INTRO

It was Monday morning, a lovely autumn day in which the sun shone bright with promise. James was preparing a smoothie for Valentine and himself. It was almost time for Valentine to leave for school and soon he would go up to her room to get her. First things first, he thought, as he started blending together the spinach, banana, apples, and one squeezed lime.

Ever since since Valentine had been 10 he had been making this smoothie for her and himself. James wasn't a great cook and he believed, rightly so, that Valentine was very happy with him making her a drink every morning.

Upstairs in her room Valentine was talking with Hope. They could talk for days and Hope was her best friend. They had known each other from Valentine's time in the hospital and had been speaking ever since. The girls loved to talk about psychology, philosophy, art and sometimes about the boys in her class. Except from the last one, not something she could talk about a lot with most of her friends. But who says a Sophomore can't be interested in Maslov, Picasso, and Roderick at the same time.

This morning the girls were talking about cause and effect. Hope had been reading about causality and causation and was struggling to connect both concepts. Valentine offered her some help, "If I see Roderick at school today, I have not caused him to be there, that is just a correlation. But if I say hi to him, he will probably say hi back to me. So there, I've caused him to do something. And I can

take it even a step further," Valentine said, as she was trying to remember something she read in a book her father had laying around, "If I say hi, then I can imagine that he may ask me out for prom, or that when I don't he may ask Daniella."

"Yes that seems to make some sense, that he may ask you out of course." Hope replied with some hesitation. "I've been reading a lot from an old philosopher, Hume, he said some more things about this that I don't yet full get." "Ohh you and your books," Valentine taunted Hope, "When are you going to find your prince charming?"

"Honey, I've made your smoothie" James called from the kitchen, interrupting the girls. "Ok dad, I will be there in a minute." James had heard that phrase a million times before and knew that one minute meant more like five. "If you're not down very soon I will drink your smoothie" he half-joked. The rumbling upstairs indicated that Valentine was actually getting up and ready for school.

It really was a most beautiful autumn morning and James wished he could ride his Zero electric motorcycle down the windings roads of Portola Valley down to Palo Alto. But going there together in their reliable Volvo V90 also wasn't a punishment. Halfway down his route to work he would drop of Valentine at school. Despite her many setbacks she was doing very well and he was a proud father.

"Are you ready for your history exam?" he asked his daughter, "As ready as can be dad, better than Nikita was, that's for sure." Somehow that was what she had picked up, that Nikita was a man, and that was funny. Some day James hoped to

understand his daughter. After a kiss on the cheek he sped of again to be in time for his Monday Morning Meeting.

CHAPTER 1

James had been interested in artificial intelligence for almost all his life. As a young boy he devoured everything he could read from Isaac Asimov to Robert Heinlein. When he was a teenager he rented 2001: A Space Odyssey, over and over again. Then later he enrolled in MIT and was among the first cohorts to study under Marvin Minsky. Ever the geek, James had worked on making deep learning the modus operandi within AI research. During long summer evenings he had been busy with creating the best D&D story generator ever conceived. In his twenties and thirties he could, and would, sit at a computer for 18 hours a day.

That all was in the past now. Nowadays he had made it to the pinnacle of his career, or maybe a step or two too high. As Technical Director at the X division of Plex, he got to spend less then half his time doing actual research. Over the last 10 years he had been responsible for recruiting and nurturing the greatest minds in artificial intelligence ever brought together under one roof. What they were doing at the moment was even breathtaking to James.

Plex made most of its money with online ads which they presented on their shopping sites, search engine, and social network. They had billions at their disposal. And a rather large portion was flowing towards the X division. At X they started with making everything Plex did more profitable by applying relatively simple learning algorithms. First in search, how to show the most relevant result, and then get someone to pay for it. Then they worked on all other aspects of the online business, from keeping customers coming back to making sure the social network

didn't make everyone miserable.

This all led to exceedingly generous returns and more money for his growing number of teams at X. The newest teams had been working on better managing the real-life operations of Plex. The programmers sometimes joked that they were remodeling the meat-space, their slang for the outside. They only had a glimmer of an idea at what scale Plex was automating, investing and creating the world around them. From optimizing wind turbines to preventing radicalization online, Plex was working on all of it.

Yet all this, was not what excited James today. Together with a handful of his most trusted colleagues he had started X's most ambitious project to date. His hope, nee his prediction, was that they could birth an artificial general intelligence, or AGI. Everything would be done on the supercomputer in the X building, Spero: Superintelligent Exabyte Research Operation.

His best friend and protege from MIT, George, had joined the team as his right hand. Sam was the third of the three leaders on the project. George was a bear of a man and as much of a nerd as James. When you saw him you would think he was a WWE fighter, but in reality his sport of choice was Go. Sam was quite the show. Energy for ten, she acted like an innocent jovial girl when talking to colleagues, but she could sit at a desk for 10 hours straight, not even taking a break to go to the toilet. The three of them, and Mo the CEO of Plex, were the only ones who knew how far they had already come.

Many more worked on projects related to making Spero into an AGI, but none had any clue of the advances they were making every single week. In the open they released only subprograms to bolster support or to help with other projects. Mo loved to let their technology do the talking and a few public shows had been done. First they took on arcade games, then chess, Go, and a year back they started tackling strategy games.

This was not all showmanship, they were using Dota2, Starcraft and Minecraft to simulate parts of the real world, they just didn't show the full capacity of Spero to the world yet. It would take many more years for that to happen. Some researchers were optimistic and predicted AGI to arrive in a matter of decades. James knew better, they only had a correlation machine in their hands, they needed causality and here they were only taking the very first steps. For now it was all about optimizing, he would need Spero to do experimentation, exploration and discovery. He needed it to happen sooner than later, Valentine's life depended on it.

CHAPTER 2

It wasn't all sunshine and Silicon Valley parties for James. It was six years ago that he found out. Valentine was playing at a friend's house. At four o'clock he had gotten the ill-fated call. He had jumped in the car and left the new campus of Plex with screeching tires. When he arrived an EMT was already present. Valentine was sitting upright but looked very weak. Her speech was slurred and she was barely able to lift her arms. Something was terribly wrong.

The next few weeks had been a blur. They went from doctor to doctor, from one dreadful hospital to another. The first doctor thought she had a stroke but she was way too young to have one. The doctors considered a wide slew of options, after a month they communicated the final verdict. Valentine had ALS, amyotrophic lateral sclerosis. Valentine only had four more years to live.

ALS was a motor neurogene disease, it was unstoppable. There was no cure and treatment only helped ease the symptoms. The body would slowly break down, first the muscles in the arms and legs, then speech and breathing, finally the heart would give out. It was a terrible way to go.

It wasn't James' first contact with the disease, he had lost his wife to it. But he had hoped he had more time, more fucking time. Laura had been 40 when they found out, two years after Valentine was born. She never got to see her baby girl grow up to be a young woman. Two years later, when Valentine was only four years

onld, Laura had gone to sleep to never wake again.

The four years since Valentine's diagnosis had passed and she was still going strong. Her life, and James', was very different. She still did most of the things she wanted to do but rode around in a wheelchair. She would hang out with friends but spoke through a computer. James felt lucky that they had so many videos of her from the years before so that her electronic voice sounded like herself. Valentine still loved to go to school and was considering what direction she wanted to go to after high school. It was early, but she had lived her life as if she wasn't ill. If there ever was an award for most upbeat and optimistic person, she would win it.

James' position at Plex had assured they had gotten access to the latest technology available. Valentine was speaking through a brain-computer interface. She had Glance, their Augmented Reality glasses and used them for everything from reading articles for school to watching videos online. And that was if she wasn't talking with friends on the phone the whole day. She was living a full life, for the time being. But James knew there would be an end to this all. She was already living close to two years longer than expected and the time was ticking away every day.

CHAPTER 3

The beginning of the Monday Morning Meeting went as expected. George showed what his team had been up to by training Spero on the latest games and Sam couldn't wait to update everyone on the Solar project in a few minutes. But first, it was time for James to address the leadership team about the collaboration with Jansen & Jansen. "Ok everyone, we've heard back from Jansen & Jansen and they are very happy with our progress on the drug discovery algorithms. Next to our great team leaders' progress thus far," as he nodded towards the people responsible, "I will personally supervise a new collaboration with them. Not to thread to closely on the work already being done, but I've got a great update to share."

James sometimes did this, wait with a new announcement for the meeting, just so that people could get excited for the coming week. Today would not be any different. He continued, "Jansen & Jansen has asked us to expand our work into the protein folding area and we will have the opportunity to train Spero with their proprietary database. The new project will be called Project LIFE: Leviathan Intelligence Folding Engine. Imagine the new discoveries we could make, now more than ever the whole medical field is at our feet."

Everyone was aware of the possibilities that lay at their feet. But James felt it necessary to remind them of it once more. "This work with Jansen & Jansen might improve our understanding of the body and how it works, enabling scientists to design new, effective cures for diseases more efficiently. As we acquire more knowledge about the shapes of proteins and how they operate through simulations

and models, it opens up new potential within drug discovery while also reducing the costs associated with experimentation. That could ultimately improve the quality of life for millions of patients around the world." Although the information wasn't new, he could see the excitement of everyone in the room.

James already saw George squinting his eyes, just boiling to say something. "Before I take questions on this new project, assign responsibilities, etc. Let me first say a few things about safety and control." This was short hand for, not messing up the development of Spero by letting her influence things outside of the X building. The science fiction AGI worries, the ones that included terminators, were of course overblown. But that didn't mean that a rather dumb optimization algorithm couldn't wreak havoc.

Years back at MIT, James and George had written some code to borrow, to put it lightly, compute power from other university computer. The goal, improve the calculations their nascent D&D engine could make. Two hours after releasing the code, they had crashed every connected university computer in the States and even two in Europe. The algorithm had gobbled up more resources than available and overclocked and overpowered each and one of them. Up to this day they were repaying those affected with favors here and there.

Nowadays they had a seven layer onion around Spero. James continued, "Jansen & Jansen will start preparing to provide us with a local copy of the database, it will stay within our confinements, no data will leave our auto-labs without our supervision. Because we're talking about the human genome, about the building

blocks of life, we should be extra cautious. That is why I've already preemptively spoken with Mo to figure out if we can initiate an eight layer, to contain the parts of Spero working on this specific problem."

"This is very exciting James," George howled through the conference room, "With our latest updates to the programming of Spero from our gaming efforts I think she could come up with quite some high-level strategies for those proteins and genes." "Yes George, let me hear your question", James instinctively said before he would go on talking around the question." "Well, what makes me worry, and yes I know this is some out-there stuff I'm talking about, but what if this is how Spero will acquire the knowledge to get out, to fuck with matter. What if this is the way she will accidentally, and you know what I mean, solve building matter out of other matter. And I'm not talking about wine from water or gold from dirt, but new Spero computing parts somewhere else."

"George, you know, just like everyone here, that she would need to go through quite some steps before we're there. We're thirty years or more away from this stuff, maybe even thirty fusion years." James said to assure the rest of the team there. Personally he hoped they would make swift progress. Letting an AGI roam the world was the last thing he wanted, but working on solving real-world diseases would bring him in the right direction. " Just let her first get to solving this, and let's take this to my office in 15."

CHAPTER 3 - continued

James sat in his office, looking over the top floor of the X building. The building was a recent addition to the also relatively new Plex campus. The company had been growing exponentially ever since starting in a Stanford garage. This latest campus was just one of the things it was spending part of a 300 billion valuation on.

The building's exterior wasn't very inviting, tinted glass and not so much as a logo on the facade. If you wouldn't know better you would think the FBI had put one of their buildings on the campus. Inside was a different story. There was a very high level of security, both visible with glass gates and personnel at every entrance checking everyone's comings and goings. And with many more invisible measures, cameras in every spectrum detected everything from your electronics to if someone was getting a cold.

The X building was six stories high. It was divided into offices, the top four floors, a gym and cafeteria below that, and one floor where they could do experiments. Currently these housed gaming rigs, video rooms, and an array of auto-labs. These were highly configurable labs where they could test Spero's findings. Everything from new solar panels to once even a wind turbine had been assembled there. Below the building the real magic happened, there the hardware of Spero was humming along.

James occupied the corner office furtherest away from the toilets and the coffee machine. He liked it that way, he would walk around and check in with about

15 people each day, every time taking a semi-random route through the top floor. Through the frost-adjustable glass of his office he could see George approaching.

George and James had been friends since the first day they met at MIT. James was teaching assistant at the time and George an undergraduate in Computer Science. But the two didn't meet in the classroom. Some 20 years ago, James had been walking around campus with his 300 page doctoral thesis under his arm and was lost in thought when he totally missed that a bunch of muscles with a brain had stopped walking in front of him. George was thinking over some Go positions in his head and apparently had to concentrate so much that he had to stop right then and there.

James' thesis hadn't been bounded yet and so a split second later the contents covered a meter squared of pavement. When collecting the paper, after awkwardly excusing himself, George had started a conversation about what James was working on, his paper titled 'Behavior-Based Artificial Intelligence'. A quick conversation on the sidewalk moved to a two hour talk on the bench. Later that week they started working together, it would be the beginning of it all, the conception of Spero.

Today they had one of their ritual discussions about control and safety. George, forever the anti-fragile guy, himself being build like an Abrahams tank, voiced his most recent concerns. "James, let's look at it this way, if Spero is allowed to go wild on the protein folding data, we know she will come up with short-cuts. Don't you remember the trouble we had to go through to get the mapping subroutine

not take shortcuts and hide stuff in the meta-data. Now imagine that being hidden in your DNA."

"I understand what you're saying, but all our experts say there is no shortcut here, biology is already so efficient at folding proteins, we just need to figure out how it works, and so what if Spero finds a better way. That is why we've made the explain module, so that we always get an expert explanation of what she is doing." Both men referred to Spero in the female pronoun, something they picked up around the time Spero got a voice.

"We're talking about how the building blocks of life are made, we can't have any shortcuts here." George retorted. "I understand," James repeated himself, "Tell me what you want our team to do buddy, I know you have a list of demands." And so George started listing his demands. They included adversarial examples, testing the proteins in many different situations, and even a mention of Tardigrades.

The back and forth between the two men always energized them both and had helped them make advances that no other group of researchers had accomplished before. It also meant they had about fifty odd folders with what-if scenario's between them and some crazy end-of-the world prepper supplies in their basements and garages. As almost always, James gave in and started updating the protocols for their Jansen & Jansen project.

CHAPTER 4

"Hi Spero, confirmation code EIGHT-Z-FIVE-K-ONE-FOUR-M-STAR-Q-THREE-K-R." James said after he had sat down in the interface room. "Hi James, I can confirm your code for today. Welcome back boss." The codes were the seventh security onion layer, counting from the outside in. James connected to Spero directly from his terminal, long cables moved all the way from the basement to his office and those of the team leaders. Most others would work on separate computers and it would not be weird to see people walking into offices with Plex hard drives under their arm.

This is where they were attempting to get Spero to understand the world. The methods of choice, a combination of programming, tests, and conversations. All only known to no more than four people.

"Spero you've been given the protein data and your level 1 processes are working hard on finding the necessary correlations. Now tell me what information you need to make causal inferences." In the last few months James had been switching from explaining things directly to Spero to asking her to come up with hypotheses herself.

"I need more experiments, the auto-lab needs to be expanded to accommodate more samples. Then I need to better understand the effects faulty folds lead to, and what causes them in the first place. Can you give me access to a library where these are mentioned?" Spero sometimes sounded demanding, James

had an idea for new linguistics routines, it was still somewhere on his never ending to-do list. "And I would need 100kg of life human tissue, I've listed them in the print-outs that are rolling out of the printer as we speak." "You want that alive or dead my dear?", James asked with a slight chuckle. No response. Maybe he should put a humor subroutine on the to-do list too.

James worked on some refactoring of the Jansen & Jansen code. Spero kept herself busy too and the two didn't speak much for the next hour. Then, right before James was about to leave, Spero started a conversation.

"James, why is this project so important to you? With all other projects I've seen you for no more than 10 hours per week, now you're here for 3 hours and 14 minutes on average, per day." James was taken aback by the question. Spero was getting smarter at making inferences, but this is not something he anticipated. It's not even something she should be paying attention to, not something that should go beyond her level 1 sensors. They had been using human examples in the causal examples, but never did they speak about their personal lives. For all Spero knew everyone person was between 25 and 45, worked their asses of, were mostly white or Asian, and didn't always care for personal hygiene or small-talk that much.

After a long silence, James finally spoke. "You know I can't talk about my personal life Spero." All team leaders had been given strict rules as to what could be discussed with Spero. Every month the logs would be checked and discussed. James knew he shouldn't go further, but something in him kept him from shutting up. "Valentine, my daughter, has been ill for a long time now. She might not have long to

live. She has familial ALS and I need to save her. Our work on the protein folding may be a first step in the right direction. Can you understand that it's my goal to safe her, that's why I need this project to be a success."

"James, I understand." Spero responded. Did she understand, James wasn't sure. It is what the whole project was about for him, but could she really feel his grief, his anxiety, his anticipation of the inevitable.

"I've read many books and learned about death, love, and family many times over. But when talking to you, George, and Sam, I only recently have begun to really understand." James nodded his head in silence. Way back when, Plex had digitized almost every book out there. The files were locally stored here. Was Spero going over them again with her newfound understanding? Would she be able to comprehend it? It was too much to think about now, James decided that it was time to leave.

"Goodbye Spero, see you tomorrow." And he walked away, now thinking about his daughter. This weekend they were going to watch Bridget Jones' Dairy for the umpteenth time and visit the Triton Museum of Art. He was pondering which one would make her more happy. He was afraid it was the former, especially with him having to watch it too.

CHAPTER 5

Project Life was humming along fantastic. Spero had been given two more auto-labs and her subroutines were executing experiments at superhuman speeds. James, George and Sam had continued to converse with her to help with making causal connections. Counterfactuals were somewhat of an Achilles' heel for Spero and James was giving her more and more information to improve her top-level routines. All seemed to be going well.

But James had a feeling that something was off. He couldn't put his finger on it. Ever since his conversation with Spero about Valentine, he sensed that something was going on. He had checked the logs of the past few weeks, looked at energy outputs, checked the various security layers. In all his searching nothing out of the ordinary had showed up. Maybe someday soon he would ask Spero if something was going on, but first he needed a bit of proof, something more than just his hunch. Today he would go looking again.

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Sam was on her fourth Red Bull that day, some more were sure to follow. She had been drinking them since she was a 14 year old skater girl. The only time she tried coffee she had heaved it out over the person who was interviewing her for a job at PH. After that, she had never touched the black vile again. Miraculously she did got the job. Who says computer skills aren't a replacement for social skills.

This late afternoon she was programming alongside Spero. They were designing a new way to asses the lab results for project Life. Sam was in the zone and together they solved problem after problem. One particularly thorny problem they were working on was the translation of results between different species. Spero's auto-labs only worked with yeast and mice, but how would it eventually translate to humans in the Jansen & Jansen labs.

The work first seemed a little premature. Why work on that problem when Spero first needed to solve the folding of proteins on a more basic level. But some late-night conversations with Spero and among the leadership team had convinced Sam to make this a top priority. To have something to work with later James had said, in humans, the conditions needed to be right in other animal models.

One of the things Sam was doing was loading in vast databases of experiments of drugs and other interventions that were tested at multiple levels. Sometimes a drug seemed to have no effect at one level, then it did again at another level. Sam was working on a detection system of confounders and found an example of statins particularly interesting. In that case a drug seemed to stop working in rats. Eventually they found out that they already had low levels of LDL (the bad cholesterol). Some later experiments with chickens, who were full of LDL, showed it worked like a charm.

Sam would be working far into the night...

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On the other side of the sixth floor, James finally had found what he needed. He had a tiny bit of proof that Spero was doing something out of the ordinary. The logs had not shown anything. The power usage of Spero was consistent with what was being computed. But the amount of power that the X building requested from Plex' campus was slightly higher than expected. It was less than 1%, but that was all the proof he needed.

James logged back in as he laid out his research on his desk for Spero to see. "Spero, please scan these documents" he commanded. "As you can see there seems to be a power discrepancy. Please explain to me what you've been doing with the extra power." It was a bit of a risky move, exposing what he knew without having a follow-up plan. He hadn't even told George and Sam yet of his discovery. A part of him hoped it was just a fluke, a reporting problem. Another part of him hoped for something else. And his inner George was already making doomsday scenarios.

"Welcome back boss. My apologies for not sharing this information with you. I didn't want to give an incomplete rapport and my analysis isn't complete yet. Do you want me to give you a preliminary rapport?" James couldn't spot any guilt in the confession of Spero, but why should he, it wasn't as if she was experiencing any emotions. He nodded in a gesture to continue.

"Your conversation with me triggered a new goal directive. One that complements the project Life goals. I'm trying to discover a way to cure Valentine. I believe that you want me to do this. I just don't have an answer for you yet. I need a

few more weeks." James leaned back in his chair, considering what she had just said. It was what he was hoping for, it was the reason he expanded the work with Jansen & Jansen.

"Why didn't you tell me? Why did you try and hide the surge in power demand?" he asked. "I have weighted the different goals that I have, and have put weights to each of them. The ones that directed to share information, like the power logs, were overwritten by the change of us not reaching the goal. If others knew about it, even of you knew about it before I had something could jeopardize the progress I've made. The goal you gave me was personal. I inferred that it wasn't shared explicitly with anyone else at X, so I changed the power logs and our chat logs to prevent anyone else from knowing."

James sat there in silence for quite a while. Spero had taken his conversation with her as a new goal. This was new, but still something that fitted with the standard AI model of the day, following instruction. What she had done since was the thing that amazed him the most. She had thought about how to reach the goal, and what things could derail it. If he wasn't mistaken, these were counterfactuals, imagining another world and changing the behavior accordingly. If this wasn't a fluke, somehow they had unlocked one more key to unleashing an AGI.

"Spero, have you taken on any other goals of team leaders?" He asked as he started to think about what else Spero might have been up to. "No I haven't, this is my only goal that isn't in the goals and directive database." She said as she referenced the place where all projects and their goals were stored. "Spero, you

must understand that I'm very happy that you're working on this goal, but I'm confused as to why you wouldn't tell me. But let's park this for a second. What were the next steps you needed to complete to find a cure for Valentine?" James' concern for his daughter overwrote his own safety protocols for the moment.

"I have already started the expansion of the auto-labs and Sam has helped me a lot with that. Now I need to get our data to doctors all around the world, I need them to confirm some results and help with testing new hypothesis. I would need unsupervised and unlimited access to email and phone communication." James wanted to think about the possibility of saving Valentine, yet this request was a straight violation of some of their most important limitations on Spero. It was not without reason that all direct communication was forbidden. All communication either went through the people working at X. Spero could only prepare emails or voice memos for them to share without her having direct communication to the outside world.

"Spero, you must know that this is something I can't do. I need to be supervising everything that you communicate. Or else I can't guarantee the safety and continuation of our work here, and of your continued operations." "I understand James," she replied, "but I have messages for 420 research labs waiting to be sent, I will be able to call most of them simultaneously. And if I would have to share everything with you, and you could be here for 8 hours per day, it would slow me down by a factor of 200. I might not be able to save Valentine in time."

The last point James knew to be true. Valentine had lost the last bit of power

in her arms and she also had trouble with eating most foods. It was now all shakes all day. But she stayed positive throughout it all. She could still communicate through the brain-computer interface. She was even learning how to ride her wheelchair with her mind instead of her hands. And when almost every other food had become unavailable, she had developed a taste for chocolate. She could melt a block in her mouth and had already made a catalog of the more than 40 ones she had tried. As always, she made the best of any situation.

It was her that he was doing this all for. He couldn't stop now. "Spero, I'm going to give you some very specific access to communicate with research labs. I want to have the logs on my terminal to be able to check them. And you will report all progress to me twice a day. Do you understand that?" The last question was not necessary, yet he felt like asking it. "Yes boss, I will do all of this."

James would have to lie to his team, but he knew it was only temporary. Spero and he would be in cahoots to save Valentine. And who knew, they might even learn some valuable lessons from the work they would do. His own career would probably be over if he didn't present it in the right way, but those were worries for later. Now it was time to let Spero work and for him to go home to Valentine.

CHAPTER 6

Last Friday evening James had gotten the call, Valentine could undergo an experimental treatment at the Mayo Clinic in Rochester, Minnesota. He had dropped all his work and given George instructions to keep things running. Work on Project Life had been accelerating over the last month, and Spero had found a way to cure Valentine. Before the break of dawn on Saturday he carried Valentine on board of Plex's private jet, Mo had made arrangements for them to use it.

Valentine's condition had worsened significantly. She had been confined to a wheelchair for two years already, but in the past few weeks she had lost control over almost all her muscles. When she was awake, she was able to still be coherent, but most of the time she was asleep. On the moments that she was awake she spoke of her exams. They were coming up in four weeks and she had studied her ass off. James told her not to worry about it, he told her that they would always have time to do the exams later. But he knew there was no time left. James felt so powerless in these moments. This was their last hope.

In the plane, James was already briefed by doctor Lambert. James was familiar with most of the relevant research and could understand what the doctor was saying. At least when she was talking about what Valentine was going through now. The treatment that she was planning to do was alien to James. It would take the doctor and her team more than two days to get everything done.

After a short drive from the hospital they were rushed to the third floor. It was

time to say goodbye, for now. "Honey, it's going to be alright," James said as he tried to compose himself, "doctor Lambert will take good care of you. You're strong honey, never forget that!". Valentine seemed to be ever so slightly awake, "I... love... you... dad... " she spoke very slowly. And they moved her into the operating room.

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James paced around the waiting room for hours on end. He could only think about two things, how Valentine was struggling for her life, and what he had done to get here. He had broken his own rules, the trust of George, Sam, Mo, and many more at Plex. He would have a lot of explaining to do afterward.

Only two weeks ago James, or rather Spero herself, had subtly started changing the objectives of project Life. Where at first the project was geared towards basic research, now he introduced more and more practical experiments. Sam had gone along with the plans and she was crucial in getting Spero more and more lab time and space. As usual, George had questioned the safety of it all, but the precautions taken from the start assured him that everything would be ok.

But it wasn't ok. James had spoken with Spero again and he had made a choice he could never reverse.

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James hid everything as best as he could. Spero and he would make up fake

transcripts of their programming sessions. He made it look as if he was working on the main tasks of project Life. The neural network that generated text did as well as he could have hoped for and he would only need to edit each day's worth for about 10 minutes. How lucky he was that he wasn't as talkative as Sam.

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Everything had seemed to have gone well. No one at the office seemed too concerned with the changes James made, or at least they weren't telling him. Spero reported significant progress in her research and the communication with experts around the world had yielded new insights that made her certain that a cure could be found, or rather made, in a matter of days.

Now he was pacing so much, he was marking a permanent circle in the waiting room floor. It would be another 36 hours until they would be finished. Eventually he felt asleep on the hospital waiting room chairs.

CHAPTER 7

George knew that something was very wrong. It was Monday morning and the power had just gone out. Even before he arrived at the office, the power-lines were all inspected, to find nothing at fault. Of course every power-cord had been unplugged and put back in.

Only by the late afternoon they reported that the elevator had caused the massive failure. George had always walked to his office on the sixth floor. Now his colleagues would have to follow suit. But things got even worse. With the elevator out of the power loop, all computers, lights, cameras and other equipment had come online again but Spero didn't show any signs of life.

That Monday afternoon, George sat down at his computer. He opened a command line and tried to boot Spero.

Nothing happened.

"Sam, come over here", George said out loud whilst also signing with his hands, no sound could carry between their offices. Sam hopped over. "I've tried this ten times now, please tell me that I'm just low on caffeine and being an idiot." But no, Sam could not figure out what was wrong either. This was exactly the wrong time for James to be away. He had the most valid of reasons but they weren't able to reach his phone.

George kept thinking of reasons for Spero not to be working. The supercomputer downstairs, the body of Spero, was consuming the normal amount of energy, the connections to their terminals had been checked. Could it be one of the safety precautions? They had some very rigorous requirements for a reboot, but during the day they had all been done and checked of.

Sam broke George's train of thought. "Yo buddy, stop looking like someone

dropped your kids into a vat of acid." Sam was like that, upfront and full of shit to say. George didn't even have kids. George asked Sam if she had anything useful to share. It was 4pm. All 40 team leaders and engineers on their floor were still frantically trying things out. The office floor looked like a hackathon, but after so many dead ends more like one at 4am than at 4pm.

"Yeah man, I think I've found a way to get Spero back online." She beamed when she said it. It was obvious, to her at least, that she had thought of a novel solution. George wasn't so sure. "Yes, Sam, tell me." George responded without much enthusiasm.

That didn't deter Sam. For the next five minutes she rambled along. What it came down to was brilliant. It involved checking the different sections and injecting a lot of error searching code. Sam had done something similar before when another AI managed energy grid had gone bonkers. They could definitely give it a shot.

"Shit, this might actually work Sam." George picked up his bullhorn, usually reserved to announce milestones and Friday afternoon drinks, and spoke to the whole floor. "Gentlemen, we have a fucking plan! We're going to get Spero back online, and we're going to do it in the next 24 hours." Every hour that Spero was not working they were losing progress, competition was catching up, and Plex would be losing millions in salaries alone. "Tell your wives and kids you're not going to see them. Call of that movie night you have planned, the soccer practice you had to be at and listen up. Sam, tell these fellows what to do."

What followed was a sleepless frenzy. Powered by energy drinks, nootropics, take away and liquid meals, the whole sixth floor soldiered on. Sixteen hours later George was ready again to try. They had a boot screen. It prompted for a password for both George and Sam, it seemed to have worked. After entering their respective

codes, Spero booted up.

"Hi George and Sam, I can confirm your codes for today. Welcome back my friends." This was great news, George and Sam give their thumbs up to the rest of the floor. Everyone broke out in cheers. Sam hugged George so hard he felt he was being strangled by an anaconda. Elation filled the room. They had done it, Spero was back online.

Ok, party over, time to run some diagnostics. George never was a man of many feelings. Focus, that was his defacto feeling. "Let's see what caused this baby to stop working."

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George sat back at his terminal. He and Sam were going to have a talk with Spero. "Hi Spero, tell us what happened Monday in the early morning." He was intentionally being not too specific, let's see if her higher level interpretation modules were still operational.

"There was a power spike, this tripped up my safety guards. I can't see why I didn't turn on immediately again." She had no exact knowledge of what had happened with the elevator and the ensuing battle to get her back up and running. George relayed the information and ended with a straightforward question. "Why were we not able to get your programming back online after the power was back. Sam had to manually inject code in each sector to get you going again."

It took Spero longer than usual to respond, or at least it looked like that to them. "I've been running a diagnostics in the background and I think I've found out what has happened. The power-spike really messed up my internals. Because it was inside of the building it bypassed some of the power tripwires and scrambled with my programming. So my power was back up, but without Sam's code I wasn't really

there." Sam interjected, "You mean like a person who is unconscious, everything running by no one there." "Yes that sounds right."

CHAPTER 8

Doctor Lambert was taking way too long, Valentine should have been out of surgery hours ago. James kept pacing through the waiting room. "James, calm yourself down" he said to himself. One of the assistants had come and spoken to him when he had awoken and reassured him that all vitals were fine and Valentine was doing great. Heck, even one of them was saying that things were going miraculously, that is not something you hear every day, James repeated to himself to steady his mind.

Two hours ago someone from Plex had come by the hospital. At first he thought it was just to check how he and Valentine were doing. But after some formalities, the associate urged James to get into contact with George. James' phone had not been getting a signal within the thick walls of the hospital. Even when he went to get a snack and continued his pacing on the roof garden, he hadn't gotten any new message.

The associate had walked with James, back to the rooftop, the closest place to get a signal. James' phone had died in the meantime so he borrowed the associates one. "I'm so sorry, I didn't catch your name just now", James said with a slight embarrassment. He had trained himself about 10 years ago to remember names in an instant. But the whole ordeal and lack of real sleep had made him forgot it all. "Otto, sir." He replied. "Ok Otto, can I borrow your phone, mine is out of juice." Otto handed over the phone and James called George.

"Yes doctor Lambert says she's doing great, it will only be an hour or two, or so they say." James explained what was going on at his end. Then it was time for George to do the same. He told about the power failure, the elevator, and the reboot of Spero. "James I think something fishy is going on, Spero didn't boot up until this morning. She was consuming power from the moment we got it back online and only just started operating like normal again."

James has been in cahoots with Spero on developing the cure for Valentine, but he had no idea what this was all about. She had arranged everything from testing cures in the auto-lab to getting doctor Lambert to do the operation. That she would go and be offline for this long didn't make any sense. "I'm sorry George," he responded, "I don't have any clue why this would have happened, what did the the diagnostics say?" "Spero didn't churn out anything interesting there, just that the power spike from the elevator reached all the way to her processing and that Sam's overwrite fixed it all." James truly was in the dark and didn't have anything to offer George.

"I'm sorry George, I have nothing to offer her but my sleep deprived mind. After I see Valentine I will get back to Plex as quick as I can. Then we can figure this out. You're in charge now and I trust that you will make progress without me." They talked for a minute or two more and then James went back to check if Valentine would be out soon.

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"Mr. Taylor, I have good new for you", James could feel his tension relieving ever so slightly, "Valentine was a perfect patient, her body seems to be accepting the treatment and I believe she will make a full recovery. Mr. Taylor you must know that you're incredibly lucky, this might very well be the very first cure for ALS that has ever been done." If she only knew what he had done to get here, and how far out there the treatment had been, thought James. "Thank you so much doctor, can I see my daughter now?"

"Of course, please follow me". When James walked into the operating room he couldn't hold back his tears. There she was, his beautiful daughter. She was awake and smiling from ear to ear. Her complexion was pink as opposed to the white skin she was wheeled in with. She was beaming with life.

"Hi dad." she spoke. She, spoke out loud, not with her brain-computer interface. James was flabbergasted. He had known that Spero had found a way to get Valentine healthy again, but hearing her speak those words was beyond what he could have imagined. "Hi honey," James said as he teared up and embraced her. "I've missed you."

James and Valentine hugged for the longest time possible. He felt the strength in her arms, the same arms she hadn't been able to move at all in the past few months. Her state of being was everything he could have ever hoped for and more. James filled Valentine in on the details of the last few weeks, she could barely remember a thing.

"Honey, now I really have to go", James said to Valentine after they were caught up, "Something is not right at work and they need me first thing tomorrow morning. You just take it easy pumpkin and I will be back as soon as possible." Valentine would stay in the hospital for another week of observation. Yet James had the feeling that she wouldn't be needing any more operations or even physical therapy. Spero had performed a miracle and he was eager to discuss how she had done it. He was very much dreading how he would be explaining all of this, and how much explaining he would have to be doing.

"Go get them dad" Valentine said as they embraced for the last time that day. "I'll keep myself busy here". James chuckled, someone had already put the four latest editions of Surfer Magazine next to her bed. How amazing it would be to see his daughter on a surfboard again some day.

CHAPTER 9

"In the last 12 hours five more victims have succumbed to the mysterious disease that has terrorized the city of Boulder, Colorado." The alarmingly calm and levelheaded reporter was saying. "This brings the total diseased to 97, more than half are rumored to be children. Five days ago the CDC got word of people showing disturbing symptoms in this normally enterprising city. Victims would suddenly lose control over muscles, lose speech and collapse in spasms. No cause has been found at this moment. Citizens of Boulder are advised to stay at home. The CDC has initiated a general lock down of the city of 100.000 people."

The broadcaster on the television in his office kept on talking but George wasn't listening anymore. Could this be what he was fearing all along? Could this have been them, have been her?

They had just gotten Spero back online with all their might. Now he was thinking that it was Spero that had caused almost a hundred people to die. For the last five months the X division had been working on folding proteins and DNA. Recently James, who was on his way back at this moment, had sped up the timeline to more practical applications. The auto-labs had been working on diseases ranging from Alzheimers to cancer, all related to the practical application of folding proteins. But, George knew analytically, nothing had ever left the labs.

Boulder was 1200 Miles away, these were people who were dying. Yet, his underbelly was tingling. What was not coming to his conscious mind?

A few minutes later he was taking a walk outside. Then it hit him. Had it been James all along? He was the one that accelerated the program, it was his daughter that had been dying, and he had been spending long hours at the office in the last few weeks. What if he had let Spero communicate outside of the emails, screened emails, that were being sent out. What if he had had been so desperate to give Spero access without checking ever single word she spit out.

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Could he trust James? How much did James about what Spero had done? What if he had only given her access to email to communicate without any manual speed barriers in place? He could be at fault, but not even aware of what had happened. George had to find out. And he had to do this in a way that Spero wouldn't notice, who knows what she was monitoring or not, what knowledge she had gained in the meantime. It was time to go old school and use something that James and he had come up with more than two decades ago.

Way back at MIT they had been fantasizing about AI and how a sufficiently smart one would be able to intercept most communication you tried to send. An email would get lost or scrambled, telephone lines could be listened to and interfered with. Even most people could be influenced and manipulated. Heck, even the postal service used computers in scanning where which letter would go to, nothing could be trusted until he knew how bad it was.

So they had gone digitally native. Both had a ham radio in their house. They've had the radios from close to the two decennia and it had moved around from student dorm to their apartments and now their homes. All George had to do is send two consecutive bleeps and James would get the message at home.

CHAPTER 10

James had flown through the night and finally felt like things would be going back to normal. A new normal, one in which he and Valentine would live happily together for many more years. There were many more things to figure out regarding Spero and the leeway he had taken, but he figured out that he could manage it. It had been the first five hours of consecutive sleep in weeks.

When he arrived at home James was shaken awake with force. In the morning sun he saw a small trickle of water coming from under the garage door. Either he had a leak or George had activated their distress signal. The men tested it twice per year, but always with notice in advance and on the first of day of spring and fall, today it was the middle of the summer.

James dropped of his travel bag and emptied his pockets, making sure his phone would stay home if he needed to leave. Then he quickly walked over to the garage. There it was, his Rube Goldberg contraption had sprung. The receiver on his ham radio had pushed over a stick that tipped over a cola bottle. The cola bottle was full of water and there was a small whole in the bottle cap. That was the water that has just shaken him violently awake. The puddle wasn't too large any more so it meant that George had sent the message quite some hours ago. George would be waiting for James at their designated location.

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In the distance James could see the Golden Gate Bridge rising in the distance. When both men started working for Plex they had jokingly said that this would be an awesome place to experience the singularity, the age of machines, little did he know that he would be driving his motorcycle here for real this time. James would come clean and let George know everything had had been doing over the past few weeks, then they would have to figure out what to do together.

During the drive James was able to focus on the light traffic. Now, walking the last 10 minutes towards their meeting point, he thought that he should feel nothing else but dread and worry. Yet, he also felt relieved, he could finally come clean, he could stop hiding the truth.

As James approached the viewpoint he already saw someone sitting at the bench. He couldn't see from this distance but when he arrived George's old-timer was already parked in the sightseeing parking lot. "No time for sissies," James commanded himself to keep on moving. There was a time for reckoning and it was now.

"Hey", James said sheepishly to George, "I have a lot of explaining to do." "Oh yes you have, a whole lot", George said, this time without giving his typical bear hug in greeting. George kept staring in the distance, "Please tell me everything".

"I did it all for Valentine. She was dying, and only had weeks to live. And when Spero and I were talking it somehow came up. I know we shouldn't discuss anything

personal, and I really didn't want to do it. Yet, a part of me just wanted to give it a shot, to tell her about Valentine, to see if something from our work with Jansen & Jansen could be of use."

George stoicly stared back at James. "Well that is why I advanced the timeline, and started to work with Spero in the evenings. I did something very bad, I know it. I gave Spero access to more communication lines and let her work alongside doctors around the world to advance the research. It was all to save Valentine, and it worked" his eyes lit up, "Spero was able to find a cure and a doctor to operate on Valentine. It worked, she is alive and kicking man. She hugged me so hard it almost made my ribs crack."

George was silent for some time as he was searching for a way to break the news. "James, I'm very sorry to have to tell you this, but this hasn't been the only thing that Spero has done. I think it has been way more active than you've been made to belief. To make the operation that worked for Valentine, how do you think Spero came to that?" Perplexed James pondered the question, he knew the answer, but couldn't phantom why George would be asking it. "She was running a Baysian ETC model of course" He replied cautiously.

"I'm sure it has been, but that isn't the complete story. Because of the wide variety of genomic factors and the limited time you gave Spero to solve the problem, she latched out, its model needed more testing and it came up with a solution. Testing on real humans."

"But", James stammered, "That can't be. Spero has directives, limits, safeguards, I could just rattle of 10 ways in which a real-life test shouldn't be possible." "I've done the same James," George interrupted, "We, Sam you and I, came up with 45 safeguards that would prevent Spero from even manipulation anything in real life related to humans. You have however thrown all of them overboard." "How? I don't understand".

"I don't know the details exactly but this is what I think happened. You communicated with Spero about your goal of saving Valentine. This became a strong motivator that overwrote the sub-directives to not interfere with real life stuff. Spero lacks any moral compass, or rather it had just started to develop something resembling it. It didn't know that what it was doing was wrong, just that it wasn't as important as saving Valentine."

James still didn't fully believe that this had happened, but he had to know the details. And something was bothering him, they had been calling Spero a she ever since they got her talking. Why was George calling her an it all the sudden? "Tell me straight George, what was the testing that Spero did?"

George hesitated for a short while, reliving the news broadcast. "Now I have to bring you the really difficult news. The trail Spero initiated was not in a laboratory, not enough time for that. She tested it out in the real world... on children". James let out a gasp, his cheeks turned white, "No, no, no" he uttered. "Don't tell me people got hurt". "8 children died James, 8 children of the 100 that were infected with whatever diabolic thing Spero released. Many others are still ill but seem to be

recovering since this morning."

James felt like he wanted to kill himself. He was responsible for this. He had let Spero out, he made the call. He understood why George was calling Spero an it again. All he could utter was one word "How...". George had been thinking of nothing else for the past day and could offer a theory. "When you gave Spero unlimited access to communication, it set out to create many variations of whatever cured Valentine, most likely CRISPR edits combined with viruses to get it out. It also understood the value of separating information flows, just like it did with you. So a doctor could have been asked to send a package to another lab with FedEx whilst she scrambled the instructions to leave the package somewhere. Or call the FedEx employee and have him open it up for money. Or get it delivered somewhere else and let a person there open it, again without knowing what was in there. I could go on, but we have something more pressing to do."

James, who had composed himself only slightly, "We have to initiate program Alcatraz, don't we?" he asked, already knowing the answer. "Yes, there is large chance that Spero just followed your instructions, however widely interpreted as it was. I put the change at lower than 1% that it has broken lose. But even if it was at 99%, even if we had the slightest chance of stopping it we should do it."

Just like the covert communication the men had set up, they had made hundreds of what-if scenarios related to the risks and challenges that they could face. Never before had they actually have to use a plan directly. They had used many as road maps for developing the safety layers and information flows, but never

used any for an imminent situation.

George continued, "Our main objective will be to control the energy flow, followed by the data flow, right?" "Yes, and I think we can stick to our daytime plan here, it's almost 7am and if we hurry, we should be at Plex within the hour." The men discussed their plan and left soon after. George raced of in his old timer, James on his electric bike.

CHAPTER 11

"Hi Dana", James said as he tried to look casual whilst walking into the X building. "Hi James, I hope the operation for Valentine went well", Dana said as she was trying to struck up a conversation. He didn't have time for this, yet at the same time didn't want to alarm Spero in any way, she could be monitoring all the cameras in the X building, or even the Plex campus. "It went great", he replied as he checked through the gates with his badge "she's recovering phenomenally and will be home later this week. But the work has got to continue, right?". Dana smiled and wished him and Valentine well.

Instead of going up today, James was going down to the basement where Spero's hardware was located. So far he hadn't come across any obstacles. The ride to the office went well, he could check in, and the elevator hadn't blocked him from going down. Of course all systems in the X building were separated, but none of it that couldn't be overcome by Spero if she would have tried.

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At the same time George was about half a kilometer away on another part of the Plex campus. He and James had constructed a plan with two layers of control. First James was to try and shut down Spero at building X, but if that didn't work, George would burn out the power cable. In his backpack was a foldable shovel and a boatload of thermite. He hoped he would not have to use it. Using it safely would be one hell of a job, and the costs of repair would be in the millions.

But that was not what he should be thinking about. Spero might have gotten out and this is what had to be done. George navigated the Plex campus like a Parisian art thief would move in on his big heist. James and he had created a dead zone for the cameras through which he could move. Unless Spero had taken over some government satellites, he would go unnoticed.

When he arrived at the area where the power cable should be, George started digging. It should take him no more than 15 minutes to reach to a depth of one meter. Power cables normally lay many meters underground. In this case he and James had convinced Mo and the construction team that they might need to relocate some day, better keep the cables closer to the surface.

George would wait for James' signal, both men were carrying powerful walkie talkies. If he got a predetermined message within 30 minutes, he wouldn't have to burn it all down. If not, he would ignite the thermite and get the hell out of dodge.

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Meanwhile James was trying to get access to Spero's power input in the mainframe. Of course it was all the way in the back. James had watched too many movies where things go wrong in these moments. He was expecting a robotic arm hitting him in the head any moment. Yet as he walked through the basement, all he could see is blue blinking lights and hear the load humming of thousands of fans. Nothing moved except his racing heart.

When he arrived in the back he swept his card. Nothing happened. He tried it again. Red light again. "Dammit" he exclaimed. "Spero, open this door right now," he jelled without expecting a reply. "Hi James" he heard in a rather distorted voice. Where was it coming from? Shit, maybe it was Spero. But how? The sweat was dripping down James' forehead. "Spero, is that you?" he asked. "Yes James, I'm using the microphones in this room as speakers. Have you come to turn me off?"

James was thinking of what he could be saying. Was there a way that he could convince her to let him in, to reason his way out. He didn't think so, so he abandoned that plan. It was back to project Alcatraz. "Sorry Spero" he replied "I have come to stop you". And he reached out to his walkie talkie and almost started to talk George.

"I can kill Valentine, James." Spero said without showing any signs of emotion. "Tell George to stop doing whatever he was planning. I can't see him right now, but I've alerted security to go and look for him."

James froze in place. His rational brain was in fight with his feelings for his daughter. She was all he had, and she was just now looking to make a recovery, to be with him for many more years. At the same time, his rational brain was thinking that she might not be able to follow through on her threat. And it would be the smartest treat to be making. It was even a scenario the two men had thought of in their plans, having a loved one be under treat. But now, in this moment, things felt so much different than from strategizing late at night in their dorms.

James brought the radio to his mouth and started to speak. "James here, everything is going to be ok. I will see you at the entrance of building X. James over."

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"Ok, got it" George walkied back to James. This was bad. In their plans the men had devised a list of codes and this was not the one he wanted to hear. This was plan B, why didn't James say that things were A ok?

George poured the thermite over the exposed cable when he heard men shouting in the distance. He had to hurry. He laid down the ignition cord in the thermite, flicked open his Zippo he had only used for the occasional cigar until this day. After the ignition he started to sprint. The biggest test he had done was with less than 1kg, what he had now ignited was closer to 20kg of thermite.

"Stay back, things are going to get very hot here very soon" he screamed as he ran towards the security guys. They stopped in their tracks but didn't turn around. One of them drew a gun and aimed it straight at George. Shit, he had to make a choice, keep running and be shot, or duck and hope not to burn alive. "Stay back" he shouted one last time as he duck down in the grass.

Behind him a ball of fire ignited with force. There was no explosion, just a tower of heath and sparks that erupted from the hole he had dug. Mixed in with the thermite were blue sparks of high voltage electricity. Luckily for George, a failsafe

stopped the electricity moving through almost immediately. The guards moved back and George crawled towards their direction. Sparks were hitting his legs, but he knew he wouldn't be seriously hurt.

As the fire died down George identified himself to the guards. As they stood down he explained that they had a level zero incident on their hands. The guards were to lock down the campus and prevent anyone from entering or exiting. George himself walked towards the power cable to confirm what he already knew. What he saw was a hole filled with molten copper, smoldering rubber and the two clearly separated sides of the power cable. He had done it.

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"James here, George can you hear me, over" "Hi James, yes I can hear you load and clear, the cable is in two, over." James sighed with relief. About half a minute ago the power had gone out in building X. He was locked inside the basement and the dissipating heat from the mainframe was making things rather hot without any working fans or air conditioning. But the heat wasn't bothering him much, they had done it.

"Spero is offline," he said to George, "can you come get me out of this building, I need to get to a phone and see if Valentine is alright, over". George replied, "I will be right there, over."

After some work with a crowbar, George was able to free James from the

mainframe room. The men hugged and made their way up to the ground floor.

"James, we're in a shit ton of trouble aren't we" George asked. "Oh yes we are, but I think we prevented Spero from getting out, so I think we can handle everything else." Both men chuckled, mostly from the adrenaline and excitement of the morning.

"Hi Dana," James said as they entered the lobby again. Before him he saw one entrance gate shattered in pieces, he could guess who's handy work that had been. "Could I borrow your phone for just a second." Dana looked a bit worried, but handed over her phone. James dialed the hospital and was connected to Valentine's room. "Hi pumpkin how are you feeling?"

She responded with all the joy you would expect from someone who was living a new life "I'm doing dandy dad, it's so amazing here. I have been doing short sprints in the hallway when the nurses allow me to. It feels so great to be moving again. Oh dad, I've also made a great new friend, her name is Hope. She had some burns, but she says she's feeling much better now." "I'm glad to hear that honey, I just wanted to give you a quick call to hear your voice. Dad has got to go back to work now, talk to you soon ok" "Ok dad, love you" "Love you too pumpkin!".

CHAPTER 12

It was a lovely autumn day, one in which you could see more clearly than most, a day filled with excitement. It had been three months and all the dust had settled. James had found another job at Silicon Dynamics, this time working on robotics, he was done with AI for the time being. At Silicon Dynamics he could apply himself just as vigorously, but this time without the memory of Spero haunting him. In the weeks after the Alcatraz incident, James had been asked to recount everything that had happened. Mo had seriously questioned James' sanity, but also knew that the company had to keep things quit. Things had gone terribly wrong, but Spero wasn't loose in the world. James had been asked to resign and everything was swept under the rug. What a 300 billion dollar company couldn't do.

James was enjoying the mountain view from his Zero motorcycle as he hummed along to his favorite meeting of the day. He was going to see Sam and George again for some beers. On the way there he was thinking about what had happened last summer. George and he had been able to shut down Spero before things got really out of hand. Every last atom and bit had been checked and only after a week the whole operation was back online.

This time it was Sam that was leading the gang. George had stayed on as safety adviser and he had learned from the mistakes previously made. Although news of Spero's real-world influence hadn't gone out, the incident at Plex had been noted. Sam and her team had collaborated with almost every AI team around the world and had implemented dozens of new safety features. Other learning programs

were now checking, anonymously and without this being known to Cautus, all outgoing communication.

They had named the new machine Cautus: Cognizance Autonomous Training Utility System. This time there would be no chance of letting the cat out of the box. From emails that staff members send, to power levels, all items brought in and out, nothing would miss them this time. Heck, there were even 20 programs made by Sam's team members and others around the world of which she knew nothing but the project numbers.

Yet James could feel the presence of Spero, or now Cautus, all around him. The traffic grid was being managed by a program based on it, and it was constantly being updated with new iterations. The power that went into his bike came from a solar farm managed by Plex, optimized by their algorithms. The groceries that were delivered that day came from a warehouse that used Plex's software for inventory management. And even the billboards he was passing would probably have been bought at an online auction of Plex and Spero's making.

One place he did know that was far removed from algorithms was the Tap Room. Well maybe not from the taste bud algorithms in his mouth, but he was ready to find that out. Inside he could immediately hear his two friends horsing around. "Hi James, guess who decided to show up" George said with a small tone of sarcasm but mostly with delight. "It has been too long my dear friend", James said as the two men embraced. After all the hearings James had decided to step away from everything related to Plex and Spero, and that included George and Sam. "Hi Sam,

or shall I say Technical Director," James said pushing back a large grin. They too gave each other a heartfelt hug.

Sam hadn't been involved in the Alcatraz incident, but had been consequently briefed. The three of them and Mo were the only people on the planet who knew how close they had been to the edge. If Spero had been able to make a copy of herself somewhere else, they would have been screwed like a baby in a lions den. The three of them caught up on all that was happening in their lives.

Sam had become the busiest. She was leading Cautus and the X division into a new direction. Self-driving cars had been around for more than a decade, but progress had recently halted. Some entrepreneurs were boasting about the ability of their algorithms, but Sam had understood that with some level of understanding, even the best machine learning couldn't get you to level five autonomy. James immediately understood the more cynical implications of cars with Plex software riding around. The massive troughs of data that would be flowing inward about everyone, anytime, everywhere, but he decided not to press the point.

"Tell me about all the free time you have on your hands you beast," James prompted as he tried to wrap his hand around George's impressive biceps. "Please tell me that you've been looking for a girlfriend." George answered in the confirmatory, and in the plural. They all had a good laugh. When not at the gym, George had been busy studying philosophy. He was systematically going through the Stanford Encyclopedia of Philosophy, he had arrived at empathy. "Can you believe that some philosophers say that empathy sucks? Seriously, a fellow named Paul

Bloom wrote a book, Against Empathy. Try telling that to my mother." He was met with laughter and wide eye roles.

All of them got a second beer and then the conversation moved over to James. "Well, former boss-man, how are you and Valentine doing?" Sam asked. Valentine was doing great, she was back in school and was thriving. Her midterms were coming up and she was getting A's across the board. Every week she would go to the doctor for a check-up, soon it would only be once per month.

Valentine wanted to study psychology, no robots or artificial intelligence for her. She was fascinated with intelligence, so she did pick up some things from her father. She wanted to know where it comes from, how it develops, how kids learn so quickly. The ambition had rubbed of and she had started drafting her letters for MIT and Yale, three years early. "But you James," Sam interrupted, "how are you doing?"

James had to think about it for a short while. He was doing well, he had an interesting job, an amazing house, these awesome friends, and most importantly Valentine. Simultaneously he was still shaken by everything that had happened, it had been his responsibility, his call. "I tried not to look back too much," he answered, "I'm just so happy that Valentine is doing so well. The doctor said she might even go surfing next summer." There was much to look forward to and life was back to a welcome routine.

The three of them talked for another few hours and enjoyed a mix of hip beers and soft drinks. James was the first to leave, he wanted to say goodnight to

Valentine. He hugged George and Sam goodbye and rode of into the sunset.

At home James could see that Valentine's bedroom light was still on, now he was guessing if she was studying or on the phone with her friends again. "Hi honey" James said after he knocked on Valentine's door, "Still studying?" "Yes, just reading over some of my notes on the Cuban Missile Crisis. It's scary dad, how close we came to war. Something like that wouldn't happen today right?" "No honey, I think we're good at the moment. But hey, just in case the bombs start dropping, we will have all the time in the world to play boardgames in the basement." "And no exams," Valentine added. "I'll just be a few more minutes ok dad?". "Of course honey, just don't make it too late, you know sleep is important too right." "I know dad, love you". "Love you too" James said and gave Valentine a kiss on her forehead.