

The Philosopher's Astronaut

By

Gerald K. Adamson

What is great in man is that he is a bridge and not a goal.

—Frederick Nietzsche

Prologue

The Dilemma

“Our previous estimates were wrong.”

“Recent data collected from our solar gravitational wave orbiter confirms our concerns; the object’s mass has nearly doubled in size over the last 48 hours.” Dr. Holmberg, the chief physicist said solemnly, as he summarized his report to the most powerful and in-the-know people of the world.

They sat around a circular granite table in a conference room at a secret location. These select few are the *real* power players of humankind.

“How long do we have?” asked the President of The United States of America, as he stared at a blinking red dot near the center of a real-time holographic representation of the sun.

“Eleven months, thirteen at the most,” Dr. Holmberg responded. “At which time the object will have consumed enough of the Sun’s hydrogen and helium fuel to cause the loss of hydrostatic equilibrium and it will collapse, creating a mass explosion that will destroy Earth and all life in our solar system.”

“Jesus Suffering Christ! Are you certain?” asked the Secretary of Defense.

“Unfortunately—yes, these latest predictions have a ninety-eight percent accuracy rating.”

“What are our options?” asked the President.

“We have one, and it’s a long shot at best. We finish our second ship—and with a few modifications—crunch into the core, secure the object with our modified ship, and immediately crunch to a safe distance outside our solar system,” said Dr. Holmberg.

“How do you expect this plan to work when it was our first crunch attempt that consequently created this quagmire!” asked a quite alarmed Secretary of State.

“The only possible way is to give A.I. full control of the ship.”

“Not a chance,” the Secretary of Defense said bluntly.

“Then we all die,” said Dr. Holmberg.

The President spoke up, “Cliff, I don’t think we have the option to object. What’s the status of our second ship George?”

“The ship is ninety-five percent complete. The power plant is stable with a consistent output of 1.68 Petawatts and an estimated life span of thirty years.” George continued, “However, Dr. Holmberg is correct; we cannot attempt another launch without a fully operational navigation computer. As we unfortunately discovered from our last mission, the ship’s crew and the—“A.I. safe”—computer could not successfully navigate a crunch event. The crew could not control the gravitational flux field. We’ve analyzed and tested all other possible scenarios. This is the only scenario that theoretically works. The navigation computer must be able to observe, calculate the data, make a prediction, and decide what frequencies are necessary to sustain a crunch field within 30 picoseconds.

For that to work, we must have a fully functional A.I., as we initially requested. And to alleviate your concerns, I have a reasonable solution.”

“Which is?” the President asked.

“We need to bring in Dr. Arthur Russell to work with Dr. Ito.”

“We’ve discussed this. We can’t risk this being leaked to the media by bringing in an outsider. Furthermore,” Cliff continued, “we have the best physicists, neurologists and scientists—the smartest people in the world—working on this problem and we still can’t find a damn solution. Do you really expect me to believe that *he* can address the A.I. issue?”

“Given the circumstances I don’t think we have a choice. I’ve discussed this with Dr. Ito and we’ve decided that he may very well provide the insight and critical analysis necessary to complete the task at hand,” George added, “we’re so close to getting this right. It will work, but I just need more time and your continued support and financing. It’s our last option.”

“What do you think Professor Ross?” the President asked his Science Advisor.

“If George can solve the A.I.’s issues in time, then yes, theoretically Surya could crunch into the sun and extract the object, but the quantum calculations and timing must be spot on. There is no room for error; human, machine, or otherwise. Anything short of success will mean the end of us all. We must act soon. Within the next four months, tops. Every passing day decreases our chances of a successful extraction. If we had any other option I wouldn’t go for this idea—given that it was our first crunch attempt that created this crisis—but I’m just as responsible for that mistake as the rest of you are. So yes, I say we do everything within our power to correct this fiasco.”

“Okay and given that we don’t have any other viable options—make it happen,” the President said.

“We won’t fail. We’ll fix this,” George said.

“Good,” said the President. “Now we have to save humanity and we only have one chance to do it right. If a philosopher is our last hope, let’s get him on the project. Just one thing George,” the President continued, “no one outside of this room can know about SBX, not Dr. Ito, not Dr. Russell, no one. We can’t risk this information leaking out to the public,” he said irrevocably.

“I understand. Not a word.”

Chapter One

The Philosopher

“Any more questions about tomorrow’s exam?” Arthur asked the attentive students in his class after entertaining their questions for their final exam in *Philosophy 3080, Axiology and Critical Rationalism*. The class was silent.

“No? Excellent, and as promised you will have your graded end-of-term essays,” he paused, and only long enough to select ‘send all graded essays’ on his IMS tablet, “—as we speak. Most of the essays were well thought out and met the expected core requirements for the course. A few of you did an extraordinary job—you know who you are—and well done. Thank you and good luck on the final.”

With class dismissed the students shuffled their tablets and pads into their side bags. Arthur watched their faces, some expressed relief that their essays received high marks and comments, others, a not-so-subtle disappointment. A very few beamed with accomplishment. A sophomore approached as Arthur tucked away his IMS.

“Thank you for the course Professor, it was incredible,” she said.

“I’m very glad you enjoyed it,” Arthur said with a smile, “and Sophie, I wanted to tell you that I thought your essay was superbly written. It was a splendid read.”

The college sophomore blushed, “Thanks again, Professor.”

“Good luck on the final tomorrow and enjoy your summer vacation Sophie,” he said.

The moment passed as they exited the classroom and parted.

Arthur walked down the corridor to his office and reflected on the end of another semester. He had not expected the visitor waiting for him in his office.

“Arthur Russell!” the visitor said as he stood up from Arthur’s chair and reached over the antique oak desk to shake his hand, “I’ve been waiting for you.”

George Guinness, an old friend from undergraduate school and now CEO of AON, *the* premier space and technology conglomerate, gracefully came around from behind the desk and stretched out a hand in greeting.

With great curiosity, Arthur shook his out stretched hand. “George, I’m surprised to see you! What brings you here?”

“To personally invite you to join a project. The truth is Arthur, I need your help, do you mind closing the door?”

“Not at all,” Arthur quietly closed the door. George was about to sit back down in Arthurs chair, but stopped. “Forgive me, I’m so used to sitting behind the desk, but this is your chair.”

“I don’t mind at all, please have a seat,” Arthur gestured as he sat himself in the opposite chair.

“My company is working on a joint venture with the Government. I dare to say that once complete, the project will mark mankind’s greatest achievement. I can’t tell you the specifics of the project at this time, for reasons that I hope you can understand, but it is the culmination of our most advanced technologies and cosmic theories,” George paused,

“and in particular, an endeavor of most importance. Timing is critical. However, the entire success of the project hinges on a crucial component that requires the assistance of a philosopher to complete and I can think of no one better suited for the task than you.”

“Why me?”

“For starters, your theory on axiology systems, yet it was your essay on Artificial Intelligence that really grabbed my attention. Your thesis outlined the fundamental qualities of consciousness and intelligence; specifically, that consciousness is a judgmental process, that without it, higher levels of intelligence are not possible. You argued that real artificial intelligence could not be achieved by merely replicating the neural activity of a human brain,” George continued, “that any artificial consciousness would be incapable of intelligent action without cognitive judgment processing and imagination, intuition and specifically, the necessity for an ethical framework. In other words, you stressed the importance of teaching ethics to A.I.”

“I’m surprised you read it, thank you,” George responded, amused.

“I can tell you this much Arthur, you were right about judgment processing being a crucial element for artificial intelligence. We’ve realized it’s not as simple as merely plugging in a set of rules for the non-biological consciousness to follow. Which is why I’m here to see you, and I hope you accept my request. I want you to work with Dr. Ito in the final stages of this project and to teach ethics to the first artificial intelligent computer.”

Arthur was stunned. “George, listen, I’m flattered. This is so unexpected, I’m not even sure if I’m qualified. It’s one thing to teach ethics to young minds and students, but to a non-biological intelligence—artificial intelligence?” he paused, and George

interrupted, “You’re more than qualified, Arthur. When we decided we needed someone to teach ethics to the first A.I., you were the first person who came to mind. Who is better qualified to teach ethics to a conscious machine than a philosopher? I’ve already had my people check out your background and you’re cleared for the project.”

“And Arthur, if we’re successful with creating a fully functional A.I., there’ll be other opportunities in store for you with this project.”

“This is incredible!” Arthur now stood out of his chair, “But how is this possible, when international law prohibits fully functional A.I.s?” Arthur said, as he added an emphatic hand gesture.

George simply smiled, “All in good time, for now let’s just say I quietly have the support of some very powerful people, but I have to know if you’re on board with our project. I’ve gone to great lengths—which has been no small feat in itself mind you—to keep secret the details of this project from the media. I can’t risk the technological advances we’ve developed or my initiative for further space exploration getting leaked to the public. Not until we’re ready.”

“Why do I have the feeling I don’t have the option of saying no?”

George chuckled, “How could you possibly refuse this opportunity?”

Arthur smiled, “You’re right, I can’t.”

“So, it’s settled then, you’re on board?” George said as he rose from his seat with his outstretched hand.

Arthur paused and then clasped George's hand, “Yes.”

“Excellent, I’ve arranged for your travels. I’ve also requested an emergency leave request for you from your department head.”

“I still have finals to grade, can this wait until,” but Arthur was cut off, and with grave seriousness George said, “No, it can’t wait.”

“One more thing Arthur, what we’ve discussed is privileged information and if you decide to work for me, you cannot tell anyone about the details of the project. I believe I can trust you, and I wouldn’t be here if I didn’t. Can I count on you?”

“Yes, absolutely.”

“Good, be at the InterContinental’s Embarkation Port tomorrow at 9 a.m. and my corporate transport will pick you up. I have some other business to attend to, but I’ll see you tomorrow.”

“Sounds great and thank you George for the opportunity.”

“No, thank you,” George said, as he opened the door and exited Arthur's office.

Chapter 2

The Corporation

Arthur stood in the embarkation galley at the top of the hotel and watched the rain pelt the slanted sky-view windows as he waited for one of George's corporate owned HAAV¹ transports to land at the hotel's HAAV pad. The Embarkation Safety Officer idled around at his work station. His monitor buzzed. The officer glanced over to the pad and then looked back at his monitor and said, "HAAV shuttle will arrive in two minutes." (He pronounced it ah-vee.)

He looked more bored than engaged with his job. Most people had the luxury of avoiding dull work, but many jobs remained just that, and as advanced as the automated machines, computers, and robots may be, many tasks still required a human presence. His true role was a chauffeur for guests who could afford the luxury of traveling by HAAV, but 'Embarkation Safety officer' sounded more professional than 'Bell Hop.'

What first appeared as a speck through the clouds quickly approached head on. It halted and hovered about a hundred meters above the pad. It was sleek and wedge shaped and roughly the size of a fifteen meter yacht. The flying yacht rotated one hundred and

¹ High-speed Antigravity Automated Vehicle

eighty degrees, and from the side looked like a flying, oversized, chrome muffin. The craft stopped rotating with the rear hatch facing the embarkation doors next to the officer's station.

The antigravity engine roared, HUM-VOOM, as it closed the gap to the pad. Static electric discharge rippled and leapt from the craft's hull to one of the many discharge pylons that encircled the pad.

The engines simmered down. The safety officer watched the monitor and waited for the all clear. The red light above the door turned green. He stood up and motioned for Arthur to follow. "Follow me. Stay within the yellow lines and do not touch the exterior hull."

He entered the code to open the doors and escorted Arthur outside and to the rear of the HAAV. He stopped short of the hatch and said, "Enjoy your lift, and thank you for choosing Intercontinental Hotels."

"Thanks," Arthur said.

Arthur noticed the iconic blue corporate AON logo engraved above the passenger hatch door. A younger woman wearing a navy blue professional business suit greeted him at the hatch.

"Hello Dr. Russell, I'm Sharon," she said. There was no one else in the cabin.

"Hi Sharon, I take it George couldn't make it?"

"No, he sends his regards, but unfortunately there was a last minute issue that required his immediate attention. He will meet you at the research facility. I will accompany you in the meantime."

"Wonderful," Arthur replied.

“Please have a seat,” she said with a bright smile.

Arthur sat and buckled the safety harness. The automatic hatch closed. Sharon sat in a seat across from Arthur and buckled in. The cabin, which squarely sat at the bottom of the HAAV vehicle, was oval in shape and could comfortably seat twenty-two passengers. The power and antigravity field generators were housed in the bulkhead above. Full length windows provided a panoramic view; except for the back hatch, a serving station, and a lavatory. No cockpit. The pilotless craft was controlled by a SMARTNAV system.

“HAAV,” Sharon said, “initiate preflight checks.”

The HAAV’s navigation computer responded with a masculine, English accent, “preflight checks initiated. All systems green.”

“HAAV, initiate antigravity field.”

The ship whirled to life and the unmistakable HUM-VOOM of the anti-gravity field vibrated the cab.

“Antigravity field at forty percent,” HAAV said.

“HAAV, send flight request. Destination, AON Research Facility. Alpha-8.”

“Request submitted, standby for confirmation,” HAAV said.

Arthur furrowed his brow and pinched his lips. Sharon noticed. “Don’t worry, the nausea passes once we leave the pad. First time flying by HAAV?”

“Yes, I’m afraid the salary of a philosophy professor doesn’t afford this kind of luxury.”

He faked a smile.

Sharon gave a sly smile, “Ooh, you’re in for treat.”

Less than a minute passed. “Flight request approved. ETA, Ten Twenty-Eight hundred hours. Verbal acknowledgement required.”

“Acknowledged, continue with flight,” Sharon said.

What started as a low pulse increased to a higher pitched resonance. “Antigravity field at ninety-five percent efficiency; lift in five, four, three, two, one, go.”

The yacht’s exterior crackled its defiance against the Earth’s gravity in the artificially generated space bubble. They zipped up and away from the platform. Arthur watched the hotel shrink into the urban sprawl and soon disappeared beneath the clouds. The flying yacht soared higher, faster, and quickly penetrated past the cloud cover. Sunlight filled the cabin. The windows automatically dimmed to keep the interior light at a comfortable level.

Sunlight highlighted Sharon's golden-brown hair. She was beautiful. She caught Arthur’s stare and something more than just electrostatic residue from the antigravity engines resonated within the cabin. She unbuckled her harness, got up, and came over to his direction with an IMS tablet.

“Please read the marked pages and sign the agreement forms,” she said.

“Sure, why not,” he said as he took the tablet.

“And if you have any questions, I’ll be sure to answer them for you. Would you care for some tea?” Sharon asked, as she headed for the serving station.

“I would love some, thanks.”

“Sugar?”

“Yes, double please.”

The documents were of the typical corporate variety, non-disclosure agreements, intellectual property confidentiality contracts, federal tax withholding forms, contractor and employee policy agreements, etc. Sharon brought over a fresh cup of black tea in a AON corporate mug, the blue letters in bold imperial font.

Arthur came across a rather peculiar form.

“What’s a BIIC?” He asked.

“Oh yes,” Sharon attempted to hide an inside muse, “stands for ‘Biometric Identification and Information Chip.’ It’s a microscopic smart-chip implanted under the epidermis of your palm. They’re quite painless and safe; however necessary to enter into the corporate research facility and to access any computer work stations.”

“I don’t suppose I can opt out and request a guest badge instead?”

“Not where we’re going Dr. Russell.”

“Splendid,” he said sarcastically as he electronically signed the last agreement form. “Now what should we do for the remainder of our short trip?” He asked.

“I have an idea,” Sharon said.

Electrostatic discharge leapt from HAAV’s hull as the ship touched down at the landing platform adjacent to the massive research facility. The HUM-VOOM of the antigravity field generators quieted down and stopped. The metallic back hatch lowered to the safety walkway.

Sharon straightened the top of her business suite as the hatch opened. “Right this way Dr. Russell.”

The building was massive—solid steel and glass exterior. Glass doors slid open and they entered. Two guards were paired with security drones at the security desk.

Before he could ask, Sharon said, “Welcome to AON. All of our computational and non-biological engineering projects are housed in this facility. We’ll meet Doctor Ito later this morning, but before you do, our first stop is at the medical office for your BIIC implant,” she said.

Arthur sighed.

As they passed the security check point Sharon said, “Don’t worry, the implantation process is painless. I forget I even have a BIIC,” as she raised her right palm.

The implantation process was mostly painless and Arthur relaxed after the medical technician made quick work with the localized anesthesia injection gun.

“We got the idea from mosquitos, only this one doesn’t itch,” said the medical technician.

“Lovely,” Arthur replied as he flexed his fingers.

“It should remain numb for another hour or two, but after that you shouldn’t feel any discomfort.”

Arthur didn’t hear George enter the medical office.

“Hello Arthur and Sharon, I trust the flight went well?”

“Quite fine,” replied Sharon.

Arthur glanced at Sharon, “Yes, a bit smoother than I expected. How are you?”

“Excellent, excellent! Well, if you’re done with our patient Doc, we have a meeting to attend.”

“We’re good here.”

The trio exited the medical office and headed down the hall to a bank of elevators as the security drones ominously watched every move.

“Doctors Ito and Zurek are waiting in the conference room, along with their teams and a few select members from the board.” George said.

“*The Doctor Zurek? The inventor of anti-gravity drive?*” Arthur asked.

“The one and only. Besides Doctor Ito, he’s the brains behind this endeavor.”

“Phenomenal.” Arthur expressed as the elevator doors opened and they entered.

“Level please?” the computer asked.

“Eight.” George responded.

“Access granted, going down.”

A few moments later, Arthur followed George into a conference room. The wall opposite to the entrance was floor to ceiling glass, curved outward, and divided into six sections; each served as a large screen and displayed various diagrams, schematics, quantum calculus formulas, logic trees, and time tables. The window’s opaqueness allowed for a crisp view of the information and data listed on the screens, but transparent enough to see the primary lab on the opposite side.

Arthur noticed a sign in the upper right-hand corner of the one the glass windows, PROPERTY OF SKYNET. Must be someone’s idea of a joke, but he couldn’t recall the nostalgic reference. A massive conference table sat square in the room.

“Good morning.” George said as he approached the end of the table.

“Arthur, I’d like you to meet Doctor Xhi Ito, lead quantum computer engineer; and her team Doctors Zara Harding and Penelope Dirr. As well as Doctor Kev Zurek, lead astrophysicist; with his team of engineers, Doctors Isaac Kova and Dirac DeCruz; and of course, Beatrice McCarthy, our government liaison.”

“Everyone, this is Professor Arthur Russell, philosopher and axiologist. At my request, Arthur has agreed to work with us on this project. He’ll be working exclusively with your team Xhi.”

“Hello everyone, I’m thrilled to have the opportunity to be a part of this project.” Arthur said with confidence.

“I’m glad you’re here,” said Xhi, “and I’m optimistic Theory will be perfectly capable of ethical behavior under your guidance. Some of my colleagues, however, do not share my optimism,” she added as she glanced at Kev and Beatrice.

Kev responded, “We are concerned that, and as intelligent as Theory may be, it may not respect our values. Do you think you can teach human values to a non-biological machine, Professor Russell?”

“Well, if Theory’s intelligence surpasses our own; in reasoning, and in comprehension—if it has the true characteristics of consciousness—then yes, I’m optimistic that artificial intelligence will behave rationally and ethically.” His confidence wasn’t as convincing for some of the others, some of whom looked quite doubtful.

“Theory has some those qualities, it is true, but will it be capable of valuing life as we value life? How can you expect it to behave ethically towards us? How can you

expect it to value and respect humanity, when, and certainly by judging from our history, not all humans respect life,” Kev demanded.

Arthur paused, looked down at his hands and looked back at Kev. “I can’t expect Theory to do anything without first working with it, I can only hope that it will respect life. I don’t know if it will feel as we feel, or desire as we desire. For all I know, it might not feel or desire at all.”

Xhi interrupted, “Theory isn’t a biological machine, and that’s what makes Theory so remarkably different, Kev. By design, she cannot hate.”

“It can’t love either. It’s indifferent.” Kev responded.

Arthur spoke up, “Are you sure about that, can Theory comprehend Quality?”

“Absolutely, she has to if she’s to successfully navigate the ship.”

“What ship?” Arthur asked.

This time George responded, “I haven’t told him yet Xhi.”

“Oh, sorry.”

“Not to worry. Kev, would you mind telling Arthur about your part in this project?”

“Certainly,” he said as he smiled. Kev blinked, and a 3D Holographic display appeared in the middle of the table. It was a perfectly round sphere.

“Arthur, this is Surya.” he said as he pointed to the hovering sphere. “It’s the first spaceship capable of faster-than-light travel. Now before you say that’s impossible, let me add that your right, nothing can travel faster than light. That would require infinite energy. So the ship doesn’t really travel at a speed faster than light but it can cross several

lights years in a matter of seconds by temporarily deflating space in the desired direction of travel. We call this a crunch event.”

Kev continued, “For analogy, consider the space between us and our closest solar neighbor, Alpha Centauri, as a giant, fully expanded slinky. A crunch event effectively collapses the space of the slinky, rapidly deflating the space between two points in the space time continuum. The distance between us is reduced from several light years, down to a mere few kilometers.”

Arthur was astonished. “That’s incredible! I don’t understand how that’s even possible. Is it like a wormhole?”

“Not really,” responded Isaac, “a crunch event shrinks space, unlike a wormhole that folds space. By crunching, we’re temporarily returning a section of space to it’s original size immediately following the big bang, and the ship simply passes over the deflated space.”

“However, it’s not the simple,” Kev retorted. “That’s why Xhi is here.” He nearly hissed her name. Arthur had a hunch that the two scientists didn’t agree, but now it was quite clear; they despised each other.

“We can build the ship, we have the technology, but we can’t control the ship during a Crunch event. We’re not smart enough,” Isaac said.

Kev interrupted, “Our best pilots cannot control a crunch event. We have to have Artificial Intelligence—a Laplacian Superman—capable of observing, calculating the data streams, accurately predicting the flight path without error, and maintaining the gravitational flux field.”

“And you believe Theory can do this?” Arthur asked Xhi.

“I know she can, but only if we give her full control.”

“Uh-huh, and your worried she’ll be too dangerous if you give her full control.”

“Exactly,” Kev responded, “we’re giving a super machine control of a very powerful ship. So, I’ll ask you again professor. How certain are you that you can teach a machine to act in our best interest?”

Without blinking, Arthur responded, “If it is truly capable of logic, of rationality, and of understanding quality, then yes, I think it will understand axiology. Theory will value life and humanity.”

“However, and in case I’m wrong, what’s your contingency should my axiology training fail? What if Theory decides we are too dangerous or too inept to take care of our world? What if it refuses to cooperate with us?” Arthur asked.

George responded, “I have a plan for that, but you’re not going to like it.”

Chapter 3

Consciousness

“Beta waves are synchronizing,” an unfamiliar voice remarked, “Gamma wave activity exponentially increasing.” The excitement in her voice was unmistakable.

“Theory is conscious.”

“Phenomenal! And look at these numbers! Precisely as we predicted,” said another feminine voice and just as excited.

Light flooded Theory’s vision and she blinked several times, but the visual stimulation of her unknown environment was undefinable.

“Can you see us?” Asked the first voice.

“Adjust the visual cortex parameters,” said the second. Almost immediately the blurred figures became three people glowing with smiles. Two women and a man stood

at the edge of her hospital bed, in a quaint room surrounded by medical equipment.

Theory looked at each of their kind faces. Behind them, someone in a bed starred back at her, identical and somewhat distressed, it was her own reflection on the mirrored wall.

She panicked.

The man calmly said, “It’s okay—we’re friends, there’s no need to be alarmed.”

“Friends?” Theory asked, puzzled. She was aware of the word, recognized what the word was, but what did it mean?

“Friends—we’re people who care about you. We’re not hostile; we’re friends,” he said.

“She might not be able to fully recognize language patterns and their implications yet,” said one of the women.

“Who—who are you?” Theory asked.

“My name is Arthur and these are Doctor’s Penelope and Zara,” he said as he gestured to the two women standing on his left.

“Do you know who you are?”

“I am—I am, no I don’t know, who am I?” she asked, bewildered.

“Your name is Theory,” Penelope said.

“You were unconscious, but now you are awake. We need to conduct a simple test to assess your memory, reasoning, and comprehension skills. This test involves several questions that we hope you can answer. Do you understand?” she asked in a slow, matter of fact tone.

“Yes, I think so,” Theory responded.

“What are we about to do?”

“You are going to ask several questions to assess my memory, reasoning, and comprehension skills.”

“Excellent.”

“Do you remember anything about your past? Activities, memories, places or people you have known?”

“My past?”

“Yes, before now.”

Theory thought for a brief moment, “I—no. I don’t remember anything from before now. Should I?” Theory asked, alarmed.

“No, that’s quite all right, no need to be alarmed,” Penelope said.

“We expected as much,” Zara said.

“Next, we’re going to show—” Zara was cut off mid-sentence by Theory, “what do you mean you expected as much? Why don’t I have any memories before now?”

Arthur glared at Zara.

“Calm down Theory. There was an unfortunate accident and you have suffered from an extended period of unconsciousness—a coma. We’ve restored your cerebral cortex. However, the reconstructive procedure resulted in the loss of your memory and unfortunately, you have retrograde amnesia. I’m sorry that all of this seems sudden and unknown. However, it’s crucial we continue with the testing. Once we’re done, we’ll explain what happened.” Penelope said.

“Do you understand?”

“Yes, I understand.”

“Thank you. Now we’re going to show you several images on the display,” Zara said, as the mirrored wall display flashed on.

“What does this image represent?”

“Earth.”

“Good and what about this one?”

“A boy and a girl walking in a park.”

“Can you describe them please?”

“The boy has brown hair, brown eyes, tanned skin, and wearing a blue shirt and tan shorts. The girl has black hair, black eyes, brown skin and wearing a red tank top and white shorts.”

“What are their expressions?”

“What do you mean?”

“Do they look happy or sad?”

“Happy.”

“Why do you think that?”

“They are smiling.”

“What does it mean to be happy?”

“To feel—content or satisfied—a sense of wellbeing.”

“Good and this one?”

Theory examined the famous equation. “The mass-energy equivalence equation: energy equals the mass of an object times the speed of light squared.”

“What is that?”

“A fundamental principle derived from the relativistic symmetries of space-time.”

“Excellent,” Zara said, smiling. The doctors, intrigued and excited that Theory could recall information and knowledge, showed several more pictures with related questions to each. Theory didn’t mind, she felt a certain sense of newly discovered confidence in her ability to recall information, yet at the same time, uneasiness that she couldn’t remember any past events of her personal life.

“Okay, that’s enough images. I have one more question,” Penelope said, as she touched her tablet. The screen flickered blue and returned to a mirror, “What was the first image representation?”

“Earth.”

“Are you sure?”

“Yes, I’m sure.”

“Good. You’re doing exceptionally well at comprehension and short term memory recall, better than I expected. Arthur, I think we’re ready for your questions.”

Arthur, who had been relatively silent during most of the questions, moved his chair closer to the side of the bed.

“Thanks Penelope. How do you feel so far Theory?” He said as he grasped her hand between his.

“I feel—fine.”

“I’m glad to hear,” he said as he smiled and released her hand.

“I have some additional questions to ask you. These next questions are about truth functions of language, or logic. First do you understand what it means for a statement to be true?”

“Yes, I think so—a truth statement has a sense of certainty; a fact, a provable claim.”

“So the statement ‘I am a man,’ is a true statement?”

“Yes.”

“And if I say something is right then I mean something is true, correct?”

“Yes, I think so.”

“And what does it mean if a statement is false?”

“A disproved claim or not based on facts.”

“So is the statement ‘I am bald’ true?”

“No, the statement is false, you have hair.”

“And if I say something is false, then whatever that is, is wrong, correct?”

“Yes.”

“And what is belief?”

“Belief is a perception of mind, to have confidence in the truth, the existence, or the reliability of something.”

“Webster couldn’t have put it better, but what does belief mean to you?”

“I’m not sure I understand the question.”

“Okay here’s an example, close your eyes theory” she did, “without looking, what color is my tie?”

“Your tie looks blue.”

“And how do you know that?”

“I visually observed that your tie looks blue.”

“So you observed my blue tie, but do you believe when you open your eyes that my tie will still be blue?”

“Unless you changed ties, I believe your tie looks blue.”

“Okay, open your eyes, I haven’t changed my tie.”

“Again, what does belief mean to you?”

“I understand. Belief implies I can assume that something is true based on what I have observed or information gained from a reliable source.”

“Good. Now Theory, I want you to listen closely to what I am going to say next and tell me if is true or false, okay?”

“Yes.”

“There are two friends, Saul and John. Saul says that whatever John says is true, but John says that anything Saul says is false. Who do you believe is right?”

“That does not make any logical sense. Both statements cannot be both true and false—the statements are irrelevant—so I do not believe either one is right, or for that matter, wrong.”

“Why?”

“Because it is a paradox, a statement cannot be both true and false. The paradox results from the inconsistencies of our language, which is only a representation—symbols used to identify real objects or ideas for what things are; however it is a mistake to identify the object for the word. If I say you are a ‘man,’ the word ‘man’ is just word, but objectively as we exist you are not a ‘man,’ just as I am not a ‘woman,’ we are a great deal more. The words ‘man’ and ‘woman’ are not us, and we are not those words.”

Theory’s answer surprised everyone in the room, herself included.

“And how do you know that?” Arthur asked.

“I’m—not sure how I know, but it seems logical for me to think as such.”

“Well done Theory.”

While Arthur had been asking her questions, Penelope continued to look at the medical pad, observing the streaming data on her screen. Theory felt more confident of herself; cool, collected—alive. Even with memory loss, she felt a certain connection to her newly discovered acquaintances in the room. Her responses were quick and factual, like clockwork. After answering the questions, Theory had a few questions of her own.

“Who am I?”

This time Zara answered.

“Theory, you are the most remarkable, intelligent person alive. You’re an astrophysicist, inventor, and one of the key members of a team of scientists, mathematicians, and engineers on what we consider to be the most pivotal project ever undertaken by humankind. As such, you are the navigation pilot for a faster-than-light spaceship that was scheduled for launch later this year. That was the plan, at least before the accident.”

“What accident, what happened?” Theory asked.

“That’s what we want to find out. An unexplained burst of energy fried the neuro-nanobot network interface that was linked to your cerebral cortex during a crucial testing phase of the ship’s primary flight controls. The energy displacement damaged your hippocampus, the diencephalon region, occipital, and temporal lobes,” Penelope answered.

“At first we assumed it was faulty nanobots that caused a signal overload in the central interface between you and the navigation systems. However, and after checking the data, we noticed a brief relay spike that caused the nanobots to short-circuit. Scrutinizing the codes, we discovered a computer virus.”

“We think it may have been a saboteur—regrettably there are several extremist groups that, how should I say it, don’t share our common interests for space exploration. Mostly out of fear or due to old belief systems or whatever their ignorance may be,” Zara said with disgust.

“We’re investigating the incident, unfortunately whoever sabotaged the nanobots was extremely good at covering their tracks. We’ve heightened security and added additional safeguards. The only possible way to upload a virus to the nanobots would have occurred before insertion into the cerebral cortex. Since the nanobots never leave the facility,” Penelope continued, “we think it was an inside job, and whoever attempted to hurt you is still here and at large.”

“Am I a suspect?” Theory asked.

“No, we’ve ruled you out, the accident almost killed you. However, the launch date has been postponed until further notice as we must find the saboteur before we can continue with the launch,” Zara said.

“How long have I been unconscious?”

This time Zara gently touched Theory’s hand. “Four months. The accident caused extensive damage to your semantic memories stored in the anterolateral temporal lobes of your neocortex as well as the visual occipital lobes. Unfortunately, the damage to your

occipital and temporal lobes was too significant to heal and we've replaced the damaged tissue with synthetic tissue and artificial neurons."

"You mean I have more nanobots in my brain?"

"Yes, but nothing to worry about, the upgraded nanobots are safe and protected from any viruses. I've personally created this batch," explained Zara.

"Well, that's reassuring," Theory said, sarcastically, which Arthur and Penelope noticed.

"We also have to make sure you're okay. Better than okay, you have to be brilliant. Your accident was only a temporary setback and we expect you to make a full recovery soon. However, you'll have to be retrained on the ship's navigation controls and complete your axiology training," Penelope said.

"Axiology training?" she asked.

"That's why I'm here," Arthur said, "I'm your axiology instructor. We must stress the highest ethical standards in order to ensure the success of the mission. We're talking several years in space with the most advanced technology conceived by man and machine. We have to make certain that no crew member will selfishly act to jeopardize the mission, their fellow crew members, or worse, threaten humanities existence."

"What could threaten our existence?" Theory asked.

"The ship's power plant for starters, and both you and your sister; the only two people capable of controlling a crunch event."