other hosts. In fact, this is one of the reasons that a major Ebola epidemic had yet to break out when Preston was writing this book (and why as of this writing it has yet to go fully global): it is so deadly that it often kills hosts before it can spread to a large number of people.

Contrast the quick incubation period of Ebola with that of HIV/AIDS, which can often lie dormant in its host for over a decade before manifesting as symptoms. Although HIV

spreads even less easily than Ebola, this long period of time without symptoms can allow HIV to jump to many other hosts.

[Nancy] had almost caught Ebola from a dead monkey, who had caught it from a young woman named Mayinga, who had caught it from a nun who had caught it from a nun who had crashed and bled out in the jungles of Zaire in years gone by.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 70

Explanation and Analysis

As he discusses Nancy Jaax's near miss at the Institute, Preston takes care to outline the chain of infection, tracing the Ebola virus strain in question back to its original source: a nun in Zaire. In this way, Preston is able to show how easily a single infected source can spread their illness to many, many others. Even though the nun died many years ago, the virus found in her blood still remains powerful and deadly. Nancy is removed from the nun by both time and space, and yet she was still in grave danger from said virus.

Even as he draws a clear line of infection from Nancy all the way to the original infected nun, Preston also implies the mysterious nature of Ebola's source. We have no idea how the nun he mentions got infected; whether she received Ebola from another human, or whether it made the jump from animal to human. An understanding of this question—how Ebola makes its way into the human populace in the first place—is a crucial one, as it may help scientists and researchers to prevent future outbreaks before they occur.

Part 1, Chapter 7 Quotes

The Ebola virus…retreated to the heart of the bush, where undoubtedly it lives to this day, cycling and cycling in some unknown host, able to shift its shape, able to mutate and become a new thing, with the potential to enter the human species in a new form.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 76

Explanation and Analysis

While narrating the tapering off of the Zaire epidemic, Preston emphasizes that the end of an epidemic does not mean the end of a virus. Just because this particular outbreak burned itself out doesn't mean that the disease will not return to infect the human race again. Indeed, just the opposite is true. Viruses evolve at an incredibly fast rate, and the Ebola virus in particular lives in an unknown host. This means that humans could easily come into contact with an animal infected by a new form of Ebola—one that can perhaps infect humans more easily—without even knowing it, especially considering the increased invasion by humans of the natural environment.

What makes Preston's ominous statement so tragic is that this is exactly what occurred in West Africa Ebola Epidemic from 2013-2015. The virus mutated, became more infectious, and struck, killing tens of thousands of people. Preston's prediction has been proven correct, but under terrible circumstances.

Ebola Zaire attacks every organ and tissue in the human body except skeletal muscle and bone. It is a perfect parasite because it transforms virtually every part of the body into a digested slime of virus particles.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 79

Explanation and Analysis

As Preston continues to explore the causes and effects of Ebola, he describes in great detail what the virus does to its hosts. In this passage he focuses on Ebola Zaire, the most deadly of the Ebola viruses, which kills nine out of ten of the people that it infects. As Preston calls the virus "the perfect parasite," it is important to remember that Ebola is transmitted through bodily fluids. Thus by turning the body into "digested slime," Ebola Zaire is essentially transforming its host into a walking, breathing vector for infection. When they emit bodily fluids (in the form of blood, vomit, saliva, stool, etc.), they increase the risk of infection for everyone around them.

This passage also hints at why exactly Preston has chosen to focus on Ebola. While the virus brings up interesting issues

surrounding globalization, environmentalism, and modernization, it is also an organism that appears uniquely suited to destroy humans—and this fact makes it an intriguing subject for the kind of "horror" book Preston is writing. Preston is fascinated and terrified by Ebola, fearing its destruction but marveling at its perfection.

Mr. Preston: Unless you include the feeling generated by gazing into the eyes of a waving confrontational cobra, "fascination" is not what I feel about Ebola. How about shit scared?

Related Characters: Dr. Karl Johnson (speaker), Richard Preston

Related Themes:

Page Number: 90

Explanation and Analysis

Richard Preston seeks out Dr. Karl Johnson, one of the leading experts in Ebola. A virus hunter for the CDC during the Ebola outbreak in Zaire, Johnson was the first scientist to isolate an Ebola virus particle, and thus earned the right to name the disease. Now retired, he writes to Preston to explain his feelings about Ebola, describing himself as "shit scared" of the virus. It is also fascinating, however, that he describes Ebola as a "confrontational cobra."

Although Ebola is not a thinking predator the way a cobra is, it does seem to have the same menacing quality for all who come across it. At the same time, scientists and journalists (such as Preston) alike seem entranced by the disease, even sometimes describing it as beautiful—in this way, we are like prey being hypnotized by a predator such as a cobra. Although Johnson may not have meant to, he has helped to explain why so many are drawn to study the disease, and why Preston himself feels compelled to write about it.

Part 1, Chapter 8 Quotes

Some of the predators that feed on humans have lived on the earth for a long time, far longer than the human race, and their origins go back, it seems, almost to the formation of the planet. When a human being is fed upon and consumed by one of them, especially in Africa, the event is telescoped against horizons of space and time, and takes on a feeling of immense antiquity.

Related Characters: Richard Preston (speaker), Peter Cardinal

Related Themes:

Related Symbols:

Page Number: 103

Explanation and Analysis

During the chapter in which he describes the death of a young boy of Marburg virus after a day of exploring Kitum Cave, Preston emphasizes the immense age of the Ebola virus. Unlike humans, who evolved fairly recently (and even more recently became the Earth's dominant life form), viruses have existed on Earth for billions and billions of years. Described as "predators," they have evolved to maximize their ability to spread, their age contrasting with the very short amount of time that we humans have been studying them.

As Preston describes the death of the boy—Peter Cardinal—he highlights the feeling of "antiquity" surrounding the event. Peter is dead after exploring an ancient cave and contracting an even more ancient virus. Although only a child, his death is the product of billions of years of evolution, something humans too often forget.

Gene felt a prickling sensation on his scalp. The paths of Charles Monet and Peter Cardinal had crossed at only one place on earth, and that was inside Kitum Cave. What had they done in the cave? What had they found in there? What had they touched? What had they breathed? What lived in Kitum Cave?

Related Characters: Eugene (Gene) Johnson, Richard Preston (speaker), Charles Monet, Peter Cardinal

Related Themes:

Related Symbols:

Page Number: 106

Explanation and Analysis

Here Preston describes the reaction of researcher Gene Johnson as he realizes that Charles Monet and Peter Cardinal, both of whom died of Marburg virus, each visited Kitum Cave days before their deaths. The "prickling sensation" is because Johnson knows this cannot be a coincidence. Somewhere within Kitum Cave is the source of the Marburg virus. Although a chilling thought, Johnson is

also excited and curious—if he were able to find this source, it would be a huge breakthrough for Ebola research as a whole.

Preston next asks a series of questions, helping his readers to understand all the possibilities that scientists must consider as they study a virus. Marburg might be spread through touch, it might be spread through the air, or it might incubate within an animal found in the cave. Of course, Preston also adds a touch of foreboding to the questions, helping readers to understand how simultaneously terrifying and illuminating such a discovery would be.

Part 2, Chapter 2 Quotes

❝ [Peter Jahrling] had held in his gloved hands virtually every hot agent known, except for Ebola and Marburg. When people asked him why he didn't work with those viruses, he replied, "I don't particularly feel like dying."

Related Characters: Peter Jahrling, Richard Preston (speaker)

Related Themes:

Related Symbols:

Page Number: 132

Explanation and Analysis

During this passage, Preston introduces Peter Jahrling, a well-known virologist who often deals with monkey diseases. Despite his skill and his bravery, however, Jahrling refuses to handle Ebola, explaining, "I don't particularly feel like dying." Preston has included this quote for several reasons: first of all, it is ironic, considering that Jahrling will shortly (and unknowingly) be handling Ebola despite his wishes. Second of all, Preston wishes to emphasize just how dangerous Ebola is considered in the scientific community. Even a courageous and accomplished man like Jahrling believes Ebola too deadly to handle directly.

His attitude contrasts with that of someone like Gene Johnson, who finds the disease both terrifying and fascinating. Attitudes towards Ebola, Preston implies, can help us learn more about the individuals who hold those attitudes. Jahrling, for instance, is cautious and considered, in contrast to Gene, who is far more risk-taking and adventurous—but thus also more prone to the risks of hubris.

❝ A freezer can be as hot as hell. When a place is biologically hot, no sensors, no alarms, no instruments can tell the story. All instruments are silent and register nothing.

Related Characters: Peter Jahrling, Richard Preston (speaker)

Related Themes:

Page Number: 136

Explanation and Analysis

In this passage, Preston narrates the very beginnings of the Reston Monkey House Ebola outbreak. As Dan Dalgard and his employees freeze monkey corpses without realizing what has infected them, the narrator strikes an ominous tone. Without the necessary precautions (which Dalgard and his men are not equipped to take), a freezer will do absolutely nothing to stop the Ebola virus from spreading.

This quote also points towards one of Preston's broader themes: that although humans believe we know a great deal about the natural world, our mechanisms of measurement are extremely limited. There are no tools to tell humans when an area has been contaminated by Ebola. Although we can take certain precautions (spacesuits, gloves, etc.), we have no way of knowing when those precautions are actually necessary. These limitations are especially dangerous in situations like the Reston Monkey House, when humans do not know (and have no reason to think) that a space has become contaminated.

Part 2, Chapter 5 Quotes

❝ He saw virus particles shaped like snakes, in negative images. They were white cobras tangled among themselves, like the hair of Medusa. They were the face of Nature herself, the obscene goddess revealed naked. This life form thing was breathtakingly beautiful. As he stared at it, he found himself being pulled out of the human world into a world where moral boundaries blur and finally dissolve completely. He was lost in wonder and admiration, even though he knew that he was the prey.

Related Characters: Richard Preston (speaker), Thomas Geisbert

Related Themes:

Page Number: 149-150

Explanation and Analysis

As the truth about the Reston Monkey House becomes clear, Thomas Geisbert, a scientist at the Institute, looks at the virus in question. Having not previously realized that he was dealing with Ebola, he has not taken the necessary precautions. Now, though, realizing his mistake, he feels the same horrified fascination that many other researchers experience within the book. Although he knows that a single particle of this virus could kill him, he remains entranced by its efficiency and perfection (this time on a cellular level).

To describe Geisbert's experience, Preston takes on an almost mythical tone. Once again, he describes the Ebola virus as a predator (and humans as "prey"), even comparing individual viral particles to the hair of Medusa, a Greek monster known for turning men to stone with her eyes. Preston wants readers to understand that these particles represent nature in its purest form: gorgeous, deadly, and ruthless. Although we can observe it, we will never control it, nor will we ever be able to escape the scope of its power.

Part 2, Chapter 9 Quotes

❝ C. J. Peters observed the comings and goings at the gas station. It gave him a sense of life and time passing, and he enjoyed the pleasant normality of the scene…What would these people think if they knew what had invaded their town? He had begun to think that the Army might have to act decisively to put out this fire. He had been in Bolivia when a hot agent called Machupo had broken out, and he had seen a young woman die, covered with blood. North America had not yet seen an emergence of an agent that turned into bleeders. North America was not ready for that, not yet. But the possibilities for a huge break of Ebola around Washington were impressive when you thought about it.

Related Characters: Richard Preston (speaker), Colonel Clarence James Peters (C. J.)

Related Themes:

Page Number: 185

Explanation and Analysis

As the government, led by USAMRIID and the CDC, begins to comprehend what might be lurking in the Reston Monkey House, Army scientist C. J. Peters begins to imagine the worst case scenario: a massive Ebola outbreak in a major American city. He watches ordinary people going about their day, completely unaware that nearby is a lethal virus that could easily end life as they know it.

This passage brings up some of *The Hot Zone*'smost important themes: first of all, there is the fact that the United States has not had to deal with an epidemic in many decades (since the times of influenza and polio). We do not comprehend how fragile our "normal" lives are, or how easily a mistake in the wrong place at the wrong time (or even no mistake at all) could end them. At the same time, there are knowledgeable people such as Peters, Nancy Jaax, and Gene Johnson who do fully understand the fragility of life. It is their job, Preston emphasizes, to keep us safe without ever knowing that we have been in danger.

Part 3, Chapter 1 Quotes

❝ Be exquisitely careful. Know where your hands and body are at all times. If you get blood on your suit, stop what you are doing and clean it off right away. Don't let blood stay on your gloves. Rinse them off right away. With bloody gloves, you can't see a hole in the glove.

Related Characters: Lieutenant Colonel Nancy Jaax (speaker)

Related Themes:

Related Symbols:

Page Number: 224

Explanation and Analysis

The Army begins to prepare for a major operation to sterilize the Reston Monkey House, and Nancy Jaax issues instructions to the soldiers under her command. Despite the fact that all the soldiers will be wearing spacesuits and gloves, her orders emphasize how easily they still might be exposed to Ebola.

This quote also highlights the importance and danger of blood within the narrative. Blood can either give life or—if it is infected—take life away. Nancy's emphasis on blood reminds us of her own near-exposure, while also reminding the soldiers (and the readers) of the billions of viral particles that these monkeys' blood contains.

It is also important to note the bravery of both Jaax and the soldiers under her command. Despite the immense danger that they are facing, the USAMRIID scientists and soldiers are clear-eyed and unflinching. They understand the importance of their mission, and are committed to keeping people safe, even at the expense of their own well-being.

Some of the monkeys that were dying in Room H had become essentially a heap of mush and bones in a skin bag, mixed with huge amounts of amplified virus.

Related Characters: Richard Preston (speaker), Lieutenant Colonel Nancy Jaax

Related Themes:

Related Symbols:

Page Number: 229

Explanation and Analysis

As the Army prepares to enter the Reston Monkey House and euthanize the infected primates within it, Preston takes a moment to remind readers of the deadly effects that Ebola has on its victims. It should be noted that Preston is exaggerating the "liquefaction" that Ebola produces, but this in the interest of keeping up his tone of horror and foreboding. His description alsoemphasizes the fact that the virus not only kills its host, but also increases the chances that others may become infected through the very means with which it kills.

This passage helps us to understand the grave danger in which the scientists and soldiers of USAMRIID find themselves, while also emphasizing the effectiveness of Ebola. It is a virus that has evolved to spread as efficiently and quickly as possible, and is dangerous long after it has killed any individual host.

Part 3, Chapter 6 Quotes

What on earth was going on with this virus? It killed monkeys like flies, they were dripping virus from every pore, yet no human being had crashed. If the virus wasn't Ebola Zaire, what was it? And where had it come from?...Something very strange was going on here. Nature had seemed to be closing in on us for a kill, when she suddenly turned her face away and smiled. It was a Mona Lisa smile, the meaning of which no one could figure out.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 269

Explanation and Analysis

After the Army decontamination operation in the Reston Monkey House is over, mysteries still remain: the virus has made monkeys fatally ill, yet no exposed humans have become sick. This fact alone implies that the virus is not the deadly Ebola Zaire, as scientists initially feared. The symptoms are even more curious when considering the genetic similarities between humans and monkeys.

Once again, Preston turns to metaphor in order to describe the power of nature. He uses personification to describe the human race's close call with calamity, before using a symbol of mystery—the famous painting of the smiling Mona Lisa—to emphasize how confusing and strange this entire incident has been. Having been spared by nature, however, does not comfort either the scientists in the narrative or Preston. All understand that the positive outcome of this incident had nothing to do with skill, and everything to do with luck. The virus did not sicken humans, yet we do not understand why or how; and a tiny mutation in its genetic makeup could easily have led to a different, far deadlier outcome.

The monkey house had been sterilized. Ebola had met opposition. For a short while, until life could re-establish itself there, the Reston Primate Quarantine Unit was the only building in the world where nothing lived, nothing at all.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 271

Explanation and Analysis

At least for the moment, the specter of Ebola infecting the United States populace has faded. In the aftermath, Preston describes the completely sterile Reston Monkey House, calling it "the only building in the world where nothing lived." This phrase illustrates the extreme measures to which the Army has gone in order to cleanse the facility of Ebola. In order to make fully sure that the virus no longer lives within those walls, the operation has killed literally every living thing inside—from monkeys to bacteria to viruses. This episode highlights the extreme precautions taken around this kind of decontamination process, and the power of Ebola, which only the strongest measures imaginable can destroy.

Even after such a complete sterilization, however, life will soon "re-establish itself there," a testament to the power and resilience of nature. Even after humans have taken every effort imaginable to destroy lifeforms, they will soon

inevitably return.

My God, with certain small changes, this virus could become one that travels in rapid respiratory transmission through *humans*. I'm talking about the Black Death. Imagine a virus with the infectiousness of influenza and the mortality rate of the black plague in the Middle Ages—that's what we're talking about.

Related Characters: Major General Philip K. Russell (speaker)

Related Themes:  

Page Number: 275

Explanation and Analysis

Philip K. Russell, the Army general and doctor who made many of the major calls during the Ebola Reston outbreak, looks back on the incident as he speaks with Richard Preston. Another important pattern within *The Hot Zone*comes up within this passage: that of the near miss. Russell emphasizes that if the Reston virus had been even slightly different genetically, it could have easily traveled through the air and killed humans, just as it seemed to be doing to monkeys. (The idea that the Reston virus *did*become airborne has later been disputed, however.)

The fact that Russell compares the potential damage of Ebola to famous epidemics of the past is also vital. Both he and Preston are implying that humans must learn from the catastrophes of the past in order to prevent similar such catastrophes from occurring in the future. Although medical technology has advanced a tremendous amount since the days of fatal influenza and black plague, it has no mechanisms with which to stop Ebola—and in fact other technologies, such as modern transportation, actually make it easier than ever before for disease to spread on a global scale.

The paving of Kinshasa Highway affected every person on earth, and turned out to be one of the most important events of the twentieth century. It has already cost at least ten million lives, with the likelihood that the ultimate number of human casualties will vastly exceed the deaths in the Second World War. In effect, I had witnessed a crucial event in the emergence of AIDS, the transformation of a thread of dirt into a ribbon of tar.

Related Characters: Richard Preston (speaker)

Related Themes:    

Related Symbols: 

Page Number: 287

Explanation and Analysis

As he travels to Mount Elgon, Richard Preston describes his childhood, some of which he spent near the construction of the Kinshasa Highway, which ended up spreading HIV/AIDS throughout many African nations because of the ease of travel—and thus of disease transmission—that it allowed. By telling the story of the Kinshasa Highway, Preston hopes to show that human progress can often have unintended consequences. Although the highway was supposed to be a source of trade, convenience, and modernity, it in fact provided a quick and easy way for HIV/AIDS to expand its range.

Preston puts the story of Kinshasa Highway in dramatic terms, saying that the highway has "already cost at least ten million lives" and calling its paving a vital twentieth-century event. He wants his readers to understand how easily and yet unpredictably humans can cause destruction, especially when viruses are involved. Preston's message is clear: the fact that HIV/AIDS spread so quickly and easily means that Ebola could one day do the same.

Part 4, Chapter 2 Quotes

Say "*Ahh*," Kitum Cave. Do you have a virus? No instruments, no senses can tell you if you are in the presence of the predator. I turned off my lights and stood in total darkness, feeling a bath of sweat trickle down my chest, hearing the thump of my heart and the swish of blood in my head.

Related Characters: Richard Preston (speaker)

Related Themes:   

Related Symbols:   

Page Number: 307

Explanation and Analysis

Towards the end of the novel, the narrative turns personal, as author and narrator Richard Preston explores Kitum Cave himself, in a spacesuit, in order to learn more about the Marburg virus that lurks within it. He emphasizes to his readers that though he's protected by a spacesuit, he has no

way of knowing if he is being exposed to viral particles at the moment or not. To emphasize his blindness, Preston turns off his flashlight and stands in total darkness, unable to see his surroundings just as he is unable to detect the possible presence of Marburg.

As he stands there, Preston observes his sweat, pulse, and blood pumping—all signs of an alive but intensely vulnerable human body that could easily be attacked by Marburg or some other "predatory" agent. Preston is implicitly comparing his own small, human fragility to the massive, ancient cave, and to the hidden menace of Marburg that lurks somewhere inside of it.

> The emergence of AIDS, Ebola, and any number of other rain-forest agents appears to be a natural consequence of the ruin of the tropical biosphere. The emerging viruses are surfacing from ecologically damaged parts of the earth…In a sense, the earth is mounting an immune response against the human species…Perhaps the biosphere does not "like" the idea of five million humans…Nature has interesting ways of balancing itself. The rain forest has its own defenses. The earth's immune system, so to speak, has recognized the presence of the human species and is starting to kick in. The earth is attempting to rid itself of an infection by the human parasite. Perhaps AIDS is the first step in a natural process of clearance.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 311

Explanation and Analysis

Preston begins to wrap up his narrative by returning to one of the core theories of his book: that human encroachment on nature is directly responsible for the emergence of more and more deadly, contagious viruses such as Ebola. Here he creates a fascinating metaphor, theorizing that viruses are a kind of "immune response" against the huge human population that is in essence infecting the earth.

This theory about tropical diseases like Ebola and AIDS is a hugely pessimistic one, as it suggests that the very innovations that have prolonged human life—modern medicine, convenient transportation, urban centers of trade—are also in fact destroying it.

Even more foreboding here is the idea that humans have had a wholly negative effect on the earth, and that nature is taking steps to correct us. Modernizations such as cities and roads, which seem so natural to us, are in fact (Preston implies) disturbing the natural balance. In his eyes, diseases such as AIDS and Ebola are inevitable, as Nature tries to regain equilibrium.

> I suspect that AIDS might not be Nature's preeminent display of power. Whether the human race can actually maintain a population of five billion or more without a crash with a hot virus remains an open question. Unanswered. The answer lies hidden in the labyrinth of tropical ecosystems. AIDS is the revenge of the rain forest. It may only be the beginning.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 312

Explanation and Analysis

As his narrative ends, Preston comes back to the topic of HIV/AIDS, which he has often used as an example of a terribly destructive virus that passed from monkeys to the human race. Despite the enormous death toll due to AIDS, however, Preston asserts that there may be far more deadly viruses on the way.

The author also discusses a "labyrinth of tropical ecosystems," another reference to the mysterious and intricate quality of nature, which humans have studied for centuries but which still remains unknowable and unpredictable. To Preston, AIDS is a perfect example of the tangled, complex web that nature can create—but it may not be the most dramatic or destructive example. He views AIDS not as the pinnacle of nature's catastrophic power, but as a kind of opening shot. In other words, the author seems to say, the worst (very possibly in the form of Ebola) is yet to come.

> Life had reestablished itself in the monkey house. Ebola had risen in these rooms, flashed its colors, fed, and subsided into the forest. It will be back.

Related Characters: Richard Preston (speaker)

Related Themes:

Page Number: 314

Explanation and Analysis

In the final scene of *The Hot Zone*, Richard Preston visits the Reston Monkey House, and finds that various types of flora and fauna have begun to return to the building, which was thoroughly and completely sterilized by the Army after their operation.

In a different narrative, this might be a hopeful symbol that life, no matter what, always returns. For Preston, however, the fact that plants and animals—as well as bacteria and viruses—have returned to the facility is an ominous sign. Nature, he emphasizes yet again, is stronger than humans will ever be. No matter our efforts, nature will always prevail. If plants and animals can return to the primate facility, then Ebola can return as well.

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.

PREFACE

The book opens by simulating the process by which an employee of USAMRIID, the United States Army Medical Research Institute of Infections Diseases (also called the Institute), enters "the hot zone," the fourth level of security in which scientists work with incurable infectious diseases, called "hot agents" or "hot viruses." The employee in this case is Nancy Jaax, one of the narrative's protagonists.

From its first words, The Hot Zone *creates a sense of both vivdness and danger. Author Richard Preston creates an environment that draws the reader into his narrative, making us aware of the "non-fiction" aspect of the book and the consequences its contents might have on our own lives.*

PART 1, CHAPTER 1: SOMETHING IN THE FOREST

On January 1, 1980, Charles Monet, a Frenchman, lives by himself in Western Kenya near a huge volcano called **Mount Elgon**. A fifty-six-year-old amateur naturalist and the employee of a nearby sugar factory, Monet is promiscuous, and has many female "friends" in the area.

Preston writes about true events—if sometimes exaggeratedly, as he has admitted—but The Hot Zone *is also in the horror or thriller genre. As in many books of this type, here Preston sets a seemingly normal scene, but with an ominous tone of what is to come.*

Richard Preston, the author of the book, goes on a brief digression, relating how difficult it is to find details about the sources of dangerous viruses after the fact. Their effects, he asserts, are so horrific that researchers soon lose sight of the humans at their center.

Preston has made it clear that disaster will soon strike Charles Monet. We also start to see Preston's writing style, in which he focuses on the human stories within these events, and jumps between personal details about his characters and wider musings on Nature and viruses.

Monet, it turns out, came to Kenya just as AIDS began to infect humans. In the late 1970s and early 1980s, AIDS spread along the **Kinshasa Highway**, a new road that spans much of the width of Africa. HIV, Preston explains, is a dangerous but not particularly infective Biosafety Level 2 agent, meaning that it cannot move easily from person to person. In fact, when researchers study live HIV, they don't even need to wear protective **spacesuit** gear.

Preston will often compare HIV to Ebola. Although HIV is a lower Biosafety Level than Ebola (2 versus 4), it has actually killed millions more people. Preston's early reference to the Kinshasa Highway brings up the theme of globalization—a human construction, designed to help economies and bring people together, but that also helped the spread of HIV/AIDS.

Moving back to Monet, Preston describes the man's routine, in which he works during the week and explores nearby forests on the weekends. Monet is kind and gentle to animals, especially to monkeys, feeding and even holding them. At night, meanwhile, he generally stays in his house with his housekeeper Johnnie, who cleans and cooks for him. Monet also loves birds. He is friends with a crow, and around Christmastime he tries to care for a sick weaverbird, which dies in his hands. Preston speculates that perhaps the bird died of a Level 4 virus, but says that no one truly knows.

We continue to learn more about Monet, and his love for animals humanizes him and makes us feel sympathy for him. Even this seemingly benign trait, however, might in fact be dangerous, as Preston illustrates when he wonders whether the sick bird died of a Level 4 virus (thus implying that it perhaps infected Monet). Preston juxtaposes idyllic scenes with commentary on deadly viruses to ramp up the tension.

Describing Monet's walk to work, Preston moves on to describe **Mount Elgon**, which looms above the surrounding landscape. He recounts how the mountain's color changes as the light shifts throughout the day, making the mountain seem lovely and mysterious.

Mount Elgon seems like the pinnacle of natural beauty, but it also (as we will learn) houses a mysterious and horrific virus, proving Preston's overarching point that nature may be gorgeous, but it can also be deadly.

Monet has women "friends" in a nearby, impoverished town called Eldoret, and he pays them for sexual intercourse. For Christmas vacation, he invites one of his friends to go camping on Mount Elgon with him, but (Preston tells us) no one can now remember her name.

The fact that no one can remember the woman's name is a crucial point. Considering that many infectious diseases spread through sexual contact, the "friend" could be infected as well—and her anonymity would make her more dangerous as a possible source of an epidemic.

Monet and his friend drive to a cliff called Endebess Bluff on the side of **Mount Elgon**. Preston observes that the volcanic dust there is as red as **blood**. He adds that Mount Elgon is a secluded spot, filled with villagers at its base but with few tourists. The jungle surrounds an old English inn that has now fallen into disrepair. Between Uganda and Kenya, and close to Sudan, Mount Elgon is a rainforest surrounded by plains. Having formed seven to ten million years ago, it is the widest mountain in Africa. Several tribal groups live near the volcano, including the Elgon Massa, who plant crops and raise cattle at its base. Every year, Preston warns, humans move farther up the mountain, cutting down trees and endangering animals such as elephants—thus "strangling the wild habitat."

Preston takes this opportunity to expand upon the opposition of humans versus nature, a dichotomy that sits at the heart of the book. Although Mount Elgon is a natural landmark, millions of years old, humans are destroying it with their everyday activities. Preston makes clear that he disapproves of this kind of destruction of the natural world, but, as is the case here, he doesn't seem to believe that much can be done about it.

After entering the small segment of **Mount Elgon** that is a national park, Monet and his friend meet a monkey, which sits on his shoulder and eats a banana. They camp near a stream that is "milky with volcanic dust" and surrounded by Cape buffalo. Above them looms the Elgon forest, huge, menacing, and full of wildlife. Preston lists the kinds of life forms and plants that the forest contains, and finishes by describing a past when "[t]housands of elephants lived on the mountain."

Preston continues his focus on nature, using his description of the Elgon forest to emphasize its power and vastness. He ends, however, on quite a different note, with his comment that there used to be thousands of elephants on the mountain. This implies that they have since been killed off by humans—a different kind of "epidemic."

A thunderstorm moves in during the afternoon, and Monet and his friend stay in their tent (with Preston speculating that perhaps they have sex). Afterwards, on New Year's Eve, they build a fire, cook, and "perhaps" drink champagne.

As he often does throughout the narrative, Preston takes care to humanize his characters, even if this means inventing details and speculating about events.

The next morning, Monet and his friend set off for **Kitum Cave**, driving as far as they can and then following elephant trails (while staying away from dangerous Cape buffalo). Preston takes the opportunity to describe the cave, which is filled with animals, including elephants, who go there at night to eat minerals and salts. In fact, the cave is so huge that it can hold up to seventy elephants at a time.

Kitum Cave is an important symbol within the book, and so Preston wants the reader to be able to picture it. Vast, ancient, and once filled with the largest creatures on Earth, the cave is clearly an awe-inspiring sight, an emblem of nature's power and mystery.

Monet and his friend explore the cave, which is enormous (over fifty-five yards across). Surrounded by elephant dung and bat guano, the two see hundreds of bats flying all around them. As they walk farther, they see that **Kitum Cave** houses a petrified rain forest, which was buried by ash during Mount Elgon's formation. Around the petrified logs are crystals "sharp as hypodermic **needles.**"

This detailed description of the cave's contents emphasizes how enormous it is, and how foreign it is from the majority of readers' experiences. Preston also uses the imagery of sickness (hypodermic needles) in describing natural beauty—suggesting how these two things can be related.

As Monet and his friend explore, Preston speculates about where their vacation went wrong—perhaps Monet pricked his finger on a crystal. He continues describing the cave, which has bones of ancient hippos, crocodiles, and elephants sticking out of its walls, and is filled with insects. Further in the cave is a crevice filled with the mummified corpses of baby elephants who have slipped and fallen. Even further back is a pillar that supports the roof, already damaged by elephants' tusks. If they continue to damage the pillar, the roof of **Kitum Cave** will collapse. Finally, at the back of the cave, a huge number of bats hang on another pillar. Maybe, Preston wonders, Monet touched the guano.

Although Monet and his friend find great wonder within Kitum Cave, they also find great danger, but their curiosity wins out. Somewhere during their exploration, the two come across something infectious and deadly. By asking rhetorical questions about what that something was, Preston illustrates the uncertainty that surrounds this kind of event, and the special kind of fear and suspense that rises from this uncertainty.

Preston reveals that Monet's friend resurfaced years after this incident. While working as a prostitute in a bar in Mombasa, Kenya, she meets a doctor who happens to have investigated the Charles Monet case. After talking to the doctor, however, she once again vanishes. By now, she has most likely died of AIDS.

Although Monet's friend escapes the illness that will eventually claim him, she has most likely died of a different virus. The world, Preston implies, is a dangerous place, full of seemingly inescapable dangers.

After his vacation Charles Monet returns to his job, but within him "a life form had acquired Charles Monet as a host, and it was replicating." On January 8, 1980, Monet develops a terrible headache and stays home from work. A temporary housekeeper tries to care for him (Johnnie is on vacation), but he only worsens. Three days later, he becomes feverish and starts vomiting. Meanwhile, his face becomes slack and dead, and he seems totally devoid of energy. His eyeballs become bright red, while his facial skin turns yellow with red spots. Confused though not delirious, Monet becomes "sullen, resentful, and angry."

Just as he describes nature in great detail, so too does Preston take care to vividly recount the physical symptoms of the diseases about which he writes. This is the first time of many that readers will hear these symptoms described. Monet is powerless to fight the virus that has mysteriously invaded him, using him as a "host." Preston emphasizes the horror of the virus, using language that suggests it is a malevolent, unstoppable force.

After several days Monet's colleagues check on him, and drive him to a hospital in a city called Kisumu. The doctors at the hospital, stumped, give him an injection of antibiotics, but decide that he should go to Nairobi Hospital. Since he is still mobile, they put him in a taxi and send him to board a Kenya Airways plane. "A hot virus from the rain forest," Preston warns, "lives within a twenty-four-hour plane flight from every city on earth," because of an interconnected web of airline routes.

More explicitly than before, Preston here makes plain how much globalization has helped viruses to spread around the world. Although a virus in Kenya may seem far away and foreign to American readers, it is actually incredibly easy for an infected man like Monet to board a plane, and for others on the plane to then spread the virus around the world.

As Monet's plane, full of passengers, flies towards Nairobi, Preston describes the landscape beneath it. They pass plantations and villages, and Preston reminds readers that Africa is "the place where the human species was born."

Once again, Preston takes care to describe the nature around Monet even as he becomes deathly ill. In this book, the natural world is as much a character as humans are.

On the small, cramped plane, Monet becomes sick. He vomits continually, and his lips become smeared with bile and blood. His eyes are bright red, while the red spots on his face have melded to form a giant bruise. The connective tissue under his skin, meanwhile, is dissolving, making his face look as if it is falling off his bones. Although his stomach is empty, Monet is vomiting black vomit, which consists mostly of **blood**—a perfect vehicle for a highly infectious virus. The vomit bag begins to overflow, so Monet closes it and hands it to a flight attendant.

Preston's description is a mixture of scientific fact and suspenseful rhetoric, as he uses biological facts and vivid language to explain the horrifying process that is going on within Monet's body. Of course, the description of Monet's symptoms is all second- or third-hand for Preston, so he uses his "poetic license" to play up the more gruesome aspects.

Preston explains that the virus has now saturated Monet's body in a process called "extreme amplification." Monet is essentially transforming into a mixture of liquefying flesh and vomit. Beneath the surface, Monet's blood is clotting, as if his whole body were having a stroke. He cannot feel any pain, however, because the clots have cut off blood flow to his brain. "Depersonalization" begins, a process in which infected people begin to lose their personalities as their brains die. Monet then gets a nosebleed, and though flight attendants give him paper towels, he is unable to stop the blood. Monet finds it difficult to interact with those around him, and he is hostile and monosyllabic—another symptom of the virus.

This description is meant to emphasize our human helplessness as "hosts" of some viruses. There is something especially horrifying about a microscopic entity that can attack even our personalities (through our brains), something most people might think of as unshakeable. By constantly referring to the other people on the plane, Preston also makes clear how easily any or all of them could be infected (and then potentially spread their infection to others).

Monet falls asleep, and Preston again describes the landscape, from the afternoon sun on the valley to the national park filled with zebras and elephants. The plane lands in the airport, and the bloody, dripping Monet gets into a taxi. Preston calls him a "human virus bomb," and describes the "heavy, dull, and bloated" feeling Monet has in his stomach. The taxi drives through Nairobi, a crowded city brimming with men, women, and children, and finally stops at Nairobi Hospital.

Preston contrasts the beauty of the natural landscape with the horror of the disease (also a product of nature) that is ravaging Monet's body. His trip through Nairobi, meanwhile, emphasizes how fragile modern urban life is, and how easily it could be destroyed by a hot virus like Ebola.

After entering the hospital, Monet sits in the waiting room, where he is surrounded by other people, many of whom are **bleeding**. As Monet waits, he "crashes," meaning that he begins to hemorrhage. Blood comes gushing from all of his orifices, and he expels his intestinal lining as well. As blood pools around him, other people move away and a doctor is summoned. The virus, Preston relates, has "destroyed its host" and is attempting to find another.

Blood, always a powerful symbol within the narrative, takes center stage during this scene, as Monet's bodily fluids begin to spread all over a waiting room filled with people who are completely vulnerable to his illness. Preston's anthropomorphization of the virus gives the episode an added feeling of menace.

PART 1, CHAPTER 2: JUMPER

Hospital staff runs to aid Charles Monet, and they are met in the ICU by Dr. Shem Musoke, a talented and personable young physician. Musoke arrives as Monet inhales his own blood and stops breathing entirely, immediately falling into a coma. Examining Monet's eyes, Musoke notices that his pupils are dilated, which denotes brain damage. Although he does not even have **gloves** on, Musoke inserts a laryngoscope down Monet's throat, his hands becoming covered by mucus, **blood**, and vomit. With his face only inches from Monet, he inserts the laryngoscope, at which point Monet vomits all over the doctor, covering his face and chest (as well as the gurney and floor) with blood. Musoke, still determined to help his patient, continues to insert the scope and watches as Monet begins to breathe again. As Musoke attempts to give his patient a blood transfusion, Monet's veins fall apart at the touch of a **needle**, and blood runs down his arms. All the while, he continues to hemorrhage from his bowels. Within hours, still attended by Dr. Musoke, he dies.

Within this narrative, Dr. Shem Musoke is a figure of great courage and selflessness, immediately helping Monet and remaining unfazed despite the infected man's horrific symptoms. Yet Musoke will soon also become a victim of the virus himself. He is brave and devoted to his duty as a doctor, but also incredibly vulnerable to the unknown disease. Musoke is the first of many doctors, researchers, and scientists within the book who put their lives at risk in order to combat Ebola. Blood, meanwhile, continues to be a major presence within the scene, a reminder of the persistence with which Ebola attempts to infect other hosts.

The doctors of Nairobi Hospital autopsy Monet, and find that his kidneys and liver have essentially liquefied, as has his intestinal lining. It is impossible to say why he died because so many things have gone wrong: his **blood** has clotted, he has hemorrhaged, his liver has dissolved, and his intestines have come apart. His remains are placed in a waterproof bag and buried in an unmarked grave.

Ebola, this passage makes clear, is a kind of ultimate weapon against the human body, affecting the blood, the brain, and multiple other organs. This explains why Ebola is so terrifying, and so difficult to survive.

Nine days later, on January 24, 1980, Dr. Shem Musoke develops a severe backache, which he chalks up to exhaustion. When he looks in the mirror, however, he sees that his eyes have turned red. Noticing that he has a fever and that his backache has spread, he decides that he has malaria, and begins to take antimalarial pills and an injection. The shot, however, causes him terrible pain, and after he develops abdominal pain, he begins to wonder whether he may have typhoid fever. Although he takes antibiotics and continues working at the hospital, Musoke's pain only grows, and he becomes jaundiced. He consults his colleague, Dr. Antonia Bagshawe, who speculates that he may have a gall-bladder attack or a liver infection. Very ill, he is placed in a private room, and his face becomes slack and dead-looking.

The virus has now moved onto another host, and Dr. Shem Musoke transitions from hero to victim. As with Monet, Preston intimately and intricately describes Musoke's symptoms. This sense of repetition makes the menace of Ebola seem all the more inevitable and unstoppable. At the same time, Preston emphasizes the horror of a potential epidemic while downplaying the fact that of all the people exposed to Monet—even those on his plane and in the bloody waiting room—only Musoke, who was covered in Monet's blood and totally unprotected, catches his disease.

In an attempt to determine what is wrong with Musoke, a team of surgeons led by Dr. Imre Lofler performs exploratory surgery. They find that his liver is swollen and red. His **blood** refuses to coagulate, so he keeps bleeding during the surgery and blood is everywhere. After taking a sample of his liver, the team gives up.

As it did to Monet, Ebola has now begun to shut down Musoke's body. His blood, meanwhile, is incredibly dangerous, and puts all the medical personnel who interact with it at risk.

After the surgery, Musoke's kidneys begin to fail, and he seems close to death. Since Dr. Antonia Bagshawe is away, Dr. David Silverstein steps in to care for Musoke. With his colleagues deeply disturbed about Musoke's illness, Silverstein begins to test his fellow doctor's **blood** for viruses, distilling the liquid down to a gold-colored serum that he then freezes and sends to both a lab in South Africa and the Centers for Disease Control in Atlanta, Georgia.

The scope of the narrative now widens as Musoke's blood is sent out to different countries for testing. Globalization is a crucial force in the story of Ebola, allowing the international spread of the disease, but also helping far-off doctors and scientists to research and combat the virus.

PART 1, CHAPTER 3: DIAGNOSIS

Preston introduces Dr. David Silverstein, a highly successful physician who splits his time between Nairobi and Washington D.C. The author/narrator meets him in a coffee shop to discuss Charles Monet and Dr. Shem Musoke. Dr. Silverstein describes how he believed that Dr. Musoke was close to death, and goes on to explain how the South African lab finally gave him a diagnosis: the little-known Marburg virus. Dr. Silverstein recounts how he lay awake after the phone call until he finally decided to research Marburg in his office.

Preston mentions Dr. David Silverstein's prestige and adventurousness for a specific reason: to emphasize how terrifying a disease would have to be to keep a man like this up at night. It is also significant that the disease has already passed from Monet to Musoke, and yet this is the first time that the doctors attempting to treat it actually begin to understand what the virus is.

Dr. Silverstein relates the history of Marburg virus, the first known human cases of which occurred in 1967 in the German town of Marburg. A factory there called Behring Works created vaccines using cells from Ugandan monkeys. In a process called "virus amplification," the virus spread from a few infected monkeys to humans, and eventually spread to the city. The first known victim, Klaus F., worked directly with the monkeys, feeding them and cleaning their cages. The next to fall ill, Heinrich P., was also a monkey-keeper, and the third, Renate L., contaminated herself by breaking a test tube full of "infected material."

Through Dr. Silverstein, Preston begins to fill the reader in on the history of Marburg virus. Once again, the force of globalization is a powerful player within the narrative. Although the virus is of African origin, its first instance was in a German town, emphasizing the speed and seeming randomness with which such viruses can spread in the modern, technological world.

By the end of the epidemic, thirty-one people had become infected, developing headaches, fevers, and blood clots before hemorrhaging and going into shock. About one in four of the victims died, meaning that Marburg was "an extremely lethal agent." Preston contrasts this disease with the highly dangerous yellow fever, which only kills one in twenty victims who have been admitted to a hospital.

Although we have learned the symptoms of the virus before, this is the first time that readers learn just how deadly Ebola and Marburg really are. The contrast with yellow fever—another historic and deadly disease—emphasizes the danger that Ebola and Marburg pose to humans.

Marburg virus, we learn, belongs to a family called "filoviruses." In Latin this word means "thread virus," because these organisms look like tangled rope (in contrast to most viruses, which are ball shaped). Marburg, specifically, will often form loops that "resemble Cheerios." When first observed in Germany, the virus had especially terrible effects on the brain, attacking it directly and damaging the central nervous system. For this reason, scientists originally believed that Marburg was related to rabies. Since rabies is shaped like a bullet and Marburg like a ring, it was called "stretched rabies." After Charles Monet died, researchers defined the family of filoviruses as containing not only Marburg, but also two strains of a virus called Ebola—Ebola Zaire and Ebola Sudan. Marburg is the mildest form of the virus, while Ebola Zaire kills ninety percent of all humans who contract it.

As often happens throughout the book, Preston shifts quickly from a global scale to a microscopic one, describing in detail the physical attributes of the tiny particles that make up Ebola and Marburg. This information will become important later, as scientists attempt to identify Ebola by looking at it through a microscope. By moving so seamlessly from large scale to small, Preston gives the reader the ability to comprehend simultaneously the effects that Ebola has within a single human cell, and also on a national and global scale. The family of "filovirus" has been redefined since The Hot Zone*'s publication, so that Marburg and Ebola are now separate subcategories (taxons).*

Preston describes the effects of Marburg on the human body, likening it to "nuclear radiation." It attacks "internal organs, connective tissue, intestines, and skin," causing everything from hair loss to hemorrhages. Even those who survive lose large pieces of skin, and many men experience inflamed, infected testicles. For months afterward, the virus lingers in testicles and eyeball fluid, and survivors can infect others (especially through sexual intercourse). Marburg also changes behavior, making its victims withdrawn, aggressive, and even psychotic. A patient named Hans O.-V., who seemed to have survived the virus, then suddenly died of a brain hemorrhage.

Preston's comparison of the virus to "nuclear radiation" offers another comparison between the ancient, "natural" virus and a manmade weapon of mass destruction. Preston goes on to unflinchingly describe the symptoms of the disease, using vivid language to give the reader the clearest picture possible of the terrible effects that Ebola can have on the human body. As usual, he emphasizes the worst-case scenario of symptoms to play up the horror and suspense.

"International health authorities" become concerned about how the monkeys have contracted the Marburg virus in the first place, since it kills them too fast for them to be its natural host. A team from the World Health Organization flies to Uganda to determine the geographical source of the monkeys, but since the monkeys were trapped all over the country, they are unable to do so.

We move once again from microscopic to global as Preston describes the international reaction to the original appearance of Marburg virus. He also gives us a clear picture of the dangers of globalization, and of the ways that human error (or deception) can help to spread a hot virus.

In 1982, an English veterinarian whom Preston calls Mr. Jones reveals that at the time of the Marburg outbreak, he was inspecting monkeys in Entebbe that were to be exported to Europe. This house sent out 13,000 monkeys a year, and the infected shipment in question was flown from this facility to London, and then to Germany. Mr. Jones's job was to visually inspect each monkey before sending it out to Europe, and to remove those that looked ill. Although he could not have known that seemingly healthy monkeys were harboring Marburg virus, he goes on to assert something more "disturbing"—the sick monkeys he picked out were not killed, as he thought, but were instead shipped out to an island in Lake Victoria. Despite the fact that the entire island was a hotbed of disease, the owner of the exporting business would sometimes use these sick monkeys as replacements when he was running low and a shipment was due, meaning that he easily could have sent Marburg to Europe. When the WHO team came to investigate, however, they never looked closely enough at the business. Mr. Jones further recalls that he observed a Marburg-like virus that infected both humans and monkeys near **Kitum Cave** between 1962 and 1965.

The story of Mr. Jones is a chilling one, because it means that humans may have essentially created a hotbed for disease—one that could eventually explode into a global pandemic. This is a theme that Preston comes back to frequently: that humans have essentially made it easier than ever for hot viruses to infect us. From the laziness and greed of Mr. Jones's employer to the WHO investigators' lack of diligence, every human action within this chain of events makes clear that they are entirely ignorant to the terrible risks that they are taking. Kitum Cave, too, pops up yet again, a reminder of the mysterious source of the now-globalized virus.

Preston compares Mr. Jones's experience of Marburg to "a flashlight pointed down a dark hole," giving a "narrow but disturbing view" about how tropical viruses originate and spread. Mr. Jones had claimed that the Marburg monkeys were trapped in a group of islands in Lake Victoria called the Sese Islands, and said that the infected isle was close by, meaning that the Marburg monkeys may have been infected by the very animals that Mr. Jones's company set free.

Preston emphasizes the role that humans have in spreading tropical viruses, and implies that Mr. Jones's company may have been responsible for the original Marburg outbreak in Germany.

Preston goes on to mention a nearby fishing village called Kasensero, one of the origin points of AIDS. He describes AIDS's transition from monkeys and apes to humans, following a series of "rapid mutations" that enabled HIV to jump from one species to another. Although Kasensero is now almost completely wiped out by AIDS, the villagers of Kasensero were once famous smugglers, and it's possible that they smuggled the infected monkeys that Mr. Jones mentioned. Preston expands on a theory about the origin of AIDS, which links it closely to the business of monkey trading that sprang up in the 1960s, in which African monkeys were shipped to industrialized countries for medical research. As native workers came into close contact with wild monkeys, different species of which were also infecting each other as they were shipped all over the world, HIV may have mdade the transition to the human race. He goes on to compare AIDS to Marburg, saying that both viruses are part of a pattern, but that their origins are ultimately unknowable.

Preston once again uses HIV/AIDS—an African virus that has successfully expanded into a global pandemic—in order to illustrate the ways in which such viruses grow and spread. Although no one knows the exact origin point of AIDS, Preston speculates that smugglers may be responsible for its introduction into the human race—yet another example of human greed and ignorance leading to the destruction of millions of lives. He goes on to refer to a "pattern," by which he means the pattern of tropical viruses infecting humans. According to Preston, as globalization continues and the human population swells, this pattern is only going to become more obvious and prevalent.

Dr. David Silverstein, meanwhile, faced with a Marburg diagnosis and a desperately ill Dr. Shem Musoke, gets the Kenyan government to quarantine Nairobi hospital, as many employees there had come into contact with or handled samples from Charles Monet and Musoke. Miraculously, Dr. Musoke survives, although he is at first confused and aggressive. Slowly he recovers, and at the time of the book's writing, he is one of the foremost doctors at Nairobi Hospital. In an interview with Preston, he relates that he remembers only shreds of his time while infected with Marburg. No one else in the hospital, meanwhile, becomes ill.

Although Monet's trip through Nairobi and Musoke's stay in the hospital have already exposed many people to Marburg, quarantining the hospital is the only way the health authorities know to stem the spread of the disease. The ultimate positive outcome is, it's implied, essentially just good luck, and has nothing to do with any measures that the authorities have taken.

Preston, however, does not draw an optimistic conclusion from this outcome. He explains that when a virus is about to emerge in the human race, "the warning signs may be a spattering of breaks at different times and places" called "microbreaks." The incident at Nairobi Hospital, he asserts, was just such a microbreak. Meanwhile, tubes of blood from Dr. Musoke are sent to international laboratories so that they can begin to study Marburg. Some of this Marburg virus (which Preston traces from Musoke to Monet to possibly **Kitum Cave**) is currently in a collection of samples kept by the US Army.

Preston returns to the "pattern" that he has previously warned readers about, explaining that these kinds of isolated episodes actually point to the possibility of a much larger epidemic in the future. Yet at the same time, globalization also proves useful in the fight against the virus, as vials of Musoke's blood travel all over the world to be studied and analyzed.

PART 1, CHAPTER 4: A WOMAN AND A SOLDIER

Preston now sets the scene in Thurmont, Maryland, on September 25, 1983—four years after Charles Monet died. This is an idyllic American town near the Appalachians, and home to a Victorian house owned by Major Nancy Jaax, a US Army veterinarian, and her husband. Nancy is a short but strong woman, trained in martial arts, with auburn hair, green eyes, and quick hands. She is cooking dinner for her five-year-old daughter Jaime and her seven-year-old son Jaison. Nancy's husband, Major Gerald Jaax (Jerry), is in Texas training. Both Nancy and Jerry are part of the Army Veterinary Corps, which cares for Army animals and inspects Army food. They work in Fort Detrick. In their house lives a small menagerie of animals, including a parrot named Herky, who frequently imitates family members.

Preston now moves on to two characters who will become central in his narrative: Nancy and Jerry Jaax. His detailed description of their suburban life at first seems like it's simply supposed to introduce and endear the Jaaxes to us. It is also important to remember, however, that this is exactly the kind of peaceful, modern life that could be utterly shattered by an Ebola epidemic. Thus Preston is not only humanizing these characters, but also emphasizing how much they potentially have to lose should Ebola ever become an epidemic on U.S. soil.

Some officers at Fort Detrick take issue with Nancy's hands, calling them abrupt and clumsy. As a result of their criticism, as well as their sexism, Nancy takes up martial arts, and learns how to kill a man with her bare feet. Despite working full time, she also does housework and cooking. The Jaax's house is near an ambulance station, and the sirens wake them at night. There is also a rumor that the home's previous owner killed himself in the basement. Besides the parrot, the couple also has two dogs, as well as a python named Sampson, which occasionally escapes its cage and slithers through the house. Nancy and Jerry are deeply in love, and met in veterinary school.

Of all the brave doctors and scientists within the book, Nancy Jaax is one of the bravest. Preston gives us a large amount of backstory—especially about the sexism that Nancy has faced in her male-dominated field—to emphasize her tenacity and competence. These qualities will prove crucial as she studies and combats Ebola. Like Charles Monet, Nancy Jaax is a lover of animals, and again Preston draws connections between beloved pets and carriers of diseases.

On this particular night, Nancy decides to open a can of green beans for her children. Unable to find a can opener, she uses a butcher knife, and cuts her hand deeply in the process. Her tendons and fingers are not damaged, however, and she seals the cut with a Band-Aid. Despite being a veterinarian, Nancy hates the sight of **blood**, because she knows "what some blood could contain." Still, she finishes dinner and puts her children to bed.

Usually, cutting oneself in the kitchen would be an unfortunate but un-alarming occurrence. In the context of hot viruses, however, blood takes on an added sense of menace because of its potential as a disease carrier. Again Preston starts with an idyllic scene in order to build up the suspense about approaching horror.

PART 1, CHAPTER 5: PROJECT EBOLA

The next day Nancy wakes at 4 AM and dresses in her Army uniform. She considers that she may need to put on a protective **spacesuit** later that day because of her training in veterinarian pathology. She is specializing in studying "Biosafety Level 4 hot agents," for which space suits are required. Nancy wakes her children and leaves them with a babysitter before heading to Fort Detrick. The building she works in is huge, and almost windowless—to protect the general public from the "sealed biological laboratories" within. Nancy works at the United States Army Medical Research Institute of Infectious Diseases (USAMRIID), also known as the Institute. USAMRIID focuses on medical defense. Its scientists research methods to protect soldiers against both "biological weapons and natural infectious diseases." It even researched offensive biological weapons after WWII, but this practice was made illegal in 1969. Since then it has focused on developing vaccines and other protections against deadly diseases.

Preston now introduces another incredibly important element within his narrative: USAMRIID, the center of the US Army's efforts to combat various diseases. That it takes a military institution to combat Ebola only further illustrates how deadly and menacing the disease really is. Fighting the disease is like fighting a war, requiring a military level of discipline, bravery, and self-sacrifice—qualities that a great many USAMRIID employees possess, as will become clear as the narrative progresses.

Nancy walks into the building and heads for the Level 4 biocontainment area, where she intends to see what has happened to "the Ebola monkeys." Preston explains the setup of USAMRIID's biocontainment system, which creates negative air pressure to keep diseases from leaking into the air. A civilian scientist named Eugene Johnson, an expert on Ebola and Marburg, leads the Institute's research of Ebola. He has been infecting monkeys with the virus and giving them drugs to attempt to halt the infection. Nancy Jaax has joined this project, and her role is "to determine the cause of death in the monkeys." Upon arriving at Level 4 (called "the Ebola suite"), she finds a note telling her that two of the monkeys have died overnight. This means that she must put on a **spacesuit** and enter the Ebola suite to dissect the monkeys—and quickly, before Ebola causes their internal organs to liquefy entirely.

Preston's description of the measures that USAMRIID takes to keep viruses like Ebola in a completely sterile and self-contained environment illustrates the great precautions that one must take while handling the disease. It also makes clear how unprepared and unprotected most hospitals and healthcare professionals are to deal with it. Eugene Johnson's experiment, meanwhile, is both important and incredibly dangerous, emphasizing the bravery of those who take part in it, but also the risk involved in any kind of research associated with the disease.

When Nancy first asked to be transferred to pathology within USAMRIID, the colonel in charge told her that the work was too much for a married woman. After a display of both her determination and her temper, however, he allowed her to join up. Nancy began working in the lower, less dangerous Levels 2 and 3, but developed a terrible reaction to the various vaccines that this work required. As a result, she was placed in Level 4 work—Level 4 viruses, or "hot viruses," are defined as deadly diseases "for which there is no vaccine and no cure."

More backstory on Nancy illustrates her bravery and perseverance. Though Nancy's decision to work with Level 4 viruses was motivated by necessity, her willingness to do so makes clear that she is ready to put her life on the line in order to protect the general public.

Preston briefly digresses, introducing the Ebola River, where Ebola Zaire first originated in September 1976, erupting in fifty-five villages along the river's banks. People at the Institute fear Ebola, and many consider its study to be potentially lethal work. Eugene Johnson (Gene), appropriately, has a reputation (both within USAMRIID and without) for being wild, even fearless. He is considered "one of the world's leading Ebola hunters." Large and disheveled with a busy brown beard, Gene does not look like an employee of the US Army, nor does he often publish in scientific journals. Despite his bravery, he is mistrustful of other people, and is deeply afraid of viruses. Having spent years in central Africa looking for the source of Ebola and Marburg, he is one of the few scientists in the Institute willing to even work with the virus. Most consider it too dangerous and frightening to handle. Gene has recurring nightmares about his **spacesuit** becoming contaminated with Ebola.

The fear that many employees of USAMRIID associate with Ebola emphasizes the disease's uniqueness even among hot viruses, and the bravery of researchers like Gene Johnson and Nancy Jaax who choose to study it. Gene Johnson's bravery and fearlessness, meanwhile, contrast with the frequent nightmares that he has about Ebola exposure. As with Dr. David Silverstein, Preston emphasizes Johnson's bravery to suggest the conclusion that any disease that makes this man wake up in a cold sweat is a force to be reckoned with.

Explaining the theory of microbreaks, Preston introduces the worry that Ebola will one day become an epidemic. Gene Johnson calls Ebola "unpredictable," since we have no way of knowing whether it will one day become an airborne, worldwide pandemic, or whether it will remain forever rare and mysterious. The virus, Preston asserts, is a simple one, killing humans "with swift efficiency and with a devastating range of effects." Taking the "worst elements" of many more commonplace viruses, from measles to rabies to influenza, the Ebola virus particle contains seven proteins, four of which are completely mysterious in terms of form and function. These proteins combine to attack the body's immune system above all (like HIV), acting terrifyingly quickly once Ebola enters the human **blood**stream. Scientists do not know exactly how Ebola is passed between people. Originally they believed that it came through "direct contact with blood and bodily fluids," but touching the bodies of the dead also seems to cause infection.

As he often does, Preston moves quickly from the human to the scientific, introducing questions and anxiety about the ways that Ebola spreads. This issue will become a vital one as the narrative progresses, and as scientists struggle to understand how exactly the deadly virus is transferred. The mystery deepens as Preston explains that scientists do not fully understand the fundamental workings of the proteins that make up the virus. This sense of uncertainty is one of the most terrifying aspects of Ebola. Humans know so little about the deadly virus that we cannot even grasp what it's made of, let alone how exactly it spreads.

We learn about Gene Johnson's Ebola experiment, in which he attempts to cure monkeys infected with the disease. Since monkeys and humans are so closely related, Ebola can move between them easily, and its effects on a monkey closely mirror the effects that it has on humans.

The parallel between humans and monkeys is one that Preston often highlights—we think of ourselves as something wholly separate from other animals, but to a virus humans are just another creature, something to prey on.

Nancy Jaax, meanwhile, has volunteered to work on Gene Johnson's Ebola experiment in order to prove herself capable and brave. Various sexist critics within the Institute, however, believe that her status as a married woman and the supposed clumsiness of her hands combine to make her unfit for this kind of duty. Her "immediate superior" on the project is Colonel Anthony Johnson (Tony), a quiet and calm man. When Nancy applied for the program, he asked around about her, even talking to Jerry Jaax, who didn't want his wife handling Ebola or wearing a **spacesuit**. When Tony talked to Nancy, however, he found her capable, and didn't think her hands were a problem at all. He told her that he would help train her for the work ahead. After the meeting, she cried of happiness.

Nancy Jaax's attitude towards Ebola is quite different from that which we've seen before. She thinks of researching it as a kind of test of bravery, and a chance to prove herself to those who believe she's too weak and feminine. In her mind, working with a deadly disease is actually a positive thing, because she can help others and pursue her passion while also asserting her own value and skill to her detractors.

After a morning of paperwork, Nancy stops by Tony Johnson's office and the two decide to enter the Ebola suite. Alone in a locker room, Nancy strips naked (except for the Band-Aid on her hand) and dresses in a surgeon's scrubs. This is, we learn, "only her second trip into a hot area." She then enters Level 2, which is protected by UV light that destroys viruses and by the Institute's system of negative air pressure. Nancy then passes through to Level 3. This room contains sterile furniture and a "hatbox," a container covered in biohazard symbols that is meant to store and transport infectious waste. In this room, the hatbox is a chair. Nancy puts baby powder on her hands underneath a pair of latex **gloves**, sealing these around her hands with tape, and doing the same with her socks.

Preston now gives a detailed description of the methodical preparations USAMRIID researchers like Nancy must undergo before dealing with a virus like Ebola. The many levels of safety and sterilization illustrate the great danger of Ebola, but also show the many opportunities for a small, relatable human error to lead to disaster—a mistake during any of these steps could lead to potential contamination. Once again, this description also implies how unprepared most of the rest of the world is to ever deal with these kinds of viruses.

As Tony Johnson enters, Nancy puts on her Chemturion biological **spacesuit**, taking special care with its heavy rubber **gloves**, the "most important barrier between her and Ebola." Although she is supposed to inspect her spacesuit, Nancy rushes through this step, allowing Johnson to lower a helmet over her head, zipping up the suit, and plugging in her supply of oxygen. Although some experience terrible panic when inside a biological spacesuit, Nancy remains calm. Nancy and Tony prepare to enter Level 4, which is covered in a giant biohazard warning. Preston calls the Level 4 air lock a "gray area…where the hot zone touches the normal world." Nancy forces herself to remain calm, crosses the air lock (which functions as a decontamination shower), and with Tony Johnson, enters "the hot side."

This passage introduces gloves and spacesuits, two crucial symbols for the lengths to which humans must go in order to keep viruses such as Ebola at bay. The spacesuit, in particular, emblemizes complete protection and isolation from the outside world (and the viruses that live there). Yet as we will see later in the narrative, even these extreme protective measures sometimes fail—a testament to the danger these viruses pose, and to the vulnerability of the human body.

PART 1, CHAPTER 6: TOTAL IMMERSION

Nancy Jaax is now standing with Tony Johnson in the mazelike, oppressive hot zone, which is completely sealed from all contact with outside air. The two put on boots and enter the monkey room, which includes both infected and healthy specimens. While the healthy (control) monkeys become agitated when Nancy and Tony enter their area, the Ebola monkeys remain quiet and passive.

Nancy and Tony are now within the "hot zone," the area potentially infected by deadly "hot viruses," from which the book takes its name. Preston uses visual language to illustrate how different the hot zone is from the outside world, emphasizing the bravery of those who choose to enter it.

The monkeys, Preston relates, have been injected with a specific type of Ebola Zaire known as the Mayinga strain, because it was found within the **blood** of a nurse named Mayinga N., who died of the virus in October 1976. After caring for a Roman Catholic nurse who fell ill with Ebola in Zaire, Mayinga died, and a sample of her blood ended up in a highly protected "superfreezer" at USAMRIID.

This detail about Mayinga brings back the theme of globalization. Although Level 4 of USAMRIID feels isolated from the rest of the world, Preston reminds us that it is located in Maryland, and still contains blood from a nurse from Zaire (which is now the Democratic Republic of the Congo).

Gene Johnson, we learn, has been injecting Mayinga's **blood** into the monkeys, and then attempting to treat them with various drugs when they fall ill with her strain of Ebola. So far, however, none of his treatments have been effective.

Gene Johnson has been taking advantage of the similarities between humans and primates in order to conduct his experiments, essentially sacrificing the monkeys in an effort to learn more about the virus.

Nancy Jaax and Tony Johnson reach the cages of the monkeys who have died during the night. Both animals have **bloody** noses and bright red eyes, and their faces look like masks, due to both soft tissue and brain damage. Nancy feels upset by the dead and distorted monkeys, but reminds herself that they have died for the greater good. Johnson watches Nancy as she carefully removes the monkey from its cage. This is a dangerous operation because, if the monkey is unconscious rather than dead, Nancy could easily sustain a bite from its powerful jaws, and such an event would almost definitely lead to her infection and death.

Nancy's uneasy feelings about the experiment allow Preston to bring up another important issue: that monkeys are being killed off in order to protect the human populace (an act that will occur with increasing regularity as the narrative continues). Preston again emphasizes the dangers that human researchers face when working with Ebola, despite the huge amount of precautionary measures that they take.

Nancy inspects the monkey, noting nervously that it still has its sharp canine fangs (which are usually filed down in captive monkeys). She pinches its toe to make sure that it is really dead, and then follows Johnson's orders to take the monkey out of the cage, facing it away from her just in case it wakes up and bites her. As the two maneuver the monkey into a biohazard container, Preston notes the kinship between human "master[s] of the earth" and monkeys. He contrasts both primates with Ebola, an "older and more powerful" life form that can hide within **blood**.

Preston further complicates the issue of killing monkeys by reminding us how closely related we are to the primates that Gene, Tony, and Nancy are using for experiments. He places humans in the same category as monkeys, in fact, in order to contrast both of us with Ebola, a life form that is both mysterious and ancient—and powerful enough to kill the human "masters of the earth."

Tony Johnson and Nancy lay out the monkey on an autopsy table. They pull on yet another pair of latex **gloves**, meaning that they now have three layers of gloves: an inner lining, a **spacesuit** glove, and the latex glove that they've just put on. After checking on their surgical instruments (all of which are blunt), the two open the monkey's chest cavity, which is described as a "lake of **blood**," all of which is highly infectious. Nancy reminds herself to keep her hands slow and steady. The two finish the procedure, and Nancy rinses her hands in a substance called EnviroChem, which kills viruses.

The various linings of gloves that Preston describes are practical, but also highly symbolic, emblemizing the many layers that human scientists try to keep between themselves and Ebola at all times. These precautions are understandable, considering the vast amount of infected blood that Tony and Nancy are exposed to just by dissecting one dead monkey.

Preston describes the anatomy of a virus, "a small capsule made of membranes and proteins" that contains either DNA or RNA, which allows the virus to copy itself. He explains that some biologists call viruses "life forms," but that whether or not they are actually alive is ambiguous. Viruses can only become active, he asserts, when they have latched onto other cells, hijacking their reproduction mechanisms in order to make more viruses. Eventually a cell may explode because it has so many viruses within it, or, as is the case with HIV, the viruses may slowly dribble out of the cell's wall. Viruses exhaust cells until they die, and when enough cells have been destroyed, the host organism itself will die. "It is not in the best interest of a virus," Preston explains, to kill its host, because it will then either need to find a new host or die itself. Ebola contains a strand of RNA, the most ancient and primitive way for an organism to replicate itself. This suggests that Ebola is a truly "primordial" organism, "perhaps nearly as old as the earth itself." Preston compares viruses to "molecular sharks," whose only purpose is to replicate. He then emphasizes how tiny viruses are.

Although this description of viruses may seem like a digression, it is in fact a clear and powerful explanation for why Nancy and Tony must take all the precautions that they do when dealing with such a powerful organism. Preston explains that at the most basic level, viruses only have one fundamental drive: to multiply at all costs. The fact that they are not quite organisms but not quite inanimate also illustrates their mysterious and implacable nature. Despite their simplicity, they are perfectly evolved machines, unburdened by anything but the constant act of multiplying. Ebola's age, meanwhile, further emphasizes its power. It has survived for (perhaps) as long as the earth has existed—compared to this kind of virus, the human race is in its infancy.

Nancy thinks about how much she hates **blood**, because of the dangerous viruses it can contain. She also monitors Tony Johnson's suit to make sure that it has no life-threatening holes or tears. Johnson, meawhile, watches Nancy to see if she makes any clumsy or jerky movements. The two work together to crack the monkey's skull, a difficult task because they cannot use any sharp implements. As they preserve the brain, eyes, and spinal cord, Johnson notices a large rip on Nancy's outermost right **glove**. She takes it off, getting blood on her **spacesuit** in the process. As she rinses her suit off with disinfectant, Nancy realizes that she feels something wet against her bare skin; she inspects her space suit glove, and sees that there is a crack near the wrist, meaning that there may be Ebola blood within it, near her wounded hand. She points the breach out to Johnson and sees fear in his eyes. He orders her to leave Level 4 immediately, and Nancy does so, growing increasingly frantic.

Preston strikes a foreboding note by emphasizing just how much Nancy hates blood (because of the viruses that it can contain within it), and this sense of dread increases when Nancy and Tony discover the tear in her glove. This is a powerful and terrifying moment, symbolizing just how fragile humans really are, no matter how many precautions they take. The cut on Nancy's hand (which she got while cooking dinner) is now potentially deadly, emphasizing how even the smallest of human errors can have massive consequences. Preston draws out this sequence of events, forcing readers to feel the same dread that Nancy does as she wonders whether or not she has been infected.

Nancy allows herself to be decontaminated for seven minutes in the air lock, and considers what will happen if she has in fact been exposed to Ebola **blood**: if this is the case, she will be forced into a sterile government hospital called the Slammer. If she dies, her body will then be destroyed in a morgue nicknamed the Submarine. She imagines what will happen to her family without her.

The Slammer and the Submarine illustrate another kind of terrible fate that awaits someone exposed to Ebola in the Institute—even if they never actually fall ill. This moment also gives the descriptions of Nancy's family life new meaning. Were she to die of Ebola, the suburban existence that Preston previously described would be completely destroyed.

When the decon shower is finished, Nancy takes off the **spacesuit**, and realizes with horror that the **glove** has indeed leaked, meaning that there is Ebola **blood** all over her innermost glove. Going to a surgical sink, she rinses the blood off the glove and strips it off. Seeing blood on her bare hand, she is horrified—until she realizes that it is her own blood, seeping out from under her Band-Aid. She next fills her innermost glove with water to make sure there are no holes (through which virus particles could have slipped). The glove appears to be airtight, meaning that she has not in fact been exposed. Upon realizing that she is safe, Nancy collapses to the floor. The accident report on the subject confirms what Nancy believes: she has not been exposed. But she has come very close to catching Ebola—from a monkey, who caught it from a nurse, who caught it from a nun in Zaire.

The fact that the exposure is actually a near miss—Nancy's final glove protected her from the blood after all—only makes clearer the element of luck and chance that factors into dealing with hot viruses. Preston ends by reminding us that Nancy almost caught Ebola from a long-dead nurse in Zaire, once again pointing to globalization as both a constructive and destructive force. He lists the sequence of infection leading up to Nancy, but before the Ebola-infected nun, the source of the virus is a mystery.

Later that night, Nancy calls Jerry in Texas to tell him about her close shave. He is appalled, and reminds her that he didn't want her working with Ebola in the first place. Nancy, however, remains calm and tells Jerry that everything is going to be fine.

Despite her terrifying experience, Nancy remains calm in the face of a crisis. This quality will serve her well as the narrative progresses.

Preston relates that Gene Johnson's Ebola experiments were unsuccessful because he was never able to find drugs that had any effect on the virus. In fact, the experiment uncovered something incredibly disturbing: healthy monkeys kept in the Ebola room as controls eventually became sick and died as well, although they had no direct contact with the sick monkeys. Preston compares Ebola to AIDS, which cannot spread through the air, as this strain of Ebola appears to have done. Years later, Nancy tells the story to Preston, explaining that somehow, Ebola managed to make itself airborne.

Despite the many dead monkeys and the huge risk that researchers such as Nancy undertook, Gene's experiment yields only negative and terrifying results, calling into question whether or not Ebola can spread through the air. The fact that so much effort has gone in, yet no cure has been found, illustrates the difficulty of combating this deadly, mysterious virus.

PART 1, CHAPTER 7: EBOLA RIVER

We flash back to July 6, 1976 in Sudan, where a man known as Mr. Yu G. dies of a strain of Ebola. He is a storekeeper in a town called Nzara, a product of the "human population explosion" of the twentieth century. Preston calls attention to the beauty and diversity of the landscape, which changes from savanna to rainforest. Preston notes that many bats roosted in the ceiling near Mr. Yu. G.'s desk, but adds that no one knows whether they were the source of the infection. When Mr. Yu. G. died, his family gave him a traditional burial, and the virus began to spread. One of the victims, a man called P.G., was extremely popular and promiscuous, and he spread the virus to many of his acquaintances.

The theme of globalization returns in this passage, as Preston transitions into Sudan, making the landscape seem vivid and clear with various descriptive details. He recounts yet another outbreak of Ebola (this time the strain Ebola Sudan), illustrating the variety of ways that humans can spread the virus to each other—from funeral rites to sexual contact.

Preston explains that while being fatal to its host is not in the best interest of the virus, if it is extremely contagious, it can jump from one host to another before killing them. The Ebola strain reaches a hospital in a town called Maridi, where the medical staff has not been sterilizing its **needles**. There, patients, doctors, and family members all begin to die. Many of the victims experience brain damage, and exhibit psychotic behavior.

The mention of unsterilized needles brings back the idea of human error and hubris, since basic medical hygiene may well have prevented this entire destructive outbreak.

The Sudan strain, Preston explains, is more than twice as lethal as Marburg, meaning it kills about 50% of those infected. He says that if the virus had made it to the metropolitan center of Khartoum, it then could have moved to Cairo, from which it would have traveled to every large city in the world. Instead, the virus "ravaged" the hospital and then largely died out. It is possible that this occurred because the virus killed people too quickly (meaning they did not have time to infect others), and because it was not airborne. After this outbreak, the virus has not been seen since, but Preston speculates that it is still out there, living in "some unknown host" until it can mutate once again and infect humans.

Globalization returns once again as Preston traces the path that Ebola Sudan could have taken to become a worldwide pandemic. He admits, however, that Ebola may in fact be too deadly to spread easily, since it kills its hosts so quickly. This realization does not give him much comfort, however, as he speculates that the virus may one day mutate into a more effective and infectious form.

Two months after Ebola struck Sudan, in September 1976, an even more lethal strain struck Zaire, near the Ebola River. This virus was twice as lethal as Ebola Sudan. Although no one knows who the first human case was, Preston asserts that it was likely someone who ate meat from an animal infected by the virus, or who was exposed to an insect host of some sort. It next moved to a hospital in a town called Yambuku, which was staffed by Belgian nuns, and had a small school attached to it.

By immediately moving on to another epidemic—this time of Ebola Zaire—Preston illustrates how constant and endless the struggle to contain Ebola really is. These viruses have survived for millions of years for a reason.

Ebola traveled to this hospital by a way of a teacher from the school, who had recently been on a vacation in the wilds of Zaire. He visited the Ebola River and ate both antelope and monkey meat while there. The next morning he felt sick, and so stopped by the hospital to get an injection of medicine. The conditions in this clinic, however, were highly unsafe, with the nuns using only five hypodermic **needles** to give injections to hundreds of patients throughout the day, and rinsing them occasionally in **bloody** warm water. The schoolteacher became desperately ill a few days later, although it is unclear whether he contracted the virus while on his vacation, or from a dirty needle at the hospital.

Once again, a large part of the problem stems from unsterilized needles, emphasizing how much human error and hubris contributes to these epidemics, and how a groundbreaking scientific discovery (injections and innoculations) can, under the wrong circumstances, become deadly vehicles of disease.

Because of the use of these **needles**, the virus spread almost instantaneously to fifty-five villages close to the hospital. It killed those who had received injections, family members of the victims, and the hospital's staff, one of whom had aided a woman dying of the virus as she miscarried (her fetus, too, had contracted Ebola and had hemorrhaged inside her uterus). A nun named Sister M.E. became ill as well, and a priest, plus a nun named Sister E.R., decided to take her to the capital city of Kinshasa. Once there they took her to Ngaliema Hospital.

The injections that the nuns deliver allow Ebola to break out in fifty-five villages at once—a far wider range than the virus would have been able to reach without modern technology and globalization. The decision to take Sister M.E. to Kinshasa, meanwhile, is an altruistic but ultimately dangerous one, because it only furthers the potential spread of the virus.

Preston describes the effects of Ebola Zaire, which "attacks every organ and tissue in the human body except skeletal muscle and bone," transforming everything else into a kind of "digested slime of virus particles." It contains "seven mysterious proteins," which first create **blood** clots that, as they grow, cut off blood flow to other parts of the body, causing internal organs to begin to die. It especially focuses on connective tissue, essentially turning the body into "mush." Skin begins to blister, rip, and bruise, and soon every opening in the body begins to bleed. The heart starts to bleed and soften, the brain becomes blocked by dead blood cells, and the eyeballs fill up with blood. Often victims of the virus experience a stroke. Even though blood within the body is clotting, blood outside of the body is unable to coagulate, as the red blood cells themselves have been destroyed. While the host is still alive, internal organs such as the liver, kidneys, and spleen cease to function. Genitals, too, become swollen and may often hemorrhage.

Of all the variations of Ebola (Marburg, Sudan, and Zaire), Zaire is the most terrifying and deadly. It is essentially a hyperefficient tool to destroy the human body. Though by now we have grown accustomed to Preston listing various horrific symptoms, the effects of Ebola Zaire take that horror to a new level. The virus's deadliness springs from how fast it is able to multiply, literally filling up the body's cells with virus particles. This need to multiply, it is important to remember, is the fundamental urge that drives the spread of a virus.

Brain damage from the virus can sometimes lead to epileptic seizures, causing a patient to splatter **blood** all around them (an excellent way for a virus to jump to a new host). The virus multiples so fast that the body's cells become filled with viral structures called bricks, which break through the cell wall and then disintegrate into the bloodstream. Eventually one drop of blood can contain a hundred million particles of the virus. Once the hosts die, their bodies disintegrate and begin to leak a fluid that was once their internal organs.

Of all the strains and diseases that we have heard about up to this point, Ebola Zaire is the most efficient and destructive—at multiplying, but not at moving from host to host (at least not yet). Preston's list of symptoms also emphasizes the fragility of the human body, making clear how little we can actually defend ourselves against this kind of deadly disease.

After her death, "Sister M.E.'s hospital room was stained with **blood**." Hospital employees refused to clean the room, so it was simply left locked. They did not know what had killed her, but doctors suspected that it might be a relative to Marburg. Next Sister E.R. fell ill and died, after being cared for by Nurse Mayinga. Soon after this, Mayinga developed a terrible headache, but remained in denial because she had just received a scholarship to study in Europe.

Moving Sister M. E. to an urban hospital has exposed dozens more people to the virus, and the person who pays the price is Nurse Mayinga. Preston makes sure to humanize her, but also explains the devastating effects that her choice not to immediately quarantine herself could have had on her city and the world.

Rather than seeking treatment, Mayinga left her job and traveled into the city to obtain travel permits before she grew too obviously ill. When she became too ill to function, she took a taxi to Kinshasa's largest medical facility, the Mama Yemo Hospital—it is unclear why she didn't return to Ngaliema Hospital, but Preston speculates that it was "a case of psychological denial." It was a crowded building, packed with the city's poor, and the doctors there gave her a shot for malaria. Still ill, she took another taxi to a facility called University Hospital, where doctors were unable to find a diagnosis. Only then did she return to Ngaliema, where she was placed in a private room, and her sickness worsened.

This kind of human error is completely understandable (and, in Mayinga's case, tragic), but could still be catastrophic in terms of spreading an illness like Ebola. Thus this passage is meant to make readers understand how difficult it is to avoid such errors—and also how, on a person-to-person level, human psychology can have monumental repercussions for an epidemic.

People began to hear a rumor about a virus upriver, and about a sick nurse in Kinshasa. Word spread to government employees, and eventually reached the World Health Organization in Geneva. The place went on high alert, as its employees waited to see whether Mayinga had infected the population of Kinshasa. Countries began to consider blocking all flights from the city, and President Mobutu Sese Seko of Zaire sent in his army to quarantine Ngaliema Hospital. He also sealed off the infected zone upriver with roadblocks. Eventually this area, called the Bumba Zone, lost all contact with the outside world.

Once again, the only available response to Ebola is to quarantine those who have been exposed. This time, however, the action has the unintended effect of completely cutting off a section of Zaire (now the Democratic Republic of the Congo) from the outside world. Though this action may isolate those infected, it also leaves many people without any access to aid or medical care. This again shows the two sides to the interconnectedness of modern sociery.

Doctors had sampled Sister M.E.'s liver as she was dying, trying to ascertain her illness, and had also drawn some of her **blood**. They sent this to a lab in Belgium, and one in England, but not to the Centers for Disease Control in Georgia—staffers there began begging for samples as well. The main branch of the C.D.C. involved in this effort is called the Special Pathogens Branch, and in 1976, it was run by Dr. Karl M. Johnson, a virus hunter who had spent many years researching in Central and South America. He had heard only that there was a fever with "generalized symptoms" in Zaire, and finally obtained a small amount of Sister M.E.'s blood from the English lab.

Again at play within this passage is the force of globalization, this time working in favor of knowledge and scientific inquiry. Only by the methods of transportation and communication in the modern world are the researchers at the C.D.C. able to access Sister M. E.'s liver, and it is this access that eventually allows them to officially "discover" Ebola Zaire.

When the **blood** arrived, the tubes that held it had cracked, and the box was "sticky with blood." The virologist in charge, Patricia Webb (who was married to Karl Johnson at the time), put on **gloves** to handle the blood and managed to collect a few droplets. She placed it into flasks with monkey cells, and observed as the virus within the blood began to attack the healthy cells. Meanwhile, another doctor named Frederick Murphy, who had helped to identify the Marburg virus, decided to use an electro-microscope to photograph the virus within the dying cells. Putting a droplet of fluid under the microscope, he became instantly terrified as he saw the string-like virus, believing it to be Marburg. Fearful of Marburg's infectiousness, he scrubbed his entire lab with Clorox bleach, before calling Patricia Webb, who quickly contacted Karl Johnson. The three looked at the shapes of the virus, noticing the classic Ebola shepherd's crook, which essentially looks like "a Cheerio with a long tail." When Patricia Webb ran tests for Marburg, they came back negative. Having isolated and identified the strain, the C.D.C. had won the right to name it, and decided to call it Ebola.

Yet again, ignorance and hubris puts multiple people at risk. Since the scientists at the C.D.C. do not know about the danger of the sample they've been sent, they handle it without any of the precautions that will later be required when dealing with Ebola. Although no one falls ill as a result, the episode still illustrates the ways in which medical professionals can be put in harm's way by lack of knowledge about a disease. This is also Preston emphasizing yet again just how much of our lives are beyond our control, no matter how many precautions people might take. There is also a note of irony within this episode—although the scientists become instantly terrified when they find out that they might be dealing with Marburg, they are in fact handling the far deadlier Ebola Zaire.

Karl Johnson is now a fly-fishing aficionado in Montana, who does a great deal of consulting work on global health issues. Preston tries several times to contact him, and finally receives a response via fax, in which Johnson calls Ebola a "confrontational cobra," and confesses to being "shit scared" of the disease.

A pattern throughout the book is the simultaneous terror and fascination with which scientists such as Karl Johnson and Gene Johnson view Ebola. These opposing emotions are mirrored in Preston, who finds Ebola horrifying, and yet is obsessed with it.

Two days after discovering Ebola, Karl Johnson headed to Africa with two other C.D.C. doctors in an effort to stop the virus in Zaire and Sudan. They stopped in Geneva, where one of the doctors became too frightened to go any further—a fairly common occurrence, Johnson explains.

Karl Johnson and his colleagues show immense bravery in traveling to Zaire, especially considering how little they know about the disease that they are facing. This spirit of self-sacrifice and courage appears in many characters, like Nancy Jaax.

Preston visits Karl Johnson and the two go fly-fishing together. Johnson discusses his trip to Kinshasa, and the panic and chaos that he found there. He explains how catastrophic it would have been had Ebola been able to spread through the air, but reveals that the idea of a species-threatening virus doesn't upset him, because the human race may in fact need to be thinned out. He then comments that he finds viruses not only fascinating, but beautiful.

The peaceful scene of fly-fishing contrasts with the horrific scenario that Johnson is describing. Johnson takes an unpopular and disquieting view of a species-threatening virus, believing that it might ultimately be a positive event for the earth as a whole. This question will come up repeatedly throughout the book, as Preston often places humanity within the bigger picture of all life on earth.

A C.D.C. doctor named Joel Breman, who had come with Karl Johnson to Zaire, was tasked with travelling to the Bumba Zone, along with a team from WHO (the World Health Organization). Breman became increasingly scared as the plane neared its destination, remembering his wife and children in Michigan. He had only surgical masks, gowns, and **gloves** in his bag, and knew that this would not be enough to handle an infectious virus. The crew who brought them refused to even get off the plane. Once there, the team bribed the local governor, who loaned them two Land Rovers to travel to the Ebola River. The smallpox virus had attacked this area for centuries, and so each village had created a rudimentary quarantine roadblock out of foreign trees.

Considering how much we as readers know about the infectiousness of Ebola and the precautionary measures that scientists and doctors now take in handling with it, Joel Breman is clearly and woefully unprepared to deal with the disease that he will soon be facing. The mention of smallpox calls back to another famously deadly and disease, drawing a parallel between that widespread virus and Ebola's potential for an epidemic.

Villagers were suspicious of the WHO team, letting them in only after finding that they were doctors. At last the team reached the Yambuku Mission Hospital, which was nearly deserted, except for a few surviving nuns and nurses, and a priest. They had attempted to sterilize every room except for the maternity ward, which was filled with **bloody syringes**, and the corpses of infected women and fetuses. Preston takes a moment to describe the beauty of the surrounding landscape before recounting the team's journey deeper into the forest, where they encountered infected villages who had attempted to quarantine the sick and dying in huts, before burning the buildings altogether. Joel Breman realized that the epidemic had already peaked, and that it had begun at the hospital. He tried to contact Karl Johnson, but was unable to. Eventually they traveled back to the edge of the Bumba Zone, where an airplane picked them up.

The scene in the maternity ward is the horrific climax of this passage. Although we have been told of the effects of Ebola before, what the doctors find within this room represents the ultimate horror that the virus can inflict. Preston's decision to describe the natural landscape directly afterwards then lends a melodramatic sense of perspective—no matter what Ebola does to the human race, the natural world continues on. Joel Breman, meanwhile, experiences yet another near miss, one of many within the book. This shows how much is up to chance when it comes to contracting a hot virus.

Meanwhile, back in Ngaliema Hospital, Mayinga was being completely quarantined. Her main physician, a South African doctor named Margaretha Isaäcson, at first wore a gas mask whenever treating Mayinga, but eventually took it off, deciding that it offered little protection. She tried to care for Mayinga, but was helpless against the infection. **Blood** gushed from Mayinga's nose and mouth and her heart began to give out, though she remained conscious the entire time. She eventually died of a heart attack. Dr. Isaäcson, convinced that she herself was infected, washed out Mayinga's room and the nuns' rooms.

Like many of the physicians in the book, Margaretha Isaäcson displays immense bravery in dealing with a patient suffering from an incurable and infectious disease. That she survives despite her exposure is a matter of luck and chance rather than skill.

Medical teams had located thirty-seven people who had encountered Mayinga while she was infected, and quarantined all of them. Karl Johnson, meanwhile, had heard nothing from the doctors in Bumba, and assumed that they were dead and that the virus was highly contagious. He organized a ship that could serve as a place of refuge for doctors, should the city fall prey to an epidemic. A division of the US Army, meanwhile, prepared to evacuate all Americans out of Zaire. Miraculously, however, no one else became ill, not even a person who had shared a bottle of soda with Mayinga. The virus could not spread through casual contact.

The one element that keeps Ebola Zaire from being a truly species-altering pandemic is the fact that it can spread only through bodily fluids rather than through casual contact. It is for this reason—a fluke of genetics—rather than any protective measures, that the virus doesn't infect all those exposed to it. For all Preston's suspense-building, this is yet another "close call" that leads nowhere.

PART 1, CHAPTER 8: CARDINAL

In September 1987, Gene Johnson receives a mysterious package from Kenya containing **blood** from a 10-year-old Danish boy named Peter Cardinal. As Johnson drives to USAMRIID, he doubts there will be anything interesting in the boy's blood, but decides to analyze it anyway, despite the fact that it will take him much of the night to do so. He proceeds to the Ebola suite, places the serum in an airtight container, and puts on **gloves** in order to begin his work.

Globalization once again takes a prominent place in the narrative, as the American Gene Johnson receives a package from Kenya containing a Danish boy's blood. This passage also showcases Gene's dedication, and his preoccupation with researching and fighting against the virus that obsesses him.

Preston gives us background on the Cardinal family, which had recently taken a vacation in Kenya. During the trip, Peter fell ill (the first symptom was red eyes), and the doctors diagnosed him with malaria. His mother, however, was unconvinced, and demanded that he be evacuated to Nairobi hospital, where Dr. David Silverstein cared for him.

Like the Jaaxes, the Cardinals are a normal family—until their lives are torn apart by Ebola/Marburg. Once again we see the human cost of this disease, as a little boy dies in front of his family from a hot virus that nobody can combat.

Preston meets David Silverstein in a coffee shop to learn more about Peter Cardinal. Silverstein describes an alert, fit 10-year-old, who appeared to have pneumonia. Soon afterward he began to turn blue, and his skin became spotted with red dots. Dr. Silverstein began to worry that the child had Marburg, and ordered his team to take precautions. Soon after, the boy was put on a respirator. Next his skin began to bruise and his pupils to dilate, indicating that his brain was **bleeding**. His skin began to puff up, meaning that there was bleeding underneath it as well. Cardinal died shortly afterwards, having bled out internally.

Despite youth, strength, and excellent medical care, Peter Cardinal is doomed from the moment that he contracts Marburg virus. Preston's description of his symptoms and death illustrates the many different avenues through which Ebola can attack the body, and the complete inability on the part of both doctors and the human immune system to fight it.

Preston compares hot viruses to predators, describing the moment when a lion attacks a zebra on the savanna. He comments upon the "immense antiquity" of these kinds of lethal viruses, and reminds us that they are far older than we humans are.

Preston makes explicit the analogy between the Ebola/Marburg virus and a predator in the wild, a rhetorical device that illustrates both Ebola's ancient heritage and its ruthless lack of concern for what it attacks.

Peter Cardinal's parents and sister watched as he lay in agony. Eventually his brain activity flatlined, and Dr. David Silverstein advised them to turn off the respirator that was keeping their son alive, telling them that there was nothing anyone could have done to save him.

Despite Dr. Silverstein's having treated Marburg before in Dr. Musoke, there is nothing he can do to fight against it—in such a situation, doctors can only make their patients comfortable and try to avoid getting the virus themselves.

Back in USAMRIID, Gene Johnson puts Peter Cardinal's **blood** into a vial full of monkey cells in order to observe its effect on them. In the days afterwards, Johnson watches as the monkey cells burst and die. Next he uses the fluid to infect three monkeys, and two die quickly. After they succumb, Johnson infects guinea pigs, which also die soon after. Its extreme lethalness towards humans, monkeys, and guinea pigs means that it can jump across species to infect them. Johnson becomes obsessed with finding out where Peter became infected, and phones a friend named Dr. Peter Tukei, a scientist at the Kenya Medical Research Institute, who offers to locate and interview Peter's parents. A week later, he has news: the family had traveled to **Kitum Cave**. New questions spring up in Johnson's mind: if Charles Monet and Peter Cardinal both traveled to Kitum Cave before their deaths, then clearly the virus lurks somewhere within the cave.

This passage reveals the true significance of Kitum Cave: as the only shared geographical point in the travels of Charles Monet and Peter Cardinal, there is a huge likelihood that this cave contains the host of the Marburg virus. Considering the extreme mystery that enshrouds the origins of such hot viruses—and the danger that can spring from this kind of mystery—finding that host would be a huge victory for a virus hunter like Gene Johnson. Kitum Cave, however, remains a symbol of the mystery and power of nature. Though it may contain the source of the Marburg virus, it will not be nearly impossible to pinpoint that source.

PART 1, CHAPTER 9: GOING DEEP

Preston visits Gene Johnson near Fort Detrick. The scientist recounts his discovery that Peter Cardinal and Charles Monet had both been at **Kitum Cave**. Afterwards, Johnson flew out to Kenya and talked with David Silverstein. The two retraced Peter's trail through Kenya, and interviewed his grieving parents. The biggest mystery was why Peter had contracted Marburg, but his sister had not. His parents mentioned, however, that Peter was an aspiring geologist, and that he had collected crystals from Kitum Cave. It seemed possible that an Ebola-contaminate crystal had perhaps cut Peter's finger. Next, Johnson and Silverstein traveled to Kitum Cave itself, despite fears that Marburg could be transmitted through the air.

After the discovery that Kitum Cave likely contains the Marburg virus's host, Gene Johnson begins his quest to discover that host within the cave. This obsession even brings him to Kitum Cave itself, despite the personal risk. This passage then once again emphasizes Gene's bravery and selflessness, while also emphasizing just how difficult it is to figure out exactly how someone contracts a hot virus in the first place, or where they reside in the wild.

The year before Peter Cardinal's death, in 1986, Gene Johnson had infected monkeys through their lungs with Marburg and Ebola, meaning that if the particles were inhaled, they could indeed cause an infection. Therefore to investigate the cave, Johnson required his team to wear military gas masks. To cover their heads, they comically made do with flowered pillowcases. After a short visit to **Kitum Cave**, Johnson got the Army to fund a major research expedition, and in 1988 he traveled to Nairobi with a full team of thirty-five scientists and staff, many of whom were Kenyans. Beforehand, the team discussed what to do if one of them died of Marburg. Along with Johnson came Dr. Peter Tukei. First, the team fills cages with guinea pigs and three different kinds of monkeys. Then they put these animals in the cave. If one of the animals came down with Marburg, then the scientists would know that the virus indeed lived in the cave, and could perhaps detect how the animal had contracted it.

This expedition is a major effort on the part of the U.S. and Kenya, proof of how seriously both governments take the threat of Ebola. This is an instance in which globalization is a positive force, allowing doctors to team up despite national boundaries and geographical distance in order to combine knowledge and combat a deadly virus. Also significant here is the bravery that these researchers display in their decision to join the expedition. Considering how little is known about the virus, they are putting their lives on the line simply by being near Kitum Cave, let alone venturing inside of it.

The **Kitum Cave** expedition moves into an old English hunting lodge from the 1920s, and gradually moves the animals up the mountain. They assume that the cave is a Level 4 hot zone, and create a decontamination area outside of it. To go into the cave, they wear orange **spacesuits** called Racals. These suits are lighter than the Chemturion suits used at USAMRIID, and are also completely portable and disposable. Wearing the suits, they create a trail leading into Kitum Cave, and place the animals inside. They collect insects in order to test them for Marburg as well. In addition to the test animals and the insects, naturalists on the expedition also trap hundreds of species of birds, rodents, and bats, dissecting them and taking samples of **blood** and tissue. They also take blood from the Elgon Masai, the local tribe, as well as their cattle. Although no one in the nearby villages has been infected, they do tell stories of an Ebola-like virus.

That a highly involved expedition should turn up no evidence whatsoever of Marburg's host is a testament to the mystery surrounding this kind of virus. Although the researchers are incredibly thorough in their approach—as evidenced by Preston's descriptions of their processes—they are incapable of cracking the secrets of Kitum Cave. This episode makes the cave's status as a symbol of the mystery and power of nature even more apparent. The cave contains secrets within it, and even the diligent, courageous colleagues of Gene Johnson are unable to access those secrets.

After weeks of this, however, none of the monkeys becomes ill. In fact, the expedition finds not a hint of Marburg virus within the cave—a terrible disappointment for Gene Johnson. Despite the apparent waste of the expedition, however, Preston suggests that Johnson's knowledge and experience may still be useful in the future. He stores his gear in USAMRIID, ready at all times to combat an Ebola threat.

Gene Johnson, like many others in the book, believes that we must be constantly ready for an Ebola outbreak. In an instance of foreshadowing, Preston implies that he is correct.

The Army sends Nancy and Jerry Jaax to the Institute for Chemical Defense near Aberdeen, MD. Nancy studies the effects of nerve tanks on rats, a safer but less interesting task than Ebola research. Both she and Jerry are promoted to lieutenant colonel, and their daughter Jaime becomes a young gymnast, while Jaison grows tall and quiet, like his father. Time passes, and Colonel Tony Johnson is appointed head of pathology at Walter Reed Army Medical Center. Remembering Nancy's competence, he recommends that she take his place as chief of pathology at USAMRIID, and Nancy begins to work in a **spacesuit** once more. Jerry Jaax, meanwhile, becomes the head of USAMRIID's veterinary division. The family moves back to Thurmont in the summer of 1989.

In returning to the seemingly mundane details of the Jaax's suburban life, Preston is in fact ensuring that the reader always understands exactly what is at stake in the fight against Ebola. Although a far-off jungle cave may seem exotic, what is also at stake is the peaceful, modern life that we (as Westerners like the Jaaxes) have come to take for granted. We assume that we have control over our health and our lives, when in reality a microscopic organism from thousands of miles away could easily turn everything upside down.

PART 2, CHAPTER 1: RESTON

Preston describes the city of Reston, a wealthy suburb about 10 miles to the west of Washington, DC. It is an idyllic place with prosperous businesses and lovely houses. Near the main street in town, Leesburg Pike, is a "small office park" across the street from a McDonald's. In 1989 this building is occupied by a company called Hazleton Research Products, a division of Corning, Inc. This unit deals with importing and selling lab monkeys, and is also known as the Reston Primate Quarantine Unit.

The theme of the fragility of modern life continues as Preston describes the peaceful suburb of Reston—once again illustrating the idyllic setting for his horror story. Although he has made no mention of Ebola yet, the reference to imported monkeys already creates a sense of foreboding and dread.

The international monkey trade, Preston explains, brings 16,000 wild monkeys a year to the US. Before they are shipped anywhere, they must be held in quarantine for a month at a secure facility such as the Reston monkey house.

The process of globalization is clearly at the root of the expansion of the monkey trade, and is directly connected to the events to come.

We next meet Dan Dalgard, the consulting veterinarian at the Reston Primary Quarantine Unit. Dalgard is a respected physician with a specialty in "primate husbandry." In October 1989, a shipment of one hundred wild monkeys comes in to Reston from the Philippines. They have been jammed into cages on a boat and taken to Amsterdam, and from there they have been flown to New York City, and driven down to the Reston monkey house. The monkeys are crab-eaters native to Southeast Asia, and are called long-tailed macaques. Strong creatures with sharp canines and human-like hands, they tend to be mistrustful of humans. Preston describes their life in the wild, from their ability to catch crabs in the river to their strict hierarchy, dominated by an aggressive alpha male. The monkeys are placed in the twelve holding rooms (designated alphabetically from A-L) within the monkey house. When they arrive in October, two are already dead. This is not unusual, but in the next three weeks, more of the monkeys begin to die.

Preston expands on the theme of globalization by explaining the route that the monkeys have taken to end up in Reston. He then spends a significant amount of time explaining the monkeys' life in the wild, clueing the reader in to the fact that these animals will play an important part in the narrative—while also "humanizing" them, as Preston does with his descriptions of other Ebola victims. The mention of the monkeys' deaths, meanwhile, creates a sense of suspense and foreboding that will only grow as the chapter continues.

That same October, the Jaax family experiences a tragedy: Jerry's brother, a businessman from Kansas named John Jaax, is mysteriously and violently murdered. A homicide officer named Reed Buente takes the case, but is unable to solve it, although the family suspects John's business partner John Weaver, with whom he had a difficult relationship. His brother's death throws Jerry into a deep depression. He becomes obsessed with solving the murder, and even fantasizes about killing John Weaver himself.

The sudden and violent death of Jerry's brother offers another kind of perspective, and serves to remind the readers that many forces besides Ebola can destroy human life. This is a horror story about a "predatory" virus, but the only truly malicious and sentient killers in the natural world are humans themselves.

Preston introduces Bill Volt, the Reston monkey house manager. On October 1st he calls Dan Dalgard to tell him that an unusual amount of monkeys are dying—twenty-nine out of a hundred monkeys, particularly in Room F. At the same time, the heating system in the monkey house is refusing to turn off, meaning that the house itself is sweltering. Volt speculates that the heat may be killing the monkeys. Dalgard arrives at the monkey house the following week. The men put on surgical masks and enter Room F, where Dalgard observes that one of the monkeys appears dazed and ill. Donning thick leather **gloves** and pinning down the monkey, Dalgrard feels that it has a fever, and sees that it has a runny nose. Finding that another monkey appears sick as well, he theorizes that it might be the heating system. The next morning, Volt finds both of the monkeys dead, and decides to dissect them. Disturbed by the autopsy, he calls Dalgard over. The two men note the monkeys' enlarged spleens, and find blood in their intestines.

Again the book displays how human error and complacency can allow a hot virus to spread unchecked. Dan Dalgard and Bill Volt are not negligent or stupid, and yet both of them have no idea of the threat that is growing within their facility. Their decision to dissect the monkeys, meanwhile, is nerve-wracking for readers, who know what exactly the dead animals' blood contains.

Another shipment of monkeys arrives the same day, and Bill Volt places them in Room H. Dan Dalgard, meanwhile, becomes worried that the monkeys have a disease called simian hemorrhagic fever, which is lethal to monkeys but harmless to humans. On November 10th he decides to check on the monkeys, and finds three more dead in Room F. He autopsies them immediately afterwards. Dalgard then begins to keep a diary, where he describes the animals' dry, swollen spleen, enlarged kidneys, hemorrhages, and lethargy. As far as Dalgard can tell, the monkeys simply became lethargic, stopped eating, and died. What he does not realize is that the hard, enlarged spleen was in fact full of a giant **blood** clot. On November 12th, Dan Dalgard returns to the monkey house and finds three more monkeys dead. He carries one of them, a specimen named O53, up to the autopsy room. He removes a large piece of spleen and collects mucus from the monkey's throat as samples.

As has happened multiple times before in the narrative, Dalgard mistakes Ebola for a different, far less serious disease—in this case, simian hemorrhagic fever. When Dalgard describes the symptoms in his diary, however, it is clear to Preston and to the reader that he is actually listing the effects of Ebola. The feeling of frustration and helplessness that stems from Dalgard's ignorance helps us to understand just how difficult it is to combat this kind of rare yet deadly virus, considering the lack of public awareness (and even scientific knowledge) about it.

PART 2, CHAPTER 2: INTO LEVEL 3

On the 13th of November, Dan Dalgard decides to consult USAMRIID about the illness in the monkey house. He contacts a virologist named Peter Jahrling, an expert on monkey viruses, who becomes curious about the mysterious malady. Jahrling has worked at the Institute for much of his professional life, but has also studied viruses in the rain forests of Central America. Trained to work in a **spacesuit**, he researches methods of combating hot viruses, and tries to think minimally about the diseases' effects. Like the Jaaxes, his family lives in Thurmont. Although Jahrling lives a fairly ordinary life, the one outward sign of his profession is a vanity license plate on his car that reads LASSA. Lassa is a West African Level 4 virus that Jahrling finds fascinating, even beautiful. He has worked with almost every "hot agent" in the world except for Ebola and Marburg. When asked why, he replies, "I don't particularly feel like dying."

Like Gene Johnson, Karl Johnson, and Nancy Jaax, Peter Jahrling is a brave and dedicated scientist who finds viruses both horrifying and fascinating. Unlike the above three, however, Jahrling refuses to work with Ebola. It is striking that even a man who is willing to study and handle another Level 4 virus—Lassa—shies away from getting close to this one. This moment is also an instance of dramatic irony, of course, as readers are well aware that Jahrling will soon be sucked into the Ebola narrative.

The next day, Peter Jahrling receives frozen samples from O53, wrapped in flimsy aluminum foil. The ice around them is **bloody** and melting. He takes them into a Level 3 laboratory, which is kept under negative air pressure to keep viruses from escaping, but does not require a **spacesuit**. Instead, Jahrling wears a surgical mask, scrubs, and **gloves**. He examines the monkey's spleen with a pathologist, and feels thankful that he's not dealing with Marburg. Later that day, he calls Dan Dalgard and reprimands him for the sloppy condition of the sample's packaging.

Dalgard's sloppy delivery of O53's samples to Jahrling makes all too clear his ignorance about the danger that he's in. Jahrling then compounds this understandable yet perilous error by working with the virus at Level 3 rather than 4. In both cases these smart, careful men have been completely fooled by Ebola, emphasizing just how difficult it is to truly contain the virus.

A civilian technician named Joan Rhoderick cultures the virus from O53, meaning that she places it in a flask of water with living cells, and waits for it to multiply. She grinds up the spleen and puts it in one flask with monkey kidney cells, and does the same thing with O53's mucus and **blood** serum. Last, she places the flasks in an incubator and waits to see if anything grows.

Preston heightens the suspense of the moment by describing in detail the way that Joan Rhoderick displays the sample for testing. Like her colleague Peter Jahrling, she is completely unaware that she is actually handling tissue infected with Ebola.

Dan Dalgard checks in with Bill Volt the next day, and learns that no monkeys have died overnight. He calls Jahrling, but is told that they won't know anything for a few more days. A day later, Volt calls Dalgard to tell him the bad news: eight monkeys in Room F have stopped eating, and will soon die. Dalgard races to the monkey house and finds the room full of glassy-eyed, lethargic animals. Realizing that the entire room will die, he becomes anxious for news from USAMRIID. By November 16th, the virus seems to have spread to other rooms. That night, Dalgard receives a tentative diagnosis from Peter Jahrling: simian hemorrhagic fever. In order to contain the virus Dalgard and another veterinarian euthanize the rest of the monkeys, including those that appear healthy. Autopsying the healthy animals, Dalgard is upset to find that they appear perfectly fine.

The sense that the virus in the Reston monkey house is a ticking time bomb heightens during this section, as Ebola spreads while the scientists at USAMRIID actually misdiagnose the disease. This error, despite the best scientific equipment in the world, comes at the worst possible moment: just as the virus begins to spread and expand. Part of the virus's danger, then, comes not just from its virulence, but from the confusion and mystery that surrounds it—as this making it difficult for even experienced scientists to correctly diagnose it.

Before leaving the monkey house, Dan Dalgard and the other veterinarian place the dead monkeys in clear plastic bags and move them to a freezer. There is nothing to suggest, Preston comments, that the place is full of a hot virus. He describes the monkeys' distorted, **bloody** bodies within the bags, their faces "expressionless masks."

Preston uses a chilling image—infected monkeys hanging dead within a freezer—to vividly symbolize the danger that lies within the monkey house. Although they may be frozen, each of these monkey corpses contains disease, and no precautions have been taken to contain it.

PART 2, CHAPTER 3: EXPOSURE

Preston introduces readers to a trainee at USAMRIID called Thomas Geisbert, who operates the Institute's electron microscope, which is used to take images of small organisms and objects like viruses. Geisbert thinks of classifying viruses as like "sorting butterflies or collecting flowers." He even feels "at peace" when in a **spacesuit**, and enjoys being in the hot zone by himself. He's also a hunter, and especially enjoys deer season. Geisbert has trained himself to identify various viruses on sight, and has spent a great deal of time looking at the Marburg taken from Peter Cardinal.

Thomas Geisbert will be another important and sympathetic figure in the book. For now, he thinks of viruses as almost a beautiful part of nature, and feels totally safe dealing with them when he is a spacesuit. This confidence leads to hubris, however, as we will see.

Having heard about the sick monkeys in Reston, Geisbert decides to take photographs of the samples in order to try to identify simian-fever-virus particles. He decides to first examine them under a normal light microscope (far less powerful than an electron microscope), and does so along with Joan Rhoderick, the day after Dan Dalgard euthanizes his monkeys. Rhoderick notices something odd, as does Geisbert: the cells in the flask look broken and dead, and are specked with tiny granules that appear to be spilling out of them. The two decide to show the cells to Peter Jahrling. Since he's only in Level 3, Geisbert removes his scrub suit and takes a shower before going to find Jahrling. When they return, they dress like surgeons once again and go to examine the sample.

At last, the scientists at USAMRIID begin to understand that they are dealing with something unusual, but they still remain over-confident and so don't take many precautions. This is totally understandable, of course, and seems like an error only in light of what we as readers already know—which makes its reality all the more terrifying.

When he sees the sample, Jahrling asserts that the cells must have been contaminated in some way—an annoying but common occurrence. Believing the contaminant to be pseudonomonas—a common bacteria that can easily destroy cell cultures—Jahrling waves his hand over the flask in order to waft its scent and smell it. He encourages Geisbert to do the same, explaining that pseudonomonas "smells like Welch's grape juice." This culture, however, has no scent, and so Jahrling instructs Geisbert to examine the sample under the electron microscope.

This is a moment of dramatic and alarming human error—Peter Jahrling and Thomas Geisbert decide to sniff a flask that is (unbeknownst to them) actually filled with Ebola virus. This episode illustrates that even conscientious medical professionals who know how to protect themselves can often fall into the trap of complacency, as their curiosity edges close to something like hubris.

Geisbert places some of the fluid from the culture into a centrifuge in order to separate out the different kinds of cells, and then sets off on his hunting trip. Preston mentions that when a filovirus takes residence in a human host, its incubation period lasts from three to eighteen days. "Then comes the headache."

Preston ends the chapter on an ominous note by citing how many days it may be before Geisbert and Jahrling begin to experience symptoms—if they are, in fact, infected by the virus.

PART 2, CHAPTER 4: THANKSGIVING

From November 20th to 25th, Nancy and Jerry Jaax have "the worst Thanksgiving of their lives." They arrive in Wichita to eat with Nancy's family, including her father, Curtis Dunn, who's dying of cancer. He has lost his appetite, is constantly smoking cigarettes, and has been researching alternative treatments. After eating with him, the Jaaxes move on to Andale, Kansas, to eat with Jerry's mother, Ada Jaax, and his family. The fields are barren, the family is grieving, and multiple people break down into tears. Nancy helps clean up before driving back to spend time with her father. Finally the Jaaxes return to Maryland.

The Jaax's terrible Thanksgiving again illustrates the fragility of human life, even outside the world of hot viruses. Both sides of the family, from Nancy's cancer-stricken father to Jerry's grieving mother, have now been marked by death. Although Ebola is a terrifying and desperately painful way to go, it is incredibly rare in relation to the many other forces that threaten human life.

Dan Dalgard, meanwhile, calls Peter Jahrling to find out further information about the virus. Jahrling tells him once again that it is probably simian hemorrhagic fever. Dalgard feels worried that the virus may have spread to other rooms, but drives to Pittsburgh with his wife to be with his family. When he returns, he finds that five monkeys have died in Room H, two doors down from Room F, meaning that the virus is moving and skipping rooms.

The delay for Thanksgiving comes at a terrible moment, just as the virus begins to move from one room to the next. Viruses, implacable and concerned only with multiplying, don't wait for human holidays.

PART 2, CHAPTER 5: MEDUSA

On November 27th at 7 AM, Tom Geisbert returns to the Institute to check on the monkey cells, which have formed a small "dot the size of a toast crumb" in the centrifuge. Geisbert uses a diamond knife—"the sharpest cutting edge of any tool on earth"—which is even able to split one particle of a virus cleanly in half. He attaches the diamond knife to a cutting machine, and watches through the microscope as infinitesimally small slices fall and attach themselves to a droplet of water. He next uses a human eyelash to stir the water droplet in order to separate the slices from each other. Using a tiny copper grid as a net, he scoops up a slice of cell and puts it into small box. He takes the sample to the room that holds the electron microscope, and attaches the grid to the microscope's sample holder, so it is "centered in the beam of electrons." Turning off all the lights in the room, Geisbert turns on the microscope and goes to a viewing screen, wondering at the immense complexity of the cell before him.

This passage's detailed and involved description of Geisbert's process helps the reader to understand the incredible delicacy and concentration that it takes to perform a job like this, and emphasizes the power of human curiosity and innovation. At the same time, this complicated procedure is dwarfed by the complexity of the cell, which is a product of natural (rather than human) design. Thus Preston is simultaneously illustrating the power that humans have over the natural world, and emphasizing how small that power is compared to the force of nature itself.

As the cell comes into focus, Geisbert knows that something is wrong—the cell has been utterly destroyed, and is filled with viruses that look like buckets of rope. Instantly knowing that he is looking at a filovirus, his first thought is "Marburg." Panicking, he recalls how similar this sample looks to Peter Cardinal's, and realizes that he and Peter Jahrling may have smelled a hot Level 4 agent.

This passage, in which Geisbert at last realizes that they have been dealing with a filovirus all along, is a climactic one within the section. Geisbert's horror at his discovery is compounded by his realization that both he and Jahrling have been exposed to it, however briefly.

Geisbert takes pictures of the scene before him, and goes to the darkroom to develop them. As he does so, he counts backwards, realizing it's been ten days since he inhaled the virus, meaning that he has eight more days in which to fall ill. Feeling paranoid, he wonders whether he has a headache or feels feverish, and tries to think about whether he was in fact exposed. Then he backtracks, speculating that perhaps his inexperience has made him misidentify the virus. Yet looking at the images he's developed, he sees virus particles shaped like snakes, as if they were "the hair of Medusa." The life form is beautiful, Geisbert thinks, even as he realizes that he may be its prey. He is also awed by what the virus has done to the cell, which Preston describes as "a chocolate-chip cookie that was mostly chocolate chips"—the "chips" in question being viral particles called inclusion bodies.

Geisbert's sense of terror, also contains a kind of hypnotized fascination. Just as Karl Johnson referred to Ebola as a "cobra," so too does Geisbert see great beauty and natural elegance within the structure that he views with his microscope. Preston also uses the predator/prey analogy once again, comparing Ebola to a hungry and ferocious animal in order to vividly evoke the very real danger that it poses to all humans who come across it.

Preston explains the term "inclusion bodies," which are masses of viral particles that form brick-shaped structures, pushing outwards until they hit the cell wall, at which point they disintegrate into threads and move out into the **blood**stream. The bricks make the cell bulge and eventually burst. Thomas Geisbert realizes that the granules he saw under the light microscope were actually inclusion bodies, and that the sick cells he saw were bursting full of their viral load.

This passage emphasizes, on a microscopic level, just how powerful Ebola virus is. A virus's only job is to multiply, and Ebola has done that so effectively that the infected cells are literally bursting with viruses—a scientific yet vivid description of the incredible virulence that Ebola possesses.

PART 2, CHAPTER 6: THE FIRST ANGEL

Tom Geisbert prints out the photos and heads to Peter Jahrling's office with them. On the way, he passes the chaotic office of Gene Johnson, before reaching Jahrling's sunny office filled with pictures drawn by his children. Showing Jahrling the photographs, Geisbert explains that he believes the Reston monkeys have been infected by Marburg. Jahrling at first assumes that Geisbert must be joking, but when he sees the photograph he realizes he isn't. Jahrling remembers sniffing the vial of virus and cutting up the monkey's spleen. The two discuss the fact that the virus looks a little bit too long to be Marburg, but they decide to pass this information up the chain of command.

The small detail about Jahrling's children's drawings again emphasizes the high stakes involved in the fight against Ebola, and the fragility of modern life. Jahrling's reaction, meanwhile (he believes that Geisbert is joking), makes obvious how unprecedented it is to find a case of Ebola on American soil.

The next person they notify is Colonel Clarence James Peters, MD (C.J.), chief of disease assessment at USAMRIID. He too spent extensive time in Central and South America looking for viruses, and he tends to ignore Army regulation, showing up at 10 AM rather than 8 AM, and wearing jeans with a Hawaiian shirt over sandals and socks. His staff is incredibly loyal to him, but he also makes enemies easily. An adventurous man, he loves eating local cuisine, and has sampled everything from monkey to zebra to jellyfish to termites. In fact, he even keeps refrigerated termites to snack on at the end of the day.

Here Preston introduces and humanizes another new character who will be a major player in the events to come. Like Nancy Jaax and Gene Johnson, C. J. Peters is another dedicated and courageous scientist who consistently puts the safety of others before his own—and also has an insatiable sense of curiosity.

Jahrling finds Peters in a meeting, but upon seeing the pictures, the colonel instantly leaves the room. In his office, Jahrling and Peters discuss whether the sample is actually Marburg. Peters asks whether there might be contamination elsewhere in the lab, but this seems unlikely. They speculate that it might be something other than Marburg, and decide to test the strain using an experiment with human blood samples that glow if they have been infected with Marburg. Peters suggests that they test for Ebola as well, and the two worry that Dan Dalgard might be infected. Peters requests that Tom Geisbert take electron microscope pictures of monkey liver in order to ascertain whether there is actually virus within the animals. Peters comments that a Marburg scare close to Washington will cause mass panic—and then he returns to his meeting.

Peters' dramatic reaction to the news only increases the reader's sense of the seriousness of the situation. The uncertainty that accompanies the discussion, meanwhile, underscores how unbelievable these circumstances are, and also how little even the most informed scientists really know about Ebola and Marburg. Meanwhile, Peters' mention of a possible mass panic becomes a huge concern within the narrative. For the officials of USAMRIID, containing the public's reaction to a possible outbreak is almost as important as containing the outbreak itself.

After speaking to C. J. Peters, Peter Jahrling and Tom Geisbert discuss the fact that they both may have inhaled Marburg virus. They count backwards and realize that they were exposed eleven days ago, meaning that they still might be within the disease's incubation period. They wonder what Colonel Peters would do if he knew about their potential exposure, and consider the possibility of being put in the Slammer. A horrific psychological experience, time in the Slammer often renders patients clinically depressed, catatonic, or even psychotic. Often those who leave the Slammer alive end up paranoid and washed up, unable to work at USAMRIID anymore.

As with Nurse Mayinga, human psychology comes into play when dealing with the disease on a person-to-person basis—Maying, Jahrling, and Geisbert all basically go into denial when confronted with the possibility that they might have Ebola. The bleak description of the Slammer again emphasizes that humans end up inflicting much more suffering upon each other than any virus could.

Jahrling asserts that he and Geisbert most likely did not contract the virus, although he decides to test their blood to make sure. He then turns his mind to Dan Dalgard, whose risk of getting the disease is far higher, but who appears perfectly healthy. Reasoning that this may be a new strain of the virus altogether, Jahrling and Geisbert decide to stay quiet about their potential exposure, and to keep researching the disease. They secretly draw **blood**, and Jahrling takes the samples to his Level 4 lab in order to test them. Meanwhile, Geisbert takes sterilized pieces of O53's liver and begins a process by which he can take pictures of the viruses within it.

Here Geisbert and Jahrling basically decide to keep their potential exposure a secret. This is a gamble, as they are now at risk of exposing dozens more people to Ebola. There is no way, however, for the scientists to know the truth right now, and again chance and luck take on a powerful role. The two men are in an ambiguous position—self-sacrificing, in that they are putting their own lives at risk to help others, but selfish in that they are potentially putting many other people at risk to save themselves.

PART 2, CHAPTER 7: THE SECOND ANGEL

On November 28th, Tom Geisbert gets up at 4 AM and drives to Fort Detrick. He slices pieces of monkey liver with the diamond knife, puts them under his microscope, and takes photographs of the virus particles within the liver. This confirms that the viruses are coming from the Reston monkeys rather than from outside contamination. He takes his photographs to Peter Jahrling and C. J. Peters, and the three men now must wait for Jahrling to complete his tests to see whether the strain really is Marburg.

Despite the possibility that Tom Geisbert has been exposed to the virus, he remains diligent and ready to perform his duty. Time, meanwhile, yet again becomes an obstacle in the fight against Ebola/Marburg, since the scientists must waste precious days waiting for lab results before they can begin combating the virus.

As he works on his tests, Peter Jahrling decides that he must notify Dan Dalgard—but at the same time, he must make sure not to cause panic. On the phone he tells Dalgard that the monkeys definitely have simian hemorrhagic fever, but that they might also have another disease. Dalgard demands to know what it is, but Jahrling refuses to tell him. Dalgard begins to suspect, however, that the monkeys might have Marburg. When Dalgard confronts Jahrling with the possible diagnosis, Jahrling says that the second virus is most likely not Marburg, but that Dalgard and his employees should try not to expose themselves unnecessarily. Upset, Dalgard asks when they will know for sure. Jahrling promises to call him back later that day.

The question of the public and the delicacy of human relations again comes to the forefront as Peter Jahrling tries to alert Dan Dalgard to the potential danger of the virus—without also sending him into a panic. This decision is a difficult one—on one hand, more knowledge helps to keep people safe (and ignorance can be deadly, as the narrative makes clear), while on the other hand, mass hysteria is itself a dangerous and powerful force. Thus the scientists at USAMRIID must toe the line between openness and secrecy.

Shaken, Dan Dalgard considers the possibilities if the virus is indeed Marburg. He reassures himself by remembering that he has been autopsying monkeys since October, but has not fallen ill. He calls Bill Volt and orders him not to open up any more monkeys, then waits for a phone call from Peter Jahrling. As he does, he wonders whether any of his employees have cut themselves with scalpels while dissecting the sick monkeys. He begins thinking about the symptoms of Marburg, and at 5:30 finally calls Jahrling, but is unable to reach him. Annoyed, Dalgard heads home.

As this passage makes clear, equally terrifying to the symptoms of Marburg are the various human errors that can lead to contracting the virus. Dalgard's obsession with the danger he and his employees face may seem paranoid or melodramatic, but it is in fact quite reasonable given the circumstances.

As Dan Dalgard waits and worries, Peter Jahrling works in his **spacesuit**. He plans to combine samples of the virus with the **blood** serum of humans who have died of different strains of Ebola. If a combination glows under ultraviolet light, that will confirm that the viruses match. He is using three different serums: that of Dr. Shem Musoke, who survived Marburg; that of a man named Boniface who died of Ebola Sudan; and that of Nurse Mayinga, who died of Ebola Zaire. When the results are finally ready, Peter Jahrling looks through his microscope at the samples. The Musoke doesn't glow at all; the Boniface glows slightly; the Mayinga's glow is bright. This means that the monkeys in Reston do not have Marburg—they have Ebola Zaire. Horrified, Peter Jahrling stands for a moment, frozen, listening to the beat of his own heart.

As he often does, in this section Preston mixes scientific fact with human emotion. The terrifying nature of Ebola Zaire is hammered home by the reaction of the usually calm, cool, and collected Jahrling, as he realizes that he may have been exposed to one of the most lethal viruses on earth. Also at play within this passage is the concept of globalization and its positive effects. This kind of research is only possible, after all, because the tools of the modern world allow USAMRIID to maintain samples of a deadly African virus.

PART 2, CHAPTER 8: CHAIN OF COMMAND

Unable to believe that the strain is Ebola Zaire, Peter Jahrling performs the test again, but gets the same results. He is positive now that the strain from the Reston monkey house is either Ebola Zaire or a closely related mutation. Deciding that he doesn't have time for a decontamination shower, he calls C. J. Peters using a phone inside his lab. At first Peters is unable to believe that the virus is Ebola Zaire, so Jahrling offers to let him look at the results himself. As Peters heads to the lab, Jahrling writes down his results on a sheet of waterproof paper, decontaminates it, and uses a contraption akin to a mail chute to send the paper to the corridor outside of the Level 4 lab. After looking at the paper, Peters tells Jahrling to decontaminate himself so that they can go see the commander of USAMRIID.

Time, formerly the enemy, now seems to speed up as the researchers take Peter Jahrling's results up the chain of command at USAMRIID. Their reactions—disbelieving and yet swift—hammer home both what an unbelievable occurrence this is, and how seriously all of the characters are taking it. Faced with a Level 4 virus, they exhibit no complacency or hubris at this point—human emotions that could potentially turn deadly when dealing with a virus like Ebola.

Peter Jahrling and C. J. Peters visit the office of Colonel David Huxsoll, the commander of USAMRIID, and an expert on biohazards. Upon hearing the news, Colonel Huxsoll telephones Major General Philip K. Russell, MD, the commander of the United States Army Medical Research and Development Command to set up a meeting. The men decide that they should also bring in Nancy Jaax. The group enters the office where the general, another virus hunter, meets them. Russell reacts with shock and dismay when he sees the pictures, and is even more disturbed to hear that the strain is closely related to Ebola Zaire. He believes that they are on the verge of a national emergency. He asks the group whether there is any evidence that Marburg can travel through the air. Nancy confirms that this kind of transmission is possible, and the men are upset that she and Gene Johnson (her co-researcher) didn't make the results of this study more widely available. Jahrling, meanwhile, decides not to tell the general that he may have been exposed to the virus.

Reacting swiftly and seriously, the characters display a sense of teamwork and bravery here that is crucial in combating Ebola. At the same time, however, Preston takes care to note that Jahrling has yet to inform anyone about his and Geisbert's potential exposure to the virus. This potential misstep complicates the heroism of the USAMRIID employees, reminding readers that they are disciplined military scientists, but also fallible humans. It is this very fallibility, however, that Ebola seems to exploit in order to infect new hosts.

The group begins considering whether this disease is Ebola Zaire or something new entirely, and then they begin to discuss their options. Since there is no vaccine or drug that can stop Ebola, they must turn to a third option: biocontainment. This means either sealing off the monkey house and letting the animals die, or euthanizing all the monkeys, burning their corpses, and dousing the building in sterilizing chemicals. Nancy Jaax asserts that it may be more humane to euthanize the monkeys rather than let them die of Ebola. She also says that she wants to look at the monkeys herself to see if they show symptoms of Ebola, and she wants to look at samples of their tissue under a microscope.

No matter how terrifying Ebola Zaire is, the idea of a different but unknown disease is equally horrific, because of how deadly ignorance can be when dealing with hot viruses. Nancy, meanwhile, displays both compassion and competence, speaking out for the humane treatment of the monkeys while also offering to dissect them. This mixture of kindness and bravery is exactly what makes Nancy such a compelling character within the narrative.

Discussion then turns to whether the Army should get involved, since it's technically only supposed to respond to military threats. If the Army does begin combating Ebola, it will be stepping on the toes of the C.D.C., whose job it is to "control human disease." At the same time, the Army does have more manpower and ability than the C.D.C. does. General Russell asserts that this operation will function best if it is staffed by soldiers, because of their discipline and their willingness to die. The group acknowledges, though, that this kind of operation has never been attempted before, and that it may not even be legal. As the conversation grows heated, the general takes charge, saying that he will get the money to fund the operation, that the Army should run it, and that C. J. Peters should be in charge.

The pettiness of human bureaucracy contrasts with the primitive drive of the Ebola virus. Meanwhile, we as readers begin to understand how massive a mission to contain Ebola within the Reston monkey house really would be. This need for military discipline and self-sacrifice emphasizes how dangerous the potential mission is. Those who work with Ebola should always be aware of its deadliness—it's almost like being at war.

General Russell adds that they need to contact Frederick A. Murphy, the director of the National Center for Infectious Diseases (a branch of the C.D.C.), one of the discoverers of Ebola, and an old friend of Russell's. He calls Murphy's office and then his home, and is amused by Murphy's violent reaction when he hears the news. Murphy says that he must see the electron microscope pictures himself in order to verify the findings.

Yet again another seasoned expert is shocked by the discovery of Ebola on American soil. Frederick Murphy's reaction makes clear how alarming the virus is, even for scientists who are both brave and experienced.

It is now mid-evening, and the group must contact Dan Dalgard, as well as the Virginia state health authorities. They will also have to notify the Department of Agriculture, which oversees the importation of monkeys, and the EPA, which has control over situations of contamination by a biohazard. They also must get in touch with the assistant secretary of defense, so that the Pentagon is kept in the loop. The group disperses to make phone calls, and C. J. Peters at last reaches Dalgard, who at first reacts with confusion to the news. He is initially relieved, but quickly realizes his mistake when Peters tells him how much worse Ebola is than Marburg. Dalgard asks if the Army will wait until 7 PM before spreading the news, so that he can get in touch with his corporate headquarters. Peters, meanwhile, requests that one of his people enter the Reston monkey house in order to take samples. Dalgard, feeling overwhelmed and helpless, resists. He asks if they can discuss their approach tomorrow over the phone. After the conversation, C. J. Peters tells Nancy Jaax that he wants her on the pone call as well.

The kind of teamwork described in this passage is a double-edged sword. On one hand, it is vital to gather the resources necessary to contain the virus before it potentially spreads to the human population. On the other hand, the more governmental agencies get involved in the operation, the more unwieldy and slow it will become, and the more likely it is to be leaked to the general public. Another obstacle, surprisingly enough, is Dan Dalgard, whose fear about his employees and corporations actually keeps him from trusting anyone and makes him uncooperative.

Nancy walks to Jerry's office and finds him brooding about his brother. She tells him that they've found Ebola in Reston, and on the ride home, the two discuss the fact that they will most likely both be involved in an Army operation. Jerry is surprised by the situation, but proud of his wife.

Nancy and Jerry are, themselves, a team, one that functions well because they share the same values: a commitment to human life and a willingness to die for the general good.

When the two get home, Jaime is at gymnastics practice while Jaison is doing his homework. Nancy drives out to pick up her daughter, who falls asleep in the car on the way home. Later that night, after reading in bed together, Nancy and Jerry discuss the monkey house. Jerry stays up late reading about the Battle of Gettysburg, and when he tries to sleep, he has nightmares about his brother.

In a kind of calm before the storm, Nancy and Jerry take a peaceful, ordinary walk outside, their moment of suburban domesticity again emphasizing the vulnerability of any kind of lifestyle—no matter how seemingly sheltered and safe—in the face of lethal viruses.

PART 2, CHAPTER 9: GARBAGE BAGS

Despite the stress, Dan Dalgard sleeps well, feeling confident in his knowledge of monkey viruses. Early in the morning of Wednesday, November 29th, his phone rings. It is C. J. Peters, requesting to send people over to look at monkey tissue specimens. Dalgard agrees to turn over the tissue, but refuses to let Peters inside the monkey house until the two men have met face-to-face. He drives to work and calls Bill Volt, who gives him terrible news: one of the animal caretakers, who is called Jarvis Purdy, has fallen ill with a heart attack. Wondering whether the heart attack was caused by Ebola, Dalgard begins to feel panicked. He orders Bill Volt to keep all caretakers out of the monkey rooms whenever possible, and adds that employees should wear biohazard suits at all times. At the same time, Dalgard is worried about the news media picking up the story, and tells Volt that the employees cannot leave the building in biohazard gear. Last, he calls Purdy's hospital, and asks his doctor to call C. J. Peters if anything about the heart attack appears atypical.

Dalgard's feelings of confidence and security are, of course, completely misguided—an example of how even educated, well-informed people can underestimate the threat of Ebola. Preston hammers home the dangers of Dalgard's complacency by subsequently revealing that Jarvis Purdy is ill. The episode illustrates a sad but true fact: that people often fail to take action until their lives and the lives of those they know are directly in danger.

Later in the morning, C. J. Peters, Nancy Jaax, and Gene Johnson head out to Virginia, where they meet Dan Dalgard at the Hazleton office. He introduces Nancy to a pathologist, who has slides of monkey liver for her to observe. As she looks at the cells under a microscope, she sees that they have been destroyed, and are filled with huge crystalloid bodies—clear markers of Ebola. Meanwhile, Peters and Johnson ask Dalgard whether the company might have been using dirty needles to vaccinate the monkeys. Dan Dalgard says that this would be against company policy, but that he's unsure. Nancy, meanwhile, collects pieces of sterilized liver and spleen to go back to Fort Detrick. When Peters asks Dalgard if they can go to the monkey house, however, Dalgard again evades the question, instead telling the group that an employee of his will meet them at a gas station near the monkey house to bring them "samples." Peters urges Dalgard to have the samples wrapped in plastic.

Although all parties involved have good intentions, this meeting is an example of the multiple ways in which an effort to combat Ebola can be hampered by human complacency and lack of cooperation. Nancy, C. J., and Gene all understand the threat they are facing far better than Dalgard does, and yet they are unable to access the monkey house due to his refusal. Dalgard, meanwhile, has to answer to his own company, even though he now understands the gravity of a potential Ebola exposure. In the end, the episode is frustrating for characters and readers alike.

Nancy Jaax, Gene Johnson, and C. J. Peters drive to the gas station and wait. As they do so, Peters watches the goings on of everyday life and imagines what would happen if Ebola were to break out in this kind of community. He also thinks about AIDS, and wonders if it would have been possible to stop its spread. He compares AIDS to Ebola, and wonders what exactly is living inside the monkey house. He begins seriously contemplating who exactly is going to have to euthanize the monkeys, and becomes more and more sure that the Army should take charge, using a military biohazard SWAT team to sterilize (or "nuke") the building.

This is a striking passage within the book, in which Peters considers the catastrophic effect that Ebola would have on this quiet, peaceful community. Readers, too, must contrast the idyllic town of Reston with the horrors described in the epidemics in the Sudan and Zaire. In many ways this question—how will modern American life react to the threat of an Ebola outbreak?—is one of the central questions of the narrative.

Sitting next to C. J. Peters, Gene Johnson thinks about **Kitum Cave**. He is terrified that someone is going to die because of the disease in the monkey house, and that the Army will be blamed. Finally he turns to Peters and tells him that someone is going to have to euthanize the monkeys, and that they absolutely must have experienced people at the helm of the operation. Peters, meanwhile, feels irritated that Gene thinks he needs this sort of advice.

Even for Gene, a rational, brilliant scientist, Kitum Cave emblemizes the deadly, unknowable virus. This huge, menacing symbol contrasts with the petty rivalry between Johnson and Peters, proof of the various forms of human effort and foolishness even in the face of a crisis.

Preston explains the complicated and difficult relationship between C. J. Peters and Gene Johnson, who went on an unsuccessful expedition together in central Africa looking for Ebola virus, and whose friendship was strained because of the stresses of the trip. Comically, it was there that Peters began eating termites (to the disgust of the pickier Johnson). During this trip, Gene had often felt that Peters was trying to take charge, which irritated him greatly.

Preston expands on the conflict between C. J. and Gene, revealing that it (like so much else in the narrative) is integrally related to Ebola. What underlies this episode, however, is the great bravery that the two men showed in searching for Ebola at all—they can simultaneously be petty rivals and incredibly courageous allies.

At last a van pulls up, with Bill Volt driving. He shows the Army team seven double bags filled with monkey corpses. Peters, Nancy, and Gene are horrified by the possibility of contamination, and Nancy refuses to put the corpses into her car, telling Peters that he should do it because he outranks her. Despite the legal problems of transporting dead, infected monkeys across state lines, Peters agrees to carry them in his "old red Toyota" anyway. The team doesn't have **gloves**, and Nancy asks Bill whether the bags have been disinfected. He responds that he washed their outsides in Clorox bleach. Disgusted but determined, they put the seven monkey corpses into the trunk. Nancy says that they must begin dissecting the corpses right away, before they liquefy. Peters jokes that they'll need to "watch for drips" from his trunk.

For the scientist characters and the reader alike, this is a truly horrifying episode, one that underscores just how little the employees of the Reston monkey house truly know about the virus to which they've been exposed. Unlike Nancy, C. J., or Gene, Bill Volt clearly has no idea how easily he could have been exposed to the virus, or that he has put others in danger as well. Despite the threat of contamination, however, all three show tremendous bravery in handling and transporting the monkey corpses. Preston, as usual, emphasizes the gruesome nature of the work.

PART 2, CHAPTER 10: SPACE WALK

The team arrives back at the Institute with the monkey corpses mid-afternoon, and moves the specimens up to the Ebola suite. Nancy Jaax finds a member of her staffed named Lieutenant Colonel Ron Trotter and tells him to put on a **spacesuit** so that they can go into the hot zone together. Nancy locks away her engagement ring and wedding band, puts on a scrub suit, enters a security code, and meets Trotter in the Level 3 area. Together they put on **gloves** and spacesuits and head to an airlock that leads to the outside world, where the monkey corpses are being kept. Back in Level 4, Nancy calms herself and begins the decontamination cycle. Afterwards she and Trotter place the bags in the refrigerator room, before taking one into the necropsy room, adding another pair of gloves, and inventorying their tools. At last they take the monkey out of the bag, and Nancy notes that its eyes are normal, rather than red or clouded.

The immense precautions taken by Ron Trotter and Nancy are contrasted with the lax conditions back at the monkey house. It is also notable that despite Nancy's wealth of experience working in a spacesuit, she still feels nervous and apprehensive every time that she puts one on. Especially since her last "near miss," she knows how easily the protection of her suit and gloves could become useless. Her fear is heightened, of course, by the fact that she's not doing research now, but rather is investigating the potential outbreak of a deadly virus. Despite all these factors, her ability to calm herself shows her experience, skill, and bravery.

Preston takes a moment to note that when most organisms die, they are never able to come back to life. Viruses, however, can "go dead" only to reawaken when they come into contact with living cells. Therefore, although the virus within the monkey is currently dormant, it could come alive once again if it touched living cells (such as Nancy's cells).

Preston takes a moment to once again highlight the power of viruses, and to remind us how easily someone could be infected at any time. Although Nancy and Ron have taken every precaution available, they are still putting their lives in danger.

Nancy cuts into the monkey's abdomen. Although the spleen is hard and enlarged, the monkey has no lesions, nor does it appear to have **bled** excessively. She does find bleeding spots between the stomach and small intestines, but simian hemorrhagic fever could also have caused this, so Nancy is unable to confirm the presence of Ebola. Next she cuts wedges of liver out of the monkey and presses them onto slides in order to study them later. She works slowly, rinsing her **gloves** multiple times in decontaminant, and changes the gloves often. As she works, Nancy wonders whether the monkey has Ebola at all, and contemplates the complexity of nature.

The mystery of the illness in the monkey house only deepens in this passage. By now the readers, like Nancy, are familiar enough with the symptoms of Ebola to realize that this monkey is not displaying many of them. Both Preston and Nancy note that nature is a complex and mysterious force, and often works in ways that humans simply cannot understand.

PART 2, CHAPTER 11: SHOOT-OUT

As Nancy dissects the monkeys, C. J. Peters runs a huge meeting in the conference room of Fort Detrick. General Russell sits in to chair the meeting, hoping to keep it from turning into a contest between the Army and the C.D.C. Dan Dalgard is there as well, outwardly calm but inwardly nervous. Also present is a glaring Gene Johnson, officials from the Virginia and Fairfax County Departments of Health, Fred Murphy, and the chief of the Special Pathogens Branch of the C.D.C., Dr. Joseph B. McCormick. Brilliant, charming, and hot-tempered, Joe McCormick has actually treated human cases of Ebola. He also has a longstanding rivalry with Peters. The meeting begins with Peter Jahrling explaining that there is a strain of Ebola infecting the monkeys. Next a nervous Dalgard explains the symptoms that he has observed. After this, Joe McCormick speaks. Preston explains that the Army people in the room find his words condescending and dismissive, while McCormick asserts (later) that he was simply offering "help or assistance."

This meeting, like so many events and actions in the narrative, has both a positive and a negative side. On one hand, the multiplicity of officials and departments included in it emphasizes how seriously all involved are taking the potential outbreak. On the other hand, the squabbling within the ranks (especially between C. J. Peters and Joseph McCormick, a conflict that symbolizes the tension between the C.D.C. and USAMRIID) makes it clear that even during times of crisis, humans are still unable to entirely put aside their petty rivalries. The effort to combat Ebola has begun in earnest, but it is hampered by human jealousy and desire for control.

Preston recounts the history of conflict between the Army and Joe McCormick, who had in the past criticized Gene Johnson for spending money studying **Kitum Cave** without publishing his findings. McCormick also feels that his knowledge of Ebola is superior because he was on the ground in 1979 in Sudan during an outbreak. Although Sudan was in the midst of a civil war, McCormick, along with a C.D.C. doctor named Roy Baron, flew into Sudan and located villages infected with the virus.

Preston expands on the backstory of Joe McCormick, another crucial figure in the battle against Ebola. McCormick has, as it turns out, earned his reputation, having displayed immense courage and dedication when confronted face-to-face with actual human Ebola cases.

Years later McCormick would describe the sight of a hut filled with Ebola victims, reeking with **blood**, and scattered with distorted, horrific corpses. Armed only with rubber **gloves**, a surgical gown, paper boots to protect his shoes from blood, and a surgical mask, McCormick began drawing blood samples and caring for patients. As he tried to draw blood from a woman in the midst of a seizure, McCormick jabbed his own thumb with a bloody **needle**. Knowing that he had been exposed, he decided to stay in the hut and help his patients until he fell ill. Baron tried to give him a transfusion of a blood serum from Africans who had survived Ebola, hoping that this might help McCormick survive. For the next four days McCormick worked in the hut, only to discover, miraculously, that the woman had been ill not with Ebola, but with malaria—he had not been exposed after all.

McCormick's story reintroduces the concept of human fragility, and the power of luck or chance—one of the foremost researchers of Ebola was still completely at the mercy of the virus, unable to protect himself against the power of nature and the pitfalls of human error. Meanwhile, objects such as rubber gloves, a surgical gown, and a mask—which usually convey a sense of security and protection—here seem ludicrously useless when compared to the spacesuits and oxygen tanks that scientists such as Nancy Jaax use when handling Ebola.

His experience in Sudan led Joe McCormick to believe that Ebola did not spread easily, and he questions whether it is as dangerous as the Army asserts. Dan Dalgard, meanwhile, asks how soon the Army will be able to confirm whether the monkeys are sick from the virus. C. J. Peters says it may take a week. McCormick, however, argues that he can perform a quick test in twelve hours, and that the C.D.C. should get the virus and the samples. Peters is furious, believing that McCormick is trying to gain control over the situation. He asserts that "[a]n ongoing epidemic is not the time to try to field-test a new technique," and adds that Fort Detrick is closer to the outbreak than the C.D.C.'s headquarters in Atlanta. He does not add, however, that the Army is already in possession of both the monkey corpses and the virus. Fred Murphy urges McCormick to cool down, while General Russell steps in, suggesting that the Army and the C.D.C. split management. Eventually they come to the agreement that the C.D.C. will oversee any "human-health aspects of the outbreak" while the Army will "handle the monkeys and the monkey house."

While Joe McCormick has undoubtedly shown immense courage during his time in Africa, his conclusion is a dangerous one, born out of hubris and complacency—and yet it could be argued that Preston leans too far in the opposite direction, playing up the "scare factor" of Ebola's contagiousness, when in fact it hasn't *spread as profusely as he fears. Either way, McCormick becomes an ambiguous figure, one who clearly understands a great deal about Ebola and has confronted it head-on, but whose judgment is clouded by his own pride and possessiveness. Eventually, however, all the involved parties are able to come to a solution—the effort to contain the possible Ebola outbreak has moved one step forward, however slowly. From this moment on, the momentum and sense of urgency in the narrative begins to pick up.*

PART 2, CHAPTER 12: THE MISSION

As soon as the meeting breaks up, C. J. Peters begins planning. First, he needs an officer who can lead a team into the monkey house, and for this position, he chooses Jerry Jaax. Although Jerry has never worn a **spacesuit**, he is the chief of the Institute's veterinary division, and he has experience directing people. Finding Jerry in his office, Peters tells him that the Army is going to need to euthanize the monkeys "in Biosafety Level 4 conditions," and asks him to put together a team of soldiers and civilians that can be ready to move out in twenty-four hours.

In contrast to the uncertainty and squabbling of the previous chapter, Jerry and C. J. both react quickly and decisively in this moment. Jerry, in particular, shows immense bravery here—despite the fact hat he's never been in a spacesuit, and is deeply fearful of Ebola, he doesn't hesitate to do his duty in combating the virus.

Jerry then visits Gene Johnson in order to map out a plan. They set up a series of priorities: Priority One is to ensure the safety of the human population. Priority Two is to euthanize the animals as humanely as possible. Priority Three is to gather scientific samples to learn more about the strain. Gene believes that a team working well and efficiently can keep the population safe, and he also feels strongly that he cannot bear going inside to kill monkeys. He does, however, have a large amount of equipment from his time in **Kitum Cave** that will at last prove useful. Gene feels both excited and afraid, ready to confront the virus that he has chased for years, and yet terrified of what may happen. Gene considers the monkey house's similarities to Kitum Cave—its enclosed air, and its contamination by monkey dung and urine. He also thinks about the Reston employees who may already be infected. He realizes that the Army will need to create an air lock with a decontamination shower leading into the building. Again he wonders what exactly is growing inside the monkey house.

Unlike the chaos and disagreement of the meeting, here Jerry and Gene show a great amount of focus and discipline as they begin to flesh out their plan of attack. For Gene in particular, this moment represents the culmination of his life's work, and a validation of his fascination with Ebola over the years. At the same time, he understands how truly dire the situation is, and even believes that there may be casualties. It is important, too, to understand the nuances within the priorities that Gene and Jerry map out—they involve not only eradicating the virus, but also learning more about it. This double-pronged approach of both combating and researching Ebola reflects both the men's commitment to their research and their bravery.

After the meeting Dan Dalgard returns to his office, removes the floppy disk that contains his diary from his computer, and heads home to his family. Later that night he types up a chronology of events. Jarvis Purdy appears to be stable, and all of the other monkey caretakers are now wearing respirators for their once-a-day visits to the animal rooms. He has also briefed the lab at Hazleton on the dangerousness of the samples that they are handling. Dalgard reminds himself that any labs that have received shipments from Hazleton may be in danger, and he thinks about all the other people who may be in peril.

At last the Reston monkey house has begun to take precautions in order to combat the virus. But even these measures—wearing respirators in the animal rooms—feel like too little too late, considering all that the readers know about Ebola by now. Dalgard does, however, at last begin to think about the broader implications of this outbreak—another reminder of how globalization can spread disease.

While Dan Dalgard types, he gets a call from Nancy Jaax, who believes that the monkeys have simian hemorrhagic fever, Ebola, or both—her results are "ambiguous."

Even Nancy Jaax, experienced and skilled in her field, cannot identify the infection—again showing the power and mystery of viruses.

PART 2, CHAPTER 13: RECONAISSANCE

On Thursday, November 30th, Dan Dalgard wakes up and decides that he should invite the Army in to sterilize Room H, the center of the outbreak. He calls C. J. Peters, and the news immediately spreads through the Institute. Jerry Jaax calls a meeting for all the commissioned officers on his staff: Major Nathaniel Powell, Captain Mark Haines, and Captain Steven Denny. He also includes two sergeants—Sergeant Curtis Klages and Sergeant Thomas Amen—and a civilian animal caretaker named Mehrl Gibson. He asks the men if they want to take on this mission, and all say yes. Jerry realizes that this means both he and Nancy will be inside the building tomorrow. Jerry lays out the facts for his team: they'll be entering one room of the monkey house at 5 AM, euthanizing the monkeys, and taking samples of tissue. They will be working in **spacesuits** under Level 4 biocontainment.

The narrative continues to pick up in terms of momentum and intensity as Dan Dalgard makes the crucial (and ultimately correct) decision to allow the Army to euthanize all the infected monkeys. As the circle of people involved in the plan widens, readers once again witness the incredible discipline and bravery of the military officers and scientists who will take part in the operation. This is especially true of Nancy and Jerry Jaax, considering that they will both be put in harm's way by the operation—leaving no one to take care of their family if they both become infected. Still, the Jaaxes and their peers feel that it is their duty to combat the outbreak.

Gene Johnson, meanwhile, heads out with Sergeant Klages to the monkey house in order to understand its layout. Once they arrive, however, they see a TV news van near the monkey house, and Gene begins to get nervous. USAMRIID is hoping to keep this operation a secret from the press. Circling around the news crew, Johnson and Klages enter the monkey house and are disgusted by the smell of monkey waste—the employees have stopped cleaning the cages. Klages thinks that they shouldn't even be inside without a **spacesuit**. The men find Bill Volt in his office, and are ill-at-ease, wondering whether that room too is contaminated—they almost vomit when he offers them a piece of candy.

This visit to the monkey house demonstrates the many potential challenges and dangers of the future operation. For one thing, any mention in the press of what is going on in the facility could generate mass panic, which would only be detrimental to USAMRIID's efforts. Second, the monkey house's employees' fear has made the conditions within the building even more unsanitary and potentially contaminated.

Exploring the building, Gene realizes that he can get to Room H through a series of abandoned offices, so that he doesn't need to breathe in too much potentially contaminated air. Finding a door that leads to a storeroom, which connects to a corridor that leads into the monkey house, Gene decides that the storeroom will be the preparation area, and the closed corridor will be the airlock. This will allow the Army to work without being observed by reporters. After exploring, Gene tells the employees of the monkey house that the back areas of the building need to be made completely airtight so that no contaminated air gets into the offices. They do so, taping the door to the back monkey rooms shut—but Gene doesn't realize that there is also another way into those back rooms.

Despite having been told how dangerous Ebola is, employees like Bill Volt still do not seem to understand how perilous their environment might be, and how cautious they must be to avoid infection. Preston's methodical description of the Army's detailed plan and the unsanitary working conditions in the monkey house helps readers understand how delicate and dangerous the operation is going to be—and how easily it could go awry in any number of ways.

Later that morning, Nancy Jaax and C. J. Peters head to the corporate offices of Hazleton, Washington to speak to Dan Dalgard, along with some lab employees who have been working with the tissues of the sick monkeys. Joe McCormick arrives as well. The mostly female employees are terrified of their potential exposure, especially because of a recent radio report that had radically over-exaggerated the number of Africans dead because of Ebola. Here Nancy's and Joe McCormick's memories differ—Nancy claims that Joe tried to tell them about his experiences in Africa but only frightened them more, while McCormick claims that only Nancy spoke to the women. Nancy asks the women whether anyone has cut themselves on glass or stuck themselves with a **needle**, and no one comes forward. She reassures the employees that they will be alright.

Even during this time of crisis, it still proves difficult for USAMRIID and the C.D.C. to work together to combat the virus, as evidenced by the different accounts of Nancy Jaax and Joe McCormick. The episode also illustrates the double duty of USAMRIID to the public: on one hand, it is important above all to keep members of the public safe from the virus, while on the other, it is necessary to make sure they don't panic or leak details to the press. This fine line is a difficult one to walk, but it is crucial for employees of USAMRIID to do so.

Dan Dalgard invites Peters and Nancy to come with him to the monkey house to look at the animals. He does not, however, invite Joe McCormick. The group puts on **gloves** and surgical masks and enters Room H. Nancy and Peters are alarmed that none of the workers are wearing respirators, but decide that the situation is too delicate to mention this oversight. In Room H, Dalgard points out the animals that look sick, while Nancy tries not to breathe too much. She observes that many of the animals look passive and sick, but even so, she tries not to look in their eyes. Should they spit at her and get saliva in her eyes, she could easily contract Ebola. She also notices that the monkeys have their canine teeth, making them all the more dangerous. Preston notes that a six-foot-tall man and a ten-pound monkey "are pretty evenly matched in a stand-up fight" because of the monkey's sharp teeth and its overall ferocity. Nancy realizes just how careful Jerry and his team will have to be.

At last, after a potentially detrimental delay, C. J. and Nancy are able to examine the actual animals at the center of the outbreak. What they find is disturbing on multiple counts: for one thing, despite multiple warnings, the workers in the monkey house are not taking any of the necessary precautions to protect themselves against a virus that may or may not be airborne. For another thing, the disease appears to have spread to many of the animals, all of whom are still potentially dangerous. This episode emphasizes how difficult it is to convince people to take the necessary precautions and accept the danger of their situation.

Later that evening Jerry drives home, while Nancy returns to her lab to continue working on the monkey samples. While Jerry is home, he receives a call from Nancy's brother. Nancy's father is close to death, and Nancy may need to return home soon for his funeral. Picking up Jaime and Jaison and taking them to McDonalds, Jerry explains that he and Nancy will be putting on **spacesuits** tomorrow and working a long day in order to deal with an emergency involving a monkey house. His children seem relatively unworried, although they both have trouble sleeping later. Once the kids finally do fall asleep, Jerry sees on the news that a reporter is delivering a story from the monkey house. He is still awake when Nancy comes home at 1 AM. She tells him that she thinks the virus has spread to other rooms in the monkey house. Jerry tells Nancy the news about her father. She contemplates flying to Kansas, but decides that she needs to stay in Virginia and do her duty.

In the midst of this potentially national health crisis, Preston injects a note of the personal and the tragic. This moment reminds us that humans are fragile in many ways, while also emphasizing Nancy's deep sense of duty and self-sacrifice. It is telling, however, that Preston focuses on Nancy—the only female main character—when describing the balance between work and family. None of the male characters (except Jerry) are assumed to have to make sacrifices like this. Meanwhile, Nancy's warning about the virus spreading to other rooms only deepens the sense of foreboding. We sense that USAMRIID's operation in Room H may only be the beginning of a much larger effort to eradicate the virus from the monkey house.

PART 3, CHAPTER 1: INSERTION

At 4:30AM on Friday, December 1st, Jerry Jaax gets up and puts on civilian clothes in order to head to the Institute. Gene Johnson is already there with his gear from Kitum Cave: **spacesuits**, rubber **gloves**, **needles**, dissection tools, flashlights, biohazard bags, and handheld sprayers to decontaminate spacesuits. Meanwhile, the Washington Post has run a story about the Reston monkey house, stating that Ebola has been found in Virginia, and quoting C. J. Peters, who asserts that there's no reason for panic. The article does not state that a vast military biohazard operation is about to take place "in a suburb of Washington," a fact that would surely cause widespread panic. Peters hopes that his comments have created an appearance of calm and control, but acknowledges that a large part of the operation is going to be media control.

Now more than ever, readers see the value of Gene Johnson's constant vigilance and foresight. Although his original expedition to Kitum Cave was completely unsuccessful, the knowledge and the gear from that trip now prove crucial in the operation that is to come. Meanwhile the Washington Post article gives readers a sense of how perilous (but vital) the secrecy of the operation is.

C.J. Peters privately acknowledges that he doesn't know whether or not the operation is safe. He thinks about the 500 monkeys within the building, knowing that it is possible that more and more will fall ill very shortly.

C. J.'s private fears highlight how little USAMRIID actually knows about the virus, and how brave the soldiers about to combat it are. The reminder that there are 500 monkeys in the house emphasizes for readers how overwhelming the epidemic could easily become.

After arriving at the Institute at 5 AM, C. J. gives the order to move out at 6:30 AM. A line of unmarked cars is followed by an also-unmarked Level 4 biocontainment ambulance, which contains an Army medical-evacuation team, and a biocontainment pod—called a bubble stretcher—designed to get someone who has been attacked by a monkey from the building to the Slammer. Because of traffic, it takes two hours to reach the monkey house. As the team begins to unload, they hear the shouts of children at a nearby day-care center. Jerry Jaax and Gene Johnson decide to have their team put **spacesuits** on inside the building so that television crews can't film them. Jerry resolves to go in first, accompanied by Mark Haines, a veterinarian and former Green Beret. The men put on surgical scrub suits and enter the storage room, where an ambulance team led by Captain Elizabeth Hill helps them put on their orange Racal spacesuits. Over these they tape **gloves** and bright yellow rubber boots. Jerry Jaax and Mark Haines enter the corridor of the monkey house and realize that they have forgotten to bring flashlights. Still, they decide to continue going forward, making their way to the far end of the corridor and the monkey rooms beyond.

At last, we witness the full intricacy and scope of the USAMRIID operation. The ambulance at the ready only underscores the potential dangers that lie ahead, while the presence of both traffic and children near the monkey house help to remind us of the everyday life that is put in peril by an Ebola outbreak. Jerry, as is typical of him, demonstrates great bravery and responsibility by making sure that he is the first man inside the monkey house, despite never having worn a spacesuit before. The fact that the men forget their flashlights, meanwhile, demonstrates the tiny errors that can occur in such an operation despite the utmost caution. While missing flashlights are not deadly, a mistake involving a spacesuit or a glove easily might be.

Meanwhile Nancy wakes her children at 7:30 AM and reminds them that she and Jerry will be working late. She watches as they walk to school and remembers being told that the kind of work she is about to do was not appropriate for a "married female." When she arrives at the preparation room, it is crowded and confused. Nancy trains the soldiers as they suit up, reminding them to always check their **spacesuits** for rips, and to put extra tape on their ankles to repair rips and tears in order to keep outside air out of their suits. She also warns them of the danger of monkey bites, and the risk of potentially being exposed to Ebola. Last, she reminds them to rinse the **blood** off of their **gloves** frequently in order to spot holes or tears. Preston notes that these types of suits have a battery life of six hours—after that, the person inside won't be able to breathe.

As Jerry is in the monkey house, Nancy is at home, a fact that reminds us of the domestic life that they are both protecting and imperiling by working to combat Ebola—and yet again Preston only shows Nancy having to "balance work with family"—none of the other characters. Meanwhile Nancy's lecture reminds both readers and soldiers of the many different dangers that Ebola poses, even when wearing a spacesuit. The mention of blood, in particular, recalls Nancy's scare with Ebola, emphasizing just how delicate this operation is, and how easily it could go wrong.

Jerry Jaax and Mark Haines enter the hot zone, hearing monkeys screaming as they do so. The temperature in the building is above ninety degrees. As they continue walking, Jerry sees two unauthorized Hazleton employees who have entered the monkey rooms through a back way—they are wearing respirators, but no other type of gear. The workers are shocked by the soldiers in **spacesuits**, and Jerry at last asks them which way to Room H. Afterwards, the two report to Dan Dalgard, who shows up in Room H wearing a respirator. Jerry is shocked that Dalgard is not protected, while Dalgard is unhappy about the potential news panic that the spacesuits may cause. He shows them the room, and the monkeys panic at the sight of the spacesuits. Jerry decides to look at all the monkeys. He and Captain Haines go from room to room, finding other monkeys that appear ill. Jaax and Haines both sense that something's wrong—"[s]omething lived here other than monkeys and people."

The idea of the "hot zone" becomes literal now, due to the monkey house's malfunctioning heating system. The presence of the Hazleton employees, meanwhile, demonstrates both their staggering complacency and exactly the kind of human error that could potentially lead to an actual outbreak. Even Dan Dalgard, despite his fears and his contact with the officials at USAMRIID, still does not seem to understand the lengths to which he must go to protect himself—in fact, he seems to care more about public image than remaining safe from the virus. Jerry and Mark's discovery that many other monkeys seem ill serves to deepen the sense of foreboding.

Nancy gets into a scrub suit, puts on her **spacesuit**, gathers boxes of **syringes**, and goes into the building with Captain Steven Denny. They head into Room H where Jerry is with his team. Dan Dalgard, meanwhile, picks four monkeys that look the sickest and gives them injections to sedate them and then stop their hearts. More and more people come in, and the room becomes increasingly crowded and confused. Nancy, meanwhile, sees that Sergeant Curtis Klages has a rip on his suit, which she tapes for him. She then removes the dead monkeys from their cages, double bags them, sprays Clorox bleach on both bags, and loads them into biohazard containers, which she sprays as well. Last she loads these containers into another plastic bag, which she also sprays. Finally she exits, and is sprayed with bleach for five minutes in the airlock. The support team then takes off her suit, and, soaked with bleach and freezing cold, Nancy changes back into her civilian clothes. As she does so, the containers are loaded into a refrigerator van. Nancy rides the van back to Fort Detrick to dissect the monkeys.

Nancy, as usual, displays great competence and efficiency when it comes to performing her part of the operation. The crowding and confusion within Room H, however, shows how easily the operation could go wrong, despite being carried out by trained, disciplined soldiers. Sergeant Klages' ripped suit also reminds readers of the many ways an Ebola breach could take place. The many precautions that Nancy takes in order to transport the dead monkeys back to the Institute adds to the sense of precariousness and danger, emphasizing the fear that Ebola inspires and the potential power of the virus to infect humans.

After Nancy has left, Jerry counts sixty-five more monkeys in the room. He uses a special device that Gene Johnson brought back from Africa to inject them: a pole with a socket on the end for a **syringe**. It is also necessary to hold the monkeys down as the **needle** comes towards them, and for that the soldiers use a mop handle with a soft pad at the end. Captain Mark Hanes immobilizes the monkeys with this tool, while Jerry injects their thighs with ketamine and general anesthetic. After this, Jerry gives them a shot of a sedative. Last, the team takes **blood** samples from the monkeys and then injects them with a lethal drug called T-61. After the monkeys die, Captain Steven Denny dissects them, taking samples of their livers and spleens, and their remains are put into biohazard containers. During this process, Dan Dalgard heads to his office, where he stays for the rest of the day.

The clinical and elaborate description of the process by which the soldiers euthanize the monkeys is horrific, but not melodramatic. Whether sick or well, all of these living creatures have been exposed to the Ebola virus, and are therefore a danger to the human public. The multi-step process also emphasizes how delicate the operation is, especially because they are dealing with wild, unpredictable, and intelligent animals. Despite the large number of monkeys that must be killed (65 in Room H and potentially 500 in the building), the process must be followed methodically and calmly.

The operation in Room H is finished by late afternoon. As parents pick their children up from the nearby daycare, the team exits the hot zone in pairs, looking pale and weak. Preston notes that the wind is strong and cold, and that Jarvis Purdy is resting comfortably not too far away.

The juxtaposition of parents picking up their children and soldiers leaving the building emphasizes the everyday life that the operation is striving to protect. The mention of Jarvis Purdy reminds us that the virus may have already spread.

At USAMRIID, Nancy Jaax and Ron Trotter stay up till 1 AM dissecting monkeys. This time, the monkeys clearly have Ebola. Their guts are filled with lesions, their intestines are brimming with **blood**, and they show signs of massive blood clots. Some of the monkeys are so liquefied that they've "become essentially a heap of mush and bones in a skin bag, mixed with huge amounts of amplified virus."

This dissection confirms that the monkeys have Ebola, and it also reminds both Nancy and readers how horrific and powerful the virus truly is. More than ever, we understand why USAMRIID's operation is necessary—and Preston lingers on the gore to emphasize how dangerous the mission is.

On Monday, December 4th, Dan Dalgard drives to the monkey house and notices that one of the monkey caretakers is outside in a mask and a jumpsuit. Furious, he goes over to tell the man, named Milton Frantig, to get back inside. Suddenly Frantig begins vomiting uncontrollably.

This sense of danger and impending disaster reaches a climax as another employee falls ill. Suspense is even more heightened than before, as readers and characters alike wonder whether an Ebola outbreak has truly begun.

PART 3, CHAPTER 2: A MAN DOWN

Dan Dalgard, horrified, rushes to help Milton Frantig indoors, and makes him lie down on a couch. Frantig also has a terrible cough, and feels faint—he suggests that maybe the bad smell of the monkeys made him retch. Dalgard sends Bill Volt out to get a thermometer, and the men discover that Frantig has a 101 degree fever. While Dalgard and Volt are near frantic, Frantig is relatively calm. He is a devout Christian, and believes that God has a plan for him.

As readers know well by now, vomiting, coughing, and fever are all potential signs of an Ebola infection. Frantig's potential illness underlines the consequences of the monkey house's employees' false sense of security. Frantig's religious response show how differently people react to potentially life-shattering events like Ebola.

Dan Dalgard rushes over to the Hazleton Washington offices, deciding that the monkey facility must be evacuated immediately, since two of its four workers are now ill. He goes to see the general manager, weeping, and recommends that the Army take control of the situation. The general manager agrees, and Dalgard returns to his own office, where a group of C.D.C. officials wait for him. He tells them what's happened, adding that he wants to turn over the facility to USAMRIID. The C.D.C. people agree, and express a desire that Milton Frantig be moved to Fairfax Hospital, where they can observe him.

At last, Dalgard seems to truly understand the gravity and scope of the crisis before him, and makes the right decision by turning over all responsibility to USAMRIID. The presence of the C.D.C. officials, meanwhile, reminds us that even during times of peril, humans still exhibit possessiveness, jealousy, and ambition.

Next Dan Dalgard calls C. J. Peters and informs him that Milton Frantig is ill. He tells Peters that the facility and animals are now "the responsibility of USAMRIID." Peters feels uneasy about the idea that the Army will be "responsible" if anything goes wrong, and says that he must clear this decision with his superiors. Next they discuss Frantig, and Peters is disturbed that he will be taken to Fairfax Hospital rather than the Slammer. Getting off the phone with Dalgard, Peters calls Joe McCormick to try to persuade him to turn Frantig over to the Institute. McCormick, however, refuses, believing that it is difficult to transmit Ebola, and that a **spacesuit** is unnecessary to treat him. Although Peters disagrees with McCormick and dislikes him intensely, he admires the man's ability to make strong decisions in a crisis.

The quibbling over the word "responsible" illustrates the delicacy of the Institute's position, and also underscores the human tendency to focus on small details—and to try and avoid culpability—even during times of crisis. This sense of human error only heightens during the conversation between Peters and McCormick. Rather than reaching any kind of compromise, their talk only reignites their rivalry. Despite all of his faults, McCormick still demonstrates courage and certainty in the face of great danger, qualities that are desperately important when combating this kind of virus.

As this all occurs, a news van arrives at the monkey house just in time to see an ambulance take Milton Frantig away. Alone in an isolation ward, Frantig begins to feel better. He prays and watches TV. Meanwhile, the remaining employees at the monkey house are unable to handle the situation anymore. They leave the facility and lock the door behind them, leaving behind 450 monkeys. The temperature inside is over ninety degrees, and the monkeys are restless because they haven't been fed. Some monkeys fall into a coma-like state, their eyes glazed. Some even begin to bleed, and their **blood** pools in metal trays under their cages.

The arrival of the news van could not come at a worse time, showing how difficult it is to keep an operation of this size a secret. As the keepers leave the monkey house, the conditions within it descend from horrific to outright hellish. The "hot zone" has become a physical place, boiling with heat, filled with dying creatures, and ripe with the potential for infection. The bleeding monkeys in particular make clear how easy it would be for the virus to continue spreading.

PART 3, CHAPTER 3: TANGOS

Dan Dalgard, feeling panicked and out-of-control, tells the senior managers at his company that he has turned the monkey house over to the Army. They say that they want an agreement in writing, adding that the Army must take "legal responsibility for the building." Dalgard calls C. J. Peters to relay this proposal, which Peters rejects. Dalgard and Peters work together to develop a written agreement, which Peters carries to General Russell. They sign it without consulting lawyers and fax it back to Dalgard.

The response of Dan Dalgard's company to the situation—they want the Army to take legal responsibility for any disaster that might ensue—again emphasizes the irrational and sometimes detrimental ways that humans react to danger. The speed with which Peters, Dalgard, and Russell come up with a solution, however, shows that they at least recognize the urgency of the situation.

Preston outlines the new plan: Jerry is going to have to go back into the monkey house with a much larger group in order to euthanize the remaining monkeys. He is the commander of a group of animal-care technicians classified as 91-T (or 91-Tangoes in Army jargon). The youngest members of this group are eighteen-year-old privates. Jerry calls a meeting with his team, made up of young soldiers and older civilians, some with Level 4 experience. He explains to them that they will be combatting an Ebola-like virus, dealing with large amounts of **blood**, handling sharp objects, and wearing **spacesuits**. He says that any member of the team can opt out, but no one does. Jerry then handpicks his team, decing not to bring along a pregnant Sergeant named Swiderski, because of Ebola's catastrophic effects on pregnant women.

The pool of those involved in the operation (and potentially exposed to Ebola) continues to expand. This time Preston takes care to mention the youth and inexperience of those who will soon be facing Ebola, even as he reports that every single one of them volunteers for duty—a fact that makes clear the courage and sense of responsibility shared by those who work at USAMRIID. The brief mention of the pregnant Private Swiderski, meanwhile, reminds us of the horror that Karl Johnson encountered when he faced Ebola, emphasizing the peril of the operation.

Preston explains that the Army does not consider this work hazardous, because the **spacesuit** should act as protection, and therefore the volunteers will not receive hazard pay. They also are not allowed to discuss the operation with anyone, including family members. Jerry instructs them to wear civilian clothes and to report to the Institute at 5 AM the next morning.

In a moment of irony and grim humor, Preston explains that the Army officially views spacesuit work as non-hazardous. The fact that they are not even going to be properly compensated for putting their lives in danger illustrates the spirit of self-sacrifice that the soldiers involved in the operation display.

The soldiers spend an uneasy night, as does Gene Johnson, who is worried about the "kids." He recalls when he stuck himself with a **bloody needle** from a mouse that might have had Lassa virus while working in Zaire. The Army had airlifted him out and put him in the Slammer for thirty days. In **Kitum Cave**, he had once cut himself through his **spacesuit** three times with bloody tools. His close calls make him all the more afraid of the virus inside the monkey house. As he stays up, Johnson thinks about the rigorous procedure that the soldiers must follow inside the monkey house. Knowing that the hands will be the weakest point, he imagines giving a monkey an injection, carrying it to the table, and dissecting it. He writes notes as he does so, next imagining holding a needle, and visualizing where the other soldiers should be standing. By the end of the night, he has written "a script for a biohazard operation."

Gene Johnson's reference to the soldiers as "kids" further emphasizes their youth and inexperience. His recollection of being exposed to Lassa (and potentially to Ebola) reminds us of how even the most careful and well-informed researchers can potentially contract a deadly virus. Johnson's fear motivates rather than paralyzes him, however, and his creation of a biohazard "script" allows him to share his skill and knowledge with those far less experienced than he is. This script also shows the multiple ways that this operation could go wrong, and adds to the suspense as the narrative continues.

With Nancy still asleep, Jerry Jaax leaves home at 4 AM and meets Gene Johnson, and together they go over Gene's script. Soldiers begin to show up, and Jerry pairs them together, organizing them as they get into unmarked vehicles and head to Reston. Once again they get trapped in rush-hour traffic. At last they all arrive at the monkey house, where Gene Johnson lectures them about the dangers they will face inside the building. He mentions Milton Frantig's illness, surprising a horrified Jerry, who was not informed of the possible human transmission. Jerry becomes convinced that his unit will suffer casualties. Meanwhile, parents are dropping their kids off for daycare down the street. As Gene Johnson speaks about the possibility that Ebola has gone airborne, he notices a beautiful private named Nicole Berke who looks no more than eighteen, and once again he feels terrified for the young soldiers. The team suits up.

In a single scene, Preston manages to illustrate the immense discipline of those involved in the operation, and the continuing potential for error and miscommunication. While Gene's and Jerry's cooperation seems like the height of efficiency, the fact that Gene has not told Jerry about Milton Frantig's illness shows how a crisis breaks down the usual parameters for accuracy and communication. Jerry's sudden fear that members of his team will die seems simultaneously paranoid and justified. This fear is echoed by Gene Johnson when he notices Nicole Berke, whose presence emphasizes the youth, inexperience, and vulnerability of many of the soldiers present.

Jerry Jaax is helped into a **spacesuit** and enters the monkey house with Sergeant Thomas Amen. The place is a mess, with monkey biscuits and papers all over the floor. They go deeper into the building until they reach the first monkey room. The seventy animals inside see them and then go wild—they are hungry and furious. They have thrown biscuits everywhere and have even painted the walls with their own dung. Jerry and Amen feed the animals and Jerry observes that many of them seem listless, have runny noses, or even appear to be **bleeding**, and some are coughing and sneezing. Jerry realizes that the disease has spread over the building, and wonders if this is some kind of "airborne Ebola flu." Terrified by the idea, he tries not to think about it.

Jerry and Sergeant Thomas Amen now witness the filthy, possibly contaminated hellscape that the Reston monkey house has become—essentially a manifestation of the horror of Ebola. The potential that this disease is an "airborne Ebola flu," meanwhile, is a real possibility, considering how little the Army actually knows about the strain that they are facing. This moment serves only to emphasize that the operation they are about to perform is simultaneously terrifying and essential.

Other members of the team spend time in the staging room fitting **syringes** with **needles** and readying them to be filled with drugs. Captain Mark Haines gets into a **spacesuit** and lectures his soldiers, reminding them that they are putting animals out of their misery and putting a halt to a deadly virus. They shouldn't play with the monkeys, laugh, or joke while in the facility. He reminds them to keep an eye on each other, and to be extra cautious with needles. If the soldiers get tired, he urges them to tell their superior so that they can tap out.

Captain Mark Haines's lecture reminds both soldiers and readers that the operation requires euthanizing intelligent, living animals for the greater good of humanity. It also emphasizes the potential for human error, especially considering the inexperience of many of the soldiers, and we are reminded again of the danger of hypodermic needles in a situation like this.

Gene Johnson begins calling out soldiers' names. Next up is eighteen-year-old Private First Class Charlotte Godwin, a tiny woman who is dwarfed by her giant **spacesuit**. Together with her buddy she enters the airlock, noting the terrible smell that is creeping through her air filter. Once they are inside, the smell of monkey is overpowering, but the air is deadly quiet. Jerry Jaax orders her to load **syringes** with double doses of ketamine. Meanwhile, he waits as Sergeant Amen pins a monkey down, opens the door, injects the monkey with anesthetic, and slams the door shut. Exposed by the open door (through which the animal could attack), Jerry has given himself the most dangerous job.

Preston's decision to recount this scene from the point of view of the young Charlotte Godwin helps to illustrate how unfamiliar and fear-inspiring this scene is to someone who is not already experienced in dealing with Ebola (or indeed, any hot virus). Jerry, meanwhile, yet again demonstrates his bravery and self-sacrifice by making sure that he takes the responsibility of the most dangerous job, as opposed to any member of his team.

As more team members come in, Jerry orders them to check each others' **spacesuits** every five or ten minutes, and to rest for ten minutes every hour. He decides to set up a "bleed area"—a shower with a drain hole—near the front of the building in order to wash out **blood**. Every time blood goes down the drain, the soldiers pour bleach after it, to ensure that Ebola doesn't get into the Reston sewers. Jerry divides the soldiers into a kind of assembly line: there is a bleed team to work the bleed table, a euthanasia team to kill the monkeys, and a necropsy team to dissect and bag the corpses. Jerry carries the monkeys in, Captain Haines draws blood, Major Nate Powell euthanizes the monkey, and Captain Steve Denny does the necropsy while Private Charlotte Godwin hands him tools. After a while Denny begins to let Charlotte do a necropsy herself, and she is both horrified and exhilarated.

The mention of blood serves to remind us of the ease with which Ebola can potentially spread, while Preston's detailed description of the euthanizing process emphasizes the need for absolute precision. Despite the many perils, however, Jerry succeeds in creating organized, disciplined teams, which begin to function smoothly and well as the operation continues. Charlotte Godwin's simultaneous excitement and terror near the end of the passage echoes many of the characters' (such as Gene Johnson and Karl Johnson) attitudes towards Ebola—they are deeply afraid of it, yet also fascinated.

PART 3, CHAPTER 4: INSIDE

The day continues, and the soldiers grow exhausted. Jerry tries to make sure that they take breaks in order to keep fatal errors from happening, but no one wants to leave. Gene Johnson stays outside the monkey house, in radio contact with those within it. Then the suit of a woman named Rhonda Williams malfunctions—her battery begins to fail and she can feel contaminated air seeping into it. Jerry radios Gene that Rhonda will need to come out immediately. Suddenly, though, a soldier appears to tell Jerry that he's found an extra battery. Since Rhonda seems rattled by the experience, Jerry sends her out with Charlotte Godwin, who appears tired.

The soldiers' exhaustion as their work progresses illustrates how easily human error can creep into even the most disciplined operation. This fact only becomes clearer when Rhonda Williams's battery begins to fail, an event that puts her at risk for airborne contamination.

A television van appears on the side of the building where Gene is stationed. Gene sends a sergeant in to inspect Rhonda and Charlotte, and the man discovers a hole in Rhonda's **spacesuit** and tapes it up before decontaminating her. Gene meets the two women to warn them about the van, and assures Rhonda that the pressure in her suit protected her from the virus. He hides the two women in the support van, away from the cameras.

The choice between potentially allowing Rhonda to become infected and risking being filmed while evacuating her reveals the conflict between safety and secrecy. The hole discovered in Rhonda's suit reminds us of the multiple ways in which spacesuits (supposedly safe) can easily be breached.

Meanwhile the news team begins to investigate the front of the building, knocking at the windows and ringing the buzzer. When they don't receive an answer, they drive off, not even noticing the army operation going on around the other side of the building. Had they only pointed their video cameras towards a window, Preston speculates, they would have gotten video of "soldiers in **spacesuits** smeared in Ebola **blood** engaged in the first major biohazard mission the world ever knew."

The episode involving the news team makes clear how fragile the secrecy of the operation is, and what a large role luck and chance play in these kinds of events. Preston's description of spacesuits smeared with Ebola blood reminds us of the great risks that the soldiers are taking, and also of the unprecedented nature of this kind of operation.

Meanwhile Charlotte and Rhonda wait in the van until Gene gives them the all-clear. They walk to the woods near the building, and find two used hypodermic **needles** lying on the ground. No one knows how they got there. Eventually safety people put on gloves and dispose of the **syringes**, though not before finding more in the grass. More people leave the building, and the last one out is Jerry, who emerges looking pale and aged. The soldiers head to Taco Bell, starving and exhausted. A Taco Bell employee asks Sergeant Klages if there's a mission going on in the area, but Klages refuses to answer.

Human error combines with mystery as Rhonda and Charlotte find used, open hypodermic needles on the ground, illustrating how even the most disciplined and well-trained group of people can easily make a potentially disastrous mistake. Jerry again puts his team before himself by exiting last. The mundane and almost absurd mention of Taco Bell reminds us how, even in the midst of this massive and horrific operation, normal life goes on.

Jerry returns home to Nancy, and the two talk while Jaime sleeps between them. Jerry tells Nancy that the mission went well, and Nancy carries her daughter to bed before holding her husband as he falls asleep.

Again the Jaax's family acts as a dramatic contrast to the grim and perilous events of the day, and reminds both readers and characters why the work they are doing is so vital.

PART 3, CHAPTER 5: A BAD DAY

Meanwhile, an Army scientist named Thomas Ksiazek has been working in a Level 4 lab in a **spacesuit** to develop a rapid test for the Ebola virus. At last, on December 6th, he is successful. He tests urine and **blood** samples from Milton Frantig and finds that he does not appear to have Ebola. The mystery deepens—why hasn't Frantig been infected?

Frantig has been exposed to the virus for weeks, and yet doesn't have Ebola. This discovery should be a huge relief, but it only deepens the mystery surrounding the virus, emphasizing a frightening lack of information.

It is the second day of the Army operation in the Reston monkey house and things are going smoothly. Jerry Jaax and Sergeant Amen go in to feed the monkeys, and they find many more dead or dying. They set up chairs in a semicircle for soldiers to take rest breaks while filling up **syringes**. Just as Jerry is about to take a break from working in Room C, he hears a commotion—Sergeants Amen and Klages inform him that a monkey has escaped. This is Jerry's worst nightmare: a strong, fast, angry, and possibly Ebola-infected monkey ready to fight off and bite vulnerable soldiers.

Preston creates a contrast between the smoothness of the operation going exactly as planned, and the moments of chaos and confusion that imperil all those within the monkey house. An escaped monkey potentially carrying Ebola represents one of the most pressing and dangerous threats to the soldiers' lives, and despite Jerry's calm and skill, he is unable to bring the animal under control.

The men find a net and begin to track down the escaped monkey. Rhonda Williams remembers it running under her feet and out of the room before scampering back in, while Jerry insists that it always remained within Room C. Jerry turns out to be right, but other monkeys bite the escapee, and soon it is tracking **blood** throughout the room. Jerry gets on the radio with Gene Johnson, who tells him to "do whatever had to be done." They contemplate shooting the monkey, but quickly scrap this idea, because of the danger of ricochets. At last, proceeding slowly and calmly, Jerry begins to track the animal, with the help of Sergeant Amen. The monkey is too fast, however, and Jerry begins to feel out of control.

Once again we understand how even the most disciplined of operations is essentially at the mercy of chance. Should the escaped monkey bite one of the soldiers, their spacesuit will in no way protect them—and again we see the terrifying vulnerability of human life. The different accounts of Rhonda and Jerry emphasize the confusion and panic that accompany the monkey's escape.

Outside the building, C. J. Peters has come by to observe—he is out of uniform. Suddenly he sees a stranger near the front of the building—it is a reporter from the Washington Post. Peters assures him that nothing much is happening, and the reporter leaves.

The fact that Peters is out of uniform turns out to be a saving grace, because it allows him to downplay the seriousness of the situation—another example of how luck and chance are forces just as powerful as skill and discipline.

Back inside the monkey house, Jerry decides to leave the escaped monkey in the room overnight. Meanwhile the surviving monkeys have become upset. Jerry decides to give the lower-ranking soldiers more responsibility, and Rhonda Williams ends up on euthanasia duty with Major Nate Powell. It is her job to plunge a **needle** into the monkey's heart, instantly killing it. When she pulls the needle out, **blood** spurts out as well. She makes sure to rinse off her **gloves** and her **spacesuit** often. Occasionally Rhonda misses the heart, causing the animal's body to jerk in a "death reflex."

Jerry's decision to temporarily leave behind the escaped monkey emphasizes his presence of mind and his foresight, even in the midst of a crisis. The description of Rhonda Williams's work gives us an intimate description of what the operation is like for the soldiers, and reminds us of the horror that comes from having to take an animal's life—these are intelligent, human-like creatures being methodically euthanized.

Next Rhonda Williams works with Captain Haines at the bleed table, drawing **blood** from unconscious monkeys. As she does so, one of the monkeys wakes up—it goes to pull the **needle** out of its leg before trying to bite Rhonda. Captain Haines pins the monkey down as Rhonda tries to stop the monkey's blood from pouring out. At last a soldier injects the monkey with ketamine and it goes limp.

The moment when one of the monkeys wakes up is one of panic and terror, yet again illustrating the many ways that the soldiers could be exposed, and the perilous conditions they are working in. Despite all of this, however, they maintain their discipline and sense of duty.

Peter Jahrling, meanwhile, has been spending all his time in his **spacesuit** running tests on monkey samples, while Tom Geisbert has been working equally hard at his electron microscope. Occasionally the two check in with each other, but neither seems to be getting ill. Further, as discoverers of the strain, they are going to get the chance to name it. Jahrling has also been testing his and Geisbert's blood, although he still believes that they most likely were not infected. He is disturbed, however, by the thought that Milton Frantig may have contracted Ebola.

The mention of Peter Jahrling and Thomas Geisbert reminds us that there are multiple avenues through which the disease could make its way to the human race.

Jahrling carries slides of his own **blood** serum into his lab and looks at them under a microscope—if it glows bright green, then he is infected. Exhausted and worried, he begins to doubt his own judgment, but at last, realizing that there is no glow, he is relieved. The same goes for Geisbert's blood. At 11 PM Jahrling enters the decontamination shower, intending to go home, but instead he falls asleep in there, and is only woken up by a harsh blast of water.

Jahrling's exhaustion and paranoia make clear his fear of Ebola, and his regret over the decision to ever sniff the vial in the first place—despite the good news that he isn't infected. Jahrling falling asleep in the decon shower is a poignant moment of human fallibility, reminding us of the emotional and physical strain involved in this work.

Rhonda Williams is standing in a deserted corridor of the monkey house. Suddenly the escaped monkey comes towards her, holding a **syringe** filled with a hot virus. She tries to escape him but her **spacesuit** slows her down. At last she wakes up, realizing that she's been having a nightmare.

Rhonda's nightmare, too, emphasizes the mental toll taken by fighting Ebola—while also consolidating the symbols of Preston's book. Rhonda clearly understands the dangers at hand, but still continues to do her duty.

PART 3, CHAPTER 6: DECON

On December 7th Nancy wakes up at 4 AM to a phone call from her brother: their father's heart is failing, and he is going to die soon. She wakes Jerry and wonders whether she should head home to say goodbye. Once again, however, she decides that she can't in the middle of the Reston situation—her post comes first. Nancy's father calls her and asks her if she's coming home. She says that she can't yet, and promises to see him at Christmas (although this is unlikely). Then Nancy and Jerry get dressed, and Jerry heads to the monkey house. Nancy puts the children on the bus, and then heads off to work. Once there, Nancy tells Peters about her family situation, and he tells her to go home—but she refuses.

The mention of Nancy's father again brings us back to the ideas of family and a different kind of self-sacrifice, as Nancy once more puts her duty ahead of the personal tragedy that is occurring within her family. Peters' response, too, shows his humanity and empathy even at this moment of crisis. We are also reminded of the fragility of the human body, and of all the other things that can kill us—things much more common than the Ebola virus.

Dozens of monkey corpses have been coming in from Reston. Most of them are being incinerated, but Nancy has also been dissecting a large number of them in order to understand how exactly the virus is spreading. As she works, she thinks about her father, remembering how she used to help him farm day and night during plowing season when she was a girl. Nancy's father dies that day, and she flies home to Wichita for his funeral, sobbing when she sees the American flag draped on his coffin (an honor he earned as a veteran).

This episode, in which Nancy dissects infected monkeys while thinking about her father, illustrates the conflict between her personal life and her work—again a conflict that isn't emphasized in any of the other (male) characters. The American flag on her father's coffin is a reminder of the same duty and patriotism that Nancy herself displays, and that ultimately keeps her from being able to say goodbye to him before his death.

At 4 PM on December 7th, the last monkey is killed. Jerry Jaax has spent hours chasing the escapee, finally catching it behind a cage with the help of Sergeant Amen. They radio Gene to let him know, and Jerry orders Sergeant Klages to explore the rest of the building. As he does so, Klages finds a freezer with the corpses of about a dozen monkeys—the original animals in Room F that Dan Dalgard had dissected. Gene orders Klages to decontaminate the bags, and with the help of Mehrl Gibson he tries to put the corpses into biohazard containers, but they are too frozen and distorted to do so. At last they leave them for the decontamination teams that will be entering the building the next day.

Even the news that the final escaped monkey has been killed comes with an unpleasant surprise, as Sergeant Klages discovers a dozen more corpses that have potentially been infected by the virus. These frozen corpses are a final, horrific reminder of the multiple lives that the soldiers have been forced to take because of the virus.

The 91-Tangoes leave the building exhausted and sweat-soaked. They have collected 3,500 samples. Gene Johnson, is exhausted as well, still wondering whether everyone on the operation is indeed safe and uninfected. Meanwhile the decon team, led by Mehrl Gibson, goes in to begin cleaning up the house, chipping monkey dung off of the walls and floor.

As the soldiers emerge from the building, Preston mentions the 3,500 samples in order to give readers a sense of the massive scope of the operation. Mehrl Gibson and his team, serve as a reminder that euthanizing the monkeys was only the first step in the decontamination process.

Meanwhile Milton Frantig appears to be doing much better. He is fever-free, and appears to have a mild flu. Eventually the C.D.C. sends him home.

Milton Frantig's good health continues to deepen the mystery of the virus and its potential to threaten human lives.

Nineteen days after sniffing a tube of Ebola, Peter Jahrling and Tom Geisbert decide that they are definitely not infected. They are reassured but puzzled by the fact that Dan Dalgard and his men seem fine as well. Why can the virus spread easily through monkeys, killing them "like flies," yet it leaves humans unharmed?

Preston expands on this sense of mystery by turning back to the narrative of Jahrling and Geisbert, who are (like Frantig) completely fine despite their potential exposure.

The C.D.C., meanwhile, traces the trail of the virus to a Philippine monkey farm where monkeys have been dying in large quantities but no human fatalities have been reported. Preston comments on the strange and mysterious ways of nature.

The theme of globalization returns as we briefly touch on the monkeys' origins in the Philippines. At the same time, we find out more about the mysterious nature of the virus, which appears not to be infecting humans.

By December 18th the decon team has scrubbed the entire Reston monkey house with bleach, and now it is time to gas the place. They make the building totally airtight with duct tape and then set out samples of a bacterium called *Bacillus subtilis niger*—this bacteria is harmless but essentially unkillable. If the *niger* is dead at the end of the process, the Ebola will be too. Using electric frying pans, the army cooks disinfecting crystals which release formaldehyde gas, allowing it to soak into the building for the next three days. Last the team goes back in wearing **spacesuits**, and finds that the treatment has killed the *niger*, meaning that the Ebola is most likely sterilized. For a short time, no organisms whatsoever live in the Reston Primate Quarantine Unit.

Preston's incredibly thorough and detailed description of the final steps in the decontamination process emphasizes for us the extreme measures to which the Army goes in order to ensure that the public will not be exposed to Ebola. The building has gone from a hot zone to a dead zone, a fact that means that the operation has been a success. The difficulty of the decontamination process contrasts with the ease with which the outbreak started in the first place.

PART 3, CHAPTER 7: THE MOST DANGEROUS STRAIN

By January 1990, the Ebola strain that infected the Reston monkey house has gone back into hiding in the rain forest. The Army returns the monkey house to Hazleton, which begins buying monkeys from the same monkey farm it used before. Less than a month later, animals begin dying of Ebola once again. This time the Army, the C.D.C., and Hazleton decide to leave the monkeys alone and see what happens. The Ebola spreads much like the flu does, causing runny noses, coughing, and pneumonia as well as more Ebola-like symptoms. It spreads easily and quickly, and is almost always fatal. It moves through the air ducts, and monkeys in other rooms begin dying.

In an incredibly frustrating and inexplicable turn of events, Hazleton repeats the exact same actions that led to the Ebola outbreak in the first place, and the virus makes its way to American shores once again. This pattern emphasizes the staggering ignorance and denial that humans display when it comes to infectious disease, and the massive threat that globalization potentially poses to human health internationally.

In mid-February, a caretaker named John Coleus cuts his thumb while performing a necropsy on a monkey infected with the Ebola virus. The C.D.C., however, decides not to isolate him, a decision that USAMRIID finds appalling. Coleus even has minor surgery in the midst of his incubation period. He never, however, falls ill. Meanwhile, all the monkeys in the monkey house die.

The case of John Coleus is similar to Milton Frantig, Peter Jahrling, and Tom Geisbert—this strain of Ebola does not appear to affect humans. The C.D.C.'s decision not to isolate him, however, proves how quickly people can become complacent about a previously terrifying illness.

Eventually a disturbing discovery is made: although Jarvis Purdy, Milton Frantig, John Coleus, and a fourth colleague never fall ill, all eventually test positive for Ebola Reston (as the strain is now called). For some reason, apparently, the virus never makes humans sick. The fact remains, however, that all the men except for Coleus got the infection through the air, meaning that Ebola is able to enter the body through the lungs.

At first, characters and readers alike take this apparent lack of human cases of Ebola to be a positive development. In truth, however, the knowledge that this strain of Ebola can travel through the air (or so they suspect) only increases the sense of menace. If it was a strain that did *kill humans, an epidemic could have begun.*

General Russell reveals to Preston that he was even more terrified of Ebola after the mission was over, when he realized how easily the virus could be transmitted. He compares its potential for destruction to a combination of the Black Death and influenza. No one, however, understands why Ebola Reston was symptomless in humans—Preston speculates that some tiny mutation in the virus's genetic code must have rendered it harmless to humans but lethal to monkeys. He suggests, however, that another mutation could easily go in the other direction.

The lack of understanding of Ebola Reston reveals how little we still know about the virus, despite having directly battled it in the Reston monkey house. The tiny genetic mutation that leads it to be harmless to humans again shows how important luck and chance are in these kinds of situations. The mutation could just as easily have made the virus more lethal, which would have inevitably led to an outbreak in America.

Preston goes to visit Nancy Jaax. She offers to show him Ebola, and he looks at slides of a monkey's testicle and lung, both ravaged by an Ebola Zaire infection. At a higher magnification he is able to see inclusion bodies, the huge bricks of Ebola that are slowly taking over the cell. Nancy explains that when in the lungs, these inclusion bodies would be able to make their way (through coughs) directly into the air.

The narrator's visit to Nancy Jaax helps us to appreciate the infinitesimally small margin by which we escaped true catastrophe. This terrifying conclusion (that Reston is transmitted through the air alone) is now disputed, however, by Nancy Jaax herself—it is more likely that the virus spread through aerosol sprays used in cleaning the monkey cages, or else other equipment or "husbandry" practices.

In March 1990, the C.D.C. puts stricter restrictions on monkey importation and revokes the licenses of three companies, including Hazleton, charging them with violating quarantine rules. The licenses are later reinstated, but the companies lose millions of dollars as the importation of monkeys briefly comes to a halt. Many in USAMRIID, however, still praise Dan Dalgard and his company for their decision to hand over the monkey house to the Army. The monkey house, meanwhile, stays vacant to this day. Tom Geisbert and Peter Jahrling—who is now the principal scientist at USAMRIID—name the new virus Ebola Reston. In Jahrling's office, Geisbert and Preston compare Zaire to Reston and wonder why Zaire is hot in humans while Reston is not. Preston asks if "we dodge[d] a bullet." Jahrling, however, cautions against this kind of talk, warning that Reston could mutate into something more dangerous at any time.

Preston begins to wrap up loose ends, but cautions us not to become complacent about Ebola Reston simply because it never caused any large-scale epidemic. Through his discussion with Peter Jahrling, he reminds us that Reston is almost genetically identical to Zaire, the most deadly form of Ebola, and hammers home the point that it was only by chance that Reston did not happen to affect humans. This passage is meant to remind us of our vulnerability at all times to these kinds of infectious diseases, and to warn us that another such occurrence may prove far more deadly than the virus at the Reston monkey house did.

C. J. Peters eventually becomes chief of the Special Pathogens Branch of the C.D.C. He too believes that Ebola can spread through the air, although he has never tested Ebola Reston in an experiment setting (doing so would be perceived as too close to germ warfare). As a result, he cannot say for sure whether Ebola can travel in this way—but if it can, he asserts, "that's about the worst thing you can imagine."

The ominous tone of this section continues as Peters emphasizes how alarming it is to find an Ebola strain that can travel through the air (although this fact is now considered scientifically disputable). He also reminds us of the uncertainty that still surrounds the virus.

Preston sums up what's happened: Marburg, Ebola Sudan, and Ebola Zaire have been joined by a fourth strain: Ebola Reston. Two C.D.C. researchers named Anthony Sanchez and Heinz Feldmann analyze the genetics of the filovirus families and find that Zaire and Reston are almost identical. Preston goes on to explain that one of the seven proteins that makes up the Reston virus is probably slightly different than that of Zaire—and it is this slight difference that kept it from causing symptoms in humans. The Army and the C.D.C., however, never downgrade Reston from its Level 4 status because of how infectious it is. A small change to its genetic code might make it not only contagious, but deadly.

In this passage, Preston helps readers to understand the large-scale implications of the events that he's just recounted. We also learn that despite Ebola Reston's apparent harmlessness to humans, it is still categorized as a Level 4 virus—a fact that emphasizes how dangerous Reston could become with only a small change to its genetic makeup. Considering how fast viruses mutate, this shift from symptomless to deadly could take place at any time, a reminder of nature's power and fickleness.

Preston next contemplates why Reston supposedly comes from Asia while Zaire comes from Africa. The most obvious possibility is that Ebola traveled from Africa to Asia on a plane, possibly during the importation of wild African animals, which some wealthy people in the Philippines enjoy keeping on their estates to illegally hunt. He acknowledges, however, that this is only a guess, and that the source of Reston, like that of all filoviruses, is ultimately a mystery. It is likely, though, that "the entire Reston outbreak started with a single monkey in the Philippines"—a monkey that picked up Ebola Reston from an unknown source.

The theme of globalization returns as Preston discusses the mysterious origin of Ebola Reston. We learn that the source may come from human greed and arrogance (through the importation of African animals to the Philippines), and are reminded once again of the mystery that surrounds the origins of many epidemics. Preston does emphasize, however, that the outbreak probably started small—with a single monkey—a stark symbol of how easily one case of Ebola could become a worldwide pandemic.

PART 4, CHAPTER 1: HIGHWAY

It is August 1993. Preston describes the road to **Mount Elgon**, which runs from the Kenyan highlands to the Rift valley. He adds that the road "is a segment of the AIDS highway, the **Kinshasa Highway**," a trans-African road along which HIV traveled when it first began to break out. Preston traces the history of the highway, which was paved in the 1970s, soon before HIV began to show itself. He then reveals that he is familiar with the road to Mount Elgon because he traveled it when he was 12 along with his parents and brothers. When you experience Africa as a child, he says, "it becomes a section of your mind," simultaneously familiar and foreign. He remembers the sights and smells of his childhood, and the masses of people whom he encountered during that time.

The narrative now becomes personal, as Preston becomes more of a character and tells readers about his journey to Kitum Cave, the theoretical source of Marburg virus. We once again encounter Kinshasa Highway, the road that helped spread HIV/AIDS, and we learn that Preston himself spent time in Africa. This personal detail helps to explain why he himself is so obsessed with Ebola. The detail about Kinshasa Highway, meanwhile, reminds us about ways in which human innovation can in fact spread deadly diseases.

Preston is currently driving along a bumpy road in a Land Rover along with an intrepid guide named Robin MacDonald, who once visited **Mount Elgon** as a child. The two pass cornfields, people, and herds of cattle, and Robin reminisces about a time when the land was wild and full of forests.

Although Robin's memories of a time when the land was wild and free from humans may sound like a digression, it is in fact a reminder of how much humans have encroached on nature in recent decades. The spread of viruses such as HIV and Ebola is in large part due to this sudden expansion.

Preston explains that "Robin MacDonald is a professional hunter and safari guide." He is also the son of a famous hunter named Iain MacDonald, who died in a plane crash when Robin was 13. He relates the many adventures of both Robin and his father, which include hunting an elephant in the middle of the desert for three days.

Robin's experiences in the wild ensure that he understands the power of nature (unlike many more sheltered citizens in the US), but he is also arrogant and reckless, often putting his life in danger despite his knowledge of nature's deadly potential.

There have apparently been "reports of tribal violence around **Mount Elgon**" because the Masai have been raiding an ethnic group called the Bukusu. Robin, however, has assured Preston that they will be relatively safe on their journey. Robin questions Preston about the reasons for his trip, and he replies that he just wants "to look around." Ronin is relatively unworried about the possibility of an Ebola infection, although he's quite impressed by its effects on male genitalia. The men discuss what Robin should do if Preston becomes ill. Preston cautions Robin not to touch him, but to deliver him to Nairobi Hospital immediately. The Land Rover passes the Cherangani Hills, and as they approach **Mount Elgon** it begins to rain. Preston asks Robin to find some bleach, and states that he hopes "it kills Marburg."

The "tribal violence" that Preston mentions is yet another manifestation of the ways in which humans are detrimentally affecting their environment. Robin's casual attitude about Ebola, is another example of how arrogant humans can be about deadly diseases, if they have not witnessed their effects firsthand. Preston, on the other hand, is all too conscious of what might happen to him if he's exposed to Ebola. Despite this knowledge, however, his obsession with the mystery of Ebola/Marburg is so great that he's willing to take the risk anyway.

Preston describes the restaurants and small hotels that they pass along the way, many of which offer food, beer, lodging, and prostitutes. He explains that doctors believe that 90% of prostitutes who work along the main road have HIV/AIDS. In the area of **Mount Elgon**, 30% of men and women are infected with HIV. Most will die of AIDS, and many will pass the disease on to their children. The beginning of HIV/AIDS, he states, "was subtle," because the disease takes years to kill its human hosts. Preston connects the paving of the **Kinshasa Highway** with the spread of the disease, explaining that when he was young, the road was nothing more than gravel and dust. Now, however, it is smooth and filled with pickup trucks and vans. He asserts that the paving of the Kinshasa Highway "turned out to be one of the most important events of the twentieth century," and is responsible for the deaths of at least 10 million people.

The author digresses to talk about the spread of HIV/AIDS, and its massive prevalence around Mount Elgon. He returns once again to the construction of the Kinshasa Highway, emphasizing how it was only due to human innovation and globalization that HIV/AIDS was able to morph into a global pandemic. He then directly links the paving of the Kinshasa Highway with the massive amount of deaths caused by AIDS, hammering home the hidden danger that lies within the human need to constantly expand and innovate.

PART 4, CHAPTER 2: CAMP

Preston introduces us to Robin's wife and business partner, Carrie MacDonald, who often travels along with him and brings their two sons. The party travels in two Land Rovers, and also includes three members of the MacDonalds' safari staff: Katana Chege, Herman Adembe, and Morris Mulatya. Preston has also brought two Americans along with him: a childhood friend named Frederic Grant, and a woman named Jamy Buchanan. He has prepared and hidden a list of instructions in case he comes down with Marburg, including in it a list of symptoms and possible experimental treatments that he hopes might keep him from dying should he contract the virus. Robin drives haphazardly down the road, singing as he does so.

Preston's description of his journey and his companions helps to make his trip seem vivid and present to his readers, even though it is a totally different setting and tone from the scenes in Reston. Preston's note makes clear that he understands the risk he is taking, and has decided (either arrogantly or bravely) to go inside the cave anyway. Although Preston understands his own vulnerability to the virus, his very human urge to understand and explore outweighs his fear of a possible infection.

As sunset approaches, the party stops in the town of Kitale at the base of **Mount Elgon** to buy beer and charcoal. As they walk through the town they are swarmed by pimps, and Preston speculates that perhaps Charles Monet's girlfriends lived around here. The air, he observes, is cold, heavy, and wet.

Preston's mention of pimps is another reference to the spread of HIV/AIDS, which was greatly aided by unprotected sexual contact between prostitutes and their clients. Monet reminds us that Ebola, too, can spread through sexual contact.

As the group explores the roads around **Mount Elgon**, they see signs of the conflict between the Masai and the Bukusu. They make camp that night in "the same meadow where Charles Monet had camped." They begin to cook dinner, and observe a Cape buffalo watching them. Robin wanders down to the stream with Preston and tells him a story about fishing for crocodiles. They observe an armed guard named Polycarp Okuku, and Robin asks if there are any lions nearby. The guard replies that there are no lions left. Preston explains that Ugandan poachers have infiltrated the mountain and shoot animals and people alike. In response the Kenyan government now requires that armed guards accompany visitors to the mountain.

Preston spends a great deal of time discussing the nature that surrounds him and his party in Mount Elgon. While this narration might seem like simple "filler" information, it actually serves to illustrate a crucial point: that the encroachment of humans has disturbed previously hidden diseases like HIV and Ebola while also having a detrimental effect on Mount Elgon's environment. Yet despite the devastation that people have brought to the natural landscape, the animals and the plants of the mountain still retain their majesty and power.

The men continue exploring, observing many animals, including a rodent called a hyrax that Preston notes might be a carrier of Marburg. He describes the forest around the mountain—"one of the rarest and most endangered tropical forests on the planet." He describes the different types of trees, some of which are massive and centuries old. Robin observes that there used to be elephants in this location, but that they've all been shot now.

It is important to remember that the same natural process that allows trees to live for centuries also allows viruses to mutate, shift, and survive. Although viruses and trees seem very different, both in fact are manifestations of nature's power, representing something far older, stronger, and more mysterious than the human race.

The men approach the mouth of **Kitum Cave**, and the sound of a waterfall grows stronger, as does the smell of bats. Nettles sting their legs and insects fly in their faces. Preston observes that either nettles or insects could be the hosts. They stop by an elephant trail that leads into the cave, and Preston states that the 2,000 elephants that once lived in **Mount Elgon's** forests have now been poached down to 70. Now the herd mainly stays out of sight, venturing to Kitum Cave about once every two weeks to eat its salt. There are many other kinds of animals that travel around Kitum Cave: monkeys, rodents, and even leopards. Preston compares the cave to the "Times Square subway station," calling it the perfect "place for a virus to jump species."

Preston continues to hammer home the terrible damage that humans have done to the landscape around Kitum Cave, here recounting the massive depopulation of elephants that has occurred over the past few decades. Despite the threat of human poachers, however, Kitum Cave still acts as a gathering place for animals, implying that nature will always continue on even in the face of human threats. This massive natural diversity offers its own threat as well, since it provides the virus with an ideal place to transfer from one species to another—as always, nature is both beautiful and dangerous.

At the mouth of the cave, Preston assembles his gear. He does not have the kind of pressurized **spacesuit** that USAMRIID uses—instead, he's brought "a neutral-pressure whole-body suit with a hood and a full-face respirator." He also has brought rubber **gloves**, rubber boots, tape, a shower cap, and a headlamp. A real spacesuit would require a full support team, and so Preston has Fred Grant help him to tape his gloves and boots to his suit. Polycarp Okuku asks Robin MacDonald who has died in the cave. Preston explains about Charles Monet and Peter Cardinal, and explains that he's just being careful. Okuku states that he's heard of the virus, and references the work that Gene Johnson and his team did at **Kitum Cave**. Preston puts his respirator on his head and tells the group to expect him back in an hour—and if not, to "call 911."

Preston recounts the protective equipment that he intends to use within Kitum Cave for two opposing reasons: on one hand, it shows how seriously he takes the threat of infection. On the other hand, however, his description of the gear he has cobbled together emphasizes that it is nowhere near as advanced or protective as the spacesuits that researchers use at the Institute. Okuku's comment that he has heard of the virus only underscores how ancient Ebola/Marburg really is—the stuff of myth, in some ways, as much as of reality.

Preston enters the huge mouth of **Kitum Cave** and walks across a floor covered in bat dung. He observes that in 1982, the roof of the cave fell in, meaning that the entrance to the cave is covered in fallen rock. He carries with him a map on a waterproof bag (so that he can decontaminate it) drawn by an Englishman named Iain Redmond who once lived in the cave for three months to study elephants. He wore no biohazard gear but never fell ill (and later Peter Jahrling would express an interest in testing his blood). Preston explains Iain Redmond's theory that thousands of generations of elephants actually carved the cave as they pried out rocks in search of salt. Meanwhile Preston treks further and further into the cave, disturbing bats with his light and noting their wet droppings on the walls. Beyond the bat colonies the cave is dry and dusty—strange for a cave, since caves are usually wet. Preston states that viruses "like dry air and dust and darkness," meaning that this kind of cave is the perfect place for one to hide.

Preston describes the interior of the cave in vivid detail, taking care to note its strange and mysterious features in order to give readers the sense of being somewhere otherworldly. His mention of Iain Redmond also remind us of how strange and fickle nature is—Charles Monet and Peter Cardinal fell ill after one visit to the cave, but Redmond survived after living within it for months. The bat droppings, while they may seem innocuous, actually carry hidden menace—since bats could be carriers of the virus, their droppings could easily be contaminated. The entire cave, in fact, is the perfect environment for a virus like Ebola/Marburg to thrive—a fact that only adds to the reader's sense that something is lurking within the cave.

As a side note, Preston explains that Tom Geisbert once did an experiment on Marburg to see how long it could survive in water—it remained lethal after five days. By contrast, HIV only survives a few minutes when exposed to the open air. As long as a surface is free of sunlight (which breaks up a virus's genetic material), Marburg or Ebola could most likely survive in a dry, dark place for a long time.

Ebola/Marburg, Preston takes care to explain to us, is exceptional among viruses because of its ability to survive in adverse conditions. Considering how much he has emphasized the power and deadliness of HIV/AIDS, the fact that Ebola/Marburg is a more resilient life form only adds to our understanding of its danger.

Preston reaches the top of a mound in **Kitum Cave** and puts his hand on the ceiling, which is made up of solidified ash and petrified trees. There are crystals too, which look very sharp. He speculates that perhaps Peter Cardinal cut himself on one. He continues along, disturbing another colony of bats, and finding a fossilized tooth of a crocodile in the rock, a remnant of the volcanic eruption of **Mount Elgon**. He sees an elephant dropping, followed by a wall that the elephants have dug into with their tusks. He finds a side tunnel and heads down it, abruptly slamming his head against a rock. He notes that had he not been wearing protective gear, the rock would have cut his scalp—yet another potential exposure to the virus. Deeper still, he finds spiders and insects—perhaps they bit Monet and Cardinal, transmitting Marburg that way. Preston acknowledges how little he understands about the cave and its inhabitants. He continues on, finding a crevice full of water. Further still he finds a giant room, hundreds of yards across. For a moment he turns off his lamp and stands in darkness, listening to his heart beat in his chest and his blood drum in his head.

Preston continues to create a portrait of the cave that emphasizes both beauty and danger. Everywhere he turns he sees evidence of the power of the natural world, from a fossilized crocodile tooth to petrified trees. At the same time, however, he must remain always on his guard from the dangers that the cave contains, as evidenced by the moment when he knocks his head against a sharp rock. Beyond these visible dangers, of course, lies the invisible but ever-present threat of Marburg virus, which Preston imagines lurks at every turn. In a larger sense, both the virus and the cave that contains it act as symbols for the mystery, power, and menace of nature. As he stands in the dark listening to his own heart beat, Preston implicitly compares his own human fragility and smallness with the massive scope and power of the natural world—which could extinguish him (and indeed the human race) at any time.

When Preston emerges from **Kitum Cave**, the afternoon rains have come. Fred Grant welcomes him back, and Preston fills a tub with bleach, washing his suit and then dropping all of his gear into the tub. Next he strips off his clothes and sneakers, double bagging them and washing the bags with bleach. He then puts on a clean set of clothing and double bags his biohazard gear as well. Robin MacDonald appears, and jokingly calls him "Sir Bat Shit."

After his visit to the cave, Preston takes great precautions in order to ensure that nothing he touches is contaminated with Marburg virus. Once again, the sequence is an almost comical one, until we remember the deaths of Charles Monet and Peter Cardinal. While Robin MacDonald may poke fun, both readers and Preston understand how important and serious this process really is.

The group heads back to camp, bringing the bags of gear along with them. A downpour begins, filling the air with thunder and lightning. At camp they drink scotch and beer and play poker as night falls. Robin MacDonald playfully asks Preston if he's experiencing any "mental symptoms." Preston privately relates that he's already begun to obsess about the bump on his head, obsessively wondering if he might have been exposed to Marburg that way, even though he knows that he's probably fine.

Preston now begins to understand the paranoia that comes with working closely with or being exposed to a deadly hot virus. He is experiencing the same fear and obsession as characters such as Nancy Jaax, Gene Johnson, and Peter Jahrling. The thunderstorm is yet another manifestation of the power of nature.

Preston asserts that "the emergence of AIDS, Ebola, and any number of other rain-forest agents appears to be a natural consequence of the ruin of the tropical biosphere." As humans encroach further and further into rain forests and savannas, the deepest "reservoirs of life on the planet," they are being exposed to new and deadly viruses. There are dozens of these diseases, the most prominent and widespread being HIV. He compares these viruses to "an immune response against the human species." He calls the human race a "parasite," an "infection," which is threatening the Earth with "mass extinction." Humans have caused an imbalance, and Nature, he notes, "has interesting ways of balancing itself." He wonders if the "earth is attempting to rid itself of an infection by the human parasite. Perhaps AIDS is the first step in the natural clearance."

Preston now arrives at one of the most important, powerful, and disturbing passages within the narrative, asserting that human destruction of the environment has directly produced deadly hot viruses such as HIV and Ebola—and implying that perhaps the Earth would be a better place if such a virus were to severely deplete the human race. As he has before, he essentially anthropomorphizes the natural world, asserting that viruses are its attempt to rid itself of the disastrously destructive human race. The sense of menace that has run through the book has all led to this passage, as Preston suggests that nature is essentially out to get us—and that, perhaps, we deserve it.

Preston calls AIDS "the worst environmental disaster of the twentieth century." He explains that HIV most likely jumped to the human race from African primates, possibly when monkey hunters "touched bloody tissue." He goes on to recount that HIV was first noticed in 1980 by a Los Angeles physician who observed that his gay male patients were dying of an unknown illness. At the time, of course, the idea that gay men in LA were dying of a disease from wild monkeys in Africa would have been absurd. Preston notes with interest that HIV jumped from apes, an endangered species, to humans, the fastest-growing species on the planet. He explains that HIV "is a fast mutator," able to constantly alter its own genetic code. This means that it is extremely difficult to develop a vaccine for the disease, and that HIV has been able to survive despite the wreck of the tropical ecosphere. Preston speculates, however, that "AIDS might not be Nature's preeminent display of power." He wonders whether a worse virus is yet to come, one that will severely thin out the human race.

Returning once again to HIV/AIDS, Preston discusses how globalization and human innovation led directly to the spread of the virus. He goes on to speculate that HIV/AIDS began to prey on humans because we are so widespread, and then notes how easy it is for HIV (like Ebola) to change its own genetic code. While he does not specifically mention Ebola, we are clearly supposed to think of the virus when Preston suggests that a disease worse than AIDS may one day emerge to exterminate the human race. His many references to HIV/AIDS throughout the book, and his insistence that Ebola is in many ways the more powerful and dangerous virus (although far less prevalent), have all led to this menacing conclusion.

Preston remembers reassuring himself after leaving **Kitum Cave**, but also knows that there is an incubation period of eighteen days. He recalls Joe McCormick, who was almost exposed to Ebola and lived to tell the tale.

Despite his many precautions, Preston remains paranoid about his possible exposure to Ebola—a fact that reflects both his obsession with disease, and his fear of and respect for the power of the natural world.

On a warm day in autumn Preston drives out to visit the monkey house. The door is locked, with shreds of duct tape around it. Through the window he can see the floor marked with reddish brown stains, and the corridor that the Army used as an airlock. Nearby Preston sees a boy playing basketball, and hears children shouting in the daycare. Inside the building he sees a vine called Tartarian honeysuckle that grows in abandoned places. He walks around the window and sees a bucket that may be filled with monkey excrement and bleach. Near it is a spider that has been feeding on flies and yellow jackets. Life is flourishing in the monkey house where Ebola once reigned. The disease has now sunk back into the forest—but, Preston warns, "It will be back."

In the book's final moments, Preston uses the Reston monkey house—a far cry from the exotic, awe-inspiring Kitum Cave—as a symbol for nature's resilience, power, and menace. In the midst of everyday suburban life, he sees the monkey house as a reminder of the outbreak that almost occurred. The signs of life within the building—which a short time ago was utterly devoid of any living thing—prove how quickly nature undoes human action and resists all our efforts to control it. Although at the moment the monkey house is peaceful, filled with plants and insects, it could just as easily have been filled with traces of Ebola. Despite humans' best efforts, nature will always remain more powerful than we are—and the longer that we treat it with arrogance and cruelty, Preston implies, the more likely we are to face a species-wiping virus like Ebola. Preston's ominous warnings in this last passage indeed seem to predict the deadly Ebola outbreak in West Africa in 2013-2015, in which the disease has killed more than 11,000 people.

HOW TO CITE

To cite this LitChart:

MLA

Hoyt-Disick, Gabrielle. "*The Hot Zone*." *LitCharts*. LitCharts LLC, 12 Nov 2015. Web. 21 Apr 2020.

CHICAGO MANUAL

Hoyt-Disick, Gabrielle. "*The Hot Zone*." LitCharts LLC, November 12, 2015. Retrieved April 21, 2020. https://www.litcharts.com/lit/the-hot-zone.

To cite any of the quotes from *The Hot Zone* covered in the Quotes section of this LitChart:

MLA

Preston, Richard. The Hot Zone. Anchor Books. 1999.

CHICAGO MANUAL

Preston, Richard. The Hot Zone. New York: Anchor Books. 1999.