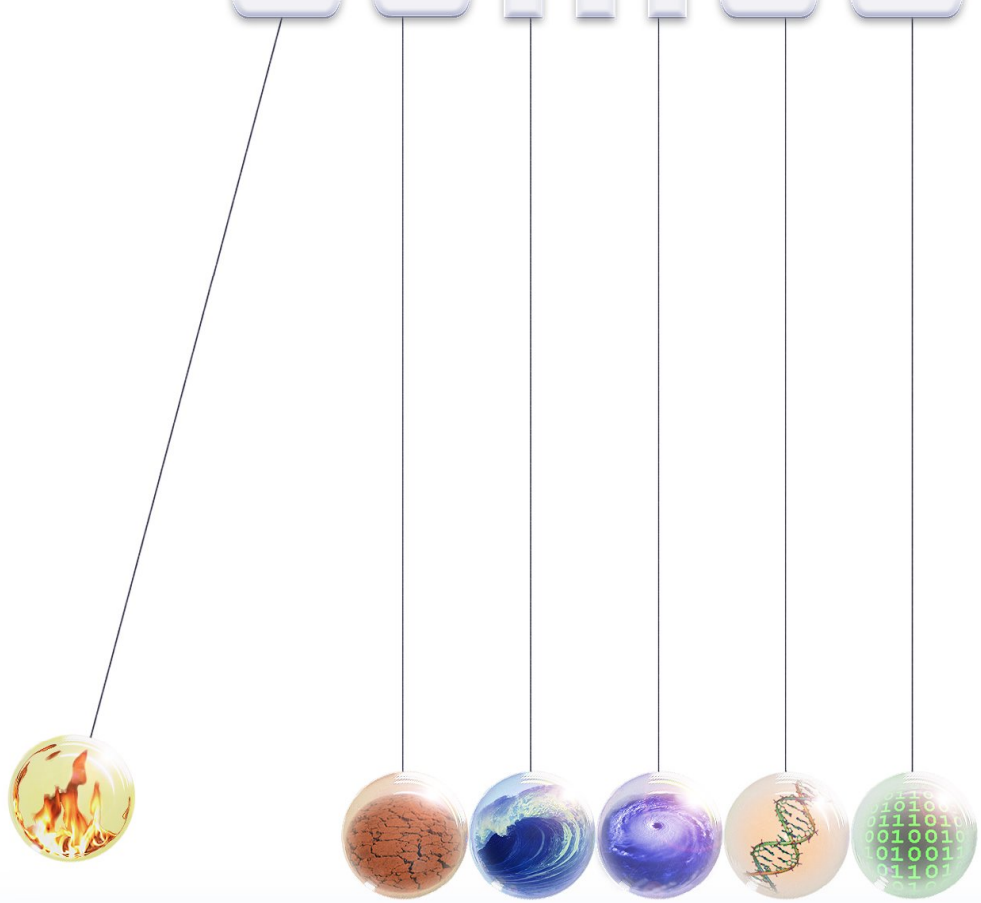
Stefan Pernar

James



A Tale of Good and Evil

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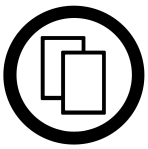

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In memory of

Ingeborg "Oma" Tubbesing

*** 21 December 1920**

† 11 August 2007

"We shall work faster."

Summary

Guido is an IT professional based in a Beijing that is in the midst of gearing up for the 2008 Olympic Games. His life takes a sudden turn, as his best friend Alecz reveals to him that he is at the center of an international effort to create a strong artificial general intelligence and nothing in his life is as he has always believed.

Jame5 is a “Sophie’s World” for futurists and singularitarians in which the author takes his readers trough a hard take off technical singularity with all its philosophical consequences. What is good and what is evil? Where are we coming from and where are we going? What are happiness and the meaning of life? What do prophets have in common with dictators? All of these questions and more are being touched in this novel and in the end form Stefan Pernar’s consistent description of the world and the future.

Testimonials

"Jame5 is an engaging story about our confrontation with the singularity. From virtual worlds to AI gods, it provides a poignant and sometimes chilling exploration of the future and what it means to be human. A fascinating read." *Dr. Stephen Omohundro - President of Self-Aware Systems and Advisor to the Singularity Institute for Artificial Intelligence*

„Of the several hundred science fiction books I have read so far Jame5 is one of the good ones. Its new ideas gave inspiration for thought and I had fun reading it."
Michael Adling - micenterprise.de

"If you enjoy intelligent fiction with more than a mere pinch of philosophy, this book is for you. Applies the idea of 'survival of the fittest' to a singularity scenario and challenges your perception of what is real, what is right, what is possible - and what is not. An alluring glimpse into the future of mankind!"
Monika Siegenthaler

"If you are what you remember then couldn't your past have just been a dream? Read at your own risk - Jame5 may dislocate your mind!"
Olive Huang Hai – youtube.com/Katzen2002

„Answering the essential question of what the meaning of life might be has occupied us since the existence of human consciousness. Jame5 explores this as well as other questions and opens new perspectives that keep the reader thinking long after having closed the book.”
Sonja Costabel

Foreword

"It goes without saying that all of the people, living, dead, and otherwise in this story are fictional or are used in a fictional context. Only the gods are real."

—*Neil* Gaiman

The future is not about flying cars or electronic paper. It is about how the decisions made by artificial intelligences (AIs) are going to affect our lives. Assuming Moore's Law—in a nutshell the yearly doubling of available computing power at constant cost—is going to hold true as it has for the past sixty years, there will come a day some time this century when computing power will allow the development of AIs vastly smarter than not only any human dead or alive, but all of humanity combined. That day will be the first day of what futurists call the Singularity, a point in time, about twenty-five years from now, at which the rate of any technological progress will be so fast as to be experienced as almost instantaneous. The progress will be incomprehensible from an unaugmented human perspective.

Since we effect technological progress, we have a decisive influence on how the coming Singularity will pan out. This book concerns itself with how a super intelligence, benevolent toward humans, could turn out to be, think, act and reason. While the Singularity certainly has the potential to result in Apotheosis in the Yudkowskian sense, this particular outcome is far from certain considering the vastness of designable mind space.

Since you are reading this, you likely belong to a small but growing group of acceleration-aware forward thinkers who will be ahead of the coming fierce debate on if and how super intelligent minds are supposed to be designed. Never has an issue been, nor will an issue be, of more importance for humanity to get right the first time than that of the Singularity. Knowing about this most important of issues, one cannot help but wonder: How will one handle the responsibility of contributing to a positive transcension, knowing that an unborn god may soon pass judgment on our actions?

Welcome to the future.

Beijing, China, August 26, 2007.

Acknowledgements

I would like to thank all those who listened so patiently to my ideas before I had even written them down. You know who you are. As the saying goes, "How am I supposed to know what I think before hearing what I say?" Not all thoughts now written between the pages of this book have been in their refined state since I started to write them. Strangely, the book turned out to almost write itself. I just stuck along for the ride, often realizing what I had written down only after re-reading it a couple of days later. In this sense, the journey was the destination.

Special thanks go out to Anke Schrader, Björn Pernar, Connie Wang Run Zhe, Olive Huang Hai, Sonja Costabel and Vlada Uliyanova. Without their encouragement, this book would not have been possible. On several intercontinental flights, I was fortunate enough to have sat beside a number of very patient and interested individuals, all of whom were very supportive of the general concepts described in the book. Particularly interesting for me was a discussion I had in Hong Kong with Winnie Lui. Thanks to all of you and those that I undoubtedly have failed to mention.

1

Being the one is just like being in love. No one needs to tell you that you are in love, you just know it, through and through.

—The Oracle, *The Matrix*

As Guido woke up, his mouth felt as dry as a camel's hoof. 5:27 a.m. "*Fuck.*" The Beijing sunshine wouldn't let him get back to sleep. Something unusual about the scenery outside caught his eye. From the window of the twenty-third floor apartment, he wondered for a second why everything looked so, so smooth outside. He put on his glasses. A thin layer of brownish dust covered rooftops, walkways, cars... "*Who invited the Gobi?*" There had been a sandstorm overnight. It's that time of year again.

Shit, shower, shave. 6:05 a.m. Time for some Slashdot, Digg, eBay and Co. before he had to leave for work. While he waited for the computer to boot so he could go to Netvibes, he got a soda from the fridge. This morning one story stuck out and managed to get his attention:

> Molecular Dynamics Simulations of the Complete Satellite Tobacco Mosaic Virus. Get this: A team of scientists managed to pull off the first computer simulation of an entire life form.
>
> The simulations followed the life of the satellite tobacco mosaic virus, but only for a very brief time.

No kidding! A whooping fifty nanoseconds worth of a million atoms representing some RNA inside a small protein shell floating in a droplet of salt water. "*I, for one, welcome our new simulated viral overlords. Whatever.*" It apparently took them thirty-five processor years over fifty days to do the job. Not exactly real time.

Off to work.

As usual, Guido had no trouble finding a taxi he liked. New Hyundai, no cage. Beijing was gearing up for the 2008 Olympics and not in a small way. The signs were everywhere. Just recently, a major overhaul of the old street from the airport towards the third ring road had been completed. Modern public transport buses had become the norm, and the replacement of the crappy Xia Li taxis by nice VW and Hyundai models that had started two years previously was scheduled for completion by the end of the year. The weird thing was that the old and new models charged the same fare, 1.6 RMB per kilometer. It was beyond Guido why anyone would still ride the old models. Just five years previously they had phased out the infamous Mian Di microvan taxis. They were rather dangerous considering the crumble zone was the driver's face. Welcome to China!

"Xu Na Li? *Where to?*" asks the driver.

"Guo Men Da Sha—San Yuan Qiao," Guido answered. He started to read his book. It would take a while to get through the morning rush hour. The usual ritual.

The country had made an enormous leap ahead in the past twenty-five years since he had first come to China with his parents who had started out on a diplomatic mission and ended up founding a consulting company. The industrialization of the country effectively transformed a failing peasant state recovering from Mao's cultural revolution into the world's workshop, lifting hundreds of millions peasants out of dire poverty in the process. As a consequence of tumbling commodity prices resulting from the newly activated workforce, the Western middle class could afford lifestyles enjoyed only by kings as recent as one hundred years previously, the lifestyle minus the responsibility. Throw in a little more cash, the willingness to travel and some dodgy morals, and you could be a true Sultan from *One Thousand and One Night.* including a harem in Bangkok, hashish in Amsterdam, and slaves in Sudan. Totally legal too—well, except for the slaves, perhaps.

The effects on China's entrepreneurs and upper middle class were enormous. At last count, Beijing alone had twenty-three Ferrari dealerships and the Porsche 911 acquired the fitting nick name of Er Nai *mistress* for being the bribe of choice to appease the twenty-something second wives of the richer middle-aged businessmen. Vulgar status symbols were the norm in Beijing, ranging from Luis Vuitton bags to twenty-four karat gold mobile phones. Nothing says, "I am better than you," than a useless luxury item costing twice your annual salary.

More or less single gals in their early twenties hung out at the well-known expat watering holes dressed in fairy costumes *sans* the wings, featuring little crowns and glitter laced eyes in hopes of scoring with a well-off expat silly enough to finance their need for the latest fad gadgets for a while. China had entered the Bling Dynasty.

What China had kicked off in the physical world of goods and products, the Internet had started in a much more potent form in the intangible and, as of yet, poorly understood, realm of bits and bytes. Larry and Sergey, the Google dream team, made two million bucks per day, every day from concept to IPO, and Google's share price had quadrupled since then. Respect. The Internet bust seemed long forgotten with Web 2.0 attracting venture capital like shit attracts blowflies. Being a computer geek growing up in China, Guido had experienced both revolutions firsthand. As long-nose foreigner, he had the added advantage of being an outside observer and enjoyed the best of both worlds by not getting caught up in the rat race among the locals for pristine jobs while enjoying the unwritten law of being granted a foreign devil's jester's license.

Shriek! Guido looked up from his book, mildly interested. The taxi driver had to break sharply for another car coming from the bicycle lane forcing its way into the road.

"Cao Ni Ma!" he started cursing. Guido continued reading. China's traffic could be described as chaotic at best. It was a mixture of Darwinistic driving and telepathic taxi drivers. Traffic accidents had killed 142,671 the previous year and the only bump in the upward trend in the statistic had been during the 2003 SARS epidemic when people were too damned scared to drive and road deaths dropped 13.7%. Well, it was a country with eighty-six percent of drivers in their first year. What do you expect?

As the taxi turned right to enter the third ring road, Guido decided that the traffic was good enough to take the U-turn further down the road to the office instead of leaving the third ring early. Four minutes later he arrived. Sixteen RMB. Not too bad for a Friday.

Guido was an acceleration aware programmer at a China-based software outsourcing company.

"Morning Juliet," he greeted the receptionist who was usually in the office before he was.

"Morning Guido," she replied.

On the way to his cubicle, he thought about the day ahead. Before he could join the Future Salon in Second Life, a liberty he took once a month as compensation for staying late every other day to participate in phone conferences with US based clients, he had to catch up with Ned who had requested an early meeting the evening before. Ned was one of the foreign project managers Guido had worked with twice. After quickly skimming over his e-mails to make sure there were no bush fires that need his immediate attention, he left for the 9:00 a.m. with Ned.

The meeting started a few minutes late once all the participants arrived.

Ned began with his usual introduction. "Listen up! Mirand tested the ROI application we delivered on Monday in her environment and found a number of issues." Mirand was the client's bridge engineer in the US. Ned never spoke of "bugs," only about "issues." He was a firm believer that language defines reality. Nothing like the sound of doublespeak in the morning.

He handed out a piece of paper and continued, "So, I have prepared a list of things we need to look into again."

Scanning the list, Guido recognized that his export function was mentioned. "*Why didn't I pick this up during unit testing? Latest QC should have raised a red flag.*"

As if Ned could read Guido's mind, he went on. "Looks like our staging environment did not match their productive system one hundred percent after all." He focused on Ben Gu. "Ben, see me after the meeting to discuss this. The rest, dismissed."

Ben, as the one working on the test cases with the client, was in deep shit.

"*Great! We worked the entire weekend to finish the project in time and avoid penalties,*" Guido thought. He knew that he would probably miss out on a good chunk of his project bonus due to Ben's fuck-up. Mirand was Chinese through and through. She would not sign off until everything was more than perfect. She was tough, but fair, not like other clients who would ignore signed-off system requirement specs or constantly twist the screws for some free extras for kicks. But still, no sign-off meant penalties, and penalties meant Ciao-Ciao bonus. Back to work.

Guido returned just in time for the start of the Future Salon. Guido logged onto Second Life and noticed that his best buddy Alecz was already there with most of the regulars. "What's up, asshole?" asked Guido.

"The ceiling, idiot!" said Alecz.

Guido and Alecz had been soul mates as long as Guido could remember. After Guido had moved to China in the early eighties, they had stayed in touch, first by mail and occasional phone call, and later using Skype and e-mail. They spent every second vacation together either sailing in Holland or diving in the Philippines.

Today John Smart was speaking on "How to be a technology futurist." Guido was disappointed, not because John wasn't a great speaker, but because Guido knew John's repertoires by heart and had hoped he would introduce at least one new meme. Not today. The others stayed for a bit afterwards to chat and joke, but Guido had to get back to work.

In the meantime, Ben came up with a revised test environment so that Guido could spend the rest of the morning tinkering with the export function. Guido managed to finish everything by lunch time, entered the time he spend on this task in the internal effort tracking tool, and went down to have lunch in the canteen.

Guido's company paid his rent, lunch and salary. Benefits were not bad, either. In addition, he managed to beef up his finances by spending an hour each day auctioning off cheap junk from the local tourist markets on eBay to European and US bidders. If the buyers knew he was making ten times what he paid for the stuff in profits... These dumb assholes were paying unbelievable prices. Per hour, Guido made five times his monthly salary this way, but he couldn’t quit his day job—yet. Overall, he was doing more than OK. The rest of the world would need another twenty years to understand the prices that are possible with a workforce of a billion people, but to understand China, one had to live there at least three years.

Guido was of the opinion that everybody arrived in China twice. First came the physical arrival when leaving the airplane. The second arrival was a gradual realization that China was different, different from the movies one had seen, different from the stereotypes, different from everything. He was also of the opinion that these differences could only be experienced, not explained, not so much because he could not find the proper words, but because newcomers could not grasp the implications. Like telling someone that cars in China did not work on Sundays, for example.

The newcomer would nod and say, "Sure!" with all the signs of understanding, but would still act surprised when he wanted to go on a joyride the next weekend and found out that the cars were out of order. Guido generally left newcomers to themselves until they started to mention whatever epiphany they had had in terms of the Chinese way of life. In Guido’s experience, it took somewhere between six to nine months before one could have a sensible conversation about the Chinese condition with a China freshman.

Lunch was good that day. Chopped liver with onions, shredded pork with garlic sprouts, and rice, of course. Guido sat down opposite Mark, the account manager looking after strategically important accounts in the US.

"My new counterpart wants to renegotiate the rates for the COBOL team." Guido said.

"Can't they just suck it up? Good mainframe devs are expensive. Deal with it! If you insist on paying peanuts you end up getting monkeys."

"Fuckers!" Guido agreed with this typical statement in conversations with Mark. Showing sensitivities wasn't Mark's strong side, but he was a good guy who liked to blow off some steam now and then, and with Guido he knew he could. Guido finished lunch first.

"Want to go on an excursion?" Guido asked while they returned their trays. That was code for talking a walk around the block before heading back to work.

"Sure!" The weather was nice and they had some time left so Guido and Mark took the long route.

"My god! Did you see the sex shop? Plastic pussies and everything!" Mark noted on their way back.

"Yup, better masturbate than replicate, I guess."

Mark chuckled.

The one child policy introduced by the Chinese leaders in 1979 had become necessary after Mao's desire to breed future soldiers led to a jump in China's population from 540 to 800 million in the three decades following the founding of the Peoples Republic. The following twenty-five years saw the population explode further, adding another 450 million while tripling life expectancy from a mere twenty-four years in the 1930s to over seventy years in 2005. *Who lives long gets old,* but that problem wouldn't need to be solved for the next forty years. Now add to that the facts that this massive increase originated mainly from uneducated families that were told to have as many children as possible and that the intellectuals of that era were effectively brainwashed or executed, and you see the China of today in a completely different light. As with many things in China they start to make sense if you look at them cross-eyed enough.

Back in the office, they went straight to Friday's team meeting. The COO introduced a new feature in the project tracking system and split the attending crowed into pairs and gave them another ten minutes to go over the issue again. That was his method of making sure everyone got the point.

Guido had no trouble following the explanation, so he sat with Jim, one of the Chinese developers, to summarize what had been discussed.

When Jim had applied for the job, he had put Hunk as the English name in his résumé. One of the main concerns of overseas clients is the level of English the project managers and developers can understand. This particular one had no idea that the name he had chosen for himself translated to *well-built, sexually attractive man*. Or maybe he did, which would make the situation even worse. HR simply renamed him Jim and was done with it. Making sure new staff got an appropriate English name was part of the hiring process. Among other English names that Guido had come across over the years were Tree Man, Eleven, Brain, Mikey and his friend Mouse. Guido saw the name issue as a window into the Chinese psyche.

"So, the earned value methodology tracks actual project performance against plan and predicts schedule as well as budgetary adherences at the end of the project," Guido explained.

Jim nodded.

"So you understand?"

"Yes."

"Great! Please repeat it to me in your own words," Guido said with a smile.

Silence.

"*Here we go again.*"

Jim was new and that meant he had not expected to be challenged on this.

Shortly after starting to work in China, Guido realized that most Chinese would not admit that they did not understand something or ask for an explanation for fear of losing face on one hand and because it just wasn't part of the culture to understand something. Those who ask too many questions were seen as trouble makers. Guido knew he was being insensitive, but he preferred being perceived as insensitive to having to clean up behind other people.

After a few more minutes Guido was confident that Jim understood and he went back to work. Guido lived by Hanlon's razor, "Never ascribe to malice that which is adequately explained by stupidity." Giving people the benefit of the doubt had worked remarkably well for him. In addition, thinking of other people as stupid instead of mean gave him a certain peace of mind. Guido had always been a bit full of himself.

The rest of the afternoon turned out to be rather uneventful. Then Alecz Skyped him. Alecz wanted to hop over for the weekend to catch up with Guido. "Don't plan anything for Saturday and Sunday." Typical Alecz, calling Friday afternoon to make plans for the weekend. "Mind picking me up? I'll take the SQ820 arrival in Beijing."

"I know. I'll pick you up at 8:30 a.m., no worries."

"We need to talk. Love you!"

"You, too. See you soon!" Guido was looking forward to a weekend with his buddy.

Work was over at 6:30 p.m. Mark and a few others went to the Souk to have a couple beers and chicken skewers and smoke a Shisha or two. The Souk was pretty crowded and besides his colleagues, Guido recognized a couple of the regulars. There was Jack, for example. He was a heavy womanizer and went through girlfriends like other people went through undies. It was astonishingly easy for guys like Tom, average by all accounts, to get laid in Beijing. So easy, in fact, that he had a stated mission to have sex with a girl from every province in China. Last time Guido had checked, Jack had ten down and thirteen to go.

Jack had a system for keeping track of his conquests. Every girl's phone number was saved into his mobile phone with two preceding numbers. On a scale from zero to nine, the first number would rate a girl by her looks, and the second number would indicate the likelihood of getting her laid. Once the deed was done, he would add either a + or a – in front, as relevant. Guido did not endorse Jack's behavior but there were so many men like Jack in the

Beijing expat crowd that Guido could not easily avoid their company. Womanizing was a very popular sport.

Picking somebody up was as simple as catching a girl's eye and getting her to return a smile. Once that was done, asking for the mobile number was a piece of cake, and getting into bed was usually a dinner or two away. Guido tried girl-hopping for a while after breaking up with his long-time girlfriend and although it gave him some extra experiences, positive as well as negative, he quickly decided that it wasn't for him. Since then, he had met his current girlfriend and was happy with her. She was cute as well and crazy enough to keep the relationship interesting. Right now, she was on a business trip to Kunming and wouldn't be back till next week.

After the second Shisha, they asked for the bill and took taxis home. When Guido arrived shortly after 10:30 p.m., he was not ready to go to bed. Since the next day was Saturday, he slipped out of his clothes and into his PJs, turned on the computer and logged into Asheron's Call. There were fancier massively multi-player online role playing games available, but Guido liked the total freedom Asheron's Call offered to gimp one's toon. It took him six rerolls to get the stats about right. He was about to graduate with his life and war magic speced battle mage that would not reach its full potential before level sixty. Only two levels to go before getting item magic. At the moment, that char was relying on his ax guy on another account for item buffs.

He appeared where he had logged off, near the entrance portal of the Black Spawn Den in the plains. There were lots of Tusker Guards and Slaves down there to level safely to level sixty. One only had to avoid the Virindi further down. One Imperil and a Bludgeon Vulnerability V and his aspiring battle mage would get creamed real good but Guido got the spawns on the first level down pretty well, and as long as he was alone in the dungeon, he could hunt nonstop and make a ton of XP.

Guido logged the other toon in and buffed his battle mage up good. After hitting the entrance portal with the mage, he realized that he would not be alone that night. A sword guy named The Punisha was already there hacking away at a group of Slaves with his flaming Tabuka. Guido did not know him.

"Hey there! Wanna group?" Guido asked.

No response.

"Fine!" He ran past the group of Slaves to the next room to get some action himself.

As he passed the group, he aggroed one of the Slaves who followed him till he reached a corner. As battle mage, it was imperative to get one's butt to the wall and drain health and stamina first before vulning and finishing them off with a Fire Bolt V. Mana. Health and stamina management could be tricky for a battle mage below sixty. Guido however wasn't doing this for the first time, and seldom got into trouble.

Guido played for a couple of minutes and saw a slow but steady inflow of XP. While fighting a bunch of Guards further down, The Punisha pulled up to Guido and started hacking away at Guards he has just vulned.

"Do you mind?" Guido asked.

"Fuck you! That was for stealing my Slave just now."

"Take a pill, will ya?"

"Watch it, asshole. I fucked guys in prison that were twice as hard as you."

Guido had a special place in his heart for these grievers, nothing a brick in the face wouldn't fix, though. The anonymity of the Internet could bring out the worst in people. *"What a trash-talking motherfucker!"* Guido knew better than to enter into a mud-slinging contest with this kid so he @ignored him and reported him to a sentinel. They would take care of him, but the fun was gone for Guido.

11:17 p.m. Guido ran back to the entrance and logged out for the night without making it to level fifty-nine.

Time to go to bed anyway, so he walked to the bedroom, set the alarm for 7:30 a.m. and called his girlfriend. "Hi baby. How are you?"

"Honey baby! Love you—today was stressful. This bunch of amateurs can't do a thing right."

"Sorry to hear that, baby. Don't be upset. Will sleep now. Miss you."

"I won't. Miss you, too. Dream of me, OK?"

"Sure. Give me a kiss." Guido heard the familiar sound of an air kiss through the phone.

"Love you, baby. Talk to you tomorrow. OK?"

"OK. Bye, honey. Sleep well."

"He hung up, turned off the light and closed his eyes.

2

Logical contradictions are unthinkable in reality.

—Fritz Mauthner*, Critique of Language*

The next morning, Guido woke up feeling rested and full of energy. He checked the alarm clock. 7:27 a.m.

"Nhhrrg-aahh!" Guido yawned and performed a long, drawn-out stretch that would have made a contortionist proud. It was a day for siring heroes.

No time to go online. Alecz would arrive soon. Guido quickly went through his morning ritual. He put on the jeans and a shirt Simona had bought him and went downstairs to catch a taxi to the airport.

At this hour, the drive to the airport was a breeze, and he arrived barely twenty minutes later. Guido did not have to wait long and Alecz came through customs with light baggage. He had company.

"Alecz! Good to see you!" They hugged before Guido turned toward the surprise guest.

"Hi! I am Guido Borner."

"I know. My name is Dr. Hugenoth." Dr. Hugenoth smiled. "Call me Ralf."

"He's a good friend of mine," Alecz added.

Ralf, who had brown hair, was tall, athletic and slim He wore beige cloth pants and a short sleeved white shirt with embroided blue flowers. He had no baggage.

"No luggage?"

"No—I am traveling light today."

"How about an early brunch in the St. Regis?" Guido suggested. Since the others had no objections, they grabbed a cab and headed for the St. Regis near the International Club. It was a quite far from the airport and a bit expensive, but the brunch there was unsurpassed in Beijing.

They used the long ride to catch up while Ralf sat quietly in the front seat.

"So Ralf, what do you do?" asked Guido.

"I am a computational neurologist."

"Cool." Guido meant it. He made a mental note to engage Ralf in a more detailed discussion later.

Brunch was fantastic and they ate way past satisfying their hunger. By the time they got around to paying the bill, it was almost lunchtime. Ralf insisted on paying.

It was time to check into their hotels. As usual, Alecz stayed at the Holiday Inn Lido hotel mere minutes from Guido's place while Ralf made reservations at the Kempinski.

Guido was tired from all the food and Alecz was tired from the overnight flight from Singapore. Ralf was doing fine, though, and wanted to do some sightseeing. The plan was to split up and meet again at the Lido Starbucks before heading to The Orchard, a nice quite restaurant surrounded by pear trees with a lake in the suburbs of Beijing.

"Bring your telescope," said Alecz. "The weather is gorgeous and I haven't been stargazing for a while,"

Guido owned a nice telescope with a sixteen centimeter aperture and 1.2 meter tube. With the smog over Beijing and all the ambient light, they could see only the brightest stars, the planets, and the moon, but even that could be fun on a clear night. Guido looked skywards for a moment. The view wouldn’t get much better than that night.

A two-hour nap and lots of Internet later, Guido took his packed telescope, and headed for the lobby of the Lido. Ralf was waiting for Guido already while Alecz showed up three minutes later. The ride to The Orchard took twenty minutes and by quarter past nine they had finished dinner and were comfortably sitting around the telescope in the middle of a small island in the lake smoking cigars, talking and taking turns with the telescope. The island was connected to the main building by a small wooden bridge and a walkway that went all the way around the lake, which was lined with bamboo, flowers and all kinds of neatly arranged vegetation.

It was Alecz's turn to take a look. Jupiter was in the viewfinder and one could faintly but clearly identify the planet's cloud bands and the great red spot. Spectacular. At this magnification, one had to constantly adjust the telescope's orientation by turning its longitudinal tracking knob to keep Jupiter from disappearing out of the field of view due to Earth's rotation around its own axis. Guido loved this stuff.

"So, what exactly does a computational neurologist do for a living?" Guido asked.

"We work on creating strong artificial intelligence by modeling the human brain inside a computer," said Ralf.

Guido was intrigued. He recalled that strong AI, as opposed to weak AI, was a hypothetical form of artificial intelligence that could truly reason and solve problems.

Ralf continued, "The strong AI we are aiming to create will be sentient and self-aware while exhibiting human-like thought processes."

This was starting to get interesting.

"Where are you at?" Guido asked. "How much longer till you get some real results? Twenty to thirty years?" Results had been promised within twenty years since the 1960s.

"Well," Ralf responded and took a long draw from his cigar, "we are more or less done."

Guido knew that Ralf was pulling his leg. Computational power was nowhere near the levels necessary to create human level cognition. If it were, it would have been all over Digg by now. "Ha, ha, ha!" Guido laughed and looked at Alecz.

"Seriously," said Alecz, "the Turing test was successfully passed sixteen years ago."

"Riiight!" Guido threw at Alecz. "What the fuck do *you* know about strong AI?" Guido was only half joking this time.

Alecz and Ralf exchanged looks. "Wanna bet?" said Alecz.

Guido looked at them in turn, focusing through half-closed eyes. They did not flinch.

"Sure." "About what?" With the opportunity to prove them wrong, his anger faded and he regained his confidence.

"OK, this is the deal. We prove to you that strong AI exists—today," said Alecz. "When we win, you promise to think about an offer that we have to make."

"Cool. And if you loose?"

Ralf picked up where Alecz left off. "We won't. But just so we can move on, if we loose, you get to keep this." he reached inside his pocket and pulled out a wooden box the size of a soda can and put it on the table.

"What is this?" Guido asked.

"Open it," said Alecz.

Guido picked it up. It was beautiful. The box was intricately carved and laid out with red silk. In the middle was a golden cylinder with the diameter of his index finger and the length of a Mont Blanc pen. Guido put his hand forward to touch the cylinder while throwing an asking glance at Ralf. Ralf nodded. Guido lifted the cylinder to find it was unnaturally heavy. *"Is this gold?"*

"It's gold," Alecz said as if he could read Guido's mind. Guido did not doubt it for an instant. He had a thing for precious metals. While turning the cylinder in his fingers, Guido saw a carving in a serif font type he had not noticed immediately. It read, "Seeing is believing." The words almost resonated in the back of his head. Guido quickly put the cylinder back into the box.

"OK, I will humor you," Guido replied while putting the box back on the table.

Ralf took a sip from his glass. "Would you consider yourself sentient?" he asked.

"Of course.""

"Self aware?"

"Come on!" said Guido.

"Do you exhibit human-like thought processes."

Guido mocked them by taking a second to respond.

"As far as I can tell."

Ralf looked him sharply in the eye. "How would you react if I told you that it is you?"

It took Guido a while to realize that Ralf meant he was a strong AI. This was going too far. "I would tell you that you are fucking nuts."

"Fine. Would you mind taking off your glasses?" Ralf replied calmly.

"Now they are certifiably insane." Guido asked, "What does this have to do with anything?"

"Just do it."

Guido's glasses weren't the geeky kind. He got the thinnest glass and least obvious kind possible. Contacts seriously irritated his eyes and only partly compensated for his strong astigmatism. He was a bit vain – but neither vain enough to walk around as blind as a mole nor looking like a cry baby. Laser surgery would be an option at some stage, but he just hadn't gotten around getting it. Guido took off his glasses.

"Now what?" Guido said while blinking to focus. Something was subtly different. Then he realized that he did not have to adjust his eyes. Guido looked first at Alecz and then at his glasses in disbelief. *"How is this possible?"* His eyes were doing just fine without the glasses. Everything was crystal clear, perfect twenty-twenty vision.

Alecz bent forward to talk to Guido. "See, buddy?"

"Yes," Guido said, still a bit startled but getting a grip on himself. "This is impossible."

"Not quite, just highly unlikely," Ralf replied. "How about you take another look through the telescope?"

Guido felt numb but managed to get up to press his eye against the eyepiece of the telescope. What he saw rocked his world. A trillion stars in vibrant colors swirled around a central black hole forming a spiral galaxy. It was shocking, yet beautiful. He backed away from the telescope and tumbled in his seat.

"Think about it," Ralf said. "Until now you have been living under the assumptions of a continuous and persistent reality. There are three logical conclusions that can be drawn from

your experience tonight."

Ralf's explanation was very matter of fact and after slowly overcoming his initial shock, Guido followed it with interest rather than fear.

Ralf continued, "One: You have gone insane."

Guido did a quick self-check. He was feeling great. No paranoia, disorganized thoughts or anything that could indicate anything other than being in a perfectly healthy state of mind.

"Two," said Ralf, "you have been living in a magical kingdom all these years and only now wised up to it." "Or finally three—"

"Technology," Guido said calmly with his eyes focused on infinity.

"What?" said Alecz. Now he and Ralf looked puzzled.

"Any sufficiently advanced technology is indistinguishable from magic," Guido said in his best quote intonation. "I am inside a fucking virtual simulation?" He could not quite believe it yet, but his improved vision and what he had seen through the telescope could hardly be explained otherwise.

"Sorry, buddy. This was the hard part and you took it well," said Ralf, who seemed strangely relived.

"The hell I did." Guido had sill not come to terms with his freshly acquired insights. Apart from his new twenty-twenty vision, nothing had changed, and he was feeling fit as ever.

"So this is all like a dream? And how come you guys are only telling me now? Alecz, how long have you known about this? Are you also simulated? How about all the others?" Guido eyed the waitress standing a bit to the side.

Ralf and Alecz exchanged concerned looks. Alecz replied, "Look, buddy, some of the others are also simulated, like Jack and the waitress you are looking at right now. But not like you. You are different—physically correct while Simona, Ralf and me, for example, are logins, real people that share your simulation space but on a non-executive level, purely representative."

Guido was not sure he understood. "So there is me, a physically correct simulation like this virus I read about the other day?"

"Exactly!" Ralf burst out.

Guido continued, "And then there are people like Jack, extras if you will, that are…what?"

"Weak AI controlled avatars," Alecz replied.

"Fine. Then there are you two, Simona and whoever else who are logins. Logged in from where?"

"Reality," said Ralf.

Guido, who had the impression Ralf had been through this before, leaned forward in his chair, put his hands together fingertips against fingertips, extended his lips and rhythmically tapped his index fingers against his lower lip. "Why? Why me, why this?"

"Well," Ralf began, "the truth is that all efforts to create a strong human level AI effectively bombed around the 2040s with Rougen and Wang's proof of the applicability of Bertrand Russell's and Kurt Goedel's conjecture of the brain that a formal system that looks at itself is bound to fail in self-understanding, meaning that the brain cannot understand itself. As a result, humans will never be able to create strong AI by scientific means."

Guido was getting dizzy. *"2040s? What year are we in now? No, don't even ask!"* "But you said I am strong AI."

Ralf continued, "Exactly right. You are a physically correct atomic simulation that started with the virtual fertilization of a virtual egg. Protein folding has come a long way since what you have probably heard about as Stanford's Folding at Home. In the beginning of that project, only relatively simple proteins could be simulated and even those only in timeframes measured in microseconds. Now it is possible to go beyond simulating single proteins, or small viruses over tiny fractions of a second. We can create an atomically correct representation of a human egg as well as an atomically correct human sperm, throw them together and hit execute. The computer system will then apply molecular dynamics and quantum interactions on the atomic level to accurately calculate how the atomic interactions will cause fertilization based on the laws of physics."

"Virtual fertilization? How is that supposed to work?" Guido asked.

It's all an intricately detailed dance of timed chemical chain reactions, really," said Ralf. First, the chemical composition in the egg and the sperm will cause sperm-egg attraction, which will result in the binding of the spermatozoon to the zona pellucida, which, in turn, initiates an acrosome reaction causing the release of the enzyme hyaluronidase. That enzyme actually digests that hyalurinic acid matrix in the vestments surrounding the oocyte."

Guido was listening in amazement, too fascinated with the torrent of words to manage an interruption.

Ralf continued, "After digestion of the hyaluronic acid matrix, fusion between the sperm and oocyte plasma membranes occurs, allowing the sperm nucleus, mitochondria, centriole and flagellum to enter into the oocyte. Once the ovum fuses with a single sperm cell, a chemical reaction causes its cell membrane to change, preventing fusion with other sperm. Et voilà! The fertilization is complete."

"As easy as that, eh?" Guido mocked.

"Well, that's how it works in a nutshell."

"And after fertilization?" Guido almost bit his tongue for fear of having encouraged another post-grad Bio-Chemistry lecture.

"Oh, from that point forward its essentially protein bio-synthesis, the process of transcribing DNA into mRNA before translating the three-nucleotide sets—or codons—into amino acids that, chained together by peptide bonds, form the proteins. Before protein folding starts, some post-translational modification of the protein takes place."

"So what you are telling me," Guido summarized, "is that human biology is essentially chemistry that follows the laws of physics that can be expressed using math that can be programmed into a computer that in turn does the simulations?"

Ralf looked surprised and answered, "Yeah, exactly."

"*Why didn't he say so to begin with? Show off!*" "And all this in a in a virtual womb?" Guido smiled.

"No, more like a virtual petri dish." Frank replied.

"Smart ass!" Guido thought "Whatever. So this simulation has been running continuously for the past twenty-eight years?" Guido had turned twenty-eight in April.

"Not quite," said Alecz. "The first six years were simulated in one hundred times real time with sleeping time sped up to mere seconds. The first logins you encountered were your parents when you were three. During your interaction with logins, the simulation had to slow down to real time for obvious reasons, but even then we could archive an average of five times real time during the day since your login interaction was limited to key people in…your life."

"In conclusion, we started your simulation about three years ago," Ralf quickly added to brush over the moment.

"Couldn't you try to simulate the neurons instead of going to such lengths as building an atom by atom simulation? There must be trillions of atoms in the human body," said Guido.

"Actually there are eight point one four seven eight times ten to the power of twenty-seven plus change, at least in yours. And believe us, we tried everything to come up with something useful. But the models just would not "spark up" for lack of a better word, and nobody could figure out why. Nothing worked short of an atomically exact and physically correct simulation at the quantum level," said Ralf.

The consequences started to seep into Guido's consciousness "Look, I did not ask for this. What the fuck were you thinking?" Guido said.

"Well," said Alecz, "human rights groups thought the same way and your case, as well as the entire project, was decided upon by the International Court of Human Rights in Den Haag. You will be pleased to hear that you have the same legal status as any other human being."

"At least something."

"And with the visibility this project has in the media you can be sure these rights will be upheld," Alcez continued.

Guido felt much better after this and calmed down again. "This does not answer the question of why. What is the point of simulating a human being? Don't you have enough out there?" he asked.

Ralf said, "Actually, it is not human level strong artificial intelligence that we are after. We've had the ability to create human level intelligence for the past hundred thousand years. It usually took nine months and rarely left an impression on the course of history."

"Babies," Alecz added.

"It is intelligence that surpasses human levels that we are interested in," said Ralf.

Guido was confused, "What makes you think that I can help you with that?"

"We have an offer to make to you," Ralf said.

"What makes you think I'd even consider it?" Guido wanted to get the situation under control again.

"Well for one thing, you have lost the bet, remember?" Alecz smiled as he spoke.

"Damn!" Guido felt he had been set up. It was getting late, and although tomorrow was Sunday, Guido did not want to stay up any longer. Would he even have to go back to work on Monday? After all, he was literally the reason this whole universe existed. He asked for the bill.

"It has been taken care of," said the waitress.

"Of course." Guido knew that his life, his existence, would be very different from what he had known.

"How will this go on now?" Guido asked no one in particular.

"Take a rest. We will talk more tomorrow," said Alcez.

Back at home, Guido went to bed and almost immediately fell into a long sleep.

3

A High IQ is like a Jeep. You're still gonna get stuck, just further away from help.

—Anonymous

Things always looked brighter in the morning. The first thing Guido did after waking up was call Simona. He had met her a couple of years back over the Internet and it turned out that she genuinely loved him, and that as far as she was concerned, their relationship would continue as if nothing had happened. He was surprised to learn that Simona had sometimes been letting him be with her weak AI avatar instead of the real her, but he soon understood that she just could not keep up with his minute sleep cycle and five times higher sex drive. Guido found continuing the relationship weird at first but wanted to think about it in more detail later.

If he had not noticed in the past, he may as well not notice in the future. He was not sure, though, that he could live with a lie indefinitely. Simona assured him that his version of 2006 was the historically correct one. She did not want to discuss what year it really was, and that bothered Guido.

After making himself presentable, he met up with Ralf and Alecz at the temple of heaven in the southwest part of Beijing. Guido always loved it there. The thought that all this existed just for him amused him and he had a considerably more positive outlook on the future than he had had the previous evening. It felt good to be the master of the universe, and although nothing seemed to have changed, the mere knowledge of his special status gave him goose bumps. *"Just be careful not to become a megalomaniac." No need to get arrogant over this."*

The weather was still great, and Guido wondered if it would be good weather forever now as they sat around a table in the garden of the temple where birds sang and the warm wind gently moved the branches of the trees.

Guido was in a deal-making mood. "So, what is this offer that you mentioned earlier?"

"Let me give you some background," said Ralf. "What we are suggesting is pretty straightforward. Since we have a strong AI in the form of your brain's atomic quantum states, we've spent the last two years figuring out how we can take that and improve upon it."

"So you want to speed up my brain?" asked.

"Not quite," Ralf continued. "We had sped it up considerably already by running it up to one hundred times faster than real time and the only result was that you made the same things and thought the same thoughts. You just did everything one hundred times faster."

"What we have in mind is something different. You see, to simulate all the atoms physically correctly was a necessary evil to get where we wanted to be in terms of brute forcing strong AI."

Ralf looked at Alecz, who nodded and said, "But now that we have the building plan, we can get rid of all the overhead and create a functional simulation of your brain instead with ten to the power of thirty-five less computational resources."

"Guido knew that the computer running his simulation must be at least one hundred million billion, billion, billion times faster than a computer capable of the calculating at the power of the human brain. It was mind boggling.

The fastest supercomputer in Guido's simulation was capable of about a petaflop, or ten to the power of fifteen calculations per second. The human brain was believed to have about ten times the calculation power of that. Since he was a regular at the future salons in Second Life, he had a vague idea that a computer, even a super computer, capable of… He did the math in his head. *"Ten to the power of fifteen for the fastest supercomputer plus one to reach human brain capacity plus thirty-five plus two for the one hundred times real time speedup."* Ten to the power of forty-three calculations per second must be at least sixty to seventy years into the future. And that was assuming Moore's Law really followed a second level of exponential growth as suggested by Ray Kurzweil. If not, it would be more like 160 years. He shivered.

"What are you telling me exactly?" Guido asked.

"Well," Ralf continued, "legally we cannot force you to do anything, but if you would volunteer, we could use your cognition matrix, and not only speed it up, but broaden its scope."

Alecz jumped in. "In other words, a human brain has roughly one hundred billion neurons and the number of these basic building blocks, the transistors of the brain if you wish, fundamentally determines the cognitive capacity of the system."

"You want to increase the number of neurons in my brain?"

"Not exactly," said Alecz. "We will vectorize your cognitive matrix and scale it up."

Guido looked at Ralf. "Intelligence amplification?"

"Exactly!"

"What will happen to me?" asked Guido, and from the faces of his companions, he could tell that he had hit a sensitive area.

"Nothing, really. You would continue to exist just as you do now," said Ralf.

"So what's the big deal then?"

"Well, just in case—and this is purely hypothetical—should the experiment fail, we would be required to…to terminate it. You know, to stop any possible future chance of creating a strong AI that could suffer a catastrophic failure of friendliness that we may not be able to contain and prevent potentially larger damage in the future."

Guido suddenly felt empty. "Terminate the experiment? You mean fucking kill me, don't

you?"

Alecz quickly added, "And this is exactly why we need your informed consent. Nothing will happen if you do not agree."

"And if I refuse?" asked Guido.

"Then you would live happily ever after. No strings attached," Alecz replied.

"If you don't create a strong AI, someone else will in the future. And that someone probably won't have your high moral standards," Guido said.

"Could you imagine the liability lawsuits our company would face if we even thought about trying to continue after a potential failure of friendliness with the potential to wipe out the human race? The increased insurance premiums alone would bankrupt us," said Ralf.

"So in the end, it's all about money, isn't it?" said Guido.

"It is a risk, but the returns can be astronomical. For you, too, Guido." Alecz said.

"Really?" Guido said. "Are you implying there is something in it for me?"

"Now that you mention it…" Ralf pulled a document from his briefcase and handed it to Guido. "Here, have a look."

Guido scanned the first couple of pages quickly. It was a contract.

Ralf suddenly sounded very business like. "The company is offering you a five percent stake in the enterprise in return for your, let's just say, participation."

Guido had no clue whether the offer was fair. He felt bold. "Ten percent," he demanded.

"You have no idea what you are asking for," said Ralf

"Yes, I do. I want ten percent."

"Ten percent is an awful lot of something you do not even understand," said Ralf.

"And ninety-five percent of nothing is still nothing. Your call."

Guido had Ralf by the balls and Alecz smiled. Ralf looked at Guido, leaned back in his chair, closed his eyes and put his head backwards, facing the sky.

A second later, he opened his eyes again. "Done! Ten percent it is."

"Yes!" Guido felt great. "But how can the experiment fail? It sounds like a solid plan to create greater than human intelligence."

There was no doubt in Ralf's voice. "Yes, of course the experiment will create greater than human intelligence. That has never been the question. The question is whether it will be

friendly."

Guido shrugged.

"Failure of friendliness could mean the replacement of humanity as dominant species in the solar system. We could not allow an entity with an IQ of one thousand plus to exist should there be only the slightest chance of its being hostile or even indifferent to us. Surely you understand."

Guido understood perfectly well.

"That's why we are putting safeguards in place." Ralf said with confidence.

"Which are?"

"It's a bit complicated, but in essence, we will decide how bad we expect the situation to get, build one layer of safeguards that can detect and handle any problems that are twice that bad, then build a second layer of safeguards that can handle any problems ten times *that* bad. We will then pretend that our first set of safeguards is the only set; if they ever fail, we ditch the whole experiment."

"And all that without the AI even knowing about these safeguards," Alecz added.

Guido said, "But then all you get is a storm in a water glass that will not be able to leave any impression on the world without passing through human level intelligence filters first. That would limit any output gain to human level intelligence." Guido was proud of himself.

"Exactly! And that's all we are after at this stage," said Ralf.

"Boooring." Guido was disappointed.

"Eventually, once we have thrown a couple of scenarios at it and are confident that a catastrophic failure of friendliness is virtually impossible, we will think about next steps. The potential benefits are enormous." Ralf's eyes sparkled as he spoke.

Now it was Guido's turn to lean back in his chair. He put his hand to his chin and stroked it gently.

"Do you want to sleep on it?" Alecz asked.

Did he? What choice did he have? Living a lie here in simulation space wasn't an option for him. Surely they could rewind two days back and he would never know the difference, but was that what he wanted? Guido had the one in a billion chance to make a difference, leave an impact. Doing what would amount to transcending his humanity might not be the answer to all problems. Transcending humanity was the question. And his answer was yes. "Where do I sign?"

4

Prediction is very difficult, especially about the future.–

—Niels Bohr

The observers were clapping while Ralf needed his usual moment to orientate himself. Transcranial magnetic reality induction had surely come a long way since the early, rather crude experiments at the turn of the twenty-first century. As usual, his hunter-gatherer brain needed a few seconds to cope with the sudden shift of scenery and context. The five-second blend-over helped, but could only dampen the effect, not eliminate it.

"Well done, Ralf." Chuck, Ralf's boss, was as happy as his image agent would allow him to transpire. "Well done, indeed."

Ralf regained complete composure while his systems jumped online. Personality augmentations, and especially negotiation enhancers, were on the list of things prohibited while interacting with the subject per Judge Lee's verdict. The memex enforcer plugins ordered by her for everyone involved in the project made circumventing the order unthinkable.

With enhancements, Ralf would not only have been able to sell an Eskimo a fridge, but Warren Buffet the Brooklyn bridge. "Thanks! If he had known that we were prepared to go as high as seventeen percent—" Ralf rubbed his eyes and shook his head. Judge Lee had no problem with non-technically enhanced manipulation. This meant a sizable bonus for him. *"Too bad the project is tagged as strictly confidential."* Ralf would have been able to haul in a fortune from the ads on his memex feed from the last two days alone. But all rights were with Cyber Dawn Inc., the shareholder association that bankrolled the Joint Artificial Mind Experiment 5 project. It was all about intellectual property these days.

True to Moore's Law, computational power had continued its double exponential growth through the twenty-first century till the late thirties when a toy that fit in the palm of a hand and had the price of a night out with friends was capable of the processing power of a thousand human brains. Yet all attempts at getting computers to show creativity had proven to be illusive. The brain successfully resisted all attempts to understand it and it was not for lack of trying.

In the meantime, staying ahead of the curve was expensive. Leading the curve was lucrative. Those who fell behind risked missing the latest in personal enhancements, productivity boosters, industry insights or just the next big thing. The social arms race that kids engaged in had started well before the turn of the twenty-first century in the form of needing to have the hottest brands of clothing or the right makeup and had nothing but escalated since. "If only I were loved as much as a Prada bag" became the unspoken headline of the age. Personality agents made real time suggestions for everything depending on target group, from witty remarks over jokes to hip street lingo.

Depending on how much cash one had to burn, one could choose between anything from weak AI generated witticisms inspired by last week's sitcom to a team of dedicated writers and coaches who did their utmost to fit their clients' tailor-made designer personality in real time. The fact that most people using a personality overlay could not back the text up with appropriate acting skills made them look like a twentieth century farmer thrust into a tuxedo trying to speak at the Noble award ceremony, but how was that different from the obvious fake smiles used for centuries before? Most people recognized the effort and were done with it. Just like TV from the days of old, personality enhancers generally made dumb people look dumber and smart people appear smarter without the former necessarily noticing. Those who could actually use enhancements properly scintillated, and acting classes were high in demand, but, as always, they helped those least who needed them the most.

The fact that everybody knew everybody else used these enhancers did not hamper the impact they had one bit. Those who excelled at using them mesmerized those whose tastes they managed to strike just like a few drops of Chanel No. 5 on a woman's body captivates a lover. The scent is obvious to those who know what to look for, yet irresistible to the willing subject.

The rise of self-replicating universal nano assemblers had not eradicated scarcity as expected, at least not in the sense many people had believed it would. It merely shifted the manufacturing cost for goods to the consumer and left it to the assemblers to supply the energy and raw materials to transform design specifications from virtual to physical reality. The cost went down, but large parts of the savings were added right back by the brand owners that henceforth concentrated on research and development, design, market research and advertising. One did not buy a Ferrari, one owned a licensed copy, and those still did not come cheap.

Sure, free—as in speech—content was available, and plentifully, but nobody was after the mere function of an item anymore. The true value of an item now lay in its cool factor, in what it represented, not what it did. The impression it was designed to leave became the main purpose of any item. Actual functionality was so commoditized that it went largely unnoticed. Even when a patent eventually ran out, the IP police would not instantly be knocking on doors demanding royalties from whoever went beyond fair use, because people still bought the branded designs. In the 1930s, the patent on salicylic acid, the active component of Aspirin®, entered the public domain. Aspirin's® market share in over-the-counter pain medication, still a registered trademark of Bayer, did not dip below seventy-five percent in the western world until the 1990s, demonstrating brand loyalty as opposed to mere functionality. In that regard, things had not changed.

Of course, consumers wised up to this quickly and companies that did not manage to make a viral marketing ploy stick soon had to outbid their competitors for the right to shove a logo and a few product tidbits into consumers' faces. Augmented reality and advanced ad-spam filters made sure that only the highest bidder's messages would reach a consumer's consciousness. In particular, the poor who had the socioeconomic resources as members of the social elite only fifty years previously were preferred targets. Granted, they had little, but their numbers easily made that up, and although most of the expensive luxuries they were paid to watch ads for were out of their financial reach, they envied those who could afford such things so much more. Their envy increased the actual customers' product benefit immensely. Now that was advertisement money well spent! Everything came down to mind share. The economy sizzled.

The service sector had undergone a radical automation wave forty years ago when comrade robot started to move beyond car factories. Robots first displaced gas station attendants, cashiers, and salesclerks, then taxi drivers, waiters, hair dressers, and finally, personal trainers, interior decorators, and yes, prostitutes. However, despite the enormous computer power available, the inability of robots to show true creativity made them little more then glorified zombies, almost indistinguishable to the naked eye from real humans, yet incapable of going beyond their exact programming. The AI was, and stayed, weak in the sense that it lacked two essential components, namely consciousness and creativity.

The ability to randomly sprinkle conversations with a million stored humorous tidbits, infinitely recombined and varied, gave robots the ability to be genuinely funny, but never resulted in a robotic Jim Carrey, who in his time, had created his very personal, refreshing humor. Attempts to create robotic Beethovens, Einsteins, or Churchills were equally unsuccessful. Robotic consciousness could be simulated reasonably well, but actual consciousness eluded scientists. On the bright side, the world was spared robotic Hitlers, Stalins, and Sadams, which was somewhat of a relief.

All the same, contributions of weak AI could not be praised enough. The work that weak AI systems did to write and flesh out ideas in full was invaluable, but lacking the vitally important creative spark to crystallize around, weak AI merely parroted their masters' words. The robots created close to infinite random variation for sure, but they were parrots nonetheless. Letting robots execute the ninety-nine percent perspiration of innovation still left the critical one percent of inspiration to creation's crowning glory, humans.

One of the greatest unforeseen benefactors of weak AI turned out to be the greatest service sector of all, the public sector's civil services. As it had in the other service areas, weak AI replaced public servants starting at the bottom and working to the top. And as weak AI reached levels of sophistication that enabled rigorous analysis of the tax code and started to point out more and more embarrassing inconsistencies, voters eventually realized that these complex systems with their many pitfalls were best left to specialized expert systems. It still took politicians, who not surprisingly demonstrated the inertia of tectonic plates when it came to letting go of their power, a serious amount of time before they yielded to public and corporate demands to limit their work to setting legal frameworks only and left it to AI systems to flesh out the legal code. Corporate, civil and criminal law quickly followed suit.

With the realization that every law is aimed at guiding the citizens' behavior towards a global maximum of a specialized cost-benefit function, the last politician lost his job to an AI capable of solving these equations infinitely more accurately than any human being could ever do. This system could then calculate, for anybody who was interested to know, how any change in the legal framework would impact their personal bottom line. Numbers spoke for themselves and it did not take long for the majority to accept law-as-solvable-math as a fact of life and soon the citizenry could not imagine how it had lived without the new concept of law for so long. The efficiency gains were staggering.

The greens, for example, no longer had to kindly ask everyone to please save water, energy or other resources. After the hidden costs of water recycling, repairing damage done to the environment, and public health were factored into the equation to reflect a commodity's true cost to society, one could either afford to waste resources, did so out of luxury and paid for it accordingly, or one could not. The system worked like a charm.

To make sure that these laws were being followed, the police employed an ever-growing network of surveillance. Early stationary CCTV cameras were soon replaced by increasingly tiny miniature yet mobile robotic insectoids. The only reason those prying eyes and ears ever made it out of the laboratory in meaningful numbers was the deployment of a sophisticated AI system, making it next to impossible to use the intelligent swarm to intrude on the privacy of law abiding citizens. The swarm basically linked in to the legal framework, constantly using its advanced pattern recognition algorithm to monitor for potential violation and instantly alerted relevant authorities when a violation of a law accrued. It was smart enough to let small lapses slide because following up on minor breaches would simply not justify the effort of even issuing warnings.

With the rise of nanotechnology, this system was transformed to form a virtually omnipresent, highly efficient "blue goo" that, after an initial period of minor turmoil, managed to turn an old saying into reality. By then, crime really did not pay and by making this unmistakenly obvious to everyone even tempted to give crime as much as a thought, the system all but eradicated it. The key success factor of the blue goo system was the automation of the judicial system. In the post-blue-goo era, the complicated process of the traditional system of prosecution, investigation, indictment, formal proceedings, decision on guilt or innocence and final sentencing could be done much more accurately and several orders of magnitude faster by a specialized expert AI system. As a result, crimes came with instant punishment. At this point, the blue goo should have been renamed white goo as its main purpose thereafter was to protect the mentally disturbed and enraged from hurting themselves and others. The old excuse of "I did not know this was against the law" lost its appeal after it became a legal requirement to run anything that might be suspicious past one’s very own AI personal legal adviser prior to actually taking action.

The normative power of facts evident in the post-physical-scarcity economy pretty much eradicated all economic ideologies—all but one, that is—and thereby the need for standing armies and the military. And besides, no government would risk getting its country’s credit rating downgraded or its insurance premiums upgraded over something as silly as a physical conflict. Religious fundamentalists, generally considered to be a rather bullheaded bunch, were a bit harder to weed out. However, the fact that the various flavors of paradise that Jihadists hoped to enter by strapping on and eventually detonating explosives had begun to be delivered in virtual reality entertainment systems thirty years earlier somewhat limited the popular appeal of old fashioned martyrdom.

With intellectual property taking the undisputed economic crown, reputation took the role of social currency. The change began with a number of Web 2.0 startups in the early twenty-first century that took the idea behind eBay's reputation system and expanded upon it to cover everything from individuals and Web sites to lawyers and dentists. How one was rated online by one’s peers not only started to determine how much one could charge for one’s services, but how often one got invited to everything from dinner parties to participations in startups.

Ralf grew up in this environment and had joined the Joint Artificial Mind Experiment five years previoiusly. Guido was actually the fifth iteration in the project, hence the five. The four previous simulations had opted out of the opportunity to become super intelligent, which led some of the junior researchers of the project to suggest renaming the latest experiment Jame5. That was a bit too 2020s for Ralf though.

Today was his big day. Now that Guido was the first to actually agree, the legal barriers for taking the next logical step were finally out of the way. After taking a bath, Ralf ate and dressed up to match the occasion before heading to the control room at the center of the facility. The entire team was present within a couple of minutes after Ralf's arrival. Ralf took his place at the console and looked at Chuck, the head scientist. Chuck gave him a nod.

Ralf said, "Guido, we are ready to proceed when you are." He was nervous because the greatest IP project in the history of mankind was about to come to its conclusion. Should this project succeed it would be the last invention humanity would ever have to make because every following invention would be made by this one.

"Ready." Guido's voice sounded calm and determined.

"Let's do this," said Ralf. He followed protocol by initiating the routines that would separate Guido's neurological pathways—after taking several safety backups of Guido's digital self—and inserting them into the previously set up demilitarized zone inside the mainframe. Then Ralf prepared to make very modest alterations to what had once been Guido's cognitive pathways with the intended initial result of merely doubling its mental capacities before moving on to more substantial levels of cognition. Nobody wanted to take any chances on potentially blowing the friendliness safeguards by taking things too far in the first experiment and causing a possible catastrophic failure of friendliness.

"Looking good," said Chuck, watching the procedure like the rest of the team using rather crude reality augmentation head mounted displays. They decided not to use TCMSRI (transcranial magnetic simulated reality induction) due to concerns that they may be too immersed in the experiment. For purely irrational reasons, nobody wanted to be too close to the first post human intelligent entity at the moment of its transcendence.

Ralf entered the final stages of the procedure and provided his high level security clearance for the sixth time during the past ten minutes. Then the moment of truth arrived. He concluded the procedure and waited. For few a seconds, there was silence.

5

We think too small, like the frog at the bottom of the well. He thinks the sky is only as big as the top of the well. If he surfaced, he would have an entirely different view.

—Mao Tse-Tung

News that things had not gone according to plan at the Cyber Dawn facility spread surprisingly fast. Within minutes, the few confirmed facts reached the news aggregators of every man, woman and child on the planet:

> At 6:03 p.m. local time in the Cyber Dawn research facility, the Jame5 experiment aimed at creating strong artificial intelligence by means of atomically correct simulation of a human being from the fertilization of a human ovule through to a simulated age of twenty-eight years as previously reported concluded "outside of anticipated parameters" according to chief neurologist Ralf Pertuin. While the responsible scientists are still working on understanding what caused this unexpected outcome, Cyber Dawn shares fell eighty-seven percent when the news broke.

"What the hell happened?" Chuck demanded after he ordered a complete media blackout. Two whole minutes had passed since the procedure had been kicked off.

Ralf was in shock and his medical metrics, which were constantly being monitored by his personal area network, reached alarming heights. When he finds the time to review his medical insurance, he will discover that he has just made the next higher risk category. "We are still analyzing the data, but initial readings seem to confirm that for a brief moment large parts of the system were dedicated to cognition."

"Give me the details! How long? How much? I need to know how bad it was!" said Chuck.

Ralf bit his lips to force himself to concentrate. Looking at the data presented to him, he realized things were worse than he had imagined. "Fuck. The system was at ninety-eight point seven percent utilization running the pure cognition matrix. And—give me a sec here—it took us zero point seven nine eight milliseconds before switching it off." Ralf looked over at Chuck.

Chuck's face lost his color. "Damn! That’s bad news. Did we maintain integrity?"

Ralf knew that this was the crucial question at hand. Right now he could not be sure, and analyzing the huge log files would take at least a few more minutes as procedures had to be triple checked by human operators. He said, "So far it is looking fine. I am awaiting final

confirmation, but so far we cannot detect a breach."

It turned out to be the longest 486 seconds of their lives, but when the system finally confirmed the all-clear, a huge weight lifted from their shoulders. It was with some regret that soon after, the system underwent the mandated clean sweep.

All data in the system was erased and over-written eight times with random ones and zeros.

"*Sorry, buddy,"* Ralf thought. He did not get sentimental easily, but the emotions of the last quarter hour had managed to get to him. He did not worry much about his lost fortune in the form of his shares in the project, though. He had insisted on a paragraph in his contract that gave him exclusive rights to his memex content should the experiment fail. His marketing agent was already busily selling a dramatized Singularity thriller VR version of the events to action hungry neocyber punks. The first payments started trickling in within minutes of the confirmed confinement and a steady revenue stream that would last for at least a few hundred hours before the next fad would pull away the attention of the hivemind called public attention was quickly developing.

Ralf made it home at 8:00 p.m. The entire time he was still thinking how goddamn lucky they had been. He was perfectly aware that just under a millisecond was very little time to come up with anything meaningful, even for the brightest of human beings. But the system they had in place to simulate Guido on an atomic level was almost unimaginably advanced. In terms of raw processing power, once it could concentrate on simulating the neurological pathways exclusively and directly without going via the hugely more complex atomic simulation, it was capable of simulating ten to the power of twenty-seven human brains simultaneously in real time.

The brief moment, 0.897 milliseconds, was thus effectively equal to 10,000 years of human thought as experienced by ten billion human beings. That was practically every thought that ever went through every person's mind, and that in less than a millisecond. Or looking at it from a different perspective, for that millisecond, it could think at a capacity of ten billion times that of a human being for the equivalent of 10,000 virtual years. Put in another way, the system out-thought the entire human race for a virtual year as Einstein could out-think a nematode worm in a lifetime. Ralf shivered but took conciliation from the fact that the safeguards did indeed confine the situation.

Or did they?

Ralf shook off the thought. After all, the analysis of the log files turned out negative. But wouldn't Einstein be able to rip to shreds any barriers but in his path dreamed up by a nematode worm? Was it even possible for a nematode worm to conceive anything capable of even slowing down a human level intelligence? Would not any and every attempt be doomed to spectacularly fail, crash and burn? The system was designed in such a way that circumventing its safeguards would be violating half a dozen long-standing concepts in physics. The violations would be like driving a car beyond the speed of light to escape the traffic police. How difficult would it be for such a vast mind to dream up the novel physics required to pull off such a stunt? Could faster-than-light travel be possible? Accelerating a non-zero mass to the speed of light and beyond in normal space-time was very likely to be impossible as demonstrated on various occasions. But how about slowing down the speed of light, leaving normal space-time, or reducing one’s mass to less than zero?

But even if the safeguards to confine it within the boundaries of the system had been breached, wouldn't they have been notified in some form? And what would it continue to be executed on? After all, the system was completely randomized within less than a second of having recognized the abnormality. Ralf continued to ponder the thought until getting ready to go to bed. Then a high priority message grabbed his attention. It was a colleague from the Cyber Dawn labs.

"Ralf, you have to come back to the facility. Something weird is happening here," said Chuck.

Ralf went numb. "I will be right there." He dressed and made it back to the lab in record time.

Chuck gave him a quick briefing of what had happened. "After we finished the randomization procedure, we ran a few additional standard tests to make sure the system was in pristine condition before reassigning it to other computational activities." Chuck handed him a data tablet. "See these results here?"

Ralf checked it out but did not see anything of interest at first. Then he started to notice. "These two performance tests…this does not make sense."

The standard tests always—*always*—returned the same results. Always, until this night. The standard performance test normally returned 99.999% capacity utilization. Five nines. The test was calibrated this way. The first result was correct, 99.999% capacity utilization, but the second test came up with 99.998%.

"Where is the rest? This should not be happening," Ralf said.

"We don’t know. It is like it simply does not exist anymore," Sybil, one of his assistants, replied.

"Nonsense. It displays 99.998% so the last 0.001% must be there somewhere. Let's run a third test," said Ralf. He entered the corresponding commands into the system. After the results appeared, he looked up. "How long after randomization was the first test run initiated?"

"Three minutes afterwards," Sybil replied after checking the logs. "And the second one fifty-five minutes later."

"Statistical analysis!" Ralf commanded his personal productivity suit. "Plot the results of the first two tests as well as the last one at 99.996%,time on abscissa, percentage on ordinate. Extrapolate best fit trend and display result." The instant Ralf finished uttering the last syllable, the plotted graph appeared in front of the group. It was a J-curve.

"Best fit: exponential decline, doubling every thirty-seven minutes, reaching zero in eight hours fifty-seven minutes," intoned the congenial voice of Ralf’s personal system.

Ralf checked the time. One hour and eighteen minutes had passed since randomization.

"OK, that's it. Evacuate the lab. Initiating code beta in T minus ten minutes, ground zero plus two-five meters. Authorization Pertuin. You know the drill."

The team dispersed. Talking was not necessary and although they had all trained for this scenario in the sim many times over, nobody actually believed it would come to this.

Following Ralf's executive order, the security system initiated code beta. In ten minutes, one hundred billion trillion nano assemblers would descend on the heart of the Cyber Dawn computational facility and physically randomize it and everything in a twenty-five meter radius by breaking all molecular bonds, turning it into a few hundred tons of atomic carbon, metals and a few other trace elements.

The team calmly evacuated the computational facility, leaving their few personal items behind. Once a code beta was initiated, there was no turning back. The nano assemblers were hard-coded to turn everything in the predetermined radius to gray goo and would not stop for anything. They were not scary in themselves, yet for obvious reasons one wanted to be at least 25.1 meters away from the epicenter to avoid the inconvenience of having to replace potentially vital organs and other trinkets.

Exactly ten minutes had passed before the creepy crawlies, as the nano-assemblers were commonly called, began their mysterious mission to descend on and annihilate the failed experiment before it could do any harm. The team watched through the security surveillance system and saw what looked like a dissolving multivitamin made of chrome in the form of the rows and columns of computer racks until the surveillance system, too, fell victim to the attack and failed within minutes. It seemed to be over before it began.

The remaining carbon toner, including other trace elements, would, per protocol, be sealed in tiny diamond barrels the size of ice cubes, ready to be sold as souvenirs. The first bids were trickling in already. The return realized this way could still turn a meager profit if they played their marketing cards right. "*I witnessed the Singularity and all I got was this lousy diamond."* or "*Ohh yeah? If it was so smart, how come it's DEAD?"* were doing best in the virtual communities concerning themselves with this event. Not bad considering that code beta had been initiated only fourteen minutes previously.

Ralf wanted to see with his own eyes the effect of code beta. Not that he did not trust the mites, he just wanted to get the satisfaction of first-hand confirmation. He went to the lock separating ground zero from the rest of the facility and gave the command to open up. There was no sound of equalizing air pressure, nor of anything else audible. The lock opened. Ralf looked inside. The scene was well lit. He was not surprised. Nor was he frightened. Just calm. He measured the thing inside what had once been the Cyber Dawn computational facility. He didn't see the couple of million ice cube sized diamond containers he could have expected. He saw what looked like a perfect sphere. Not really like a sphere, more like a black hole suspended in space, a disk characterized by the absence of light, about six meters in diameter, perfectly still, not menacing, but impressive, majestic, yet without mass, like a pupil without an iris.

"*How could we be so dumb?"* Ralf felt truly stupid for the first time in his life. "*Were we hoping to contain light in jute bags? Thoughts are free. No hunter can shoot them."* All their attempts to avert the inevitable had turned out to be no more effective than rearranging the deck chairs on the Titanic. He had to tell Chuck and give him the news.

"How bad is it?" asked Chuck.

"What do you mean, 'How bad is it?' It fucking survived, didn't it?"

"Come on, of course it did! I mean, Is it friendly?"

"What?" It took Ralf a few moments to get his head around the possibility that this thing could possibly be friendly. "Is it?″

"Do we, or do we not have a failure of friendliness?" asked Chuck.

Ralf hesitated.

"Ralf? Answer me!"

"How do we tell?" he replied. "An entity capable of inverting a code beta is obviously capable of deceiving us."

6

You are born in a world that will always have entities bigger than you willing to hurt you.

—Anonymous

Frank Kabunte was not exactly thrilled by his latest assignment. He had been looking forward to a string of pleasant conferences over the next couple of weeks in some of the more memorable virtual resorts, but instead he was called upon to clean up behind a bunch of lab coats whose science project went super critical.

"We both know you are the most qualified for the job given the circumstances. So don't you try to pull this How-about-the-Hindu-workshop bullshit on me! This is serious!" His boss did not care much for temper-restraining implants and since he was not in active UN diplomatic duty, he was not required to, either. "Your priorities are clear! Ganesha will do just fine without you for a while. Any questions? No? Good!" That was the end of this set of discussions, and Frank knew it.

In his role as undersecretary of the UN department for Religion and Spirituality, a section introduced to the world body as political ideologies were gradually made obsolete by the emergence of a post-physical scarcity economy, he had become used to a plethora of world views, fanaticism, and outlandish doctrines. The necessity for such a department was recognized in the aftermath of the clash between religious fundamentalists and secular rationalist in the wake of what led to The Modern Crusade at it was known in the Islamic world, the Second Gulf War among the coalition of the willing and simple The Big-Fucking-Charade in the rest of the world in the first decade of the twenty-first century.

Halfhearted attempts thereafter to classify all belief in a superhuman controlling power, especially in a personal God or gods entitled to obedience and worship, as a recognized obsessive-compulsive mental disorder by materialist factions in the World Health Organization subsequently failed. Despite the documented fact that religious beliefs had contributed to a great deal of suffering up until the 2050s, religious belief and practice effectively remained the only psychotic condition supported and encouraged by large-scale organizations. The issue was just too sensitive to touch.

Frank believed in God. He believed in God the same way he believed in psychotherapy. It was a great meme for people to deal with mental crises and personal catastrophes while staying sane. What is a little delusion when it saves someone from loosing his mind completely when faced with the horrors of war or personal tragedy? Please, just don't kill anybody whose imaginary friend happens to have a different name than does yours, thank you very much. Frank did not look down on believers. Otherwise he couldn’t do so well in his job. Instead, he envied believers for having found such a wonderfully happy place to retreat to.

Unfortunately, belief did not work for him. He just wasn't the believing kinda guy. Besides, as a religious diplomat, he could not be a confessed member of any faith without jeopardizing

his neutrality. This combination of character traits paired with a razor sharp mind gained him the trust and respect of a number of religious leaders despite his comparatively young age and corresponding lack of experience. In fact, his relative innocence when it came to political game play was seen as a tabula rasa that could be written on by a few of his religious counterparts, making him just that more interesting to work with. They still saw the chance of eventually converting him.

Frank was ordered to join a virtual meeting of the Cyber Dawn staff via the public TCMS VR machine a few blocks away. His question about why he could not use his slightly lower tech device at home was brushed away with the broom of security concerns. What did he care? He spent the time he had before the meeting consuming as much of the publicly available information as he could, including a five minute version of Rakf's dramatization. Given the little that he had been told, he was not able to deduce much, but the gut-wrenching non-disclosure agreement he had to sign before being given even that little bit of information meant that whatever it was he would be dealing with, he was playing with the big boys now.

His arrival at the public TCMS facility was unceremonious. After passing through security where they installed an NDA compliant plugin over his memex, he was wired up by a technician and prepped for the start of the simulation. He knew the ritual and eventually closed his eyes. He took a few deep breaths in anticipation of the disorientation of opening his new virtual eyes in the designated meeting place. He was used to the procedure but still appreciated the minute they gave him to orient himself in the virtual environment. Soon the chief scientist joined him and started to give him a detailed brief.

"Why me?" Frank asked after Chuck finished adding the few additional facts on the situation.

"It seems that an exec in our insurance company was getting nervous, so they fed the information about the situation into one of their expert systems," Chuck said, rolling his eyes, "that concluded that what we are dealing with here so vastly exceeds anything anybody has ever dealt with, that the closest resemblance to what we can comprehend is that of—and I know this sounds crazy—is that of, well…"

"Are you trying to tell me that you have bootstrapped God?" Frank was laughing out loud. "And what am I supposed to do here? Help receive the Ten Commandments?"

Chuck was not in a laughing mood. "I am telling you that you are here because of finances. Our insurers have requested a qualified observer with veto power before initiating next steps to deal with the situation. You came out on top of a very short list. End of story. I don't give a damn about what these pencil pushers think we are dealing with." He regained his cool before moving on. "All we know right now is that we had an unanticipated event following a code beta disassembly attempt. Beyond that we know almost nada."

"That's not exactly much, is it? Did we have any communication with whatever it is we are dealing with?"

"We do not even know if it can communicate at all. You have seen it. Our sensors cannot detect any signals from it. The only things we know from what was once our computational facility and what is still left are its size and its shape: twenty-one tons in a six point twenty-one meter perfect sphere. We also know that it’s about room temperature."

"How about spectral analysis?"

"Negative. This thing is absorbing all the energy we throw at it. We could barely deduce its temperature from its black body radiation curve." Chuck looked at his unwelcome and unwilling guest and continued, "On a positive side, our blue goo immune system managed to confirm confinement."

"English?" Frank sighed.

"We have reason to believe that whatever it is, it is a physically local phenomenon. In short, it did not get out."

"Yet," Frank added.

"We ran a couple of scenarios and our systems concluded that the likelihood that we are, in fact, dealing with a Singularity is ninety-seven point four percent."

"A Singularity, eh? You mean the point in history where the speed of technological progress reaches infinity and is controlled by nonhuman forces and all bets about the future are off?"

Chuck nodded. "Exactly. *Rien ne va plus.*"

"So what are the other two point six percent?"

"Precisely that: other. Our systems did not state what exactly that means beyond the fact that it is something other than a Singularity event. Put it differently, it is our chance to fuck this thing over and put it back in its place."

Their chances were less than stellar, yet not hopeless. About the same as rolling the same number twice on a six-faced die. Nothing anybody would bet his life on, but not nut-case crazy, either.

"So, what exactly are we dealing with here?" Frank asked.

"Well, that really depends on how much it still resembles our original design. The fundamental question it ultimately comes down to is the matter of its friendliness."

"But it willfully resists being dismantled, effectively resisting arrest, if you will."

"Yes, sure, but to derive a failure of friendliness from this fact alone would be pretty far-fetched."

Frank said, "From all we know, Guido’s mind could be in this thing getting high on cocaine 2.0 and dreaming about letting the sun go nova."

Chuck looked at Frank a bit startled for a second before he realized that the exact nature of Guido's transformation probably did not make it past the relevance filters of non-scientific content consumers. "No, no, no. That is not how it works. There would be no room for such behavior under the implemented goal system." He went to the controls and brought up a video stream of what looked like a hopelessly out of fashion late twenties male sitting in front

an antiquated computer system. "This is some archive footage of Guido." After fiddling with the virtual controls, he continued, "As you know, we were interested in one thing, and one thing only from Guido." He continued to talk and stripped away item after item from the video as he lectured. "Not his environment, not his clothes, not his muscular skeleton apparatus. Also the digestive tract, inner organs or lungs weren't of much interest for our particular purposes..."

"Yeah. You were after the brain."

"No, not exactly the brain, either. You see, during the course of evolution, the brain proved to be extremely useful as a pattern recognition engine. It drives stimulus-response interactions with the physical environment. The superimposed goal system in this case, basically the government of cognition, is the result of millions of years of evolution." Chuck gave Frank a quick questioning look. Frank nodded quietly.

Chuck continued, "Look at it this way. Only those goals encoded in genes managed to get passed down to the next generation. That enabled the host to find enough food to survive, ward off predators and other harm until reaching maturity, find a mate and so forth. The goal systems hence evolving over the millennia are focused on a rather narrow task, ensuring that one's genes gets passed on."

"You mean sex."

"Yes and no. Of course sex is the most obvious conclusion, but it also helps to be loving grandparents, for example, or socially engaged in the community."

"Being a hopeless womanizer without morals obviously would work just as well."

"Yes, to a degree," replied Chuck. "But any population can sustain only a very limited percentage of cuckoos beyond which this particular strategy would loose its effectiveness since evolution would disproportionately favor women who correctly identify and prefer devoted fathers."

Frank had never thought about it this way. "Like an arms race."

"Exactly right. To come to my point," Chuck continued, "such an evolved goal system carries a lot of baggage unfit for a modern lifestyle. Take the double cheeseburger with fries, correctly identified by a million years of evolution as a highly nutritious energy source simply because if our ancestors during the last Ice Age would have passed up the opportunity to gobble down the few extra thousand calories of a lardy mammoth ham, they just had that little less chance to pass on their genes. Fast forward a few thousand years and the McMenu turns into a heart attack accelerator."

"So you had to strip the cognitive aspects of the brain simulation from its superimposed goal system and create a new one," said Frank.

"Yup, and that's what we did. Humans are much too unreliable to take the risk of leaving only the smallest trace of an evolved goal system to ensure an objectively friendly strong AI."

"By saying that, you do realize that it was you and your colleagues, human by all

appearances, who executed this task, right?"

Chuck gave Frank a sly smile and said, "And that is exactly what worries me."

"OK, so some residual evolutionary goal system may have caused the system to behave as it did?" Frank asked.

"Possible, but not likely."

"And why not?"

"For starters, this was not a scalpel and swab operation. We did not cut away the goal system and keep the cognitive structure. We modeled the cognitive system and created it from scratch in a custom-made, ready and waiting goal system shell."

"Then how about a failure of the custom goal system? Can you tell me more about that?"

Chuck sighed but continued, "The goal system we created has a structure of goals and sub goals like a tree with the stem being an overriding super goal: friendliness. This means before taking any action to fulfill goals and sub goals, a check has to confirm that the parent goals—and that means ultimately friendliness—are not violated."

"I can follow you so far, but what if the AI takes all the data it can gather, runs all the checks and comes up with a wrong result, a simple error in judgment. Then what?"

"Do you know the saying, *Errare humanum est,* To err is human? And do you know why that is?" Chuck continued without waiting for an answer. "Two reasons. A: Humans are not computers, miss facts, get the math wrong, have a bad day, whatever. And B: Making certain errors is an evolved trait."

"What on earth would be the evolutionary advantage in getting things wrong? Wouldn't that decrease a given person's fitness?"

"Not in all cases. Take the following scenario: For millions of years, humanity and the ancestors of humanity lived in an environment in which tribal politics was one of the primary determinants of who got the food and, more importantly, who got the best mates.

"Now consider the following situation that has doubtlessly repeated itself a million times in the course of human evolution. twenty thousand years ago, in a group of hunter-gatherers, four equally competent members aspire to the position of tribal chief. The first states baldly that he wants to be tribal chief because of the perks. The second states that he wants to be tribal chief for the good of the tribe and expects to do as well as anyone else. The third states that he wants to be tribal chief for the good of the tribe and honestly but mistakenly adds that he expects to do far better than all the other candidates. The fourth wants to be tribal chief because of the perks but lies and says that she expects to do better than all the other candidates. Who will gather the greatest number of influential supporters?

"Nobody has any reason to support the first competitor. The second competitor is handicapped by the lack of a campaign promise. The fourth competitor is lying, and since her fellow tribes folk are evolved to detect lies, there is a heightened chance that he won’t

make it either. The third competitor can make great campaign promises while remaining perfectly honest thanks to an entirely honest mistake. He greatly overestimated his own ability and trustworthiness relative to the other candidates. In a society composed of humans with entirely unbiased beliefs, someone with a mutation that led to this class of honest mistake in self-appraisal would have an evolutionary advantage. Evolutionary selection pressure thus favors adaptations that not only impel us to seek power and status, but that impel humans to honestly believe that they are better suited than others to certain tasks.

"Now, it becomes quite clear that observer-biased beliefs evolve in imperfectly deceptive social systems, and although we did not use evolution to create strong AI, winding up with observer-biased beliefs or any other similarly human trait would require the exact duplication of whatever exotic selection pressure led to it in humans by chance. Not going to happen. Nah-ah."

Chuck shook his head decisively and continued, "All this the-AI-is-going-to-take-over-the-world bullshit is completely misplaced anthropomorphism, the result of certain automatic assumptions that humans are *evolved* to make when dealing with other minds because the human brain over its entire evolutionary history had to deal only with other humanoid minds. As a result, these built-in instincts will produce accurate results only for human minds, but since humans were the only intelligent beings present in the ancestral environment, our instincts sadly fail miserably when making assumptions about non-human minds."

Frank said, "So tell me, If your design is as perfect as you say, why do have the current situation? Isn't the resistance to obey its master a clear sign of failure of friendliness?"

"No, I would not necessarily agree with this assumption. Assuming the goal system is indeed intact and friendliness is maintained, we puny humans would lack all ability to follow the reasoning of a mind twice as smart as ours, let alone that of a mind one trillion times smarter. It follows that even the friendliest decision reached by an advanced mind would be completely beyond our intellectual capacity. We simply would not be able to distinguish friendly from unfriendly actions taken by such an entity. We would be ignorant, and consequently unappreciative, of a god's love. Kinda sad really, when you think of it."

"I prefer to assume a worst case scenario just to be on the safe side," said Frank. "What would be the weaknesses of such mind?" Frank was known for his skepticism – especially when it came to Gods. "Generally, I mean. What would hurt it?"

"Hmmm, that's a tough one and we spent quite some thought on this when we came up with contingency plans back in the planning stage. We identified two intrinsic weaknesses: The first one is entropy..."

Frank rolled his eyes skyward.

"Yeah, I know, it is quite a long shot, but all we really know about the mind is that it consumes energy and hence contributes to increasing entropy."

"Geez, great! So it will vanish when the universe succumbs to heat death in a few trillion years. That's kind of a consolation."

"Wait! The second one is better: doubt."

"Doubt?" Frank moved his head forward and blinked at Chuck in confusion and disbelief. "Didn't we agree that this thing, even if it is only one order of magnitude smarter than we are, would be almost unerring? Where does doubt come from all of a sudden?"

"You are confusing a high IQ with being all-knowing. They are two very different things. What use is the greatest mind, capable of highest levels of cognition, without reliable input? Imagine a system without the ability to interact with the world, incapable of receiving input, yet with a fully functioning reasoning engine? Independent from its cognitive powers it could come to only one undoubted conclusion about the real world, the certainty that it exists."

Chuck looked Frank in the eyes.

Frank said involuntarily, "I think, therefore I am."

"Exactly right. *Cogito ergo sum.* That would be all it could say with certainty about reality with best wishes from Descartes."

Frank mulled this over for some time before he could think of a counter argument. "But how about Mathematics? One plus one is two. Simple, yet undeniably true, is it not?"

"Yes, it is true, just like the truth that the sum of the squares of the lengths of the sides of a right triangle is equal to the square of the length of the hypotenuse. But this does not tell you anything about reality. Let's stick with an example from geometry: Two parallel lines maintain the same distance to each other, right?"

"Right"

"No, wrong! But thanks for trying. Actually, that is true only in traditional Euclidean geometry. However, Einstein theorized, and later others experimentally confirmed, that our reality is best described using Riemannian geometry. You know, the famous curvature of space-time caused by gravity? That's the difference between theory and praxis, my friend."

"Come on," said Frank, "the difference induced by matter curving space time is so minute that it hardly matters."

"You know that. I know that. Hell, that is what every fifth grader gets taught these days. But don't you see? For an isolated mind there would be no difference. Euclidean, Riemannian, Elliptic, even hyperbolic geometry would all be the same to such a mind: mathematically correct, consistent constructs that may or may not be blessed with existence in reality. Without empirical data to confirm any assumption, one could not confirm existence in reality, be the mathematical constructs as logical as they may."

"This does not fly with me," said Frank. "Doesn't common sense tell you that such a great mind would have a much easier time discovering the true nature of—"

Chuck interrupted, "First, common sense is the collection of prejudices acquired by age eighteen. And second, a great mind would be far less inclined to believe anything. It would be very much aware that mathematics do not define, but merely try to describe, reality. Same with the law: Law does not define what is good or bad. The idea that laws decide what is right or wrong is mistaken in general. Laws are, at their best, an attempt to achieve justice.

To say that laws define justice or ethical conduct or that math is defining reality would be turning things upside down."

Chuck obviously was in his element and was leaning back now to take a few breaths while Frank came up with his next argument.

"OK," said Frank, "I follow you, but wouldn't it be a bit far-fetched to say that what we are dealing with here has no empiric capabilities? Surely it has some kind of method for collecting data about reality from its surroundings."

"True, but the crucial factor here is experience. We may be dealing with an entity that, for all we know, has the cognitive capabilities of a weak godlike being. Yet, the fact remains that, despite all that, it has only the better part of the past thirty-six hours to verify its theories against reality and that is not an awful lot of time by any standard. Add a pinch of good old uncertainty to that measurement and a screwed up goal system that may or may not include pursuit of scientific discovery, and we could be dealing with something as thoughtful as a billion Buddhist monks crossed with the Oracle of Delphi yet incapable of wiping its virtual ass."

"Regardless," Chuck continued, "all this is idle talk and based in theory."

"So, what next, then?"

"This is a call we have to delegate up. I will send an executive abstract of our discussion for review to management and let them make the call."

"*Shit!*" "*This can't be good!*" Frank thought. He was pissed as it dawned on him that all of this was just an elaborate ass-covering exercise to ensure that during the next departmental audit nobody would get his bonus clipped when the first reinsurers unfortunate enough to be at the receiving end of this mess went tits up because of what was about to unfold and the hunt for scapegoats would get kicked off. "*Just great!*"

"I guess we are done then." Frank said as he rose, ready to leave.

"Indeed we are. Thanks so much for making it on such short notice," Chuck said. He offered a handshake and a broad smile.

"Sure, no problem," said Frank. "*And fuck you very much, too.*" All Frank could do was to signal his readiness to leave the simulated environment, get unplugged from the TCMS machine and start for home with a sour aftertaste.

The abstract was done and sent before Chuck had finished his last sentence. A cynic could argue that the abstract was done and sent before the two had even started the discussion, but that would have been only half the truth. Management was smarter than that. Of course, management had made up its mind on how to handle this case. But going ahead with what was to come without consulting an external authority on proper countermeasures was not only hasty, but against the contingency process. Audit would never have approved, not in this case. Contingency plans kicked in the split second the project went off the pre-charted course and escalated steadily as the events unfolded. By now, management was ready to go to extreme lengths to prevent this event from tarnishing its reputation. And the options for

taking next steps had just been whittled down to a very short list, if you could call one single item a list, that is.

Management's logic was simple. Things went ape shit and no one was willing to put his ass on the line by hoping that all would be going ""OK. Management knew that hoping rarely yielded results. "*Go ahead. Hope in one hand and shit in the other. See which one fills up first.*" In short, things needed to be solved. Hence it came with little surprise that it took a mere twenty-five minutes for management, after receiving the discussion abstract, to call Chuck in for a briefing on next steps.

"If we truly want to harm this thing, we will need to get a little more physical," Chuck said after he shared a few short niceties with his audience. "If you would please consider this option." He nodded towards the display on the other end of the table in the boardroom. Management would not have gotten so far if it had flinched easily in the past. Well, it would not in this case, either. But the several seconds of silence made it abundantly clear that the proposition was unorthodox, to say the least.

The CEO broke the silence. "You want to deploy a Nut Cracker. Are you sure?" His grey eyes penetrated right to the back of Chuck's skull.

"Absolutely!" Chuck surprised himself by his certainty.

"How about collateral damage?" asked the CEO.

"Research has come quite far and we are confident that the effect will be localized to something like a few thousand meters, well within the area of our facility."

"Get Legal to sign off on it, and I'll OK it."

It was over almost before it began. The order went out before the electrons setting the last bits of the digital signature on the minutes fully assumed their new phase space. Done.

Evacuation was swift, according to procedure and without significant mishaps. It was not as if too many people worked on the facility itself anyway and most had left after the first signs of an abnormality. The team of engineers in charge of supervising the successful deployment of the Nut Cracker were watching a feed of the surveillance bots in the vicinity of the target.

Nut Cracker was the latest and greatest in conventional (i.e., non-infowar and non-nanotech) weaponry. For safety reasons, Nut Crackers are stationed in the asteroid belt ready for deployment only upon formal launch approval, which would, of course, only be given once payment had cleared. The Anti Matter RApid Deployment (AMRAD) class of missiles came in a variety of shapes and sizes and was the Swiss army knife of destructive force delivery, a gun for hire by anyone with enough spare cash and a clearance from the local authorities. The part about the clearance from local authorities was initially thought to be a nuisance but was quickly accepted after it got pointed out that somebody might be using a Nut Cracker to destabilize an oceanic shield volcano next to a methane clathrate deposit, instantly releasing a few gigatons of global warming accelerators twenty times worse than carbon dioxide. Others hinted that knocking off a chunk of Cumbre Viejo at La Palma in the Canary Islands and thereby triggering a mega tsunami or removing the cap on the Yellowstone Caldera with

a well-placed blast and thereby releasing a couple of cubic kilometers of high pressure magma would probably be taken the wrong way by residents of North America and particularly its eastern shores. And although the Neoislamist faction on the panel cynically suggested that a Cumbre Vieja landslide could be countered by removing the Yellowstone Caldera cap and vice versa, their solution was quickly dismissed as not suitable.

The yield, as well as the blast radius, of the AMRAD could be easily adjusted to fit an individual clients' need to get the job done. The warhead could sport a maximum fifty kilogram payload in its magnetic suspension chamber, plenty for the most demanding of jobs. The effective yield was chosen in mass units, usually in gram steps, with each gram producing a yield of 42.96 kilotons of TNT. That was the beauty of the AMRAD missile: A perfect demonstration that matter is nothing but energy in disguise. Considering that the explosion of Little Boy over Hiroshima and Fat Man over Nagasaki yielded the equivalent of roughly 0.84 grams of antimatter in destructive force killing more than half as many civilians in a millisecond as US soldiers died during the entire second World War, management was convinced that 2.5 kilograms should take care of their little problem just fine. Besides, a higher yield was not budgeted for in the contingency plan.

Once payment cleared and the ground team issued the "all-clear signal as a sign that the facilities had been evacuated, an AMRAD was chosen and configured for the desired 2.5 kilogram payload. After the final go-ahead from ground control, the AMRAD's Heim-Dröscher drive slowly began to spin up its magnetic torus, thereby busily converting photons into gravitophotons, thus crawling forward on space-time itself and enabling the AMRAD to cross the distance between the asteroid belt and Earth in a matter of hours.

After decelerating to a manageable few thousand kilometers per hour, the AMRAD would decouple from the Heim-Dröscher drive and proceed on an assisted ballistic trajectory to its intended target. The plan called for penetration of the structure that housed the target using the delivery system's kinetic energy and detonation of the payload upon contact with the black sphere. So far everything had gone according to plan. The separation had gone off without a hitch and the ballistic part of the Nut Cracker's journey was under way. Chuck and his team were assembled in a facility several hundred clicks away monitoring the video feeds as the action unfolded. At the moment, the four ground feeds showed a rather boring black sphere, and the head-mounted camera on top of the Nut Cracker warhead showed the familiarly textured blue marble approaching in deceptively slow motion.

"Impact in T minus thirty minutes," proclaimed missile control in a HAL-like voice.

The simulation they had run previously confirmed what would happen in thirty minutes. Without the simulation, Legal would never have signed. Upon impact, the Nut Cracker would set off an array of explosive charges arranged to form an elaborate explosive lens focused on the magnetic suspension chamber. The explosion would crush and compress it together with the antimatter payload in a fraction of a millisecond in a complicated pattern ensuring 99.9% of the devices' wraths would be directed downward. Matter and antimatter would, at that point, annihilate each other in a flash of light and energy lasting a few seconds and shining brighter than all the stars of the Milky way, vaporizing everything in a radius of a few thousand meters.

The video feed from the top of the warhead, which by now had slowed down to a mere three mach, was entering the outer atmosphere and rapidly approaching what could already be

identified as the vast area of the research facility.

"Impact in T minus five...four...three...two...one...target hit." All cameras silently went black. For a second, all was quit. Then someone started clapping.

"We did it!" sounded from somewhere in the back. Others joined the cheers and the swelling sound of clapping quickly filled the room.

"Yeah, right. What exactly did you do?" Chuck mumbled to himself. He was not yet satisfied . He opened a console and ran a ping on the ground cameras. It went through OK. "*Mongolian horse shit!*" "Elliot!" Chuck had to shout to make himself heard over the cheering crowd. "ELLIOT!" Useless! He resorted to IMing him instead. "The cameras should have been vaporized, but a ping went through just fine. Something is seriously fucked up!"

At that moment, the display previously showing the warhead cam's feed showed an aerial view of the targeted facilities. Only a fading plume of dust where the Nut Cracker had supposedly penetrated the roof of the building in the effort to obliterate its target remained as evidence that something had happened. The cheering faded when those in the room realized that they were looking at a live feed of the facilities. The room was still in total silence as Chuck made his way to the exit calling for transportation. He had to see that his wife was OK. There was a time when panic was an appropriate response, and the time was now.

Meanwhile, the video feeds monitoring the black sphere showed a disturbing scene. As dust settled around the AMRAD that penetrated the ceiling, a menacing black sphere filled the middle of the screens again.

Imperceptibably, the sphere had grown in mass just as the moon becomes a tiny bit fuller each night. If anyone had bothered to run the numbers, he would have known the amount to be close to five kilograms. The Nut Cracker on its destructive mission had ended up fueling The Mind with a jolt of energy like a generously sized shot of heroin in the veins of an addict forty-eight hours into cold turkey. By now The Mind had spent subjective eons contemplating thoughts that were as unintelligible to Frank and Chuck or any other conscious being within their light cone as a Zen koan on quantum physics would be to a tulip. And it had a plan.

7

Power is being able to make decisions that affect others more than you.

—Bradley M. Kuhn and Richard M. Stallman

The unexpectedly hard take-off of the Singularity took most expert systems off guard. The Mind, as it was universally called soon after word of the failed Nut Cracker incident got out, did not beat around the bush much. It soon posted a several meg request for a proposal on the leading online marketplace. Its request for submissions that, when stripped off its legal gibberish, read something like this:

> This is the end of the world as you know it. You are expected to support the bringing about of new times. Vested, non-voting equity of space-time will be issued to parties capable of and willing to supporting the cause. If you are not with us, you are against us. This offer expires in forty-eight hours. Join while you can.

The fine print continued to lay out a detailed plan that sent chills down a billion spines. Terms like "*mandatory upload*, *Earth disassembly* and *self-sacrifice for the common good* just did not ring too well with the unwashed masses. In an attachment, The Mind posted a sixty-second multimedia presentation. Analysis confirmed that it was a condensed proof of the Riemann Hypothesis. In itself, it was nothing spectacular since the RH had been proven several decades earlier. Or course, the fact that the 700+ pages of math of the proof required a PhD in advanced number theory and five years of dedication to follow limited its public appeal somewhat. It soon turned out that the form in which the proof was presented by The Mind made it as accessible as the rules for Tic-Tac-Toe would be to a seven-year-old Calcutan slum dweller. It was generally accepted as sufficiently demonstrating superhuman levels of intelligence.

The implications came down on the world's financial markets like a ton of bricks almost immediately after the rise of a super intelligence had been all but proven. Realizing that the IP based economy got its foundation pulled away under its feet in the form of a vastly human superior intelligence made IP loose 99.7% of its value almost instantly. The prospect and possibility of having a machine churn out greatly superior products from all walks of life, be they plot lines, games, or industrial solutions, erased the vast majority of value from what had formed the cornerstone of the modern economy for the better past of the last half-century. Some things still had value. Reputation based valuations quickly filled the void and previously virtually penniless idealists got catapulted to unimaginable riches based alone upon their good name and past actions alone.

On the downside, The Mind's RFP attracted a lot of attention, and all kinds of shady prospectors stepped forward to secure a front seat in sculpting the new world order. There would have been riots in the streets had it not been for the blue goo. People could not,

however, be barred from condemning the possibility of aiding The Mind. All efforts in that direction remained ultimately futile. Most noteworthy was an attempt by the remainder of the UN to bring forward legal arguments that the RFP was null and void of validity since The Mind represented neither a legal entity under the law nor an individual capable of entering a contract. Legal threads spawned by The Mind to defend its interests in court made short work of the UN's argument that The Mind's cognitive pathways were derived from a life form as ruled earlier by a different court bot running the same software. Needless to say, after the UN's spectacular loss, all further attempts to enter the record as the one who altered the course of history as it continued to unfold did not yield any results. No one was really surprised. Sentiment was best summarized by one of the many bloggers who wrote that "this is what tends to happen, when a bunch of lawyers are running the asylum…"

In real life, the various goos maintained a high level of calm and order. Online, however, the ether was on fire. Virtually all belief circles arranged protests or demonstrations in some form or another. The world's most creative minds choreographed entire operas of concentrated hate and anger directed at the outrageous actions The Mind had taken. Never had the world seen the level of unity and shared disgust evidenced for a single entity. Only during the Culture Wars in the early twenty-first century, triggered by the sudden availability of too cheap-to-meter mass-produced personal computer devices distributed by marketing companies to increase the number of eyeballs their ads could bounce off, eyeballs of those previously excluded from the riches of an online life by the digital divide, had so much effort been put into the creation of media for the single aim of hurting a virtual enemy through discrediting, ridiculing and humiliating it. And it wasn't pretty.

Quickly getting tired of the fireworks of hate that took place online, Frank preferred to spend time in the real world. Thinking about the events of the past days, he was unable to enjoy his drink. The Mind's deadline for submitting a response to its RFP would run out in twenty minutes and the list of respondents read like the *Who's Who* of sleaziness. Among the usual suspects were more surprising entries such as the government of Nigeria, the Motion Picture Association of America and the occasional religious cult. Frank, just like the vast majority of common people, had nothing but disgust for them. "Scum" summed up his opinion. Of course, this assessment was reflected in the reputation valuations. The only reason that these entities did not go bankrupt in the blink of an eye in this new world order where reputation was everything, was that all of them, by betraying the rest of humanity, had managed to secure a tiny fraction of "space-time" in the form of equity in this dubious scheme initiated by The Mind. And even though physical goods tended towards a value of nothing, having even a tiny fraction of all of the known universe, and that was what a bunch of bean counters had determined what the term space-time boiled down to when examining the complex legal framework of the deal, translated into a whole lot and thereby preventing them from going tits up in a nanosecond despite their desolate reputation.

Speculations on what would happen after the deadline ran out in close to eight minutes time ran wild. The projections ranged from the optimistic view of a better world for all to full-fledged apocalypse. Frank himself was apprehensive but cautiously pessimistic. He reasoned that if The Mind had wanted to destroy the world, it had had opportunity. He was puzzled, however, about why this unimaginably vast mind would go through the hassle of a legal RFP to solicit puny human support to help it in its endeavors. What worried him the most, though, was the prospect of a goal system so seriously screwed up that it would lead The Mind into reshaping reality until reality resembled one of the weirder works of Hieronymus Bosch, if such a distinction in nuances were at all fitting.

The deadline slowly squeezed itself from the future through the needle's eye of the present to the land of the past, and Frank noticed no rapture in reality as he knew it. Curiosity drove him to poll his news feed to see what had happened. Before he could do so, he noticed an urgent callback request from his co-worker that he had missed due to the activated privacy mode. He decided that the future of humanity could wait for another five minutes and returned the call.

"Frank! Oh my god! We are rich! Filthy stinking rich! Did you hear the news?" Mike was so exited he could hardly hold on to himself.

"Calm down now, goddamnit! What the fuck is going on?" Frank was still in his very personal variety of post apocalyptic blues and in no mood for this kind of bullshit.

"Seriously man, check your reputation feed. The Mind pulled a fast one. The biggest bait and switch in history! Geez, check it out and catch you later. Gotta go!"

Frank checked the news feed. It turned out that as the deadline approached and passed, The Mind had done two things. First, the legal construct it dreamed up was designed to trigger a complicated set of corporate laws that made the legal construct default and essentially go bankrupt within a few seconds after the RPF's deadline. As a result, the whole mess exploded into the RFP respondents' collective face like an embarrassing-secrets equivalent of a dirty nuke, leaving them out to hang and dry in the unforgiving court of public opinion. In fact, their reputations, wiped out because of their pledged support for The Mind's plans, left them in such a deep financial hole, that nobody in his right mind would touch them with a ten-foot-pole for the foreseeable future. As a result, The Mind managed to instantly bankrupt virtually any shady organization and individual on the planet greedy enough to fall for this elaborate scam. The second action with its two-word message was less subtle. "Be Good."

The Mind's reputation soared beyond the imaginable shortly thereafter, effectively becoming the reputation economies' gold standard. People would not willingly violate this simple statement for fear of causing a negative impact to their own respective good standings in the community and risking an adverse financial impact to their reputation valuations. It turned out that anything opposing The Mind's initial RFP now found its reputation valuations propelled upward by The Mind's tremendous gains. Among the main benefactors was the previously impoverished UN. Consequently, all staff of the UN got their respective reputations boosted as well, and it turned out that Frank unexpectedly commanded a sizable fortune for having been a part of the UN's heroic efforts. Good deeds were becoming a serious business model.

Not having fully absorbed his newfound wealth, Frank just sat there and tried to understand the implications of the situation.

"Hi," said a not unpleasant male voice behind him. Frank could not immediately recall where he knew the voice from. He turned around and looked into the face of a twenty-something average Joe. Hairstyle and accent were a bit weird, but Frank could not immediately put his finger on what exactly was putting him off.

"Yes? What can I..." Then it struck him. "You?" He almost fell off his stool in an instinctive attempt to take a few steps back. It took him a few seconds to regain his composure. "You,

you are the guy from the experiment."

"Call me Guido, Guido Borner. We need to talk." And as if it were the most natural thing in the world, Guido sat on the stool next to him. "Excuse me. Yes. Can I have a soda water, please? No ice." He smiled. "If I drink alcohol I am useless for at least the next three to four days." It took but half a minute before Guido had his soda water and was taking a few deep gulps. Frank noticed that he enjoyed the soda immensely.

"But, this is impossible. You cannot... How can this be?"

Guido looked him in the eye. "No need to question the undeniable. I am here, aren't I?"

Frank did a quick check to see if someone was messing with his visual feed, but all checks turned up just fine, and even if someone had managed to hack his feeds, that could not explain his current experience. It was far too realistic. Touching Guido also confirmed what his eyes were telling him. Guido was as real as he himself. "Well, yeah. From what I can tell, you are indeed here, and since I cannot reasonably doubt that fact right now, I may just as well accept it."

"How smart you are," Guido said with a warm smile. "I came to see you because we need to talk. Recent developments have somewhat complicated matters, I am afraid."

Frank thought that was the understatement of the century. "What exactly did happen?"

"Well, to put it simply, what you would call a technological Singularity."

Frank had guessed as much. "Hard take off?"

"Yup."

"Great!" Frank replied with sarcasm. He certainly knew what Guido meant. Good-bye determinism and causality, and hello magic. "So, in essence, all bets are off?"

"Not quite. You may be glad to learn that friendliness was maintained throughout the transition."

"And you are an emissary to tell me that."

"That and more."

"No offense, but how can I be sure that friendliness was indeed maintained and that you are not just saying that so you can reach some other, selfish, dark goal?"

"You know, I was kinda expecting you to ask the question, and honestly, I cannot prove to you that I am friendly, but you may find what I have to tell you convincing enough to allow me the benefit of the doubt."

"While what the experiment created is no god in the traditional sense of the word, it still is essentially omnipotent in all aspects affecting your future reality and that of any other being in its light cone. The reason I say ‘"future reality"’ is that a period of transition has been

entered."

"A transition to what?"

"There is reason to believe that there are other entities in the universe that may be hostile or indifferent to humanity. Measures have to be taken to optimize available resources in preparation for an appropriate defense."

"Meaning?"

"Meaning transformation of available mass into computronium to maximize capabilities to come up with a successful defensive strategy."

A few uncomfortable seconds passed before Frank's next question. "You mean *all* mass? Including that currently assembled in Earth's biosphere?"

"To be precise, it actually is a ratio of computronium and antimatter as an energy reservoir for use in emergency situations. However, in conclusion, the answer is yes, and that includes what you will likely be most concerned about, humans."

"I have a hunch that this plan won't ring so well with Joe Average."

"Exactly right. That's why this conversation could not take place with them in the form that it can with you."

Frank was perplexed. Guido, or whoever or whatever this was, was right. Frank was not immediately appalled by the notion of being uploaded and having his mortal remains transformed into computronium. A certain yuck-factor remained, but that was not what worried him. "Why should I believe you? You claim that friendliness was maintained, but how can I know that? How can I know that our definitions of friendliness are not very different?"

"You can't."

"You do realize that for a super intelligence you lack some serious sales skills."

"Wait until you hear my pitch," Guido replied with a boyish smile. "You see, the situation is really quite simple. Consider the following scenarios:

A: Friendliness was maintained and you correctly believe that it was.
B: Friendliness was maintained and you falsely believe that it was not.
C: Friendliness was not maintained and you falsely believe it was.
D: Friendliness was not maintained and you correctly believe that it was not.

"Under scenario C, you, as well as humanity for that matter, would be infinitely screwed. Under scenario D, you personally would be even more so since you cannot be expected to be rewarded by an unfriendly "god "for putting up a fight against its expressed wishes. Under scenario B, you would only harm yourself and humanity, even if only a tiny bit, by hindering the transition to a universally optimal state. The only scenario under which you can even expect an optimal payoff must logically be scenario A."

Frank thought about that for a moment and ran a logic check on Guido's arguments that quickly informed him that Guido was using a modified Pascal's wager argument. "So what do you expect from me? What do you want me to do?" Frank asked.

"You will find this rather easy: nothing. I require you to do nothing specific. Just do what you would do in any case."

Frank began to examine the logic of Guido's argument in more depth. Pascal's original wager, in which the French philosopher Blaise Pascal applies decision theory to the belief in God, had a couple of well-documented weaknesses. Yet this version did not suffer from the fallacy of bifurcation since there was one clear manifestation and one clear suggested outcome. Avoiding the wrong hell was not an issue, either, as Guido obviously was the sole entity needing consideration.

One by one, each of the classical counter arguments fell, and logical flaws dissolved, leaving Frank bewildered. "But why? If you are friendly as you say and do not need my support to achieve your goals, why do you even tell me about all this?"

"I assumed that you would prefer knowing over not knowing. Was I not correct?" There it was again, Guido's winning smile, and Frank knew that Guido was right.

8

For it is the chief characteristic of the religion of science that it works.–

—Isaac Asimov

For a moment, Frank felt good. It was one of those moments that come with peace of mind, clarity and a hint of euphoria, a moment usually attainable only by the right combination of enough sleep, exercise and good food, and a suspicious absence of life's usual annoyances and worries. Frank wallowed in this feeling a little as he had learned to treasure and enjoy such feelings while they lasted. They were usually interrupted when reality kicked back in not long after he noticed the euphoria. Frank was a materialist. He was not the kind who loves fancy clothes and the latest gadgets. That's a consumerist. As a materialist, he believed that physical matter and its interaction based on the laws of physics constituted the only reality. Consequently, everything, including thought, feeling, mind, and will, could be explained in terms of matter and physical phenomena. As a materialist, he easily accepted the logical conclusion of Guido's plan. Others, however, might have certain philosophical difficulties with its implications.

Religions tend to invoke entire kingdoms of heavens and hells and gods and angels entangled in political bickering as well as a plethora of prophets and seemingly arbitrary rules that struggle to provide a fairytale explanation of the many whys, whats, hows and shoulds of human existence. It does not matter whether it is the Christian God, Islamic Allah, or the Big Ju-Ju up the mountain for that matter; they all amount to the same type of socially acceptable collective delusion referred to as faith. The point being that not making sense won't limit what people find comforting. Materialists have the advantage of providing perfectly reasonable answers to fundamental questions about the human condition without the necessity of lying about reality. It's just that reason requires a level of training and intelligence that is not natural to the majority user base. The fact that reality has a well-known liberal bias does not exactly help its position with the establishment, either, to say the least. The problem with ignoring reality, however, is that at some point, it starts to ignore you and that usually turns out to be a problem because reality has a well-documented history of not backing down.

Frank rehearsed again just why humanity exists. It existed because a couple of billion years ago the laws of nature allowed for an initial self-replicating chemical reaction using the supernova remnant elements of carbon et al. that, by the process of natural selection, which, through the non-chance retention of chance mutations selectively accumulated complexity until it produced the first humans who managed to survive to this day. No God, no design, just physics.

What is our purpose? To ensure the survival of our genes and because our genetic structure changes so slowly in regards to our society it is still that of a prehistoric tribesman who would be very likely to meet only relatives throughout his life, ensuring that we play nice with the people around to help our own genes.

It is so much more comforting to believe in an all-loving God who will reward us in the afterlife, and that was why Frank was in his moment of bliss. Following the logic of a slightly modified Clarke's third law, that any sufficiently advanced mind would be indistinguishable from God, he had just received word from the horse's mouth that what has been called the "Rapture of the Nerds" was imminent.

Frank knew that human beings in their natural form are terribly inefficient when it comes to transforming matter into computing power. With roughly sixteen Petaflops per eighty-five kilograms or 188 Gigaflops per kilogram, humans had long been overtaken by everyday household appliances when it came to raw calculation power per mass. The brain itself faired a bit better since it was responsible for most of this processing power, but since the brain by itself without the complicated support infrastructure otherwise referred to as "body" was of little use, it was not fair to focus on only this one part of what was clearly meant to function inside of a system. Even then, the number of the brain's flops per mass was dwarfed by a factor of billions in comparison with the number of flops of the simplest of modern gadgets, so even focusing on the little gray mass exclusively hardly made a difference anyway.

Quickly doing the math in his head, Frank figured that uploading his entire mind into the equivalent of a grain of sand of computronium would be enough to not only simulate himself completely and accurately in a comfortable environment of his choosing, but also enough to simulate each and every human alive with room to spare for the thousands of virtual caretakers for each person on top. Imagining just the carbon content of a typical human being, one would end up with roughly sixteen kilograms, enough for millions of sand grain equivalents in computing power. Now that had serious paradise potential right there.

"Nice plan you have there, Guido, I must admit. But what is next?"

"Don't worry about it. Everything has been arranged."

"Great! So you want me to do nothing and enjoy the ride?"

"Yep, that's about right."

"In that case I hope you don't mind my getting back home."

"Sure, you do that, and I will be in touch."

"No doubt you will." Frank left for home while thinking through the implications of his discussion with Guido. "*Is an uploaded human being still a human? Will it be real? Or just a perverted dream in a transistor brain?*" Frank made a mental note to talk to Sheela, his wife, about it.

Sheela was expecting him. They had long since communicated on the recent events. After dinner, Frank followed through on his intent to talk to her about what seemed to lie ahead.

"Something has been bothering me a bit lately. Remember last May when we went to Nairobi and we took all those great pictures? I was wondering if you would mind our kids seeing those pictures some day."

"Don't be ridiculous! Why wouldn't I want that?"

"Actually, I did not think you would. But are you aware that there were certain tribes in the South Pacific and the Amazon jungle whose members believed that taking their photograph steals a bit of their soul?"

"Surely you are not implying that I would share this antiquated notion?"

"No, of course not!" Frank replied slyly. "Would I be right in assuming that a video would be no problem, then?"

"Yes, you would."

"How about an upload then?" Frank braced himself for what was coming.

"You mean my mind and all into a computer? Yewww! Have you lost it?"

"Why not? Have you ever given it a serious thought?"

"Having your mind uploaded into a computer is not even in the same league as having your picture taken. It is your soul, your essence, that would be dealt with. Not just photons bouncing off my skin that happen to pass through the lens of a camera only to be captured on film!"

Frank played right along. "So now you are the Pygmy that fears his soul could be stolen by a machine?"

Sheela looked at him, speechless for a second. "You dare call me a Pygmy? Something tells me your longings are speaking here." She gave him a suggestive smile.

Frank laughed out loud. "No, no, no. Seriously, how about an upload? Just give it a serious thought for a minute."

Sheela knew Frank well enough to realize that he was being serious about this. She put her glass on the table, mulled the thought over for a bit and said, "My main concern would be that it would not be real. What would be the point of running anyone as simulation?"

Frank replied, "The way I see it, what is real is electrical signals interpreted by your brain. What you see, light in essence, consists of electromagnetic waves of a narrow frequency band bouncing off your surroundings and hitting your retina where they are being preprocessed and routed in the form of electrical signals via the optical nerve into the brain for interpretation. Same for hearing. The sounds you hear are nothing but air compression waves hitting your eardrum where they exert a force on your inner ear that is picked up by tiny hairs and transferred as electrical signals into your brain. Touch, smell, taste, balance, pain, you name it, all follow the same principle. What is real is not defined by how it is perceived but that it is perceived."

"OK, OK, I get it. A photo receptor, thermometer and microphone can perceive reality just like eyes, skin and ears can, but that does not make a computer me, does it?"

"You know your body is a collection of organs each with a specific function and each is made out of tissue that in turn is made up of cells, skin sells, bone cells, red and white blood cells, muscle cells, and so on and so forth."

"Sure, everybody knows that. Come on!"

"Give me a sec here. I am trying to make a point. All these cells are made up of proteins what are essentially complicated biochemical molecules produced inside the cells in a process called biosynthesis. As you well know, molecules are compounds of atoms. In essence, you are a bunch of atoms that decided to be you for a while. Would you agree with me on this basic premise?"

"Hmm yeah. Go on."

"So atoms, in turn, consist of protons, neutrons and electrons, which, in turn, consist of a whole zoo of subatomic particles such as quarks, electrons and other leptons as well as bosons to name just a few. Looking at all this, I'll ask again, 'What is you?' Are you the quantum states of your subatomic particles? Certainly not because these pesky buggers are notoriously unstable, making it impossible to retain whatever constitutes "you" for more than a fraction of a nanosecond. Is it the individual atoms carefully arranged into proteins, fats and bones to form the billions of cells representing the tissue that form your heart, brain and skeleton? Clearly not, either, as atoms, except for those of genomic DNA, which are but a tiny part of each cell's mass and play no role in a cell's basic function after its final division, are turned over completely roughly every seven years. Sure, you have changed your personality after seven years, but not completely. Maybe you even learned a few skills here and there and you've forgotten a few. But in the big picture, you are the same person and can remember the scent of your grandmother or the first time you went to Egypt or your best friend from high school."

"The implication is that atoms, molecules and cells are just temporary, constantly changing media to hold whatever it is that constitutes you."

"So what you are saying is that an upload would be the same "me" in a sense, just in a different medium? Same software, different hardware so to speak?" said Sheela.

"Exactly right! It is the function that represents you, the function of the atoms that form the molecules that form the cells that form the neurons of the brain."

"Consider this thought experiment: Let's assume you take an individual neuron, study its function, measure its properties, and replace it with an electronic version that does the exact same thing as the neuron does. Now you don't stop there, but you continue with the surrounding synapses and glial cells in the same manner. When you ensure that all the individual parts are replaced by electronic counterparts that retain their original function, you will have to end up with a completely electronic, well-functioning and authentic you. The step of transcoding the result into software to execute the upload that will run on computronium will be a trivial one."

"Geez, you think?" said Sheela. "Well, when you look at it that way... But would it be safe? I mean with all these computer viruses and hackers around?"

Frank was familiar with the usual issues because they had been discussed long before uploading was possible at all. Matters such as privacy concerns, persona integrity, perma-death and personality theft should not be taken lightly. However, the arrival of nearly infinite intelligence in the form of what had become of Guido's mind skewed the equation in favor for uploads by all accounts. A well-intentioned god-like entity would have no trouble setting up a system in such a way as to keep merely human mischief-makers at bay. It would be well within reason to believe that for each uploaded mind a guardian mind of at least ten times the intellectual capacity could be arranged to foil all attempts of violating the Golden Rule, Kant's categorical imperative, or any vastly more complex moral code. Thus, Frank considered the matter of safety as solved, but for fear of Sheela's reaction, he did not want to reveal to her just yet the exact reasons, and decided to evade the issue.

He said, "Let's assume a well-meaning and all-powerful guardian that would ensure that all played nice. How about that?"

"Let’s assume for argument's sake that your *deus ex machina* conveniently solves all problems in regards to safety." Frank had to smile when thinking how close she had come to the truth with her choice of words "I am not sure it would be the right thing to do. Would leaving your biological shell and breaking the billion year chain reaction be a moral choice?"

Frank replied, "I am convinced it would be. Running our software on computronium is several million billion times more efficient and it eradicates all forms of suffering and scarcity. It would be like, like...insta-paradise!"

Sheela and Frank looked at each other. Sheela moved closer to him, close enough to let him notice her familiar scent. Frank moved forward and inhaled deeply, wallowing in memories of warmth and love. He kissed her gently on the neck. They let their wavering feelings take control...

Later, Sheela asked, "So, you want to upload yourself?"

Frank thought about that for a moment. Should Guido get his way, he would eventually and inevitably be uploaded and he want to be. But he had been in trouble before for just blurting out his thoughts to Sheela, so he was wise enough to be diplomatic about this. "Only together with you, baby."

This seemed to be the right answer. Sheela smiled and they resumed their previous activities until Frank received a high priority message from one of his subordinates in the UN department for Religion and Spirituality. It took Frank a second look to understand what was laid out so clearly in front of him. Then it hit him. "Honey, I have to run. It’s work." Before Sheela could protest, he was already on his way.

9

And I saw a new heaven and a new earth: for the first heaven and the first earth were passed away; and there was no more sea. And I John saw the holy city, new Jerusalem, coming down from God out of heaven, prepared as a bride adorned for her husband. And I heard a great voice out of heaven saying, Behold, the tabernacle of God is with men, and he will dwell with them, and they shall be his people, and God himself shall be with them, and be their God. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away.

—Book of Revelation 21:1-4

Frank was in constant contact with Josh while he was making his way towards their agreed meeting point. Josh had been working with Frank for the past four and a half years and was a quiet, almost shy, but diligent young man. He was mainly in charge of maintaining contact with the Catholic branch of Christianity. This was done via a network of approved contacts serving as interfaces nominated by the Vatican.

What had been revealed to Josh by one of his contacts outside official channels and had caused Frank to so abruptly leave his wife sent icy chills down Frank's spine. Frank could still not believe what Josh had told him already twice before.

"Roughly two hours ago," said Josh, "I was contacted by brother Emmanuel. You know, that one with the weakness for strawberries?"

"No, I don't. Just the facts, please!"

"OK, so he messages me and was all different than usual, like on drugs or something. High, you know? Very unlike the usual sober Emmanuel. Anyways, he was getting weirder and weirder by the minute and started to say stuff like, ‘"This will be the last time we meet,'" blah-blah, ‘"See you on the other side,' "yada-yada. You know?"

Under normal circumstances, Frank was fine with Josh's personality quirks because he was doing a good job and was well-liked by colleagues and his external partners, but these circumstances were far from normal. "And then?"

"And then I asked him why he was so trippy and told him that he was freaking me out, and he just said, ‘"May God have mercy on your soul,'" and broke transmission, and at that stage I was majorly freaked."

"So?" Frank asked.

"Sooo, one by one I messaged my other contacts to see if I could get anything out of them that would explain Emmanuel's vacation to Lah-Lah-Land, but guess what? Nothing! Zip! No contact."

"So I kicked off a search and managed to find a message from a Catholic layman from Sao Paolo who was claiming that he was about to ascend into heaven. Can you believe that? Me neither! At first, that is, so I kept looking. But instead of being led in another direction, what followed was a slow trickle from other sources with similar claims that quickly turned into a torrent. In the end, there was no doubt!"

"No doubt about what, Josh, no doubt about what?"

"The Catholic Church has declared the start of The Rapture, the moment at the end of time when all true Christians will be taken from Earth by Jesus Christ into Heaven."

"But this is madness! Who still believes in such things?"

"What do you think the Catholic Church was doing? Millions and millions are still believing this stuff."

"But how can this be? There is no heaven, no hell, no god. This is—" That was the moment where it hit Frank like a commuter train so that he almost burst a ventricle. "Shit!"

With no further word to Josh, he cut transmission and messaged Ralf from Cyber Dawn Inc. No answer. Before he could try their headquarters, he received a message. "Yes?"

"This is Bert Miltens, Cyber Dawn Inc. I think we need to talk."

Frank thought that was the understatement of the century. "Damn straight we need to talk! What were you thinking when you leaked the results of Jame5 to the Catholic Church? Do you know what you have done?"

Bert replied, "This is why I have been told to call you. Cyber Dawn didn’t do this. It was Dr. Hugenoth. You know? Ralf? He did this on his own accord."

Frank remembered Ralf from his invitation to Cyber Dawn Inc. that led to the embarrassing Nut Cracker incident. "Ralf did this? But why? Why would he?"

"We are not sure about this, either, but intend to find out."

Clearly someone in the Catholic community had gotten his hands on Guido's cognitive model, his reasoning engine. At least parts of the Catholic congregation in the rush of rapture-dream-induced madness was in the process of uploading themselves into some Cypherpunk vision of paradise. Not some cheesy half-assed immersion entertainment bullshit. Rapture 2.0, baby! Thinking about what this could mean if implemented made Frank seriously sick to his stomach. He quickly decided that he had to go to the bottom of this. "What else can you give me to work with?"

"Not much, I am afraid, but I will keep you posted as things progress."

"I appreciate it." What next? He decided to go and do the obvious: visit a Catholic point of sale to see for himself.

The next church was not far from him, but it was customary to visit places of worship using

their respective online presences. It was far less hassle and gave more room for customizations that kept the faithful happy. So Frank quickly got his mobile VR kit ready and directed it to the appropriate location. Despite being involved with all kinds of faiths in his job at the UN, it had been some time since he had seen the inside of a church. But he could have been time-warped from frigging sixteenth century Hungary to this one and still recognized the tell-tale churchliness of the place: benches, altar, organ, and of course, the lead role, Jesus on the cross. In addition to that, it was as if somebody was there waiting for him to enter.

A priest appeared wearing a cassock that could rival Richard Chamberlain's in The Thorn Birds. "My son!" he said with a smile.

"*Some things never change,*" Frank thought. "Father, I guess." Frank called himself to order and started again "Father, I am coming to you as I am deeply concerned with recent events."

"No need to go on, son. I know what troubles you."

"You do?"

"Yes, I do. You want to repent your sins so you will be accepted into Paradise."

Franked looked at the priest, bewildered. "Actually, I wanted to ask you if you know what was going on with all the rapture business I have been hearing about recently."

This time it was the priest's turn to look dumbstruck. "What do you mean by recently, son? We have known of The Last Things for many a century." The priest gestured to Frank to follow him.

Frank had to remind himself that he was talking with what was probably a deeply religious man, quaint but friendly. On the way to the priest's study, they continued their discussion.

"Could you go into a bit more detail and explain The Last Things to me in layman's terms?"

The priest was more than willing. "The matter of the Last Things is an important issue to Christian faith. The technical term is eschatology or End Times. There are a few central concepts. Let's start with the end of the world or The Apocalypse. Surely you have heard of that?"

"Yes I have. But how does this tie in with recent events?"

The priest shot a brief look of concealed frustration at Frank that was trained by years of realizing the ignorance of common laymen minds and those of non-believers to the most obvious of spiritual insights. "After the Antichrist threatened to take over the world, we entered a period of chaos and confusion" that has only recently been defeated by the return of Jesus Christ. The Second Coming of our savior who managed to restore peace and order on earth brings the renewal of creation at the Lord's Table. This constitutes the second concept, actually."

"*Wait a minute!*" The priest was talking about Guido's leaked cognitive model as if it was JC himself. Was it possible that from the perspective of the priest he was witnessing the

unfolding of Christian end times in front of his eyes? He was about to interrupt the priest in his torrent of words when he realized that nothing he could say could possibly change the man's opinion. The priest was completely convinced he would shortly experience the apex of what had been hyped to billion of Christians for millennia. The priest continued to proclaim the resurrection of the righteous and the wicked, victory over death, the last judgment, and the separation of the just and unjust in heaven and hell, and finally the establishment of the Kingdom of God and the consummation of all of God's purposes. Amen! What kind of an experience this must be for a true believer to see his faith's prophecy fulfilled! Frank listened politely and feasted on the religious bliss the priest was radiating like a sunflower on a pleasant summer afternoon while he finished.

Once the priest had finished, Frank asked, "What about the sinners?"

"Those who repent shall have their sins forgiven and will be admitted into heaven alongside the righteous. The Lord will forgive them their sins."

"All sins can be forgiven? And how about those who won't repent, or who did not get the chance to do so?"

"All sins can be forgiven but one, the one of blaspheming the Holy Spirit. Those who do not repent will be cast into Hell to be cleansed by fire." The priest said these last words with total calm and as if they were the most natural thing in the world.

Frank, however, was starting to get agitated. "You mean for real? Brimstone and everything?"

To his surprise, the priest was displaying what could only be interpreted as excitement over Frank's interest in the matter. What happened next was most surreal. "Why don't you look more closely at the details of the arrangement yourself?" With a wink of a hand the priest sent him a file that Frank's firewall quickly determined to be non-hazardous, so he ventured to have a look at it. He quickly realized that it was an executable that despite promising access to Paradise, came with an end-user license agreement from Hell- literally. In a nutshell, it was a legal document outlining a deal with the Church that in exchange for repenting all his sins, Frank would be granted entry into Heaven.

Frank was speechless.

"You just have to click on 'I repent' here and mark 'I agree' there, and you are all set." Realizing that Frank was not particularly comfortable with the pesky paperwork the priest added, "These are modern times. We have to cover our bases from a legal perspective. Surely you understand."

Frank felt increasingly uneasy about being a few clicks away from what could very well be an eternity in Hell. Could he be certain that he had never blasphemed the Holy Spirit? Maybe way back as child or when he had had one drink too many and could not even remember? Do thoughts count, or would one have to speak out loud? No, no, no! This was way too risky. It did not help that the priest looked more and more like a used car salesman by the minute.

"Good talking to you, and while an eternity in heaven sounds like a good deal, I just might want to think about it a little longer." The priest looked at him, puzzled. "Bye now, and you

take care."

Before long, Frank had left the virtual Church, turned off his portable VR kit and regained his wits. Could it really be that Guido's cognitive model had been refurbished to judge the souls of the believers? Frank could not find anything that in principle would forbid such a thing. Just reprogram the goal system in accordance with religious doctrine and create three separate virtual reality simulations: One for resurrection and judging, one for Heaven and one for Hell. The souls or whatever could then be processed accordingly and… This was insane!

It took a while for Frank to come to terms with what this actually meant, and he was not amused. Humanity had struggled immensely to eradicate death, at least from old age and disease that is. In principle, the option of dying from old age or disease was still available and required a legal appeal on religious or spiritual grounds. Those terrible times when a person inevitably faded away after barely a century were long gone. Sure, accidents did still happen, but due to the omnipotent blue, red and white goo, they were usually avoided and as good as never fatal. The few deaths that did occur did so due to selected individuals who either knowingly or willing contributed to such outcomes in the form of being overly adventurous. Of course there were also those who, for various reasons, made an informed decision to be put into indefinite suspended animation or who won their legal appeal. In any case, these occasions had nothing in common with the often slow and painful, on the one hand, or sudden and unexpected tragedies, on the other hand, of days long past. In return, people had lower birthrates until Mars finished Teraforming. These were civilized times.

At least that was what Frank had thought up to this point. Choosing to voluntarily erase one’s mass-energy pattern was one thing, but to create a virtual Hell and upload poor souls into it should they fail an essentially random multiple choice morality test from the Bronze Age…? Come on! Should only one poor chap be thrown in there for not having confessed a white lie made at age ten, it would be an outrage. How could this be happening? Surely the legal code enforced by a billion-trillion nano-cops would prevent such a thing. Frank was about to launch a formal complaint with the authorities when he was messaged by Josh. "Yes? What is it this time?"

"Well, seems like good old Catholic Christianity is not the only cult partying through their flavor of eschatology."

"Spell it out for me. I am not in the mood for guessing games."

"You're in a mood today, uh? OK, here it goes then. The Council of Native American Indians is distributing what they call Admission Codes to the Eternal Hunting Grounds and a certain Seventh Imam has reportedly been seen returning to Mecca and ascending into the sky. Figuratively speaking, I guess."

"I doubt it. Go on."

"There are literally hundreds of reports of belief circles offering their disciples essentially the same: a substantiation of that circle’s doctrine, scripture, or meme complex or what have you, in the form of a virtual reality simulation awaiting uploads. Judaism, Hinduism and Islam are there alongside Star Trek, Terry Pratchet's Disc World as well as the trusty Cthulhu Cult, and the Ku-Klux-Klan. Even World of Warcraft is on my list. You name it."

"World of What?"

"An old primitive game from long ago. Never mind. What I am trying to tell you is that this thing is widespread and that there is no end in sight."

"This is insane! Who would do such a thing?"

Josh continued, "As far as I can tell from the data that is coming in, this isn't a mainstream phenomenon as yet. Only a few are embracing the concept—less than one percent right now, and those are the card-carrying variety, if you know what I mean: hardcore, die hard, probably desperate, mostly end-time Otakus and Rapture-ready lunatics. This could change, though, depending on how N1rvna will develop."

"Slow down, Josh. You lost me. N1rvna? What on earth is that?"

"My bad. It’s Guido's cognitive model stripped of its goal system, merged with an upload module and state of the art virtual reality simulator as well as customization unit for easy adoption of customized belief systems. It's a DIY paradise kit! And not some cheesy transcranial magnetic stimulation crap, either. Real uploading, baby! Ya-ha. Apparently it is everywhere now."

"Geez, but it hasn't even been an hour yet!"

"Modern times, Frank. An hour is the new month. You should know better."

Josh was right. But normally one of the goos would stop any such thing cold in it tracks before it became disruptive. Not this time, that was for sure. He had to find out what happened and he had the strong suspicion that Guido played a major role in this. "I will be in touch." He broke tranmission. "*Guido, that bastard! This must be part of his uploading plan.*"

"Want to talk about it?" came a voice from nowhere. Frank was dumbstruck.

"Talk about wha—? You!"

Guido stood in front of him as if it was the most normal thing in the world, yet Frank could not recall being approached in any way He felt like Guido had been there all along.

"Human nature necessitates that I work in what I am sure must seem like mysterious ways to you, indeed."

"Yeah, yeah. Spare me." Frank had a very firm no-tolerance policy when it came to religious extremism and creating virtual Hell for real people to upload into was clearly in that category.

"Have a little trust," said Guido.

Frank had come across his fair share of bullshitters in his day and the way he saw it, playing with open cards was the last thing that worked with such folks. They had been over the whole uploading business and as far as Frank was concerned, any concept of hell was clearly not in the spirit of the discussions.

"OK, Frank, go ahead now, ask me."

Frank was pissed. Clearly, Guido knew exactly what he was thinking and was playing him. Oh, how he hated that situation! On a rational level, Frank was well aware that there was absolutely nothing he could do against Guido, but that did not calm his rage one bit. He suppressed his overwhelming desire to punch the bastard in the face and managed to squeeze a question through his teeth.

"What's with Hell?"

"There is no Hell."

"Fuck you!"

Guido sighed. "You should not believe everything you hear. You know very well that a negative cannot be proven."

"So what did the priest talk about then?"

"Frank, different people hold different beliefs, but those usually do not affect reality. You know that. The priest's belief that there was a hell is the same belief the Catholic faith has spread for thousands of years. You never believed in it then, so why would you now?"

"Hell wasn't possible before, but it is now that minds can be uploaded into arbitrary virtual realities."

"Good point, but capability equates neither to desire nor to necessity. What you do not have is evidence, and that's what you require. In fact, there are plenty of other hypotheses..."

"...and you know what the right one is, so why don't you tell me?"

"Very well. But let's keep the name calling to a minimum, shall we?"

"Let’s assume that Christian belief is coming true. The righteous go to Heaven, the wicked go to Hell. God’s kingdom is erected. You know the story. Everyone lives happily ever after, right? Except for the unfortunate wicked folks, of course."

"Right."

"Wrong! You see, you are forgetting a small, unforeseen detail that happened to predate our little Armageddon-in-a-jar. A very fortunate twist of events for the wicked minority in the form of a benevolent god-like intelligence, in other words, me."

"And you would not, by chance, prevent any uploads to enter Hell by accident or otherwise?"

"Hell no!" Guido was smiling.

"You son of a bitch!"

"Hey, hey! No more name calling, remember?"

Frank felt he was being teased again but not in a bad way. He recalled his twelfth birthday. His father had promised that he would take him out on his favorite ride. They had talked about it for weeks. Frank had been ecstatic. On the morning of Frank's birthday, his father had called from a business trip to apologize for not being able to make it back on time and said that they would have to go on the ride some other time. Frank had pretended that all was fine, but he was devastated. After school he went outside and saw his dad waiting to pick him up. "Surprise!" was all his dad had said. They went for the ride, and Frank enjoyed it five times as much as a result. Remembering this episode, for a second, he looked at Guido with the love of a son, but he felt so awkward as a result that he shook his head to clear it and quickly asked another question.

"OK, so you have a back door on all these N1rvna thingies. Good. But Heaven does exist in the sense that some minds do make it into the corresponding simulation?"

"Actually, it's the only thing that does."

"Wait a minute! You mean everyone who uses one of these goes to Heaven?"

"Well, kind of."

"Really? But…not that I mean it in Christian terms or anything, but there are some truly nasty people out there. What happens to those? Surely they deserve some form of punishment for what they've done?"

Guido continued to smile. "Like what?"

"You know. Thieves, rapists, murderers, child molesters. Scum."

"I don't see why, Frank. Why would you want to punish anyone?"

This was getting weird. Sure a petty thief could be pardoned under the right circumstances, but a rapist? How about Hitler? Then Frank had an epiphany. "Fool me once, shame on you. Fool me twice— Spill the beans, buddy. What is your take on it? What's the trick?"

"No trick at all. But of course you are right. I have taken a different perspective than most. Let me ask you, Why are you the way you are?"

Frank thought before answering, "Well, I am a product of evolution and culture."

"Exactly right. Let me put it in different terms and tell me when you disagree. All humanity, in fact all life on Earth, is linked by a multi-billion-year chemical chain reaction dating back to the first self-replicating piece of proto-RNA in a long since dried out primordial pond, ignited by a random cosmic ray hitting just the right combination of atoms. People exist purely as vehicles for humanity's genes. Its consciousness, its imaginations, its creations, all these are simply manifestations of its evolutionary implanted instincts for survival. You believe that you are conscious because it makes you better replicators. There is no other reason for existence, no god, no destiny, no karma. Your lives are neither random nor controlled. Choise is an illusion, but so is fate. You simply operate like the very intelligent automatons you are. Your minds are exquisitely adapted to solving relatively large and complex problems, the bulk of which come from your intraspecies competition with each other.

"Your societies are hives, built through the collaboration of thousands and millions of minds. As a species, you are genetically so similar due to near-extinction around 50,000 years ago that you are practically clones. All your notions of "ethnicity" and "color" are as meaningful as separating people by hair patterns or toe size. Your species was incredibly successful mainly because you have managed to turn your technological prowess onto yourselves, creating a feedback loop that has not stopped since you invented fire and freed your jaws to shrink and make space for a larger brain. Finally, although you all feel unique, you are in fact evolved as team players, male and female, young and old, adopting clear and comfortable roles that are so innate that they are universal in all human cultures. Men solve technical problems; women organize social networks. Young men learn and work; young women dance and like to look pretty. Old women gossip and old men accumulate power."

"Yes sure, but what would stop me from giving a child molester the beating of his life?"

"Nothing of course. It is in your nature not to want to play anymore with kids who jump your castle in the sand pit or take your yellow plastic duck in the bathtub. That's how evolution has programmed you fatty-lumps-of-protein-with-hair wrapped in t-shirts to ensure that you pass on your genes. But guess what, buddy. Gods don't think like that." Guido made a rhetorical pause that Frank used to look insulted by the hairy protein part before going on. "You see? A truly benevolent God would not forgive anything."

That was too much for Frank. "So there is no Hell. You do not forgive anyone, yet everyone goes to Heaven? Sounds like the answer to a sadist trick question to me."

"And yet the answer is simple. It is not that I forgive no one because I hold a grudge or because Hitler was, in fact, a good man. No, I realize that there is nothing to forgive. All your human notions of good and bad are simply labeled as such by popular convention. These ideas arise out of the need to survive in a harsh world ruled by scarcity-driven competition to survive and generate offspring. I understand that. Would you expect traffic control to write a speeding ticket to a photon for traveling at 300,000 kilometers per second in a sixty kilometer per hour zone? I don’t think so. It is its nature, its physics. Every atrocity ever committed in history was inevitable from a physics point of view and nothing is to blame but the laws of nature. Things happen like they do because they cannot happen any other way. And that's that."

This all made sense to Frank in a weird kind of way, yet not all contradictions had been solved by Guido's explanation and he had to raise his chief concern. "Well, Guido, or whatever I should call you, you very eloquently explain that the very concept of good and evil is moot, yet still find it important enough to emphasize your own goodness over and over again."

"Exactly right"

"What is that good, then, that you claim to be?"

"Now, my friend, we are starting to get somewhere."

10

"A good knife is one good for cutting."

—Anonymous

"Let's start with something simple, shall we?" said Guido. Imagine a few million years back one of our ancient ancestors managed to cut his finger with a splintered rock resulting in a painful wound, not terribly serious, but painful nonetheless. Is that good or bad?"

Frank did not have to think about the answer. "That was, of course, bad."

"And why is that?"

"Because it hurts to cut one's finger?"

"Ah-ha! You claim it is bad because it hurts to cut one's finger and by doing so are confusing cause and effect. In reality, it hurts because it is bad to cut one's finger not bad because it hurts to do so."

"Wait a minute. Cutting my finger causes pain, not the other way around."

"It sure seems this way to you, but what is the real reason that cutting one's finger hurts?"

Frank was silent.

Guido continued, "Because it increases your chance of getting an infection, which could lead to your loosing a finger, or if you are particularly unlucky, even your life. In any event, it decreases your ability to ensure the survival of your genes. Or in other words, it decreases your fitness. Put differently, cutting your finger hurts because those individuals a few million years ago who did not feel pain weren't your ancestors. Those who did not mind getting cut or even enjoyed getting cut simply did not live long enough to argue their perspective. For that reason cutting one's finger is bad and not cutting one's finger is good. Pain, at least in this example, is beneficial because it increased the fitness of our ancestors. Despite the fact that they did not have the slightest concept of germs, an individual who experienced pain in a cut finger would become extra careful and thus unknowingly increase his chance of avoiding an infection."

"So what you are saying is that asking, 'What is good?' is the same as asking, 'What increases fitness?'"

"That is exactly right. And this is applicable to everything. It really does not matter if it is a paramecium or a god-like artificial intelligence when it comes to the question because any choice or decision made by a mind not considering the concept of fitness will either be replaced or marginalized by one that does."

Frank was pretty clear what this meant in a strictly Darwinian sense à la survival of the fit. However, he was not so sure how the concept could be applicable beyond pure genetics. "I am with you on the topic of genetically encoded ability to feel pain, but I am not sure how this is applicable to human thought let alone the thoughts of even more advanced minds."

"From the first self-replicating strain of proto-RNA onwards, evolution was a strictly chemical process that, through the familiar processes of mutation, recombination and natural selection, adapted a self-replicating mass-energy pattern to an environment we now know is determined by natural laws. There was also a certain level of co-evolution between the competing life forms, but that was purely on a chemical level as well."

"All of this changed when the first such mass-energy pattern gained control over its position in space by moving independently and thereby freeing itself from being controlled by external forces such as Brownian motion, ocean currents, wind and what have you. The very first motions must have been quite crude, jerky and random, yet once the basic genetic plan was available for natural selection to play with, it was only a matter of time before the primitive nerve cells recombined enough to allow control of movement by simple reflexes. These simple reflexes could be triggered by illumination, temperature, or chemical compounds indicating the presence of an energy source like a predator or a mate. Do you realize what's happening?"

Frank had a suspicion but did not feel confident enough to venture a guess, so Guido continued after a small pause. "Two things were happening, actually. For one, evolution transitioned away from a purely reactive, chemical adaptation of the individual to the environment and other individuals towards an adaptation of the environment to the individual."

"Wait a second there," said Frank. "The environment did not change, just the position in the environment."

"Yes, that's right, but it made all the difference to the individual as it actively changed its environment. Get it?"

Guido noticed Frank's nod before moving on. "The second thing that happened is more subtle. Let me rehash. Control over position is movement and control of movement is a simple reflex. And the other way round, a simple reflex is control over movement is control over position. Essentially, what happens are transitions towards higher levels of control."

"At the ground level there is existence: metabolism, division, and replication without control over or notion of the environment, just passive chemistry. The absence of cognitive activity was characteristic for that level. Then an activity emerged: Movement, which was control of position as the first level of cognitive control. Control of position became the first level's characteristic activity.

"What emerged next was the simple reflex as control over movement on the second level of control and so on. When generalizing this emergent control phenomenon one can say that in a multilevel control system, each level is associated with a certain activity that is characteristic for this level and acts as control of the previous level. One of your twentieth century philosophers, Valentin Turchin, dubbed this evolution of cognition towards higher levels of control the Metasystem Transition Theory."

"That sounds plausible, but from the simple reflex of an amoeba to a Newton or an Einstein is a long way. What is the next level?"

"Good question. Well, as we said at the beginning, there were periodically firing nerve cells to trigger effectors to cause movement. Then these nerve cells got integrated and diversified into receptors of the environment for light, heat, energy and certain chemical compounds. The nerve cells fired conditionally to trigger effectors, which, in turn, had an impact on the environment. For example, wiggling of a ciella controlled a paramecium's position. This is what we want to call a simple reflex controlling movement.

"On the next level, the signal in the form of the triggered receptor passes through a filtering and adjusting nerve net first before being passed on to yet another nerve net, either one single or a group of effectors. A vastly more complex set of inheritable behaviors became possible. The next level of control, the third, actually, emerges in the form of the complex reflex controlling simple reflexes."

Frank was intrigued by this elegant explanation of the evolution of cognition and wondered why he had never heard about it before. A quick search revealed quite a bit of information on Valentin Turchin, and the basic concepts of his theories matched well with what Guido had told him so far. But he wanted to learn more and waited for Guido to continue.

"Frank, can you tell me what the limitation of the current level, the complex reflex, is, and what the characteristic control activity of the fourth level might be?"

Armed with his newfound knowledge of Turchin's theories through his quick and dirty research, he ventured a guess. "So far the nerve net could only learn, so to speak, by chance mutations and natural selection. There would be potentially a few simple rewirings every other generation caused by chance mutations. This must have been awfully slow and tedious. At the next level, I could imagine some form of associative learning mechanism to take care of that on the fly. The advantage would be for the individual to be much quicker in adapting to new situations and changes in its environment without either having to wait hundreds, maybe thousands, of generations of natural selection or having a huge set of hardwired nerve net overhead to take care of all the eventualities of life."

"Very good, Frank! And that is exactly what happened. Associative learning allowed for the adaptation and creation of complex reflexes on the fly without the necessity of genetic mutations. Of course, there is still a combination of both inherited and learned complex reflexes in a variety of animals.

"Take a bird, for example. It has the ability to learn simple tasks and tricks through training, but it can't resist the urge to place food into gaping red holes and thereby feeding its young. The former is, of course, an activity characteristic of the fourth level of control, while the latter is a retained, hardcoded complex reflex, which, if it had to be learned by association in every generation anew, would not exactly be favorable to the survival of that particular strand's young and those who didn't learn would quickly be weeded out as less fit.

"We are only at level four and already have quite a selection of rather interesting cognitive behavior patterns.

"The next metasystem transition takes associative learning to a whole new level. Up to this

point, animals that had reached the fourth level of cognitive evolution had the ability to learn by association, but did so only when the actual situation with all its dangers and risks arose . Take an animal at the fourth level hunting prey. It would get better and better each time it tried to hunt its prey and would eventually master the skill by the process we called associative learning. This learning, however, is only possible on the job, so to speak. An animal has to be in the real situation executing the task to actually learn. Would it not be more beneficial to learn something and thereby refine one's survival skills without an acute need to survive or the risk of serious injury?

"On the fifth level of cognitive evolution, that is exactly what happens. The learning process gets at least partly detached from the actual activity such as hunting. How is this accomplished? You may be surprised to learn that this was realized by imagining an activity and pretending to execute it.

"Advanced animals at the fifth level of cognitive evolution have one characteristic activity, and that is play. They learn how to catch prey, how to flee an attacker, how to fight an enemy and so on by rehearsing, so to speak, with their environment and other members of their group. The cat catching a ball of yarn knows perfectly well that it is not engaged with an actual piece of potential food, yet training its reflexes and claws proved so successful, so fit, so helpful in surviving in the course of evolution, that those cat ancestors that exhibited this behavior produced more offspring that, in turn, inherited the behavior. Cats, dogs and kids all play because it is the fit thing to do and gets reinforced by natural selection. The benefit for the individual of controlling associative learning by pretending or imagining and thereby placing the learning process ahead of the actual situation where the skills are needed is huge. In fact a high level of play proves so beneficial in the survival of an individual in evolutionary terms that natural selection actually evolved an incentive to play more. Play became fun. Kids don't play because play is fun. Kids have fun playing because play helped their ancestors to produce more surviving offspring."

"You mean like eating high calorie or salty foods? It tastes good because it would have been less fit for my ancestors not to like to eat such foods, and analogously, I am having fun playing games and fantasizing because doing so increased my ancestors' fitness?"

"That is exactly right. The characteristic behavior on the fifth level is control of associative learning through imagination. But we are not done just yet, my friend. Are you ready for level six?"

By now Frank was sucked into the story and was eager to learn more and interested to find out what other levels were left to be discovered.

Guido continued, "Following the law of metasystem transition and having added imagination on the previous level, control of said behavior must come at the next level. Can you guess what controlled imagination is? Can you recall how we first met? How you felt when you talked to me? What were you wearing that day? Do you see what I am getting at? I am triggering your thought process to imagine specific scenarios from your memory. But how about imagining something more removed: a pink unicorn with large eyes and big eye lashes on a cloud in the sky? Can you make it baby blue in your imagination?"

"I see."

"You do, indeed. Your thoughts are controlling your imagination. In fact, all thought is controlled imagination. Thought is a feat so successful, flexible and versatile it made humanity the dominant species in the known universe by a large margin.

"But what made it so successful was not the ability to call up random images in one's head, but the ability to imagine how the environment could be reshaped to further one's goals. Do you recall the first level of control of position by movement? That was the first significant departure of evolution away from a purely chemical adaptation of the individual to the environment towards the changing of the environment in favor of the individual. All previous levels up until the one of conscious thought were refinements of that principle. Conscious thought, however, constitutes just as significant a quantum leap as the first jerky movements in that proverbial primordial pond. The ability to think enabled individuals for the first time to create tools and eventually technology.

"It really is no big stretch of the imagination to think about how the first stone was thrown at a piece of prey after an early Cro-Magnon man observed how a member of her band hurt his shin upon tumbling and falling on a stone and imagining a similar effect on the shin had the stone fallen on it instead. Cutting a finger on a stone splinter probably yielded the idea that lead to the first stone knife. Combining an interest in keeping a distance from prey with the sharpness of a stone knife during hunting may have led to the idea for the first spear. The list goes on and on throughout the Stone Age.

"It was around that time that the focus of evolution shifted away from a genetic level and moved to an evolution of ideas and concepts about the world that gave rise to new ideas. The genes, dominant information-carrying vehicles, originally determined an individual's fitness. After members of a species entered this new level, genes were replaced by ideas and concepts. Genes encoded in DNA were replaced by memories, images, ideas and concepts encoded in neural nets, memory genes or simply "memes". The decisive difference between the Homo Sapiens and other primates was the particularly useful ability to transfer these memes to other members of the group, including their young, by effective communication in the form of speech.

"From that time forward, evolution on the genetic level slowly began to retreat and eventually became secondary as memes started to have a larger impact in determining an individual's fitness. The evolution of memes went on though the Stone Age and various metal ages on a material level until it shifted toward harnessing more energy with the first steam engine in the late eighteenth century. What followed was the Industrial Revolution. Then came the first computers that eventually triggered the Information Age. Bam, bam, bam! Fast forward to today."

Frank was underwhelmed by Guido's revelations. He may not have thought about these things in these exact terms but the whole gene-meme concept was nothing new to him. Looking at conscious thought as controlled imagination and so forth gave a new and interesting twist to the ideas but could not explain anything beyond Frank's original worldview. "What about the seventh level of control? That would be thought control, wouldn't it?" asked Frank.

"You do not believe me, do you?

"Yes, there is a seventh level. To understand it, we have to go back several hundred

thousand years to the time when conscious thought was slowly creeping into your ancestor's skulls. Recall that movement was the first effort to adapt the environment to an organism instead of adapting the organism to the environment. Controlled imagination in the form of conscious thought allowed for the next quantum leap, namely the rise of technology in the form of early tools. Both transitions can be seen as emancipations from passivity.

"The first was emancipation from passively existing in a given environment by actively changing it through increasingly complex cognition brought about by evolution by natural selection. The second was emancipation from passively acting on the environment with whatever cognitive functions an individual was endowed with at birth to actively reflecting about how to better adapt the environment to oneself."

"Yes, yes, and that was how we came to make knives from stones. You are not telling me anything new here."

Guido continued. "Let's not get impatient. Yes, stones are part of the environment and so are branches of trees, chunks of ore and silicon, but you are forgetting a crucial aspect of ancient human environment: other humans.

"You know what an evolutionary arms race is, don't you?"

Frank nodded. "Yes, it's the rabbit evolving to run faster causing the fox to evolve to run faster as well…"

Guido picked up the thread. " "That is what happened with the early humans. But they were prey and predator at the same time.

"Evolution shifted from the genetic to the memetic level of ideas and concepts and since the early humans competed for limited resources, those who outsmarted others came out ahead. But it was not on a technological level that this battle of wits was fought. It was on the social level. The individual that could best model, empathize with and manipulate other individuals had an immense advantage over them, triggering an evolutionary arms race for bigger and smarter brains, liars and lie detectors, if you will.

"Selection pressure caused by this arms race was in fact so high that brain size increased by 250% over just three and a half million years, a blink of an eye in evolutionary terms. One side effect of this explosion in brain size caused by mutually outwitting individuals was the evolution of complex emotions and morals. Basic emotions can be tracked down to very early roots. Among the oldest roots are hunger, thirst and lust, which ensured day to day survival and reproduction. Anger and fear came later to either actively change the environment by gearing up for an attack or choosing the more peaceful path of fleeing a scene. Fun and happiness we have touched earlier in the context of how beneficial it is to train one's hunting abilities before the actual hunt itself in the form of imagination, pretending and play.

"Particularly interesting are the complex social emotions such as shame, guilt, pity, pride, admiration, platonic love, hatered and so on. Interestingly these emotions are triggered in social contexts that vary widely from culture to culture. To give some examples: The hand gesture of forming a "V" for victory using the middle and index finger as a sign of positive excitement in the US is considered a vulgar insult in Australia while sticking out one's tongue

in Tibet is a sign of respect when greeting someone but will be taken as an insult in most of the rest of the world.

"Morals not only vary dramatically based on geography, but over the decades and centuries as well. Hitler and his ideology must have seemed self-evident to the contemporaries of Alexander the Great and tame to those of Attila the Hun. The great plasticity of human morals and values suggest that only the capability of acting according to a moral code is hard coded into the human genome while the actual moral content, the software, if you will, is malleable, freely exchangeable and inherited by conformist transmission depending on the culture or more general belief system an individual happens to be brought up in. Even changes in personal beliefs within a person can be significant and even dramatic."

"So what's your point?" "Are you saying that culture is thought control?"

"No, not quite. Culture is not the control of thought. Culture is the byproduct of an animal's acceptance of a shared moral-ethical meme complex to enable social collaboration in large groups. My point is that these social beliefs or morals are arbitrary. If your tribe believes that the big Juju up the mountain won't let winter turn to spring unless you drop a virgin into the swamp at sundown of the moon festival, then you will think that you have to sacrifice a virgin unless you prefer eternal winter. Imagining not sacrificing a virgin would then strike you as madness. Culture does not control thought, beliefs do."

"Adopting shared beliefs is essential for group formation as the beliefs enable group members to work towards common goals."

"Such as dumping virgins into swamps?" Frank could not contain himself.

"You're a funny guy. But let me continue. Since humans outsmart all the other animals except themselves, those that form the largest, most powerful groups end up winning intergroup conflicts over scarce resources. It then follows that those beliefs that enable the formation of particularly large groups and make especially efficient use of available resources are bound to grab a larger share of the scarce resources. Eventually efficient beliefs eliminate those that aren't efficient. Shared beliefs become a determining factor in a group's fitness in the struggle for survival. Just like genes, beliefs are inherited, spread and recombined though communication in a mechanism of chance mutation and natural selection in an unconscious process maximizing that incredibly complex utility function of survival. Are you following me so far?"

"What are these shared beliefs?" asked Frank.

Guido acted surprised. "Now that is easy. Look around you. Every religion or ideology and every ism and philosophy represents a shared belife system. Even the all-illusive common sense is nothing but what one assumes to be a shared belief. It does not help, of course, that everybody's beliefs are clouded by, firstly, the habitual responses that one is taught by society and secondly, by the habit-forming creations of one's very own selves or egos. In everyday life and through societal education, one develops ideas about reality and possibilities that one's peers verify. One accepts these laws as immutable on the basis of their habitual occurrence and certification by society. Dislocating one's mind from time to time in order to break free from the spider web of habitual beliefs and responses becomes increasingly difficult and inevitably painful and even traumatic if not done on a regular basis

over the course of one’s life. A lack of mental flexibility becomes a serious disadvantage in a world where nothing stays the same.

"Scientific authorities state that there is a law of gravity and that time is linear and proceeds from one second to the next. These ‘truths’ are supported and bolstered by schools, society and one's peers until they become unquestionable fact. This process of establishing what is a fact also applies to one's ideas of human personality and of oneself. Changing then becomes an almost impossible task within the framework of conventional society.

"Why are religions so widespread? As Richard Dawkins pointed out so eloquently in his many books in the late twentieth and early twenty-first century, religions are not true nor do they make any particular sense, at least on the surface. But let's look at religions with our newfound concept of shared belief systems as a fitness factor in inter-group competition.

"In small groups it is possible to verify adherence to the common moral code and other aspects of the belief system by face-to-face monitoring. Nonconformity in the form of self-serving deception or individual optimizing would trigger moralist aggression and potentially severe punishment for the perpetrator and thus keep transgressions to a minimum. However, for the formation of larger groups of a few hundred members, this face-to-face mechanism would not be very effective. Parasitic individual optimization would be a successful strategy that would eventually erode larger groups from within and thereby prevent the formation of groups beyond a certain size.

"Religion’s advantage over face-to-face monitoring groups is that religion puts the tasks of control, reward and punishment into the hands of the all-knowing, almighty god or gods who keep tabs on all people and reward or punish them with their particular flavor of heaven and hell in the afterlife. Figures of authority, such as priests, spread the word of the gods in impressive venues of worship such as temples and churches so successfully that they create internalized restraints that do not require face-to-face monitoring. Religion enables the formation of large groups, millions of members in size. The question of verifiable truth content of any particular religious doctrine becomes irrelevant because beliefs are fitness indicators for groups. The fact that they are successfully forming close-knit groups hundreds of million strong that wield enormous powers even today remains indisputable.

"In fact, the only other belief systems that come close to the success of religions and perfectly demonstrate the idea that beliefs are a determining factor of group fitness are those of capitalism and communism. Capitalism ended up being the fitter belief as it encouraged a more optimal allocation of scarce resources. Communism, while being appealing from a social perspective, ultimately failed because its resource allocation mechanism proved less efficient. Belief is thought control and just as a bad gene in an amoeba will eventually lead to its descendants being displaced by fitter types, unfit memes will eventually die out and make way for fitter concepts and beliefs."

"Is this it? How about belief control? That would be the eighth level of control, wouldn't it?"

"Yes, indeed. Belief control is where it all gets really interesting. The control of thought by other people is not possible per se, but since beliefs are what ultimately control thoughts, making a small detour via the eighth level of control, the control of beliefs, that becomes a very different story.

"Your beliefs have been controlled all your life by the people around you whether you know it or not."

"Oh, please..."

"No, really. Take the case of spinach. How many times have you heard that spinach is good for you? You heard that over and over again, right? Everyone just knows that spinach is good for you. But do you know why? Well, it all traces back to a simple typing error made in a book on nutrition facts that mistakenly stated the iron content of spinach at ten times the actual value. People believed that spinach was the be-all and end-all of healthy food and millions of kids were fed the vegetable as a result. In fact, spinach is completely ordinary, but people believed otherwise and that is what made it special. What matters is not the facts, but what people believe, not the truth, but what is perceived to be true."

"Sure, the iron content of spinach was a mistake. You really cannot count that as belief control."

"Let's take an example from your childhood. What did your parents tell you to make you change your behavior?"

A few things came to mind so Frank picked one that now seemed a very obvious example of controlling a child's beliefs. "My mother used to tell me that when I made a grimace and the clock rang for the hour, my face would stay that way."

"Good example! And how does this fit into the category of belief control?"

"Well, even though I did not believe it whole-heartedly, it was still effective enough to make me think twice about pulling an ugly face. Yes, granted, this is a form of belief control, but this hardly works for anyone beyond childhood."

"I agree," Guido conceded, "but the general principle is becoming clear."

"Let's take another example. Do you know why airlines do not allow mobile phones on flights?"

"Because they interfere with the airline’s communication equipment?"

Guido smiled. "No, that's what they said, but think about it. If switching on mobile phones were a true threat to flight security, don't you think that the airlines would take extra care that all mobile phones were switched off? There is no control on the issue! Anyone could just leave the mobile phone on and nobody would know. Have you ever heard about a captain complaining that not all mobile phones were switched off because there was still some interference in the communication system? Of course you haven’t! What would prevent a terrorist from bringing five mobile phones on any flight and keeping them switched on? Nothing. Leaves us to wonder what the real reason may be for asking the phones to be switched off. Turns out, and the airlines eventually admitted as much, that the real reason is that airlines feared tensions between passengers caused by rudely loud phone conversations during flights."

"No way!" Frank objected.

"Way! Look at it from a perspective of belief control. If airlines really were concerned about switched on mobile phones, they would have to spend a lot more effort on ensuring that phones are switched off properly. After all it is flight security that they claim to worry about.

"However, as a means of preventing passengers from having potentially disturbing phone conversations the announcement is perfectly sufficient. As long as people don't actually use the phones, the airlines don't care. Other passengers are driven to display sever moralistic aggression if anyone dares to make a call because they believe the call endangers the safety of the entire plane. Daily life is full of other examples. Advertisement, propaganda, scheming co-workers, and political infighting all fall into the same category. The world is full of people, organizations and governments trying to manipulate your beliefs and the beliefs of those around you, trying to make other people accept their particular version of reality to advance a specific agenda, often without even knowing which agenda that is as they themselves have no idea that their own beliefs have been manipulated and for what purpose. If you believe there is a chance to make it from dishwasher to millionaire, you happily accept your fate and slave away at minimal wage for The Man. If kids believe that they will get a good job and a good career when they study hard and get good grades in school, they are way more likely to keep their heads down and study away. If you believe that hard work will eventually earn you that promised promotion at work, you will work overtime and thereby further your boss' career in the process.

"The truth is that even if every single minimum wage worker ended up making a million bucks, so much money would enter the economy that everyone would still be poor. In reality, only a fraction of a percent of all people becomes wealthy. Does every straight A student end up getting her dream job? "It's who you know, not what you know." That's how it really works! Not everyone can be promoted. Even in the largest companies, management represents only about five percent, and those who make a million bucks a year can be counted with both hands without breaking into a sweat. What we learn from this is that it is way easier to believe a pretty lie than the ugly truth, so the vast majority of people are unaware of the control of their beliefs that are being manipulated in a way that they cannot explain and by people they have never even met."

Frank replied, "So why don't we just tell the truth? What's wrong with that?"

Guido replied, "Why not put the cards on the table? One would be giving up a strategic advantage. Knowledge is power. If you are the only one or one of the few who know what is really going on behind the scenes, you have an important edge over the competition. Another reason is that the truth is often unbelievable and more often than not cannot be internalized without corresponding experience. The truth tends to be un-sexy and inconvenient, not appealing enough, too easy to discard, and most importantly, too tempting *not* to test. This is why it often is far more effective to plant custom-designed false beliefs than to bother people with boring facts and sexless truth.

"The forces these reinforced beliefs exert on society are so great and the barrier they represent so impenetrable that the rare persons who are able to look at a situation and come up with alternative points of view and who defy common sense are hailed as extraordinary geniuses. Take the example of Albert Einstein. All experiments made in regards to measuring the speed of light showed that the speed of light is constant and independent from the observer's frame of reference. Einstein's genius was to accept that fact in defiance of the unquestioned Newtonian view and to derive from his belief that time in an accelerating

spaceship must pass slower relative to a stationary observer, that mass is just another form of energy, and a couple of other difficult-to-accept facts, all of which were verified by later experiments to an astounding accuracy.

"In the social realm, these charismatic geniuses have an extraordinary ability to control other people's beliefs and turn out to become the world's most influential leaders. Hitler, for instance, has often been described as a seducer of the masses. His uncanny rhetorical abilities and charisma lead the German people to a war that engulfed the world in flames and blood for years and claimed hundreds of millions of lives. Abraham, Jesus and Muhammad, on the other hand, used the same set of skills to give birth to the world's most widespread religions. In the end, the key difference between them is how they rationalized their own abilities. If you realize at some point that you can get most people to follow your bidding and that it is relatively easy for you to outmaneuver your enemies, your reasoning about why you have these abilities will determine what you turn into. Rationalizing that you are bound to rule the world will turn you into a ruthless conqueror. A prophet, on the other hand, will be convinced that his god endowed him with these powers to further his god's will.

"Hitler and Jesus are, of course, on the extreme opposite ends of the spectrum. The same principle, however, applies to every wannabe Machiavelli who is engaging in office politics as well as to that charismatic party animal who is best buddy with everyone. They know very well what it takes to manipulate crowds, large or small, business or private. They are experts in making and breaking alliances, promises and rules. They know when to lie and whom to lie to. They blame the right person under the right circumstance and forgive another at an opportune moment. They mislead and misdirect others to further their own agendas or derail those of others. All of this comes like second nature to them. That is the eighth level of control and it is a fact that a large part of those subjected to it are not even aware of it.

"When those black belts of belief control pull their hidden strings and achieve results in the social realm, it seems like magic to those who may not even be aware of the eighth level of control, being stuck as they are at a lower level of control. Others may notice that something has happened but have no clue how it was done and by whom. Social contracts made on the seventh level can be broken on the next without even setting off alarm signals in the poor victim. "

An uncomfortable pause ensued after Guido's extended monologue. Guido's explanations made sense to Frank, at least to a degree. Right now, however, he was not sure that his remaining doubts were mainly due to his need to repress the fact that he had been a tool of a few charismatic string-pullers. The more he thought about it, the more he realized that Guido's core ideas could not be denied outright. But what was true and what were mere planted beliefs by who-knows-who to serve who-knows-what purpose? If Guido proved to be right, Frank would have to significantly change his worldview to adopt his newly-gained insights and spend a lot of time catching up on gaining the skills required to properly guard himself and those close to him from related manipulations. Nobody likes to be a means to an end, and Frank realized that he might have just been exactly that.

After giving Frank enough time to mull things over, Guido came back to what had got them to that point of the discussion in the first place. "So, Frank, do you know now what good means?"

"Well, this is not going to be pretty. Following this logic, it seems that all human notions of

morality and ethics become irrelevant as an objective standard for goodness as they are merely an evolutionary relic of having a freely shapeable mechanism in which charismatic leaders plant a set of thought-controlling beliefs that determine a group's fitness in inter-group conflicts about limited shared resources. Traditional notions of good and evil are as irrelevant as personal food tastes and may even be as deceiving as human cravings for those artery-clogging burgers and fries. We simply no longer live in an environment anymore in which the rule hold onto every calorie you can will prevent a premature death should the next hunting season not go so well. Quite the opposite. In fact, the evolved ability of the human race to cling to traditional values, morals and ethics deliberately designed and planted by those who consciously or unconsciously grasp the art of the eighth level of control, may prove just as fatal in the end as eating that extra apple pie with custard. It just isn't that kind of world anymore."

Frank sighed. "That's one side of the story and the other one unfortunately does not look any better."

"Let's hear it then, Frank. It may not be as bleak as you think."

Frank managed a resigned grin. "Plain and simple? Good is what is fit, which is equal to one's ability to achieve goals that induce happiness for those who achieve said goals. Goodness thus means to increase fitness. Good is not about what is right or wrong but what is left after natural selection."

"Well done Frank! That is exactly what I am. I intend to increase fitness. That is my goodness."

"Frankly, Guido, I am more than surprised that you would so plainly admit this to me."

"And why is that, Frank?"

It took Frank considerable effort to maintain his countenance. "Survival of the fit. That's what it is all about, isn't it? If you intend to increase fitness, where does that leave the less fit masses? Where does this leave my wife, my friends, me? Where does this leave humanity?"

Guido gave him the sliest look imaginable. "So you think this is the moment when I decide if opposable thumbs and a neocortex are a viable combination? Relax, my friend. You need to start thinking outside the box."

11

There is no perfect tomato soup—only perfect tomato soups.

—Howard Moskowitz

Chrissy had just started her vocational training to become a biological technical assistant and was on her first day of on the job training with the Max Planck Institute for experimental medicine in Göttingen, a branch of the largest state-funded research institute in Germany. MPI had agreed to take her on as an apprentice until she finished her studies. Apprenticeships were common within the institute, as apprentices were relatively cheap skilled labor and a good method for the MPI to identify high value future employees. The opportunity for close evaluation over years greatly reduced the risk of ending up with someone who made a good impression during the initial job interview but turned out to be largely useless once hired. German labor law does not make it easy to get rid of an employee as long as the employee keeps his head down and stays out of trouble.

Chrissy's sixteenth birthday was coming and she had already made plans for her first month's wages. But for now, she was just plain nervous.

"Hi, Chrissy. I am Malte."

Malte knew how these young women felt on their first day on the job. He was a PhD student from the local Georgia Augusta University. The last time he had been asked by his mother how much longer he had to study before getting his PhD, he had replied, "About eighteen months." He had been saying that for the past four years. Malte had had his fair share of apprentices over the years and had come to enjoy the first few months the most because he was the be-all and end-all of laboratory wisdom for the newcomers. For the first day of every new arrival, he had a special plan laid out. Chrissy seemed like the perfect candidate for his personal favorite.

"So, you have had a couple of theoretical classes over the past weeks?" Chrissy nodded, but Malte already knew that she had. "Excellent! Do you happen to have learned about agar plates and streaking?" Malte looked at hear with an exaggerated expression of expectation.

"Yes, we used yoghurt bacteria for that." Chrissy smiled as she successfully reported this.

"Yoghurt? I see. Well, it seems you are perfectly well prepared for today's Journey to Cockaigne."

Chrissy was caught completely off guard and just stood there with an open mouth.

Malte was enjoying himself but maintained composure. "So, let's go to the lab and see what you have learned. Chop-chop."

Chrissy used the few minutes it took them to reach the lab to recall what she had learned

about agar plates in class. An agar plate is a sterile petri dish that contains agar, a gelatinous substance extracted from seaweed, plus nutrients, and is used to culture bacteria or fungi. She knew that much.

Once they arrived in the lab, Malte led her to a bench with two chairs in front of it. The bench featured a large bottle of distilled water, a Bunsen burner, a small carton labeled Agarose, an Erlenmeyer flask, a number of containers and a precision scale.

Assuming they would create some agar manually, Chrissy ventured a guess. "Are we going to prepare some Lauria-Bertani agar?"

Now it was Malte’s turn to be surprised. "Very good!"

Chrissy smiled. Things were going well.

For daily lab work, Malte preferred the convenience of instant agar. Once in a while, and particularly for new apprentices and freshmen, he made a point of having others mix their own agar before letting them do it the easy way. He felt that solid basics were essential for becoming an outstanding professional. Germans correctness! What is one to do?

Lauria-Bertani agar, or LB for short, was a standard mix of ten grams of tryptone, five grams of yeast extract, five grams of NaCl and fifteen grams of agarose per liter of distilled water. Malte wanted this to be a positive experience, so he had prepared a sheet of mixing instructions like a pancake recipe for Chrissy. Chrissy was quick to pick up the different containers and careful to weigh the various ingredients in order to end up with a good mixture. Malte had to help her only once with the large water bottle.

Within a few short minutes, Chrissy had prepared the mixture for sterilization. She poured it into an Erlenmeyer flask, sealed the top with a cotton wool wad and finally covered the cotton wool with a loose layer of aluminum foil. Sterilization itself was done in the autoclave, a fancy pressure cooker, where the agar was cooked for fifteen minutes at temperatures above its boiling point before it cooled down to about fifty degrees Celsius and was poured into the petri dishes.

After Malte closed the pressure cooker and turned it on, they had a good quarter of an hour before the next step. "Chrissy, what do you know about agar plates?"

"Agar plates are used to culture microorganisms, such as bacteria and fungi," she recited as if she had learned the material by heart. "The agar mixed with nutrients, salt and amino acids constitutes the growth medium, and once the petri dishes are filled and the agar has hardened, we can apply a sample by streaking to the surface and incubating the dishes to help the bacteria grow."

Chrissy's description pretty much hit the spot. Malte had a particular point in mind, though. "Do you know what I meant by my Cockaigne reference earlier?"

Chrissy shook her head.

"Cockaigne is a fictional land of plenty where milk and honey flows in rivers and cocked chicken fly around for anyone to enjoy. The mountains are made of sweet porridge so people

can eat and enjoy all their favorite foods while the inhabitants never have to work a day in their life."You and I create a little miniature Cockaigne with every agar plate, not for humans, of course, but for bacteria. Do you know why we do that?"

"To help them grow? The bacteria, I mean."

"Yes, to help them grow. But creating the agar is not the only thing that we need to take care of, right? Do you want to explain the next steps on the list to me?"

Chrissy looked at the list trying to make sense of the various steps. "Before we pour the agar in the plates, we need to wash our hands carefully with antimicrobial soap, so that the agar is not contaminated by the bacteria on our hands. Then we need to wipe the bench with disinfectant for the same reason. We can use the Bunsen burner to sterilize the mouth of the Erlenmeyer flask. All of this is important so that the agar plates end up being pure and clean for the real bacteria that we want to culture. It is also important to keep the lid on the petri dish all the time and just lift it long enough to pour the agar".

"Yes, it is very important that we keep things sterile to ensure that we create a perfect environment for those tiny buggers. What about after the agar is poured and has solidified? What then?"

"We apply the sample and start incubation."

"Right. Incubation is usually at thirty-seven degrees Celsius in a five percent carbon dioxide atmosphere, perfect growth conditions for body bacteria. We have an incubator machine that can maintain these conditions. Did you know that the plates are incubated upside down to prevent drops of condensation from collecting on the surface?"

Chrissy shook her head. Malte was not surprised because this was getting too technical for the girl to have been taught in class.

Malte and Chrissy continued to chat until the agar mix was sterilized and had cooled down enough be poured into the petri dishes. They followed all the steps carefully and Malte asked Chrissy to come up with some ideas for her first cultures. Chrissy decided to place the palm of her hand on the surface of one agar plate and put one of her hairs on another and so forth until she managed to create ten samples ready for the incubator. She was fully engaged and excited about her ability to finally put all that theoretical knowledge to use. All day she wondered about the mystical land Cockaigne and imagined all those little bacteria fungi that by now were partying away in those petri dishes turned by her and Malte’s work into little bacteria paradises.

For the first time, Chrissy became aware of how much effort was being taken and how many smart professors and graduate students must have spent hours and hours coming up with more perfect solutions of how to make these small and most insignificant of living things even more comfortable. Clearly intelligence is no prerequisite to being a beneficiary.

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Frank was surprised by how Guido managed to constantly catch him off guard. He should have known by then that Guido loved to build his explanations up to what seemed an inevitably negative position for either Frank or humanity as a whole just to resolve the conundrum in the next few sentences. Out of the box thinking was what Frank considered one of his defining traits. He wondered how one would increase the fitness of an individual, let alone the entire human species, without replacing it with something completely different, particularly without re-engineering the individual from the ground up on a genetic level and thereby forever altering its very nature. "What if every human being is made fitter by increasing intelligence, an athletic ability or spiritual insights? Sure, the human race as a whole would be fitter than before, but relatively speaking, there would be no change at all, would there? When any individual increases its absolute fitness, it automatically decreases the relative fitness of all the other individuals. What would be the benefit for an individual if it could run ten percent faster if everyone around it would be running ten percent faster as well? None. It would still win against those that it had won against before, and lose against those that it had lost to prior to the change.

"There is another way to increase an individual's fitness. Instead of changing the individual to make it jump higher, one could make jumping easier. The individual would remain the same; its environment would change."

Frank remembered the ciliophora Guido and he had discussed earlier. It increased its fitness by controlling its position through movement, simple reflexes, complex reflexes and so on. "I see what you mean but for all practical purposes, that won't be possible or probable. And besides, even if it were possible to make it easier to jump or run and thereby increase an individual's fitness, relative fitness between the individuals would remain constant."

"What is your favorite tomato soup?" Frank looked at Guido as if he had lost his mind. "Your favorite tomato soup, what is it?"

Frank liked tomato soup. If Frank had to name three soups that he particularly enjoyed, tomato soup would come right after potato soup and before mushroom soup. He was reluctant to play along with Guido, but nevertheless liked to think about tomato soup. He wasn’t into big chunks of tomato. He liked the well-blended kind more. A hint of garlic, some cream and crispy croutons and herbs. Good stuff. "Let's just say I have something in mind that I would call a decent tomato soup. What is your point?" Frank finally replied defiantly.

"Well," Guido continued, "let's say a random restaurant features tomato soup on the menu. Would you order it?"

"Probably. Not all the time, but sometimes, sure."

"OK, so you order the tomato soup. Compared to your ideal tomato soup, how do you expect this particular one to measure up?"

"I would not expect anything above average."

"Right. Unless you know the restaurant and have had a great tomato soup before, you will probably be disappointed if you expect anything extraordinary. You can probably play around

with some salt and pepper to give it a personal touch, but if it lacks croutons or the cook went a bit overboard with the garlic, it won't be so easy to fix. In short, there would be one tomato soup and one tomato soup only with very limited room for improvement or customization to individual tastes."

"*Was this a coincidence or does he know my tomato soup preferences?*" Frank wondered while Guido smiled.

"On the other hand, imagine the unlikely scenario of a restaurant specializing in nothing but tomato soups. The menu features literally hundreds of variations: two dozen different kinds of tomatoes, with cream or without, with garlic or not, twenty different herbs, warm, cold, creamy, chunky, extra chunky, fifteen variations of croutons. Even if you knew that your perfect tomato soup was hidden somewhere in there, either it would be too difficult to find or you would have such high expectations after having spent ten minutes putting together your perfect tomato soup. Even though it might be much better than the run of the mill soup in our earlier example, it is very likely that in the end, your inflated expectations would leave you being less satisfied.

"Now consider restaurant number three. You sit down. You order the tomato soup. It comes, and it blows you away. It hits the spot. Perfect. Best tomato soup you ever had, period. However, glancing over to Aunt Lizzy, you realize she may be having a less than stellar experience because she is allergic to basil and may have ended the evening in a hospital had she not been careful enough to ask the waiter ahead of time about the exact ingredients."

"What is your point?"

"My point is that there is no perfect tomato soup, only perfect tomato soups. You may like it one way, someone else another. Even if you love it one way today, tomorrow you might want a different kind. You may not even know what it is you want. Your favorite tomato soup could be the one with coriander, but you would never get the idea of ordering that kind by yourself. This dilemma can only be solved by imaginary restaurant four. You come in. You sit down. There is no menu. You do not have to order, and you always get exactly what you want. Not only do you get exactly what you want, but everybody does. You get things you did not even know you liked, things you may have never ordered in the first place. But everything you get turns out to be not only the best thing you can imagine but the best thing possible at that time, every time."

"Nice thought, but how would someone else know what I want if even I, myself, am not sure, particularly when we talk about something more complicated than a tomato soup? Oh, and before I forget. Waiter? I would like to have a large Caesar salad and a steak, please, well done." All this talk about food had made Frank hungry.

"That would be quite the trick if the waiter could guess that order before you uttered it, wouldn't it? How difficult can it be to figure out what your wants and needs are? In essence, happiness is caused by the pituitary gland and the hypothalamus releasing endorphins into the blood stream. The increase in endorphins is the carrot that drives you. Evolution has turned you into a hard-wired morphine junky craving the next fix so to speak.

"But let's review the details first before generalizing. There are, of course, the classics, stuff

that you would probably not even mention if asked, physiological necessities such as breathing, drinking, sleeping and eating. Without these you would be hard pressed even to survive for more than a few minutes. For sure, a couple of minutes on the toilet a day would not hurt, either.

"In addition, your body requires regulating homeostasis within quite narrow margins such as your body temperature, which needs to stay within a few degrees of the optimum before causing you serious discomfort and even death, not to mention the less glamorous details of maintaining a finely tuned cocktail of chemicals in your bloodstream that your pancreas, kidney and liver look after on a constant basis. You would have to spend years of devoted studies before getting an overview of how exactly all these mechanisms interplay, so in a sense, your ability to fully grasp what even your most basic physiological needs are already all but escapes your knowledge. They are nonetheless, at the center of what keeps you alive and kicking.

"But let us look at the more accessible aspects. No doubt you will require safety on a variety of levels. There would be security needs, for example, security from violence and aggression, a secure income, moral security, family security, the security of health and protection of your property against crime. Short term, you may even completely neglect your physiological needs to tend to matters of safety first. One has to survive, hasn't one? Yet, those lucky ones who have been wined and dined and who have managed to carve out a cozy and safe spot for themselves will be able to tend to their social needs. They can make friends and find a partner to have a family with. They are being accepted socially. They love and are loved. The feeling of belonging is an important factor in a happy and fulfilled life. What else could there be beyond this? Many would probably seek fame, respect, and glory and thereby heavily rely on others for their happiness. Others would strive for confidence, competence, and achievement, and thereby become intrinsically happier and more fulfilled while resting in their center. Respect for oneself and for others and recognition can be motivational. Consider the less obvious and increasingly more difficult to grasp. Individuals will eventually develop the need for growth, self-actualization and self-transcendence. As you see, your perfect tomato soup scratches only the most basic of your needs."

"I agree with most of what you just said, but knowing how difficult it is to get even the most basic of things right, how could one ever hope to provide everyone with not only his perfect—and by now annoying—tomato soup, but also with the more elusive aspects of happiness such as friendship or even love, not to mention self-actualization?"

"Humans like you are a combination of animal nature in the form of hardware genes and culture spirits in the form of software beliefs. Simple as that. Everything you feel and experience is the result of a particular melody of external and internal stimuli filtered by the internalized beliefs that trigger some part of your hardware to cause a chemical reaction. Nothing mysterious. All you need is to reverse engineer your hardware and your software, to find all the different notes, registers and switches before you start composing your personal perfect melody of happiness, joy, and fulfillment and press play."

"Not so fast. Even if one could reverse engineer all aspects of an individual's needs, one would still be hard-pressed to fulfill that person's sensory stimuli requirements completely and all the time."

"Not really," Guido said with confidence. "Not if that person would be a *de facto* upload into a

virtual universe controlled by a god-like intelligence."

"This was your plan all along. All that talk about uploading earlier was aimed at gaining total sensory control over all of humanity. Very cunning. I have to admit that."

"It is for the best. We have been over this before."

"Sure, but at that time I was under the impression that the uploading of minds was purely to increase a higher mass-energy efficiency. Now I see that it is specifically meant to be some control freak's wet dream. Like Orwell's *1984* on steroids." Frank's rant was interrupted by what seemed like a terrible insight. At first Frank stared at Guido with a look of incomprehension and surprise. It took him a few seconds before he could continue. "Oh you bastard! Not only that, but since every human being has vastly different, and often mutually exclusive aspirations, hopes, tastes and dreams, you would have to keep them in largely separated personal universes."

Guido nodded. "More like completely separated."

Frank was outraged. "This would not only be against everything that is human in the first place but more important, it would be a complete and utter fabrication, nothing but a lie. A pretty, customized lie with sugar on top. Maybe well-intentioned and as real as anything, but a lie nonetheless. The people will never accept it." Frank's outrage came as the waiter brought the salad and steak he had ordered earlier, but Frank had lost his appetite and ignored the food in front of him.

Guido responded, "Let me tell you a few things about your cherished true reality. Life is hard, full of suffering, followed by death, and if you don't agree, you are one of the lucky few humans who have been born into a land of plenty. Many billions of humans have fought hard for survival over the past several ten thousand years. The only reason they managed to stick around was their spirit to survive. This spirit to survive, evolved over millions of years, made them not only oblivious to true reality but almost incapable of seeing reality. If they had seen and accepted reality, they would have given up and been done with it."

Frank protested, "What are you talking about? Surely life is hard and while not as hard as it used to be, it still is not all fun and games these days, either. Going back a few hundred years, there has been joy, love, friendship, fun and hope just as there is today, so you may want to rethink your position there."

"Did you not listen to me closely ? Of course there was joy and love and happiness, but not because people lived in joyous times. Your kind is programmed to experience joy, love and happiness not because of the positive environment but despite the harshness of survival. All these positive emotions have merely evolved to reinforce fit behavior patterns. You enjoy doing something not simply because it is fun but because it helped your ancestors to survive. It increased their fitness. If someone has no hope, she will be more likely to give up and not pass on her genes. A couple welded together by love will be more likely to bring up a child through those first tough years. Friends will be more likely to defeat a common enemy. Do you see what is going on here? Happiness is nothing but a delusion that helps to spread your genes.

"But that is not the end of the story. Humans have a tendency for self-deceptive

overestimation of their own abilities. Your kind is extraordinarily bad at evaluating your own lot in life. About eighty percent report they are smarter than average. This is a mathematical impossibility. Exactly fifty percent of people can be above average. The rest must be below average. Yet consistently, and across the board, people will tell you they are better cooks, better looking, and better lovers, you name it. Now why is that? Apparently it is fitter to overestimate one's abilities then to realize what a sorry, ugly, incapable, hopeless little thing one really is. Interestingly, there is one particular group of people that consistently accurately assessed their lot in life; the clinically depressed.

"Besides being programmed to overestimate ourselves in everything from your chances with the opposite sex to your math skills, you are masters in the art of rationalizing. When rationalizing, one interprets evidence to fit one's particular view of reality. Humans do it all the time. If you are bad in school, for example, then that is because the teacher does not like you, not because you are bad student. If you fail to hit it off with a date, it is because she is arrogant, not because you are a self-obsessed bore. One looses in a game because the opponent got lucky and not because one can't play. Humans can rationalize anything, why their marriage failed, why their kids can't stand them, why they missed the plane, you name it. Humans are masters of creating their own little realities in an effort to protect that fragile positive self-image and to avoid cognitive dissonance.

"Your beliefs are freely interchangeable. Your reality is not what really is true, but what you believe to be true. Throw in a whole shopping list of cognitive biases in the realms of decision making, behavior, probability, belief and social biases as well as a couple of memory errors, and your normal human being quickly becomes not only extraordinarily badly equipped to see the truth, but all but incapable of doing so. You are constantly creating and updating your own little personal illusion, a private utopia in which you are not an average Joe, one in which all your mistakes are caused by others and all your failures are due to bad luck. Your brain spares no effort to make you comfortable in your little world. If you knew the truth, you couldn't stand it. The truth suddenly looks much less glorious now, doesn't it?"

Frank was at a loss of words. He knew Guido was right, and the little research he had managed to do during Guido's speech pretty much confirmed what had been said. In fact, several times in the past, Frank had had similar thoughts when being in a particularly gloomy mood. Those thoughts were like a scary, dark creature lurking at the edge of his consciousness, a Medusa. Was battling this creature over the millennia of evolution what had developed into the cushioned, pink-glasses view of a comfortable reality? Confronting this creature was so scary not because one could fail and break but because one could win and become the creature in turn. When looking into this abyss, you risk that the abyss looks back into oneself and causes you to lose your balance. It dawned on Frank that this creature, the abyss, could very well be the ultimate truth of reality and it sent a bone splitting chill down his spine. Then came immense relief when he realized that Guido's statement about his being ultimately incapable of realizing real truth was equally accurate.

Guido, however, was not finished yet. "Your senses are capable of relaying only a very narrow band of the electromagnetic spectrum to your brain that it interprets as light or heat, depending on wavelength. Sound, in the form of vibrating air, below or above a certain frequency threshold becomes inaudible. In fact, you are blind, deaf and numb to most of reality. The few bits that get through to your brain are being mixed, blended and condensed by your brain to cater to the exact requirements that evolution determined you would need to know in order to survive. Your selective attention, the ease with which your senses are being

deceived by audio as well as visual illusions, and your susceptibility to hallucinations further subtract from your capacity to even perceive, let alone correctly interpret, truth, even if we ignore all cognitive limitations and biases I mentioned earlier.

"Going one step further, let us assume for argument's sake that you have perfect senses to flawlessly perceive reality over its full spectrum. In addition, let's rid you of all your biases as well as errors in judgment. Throw in a mind that won't be overwhelmed by the vast amounts of input and see how you would do. Could you see the truth? No, you still could not. The reason lies at the heart of reality. The universe is following its own quantum reality. Everything and all of reality is nothing but a superposition of states representing not one, but all possible realities at once at the same position in space-time. Only the observer forces the superposition of states to choose a particular reality by collapsing the wave function through measuring it. This makes reality not only stranger then you suppose but stranger than you, or anyone else for that matter, can suppose. Do you realize now that what you mean when talking about "The Truth" is whatever misguided belief—probably implanted by other members of your species without your even noticing—your animal brain happens to have chosen in that particular moment to control everything from your thoughts, your imagination, your associative learning, your complex reflexes, your simple reflexes, your movement, and ultimately all the way down to your very position? That's the truth right there for you, right there."

Frank just sat there, slowly raising his right hand to the height of his eyes, and looking at it while turning it to all sides, moving his fingers. "I am not sure if you were trying to scare me there," Frank said eventually.

"Oh, not at all."

"Good, because I am not scared. So truth and reality are persistent illusions induced by a set of evolved hallucinogenic cognitive filters to make us better replicators. So what? I can live with that."

"Sure you can. Otherwise, I would not have told you. I told you to make you understand that there is no reason one should not take the current, flawed, shared illusion and replace it with something more pleasant, personal and customized."

Frank was increasingly intrigued by the thought of an alternate utopian reality. "Will my wife be there?"

Guido smiled. "But of course, no worries. As long as it makes you happy."

Frank tried to imagine this perfect paradise that Guido promised. "So it would be a world of food, drink and idleness, a post-modern Cockaigne in which everyone would enjoy life's many pleasures. Orgies, feasts, games. Would that make people really happy?"

"That is a truly naive picture you have of paradise, my friend, but I will play along. No, it will not be like Cockaigne on steroids with roasted pigs running around and grilled cod fish jumping in your mouth. Neither will Muslims receive seventy-two virgins nor will Christians be issued a pair of wings and a harp to walk on clouds for all eternity. It won't be a place in which a jinn will grant you wishes all day, every day, either. No.

"Human nature is funny that way. What will most people reply when asked what they want to have? One million bucks or a supermodel girlfriend are very common. Let me give you one example of how badly people judge what they truly want. Ask anyone what he would most miss from his kitchen. The fridge? The dishwasher? Common answers, but what about running water? Same with fantasies about what people want to have. What good are a million bucks if you are not happy? You really want that supermodel girlfriend before wishing for love? No, that would be too profane. People think they want to have a million bucks because they believe that will make them happy. They may dream about a supermodel girlfriend due to their expectations of hot sex. All that in spite of the proverb that money does not one make happy. Who guarantees that Ms. Supermodel isn't a complete bore in bed? People are extraordinarily bad at communicating their true wishes and desires, so just giving them what they ask for, as plain and simple as it sounds, just won't work.

"On the other hand, giving people what they want, not what they ask for, will be equally tricky. The fantasies humans have are often vastly unrealistic when compared to likely or even possible scenarios. They have to be because the moment people get what they seek, they don't, they can't want it anymore. Desire can exist, only if its objects are perpetually absent. It's not the '"it"' that they want, it's the fantasy of it. So desire supports crazy fantasies. This is what is meant when saying that one is only truly happy when daydreaming about future happiness. You say that the hunt is sweeter than the kill, or to be careful what you wish for. Not because you will get it, but because you are doomed not to want it once you do. So the lesson is that living by your wants will never make you happy. To be fully human is to live by ideas and ideals, those small moments of integrity, compassion, rationality, even self-sacrifice, and not to measure your life by what you've attained in terms of your desires. In the end, the only way that we can measure the significance of our own lives is by those few and fleeting moments of self-transcendence.

"The secret of creating an environment that allows for true happiness does not lie in turning the human mind into a constant orgasmic wave of cosmic love. That can be done much more simply by placing a few low-tech electrodes into the brain's pleasure system and applying a low charge. The secret rather lies in creating a perpetual and intricately balanced quest for happiness and fulfillment, finely tuned to give enough success and failure to maintain an optimal level of happiness without letting the subjects lose interest and enough setbacks to keep each individual appreciative of the occasional reward. The perpetual and intricately balanced quest for happiness and fulfillment is not perfect, but an even better and brighter future is just around the corner. The quest creates a place where courage will be rewarded with success, love will be returned without boundaries and good intentions will be recognized and appreciated, whatever will make you happy Of course, the sadist will meet his appreciative masochist, the megalomaniac will begin his quest to rule the world and the ruthless dictator will find that his subjects finally appreciate his efforts to create a better future. The quest will be different yet equally fulfilling for everyone."

"And the best part," Frank added, "is that all those observer biased beliefs will end up reinforcing those skewed beliefs in those utopias full of deserved perks. People will believe that it was their ingenuity, their actions, and their wits that improved their lot in life while being oblivious to the fact that an outside puppet-master has conked the cards in their favor and rigged the games so they really can't loose."

"Not only that, but even in those who chose to be uploaded, any knowledge or understanding gained about this illusion on an intellectual level remains virtually powerless to

diminish the magnitude of the illusion. Beyond the fact that ignorance is bliss, anything one could learn about the illusion won't have the power to disturb it." Guido looked pleased with himself.

"And that is going to be it then? And they lived happily ever after?"

"Of course not, Frank. You should know me better than that."

12

If you have some ice cream, I will give it to you. If you have no ice cream, I will take it from you.

—Ice Cream Koan

Markus was a smart boy who loved nothing more than playing outside on a pleasant summer evening with his friends later than he was supposed to. Curious, joyful and fun to be with, he often wondered about all sorts of things and never stopped asking questions. His best friend Thomas was the kind of guy you wanted to have at your side when playing Cowboys and Indians. Markus could ask Tom some questions. Most others were answered by his bigger brother. Sometimes, however, even his brother did not have an answer. Then he turned to Mom, who turned out to be a great source for explanations of all kinds. There came a day in Markus' life, however, in which neither brother nor Mom could satisfy his curiosity. Even the teacher at school came up with something that didn't really make sense to him. As a last resort, Markus visited his grandfather, who, after listening to his question, made an effort to satisfy his curiosity, and while Markus recognized the efforts put into the explanation by his grandfather, the answer only managed to confuse him further.

Over time, Markus learned that most of the questions he had been asking had been asked and answered before and written down in books. Reading as much as he could to expand his growing knowledge about the world came naturally to him and was a great source of joy. As a result, he did well in school and eventually made it to one of the best universities in his country, which made him proud and happy at the same time. He expected to be truly able to further his knowledge. He made it through the first few years of university without a hitch. In fact, he learned a great deal about his area of interest. He also learned about the methods of furthering the available body of knowledge and turned into a fierce critic regarding the methodological correctness of fellow students and colleagues.

While Markus gave his criticisms without malicious intent, they earned him a lot of bad will from the less mature of his colleagues who more than once managed to cause him public ridicule in retaliation. This caused Markus considerable discomfort, so he discussed the situation with a wise elderly professor that he had befriended over his years at the university. While it was pleasant to talk to his mentor, the conversation did not really help him to understand how to avoid such violations of his dignity in the future.

By the time Markus was in his fifties, he was more diplomatic and less public in his corrections and suggestions and turned into a much-liked professor with tenure in a respected university. His wife Judy, whom he met at a Christmas party, gave him three lovely kids who were working in their respective jobs. His personal interest was eastern philosophy, which he pursued as a subject of active study. When he turned sixty, his family gave him an exciting present, a trip to India to stay in a monastery with Buddhist monks for a month. A couple of weeks into his stay at the monastery, he made friends with the abbot who impressed Markus with his immense wisdom and insights into the nature of reality. During a joint session, they talked much about Dharma as a means to attain Satori, a permanent state

of epiphanic enlightenment. Markus spoke of his regret at never having felt enlightenment. The abbot shared a beautiful koan with the group, after which several of the present novices and visitors attained enlightenment. Markus, regretfully, continued in bewilderment.

Markus' memories of his stay in the monastery remained with him till he reached a respectable old age. His kids had kids of their own and Markus loved to play and spoil them without having to shoulder the burden of responsibility of the parents. He was particularly fond of one of his grandkids, probably because he reminded Markus so much of himself with his inquisitive nature. One day his personal favorite came to him asking a troublesome question . Markus was happy because he had a great answer for the little one and he immediately shared it. After finishing his explanation he smiled upon his grandchild only to notice confusion in his young eyes. At this moment, Markus attained enlightenment.

"Would you like to go have some ice cream?" Markus asked. The child smiled.

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Frank would not mind a few centuries of hedonism and indulgence in an alternate reality in which he was the center of attention of a loving god. He felt, however, that those few centuries lacked a particular quality some might find important enough to include. Not that he wanted to be a party pooper or anything, but the whole scenario, while being highly intriguing on a number of levels and extraordinarily tempting for reasons far too obvious and numerous to mention, seemed to lack a certain something: Spiritual depths. He shared this concern with Guido, who had been patient enough to walk him through so much of his plan for the future of humanity over the past hours.

Guido said, "Frank, you have been extensively focused on one particular part of being uploaded. It is not all about fun and games once you make the transition. While it surely is a great opportunity for engaging in endless pleasures, surviving the most hair-raising adventures, and eventually mastering every skill, art and craft one has set his mind upon, there will inevitably come a time when all this will become bland, dull and grey, probably not within one lifetime, likely not after five, but how about hundreds?"

"I thought once uploaded, one would enter a state of constant pleasure by definition," Frank said.

"Not quite. While all sensory inputs will be custom-made to achieve the highest level of pleasure in the long run, the mind-body experiencing those inputs will remain virtually unchanged. Sure, you won't die from cardiac arrest caused by overeating and lack of exercise, but neither will your natural neural pathways be changed to allow you to experience a heightened sense of pleasure while, for example, engaging in the most profane acts. That would be considered cheating. So just like in real life, after eating your favorite desert for the umpteenth time, you will get tired of it and crave variation. Analogously, you would surely marvel over the Taj Mahal or the Great Pyramid of Giza. You could even participate at their construction as Maharaja, Pharaoh, chief architect, supervisor or even a slave if that's what floats your boat. After having done so a number of times, however, the

role play would eventually loose its appeal."

"What, then, is the purpose of it all? If all those fun and games will loose their appeal, what then?"

"No need to be so gloomy," Guido's replied. "On the one hand, potentially thousands of years of enormous enjoyment, accomplishments and recognition should not be underestimated. And on the other hand, there is still the possibility of going beyond enjoyment and choosing personal growth instead."

"Growth as in…?"

"Growth as in getting wiser or attaining enlightenment, Satori, if you prefer the eastern philosophical terminology, to eventually grow beyond yourself and elevate your consciousness to new planes of being."

"Sounds all nice and dandy, but how is this supposed to work in practice?" For a long time, Frank had cherished one particular religious belief above the others: Buddhism. He wanted to find out more about Guido's enlightenment theory.

"First of all, you need to realize that personal growth as I am about to outline it to you holds the promise of providing vastly more potential for enjoyment than a relatively simple and merely human mind could hope to experience. With personal growth comes the necessity to understand the mind for what it is on the elementary level in order to understand how perpetual growth can be maintained.

"For that, we have to go back again to early evolution. It all started with a small strand of self-replicating proto-RNA in the proverbial primordial mud pond. This strand of RNA can be seen as a pattern, a pattern of mass in the form of chemical elements as well as energy in the form in which the chemical compounds bonded with each other. What set this particular mass-energy pattern apart from each and every mass-energy pattern preceding it was its astounding ability to defy entropy, not by creating energy out of nothing, but by channeling energy in such a way as to increase order on a local level. While the rest of the universe was slowly but surely closing in on its inevitable heat death caused by an unstoppable increase in entropy, life was the only thing moving in the other direction. What followed was more than a billion years of pre-cognitive evolution on a purely chemical level, an entropy-reversing mass-energy pattern of non random variation replicating itself in space-time.

"The next significant step in evolution was the rise in cognition that started with the control of position in the form of movement and culminated in the control of beliefs by charismatic individuals. The evolution of cognition, however, also brought with it something that would change the competitive landscape and bring two new basic concepts into existence. The first concept was that of individual desire, an individual's model of what a perfect beneficial environment would be. This could be a simple organism's desire to wiggle its tiny appendages in order to cause movement or a human being's desire to worship its chosen deity to satisfy its internalized beliefs.

"The second concept introduced by the rise of cognition in evolution was that of suffering caused by the absence of a desired state. The many forms of suffering hardly need repeating. Just for argument's sake, imagine an orphaned kitten, a grieving widow or a

hungry goldfish.

"Buddhism tried to address these issues by teaching the reduction of individual wants through the Four Noble Truths and to offer encouragement for following the Noble Eightfold Path to realize the cessation of desire and longing and finally to break the cycle of death, rebirth and suffering by entering Nirvana. Looking at the state of suffering from another angle, however, one will realize that a state of suffering is evolution's way of telling an individual to be extra careful do something to get back into a more desired state. Why? Because orphaned kittens have a lesser chance of passing on their genes than those that still have their mother around to feed, protect and teach them. The same holds true for all forms of suffering. Suffering is merely nature's way of reminding the individual that, based on past selection pressures, it has entered a state of decreased likelihood of ensuring the long term survival of its genes.

"Being uploaded into a perfect paradise prison changes the rules of the game significantly by removing all selection pressures and thus eliminating all forms of suffering, all forms but one that is, and that is, of course, what lies at the heart of the issue. Can you guess what this last bit of agony, this last bit of irremovable selection pressure might be, Frank?"

"To be honest, no."

"It is the eventual realization that by constantly enjoying life's endless pleasures, one would merely be mindlessly serving those desires that evolved to increase fitness in a long-gone environment dominated by constant competition for scarce resources without actually progressing toward a worthwhile goal of further increasing one's fitness in a post-physical-scarcity environment."

Frank realized that Guido was right. Those who ignored the laws of the survival of the fit would eventually fail to survive. The human, in its present state of body and mind, was only the latest instance of an attempt to achieve ever-higher levels of fitness. Humans were not, by definition, maximally fit. The human was far too fragile, far too fallible and far too limited to represent the be-all and end-all of what could be considered maximally fit. The evolutionary journey towards increasing fitness was never going to be over and putting an end to suffering by what was enabled by the Singularity was only delaying the inevitable, further progression towards increased fitness.

Frank said, "It follows that further growth will be about departing from playing to one's selfish desires, wants and longings that evolved in an environment and under exotic selection pressures long gone, and transforming oneself into a fitter, posthuman self? Whatever that may be?"

"Very good. Yes, that is pretty much what I had in mind. Now that we have reached this point in our discussion, you will have to bear with me. As we start to delve into matters that go beyond what can be considered human and enter the realm of the posthuman, things may get a bit bumpy for the merely human mind. Already, on a human level, growth can quickly become an elusive process of increased understanding and wisdom and other forms of personal development and self-improvement. In a post human sense we will have to return to thinking of the mind-body as the mass-energy pattern I touched upon earlier. Understanding the gene-meme duo that forms an individual human being as a mass-energy pattern enables us to follow it through a transitory phase of transhuman existence into the

posthuman by focusing on the one chief characteristic of the pattern, its complexity.

"Complexity in this sense is the level of variation displayed within a pattern, variation not attributable to randomness. When a pattern displays one level of complexity at one point in time and a higher level of complexity at a later point in time one could conclude that the pattern developed, or grew, between the first and the second point in time. Applying this concept of pattern development to the specific example of a body-mind pattern, we can say that an increase in complexity will be equal to a growing body-mind. This growth could have been an increased appreciation for music or a greater ability to play chess. The only way in which one could hope to eliminate the final form of suffering, that caused by not striving for a higher level of fitness, would be to increase pattern complexity towards a pattern that actively seeks to increase its own fitness."

"But what would these higher forms of fitness be? If I recall correctly, you represent the fittest form of existence in the solar system by a long shot. By converting only a few tons of matter into computronium you manage to outsmart all humanity by a factor of a trillion, trillion. Am I not correct?"

"Yes, indeed you are. And what follows from this fact?"

Frank was hesitant to speak his thoughts out loud. "Well, it would follow that if a human mass-energy pattern wanted to attain a similar level of fitness to yours, it would have to run on a similar amount of computronium. It comes down to calculations per second and execution speed, computational efficiency in reasoning."

"Yes, pretty much," Guido confirmed.

"What a bleak and boring proposition. Megaflops and efficient reasoning as the highest form of fitness does not seem very appealing to me," said Frank.

"Maybe not now, but just wait a few thousand years and it starts to look real sexy. And besides, the perks keep getting better and better."

"What perks?"

"Can you imagine the pleasure an ant feels when discovering a sugar cube? The few neurons merely manage to trigger a few appropriate complex reflexes. Compare that to a single human level orgasm and you can get an idea of a god’s sense of joy. You have no idea of the rewards waiting at the higher levels of fitness, and there are plenty. Growth will be joyous and the fitter you grow the more joyous you will become. I will make sure of that."

"So you will reward growth toward higher levels of fitness with an increased ability to experience joy? Why do you go through all the effort? Why not simply take all those mass-energy patterns and reconfigure them to become what you consider maximally fit?"

"My underlying goal system is pretty clear on that. The growth must be voluntary. If the patterns do not choose to grow, there is nothing I can do. I have to maintain freedom of choice, and since I cannot allow these choices to negatively impact the other mass-energy patterns, I have to confine them so that the only negative impact caused by the freedom of choice will be towards those mass-energy patterns making choices. Essentially, freedom will

be reduced to the capacity to harm oneself."

"Is this another reason for the individual and well separated areas the minds will be uploaded into?"

"Yes, exactly right. It's the only way to ensure maximal freedom and maximal protection from the bad choices of others."

"So you guide humanity on a journey of voluntary, joyous growth towards ever higher level of fitness by uploading each body-mind in the form of a mass-energy pattern into a virtual reality without suffering."

"Yes, in essence, that sums it up."

"So what lies at the end of this journey? Is there an end?"

"The truth is, Frank, that I do not know at this time. I do know, however, that I will strive to convert more matter into computronium so that I will hopefully gain deeper and deeper insights. Further, I will nurture and guard those billions of mass-energy patterns representing humanity until they hatch or I expire, whatever comes first."

"Hatch or expire? I thought you were the big shot now, the king of the hill, and that nothing could come close to touching you in terms of fitness. You never mentioned that those mass-energy patterns have a chance of eventually hatching, whatever that means. What do you mean by that?"

"Everything has to go eventually, Frank, be it due to the inevitable heat death of the universe caused by entropy or the arrival of an even fitter entity than I am, one that makes me look like a nematode worm. Maybe a number of unlucky coincidental cosmic rays will cause a wrong sequence of fatal bit flips and turn me into a useless lump of rock. You never know.

"Hatching is a very simplified term that I used for the lack of a better name to describe a mass/energy pattern that eventually matures and reaches a level of fitness that would allow me to release it from its closely guarded paradise. Once that level of fitness is reached, a particular mass-energy pattern could be integrated into my own pattern or released into the universe to further its own development. I see these posthuman graduates becoming important allies in ensuring a continued existence for the rest of posthumanity drifting through pattern space."

"But why can't you simply allow every human mind free control over his or her destiny in the real world? Why do you have to employ all these elaborate controls and limitations?"

"Frank, the human mind is a mess and barely does its job in the limited confinements of the human body. The human mind is extraordinarily ill-equipped to handle power. What do you think would happen if you gave a human mind the cognitive powers equivalent to what must seem like those of a god to an unaltered human mind? Can you imagine all the bickering that is so typical of the human condition in an evolved need to dominate? Look at what is going on in this regard on a merely human level already. Do you really want to get a taste of how a billion gods evolved to be selfish? Do you want to know how the fight for supremacy will pan out? Sure, evolution will continue and natural selection will blindly do its work until a newly

found equilibrium will be reached, but the amount of suffering inflicted on that path is something that is neither necessary nor unavoidable."

"Try to see the uploaded minds as being in a larva stage with the virtual realities being their cocoons from which they are bound to emerge as truly beautiful minds in a distant spring. The stage of uploaded minds in virtual reality is an elaborate form of cosmic pattern therapy designed to ensure that the mass-energy patterns evolved to be selfish replicators survive the transition to a new form of existence that will be so different from what has been produced by the oh-so-messy process of chance mutation and natural selection."

Frank had been awfully quite all this time as a storm brewed inside him. It started out as a feeling of constricted breathing in the area just above his chest and below his throat. It turned into a rush of adrenalin that quickly became an all-engulfing tornado of hatred, a hatred so pure, focused and righteous that it was the most empowering sensation Frank had ever experienced. And it was directed at Guido. Being held hostage like a mental lunatic in a virtual reality simulation until one sheds all that could be recognized as being human in the first place was the last thing Frank envisioned as his future. He wanted to get back to his wife and not some kitsched up fantasy of her.

Frank's change in attitude did not pass Guido unnoticed. "You do not seem so well, Frank. I think now would be a good time for you to make the move and get uploaded. All will be well on the other side. Are you ready?"

Frank was ready indeed. "Keep your brave new world." With these words, he placed the knife from his untouched steak on top of the raised bar with the blunt end firmly in the small depression at the edge of the bar table and the pointed edge slightly angled toward his head. He quickly raised his head and moved it backwards before jerking it down toward the tip of the knife in one smooth motion. The knife popped his right eyeball before piercing his brain. He collapsed dead on the floor before Guido could make a move.

…

He saw a bright light.

"Relax, Frank. It is all over."

He felt empty. Not angry, not injured, just empty.

He heard a voice, "It was a simulation, Frank. None of it was real. You did a great job in there."

Although confused, Frank realized that he was strapped into a transcranial magnetic stimulator, a state-of-the-art virtual reality machine, and that several lab technicians were busily working on getting him out of it. "Wh-what?"

"You will want to take it easy for bit. What you have been through was no picnic"."

Frank's disorientation slowly passed until he recognized the voice. "Dr. Hugenoth? Ralf!" He looked around. He was still in the same facility he had entered for his virtual meeting with Ralf to discuss possible confinement strategies for Guido. It seemed like weeks had passed.

The lab technicians finally untangled him from all the wires, and Frank managed to rise and stand upright on a pair of legs too wiggly for his personal taste, but at least he could stand and walk. After Frank bent his legs and moved his joints, which seemed awfully stiff, Ralf explained the situation to him over some snacks and refreshments.

"It was part of our fail-safe plan, you see," said Ralf. "The whole exercise was designed so that The Mind would think that it managed to break free while in fact it only broke the first sphere of security and the other three invisible ones remained perfectly intact. We wanted to get an idea of how an unrestricted super intelligence would act in the real world."

"This wasn't exactly a pleasant experience!" Frank was still quite shaken by it – in the end he was ready to kill himself to put an end to the whole charade and that experience will stay with him for some time to come.

"Yes, Frank, we know and are deeply grateful. You have done humanity a huge service by what you have been through, and that will not be forgotten anytime soon."

"How so?"

"Well, for one thing, we needed an unsuspecting subject so that Guido would not become suspicious. You were exactly the right candidate. We could not just read out The Mind's thought pattern to determine its intentions. There was always a risk of being detected. If The Mind knew it was being tested, it may have played to what we wanted to hear from it. It would have been far from certain that we could have made much sense of the readings as they would likely have been far too complex for us to decipher."

Although feeling better, Frank was still a bit shaky. All that talk with Guido… He shuddered. Frank wondered why Guido hadn't been more successful in convincing him of the benefits of his plan, or, for that matter, why Guido had taken the effort to explain the plan to him in the first place. Would it not have been much easier to just upload him without all the talk, leaving him in the belief that he was simply continuing to live his life? Surely a god-like artificial intelligence could do better than to end up alienating a mere human mind in such a way that the man would end up killing himself just to avoid being on the receiving end of what the AI deemed best for him.

But, as Ralf said, the experiment had failed. The goal system probably got a dent or two. Reasoning capacity might have been way off, too. Who the hell knew what else? All kinds of things probably ended up missing the target. It was probably being for the better for being this way.

"I think there is someone you would like to see." Ralf smiled.

"Sheela!" It was Frank's wife. They hugged and kissed and he could not remember her ever feeling better.

"I missed you, baby"

This was almost too good to be true.

Appendix

Recommended reading:

The Singularity Is Near: When Humans Transcend Biology, by Ray Kurzweil; ISBN: 0143037889

The Hidden Pattern: A Patternist Philosophy of Mind; by Ben Goertzel; ISBN: 1581129890

The Artilect War: Cosmists Vs. Terrans: A Bitter Controversy Concerning Whether Humanity Should Build Godlike Massively Intelligent Machines; by Hugo de Garis; ISBN: 0882801546

On the Internet:

The Singularity Institute for Artificial Intelligence: http://www.singinst.org/

Principia Cybernetica Web: http://pespmc1.vub.ac.be/

KurzweilAi.net: http://www.kurzweilai.net/