

Frameshift Study Guide

Frameshift by Robert J. Sawyer

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Contents

Frameshift Study Guide.....	1
Contents.....	2
Plot Summary.....	3
Chapters 1-5.....	4
Chapters 6-10.....	7
Chapters 11-15.....	10
Chapter 16-20.....	12
Chapter 21-25.....	14
Chapters 26-30.....	17
Chapters 31-35.....	20
Chapters 36-43.....	23
Characters.....	28
Symbols and Symbolism.....	32
Settings.....	36
Themes and Motifs.....	37
Styles.....	40
Quotes.....	42

Plot Summary

In *Frameshift* by Robert Sawyer, Pierre Tardivel, a brilliant Canadian geneticist, goes to work for the Human Genome Project in Berkeley, California. His boss is Burian Klimus, a Nobel laureate and genetics researcher. Pierre meets and marries Molly Bond, an American working on her PhD in psychology at Berkeley. Pierre carries the gene for Huntington's disease, and he does not want to pass that to his offspring. The couple decides to pursue artificial insemination. They pick the 86-year-old Burian Klimus as the father. Pierre notices that Klimus bears a resemblance to John Demjanjuk, a Ukrainian and Nazi sympathizer, who was called Ivan the Terrible at the Treblinka death camp.

When their daughter Amanda is born, Molly and Pierre notice a few anomalies such as her hairy back and stocky build. When they figure out that Klimus has altered his DNA by inserting Neanderthal DNA into his sperm, both Molly and Pierre become enraged. Since Molly has an ESP-type ability to read minds, she can communicate with Amanda in a way others can't. Amanda may never actually speak because of a malformation of her throat caused by the Neanderthal DNA.

Pierre discovers that Condor Insurance of San Francisco, where he's applied for life insurance, illegally uses genetic screening to deny coverage to those deemed high risk. There is also some evidence that Condor secretly arranges to have some policyholders with chronic diseases murdered. As he looks deeper into the matter, he sees a connection between Condor founder Abraham Danielson and the Millennial Reich, a local hate group fashioned along the lines of the Third Reich. Danielson is not only a member of the Millennial Reich but also its founder. Pierre suspects Robinson is also a Nazi war criminal.

Pierre goes to Condor Life Insurance to confront Danielson with his criminal past as a Nazi and his criminal present as head of Condor, which has engaged in a long list of crimes from murder to fraud. At the time the 30-something Pierre confronts Danielson, he is hobbling along on a cane and considerably weakened in his physical condition because of his Huntington disease.

Robinson tries to flee by going to the roof of the building and hopping on a helicopter, but Pierre follows. When the helicopter arrives late, Danielson climbs aboard. Pierre hurls a heavy crowbar into the spinning rotors. The helicopter sputters, wobbles, and finally crashes from the high-rise building to the street below killing Danielson and everyone else on board.



Chapters 1-5

Summary

Treblinka, the Nazi death camp in Poland, is in full swing when the story begins. A brutish Ukrainian named Ivan directs the sadistic abuse and eventual murder of hundreds of Jews in August, 1943, which was approximately the midpoint of World War II. The soldiers routinely pack as many as 500 Jews into the gas chamber at a time, closing the doors tightly as the Zyklon-B is released. Despite the forced performance of a band of Jewish musicians and the horrific roar of the engines powering the human death factory, screams still pierce and penetrate the nearby woods as the prisoners die like cattle crammed into a freight car. They are packed so tightly that their corpses remain standing even after the doors are opened. Then, their lifeless forms begin collapsing one by one.

Jubas Meyer, one of the prisoners forced at gunpoint to carry the corpses out for incineration, begins weeping when he sees the naked body of his sister Rachel among the pile of dead. As he weeps and wails, Ivan neatly slices off Rachel's right nipple, sending it into the lap of her devastated brother. Then he coughs up a cold, metallic laugh.

Jubas and another prisoner witness a Nazi guard abusing a Jewish boy who has a few coins in his pocket. As the soldier starts to march the boy into the woods, Jubas pulls out one of six stolen pistols and shoots the Nazi guard. The shot heard round the camp prematurely triggers a planned prisoner revolt as all 850 prisoners clamber to escape through and over the barbed wire fences. Most are shot dead on the spot; some are chased into the woods. Jubas is one of about 50 who escape and keep running.

The story flashes forward to the early 1980s, when 18-year-old Pierre Tardivel travels from Quebec to Toronto, Canada, to meet his biological father, Henry Spade. Spade has been absent since the 1960s when Pierre was born. His father now lies bedridden by Huntington's disease like "a man dancing on his back." Pierre, because of his genetics training, knows he's at high risk for developing the same disease.

When Pierre returns to Montreal, he consults a doctor who specializes in genetic diseases. He tells Pierre there's really nothing that can be done for Huntington's and gives him information about a support group for fellow sufferers. When he asks Pierre if he's ever considered or attempted suicide, Pierre answers no. When he returns to his hotel room, Pierre catches himself unconsciously sliding a business card back and forth over the wrist tendons of one hand.

By the age of 18, Molly Bond is an undergraduate at the University of Minnesota. She is already acutely aware of her ability to read minds. For this and other reasons, Molly chooses to live in a dormitory rather than at home with her sister, mother, and stepfather. Meanwhile, Pierre flunks all of his freshman classes at McGill University; but,



he is given a second chance by a sympathetic dean who allows him to make up some credits in summer school. While there, Pierre sits through a second class in introductory genetics. This time, it sets him ablaze with curiosity and excitement. When he is not petting his girlfriend or dreaming of the Nobel Prize, Pierre is consumed with fear and worry about his own predisposition to Huntington's Disease.

Jubas Meyer, one of the 50 escapees from the Treblinka prison camp, relocates with his wife to Chicago after the war. Three years later, just before the birth of his son, Avi, Jubas dies. Avi becomes an agent with a division of the U.S. Department of Justice charged with finding Nazi war criminals. The group identifies a Cleveland auto worker called John Demjanjuk as "Ivan the Terrible" of the Treblinka death camp.

Demjanjuk is arrested on the basis of positive photographic identification by former prisoners of Treblinka and returned to Israel where he awaits trial on war crimes charges. At the trial, a former Treblinka prisoner identifies Demjanjuk—who is sitting in the courtroom—as the man in a black and white photo and as "Ivan the Terrible." Demjanjuk yells out in the courtroom, calling the Israeli prosecutor a liar.

Analysis

In Chapters 1-5, the plot is set in motion when Nazi bestiality and the science of genetics are introduced. There are shocking descriptions of unimaginable cruelty toward Jewish prisoners at the Treblinka death camp. For example, Jubas Meyer, the father of Avi Meyer, witnesses the sadistic guard Ivan Marchenko (Ivan the Terrible) mutilating his sister's corpse. His parents will immigrate after the war to Chicago where Avi will grow up. The horrific scars of the Treblinka experience motivate Avi to become a professional Nazi hunter for the U.S. Department of Justice.

Meanwhile, a Canadian named Pierre Tardivel finds his academic niche in college when he develops a passion for genetics. Molly Bond, a college student in Minnesota, finds she has an unusual ESP-type ability to read minds. These disparate narrative threads will come together to create the pattern for an inevitable confrontation with evil lurking within a university genetics lab and a San Francisco insurance company. The evil in both places bears an uncanny resemblance to the evil practiced within Hitler's Third Reich. However in these early chapters, the primary characters—Pierre, Molly, and Avi—are innocents who become sucked into a web of violence and hate they could hardly imagine.

Discussion Question 1

How does the subject of genetics play a major role in the life of Pierre Tardivel?

Discussion Question 2

How do Nazi atrocities play a major role in the life of Avi Meyer?



Discussion Question 3

How does the subject of genetics play a major role in the life of Molly Bond?

Vocabulary

postmortem, vestibule, undercurrent, dementia, predictive, crucifix, audible, requisite, fritter, protrude, calumny



Chapters 6-10

Summary

Five years later, prosecutor Avi Meyer watches TV in his Washington apartment when news comes that John Demjanjuk has been acquitted by the Israeli Supreme Court. Under Israeli law, an appeal is mandatory whenever someone is convicted of a capital offense. Meyer feels that all his work on behalf of OSI is wasted. He's in a state of shock. The conviction is overturned on testimony by witnesses that the Treblinka monster is Ivan Marchenko—not Demjanjuk, although the two men bear a striking resemblance to each other. Meyer realizes that the mistaken identity almost cost the life of an innocent man, Demjanjuk.

Pierre Tardivel earns his PhD in genetics and has a brief, stellar career as a genetics researcher in Canada before he is appointed postdoctoral fellow at the Lawrence Berkeley Laboratory. He is assigned to the Human Genome Project. Although he is thrilled with his new job, Pierre is intimidated by his boss—irascible Burian Klimus, winner of a Nobel Prize for his work on DNA sequencing.

Molly Bond takes a position as associate professor of psychology at University of California at Berkeley, in large part to put lots of geography between herself and her family. Eager to establish a social/dating life for herself, Molly is soon stymied by her mind-reading capabilities. While on a date, she is bombarded with disturbing pornographic thoughts from the other person. On at least one occasion, she walks out of a dinner date without explanation.

Molly sits down in the library next to a man she finds attractive (Pierre) and is enchanted that his thoughts are almost entirely in French. She asks him to have coffee with her when they leave the library. At the coffee house they talk for a long time, and her hopes are that Pierre isn't as crude as American men. He walks her home and asks her to have brunch with him in the morning. He bids her goodnight without trying to kiss her—a novelty!

Pierre and Molly share a pizza in his apartment. She tells him about her failed attempts to get pregnant by sleeping with several different men. Remorsefully, she says the only thing she got was gonorrhea which was cured with antibiotics although the infection scarred her Fallopian tubes so she can't conceive a child. Pierre listens, speechless. When he reports for work at the Human Genome Project there's a party in progress.

Klimus has successfully retrieved a complete strain of DNA from a 62,000-year-old Neanderthal skeleton. One of the lab workers tells Pierre the discovery could answer the question whether Neanderthal was a separate species, or just a branch of modern humans. The DNA could also help in determining if some of their genes survive in modern humans because of cross-breeding.



Pierre experiences the Catch-22 of the health insurance business when he's visited by a saleswoman named Tiffany Feng. She asks Pierre whether he'd like to augment his free, government healthcare coverage with a more inclusive plan that would be honored in all Canadian provinces. During her interview, Pierre tells Tiffany his father died of Huntington's disease. She asks if Pierre has Huntington's; he tells her he doesn't know and doesn't want to take the test to find out.

Tiffany tells him that if he takes a genetic test for Huntington's her company will insure him if he gets a policy before a new healthcare law goes into effect in California on January 1. If he doesn't take the test, her company will not cover him. Pierre buys the gold-plated Cadillac of healthcare plans under the assumption that he's getting the best possible deal.

Pierre gets into a discussion about deoxyribonucleotide acid (DNA), the essential chemical chain inside every living cell that directs not only the structure but also the function of every organ in the body. Pierre's research focuses on introns (or "junk DNA") that make up 90 per cent of the human genome but do not direct protein synthesis. He espouses the view that introns are archaic chains that may have served a purpose in earlier evolution. He reminds her that the structure of the DNA molecule was revealed to Crick and Watson because it was the "most beautiful" solution possible.

Analysis

The scientist who makes a pact with the devil for more knowledge is a literary convention dating at least to Mary Shelley's "Frankenstein." This trope is as much about intellectual pride as evil. In the case of Burian Klimus, there is the example of a modern-day geneticist willing to twist and pervert the laws of nature to find an answer to an anthropological question. Was Neanderthal a separate species of human beings or an evolutionary step in the appearance of modern humans (*homo sapiens*)? To find an answer to this puzzle, Klimus transcends the ethics of medicine and science by extracting DNA from an ancient Neanderthal skeleton to create a clone by inserting those genes into the ova of a modern woman (Molly Bond) without her consent. As in the case of the fictional Frankenstein, the product of this experiment in cross-breeding is less than the sum of its parts.

In the process of ignoring natural law and ethics to carry out their mad experiments, both Dr. Frankenstein and Dr. Klimus turn themselves into monsters while their misbegotten and ill-conceived life forms are creatures more to be pitied than feared.

Discussion Question 1

What is the dilemma Pierre faces when he applies for a life insurance policy?



Discussion Question 2

What experience does Avi Meyer have that sensitizes him to the importance of accurate, methodical work in his job as a Nazi-hunter?

Discussion Question 3

How does Pierre react when Molly tells him about her unsuccessful attempts to conceive a child?

Vocabulary

mandatory, perpetrate, righteous, putative, sporadic, blasé, insurmountable, sordid, congenital, aerobic, chromosome, fluorescent, protracted, predisposition, asymptomatic, supersede, rigmarole, redundancy.



Chapters 11-15

Summary

Pierre's research assistant, Shari, comes in one morning red-eyed and disheveled. He notices that she seems to be crying and asks her what's troubling her. Shari tells him she's broken up with her fiancée because they both carry the genes for Tay-Sachs—a genetically-caused disease among Ashkenazi Jews that causes dementia, convulsions, paralysis, and death in childhood. Since they both carry the gene, there is a 25 percent chance their child would develop Tay-Sachs, Pierre says. Shari tells Pierre she was brought up with the notion she should bear children to help compensate for the murder of six million Jews during the Holocaust. She says her boss couldn't understand because he is not Jewish.

Pierre tells Molly he hasn't taken a test to determine whether he has Huntington's because many who test positive commit suicide. She tells him she wants to marry him, regardless of the possibility that he carries the gene. If he should develop the disease, they'll cross that bridge when they come to it. Molly tells Pierre that he shouldn't take the test for her sake, but for his own. They decide to run a blood test on Pierre to determine his risk of Huntington's.

Sadly, the tests confirm that Pierre has many repeats of nucleotides which indicate severity as well as probable age of onset. Shattered, Pierre estimates he has four or five years before serious symptoms develop following initial decline in coordination and the appearance of facial tics. Pierre becomes enraged and throws a fit. He tells Molly to leave because they cannot risk passing the gene on to any future children. He says that he has wasted too much time on the disease already.

After his rash decision and hasty exit from Molly and their relationship, Pierre has time to reflect. He shows up at her office bearing a dozen red roses. Pierre apologizes and asks her forgiveness. She replies that she wants a child and will undergo in vitro fertilization because of his concern about passing along Huntington's genes. Pierre mentions adoption as an alternative to in vitro fertilization, but Molly is insistent.

Analysis

The Holocaust, a murderous campaign to eradicate an entire population, has driven Jewish women to have more children to compensate for the 6 million killed by the Nazis. There is a flaw, however, in the perceptions of both persecutor (Hitler) and persecuted (Jews) in thinking genetics can be used either to eradicate Jews or propagate Aryans. Judaism is a religion, not an ethnic or genetic group. There are black Jews, for example, in Egypt. By this reasoning, there could just as easily be a holocaust against any religion. Science shows that there is no such thing as a pure Aryan—or any other kind—



of race. Modern humans are the product of much cross-breeding between groups and even, in the case of Neanderthals, species.

Nazi geneticists tried to impose their political beliefs on nature, instead of allowing natural selection to proceed. The same is true of Pierre's co-worker Shari, who is afraid to have a child with her fiancée although it is not a certainty they would produce offspring with genetic defects. The issue here is the boundary between man's provenance and nature's provenance in the evolution of homo sapiens.

Molly's bizarre ability to "read minds," for example, seems likely to be more of a genetic fluke than a solid step in evolution. It may represent a case of retrogression, or reversion to an earlier form or function of an organism. If that's the case, it would be next to impossible to repeat this genetic trait, however beneficial it might be judged by humans.

As the theme of genetic engineering is explored by the author in these chapters, it seems reasonable that there exists a point at which genetic meddling by humans in their own evolution becomes an extremely risky business.

Discussion Question 1

What is Pierre's reaction when Molly tells him she has telepathic abilities?

Discussion Question 2

What is Molly's reaction when Pierre tells her he has a genetic predisposition for Huntington's disease?

Discussion Question 3

What is the faulty assumption in the thinking of both Nazis and Jews in regard to the Holocaust?

Vocabulary

convulsion, amniocentesis, gonorrhoea, articulate, enzyme, malicious, viable, fetal, pigsty, doublet, audibly



Chapter 16-20

Summary

Because of the risk of Huntington's disease, Pierre and Molly meet with Burian Klimus to ask his advice on in vitro fertilization clinics and procedures. They discuss the high costs of such a procedure and methods used by various clinics—including those that offer women a catalog of potential sperm donors with information on their age, race, IQ, temperament, and other characteristics. When Pierre and Molly seem overwhelmed at the choices, Klimus offers himself as the potential father.

After working late at the lab one night, Shari Cohen takes the shuttle bus home but stops at the psychology building to transfer. She nearly collides with a young man dressed in dark clothing and a black leather jacket, pacing back and forth. Later that night, Pierre barely survives a knife attack as he walks with Molly across campus. In the struggle, the attacker falls on his own knife and dies.

The Berkeley police tell Pierre that his assailant, Chuck Hanratty, was a member of a new-Nazi hate group operating in the Bay Area called Millennial Reich. After medical care and an interview with the police, Pierre asks himself—and Molly—why a skinhead would attack him. He introduces himself to Helen Kawabata, a forensic physician with offices in police headquarters. He tells her that he's with the Human Genome Project and he is searching for any information on the late Nazi thug who attacked him.

She prints up a report for him on Hanratty and asks that he keep it secret. She also tells Pierre that Hanratty was a suspect in another murder. Soon a federal agent with the Department of Justice named Avi Meyer shows up at Pierre's lab and begins asking a stream of questions about his work and his associates. He cautions Pierre not to mention his visit, then quickly leaves.

As Molly visualizes their still-imaginary child, she tells Pierre she'd like to know specifics about her own genetic makeup that might account for her telepathic abilities. Molly's blood panel arrives on Pierre's desk, and everything looks normal except for one protein neither had ever seen before. They suspect it's a neurotransmitter because one of its chief components is choline. Further lab investigation into the makeup of Molly's blood reveals an error in the sequence of proteins that make up the structure of the gene itself, called a frameshift. As Pierre explains to Molly, frameshifts are disruptions of punctuation that delineates words in the language of genetics. Frameshift mutations cause severe genetic diseases such as Tay-Sachs and cystic fibrosis. They can increase vulnerability to cancers and other genetically-based diseases.

Analysis

When Molly and Pierre seek advice from Klimus, they don't know anything about Klimus' connection to the Millennial Reich or his shady past as a possible Nazi



collaborator at the Treblinka death camp. This raises a central question whether there a genetic basis for evil. In an empirical sense, this question may never be answered although it points toward the risk of unintended consequences in any kind of medical experimentation. Could a hypothetical ex-Nazi pass along genes for hatred and intolerance of Jews, or is that strictly a manifestation of learned behavior and individual choice? In trying to manipulate the gene pool of Germans to create the "pure Aryan race" of Hitler's mad vision, it is conceivable that the Nazis were unconsciously selecting genes for intolerance and brutality. The book raises these questions but does not answer them except by posing hypothetical issues that call for caution in genetic engineering of any kind.

Another issue raised in these chapters concerns the nature of evil. For example, does the simple fact of manipulating the human genome constitute an evil because it disrupts the mechanisms of natural selection as outlined in the work of Charles Darwin? Where is God in these matters? It could be argued convincingly that evolution is God's will; therefore, it is holy. If one assumes that such man's manipulation is evil, then is raising genetically-modified crops also evil? Is it evil to use science to increase the world's food supplies because to do so requires genetic meddling?

Again, the novel provides no pat answers for these rather abstract concerns but simply presents them for the reader's examination.

Discussion Question 1

What similarities are there, if any, between the operating principles of the Third Reich and Condor Insurance Company?

Discussion Question 2

Why do Molly and Pierre choose Burian Klimus as the donor for artificial insemination?

Discussion Question 3

What does Molly's blood test reveal about her psychic abilities?

Vocabulary

reiterate, neonatal, eugenics, manifest, rudiment, embryo, bonhomie, premeditated, forensics, millennial, neurotransmitter, corpuscle, gibberish



Chapter 21-25

Summary

Molly and Pierre are thrilled when the in vitro fertilization succeeds in producing seven fertile eggs. However their patience with the sperm donor—Burian Klimus—grows markedly shorter the more time they spend with him. They are offended by his brusque and detached manner that contrasts vividly with their parental euphoria. Pierre decides to visit the widow of Bryan Proctor, the man who was killed by Chuck Hanratty in his murderous rage before Pierre killed him that night on campus. Mrs. Proctor is reluctant to let him inside her apartment in a rundown building near Chinatown in San Francisco. But, when Pierre confirms he's the one who killed Hanratty, she opens the door wide and invites him in for a drink.

Pierre tells Mrs. Proctor he's searching for any information that can help him to understand why Hanratty attacked him and Mrs. Proctor's husband. The police report speculates that Hanratty killed Proctor because he wanted to steal his extensive collection of tools, but Pierre wonders if the motive could have been xenophobia because of his association with the Millennial Reich. But, Mrs. Proctor tells Pierre her husband was born in America. He leaves without having learned anything new about Hanratty and goes to his laboratory to clean up his beaker, tubes, and dishes. In the process, he drops a large glass flask. It shatters and spreads a yellowish stain on the floor. When Pierre gets home, he tries to convince himself his clumsiness is just because he's tired. However, he can't escape the thought that the real reason is his Huntington's. Also, in this section, Molly uses a self-test for pregnancy, and the results are positive.

One night an employee of the Human Genome Project, Joan Dawson, returns to her modest home in Berkeley after a long day at work. She steps inside and is confronted by a young punk with a long knife. She grabs a fireplace poker to defend herself, but he thrusts the knife deep into her chest.

Pierre does a computer search on the infamous "Ivan the Terrible" of Treblinka. He finds that John Demjanjuk, a retired auto worker from Cleveland, was accused by the Office of Special Investigations of being that same Nazi executioner, arrested and sent to Israel for trial. He is convicted but found innocent on appeal to the Israeli Supreme Court. By reading newspaper and magazine accounts from the 1980s, Pierre finds that Demjanjuk is innocent and that the real suspect is Ivan Marchenko who escaped after the war and may still be at large.

Although there is some physical resemblance between Marchenko and Demjanjuk ("Ukrainian, bald, sturdy, thick-necked, protruding ears") according to the old news reports, it is Marchenko who is the subject of interest to Israeli Nazi hunter Avi Meyer, who has been asking questions lately at the Human Genome Project. There is also a strong similarity between descriptions of Ivan the Terrible and Burian Klimus, who is old



enough to be a Nazi criminal. Pierre's mind reels with the prospect that Ivan the Terrible may be the real father of his child and that "Molly is carrying within her the child of a monster."

Pierre notices thin white lines behind Klimus' ears and wonders whether they are markers of plastic surgery that could have reduced his semaphore ears to change his resemblance to Marchenko. When he learns that Joan Dawson hasn't showed up for work and hasn't called, he drives to her home to check on her. He sees her blood-soaked body inside and calls the police. At first the police are suspicious of Pierre because he has been at the scene of two fatal knife attacks recently in Berkeley. Molly comes to the police station and says her husband was with her when the attack took place.

Pierre tells Molly that his research has raised the possibility that Klimus may, in fact, be the same man as Marchenko. She replies that it's hard for her to believe that a mass murderer could also be a Nobel Prize laureate. Pierre asks her whether she would consider aborting the fetus and going to a pregnancy clinic for a second fertilization. She is defensive and says she wants to keep the child.

Molly and Pierre see Klimus at the funeral for Joan Dawson. Molly sits next to Klimus and whispers about how awful her death is, hoping to be able to read some association in his mind and/or words. When she mentions World War II, the Treblinka camp, and Ukrainian names, there is a flicker of recognition in his brain but not enough activity to "read" something clearly. When he gets uncomfortable, Klimus rises and walks away.

Pierre meets the Nazi hunter Avi Meyer at a Berkeley restaurant. The OSI agent tells Pierre that much of his investigative work focuses on genetics labs, physics departments, and political scientists. Pierre tells Meyer he's been doing some research of his own and found that there is a strong physical resemblance between Marchenko, Demjanjuk, and Klimus. Meyer says Klimus and Marchenko were both born in 1911 in the same Ukrainian town.

He adds that the leader of the Millennial Reich is someone named Grozny. Ivan Grozny translates from Russian to English as Ivan the Terrible. Molly read the mind of the man who tried to kill Pierre when he was dying and learned that he'd been ordered to assassinate him by a man named Grozny. Meyer advises Pierre to "watch your back."

Once Pierre accepts the reality that he has the fatal Huntington's disease, he goes to a support group for Huntington's patients in San Francisco. He learns from one of the attendees that Burian Klimus has been a speaker at a previous meeting. After that meeting, several members of the group died of knife wounds from apparent "muggings" in the Bay Area.

Analysis

The backgrounds of Burian Klimus, Ivan Marchenko, and Ivan the Terrible seem to merge in a shadowy world of coinciding dates, names, and places dating back to World



War II. Pierre works hard to uncover the truth about this confusing history and learn more about the father of his child. It appears that Ivan the Terrible was a Nazi sympathizer in Poland who gave his birth name as Ivan Marchenko, although admittedly Marchenko is not his real name. He gave that name as his mother's maiden name. His reason for giving the wrong name is that he couldn't remember her actual maiden name. John Demjanjuk, a retired auto worker from Cleveland, is neither Ivan the Terrible nor Ivan Marchenko. It appears that Demjanjuk was arrested as a war criminal because of alleged photographic similarities with Ivan the Terrible. His conviction is, in fact, overturned by the Israeli Supreme Court on appeal.

Questions linger about Klimus, who also seems to bear a resemblance to both Demjanjuk and Ivan Marchenko. In Pierre's mind, Klimus becomes more than a little suspicious when he uncovers his connections with the Millennial Reich, a contemporary network of hate groups with a neo-Nazi agenda. Even more disturbing, there appears to be a link between the Millennial Reich and Abraham Danielson, founder of the infamous Condor Insurance Co. that operates with secret genetic testing, conspiracy, and murder.

Like most fiction, parts of this narrative's background information are factual, having been taken from the pages of history and old newspapers. There was an actual John Demjanjuk who was convicted, then exonerated, as a Nazi war criminal. Also, there was an actual Ivan the Terrible at Treblinka; however, in reality, it appears that the two Ivans were never connected. The real Ivan the Terrible has never been identified or apprehended.

Discussion Question 1

In reality, who is Ivan the Terrible?

Discussion Question 2

How does Burian Klimus betray his fascist past through his actions and words?

Discussion Question 3

What is Avi Meyer's attitude toward Pierre's detective work to find ex-Nazis?

Vocabulary

shoehorn, gaunt, intravenous, exacerbate, fondle, rapacious, wince, dismantle, interrogation, exasperation, incipient, terminal, mugging



Chapters 26-30

Summary

Pierre and Molly are relaxing in the hospital room after the uncomplicated delivery of 7 pound, 12 ounce Amanda when Burian Klimus shows up and raps on the door. He's full of questions about the specifics of the birth. He asks about the child's gender only after asking clinical details. Molly thanks Klimus for his help and says her obstetrician noted that the hair on the baby's back would soon disappear as her body's hormones come into balance. The next day at the office, Klimus hands Pierre his mail and announces that he's coming to their house Saturday to visit the baby. Pierre resents his presumptuous manner but holds his tongue.

When Klimus shows up at their home Saturday evening, he asks more clinical-type questions and scribbles notes in a small notepad in Cyrillic. But, he doesn't play with the little girl. Over dinner, they share a conversation about Klimus' work on human origins, specifically his attempt to determine whether homo sapiens evolved from African migrants to Europe or arose in multiple locations, among specific groups of hominids. The second choice would mean there could have been different types of proto-humans competing with one another, Klimus explains. But, he tells Molly and Pierre that neither theory fully addresses the question of whether Neanderthals were a separate species of homo sapiens.

Pierre takes a tiny sample of his daughter's DNA and tests it for the genetic mutation that gives Molly her uncanny ability to read minds. He finds none, but he does see the expected mixing of genetic material from Molly and Klimus. Their domestic peace is upended when Molly's mother and younger sister Jessica arrive for a visit. Molly soon grows irritated with their presence, especially when she finds her sister thinking "dog" when she sees Amanda, and her mother, "What an ugly kid!"

Before falling asleep, Pierre realizes that "Klimus could very well be a Nazi" because of his involvement with the Millennial Reich and his enthusiastic support for voluntary eugenics.

To test his theory that someone perhaps connected with the Millennial Reich is murdering people with genetic diseases, Pierre asks his friend Helen Kawabata at the forensics lab for tissue samples from unsolved murders in the last couple of years. She agrees, but says it will take weeks, if not more. Local TV news airs a story on the growing controversy at UCB over research into whether different races are endowed differently with intelligence, and Pierre sees Professor Felix Sousa—a colleague of Klimus—interviewed on the issue.

Pierre tells Molly he's still angry about Condor Health Insurance "coercing" abortion of fetuses that may have genetic flaws. Molly suggests he buy a share of Condor so he can gain inside information on the company not available to outsiders; so, he purchases



100 shares for about \$1,100. Helen Kawabata calls Pierre to tell him she has tissue samples from 117 unsolved murder cases. Pierre gives the samples to his lab assistant to analyze and make copies of the DNA. Pierre continues his work on Molly's DNA, specifically for the telepathy gene. He discovers a mechanism in the cell that prevents any aberrant frameshift from being passed on to the next generation.

Amanda has her first birthday party, and Burian Klimus shows up uninvited, unapologetic, and takes more notes. Pierre can barely contain his anger. When Molly and Pierre visit Amanda's pediatrician, he tells them not to worry about the fact Amanda hasn't made any speech-like utterances because some children don't start trying to speak until they're 18 months old. But the cause of her problem, the pediatrician says, is the hyoid bone in the larynx that has not descended, and it's unlikely it will ever descend normally. Her large size and body hair are not uncommon in children from Eastern Europe, he adds. The pediatrician tells Molly and Pierre that Down Syndrome-like facial features do not mean she is mentally handicapped. In fact, he says, she's quite bright.

Analysis

Pierre and Molly struggle with the puzzle of how to relate to Amanda. She is affectionate and playful, like any one-year-old. When Molly's mother and sister visit, Molly reads their minds as they see Amanda for the first time. Words like "dog" and "ugly" form in their minds. Her parents would like a normal child, of course, but are baffled by her lack of vocalizations as well as the thick growth of hair on her back.

Their distress over Amanda is compounded by the brusque and intrusive behavior of Burian Klimus. He shows up at times unannounced and makes more measurements. Klimus explains to Molly and Pierre that he hopes to use Amanda to settle the question whether modern humans descended from Neanderthals or arose in multiple locations spontaneously, as a separate species. Soon Molly and Pierre grow extremely hostile to Klimus and accuse him of using Amanda only as an experiment, without any love or caring for her.

Oddly, Klimus doesn't dispute their assertions; but, he coldly claims that in a court of law Amanda would be considered his daughter and he has parental rights that permit him to visit her and exert an influence on her upbringing. To Pierre, Klimus' attitude is no different than any Nazi doctor in a concentration camp who allows hideous medical experiments and atrocities.

At the same time, Pierre reaches the end of his patience with Condor Insurance, and he takes Molly's advice to buy a share or two of the company so they can go to the annual stockholder's meeting and grill company executives about their exclusionary policies. In both areas—Amanda and the insurance company—Pierre and Molly feel powerless and angry.



Discussion Question 1

What do Molly and Pierre threaten to do if Klimus doesn't back off and stop disrupting their lives to keep tabs on Amanda?

Discussion Question 2

What is the scientific question Klimus hopes to answer by conceiving and raising a Neanderthal/human clone?

Discussion Question 3

What sort of veiled threat does Klimus make to Molly and Pierre in retaliation for their threat to move to Canada?

Vocabulary

presumptuous, bassinet, hypothesis, multi-regional, precarious, kindred, cavernous, reproach, dubiousness, exonerate, opulent, conversant, empirically

Chapters 31-35

Summary

Molly does some Internet research on the question of the hyoid bone in the larynx. The bone is necessary for human speech. To date, there has been only one discovery of a Neanderthal hyoid, and it was not found with a complete skull. Therefore, it did not settle the question whether that species could speak as modern humans speak. The few research studies concluded that more evidence, including more skeletal remains, are needed to settle the question. Suddenly, Molly is horror-struck at the potential enormity of Burian Klimus' perverse genetic experiment called Amanda: "It looked horribly, incredibly unthinkably as though Burian Klimus had found a way to bring just such new evidence to light."

Testing his theory that Klimus and the Millennial Reich are engaged in their own kind of genocide against those with "bad" genes, Pierre visits the widow of Bryan Proctor who was stabbed to death on the UC Berkeley campus. He asks if Bryan had any known genetic diseases such as Huntington's or Alzheimer's. She replies no, but he surreptitiously takes one of Proctor's razors from the bathroom to have it tested in the forensics lab. When Pierre returns home, Molly tells him of her suspicions that Klimus had taken Neanderthal DNA and inserted it into her eggs. Pierre reassures Molly that, even if that is the case, it would not affect his love for Amanda. Then he tells his wife he's going to the lab to steal some of the Neanderthal DNA to which Klimus has access.

He gathers a small snippet of DNA from a sample marked "Hannah" (for the eponymous Neanderthal "Hapless Hanna") in a small refrigerator in Klimus' office. He takes the sample to his own lab and initiates chemical processes to make exact replicas of the DNA for research. The next day he goes to San Francisco police headquarters and picks up some of Bryan Proctor's DNA recovered from the razor by Helen Kawabata, then takes it and Hannah's DNA to his own office where he instructs his assistant Shari Cohen to run the same battery of tests on both samples.

He also gives her tissue samples from 117 victims of unsolved murders in San Francisco, obtained through Helen Kawabata, and asks her to check for genetic defects that cause disease. The results show that the vast majority of those victims did, in fact, have "bad genes."

Pierre comes to work and gets the results of the DNA tests for his daughter, Amanda, and that of Hapless Hannah, the Neanderthal. They are one and the same. Shocked, Pierre collapses into his chair. "His daughter, his baby daughter, was a clone of a Neanderthal woman who had lived and died in the Middle East 62,000 years ago." (p. 238) Almost as an after-thought, Shari tells him the DNA collected from Bryan Proctor's razor shows no evidence of any genetic disorder. But Proctor's widow tells Pierre her husband had a bad liver and was a candidate for transplantation.



Molly and Pierre confront Klimus in his office, bristling with anger. They call him "asshole," "monster," "bastard" and threaten to destroy his career and expose him as Ivan Marchenko. Klimus, referring to Amanda as "the infant specimen," asks Molly and Pierre whether they really want all the publicity that would attend a threatened public shaming. He says he will record her growth and eventually publish a scientific paper in a professional journal referring to her only as "Child A." Klimus tells them he will stop at their house Saturday to take more measurements of Amanda. On their way home, Molly says she would like to find a way to kill Klimus. Pierre tells her to be patient because Klimus will most likely be executed by the Israelis when the full extent of his wartime atrocities are known.

Armed with this information, Pierre contacts Avi Meyer and tells him he suspects Klimus of arranging these murders for the sake of genetic "purification," as outlined in Adolf Hitler's "Mein Kampf" Nazi manifesto. In other words, Pierre says, "Klimus is Ivan the Terrible" who has secretly continued his job of executioner long after the end of World War II.

Pierre tells Molly that Condor Insurance—a huge firm serving the Pacific Northwest and California—had insured both Bryan Proctor and Joan Dawson, two people with serious chronic illness that would cost Condor millions in medical care, and two victims of unsolved murders. He suspects the insurance company of denying coverage, or actually killing, customers who would present large claims. Pierre wonders aloud how Condor could get tissue samples of potential customers for genetic testing. Then he has an idea.

Molly contacts the insurance company and, using a false name, asks a Condor sales person to come to their home and explain various policies. Once the sales person has described the plans, Molly picks the gold plan and prepares to sign the application. The sales person offers Molly a ballpoint pen from a large collection inside her jacket. Molly signs and then jerks the pen away before the sales person can retrieve it. Pierre lumbers into the living room to help Molly hold onto the pen. She hands the pen to Pierre. He examines the retractor tip and finds a minuscule spike which is used to scrape off skin cells that can later be genetically tested.

Pierre and Molly decide to make an appointment with Condor President Craig Bullen and confront him with their knowledge of the pen as a tool to deny coverage based on genetics which is illegal in California.

Analysis

At this point, much of the story turns on issues related to DNA and genes. Pierre steals some of the Neanderthal DNA from Klimus' office and gives it, with a sample of Amanda's DNA, to his lab assistant for processing and comparison. The results show that both Hapless Hannah and Amanda have the same DNA. Amanda is therefore a clone of the ancient Neanderthal woman. Further DNA analysis on more than 100 samples from unsolved murders indicates the majority of victims had some type of



genetic disease. Pierre suspects collusion between Klimus and Condor Insurance to "purify" the ranks of insurance policyholders and, in a Hitler-like manner, to purge the gene pool of "inferior" genes. This seems plausible based on the connections to the Third Reich—not to mention the Millennial Reich—of both Klimus and Danielson, founder of Condor Insurance.

Molly and Pierre decide to pass along this information to Nazi-hunter Avi Meyer and to confront Condor executives with accusations of illegal genetic screening at the annual stockholder's meeting in San Francisco. It appears to them that they are really attacking a single two-headed beast. One of the heads is called Condor Insurance, and the other the Millennial Reich. They are aware that both heads must be chopped off to stop the monster in its tracks. They prepare to do battle in a major confrontation at the stockholder's meeting but have no idea whether they'll succeed or be hooted out of the meeting by supporters and investors of Condor.

Discussion Question 1

What does Pierre tell Molly when she says she'd like to see Klimus dead?

Discussion Question 2

When Amanda's DNA is compared with the DNA of the 62,000-year-old Neanderthal woman called Hannah, what is the result?

Discussion Question 3

What method does Condor Insurance employ to gather illicit DNA samples of applicants for insurance?

Vocabulary

citation, stonewashed, splay, anthropologist, implantation, footfall, dilapidated, disproportionate, insistent, clandestine, retractable, actuarial



Chapters 36-43

Summary

Using stationery with the Human Genome Project letterhead, Pierre writes to Bullen and tells him there's been a breakthrough that could "revolutionize" actuarial science, and that he'd like to share it with the insurance executive. Bullen welcomes them into his office, offers them drinks and tells Molly how beautiful she is. Pierre tells Bullen his company has a "very low" rate of major claims payments; Bullen responds that Condor has been "very lucky." But, Pierre challenges his statement by saying that more is involved than luck.

Pierre quotes Nobel Prize-winning economist Milton Friedman to the effect that corporate executives have no other responsibilities to their stockholders other than to make as much money as possible and stay within the law. Pierre says that staying within the law is a very hard thing to do. Bullen becomes agitated and tells Pierre that he thought they had some useful information for him. Pierre accuses Bullen of illegally taking genetic samples from policy applicants. "I've seen the pens," Pierre says. Condor uses that information to identify in advance which policyholders might make large claims and eliminate them.

"You arrange the murder of anyone you discover might make a big claim against you," Pierre says. Enraged, Bullen orders both Molly and Pierre out of his office. Security guards with guns appear and lead them out of the building. On the way home, Molly tells Pierre that the only inner thoughts of Bullen's were that he didn't understand what Pierre was talking about.

Molly and Pierre attend the Condor annual stockholders' meeting. When Bullen asks for any new business, Pierre hobbles to the speaker's podium and accuses Bullen of violating California law by using genetic tests to screen out high-risk policyholders. Some members of the audience yell at Pierre, throw wadded paper at him and boo him. Once the ruckus dies down, Bullen calls on the company founder, Abraham Danielson, to make closing remarks. As Danielson walks to the mike, Molly suddenly recognizes something in his cold, cruel eyes that reminds her of Klimus but more closely resembling John Demjanjuk. Pierre looks closely and tells Molly, "It's Ivan Marchenko!"

As they leave the conference room and head for the elevator, Molly and Pierre are hailed by a large, well-dressed black man who identifies himself as Barnaby Lincoln, a business reporter for the San Francisco Chronicle. He tells Pierre he'd like to write something on what he said at the meeting and go into more depth. "There needs to be federal legislation preventing the use of genetic profiles in determining insurance eligibility," the newsman says.



Pierre tells Lincoln that before he gives an interview, he'd like him to take a photo of Abraham Danielson. Lincoln slips back into the meeting and returns a few minutes later: "Got it," he says.

Pierre faxes the photo of "Danielson" to Avi Meyer and tells him it's actually Ivan Marchenko, otherwise known to former Treblinka inmates as Ivan the Terrible. But, says Pierre, "Klimus isn't Ivan Marchenko."

Meyer tells Pierre he discovered that Abraham Danielson's real name is Avrom Danylchenko born in 1911, the same year as both Ivan Marchenko and Burian Klimus. And Meyer says he's been unable to find any public records on Danylchenko before 1944. He also tells Pierre he's flying to New Mexico to show the photo to one of the Treblinka survivors, then to Israel for the same purpose.

Pierre asks Meyer whether the Israelis use DNA fingerprinting on prisoners in case they are needed in any legal proceedings. Meyer says it's illegal in Israel then admits they do it anyway. Pierre asks Meyer to send him some DNA samples from John Demjanjuk as soon as possible because he can use it to resolve questions about what went wrong at the Ivan the Terrible trial in Israel in the 1940s.

Meyer calls Pierre from Chicago to tell him he's located a Treblinka survivor named Zalmon Chudzik, to whom he showed the photo. But, the old man has Alzheimer's Disease and no memories of Treblinka. Meyer says there are only four credible witnesses out of 50 Treblinka survivors who could identify Demjanjuk. Without a positive ID, Meyer says, the case "evaporates."

Accompanied by Detective Izzy Tischler of the Israeli police, Meyer begins calling on the four survivors with the photo. The first one, Casimir Landowski, can't help because he's blind from complications of diabetes. Meyer and the policeman go to Jerusalem for the third contact, Shlomo Malamud.

They are met at the front door by a teenager who won't let them inside to bother his grandfather, but tells them to return when his father is there. But the old man summons them inside and begins going through the photos. Soon the old man stops at the photo of Danielson and says, "It's him, after all these years you've found him!"

Avi, his voice trembling, asks: "Who? Who is it?"

"That monster from Treblinka—Ivan Grozny."

The old man asks whether the police have Grozny in custody, and Avi tells him yes, but he will be brought to Israel for trial.

Meyer and Tischler visit David Solomon, the fourth survivor. He points to the third photo in the middle row and says "Ivan Marchenko," although the actual photo is an American. As Solomon confirms his identification, he points to a different photo—Marchenko—and clarifies that he meant the third photo from the right, the same direction in which one



reads Hebrew. The clarification means that they now have two positive identifications; they go to the airport to return to the U.S.

Pierre shows Avi some visuals of DNA molecules ("fingerprints") that are identical except for a few small variations, which indicates the two individuals are related but not full brothers. They review what's known about the family history of both Ivans, including their mother's involvement in a love triangle and Avi realizes that Ivan Marchenko and John Demjanjuk are half-brothers. The implication for their research is that one tissue sample gathered by Pierre is from John Demjanjuk and the other from Abraham Danielson.

Avi sighs with the realization that he knows virtually nothing about Danielson because he's likely been able to bribe people through the years to distort or destroy any records that would reveal him as a Nazi. But Pierre offers to meet with Danielson while wired for sound and try to get him to say something incriminating that could open the doors to a full investigation of war crimes.

Pierre takes the straightforward approach. He calls Danielson's office to ask for an appointment, leaves a message saying Maria Dudek of Poland suggested he call Danielson. After being put on hold, Pierre finally has Danielson on the phone. He repeats the reference to the Polish woman just to throw his quarry off-guard. Danielson agrees to meet Pierre at the Lawrence Berkeley National Laboratory. As he enters the Condor building to see Danielson, Avi is reassured by the fact four other OSI agents, two San Francisco Police officers and Avi Meyer are parked nearby in a van loaded with eavesdropping equipment.

Pierre tells Danielson he's been in the same building before, to meet with Craig Bullen, for the same reason. But, he says, he had the wrong person. He repeats the charges that Danielson is the leader of the Millennial Reich and that his company, Condor, practices genetics discrimination in offering insurance coverage—and that Danielson is behind the murder of policyholders who are likely to file huge claims. "If someone you insured had bad DNA, or applies for an expensive³ treatment, you have them killed."

Pierre also accuses Danielson of being Ivan the Terrible of Treblinka. Danielson at first calls Pierre crazy but then asks how much it will cost to silence him. He replies that it will cost 5 million dollars to care for his wife and child after he dies from Huntington's disease. A security guard appears and says a transmitter has been detected in the room. He grabs Pierre and frisks him while Danielson hits a button on his desk that brings down a metal barrier separating him from the rest of the room. Danielson slips out a hidden passageway and the guard manhandles Pierre to the elevators and an escort outside.

The guard takes Pierre's cane. Pierre crumples to the floor of the elevator. The guard leaves him there, a writhing mass of defective nerve and muscle tissues twitching uncontrollably. Pierre pulls himself up and manages to find a staircase to the roof, where he remembers seeing a parked helicopter as he drove in earlier. He sees the 87-year-old Marchenko standing on the roof, expectantly searching the skies for an



incoming helicopter. Marchenko spots Pierre, yells at him, and advances toward him slowly and painfully. The two—an aged, infirm man and a young man nearly crippled with disease, circle each other in a dance of death.

Marchenko goes into a rooftop helicopter tool shed and grabs a large crowbar. He tries to smash Pierre with the crowbar, but Pierre manages to roll this way and that to avoid its blows. One of the strikes hits him on his kneecap, shattering it. Pierre puts his keys in his clenched fist and climbs on the fallen Marchenko. Then, he smashes his mouth, and the blood gushes. As Marchenko swings the crowbar again, Pierre grabs his ankle and pulls him off-balance onto the rooftop.

A great wind and loud whirring announces the arrival of the helicopter. It hovers low as men drag Marchenko inside the cabin. A police helicopter arrives and hovers to one side of the building in case there is a shoot-out. Suddenly Marchenko's helicopter starts to rise; Pierre throws the heavy crowbar with all his strength directly into the rotors. The machine chokes, wobbles, and crashes into the high-rise windows as it swings out of control. Then, the copter is engulfed in an explosion of flames, and it plummets to the street below killing all aboard.

Avi Meyer arrives on the rooftop and summons a medic helicopter. As the two await help, Pierre says: "Justice is always delayed and finally done only by mistake."

While Pierre recovers from his injuries in San Francisco General Hospital, the San Francisco Chronicle publishes a front page story written by Barnaby Lincoln that the state insurance commissioner has seized control of Condor Health Insurance and will transfer its business to another insurer, once existing claims are settled. Pierre gets word that his research proves the hypothesis that "pre-programmed evolutionary steps could take place across vast groups of beings all at once."

Molly uses her telepathic powers to teach Amanda a rudimentary sign language. Pierre's Huntington's disease progresses—but no faster than the love and communications within the little family. In a scratchy voice "like the tearing of coarse paper," Amanda looks up to Pierre and says, "I love you."

Analysis

Pierre bluffs his way into the offices of Condor Insurance with a ruse that he's a researcher at the Human Genome Project who has found a way to handle actuarial statistics that could save the company millions. Once inside the office of president Craig Bullen, Pierre charges him with murder, illegal genetic testing, and conspiracy. Bullen denies the accusations and has Pierre thrown out of his office. At the stockholders' meeting, Pierre makes the same accusations in public after the founder, Abraham Danielson, speaks. When Pierre sees Danielson, he tells Molly he looks like Ivan Marchenko, or Ivan the Terrible. Because of the historical context of the accusations, stockholders and others are stunned to hear the founder accused of being an ex-Nazi. But, Pierre doesn't relent.



Instead, he contacts Avi Meyer after the meeting and gets positive photo identification from two Treblinka survivors that Ivan Marchenko is Ivan the Terrible, later known as Ivan Grozny. Avi also gets evidence that John Demjanjuk and Ivan Marchenko are half-brothers from the same mother. Abraham Danielson is really Ivan Marchenko. The disclosure of criminal connections is too much for the 87-year-old Marchenko. He runs to the roof of the building to board a helicopter and escape. But, Pierre doggedly follows and throws a crowbar that causes the helicopter to crash.

Discussion Question 1

What does the San Francisco Chronicle do that blows the lid off Condor Insurance Co. and its illegal practices?

Discussion Question 2

What does the crippled Pierre do that finally causes Marchenko's helicopter to crash?

Discussion Question 3

John Demjanjuk and Ivan Marchenko are half-brothers. Does that fact implicate Demjanjuk in any crimes? Justify your answer.

Vocabulary

outskirts, chevron, silicone, proffered, anomaly, epithelial, chorea, porcelain, canapés, inalienable, aspartame, transcendental, ponderous, jurisdictional, minuscule, predicate, roundhouse, turbine, foreshortened, posthumous, reformulate.



Characters

Pierre Tardivel

Pierre Tardivel is a Canadian geneticist with Huntington's disease. He discovers the link between his boss at the Human Genome Project in Berkeley, California, and the atrocities of the Treblinka extermination camp in Poland. Treblinka was operated by the Nazis during World War II. Like a true scientist, Pierre remains cool and rational most of the time, except when sniffing the trail of a mass murderer like Burian Klimus. Pierre is fearless when staring evil directly in the eye, as when he accuses Klimus, his Nobel Prize-winning boss, of being a former Nazi war criminal. He also makes a public charge against Craig Bullen, CEO of Condor Insurance. He accuses Bullen and Condor of using genetic information to deny life insurance coverage to applicants likely to file claims.

Craig Bullen

Craig Bullen is the vice president of Condor Insurance Co. and second in command to Abraham Robinson. When Pierre accuses Condor Insurance of a list of felonies from murder to using illegal genetic screening at a stockholders' meeting, Bullen is the one who tries to silence him by yelling back at him. Bullen is basically a flak-catcher for Robinson, whose real name is Ivan Marchenko, otherwise known as Ivan the Terrible.

Molly Bond

Molly Bond is a PhD student in behavioral psychology at Berkeley. While there she meets both Pierre and Klimus. She has a unique ability to telepathically read minds that is probably the result of a frameshift mutation. When she meets Pierre Tardivel her gift has all but ended her social life because she knows what potential suitors are thinking before they make any moves on her. But it also comes in handy in sorting out lies from truth in their search for answers regarding the involvement of other scientists in the holocaust. It also proves useful in establishing communications with Amanda, her daughter with Pierre, who has Neanderthal traits because of a clandestine mixing of genes during an artificial insemination. Like Pierre, Molly is idealistic, curious, and devoted to her research.

Amanda Tardivel

Amanda is the child who results from artificial insemination (AI) of Molly Bond's eggs by Burian Klimus. Both Molly and Pierre are enraged when they realize that Klimus has used the DNA recovered from a Neanderthal skeleton to insert into the fetal egg. As a result, Amanda has an unusually thick growth of hair on her body. She is unable to form



the sounds necessary for speech, and she has a body shaped more like a human ancestor than a modern human.

The couple turns to artificial insemination because of Pierre's concerns that he might pass along his genetically-based Huntington's disease to his offspring. They agree to an offer from Klimus because of the fact he's a Nobel Prize laureate in genetics and because he's accessible since he is Pierre's boss. They have no way of knowing that Klimus has just received scraps of DNA from the skeleton of Hapless Hanna, a female Neanderthal, which he has been seeking for a long time.

Klimus intends to use the DNA in an experiment to answer the question whether it was possible for different human populations to arise in different parts of the world simultaneously, or if those populations were all part of an unbroken chain of evolution from a single species.

After the birth of Amanda, Klimus shows up at the home of Molly and Pierre regularly to write in a notebook the specifics about the child's rate of growth and development, as well as other details. Finally, Pierre and Molly become enraged at his cold scientific inquiry intended to gather facts for publication in a research paper that he hopes will win him even more fame and possibly another Nobel Prize.

Helen Kawabata

Helen Kawabata is a pathologist who works in the forensics lab of the coroner's office for the City of San Francisco and a good friend of Pierre Tardivel. As Pierre plays detective to gather evidence of genetic tampering by Burian Klumus that could lead to charges of mass murder, Helen Kawabata assists as much as possible without losing her job. She is the one who tells Pierre of the apparent link between Condor Insurance claims filed by sufferers of genetic diseases and a string of unsolved murders in the San Francisco Bay Area.

John Demjanjuk

John Demjanjuk is mistaken for the real-life Ukrainian who was operator of the gas chambers at the Treblinka Nazi death camp—a man also called Ivan the Terrible for his unspeakable cruelty. Ivan Marchenko is a fictitious name that Ivan the Terrible gives when the Treblinka camp is liberated.

At one point, there is confusion about whether Demjanjuk is, in fact, Marchenko because photographs show striking similarities between the two—a stocky, East European build, prominent nose and cold, distant eyes. After the war, Demjanjuk is a quiet auto worker in the United States who is finally tracked down by Israeli intelligence.

Avi Meyer and Pierre Tardivel sort through a pile of old photos to compare similarities and differences between Demjanjuk and Marchenko. Not only are there obvious similarities (semaphore ears, baldness) between the two men, but also to Burian



Klimus. Meyer shows an enlarged old photo of Marchenko to Pierre and asks if the subject is Klimus. Pierre says it could, indeed, be Klimus.

Ivan Marchenko

Ivan Marchenko is the fictitious name used by the SS officer known as Ivan the Terrible to escape imprisonment for war crimes after the Treblinka death camp is liberated. Marchenko is his mother's maiden name and a common last name in Ukraine. This inevitably leads to confusion about the real identity of Ivan the Terrible, who is pursued by Avi Meyer of the Office of Special Investigations and geneticist Pierre Tardivel.

Meyer suspects that Burian Klimus may actually be Marchenko (Ivan the Terrible). Meyer warns Pierre that Marchenko is a monster. In Russian, Marchenko's nickname is Ivan Grozny, a surname that reappears later in the investigation of former Nazis.

Burian Klimus

Burian Klimus is a Nobel Prize-winning geneticist who runs the Human Genome Project at the University of California, Berkeley where Pierre Tardivel also works. Klimus' special interest is in Neanderthals as an evolutionary stepping-stone to modern humans. Because of his stature in the field, Klimus is given a sample of DNA recovered from the remains of Hapless Hanna, the oldest and most complete Neanderthal skeleton recovered to date.

At the time of the story, Klimus is a grizzled octogenarian with an air of intellectual superiority and an aversion to answering questions that make him uncomfortable.

Avi Meyer, a special agent with the Office of Special Investigations, is a professional Nazi hunter who spends time digging into the backgrounds of genetic researchers at universities and corporations looking for any links with the Nazi beliefs about racial purity. Klimus is of special interest in this investigation because of photographic and anecdotal evidence that he may actually be Ivan the Terrible. But, because of aliases and fake identities assumed by Nazi war criminals, it is difficult to pin down his identity.

Joan Dawson

Joan Dawson is a pleasant, helpful woman who works at the Human Genome Project offices in Berkeley. She also has diabetes and is insured by Condor Insurance. Joan and Pierre become good friends in addition to being co-workers. When Joan becomes the victim of a seemingly senseless murder, Pierre begins to suspect a link between a string of unsolved murders, people with genetic diseases and Condor Insurance Co.

Abraham Danielson

Abraham Danielson is the founder of Condor Insurance Co., who Pierre suspects of arranging the murder of policyholders who are deemed high risk because of genetic or other diseases. Pierre sees a similar pattern between insurance slaughter and the systematic extermination of Jews in the Nazi state. Pierre and Molly go to an annual meeting of Condor stockholders in San Francisco and accuse him publicly of those murders plus illegal genetic screening of applicants. At the same time, when Molly sees Danielson she gasps, "It's him—the man I saw torturing a dying cat." Pierre thinks Danielson looks like Burian Klimus, or more closely like Ivan Marchenko.



Symbols and Symbolism

Millenial Reich

Adolph Hitler promised the German people his Third Reich would become the "thousand-year Reich." In reality, it lasted only 12 horrific years until it was destroyed during World War II. This group is symbolic of the genocide, hatred, and violence of the Nazis. In the book, police and special agents suspect a series of unsolved murders is traceable to the Millenial Reich. Abraham Danielson, a former Nazi and head of Condor Insurance Co. of San Francisco, is the head of the Millenial Reich. Burian Klimus, the Berkeley geneticist, is suspected of being a member.

Molly Bond's ESP

One of the least-expected twists of this story concerns the uncanny ability of Molly Bond to "read" other people's thoughts. This facility operates only when someone is consciously thinking of a word or sentence they do not utter. She uses this gift to try to get information out of Burian Klimus as well as a means of communicating with Amanda, her daughter who may be incapable of speech because of genetic shuffling by Burian Klimus. When Pierre does a genetic test on Molly, he discovers that she has a genetic variant caused by a so-called frameshift, or error in DNA replication.

To the non-scientist, however, this ability could be seen as extraordinary empathy or the capacity to feel what another person feels. Empathy is not associated with any known genetic cluster and is considered a common behavioral trait. In this sense, Molly's unusual abilities could symbolize an unusual degree of empathy that seems almost supernatural compared with most people's empathic abilities.

Ethics and Genetic Research

Is the mere ability to understand and manipulate genetic material license to experiment with the fundamental structures of life as we know it? What is the morality of producing a human clone? These are some of the questions raised but not answered in this book. Arguments on both sides of these puzzles already have been as intense and vocal as the ongoing debate over abortion. As evidenced in the story, our science has far outstripped our morality, which is to say that no one knows the answers to those questions.

From genetically modified crops to cloned farm animals, the impact of genetics is everywhere. Some religious groups see genetic modification as a slippery slope: where will genetic engineering of humans take us? If we humans have the ability and rationale for modifying the human genome, at what point do we transgress our rightful place as God's creatures to becoming God ourselves, some religious people wonder. Some even see evil at work in this business.



What is the difference between genetically modifying corn for better crop yields and genetically modifying humans to produce a healthier, longer-lived human race? And how can any of this be different from Nazi eugenics that favored only the blond, fair, so-called Aryan race over all others? If genetic modification makes anything possible, who will play God and decide outcomes?

There is little question that, perhaps unaware, Burian Klimus played God when he inserted ancient Neanderthal genes into his sperm to fertilize Molly Brand. The shocking thing is not just the act itself, but the utter disregard for other people Klimus displays. At that point, the former Nazi becomes Dr. Frankenstein conjuring up a new creature of his own devising in violation of natural law. It is hardly surprising, then, that Molly and Pierre both despise Klimus for his arrogance and disrespect.

Hyoid Bone

The hyoid bone is part of the throat/larynx structure of the human body, necessary for forming speech. It is not known whether Neanderthals could speak because of the positioning or absence of that bone. Because of the scrambling of Amanda's genes with those of a real Neanderthal by Burian Klimus, she is born with the hyoid bone, but it is not positioned properly to produce human speech. For a time, Molly communicates with Amanda through her unique ability to "read minds." Pierre and Molly, her parents, assume she will never be able to speak. But, one day near the end of the story, Amanda croaks out a scratchy "I love you" to her father." It's not known whether the love and care she receives has anything to do with this unexpected development, or whether her speech apparatus is merely delayed in functioning. The implication is that having once produced speech she will continue to communicate this way.

The hyoid bone symbolizes human speech, without which human society would be impossible—one of the things that makes humans unique in the animal kingdom. When Amanda speaks, she sets aside any lingering doubts about her human characteristics. This event symbolizes a victory over the situation and especially over Klimus, the egomaniac who engineered her creation.

Avi Meyer

Avi Meyer is a Jewish special agent with the Office of Special Investigations (OSI), a branch of the U.S. Department of Justice. Specifically, his job is to find and capture or kill former Nazi war criminals wherever they are. Avi and Pierre form an informal partnership in the search for Ivan the Terrible, former mass murderer at the Treblinka Nazi death camp. Ari sorts through thousands of clues, documents and interviews with seemingly endless enthusiasm and doggedness. His is not a profession with instant gratification. Rather, it is a labor of righteousness. Avi Meyer burns with a passion for truth and will not be satisfied until every living former Nazi is arrested and brought to trial. His passion thus is symbolic of every man's search for truth, since only truth can lead to real freedom.



DNA Molecule

The human DNA that directs every structure and function in every person, is a varied aggregate of four chemicals: adenine, guanine, thymine and cytosine. These are symbolized by the letters AGTC. In various combinations the chemicals are arranged in a double helix pattern first described by geneticists Watson and Crick. Decades later, the human genome, or the instruction book for life, was similarly analyzed and categorized and represented by symbols as in any chemical compound. The inner working of humans and all living creatures can be represented by alphabetic symbols understandable to chemists, biologists, and anthropologists. The designation of each of the biochemical compounds by a letter is really a symbol for life.

Treblinka

The Nazi death camp at Treblinka, Poland, is one of a network of detention and extermination facilities constructed by the Third Reich for the murder of Jews and other "undesirables." Like the other camps, Treblinka is run with machine-like Teutonic efficiency. It is a symbol of hatred and intolerance in a system that creates scapegoats for Germany's post World War I depression and social disintegration. Hitler's Nazi party identifies all of Germany's problems with Jews, who are held to be the agents of German decline. As a political message, this blame shifting works extremely well. Hitler tells the Germans that they are blameless and they had been stabbed in the back by the Jews. Never once in this worldview is there room for a realistic stock-taking of how the Germans might have failed themselves. If the Jews are eliminated, then Germany can achieve the world status to which it is entitled, Hitler tells the Jews. But, the hatred that brought Treblinka and the other camps into existence is really a form of self-loathing that is directed toward another group. As a symbol of hatred, Treblinka is a kind of hell far more evil and devoid of soul than anything imagined by a poet such as John Milton in his "Paradise Lost."

Skin-scraping Pen

When Pierre signs an application for health and life insurance with Condor Insurance Co., the agent pulls out a pen from a pocket inside her jacket that is crammed with pens and insists that he sign with that pen. Later he discovers that the pen has a tiny spot on its tip designed to scrape off some skin cells. These skin cells are then sent to a laboratory where they are analyzed for DNA evidence of genetic flaws that could cause serious disease, costing the company huge expenses. This kind of genetic testing is forbidden under California law, but the surreptitious way in which the company gathers this information is symbolic of how they conduct business. Those found to have a genetic profile that is suspect are either cancelled as policyholders or murdered.



Sign Language

Molly and Amanda both learn sign language as a way of communicating, beyond Molly's telepathic gift, since Amanda hasn't learned any speech. The combination of sign language and mind-reading works fairly well for a time. The sign language is therefore symbolic of their need to communicate, whether through words, thoughts or gestures. But, the whole situation is thrown into delightful disarray when Amanda suddenly says to Pierre in a scratchy, rough voice: "I love you."

La Val's Pizza Parlor

La Val's in Berkeley has been a central campus gathering place for a half century. It's where students and professors from every department and every level meet, talk, drink beer and eat. Perhaps even more of a UC Berkeley icon than Sather Tower, La Val's symbolizes the laid back, informal nature of the Berkeley lifestyle. It is probably inevitable and fitting that characters in *Frameshift* would appear at La Val's since the Human Genome Project is based on campus.

Settings

University of California, Berkeley

University of California, Berkeley, is the location of the Human Genome Project headed by Burian Klimus, a Nobel Prize winner in genetics research. That is also where the lead character Pierre Tardivel, works. The project operates its own research laboratory for studying genes and genetic material, such as DNA.

San Francisco

San Francisco is the location of the Condor Insurance Co., founded and directed by Abraham Danielson, who Pierre Tardivel discovers to be Ivan Marchenko, a former Ukrainian Nazi known at the Treblinka death camp as Ivan the Terrible.

Treblinka

Treblinka is one of a network of extermination camps set up by the Third Reich to execute "the final solution" or genocide of European Jews. It is through the memories of survivors and assorted old documents and photos that the infamous sadistic guard "Ivan the Terrible" is identified.

Tel Aviv, Israel

Tel Aviv, the capital of Israel, is where many Nazi war criminals were prosecuted long after the Nuremberg Trials in Germany sought justice for some of the worst criminals of the Third Reich. As other Nazis were apprehended in later years, they were brought to Tel Aviv for trial.

Montreal, Canada

Montreal is the home of Pierre Tarvidel, the central character of Frameshift. Montreal is the center of French-speaking Canada.



Themes and Motifs

Institutional Evil vs. Moral Conscience

The theme of submitting to the evil of an institution rather than embracing one's moral conscience is explored in *Frameshift*. When the Nazi officials responsible for operating the mechanisms of extermination were asked at the Nuremberg war crimes trial why they acted as they did, many claimed they were simply carrying out orders. The same question could have been asked of any worker at any factory and a similar answer might have been given. The war criminals chose to ignore the basic moral principle against murder and give in to the Nazi institution.

The theme is also demonstrated through the character of Klimus, who is probably the former Ivan the Terrible of the Treblinka Nazi death camp. Klimus has already published scientific papers on his gene research for which he was awarded the Nobel Prize. To answer an important evolutionary question, he wants to insert native DNA from a 62,000-year-old Neanderthal skeleton into a living modern human. He uses an opportunity to be an artificial insemination donor as a clandestine means of carrying out his experiment. It is the next logical step in solving the puzzle—regardless of its effect on the people directly involved. This is an example of how a moral blind spot can enable institutions to cause real harm in the name of progressive discoveries.

Another institution, Condor Insurance Company, founded and directed by another man who may have Nazi connections in his past, leaps over legal and humanitarian hurdles to exclude life insurance policy holders from coverage of genetic diseases. Condor uses secretly-gathered tissue samples to isolate and eliminate those who might file huge claims from coverage. In some cases, Condor uses murder as a means to accomplish this goal in a bureaucratic fashion not unlike the Nazi extermination program. Condor insurance is an example of an evil institution that lacks a moral conscience.

Genetic Engineering

The theme of Genetic Engineering is explored with the conception and birth of Amanda Tardivel. Her conception is diverted through insertion of Neanderthal DNA. This example of genetic engineering raises an interesting question. Is she "human" or "ape" or some kind of hybrid? Is she, perhaps, the reincarnation of a transitional species between Neanderthals and modern humans?

Although Amanda shows certain physical characteristics of a Neanderthal (hairy back, stocky build, lack of an important structure in the throat that enables human speech), she acts for all intents and purposes as a human child. Certainly, in the eyes of her gestational parents—Molly Bond and Pierre Tardivel—she is as human as any other child and loved as much. However, the physical differences result in shock from her



aunt and grandmother. Klimus never considered the little girl's future while meddling with her DNA.

As the tiny infant becomes a toddler, Klimus continues to see Amanda as nothing more than his scientific experiment, similar to cross-breeding different types of horses. Klimus makes notes about her growth and development rather than bringing her toys. It does not go without notice by Pierre and Molly that he does not possess the warmth of a father, but the cold curiosity of a psychopath capable of killing thousands of people with the flip of a switch.

In essence, Genetic Engineering (as explored in *Frameshift*) does not take the "human" into consideration when meddling with DNA. Although Amanda carries Neanderthal genes, she is completely human in her capacity to bond with and show affection for her parents. On the other hand, her donor father Klimus is lacking in the human capacity for warmth and love to understand that meddling with her DNA has brought many problems to an innocent being.

Evolution

The term "frameshift" refers to an error in genetic sequencing. To a trained geneticist, this glitch is obvious. The standard behavior of genetic replication is in error. This error often produces mutations, or changes, in the genes of the organism. In the case of Amanda, the human-induced mutation renders her somewhat like a Neanderthal—probably an earlier species of hominid rather than a homo sapien. The question becomes "What role did frameshifts play in the emergence of so-called "modern" humans?"

For Molly Bond, a frameshift has altered her genetic makeup so that she has an extraordinary ability to read the thoughts of other people. Could this "error" be the emergence of a new human capability in the journey of evolution? Or, is it the reappearance of a trait common in earlier species of humans? This is an elusive question because some evolutionary changes in organisms seem to arise from a process other than natural selection.

Corporate Mindset

When Pierre and Molly go to confront Condor Insurance founder Abraham Danielson about alleged illegal activity, they are directed to CEO Craig Bullen. He is a 30-something, suited graduate of Harvard Business School whose primary goal seems to be making as much money as fast as he can for himself and for the company. In many respects, Bullen symbolizes the business world of the 1980s and 1990s—a sort of reincarnation of the post-war days of Eisenhower before the Vietnam War. As CEO, Bullen's primary concern is showing a profit for investors—and especially for himself and Danielson. He is unconcerned about the fiscal and emotional turmoil that company policies have on employees and on policyholders.



At the Condor Insurance Company's annual stockholder meeting, Bullen and Pierre get into a shouting match over those policies. This leads to a front-page story in the San Francisco Chronicle. In turn, the story leads to an investigation by the state insurance commissioner's office. Finally, the events lead to the demise of Condor Insurance Company.

Karma

One consistent theme in *Frameshift* is the human's inability to conceal, cover up, and evade personal wrongdoings. There are several examples. Burian Klimus is just one of several former Nazis who escaped capture by the Allies at the end of World War II. Despite aliases, changes of address, and changes with affiliations, his past is revealed through detective work by Pierre Tardivel and Avi Meyer. The fact he has won a Nobel Prize for his work in genetics neither justifies nor conceals his past. Klimus tries to conceal the fact he's inserted Neanderthal DNA into the genes of the artificially conceived Amanda Tardivel. Simple genetic screening, such as that practiced at most genetics labs, reveals the anomaly in her genetic makeup which affects her physical appearance and intellectual capabilities.

Abraham Danielson, the founder of Condor Insurance Company, also experiences Karma showing up. His callous disregard for the rights of policyholders with genetic flaws or high-risk health profiles reflects his past as another former Nazi. He, too, has sought to conceal his past through aliases and geographic changes. His secret policy of discrimination wins praise from investors. But, he receives a jail sentence from the courts when his activities—including murder—are brought to light.



Styles

Point of View

The point of view of *Frameshift* is that of the omniscient narrator. As such, the reader is aware of the thoughts and actions of all characters. The omniscient point of view allows the narrator to jump through space and time at will, sharing previous and future knowledge when such information will have the most impact on the story line.

Language and Meaning

Most language in *Frameshift* is standard American English, although there are occasional French or Ukrainian names and nouns sprinkled about to lend an air of authenticity to the narrative. There is also a considerable amount of scientific and medical terminology, related primarily to genetics. The characters in the story come from different —Canadian, American, Ukrainian, Japanese—so the occasional use of words from those languages lends a realistic tone to the action. There is some profanity used by the characters, appropriate to the narrative.

Structure

The story line follows the traditional problem—conflict—struggle—crisis—resolution plot structure. The primary problem can be summed up in one character—Burian Klimus, a Nobel Prize laureate in genetics who directs the Human Genome Project located in Berkeley, California. The problem involves the unanswered question whether Klimus is the sadistic former SS guard of the Treblinka Nazi death camp known as "Ivan the Terrible" because of the atrocities he committed against prisoners. Finding an answer to this question haunts the lead character, Pierre Tardivel, a geneticist who works under Klimus. When Klimus uses recovered DNA from an actual Neanderthal to insert into the ova of Molly Bond, Pierre's wife, the resulting child shows traits of Neanderthals and humans.

Finding proof of Klimus' Nazi past becomes an obsession for Pierre and Molly, although they have little information to go on except for a few faded old photographs. Pierre works closely with Avi Meyer, a special investigator from the U.S. Justice Department assigned to finding World War II war criminals. As a result of his investigation, Pierre concludes that Klimus is not Ivan the Terrible. That distinction goes to Abraham Danielson, founder of Condor Insurance Co. which they believe contracts for the murder of policyholders with genetic deficiencies.

Pierre is convinced that Danielson is actually Ivan Marchenko, the name assumed by Ivan the Terrible during his days at Treblinka. The action reaches a crisis when Pierre, crippled with Huntington's disease, pursues Danielson to the roof of his high-rise

building where he boards a helicopter to escape. The helicopter crashes, killing everyone aboard—including Marchenko.



Quotes

It was horrible news, devastating news. The pace of the executions was slacking off. It didn't mean the Germans were changing their minds. It didn't mean they were giving up their insane plot. It meant they were running out of Jews to kill.

-- narrator (chapter 1 paragraph 6)

Importance: This observation from within the Treblinka Nazi death camp in Poland in 1943 takes the reader to the earliest days of Ivan the Terrible, a sadistic guard and director of the Jewish corpse disposal ovens. He is so called because no one knows his last name. He is brutish, cruel, and conniving. Part of his job is ensuring a steady flow of Jews from railroad cars, to the lethal gas chambers, to the crematory ovens.

Herr Janning, it came to that the first time you sentenced a man to death you knew to be innocent.

-- American Judge Haywood (chapter 6 paragraph 5)

Importance: The quote is attributed to the American Judge Dan Haywood, who conducted the Nuremberg trial of four German judges for murder following the conclusion of World War II. Judge Haywood speaks those words to Ernst Janning, a Nazi judge who claimed he did not realize how his decisions advanced the programmed genocide of the Third Reich. The relevance of this quote is that it deals with the issue of individual responsibility for war crimes, applicable also to the case of Ivan ("Ivan the Terrible") Demjanjuk, the Ukrainian operative at the Treblinka death camp who sent thousands of Jews to their deaths.

Why would some aspects of DNA be absolutely elegant while others, including something as important as the actual genetic code, be sloppy? My bet is that God or nature, or whatever it was that put DNA together, is not sloppy.

-- Geneticist Pierre Tardivel (chapter 10 paragraph 5)

Importance: Among many scientists, the "elegant" or "beautiful" solution to a problem is invariably the correct one. This quote builds on that awareness as Tardivel tries to explain to a student how the human genome works. Perhaps, he suggests, "sloppy" is just a word humans use to describe a natural process that is beyond their grasp.

I thought telling you about my stupid bout with gonorrhoea was hard. I've never told anyone this before. I can read minds, Pierre. It's true. I've been able to do it since I was 13.

-- Molly Bond (chapter 12 paragraph 10)

Importance: Molly Bond, Pierre Tardivel's girlfriend, reveals a truth about herself that makes him probe even deeper into his understanding of human genetics and how it affects abilities, preferences, learning and creativity. Pierre believes Molly and surmises there is a genetic basis for her unusual gift. He hopes to find the answer through his research.



I'm a Nobel Prize winner; I have an IQ of 163; I'm a proven commodity as far as longevity is concerned and I have excellent eyesight and reflexes. Plus I don't carry genes for Alzheimer's or diabetes or any other serious disorder.

-- Dr. Burian Klimus (chapter 17 paragraph 11)

Importance: In this quote, Klimus promotes himself as a sperm donor for Pierre and Molly who don't want to use Pierre's sperm since he carries "bad genes" that he doesn't want to pass along to his offspring. Klimus, a Nobel Prize laureate, happens to be Pierre's boss at the Human Genome Project at University of California, Berkeley and is without children. The couple are somewhat speechless at his sudden offer.

If we knew of a large group of people who had your ability we might be able to track down the gene responsible. But with you being the world's only known legitimate telepath, I don't think there's anything we can do in terms of looking for a gene.

-- Pierre Tardivel (chapter 20 paragraph 6)

Importance: In this quote, Molly Bond—Pierre's partner—asks whether there is a specific human gene that gives her telepathic powers that are so real she often wishes she could turn them off. This is a legitimate question coming on the heels of the mapping of the human genome. But, Pierre throws some scientific cold water on her face that makes her aware of the limitations of genetic research.

William Shockley invented the transistor and won a Nobel Prize for that in 1956. He was also a raving, out-and-out racist (who) claimed that blacks were genetically inferior to whites (and) advocated sterilization of the poor as well as anyone with a below-average IQ.

-- Pierre Tardivel (chapter 23 paragraph 9)

Importance: Pierre and Molly wrestle with the question of whether "Burian Klimus" is actually escaped Nazi war criminal Ivan ("the terrible") Demjanjuk, responsible for the deaths of thousands of Jews during World War II. Their concern isn't merely academic: Molly has accepted Klimus' offer to be a sperm donor, and she is already pregnant with the child she and Pierre hope to raise as their own. Their suspicion is that "Klimus" assumed the name of Marchenko to evade prosecution after the war, then changed his name again to Klimus. If so, he is both a war criminal and Nobel Prize laureate.

Pierre had never really seen anyone else with advanced Huntington's up close. He watched their pain, their suffering, the contorted faces, the inability to speak clearly. Pierre's condition was getting steadily worse; he'd broken dozens of pieces of lab ware and drinking glasses by now. Still, only those who knew him well suspected anything serious was amiss. Just a tendency toward dancing hands, occasional facial tics, a slight slurring of speech.

-- narrator (chapter 25 paragraph 3-4)

Importance: This section details the specific horrors that people with Huntington's disease must endure—even a brilliant geneticist such as Pierre Tardival whose life's work centers on genetically-caused diseases. Although, as a scientist, Pierre knows the



signs and symptoms of his disease are clearly defined, still he experiences a degree of shame and wants to keep them secret as much as possible.

In 1980 and '81, a dozen babies were murdered in the (Toronto) hospital's cardiac ward. They were all given overdoses of digoxin. A nurse was charged in the case, but exonerated. The most popular theory is that someone on the hospital staff was killing the babies out of a misguided sense of mercy.

-- Pierre Tardival (chapter 29 paragraph 16)

Importance: In discussing Huntington's disease with his friend Helen Kawabata, a toxicologist with the San Francisco police department, Pierre tells her he learned at a Huntington's support group that three of their number had been murdered within the last two years. When he asks her for small tissue samples of the three murder victims so he can test for Huntington's, Helen hints that he's deranged because of his own Huntington's. But, she finally agrees to get him the samples. He also adds that his suspect is under investigation for war crimes by the Department of Justice as a Nazi in the Third Reich.

The implications were staggering: a built-in mechanism existed to correct frameshifts, a built-in mechanism existed to correct frameshifts, a built-in way of keeping certain fully functional bits of the genetic code from becoming active.

-- narrator (chapter 30 paragraph 1)

Importance: Molly and Pierre discover the gene in Molly's body that gives her telepathic powers. Then, they realize that their daughter Amanda may carry the same gene, even though her biological father (Burian Klimus) is not her legal father. They want to do a genetic test to determine if Amanda has the gene and, if so, whether it is actively expressed.

Lots of Europeans have stockier builds, heavier faces, and more body hair than do Western Europeans. So as far as appearance is concerned, you're probably worrying about nothing. She clearly just takes after her biological father.

-- Dr. Gainsley (chapter 30 paragraph 2)

Importance: Pierre and Molly are concerned about the fact Amanda's hyoid bone in her throat hasn't migrated at the proper age. Thus, she communicates in a high-pitched voice and has no ability to form certain sounds. Then they become concerned about her stocky build and abundant body hair. They are assured by pediatrician Dr. Gainsley that the body hair will disappear. However, he advises there isn't much that can be done about the hyoid that has not descended. They also run across research papers that claim Neanderthals probably couldn't speak languages because of their physical limitations—the same as Amanda's. Immediately they seize on the Ukrainian ancestry of her father, Burian Klimus, as a potential genetic link to Neanderthals.

I wasn't sure before but now I am—this kind of experimentation is pure fucking Hitler. Klimus must be Marchenko! Don't worry; he's going to die all right. But it won't be us doing it. It will be the Israelis, hanging him for war crimes.



-- Pierre Tardivel (chapter 33 paragraph 16)

Importance: Both Molly and Pierre explode with anger when "Klimus" reveals to them that some ancient extracted DNA from Neanderthals was inserted into his sperm sample used to impregnate Molly with Amanda, thus turning the child into an an evil lab experiment. This mixing of ancient and modern DNA could be responsible.