# HIRAETH: A Practical Utopia

A Novel of Our Potential Future

by

The Reverend
Joshua M. Brock

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Management cybernetics model from Stafford Beer. Circular cities *inspired by* Jacque Fresco and Walt Disney.

**The story, all names, characters, and incidents portrayed herein are fictitious. No identification with actual persons (living or deceased), places, buildings, and products is intended or should be inferred. (edited from Wikipedia)**

To those who didn’t make it, but together meant that I could make this.

To me, and to you, and to everyone everywhere.

This is the happy memory that lives in my heart. It does not exist. But it could, and there are moments where that is enough.

But they are just moments.

**On utopia:**

"The economic critique offered a totalising vision in which the problems of capitalism lay not in its quantification, nor estrangement from the past, nor in the minds of passive individuals. Instead, the problems lay in the system itself: its ironic tendency to both create and destroy, to free and imprison, to give us a hint of what the future could be, but not a way to get there. The way forward is not therefore to intensely ruminate upon the ill deeds of the rich nor even the suffering of the poor, but to focus on the potentials of the future being kept from us and a sincere appraisal of the system itself. If we can do this, we might just figure out how to get there."

—Ashley Frawley

**On capitalism:**

"But it was also clear that an all-round increase in wealth threatened the destruction—indeed, in some sense *was* the destruction—of a hierarchical society. In a world in which everyone worked short hours, had enough to eat, lived in a house with a bathroom and a refrigerator, and possessed a motor-car or even an aeroplane, the most obvious and perhaps the most important form of inequality would already have disappeared. If it once became general, wealth would confer no distinction. It was possible, no doubt, to imagine a society in which wealth, in the sense of personal possessions and luxuries, should be evenly distributed, while power remained in the hands of a small privileged caste. But in practice such a society could not long remain stable. For if leisure and security were enjoyed by all alike, the great mass of human beings who are normally stupefied by poverty would become literate and would learn to think for themselves; and when once they had done this, they would sooner or later realize that the privileged minority had no function, and they would sweep it away."

—George Orwell, *Nineteen Eighty-Four*, emphasis added

**On the future:**

"Before I breathed my last breath in a hospital bed in Arizona a century ago, something else in me died first. Even before I was diagnosed, I spent my adulthood worrying that there just wouldn't be a future for me, a career and a two-car garage and barbecues in the summer. There was the overwhelming sense that this was a future that was reserved for my parents' generation, or *their* parents'. A sense that nobody like me got to live that dream anymore, and that all the dreams available for us, that we could actually realize, were worse, and would get worse, forever. No stability. No purpose. Existing just to exist. Jobs that went nowhere, that paid less and less and asked more and more, and a smaller and smaller group of people who took all of it as the price for empty promises.

"Even what we did manage to achieve was for them, not for us. The space stations that now ring the planet were once the refuge of the elite, and you need to understand that this future, this New Community, wasn't an idea it was possible to have back then. It would forever be fantasy, to us. It wasn't *practical*, it wasn't *economical*. When they told you nothing could happen that wasn't profitable, they meant your *life*. Your existence was tolerated only insofar as it kept things stable enough for another quarter of profits to be extracted. The parasite had won, would win forever. Orwell had it right, he just had the target wrong. It wouldn't be corrupted socialism that destroyed the world, it would be victorious, purified capitalism. The end of history would be more than a metaphor.

"And it would be *boring*. If you were lucky, you could afford to distract yourself until you didn't have any ambitions anymore, nothing beyond the next round of consumption, and if you refused that lifestyle then you had nothing at all, no travel, no passions, or at least none you could actually realize.

"And for the exceptionally rare person who managed to escape that dreadful, dull dystopia, however briefly, the system turned them into examples of the success *of* the system, that therefore the failures of capitalism were actually your own failures. That such a paucity could birth all of *this* was unthinkable…and yet, look where we are.

"I tell you this so you understand that what you know of your own history is not propaganda. It was my life. I lived in that world, and in the end, having spent decades squeezing the last drips of surplus value from the population, stagnating the material and social development of technology, of science, of *opportunity*...it gave me its final gift.

"It killed me."

—Max Kustaja, from a speech given to the Novacom General Sortition Assembly, on the 76th anniversary of the signing of the New Community Charter Amendments, at H. H. Schmitt University Lecture Hall, Taurus-Littrow Valley, the Moon, Earth Orbit, Sol System

hiraeth (HEE-RYTH, with rolled *r*): *n.* a longing or nostalgia for a place that is out of reach or does not exist, or has never existed at all

# CHAPTER 1

*"Please do not be alarmed. You have been in suspension for many years. A servicemember will arrive shortly to assist you."*

The voice was calm, female, and clearly artificial, like something out of a chrome-plated science fiction film. The fact that I was lying on a plush table in what was otherwise a very shiny, very medical room under a chandelier of robotic arms, beeping machines with flashing lights twinkling the walls with color and sound made me wonder, for a moment, if I was still dreaming. Or dead.

I must have spoken aloud, because a new voice said, "Not dreaming." Still female, but very much real. I craned my neck as best I could to look at the person coming through the door to the room.

She looked to be in her late twenties, and was wearing a short-sleeved one-piece uniform with an asklepian symbol over her left breast. Her skin was a smooth sort of creamy-tan. Her hair, pulled back into a ponytail, was a deep, dark reddish-brown.

And her eyes were purple.

She continued as if she did not notice my appraisal of her, checking something on a monitor out of the range of my vision. "And, as for being dead, well, what it means to be dead has changed somewhat since you went on ice. Certainly you were *considered* dead when they froze you, or else they wouldn't have." She put her hands on her hips. "Vitals are normal, upgrades look good…I think it's time to get you checked out and into some real clothes, hmm? Testing first, though. Gotta go by the book."

She did something to the side of the bed, and it changed shape, forming into a chair. Armrests unfolded from beneath my arms, so I did not simply slide unceremoniously to the floor of the little room.

"Upgrades?" I said.

"You've been revived with a list of standard upgrades," she said. She pulled a small flashlight from a pocket and checked my pupillary response with it. I winced against the sudden brightness, but I had spent quite a lot of time in hospital before I was put…on ice, as she had said. I knew what she was doing, so I just suffered the examination as best I could.

She began to check my reflexes next, tapping below my knees with a triangular rubber mallet. I felt the sensation travel up my spine, a

slightly unpleasant but painless jerking of my muscles without my telling them to do so. She kept talking as she went. "Standard baseline cleaning, no more nasty genetic diseases or chromosomal mutations. Cancer scrubbing, immune upgrades, metabolism adjustment, hair follicle reinforcement, melanocyte intensity regulation, corneal shifting… half a dozen standard computational implants…"

She pulled down what I recognized as a standard eye chart, with semicircles instead of letters.

"It does seem that I no longer need glasses," I said. Indeed, I could read far further down the chart than I ever could have before.

"Only if you like the way they look, or the sun is in your eyes." She put away her tools and helped me to stand up. "We've come a long way since you were frozen."

I rose unsteadily to my feet. The sensation of cold hospital floor, not to mention my own body-weight, made me hiss for a moment. It was not *painful*—I had never felt lighter, *cleaner*—but it was most certainly…unusual. As if I was not used to standing up, or cold hospital floors. "And how long has that been?"

"Well, once we had the technology to clean out the vitrification solution, repair any broken neural bonds and genetic damage and cellular rupture, fix whatever it was that was wrong with you in the first place, reverse injury and age damage…" She shrugged. "Then we just went in order. You're number…" She stared off into space, and I had to resist the urge to wave my hand in front of her eyes. "Ah. Number four-thousand five-hundred thirty-two." She went over to a countertop, on which was a bundle of clothing wrapped in plastic. *Four-Five-Three-Two* was embroidered into the cloth, just below my name. I became aware suddenly that I was wearing nothing more than a simple paper gown, open in the back. I supposed some things would never change.

"It sounds very…impressive," I said, accepting the bundle when she handed it to me. She pulled a curtain from the wall and turned her back, but I ignored it. This person with me was obviously someone with medical training, a nurse or a doctor of some sort. She had probably seen her share of naked people.

"Maybe five years ago it was," said my attendant, still looking away from me. "It's very *routine* now, though. Some people really go all out, but if you didn't leave a list, you get just the standard package,

at least to start."

The clothing they had prepared for me was a jumpsuit almost identical to the one I had seen already and a set of underclothes, plus thick-soled rubber sandals. As I dressed, I noticed that the stretch marks over the muscles on my arms were missing. So, as it turned out, were the creases and calluses on my hands and feet from a life of rock climbing and machine work. Until, at least, it had become too painful to move, and too dangerous to climb lest I seize up again.

In point of fact, I was fitter than I had ever been. Stronger, too. Even the hyperlordotic curve in my spine had been straightened out, leaving me slightly *taller* than before.

"I feel like I could climb K-2 freehand," I said. I finished strapping the sandals onto my feet, and pushed the curtain back into place, for emphasis that I had finished changing.

"I wouldn't recommend it," said my companion, turning back around. "Not unless you want me to schedule you for respirocyte training. And diplomatic relations training, come to think of it."

"No, no," I said. I paused, thinking. "Well, maybe. Later? And why diplomacy?"

"Of course…and it's a little bit of a long story. Best to get the basic training out of the way, anyway. My father will explain." She led the way out of the room. Down the hall, I could see other people dressed as I was, and their medical companions, making their way to some room I could see opening up at the other end. "My name is Jak, by the way. Jak Atamai."

"Max Kustaja." I held out my hand, and she smiled and took it in a firm grip. "*Doctor* Atamai?"

She laughed as we followed the others down the long hallway. "No, that's my father. I'm just part-time. You'll find we don't have much call for *titles* here anyway. Some places do, but this is a very relaxed clinic."

"Are there many clinics like this one?" I asked.

"A few, scattered around the country. Not so many of you elected for the deep freeze as perhaps I would have preferred, unfortunately."

"How many cryonics patients are there?"

"A couple of hundred thousand. Nearly all of them we know how to revive, but a few will still have to wait. Real shame." She sighed.

"Whole generations obliterated."

"You never answered my question," I said. "How long since I was frozen?"

"You? A little over a hundred years."

I blinked. "Is that…long? Cryonics was still somewhat *niche* when I signed up."

"It's a little on the old side, to be honest." She grinned at me. "Technically, you're old enough to be my great-grandmother. But don't worry, we revive at twenty-five, standard, if you were older than that when you went in. That way everyone's got all their neurological development out of the way."

"I used to get advertisements back in the day for face cream," I said. "Claimed they could make you ten years younger. You really went and did it."

"Ah, yes," said Jak. "Advertisements."

"You don't have advertising, here?" I said.

"Not quite how you're probably used to, if all the stories I hear are true."

We emerged into the room at the end of the hall, where twenty or so other people were settling down into plush chairs, arranged in tiers like a university lecture hall.

A man stood at the front. He was paler than Jak, his hair and eyes a different color, but he was clearly related to her.

"Yes, that's my father," said Jak. "Mudrac Atamai. He invented the process that allows for cryonics patients to be revived. He runs the clinic." She led me to a seat, a double-sized seat suitable for two people, and sat next to me. Strangely, I was filled with relief to feel her body against mine as we sat down. I supposed I was more starved for human contact than I had imagined. "He likes to give the orientation briefing. It's just an overview, so if you're confused about anything, that's okay. It's what I'm here for."

"You?" I said.

"My job is to walk you through orientation, help you get settled in our society. Things are a little different than you might be used to. We have different ways of looking at the world. Don't worry," she added at the look on my face, "nobody will be offended if you mess it up. Temporal transplants like you are common enough, especially around

here, that most people will understand and will gently correct you. But you'll get used to it quickly, I'm sure. You don't seem too shocked by what you've seen so far."

"Well, I did elect to have my body cryonically preserved after I died," I said. "I was already open to the possibilities."

Jak smiled, but before she could say anything else, the lights dimmed.

"Hello, hello, hello!" said the man at the front of the room in a broad, booming voice. "I want to welcome you all to my clinic. I am Doctor Mudrac Atamai, and you are all here as my patients, guests, and new citizens of a glorious tomorrow!"

As he spoke, the blank projection screen behind him, curved in a single continuous piece across the entire front of the room, lit up. It showed an image, almost floating off of the screen, of what must be the clinic campus sprawling across a beautifully-landscaped piece of land near a river. As we watched and Doctor Atamai spoke, the view pulled back, showing first an almost-familiar view of the eastern seaboard of North America, then the whole of the western hemisphere of Earth, then further back, to show the moon, and the inner planets, and finally points of light spread across the entire plane of the Solar System, with the Sun in the center.

Mudrac continued. "Humanity is now an interplanetary species. When you leave here, you will have the option of living almost anywhere within our civilization, including the Moon, orbiting space stations, or on other planets. Some places, like Luna and Mars, are ready for civilian habitation, and some places such as Titan or Ganymede are still under travel restriction pending sufficient infrastructural development. If you wish to go there, you will have to apply for a permit, which usually requires that you have or develop some special skill. But fear not, progress is very rapid in this new tomorrow of yours! And, of course, you'll have plenty of *time* to enjoy it!"

At the words *interplanetary species*, I felt something twinge in my chest, and the familiar pressure of unshed tears filled the space behind my eyes. Jak glanced at me, but I wiped my face and looked back at Mudrac, and she did not press me on it.

A man in the front raised his hand, and Mudrac called on him. "How will we afford to live in *space?*" he said. "Do jobs pay so well

these days?"

"All of you were frozen before the events that led to the creation of the New Community that currently comprises around a third of the human race, so you will not be familiar with its economic model. It is a little complex, but suffice to say that material scarcity, both natural and artificial, is a thing of the past, and that what little is considered necessary to ration, such as it is, can be paid for from a social distribution available to all citizens regardless of employment status. That is, except for very particular wants or luxuries, you will not have to pay for anything considered a basic need, such as warm and comfortable clothing or education or health care or nourishing food or a place to live…" He paused a moment while we all smiled politely at his rambling. "…and so, the question of how to afford to live is quite definitely *moot*. In any case, all your savings, investments, trusts, funds, and portfolios are totally and utterly worthless now."

Against the stunned silence, Mudrac grinned. "Moving on."

An image of Da Vinci's *Vitruvian Man* appeared on the screen behind Mudrac, only surrounded by labels and lines pointing to parts of the figure's brain and body. "You have been revived from your elective cryonic suspension. The technological process that enabled your revival has been used to clean the vitrification solution from your bodies and re-construct neuronal structures according to magnetic resonance imaging scans of your brains taken from before your suspension or, if necessary, from reconstructive efforts for those of you suspended before such techniques. It has also been used to install what are today common brain-computer interface nodes. These systems are strictly local, with no in-built wireless communication technology, although we have accessories for that if you wish. These implants will allow you to identify yourself uniquely to Novacom systems, interface with the electronics embedded all around you, and even induce sensory experiences."

He waved his hand in the air in a deliberate manner, but one I did not understand until the image behind him changed, showing a chevron-shaped logo with the familiar orbital rings of the Solar System's major celestial bodies behind it. "The political entity you knew as the United States no longer exists as you understood it. Or, looked at another way, it has expanded to include the entire Western Hemi-

sphere of the Earth and then some. The system we have is named the New Community Federated Cybernetic Hierarchy, or *Novacom* for short. Our government, such as it is, is a system that is truly of, by, and for the people. It is designed always to return to stability if it is disturbed, and it has as its prime focus your well-being, as measured by general agreement. Political parties do not exist, or put another way, there is only one political party and it is called all of us.

"Every function of government still exists, from defining what it means to be a citizen, to defending the borders of our political jurisdiction, to operating the criminal justice system. But it is no longer designed for the benefit of an elite ruling class. Or—" He grinned. "—put another way, we are *all* the ruling class. The great contradictions of the system you were used to, the capitalist system that pretended it was a democracy, are no more. In this, your new tomorrow, we have wonderful and exciting *new* contradictions to explore!"

Beside me, Jak smiled fondly at her father, and I felt myself smiling too.

Mudrac continued. "But in all seriousness, it really is a very different place in which you all now find yourselves. Your group's average time in suspension is almost ninety years. Many of the institutions and social norms you were used to have gone, although much of what remains will be familiar. Contrary to the beliefs of your time, creating a system where work is optional, and thus well sought-after, did not require any great brainwashing of the people, or some grand change to human nature. For it was human nature to build upon the strengths of all people long before it was *thought* to be selfish individualism. The egotism, selfishness, and desire for acclaim and esteem sought by the archetypal human being still exist. The difference is, in our New Community, the reward which satisfies those drives is achieved by contributing best to the benefit of all humanity. It has long been desired that those most revered in our society ought to be, not the wealthy or powerful, but the intelligent, and generous, and hard-working. Now, no matter who you are or how you contribute, you are valued. Starting today, you are all officially citizens of the American Novacom, Virginia Administrative District, Richmond Node, and we welcome you to this bright, new future.

"You will all notice the upgrades you have been given in due time. Don't worry, unlike the old days, you owe us no debt. This is the work of my life, and I and others have built this clinic for the accommodation of your needs as you transition from cryonic revival to fully capable citizen. While you are here, within reason, your luxury needs—not to mention your food and health needs—will be accommodated without running down your weekly resource allocation. We find that a period of accumulation is common among revivals, so if you find yourself buying everything in the clinic catalog, we understand completely." There was a smattering of light laughter, with revivals nudging each other. I noticed then that some revivals were clearly romantic pairs, or at least familiar with one another from before they had been frozen.

Before I could dwell on that too long, Mudrac continued. "Your upgrades will allow you to customize your appearance to some degree, including hair and skin and eye color. Consequently, you will find that many notions common to your time period, categories of being such as race and sexual orientation and gender, are no longer very relevant. There are as many ways of living as there are people to live them. Some choose to alter their brain chemistry, some choose to alter their bodies. Color of hair and skin and eye can be designed for, now, as can the shape and style of your hair and bone structure. However you wish to design your body, it is now yours. With some exceptions, mostly related to things like weapon implants and chemical secretions, your ability to enact total morphological autonomy is unrestricted. As you can imagine, this has had significant effects on our society. It goes without saying, for example, that your role in our society is not restricted in any way based on your physical appearance, as the ability to change oneself so completely renders such judgment more than ludicrous. We are not perfect, and like any social beings the concepts of inclusion and exclusion still apply, but at least we fight and argue about things that have some actual meaning, now. Incidentally, there is still baseball under communism, so if you wish to deny that the Virginia Rapids are the superior team in this year's National conference, we can have it out but good…but only after your reintegration into society is complete!"

He grinned again, and I did laugh, if only at how pleased he looked with himself.

"In the Novacom, there is no recession caused by too much productivity, because increasing productivity means making more things more cheaply and getting more hours for living. In the Novacom, we do not need to adjust the economy to hold production back just to suit the whims of rich investors. In the Novacom, the system of rewards and recompense we have implemented means that the greedier a person is for fame and acclaim, the more innovative we are with our production, and the more daring we are in our explorations, the better off society as a whole becomes. And most importantly, in the Novacom, when society prospers, so do its citizens—and when its citizens prosper, so does society. The question of civilization has finally been solved, and life cannot help but improve unto the very limits of the universe."

Mudrac smiled and clapped his hands together, shaking us out of our rapt attention. "I think that's about covered the usual hurdles for people from your era," he said. "I like to get the big stuff over and done with up front. There is so much to tell you about the world as it is, but I understand that I can only give you so much to consider at once, which is why we pair you up with our expert transition assistants. So now that I've sufficiently upended your world-view, please allow me to foist you off onto the professionals, so I can avoid having to answer any difficult questions." He spoke with a grin, and with such good humor that we the assembled revivals could not help but laugh, and even applauded as he swept off of his little stage and out of the room.

We stood up, and Jak led me to a private room, with a little table and chairs and a screen.

"So I can control the color of my hair and eyes and skin?" I said.

"Yes," said Jak. "When we repaired your body, we also built the molecular structures that allow you to manipulate those things. Any changes you make will take a little while to show up, but it's quite easy. You'll have to learn how to control your implants, first, of course."

That was another element that fascinated me. According to Doctor Atamai, the same process that had cleaned the vitrification solution

from between my neurons had also been used to build molecular-scale structures that performed some surprisingly complex computations. As Jak explained it, there was a computational substrate built along my back and shoulders for heat dissipation with my sweat, powered by sugars in my blood.

Jak walked me through the tutorial. All I had to do was close my eyes and think about certain things happening, in the same way that I could make my heart race or take my breathing off automatic just by thinking about it. With practice, I would be able do it with my eyes open. The tutorial ended when I was able to conjure simple shapes and colors in my field of vision, and simple tones and sounds in my range of hearing.

"Eventually you will be able to interface with external machines, so you can access data and receive full sensory feedback." Jak held up a small mirror that was sitting on the table and touched my temples, where there were indeed stark black lines printed into my skin—subcutaneous computer interfaces. They were spread across the palms of my hands as well. "Your implants will also allow you to identify yourself to Novacom machinery. That's how you'll get food and clothes and other goods."

"Novacom…" I said, staring at my palms. "Your father talked a little about the political situation. Is it really true that there is no more American government?"

"Hmm, that was a little bit of an exaggeration," said Jak. "It's a little more accurate to say that the government is *everywhere*, or rather, that there isn't much of a distinction between government and non-government. I'll take you to the local political center this week, show you around."

"I'd like that," I said. "He also mentioned sensory *experiences?* Does that mean films or games?"

Jak smiled. "In due time. We've found it best not to overload new revivals with too much artificial stimulation. I'll take you to a recreation center, so you can get the full experience. In fact, I'll make up a whole schedule for the next few weeks."

"All right," I said.

My stomach growled, and Jak laughed. "I'm sorry, you've been on an empty stomach all this time. We usually wait for that to happen be-

fore we try to feed you actual solid food, instead of the nutrient slurry you'd been receiving before you woke up." She stood up and took my hand as I followed her. "Let's go to the cafeteria. I'll show you how to use the standard Novacom dispensary system. You won't have to worry about adjusting to food, that was part of your revival process."

The cafeteria was more or less as I expected it to be—a large room full of people eating at individual tables—only instead of being a bland, inexpensive white, it was a fully-furnished, downright luxurious environment. There were tables with tablecloths and full place settings, small potted trees, and a wide floor-to-ceiling window with a fantastic view of the nearby river—Jak told me it was called the James. I had never been to Richmond before—I had been frozen in Arizona, and had lived all my life on the other side of the continent—so I decided then and there that I would try to make it my home, as if I had been born anew. Which, I reflected, I had.

We found an empty table and sat down. There were around fifty tables in the large room, and around half of them were filled, mostly by revival-attendant pairs like me and Jak. But it was much quieter than I had expected, and as I sat down, I realized there was actually soft music playing, a pleasant jazz I did not recognize.

"That's the sonic isolation system," said Jak when I asked. "Communal areas like this can sometimes get crowded, so we take great pains to provide at least a little privacy. There are sound emitters in the ceiling and walls, measuring the sound in the room and canceling a lot of it out. They can track individual people if you'd prefer to have quiet on the go, but they're set to be focused on the tables by default. And of course you can tune your own auditory processing system to compensate for the noise, although it doesn't prevent damage to your eardrums that we then have to fix."

A robot—it could only have been a robot, as it was about shoulder-high to me sitting down and made of smooth metal—rolled quietly up to the table, deposited a basket of hot, fluffy rolls and butter, and trundled off again. Jak took a roll, cut it in half with her bread knife, and began to butter it.

This, at least, I understood, and my own bread was hot and soft, and the butter was smooth and rich and creamy.

"This is very good," I said. "Do you have cooks on staff?"

"A few," said Jak. "But they're mostly culinary researchers. They manage the menus, balance nutrition, that sort of thing."

"So who made the food, then? For all of these people?" I looked around. The variety of food on display was rather staggering. I saw soups and salads and sandwiches alongside elaborate meals of cuisine from every era and culture I could recognize, and some I did not recognize at all, strange agglomerations of juice spheres and pastes and odd savory cakes. The attendants—those from this new future—tended to eat the latter, and the revivals mostly ate food I more-or-less recognized.

"Machines, of course," said Jak. "The New Community would be impossible without significant and highly adept machine production." She stared into space for a moment. "Sorry, just wanted to make sure to schedule a walk-through of the local manufax. Your chart says you used to be a technician?"

"I was a machine shop worker," I said. "And I would very much like to see how things are made around here."

"I would very much like to show you," said Jak. "But first, we should order. Don't want to fill up on bread."

I was not sure that was possible; I had eaten all of the rest of the bread from the basket and was staring hungrily at the other diners' plates.

"Do we order with the…robot waiter?" I asked.

"You can, if you wish," said Jak. That was beginning to be a common statement. It seemed that this *New Community* had little in the way of some universal notion of proper versus improper interaction with the system—save that it was universally *constant*.

Jak placed her hands on the tabletop, and her gaze went distant again. I would have to get used to that. Jak did it so easily that I supposed it was not considered strange or rude in this new future. I wished I had a pad of paper and a pen, to write down all of my observations and questions.

"What would you like to eat?" said Jak after a moment.

"What do they have here?" I asked.

Jak smiled. "Almost anything you could want. We have a particularly expansive selection here, although not so much more than in most places. And don't worry about payment or anything. While you do

have a resource allocation, you won't have to be concerned with it when you're here. At least, not so much as elsewhere."

I thought back to my life before, and knew my selection instantly. "Grilled cheese, with those old American singles like how my mother used to make. And tomato soup, with basil. Please. And do you have a pen and paper, by chance?"

Jak looked distant again, then removed her hands from the table and folded them in her lap. "Coming right up. All of it."

Indeed, the robot waiter rolled up again, bearing two trays with lids. Underneath one was a dish of some meat I did not recognize, which went to Jak. Underneath the other was a grilled cheese sandwich and a bowl of soup, and a pad of paper with a fine-nibbed pen. The sandwich was not quite how my mother had made them when I was a child, but it was delicious anyway, as was the soup. And the pen wrote superbly.

"It's all just…there, isn't it?" I said.

"The Novacom believes that, when you reach for something, there it should be," said Jak.

I turned that over in my mind for a moment, and took another bite of my sandwich.

"Good?" said Jak as I ate.

"Very," I said. "What are you eating?"

"Roasted mammoth," she said.

I put down my spoon. My tomato soup was almost gone, anyway. "Mammoth?"

"Oh, yes," Jak grinned. "Some years ago we recovered mammoth DNA from a taxidermied specimen in a museum, and like all our meat we grow it in an industrial process—although we have plenty of live specimens over at Maymont Park, and in museums and zoos across the Novacom. One of my father's first major developments in nanometric physical chemistry. Would you like some?"

I declined, mostly because I was too surprised to enjoy it. "You grow all your meat?"

"I've never eaten anything that could feel pain," said Jak. "And I'm known in my family as rather the carnivore."

I began to laugh, and Jak looked at me quizzically. "Oh, nothing," I said, wiping my eyes. "It's just that along with poverty, it seems

you've eliminated annoying vegetarians as well!"

Jak smiled. "Oh, yes, the moral vegetarian. We have our moral crusaders, of course, but it's difficult to protest against the use of something that, really, is no different than lettuce."

"Oh, if my sister could hear you say that!" I said, then paused. "She…is she…?"

"I'm sorry," said Jak. "I don't know. Those records are sealed. I only get to know about *you*. It's against the law for me to inquire about anyone's medical history unless I have a good reason, and this counts as a medical procedure."

"What about me? I'm her family. If she *is* here, somewhere…"

"Privacy is a very sacred thing in our world, Max, especially with how much data there are flying around about all of our preferences and habits. If you were next of kin, I would have been informed already."

"I understand. I'll just have to…wait, then. And see."

"We could petition at the political center, since you're a revival and family reconnections are important to your health, but I won't make any promises I can't be sure I can keep."

I nodded. At least there was a path forward. "That would be fine, Jak, thank you."

Jak reached across the table and put her hand on mine. "It'll be all right," she said. "Try not to think about the things you can't change. We try to cultivate an ideal of knowing what we can and cannot do, individually and together. Otherwise you spend your whole life bitter."

"You're right," I said. "Is there a form or something I would need? To petition?"

"No, nothing like that. All of your data go around with you, so all you'd have to do is ask someone at the political center, and they'll do what they can. I could call someone now, if you'd like?"

I shook my head. "Just getting oriented is enough for me right now. I'm not sure I could handle a lot of…bureaucracy."

"I understand," said Jak. "It wouldn't be nearly so bad as you were used to a century ago, but it can still be a little overwhelming, especially for people who are under the kind of stress you're under."

I yawned. I looked out the window, and saw that the sky was turning vivid colors. "What time is it, anyway?"

"Nearly twenty-hundred. You're part of the late-shift revivals. We tend to revive people late in the day, since it's such a draining process. Physically and emotionally."

I frowned. "What day *is* it?"

"July twentieth. Come on, I'll show you to your room."

My room was not far. I could see other revivals and their attendants moving through the dormitory hallway, so Jak must have been correct, and the day was trying indeed for some. I felt a little better. There was so much to learn, and to do, that I felt a little guilty for wasting time with mere sleep.

I said as much to Jak, and she just said, "Well, sleep is highly elective in this day and age, but it's best you stick to your natural rhythms for a while."

I yawned again as Jak showed me how to enter my room—with my hand on the doorknob, the computer recognized me nearly instantly and unlocked the door.

The room was as nice as the nicest hotel room I had ever stayed in, which was during my sister's wedding, in Las Vegas. The bed was large and plush, there was a spacious and luxurious bathroom through a door—with what appeared to be a jet tub and a rain shower and some ludicrously fancy toilet I had only before seen in Japanese dramas—and the closets were full of simple but varied clothing, all in my size. What must have been an antique—or at least antique-*style*—flat television was mounted to one wall. There was even a small kitchen, stocked with prepared foods and ingredients. A window looked out over the river outside, and a hatch in the wall revealed a *dumbwaiter* of all things. Jak explained that it would function as the robot waiter did in the cafeteria, bringing food or items from the dispensary in the basement. While the risk of opening the door to strangers was fairly low, it seemed that most revivals felt safer knowing that only they and their attendants could access the room, and the latter only with permission or in an emergency.

"We do not know what kind of person will be revived, only that they were able to *afford*"—she said the word with some distaste—"cryonic preservation. It is better to be cautious."

I was grateful, and said so.

"I'll leave you to get settled," said Jak. "I'm staying in the building for the duration of your orientation period, so if you need anything at any time, just call. You can use the telephone in the corner, or if you're feeling up to it, the panel by your bed is an access point for your neural implants. Don't worry about waking me up, I'll probably be awake all night drafting an orientation plan."

"Those aren't standardized?" I said, pulling a soft cloth robe from a hook by the bathroom door.

"Nope," said Jak. "Custom, for every revival. That's why you get me all to yourself for the next twenty days."

I stopped playing with the robe and looked up at her. That sounded…very nice indeed.

"I'm glad," said Jak, and I realized I had spoken aloud again without realizing. She smiled. "Good night, Max. I'll see you in the morning. I plan to be here at eight-hundred, unless you need me before then."

"Eight-hundred," I said. "Eight AM. Understood." I looked down at the robe again. Turns out having a twenty-five-year-old body meant more to my erythic response than having a thirty-five-year-old brain.

I looked up again and she was gone, the door latched solidly behind her. It was comfortable, in that room, alone, and I was excited for the next day, but as I luxuriated under the first hot shower I had had in a hundred years, playing my fingers over a body I had never had in my life even before I had been frozen, I felt…whole. Content.

I wondered idly how long it would last.

I fell asleep in that plush bed, wrapped in the warm and fluffy robe, listening to the dim chatter of good old television, playing reruns from my time. They really had thought of everything.

# CHAPTER 2

Jak found me awake and dressed the next morning. I had opted to wear the jumpsuit again, as it was comfortable and had many pockets.

I had awoken at five-hundred, suddenly full of energy, and had spent the next three hours playing with the catalog and dumbwaiter. The selection of items was limited, although less so for food, but I had found a few things that were of interest, and I showed them to Jak when she knocked on my door.

"Oh, that's a data storage bracelet," she said. "It provides easy storage for any data you wanted to carry around with you. There's a whole line of jewelry for that purpose."

"And this?" I held up what seemed to be a small, matte mirror. It reminded me of the smartphones we had carried around, before I had been frozen, only I could not get it to turn on.

"That's for displaying something to someone if you don't want to interface directly with them," she said. "Not everyone is comfortable linking directly to a stranger."

"You can do that?" I said. "Link directly?"

"Sure." Jak took my hand, pressed her palm into mine, and words floated into my vision, stark and clear.

"Something wants to know if I should accept the connection?" I said.

"Just think that you do. It has to be deliberate, and for a few seconds, so you can't do it accidentally."

I followed her instructions, and when the words cleared, I saw images—images of *me*, from the previous day, watching Mudrac Atamai giving his presentation.

I smiled, and a new image appeared, of me, sitting on the bed next to Jak, smiling.

"You can do that, too?" I said.

"Yes. It's necessary, for the technology to work at all. You'll have to be careful what you do in public. But we've all lived with it for so long, the scandal of some prominent person picking their nose wore off decades ago."

She smiled, and I laughed, and she let my hand go and I missed it for a sudden, sharp moment. It was nice, I reflected, having someone make contact with me so casually. Before, it had been…infrequent.

More so since the illness. I tried to keep perspective—Jak was a volunteer, someone who helped revivals all the time. I would not be special to her.

But still. It was nice. And a friend, at least, was a friend.

"Shall we, then?" she said. "I thought I'd take you to the political center first, so you can get your request filed. They have an introductory tour. Usually it's for schoolchildren, but they are more than happy to do a special tour for revivals from the Clinic."

"You still have field trips in this day and age?" I said as she led the way out of the room and down the hall. I heard the door seal shut behind me and latch closed with a *thunk*, and I gave it no more thought. I was adapting to the future very well, if I did say so myself.

"We still have mandatory schooling, even, although it looks a little different than you might have been used to a century ago. Schoolchildren work at their own pace and in their own manner, and the things we teach are more like broad building-blocks rather than lists of facts to be memorized."

After breakfast, we went to a part of the clinic I had not seen before, a wide glass-domed lobby. There was a long reception desk against one wall, where revivals and attendants browsed for information on large screens with friendly animated avatars. The flat, smooth tiles that made up the floor formed a huge design, a Rod of Asclepius overtop a familiar angular chevron—the common heraldry of the Novacom, apparently. The glass that domed in the ceiling did so in repeating triangles, with designs in color that fit together to form a huge image of—

"Is that *The Creation of Adam?*" I said, pointing up.

Jak looked up. "Almost. It isn't God and Adam. See? Adam is—"

"A…galaxy?"

"Yes."

"And God is—"

"Made of math, yes." Jak laughed. "My father had a local artist design it. It's called *The Awakening*. It depicts the conquering of chaos by reason."

"Heavy," I said, still looking up at the massive geodesic skylight.

"My father has been a major advocate for a *global* Novacom. This represents…a dream." She looked into the distance for a moment. "We

should get going if we want to catch the next tour at the political center."

"Yes, of course," I said. I let her lead me outside, through the long line of glass doors that opened automatically as we approached, and I felt the outside world for the first time since awakening in that little room the previous evening.

It was a bright, blue-sky day, cooler than I had expected for July. Fragrant flowers filled the center of a semicircular pathway that arced away from us in both directions. I heard a soft hissing sound, and the reason for the unnatural coolness became apparent: fountains, timed and aimed to evoke dancers twirling in the water, spouted up from the center of the flowerbed, which I saw now was less flowerbed and more flower-embellished dancing fountain.

The pathway had no cars, as I had expected there to be, but instead had yet more people, visitors and revivals and attendants, walking both ways. It was not unlike the theme parks of my youth, with wide boulevards bordered by trees and water features, signs with information, people pulling drinks and snacks and useful items out of dispensers. Other paths snaked off, away from the clinic, with signs pointing to residences and parks and dining areas. Was the whole city like this? The whole *country?*

"When you've fully trained on your implants, you'll be able to call up a map that will take you anywhere you want to go," said Jak. "Of course, there are still posted signs and maps, for those who won't or can't use implants, but for now, just follow me."

She led me around the central fountain, which was wide and cool and pleasant to hear even up close, and beyond it, to a wide rectangular plaza with half a dozen other people standing under a curving, sweeping roof glittering white-blue.

"Solar panels?" I said, pointing at the roof.

"At every opportunity," said Jak. "But that's mostly to take the pressure off of the powersats during the day."

"Powersats?"

"Oh yes," said Jak. "I'll take you out to the park tonight, you'll be able to see them in the night sky."

More and more to see. I pulled my pen and paper from their places in the pocket on the hip of my jumpsuit and wrote it down—*power-*

*sats*.

We stopped under the wide roof, and I suddenly realized that it was not a plaza at all—it was a train station. But it was an unusual train station—instead of tracks, there was a thick concrete beam running the length of the platform.

"That's because it's a monorail station," said Jak when I asked. "They can be built over rough terrain, powered electrically, can even run over streets and pathways. Plus, they're cheaper than flattening ground for heavier rail, which we don't need for such short distances and our typical uses."

"Cheaper?" I said. "I thought people weren't employed the same way they were in my time."

"We don't count currency like you did, but we still track resource usage, including labor." Jak put a finger to her lips. "But one thing at a time. We'll hit the manufax tomorrow, and they can explain it all much better than I can."

Dutifully, I made a note.

The monorail pulled up, quiet—rubber wheels, Jak said. We stepped inside, and I luxuriated in the air conditioning. So far, it was not much different than the public transit I had known before, only there were no advertisements, or disheveled people sleeping under newspapers for lack of alternate shelter. There *were* uniformed police officers at either end of the train, but whereas in my time they were usually left alone, now groups of passengers chatted with them amicably. Things were very different, it seemed.

Jak led me to a seat in the front, before a wide window looking out over the monorail track snaking before us like a gleaming white ribbon. There was no driver.

"No need for one," said Jak when I pointed it out. "You had automated transit in your day, didn't you?"

"In some places," I said. "A lot of people didn't trust it."

"Our systems are not perfect," Jak admitted. "But then, they don't need to be. They just need to be better than humans. And they get even better as the whole integrated system learns from the mistakes and failures of other parts of the system, a statistical database that allows the computerized systems that monitor the whole Novacom to predict deviations—including failures—and alert people who can act to prevent

them. Once you get used to that kind of functionality, you'll see it everywhere, both in our mechanical systems and in our way of life. That's the *cybernetic* part, as you'll soon see."

The last passenger entered the train, the doors closed, and the monorail began to move. It descended smoothly out of the station, and I looked over my shoulder as the monorail track curved back towards the hill on which the revival clinic stood. The sprawling complex was no less beautiful from the outside, with a geometric sort of architecture that both complemented the natural undulation of the land and stood out as starkly synthetic, an ideal blending of humanity and nature that dissolved the distinctions between each.

Jak pointed out landmarks as we left the riverside—the nature preserve on the edge of the clinic complex, the artificial lakes of the nearby apartment housing, the tall Carillon belltower in the middle distance, and even more as we headed down into the heart of the city itself. The journey seemed to be equal parts simple transportation and delightful scenic tour, and I was impressed that the clinic had its very own stop, albeit only as part of a much broader pedestrian-oriented area.

"That's part of my father's doing," said Jak. "The city prides itself on its part in the Great Common Task—the revival of the dead, as it were. As such, we thought it was important to make a good first impression, especially since, and I mean no offense, many of the ideas we fight against are still in your minds, since you aren't used to the New Community way."

I took no offense, of course, and merely said, "What is the Great Common Task?"

Jak laughed. "A little joke. Once upon a time there was a group of mystics that believed the purpose of humanity was to conquer nature, end death, and revive all those who had once lived and had died. The first two we are well on our way to doing. Our ability to do the third is…limited." She put her hand on mine again, just briefly. "But we're doing what we can."

"And I am very grateful, I assure you," I said. "I was never very politically active in my old life. You won't have to worry that I'll try to, I don't know, usurp the current order."

"Oh, please, usurp away," she said, smiling more broadly. "Yell as loudly as you want. It's just more data for the models."

The political center was housed in a huge, white building built a top a wide, grassy hill not far from the James River. Jak said it once housed the oldest legislative body in North America since Europeans first arrived, but now it functioned primarily as the local node for the great political calculation engines that drove what passed for the Novacom political system. Still, what little representative democracy yet remained *did* use the place for its regular meetings.

The monorail station was at the foot of a tall, wide set of stone steps that led up to the columns that fronted the doors to the huge building. I eyed the stairs a little warily—the old me, in my old body, would have struggled up those steps—but I remembered that the future was a new and different country, and it was I who led the way…at least, until we made it through the front doors.

"We have to check in with security first," said Jak.

"Security? I thought there were no politicians here right now."

"The world is not a perfect place, Max. Unfortunately, there are still those who would do the innocent harm for their own political gain. But I promise, it is much less intrusive than you would be used to."

Indeed, the security station was little more than a desk. We logged our presence—Jak showed me how to identify myself with my implants—and we passed on.

"No weapons checks?" I said.

"The perimeter fence between the station and the plaza at the foot of the stairs is equipped with many sensors that can identify hidden objects," said Jak. "If you had been carrying a weapon, we never would have made it to the steps, much less the front door or the security desk."

"Seems pretty intrusive to me," I said.

"Only if you *want* to enter the grounds," said Jak. "If you're just passing through on the monorail, there's no way for them to know anything."

"And they can put those fences anywhere?"

Jak shook her head. "No, only public areas are policed like that, and only in proportion to their sensitivity. For example, if you were to

walk through Monroe Park by the campus, nobody would be tracking your possessions at all, although you might see an increased presence of actual officers."

"I did notice that, yes," I sighed. "I suppose I'd hoped that there had been some kind of…awakening of consciousness."

"Our system is not predicated upon the good behavior of individual people," said a voice nearby. We turned and saw a man dressed in, of all things, an honest-to-god *robe*, draped over his shoulders so as to expose his upper back. He even wore a metal band around his forehead, crossing over the interface lines on his temples.

"Ah, Tom," said Jak. "Max, this is Director Thomas M'baga, head of the Richmond Political Center. He has graciously agreed to lead today's tour."

"Honored, Director," I said, taking the hand he held out.

"It is *I* who am honored, Max Kustaja," he said. "Jak tells me you're interested in our system? Most people in your situation just take the first opportunity to…disappear."

"They don't really disappear," Jak said to me. "A lot of revivals adapt all right, but they tend to be insular. We call it *future shock*." She turned back to the Director. "Max is trying to discover whether her sister joined her in the deep freeze."

M'baga nodded. "Well, Max, I'm afraid that's a bit of a tricky proposition. Jak has told you about our privacy protections?"

"Yes, sir."

M'baga laughed. "Oh, Max, you don't need to be so deferential to me. I'm just someone who gives his time to a cause he believes in, just like everyone else. You can call me Tom."

I smiled. "Tom, then. Yes, Jak has informed me of the…complications."

M'baga pursed his lips in thought for a moment. "I'll tell you what I can do, though. I'll see if your family has any descendants who could give you permission, how about that? We have quite good records of such things. I'll need *your* permission, of course, to look into your family history."

"You have it," I said. Finding a path forward seemed to be the way of things in the future.

"Here," he said, and held out both of his hands, palm-up. I put my palms against his, and accepted the connection when it asked, and again when it told me what he wanted: my unique identifier, and an encryption token.

When it was done, he dropped his hands back to his sides, and I followed his example. "If I find anything, I'll have it sent to your address. Is that all right?"

I said it was.

"I'll make sure she's up to speed on managing communications," said Jak. "Thank you, Tom."

"Of course," said M'baga. "Now, come this way, the tour will start soon. Best get on with it, hm? Plenty to discover!"

He led us through the building and into a small room with a wide set of double-doors on the other side. The sign over the doors said *Richmond Political Center Museum and Historical Exhibition*.

"Welcome to the Richmond Political Center," said M'baga, "home of the Richmond Node of the Virginia Administrative District, and the home district of the Virginia Novacom. Now I know Mudrac Atamai mentioned the Novacom, but I also know he likes to give the *short version*. Rest assured, that is not *my* approach." He grinned, and I had a moment to anticipate the coming lecture before he pressed on.

"The Novacom, to use the textbook definition, is a political entity that covers four continents and dozens of former nation-states in the Western Hemisphere, Asia, and Oceania. Specifically, the Novacom covers all of North and South America, Antarctica, the Caribbean, Australia, New Zealand, Japan, and all of the islands of the Pacific east of China and south of Indonesia, not to mention our extraplanetary holdings. The rest of the world is grouped into a loosely-joined *Coalition of the Free* which sees itself as dedicated to repelling our expansion, and to stymieing our efforts to bring health and well-being to the whole of humanity."

"Why not just…leave them behind?" I asked. "Things seem to be going well enough here."

"A common enough sentiment," said M'baga, "but many believe that to do so would be a violation of our most firmly-held principles. We have the ability to render aide, and so we must endeavor to do so—it is our obligation. The principles of the New Community apply at ev-

ery level of our society, just like our political system."

M’baga led the way. In front of us was a genuine museum corridor, full of displays and plaques. I supposed I could have stayed there all day, just reading, but M’baga seemed interested in the tour first and foremost, as he pushed on a few displays in, to an image projected crisply onto the blank wall behind him. Despite the hallway lights, the image was somehow not washed out or dulled.

It was a political map of North America, right down to the states of Mexico and the US, and the provinces of Canada. "This is how North America used to be," said M’baga. "You can see the familiar outlines of the current regions, yes?" As he named them, they flashed each in turn. "Canadian Novacom, American Novacom, and Mexicentral Novacom." The last included most of the islands of the Caribbean, those that had not been included in the second polity. "These were once all many separate whole countries, with independent jurisdiction over their territories. When natural disaster, or disease, or some other emergency threatened one, rendering aide became a complex tangle of political agreements, treaties, and expectations. Pursuing separate interests as independent states would often bring them *farther* from objective social goals such as safety and health, and outside of the threat of *war*, large-scale cooperation was almost impossible.

"That’s another reason we work to expand the New Community," M’baga added. "So long as the rapacious greed of the rest of the world continues to bleed the Earth dry and choke her skies and seas with pollution, we are threatened even here."

He shook his head. "But let us start with the fundamentals of political economy, yes?" He moved from display to display, each of which showed a different example or illustration to help explain his point. It seemed that Director M’baga gave this lecture often, but he seemed fully engaged, even *excited*, so I said nothing and simply tried to understand what he was saying. It was quite a lot of information.

"The old United States that you once knew, Max, operated primarily by means of a system called *capitalism*. Before I begin describing that system, I should explain a few things. To begin, the analysis I am about to describe to you is a very basic rundown of the Marxist critique of capitalism. When it was first published in the nineteenth century, it illuminated the fundamental systemic problems within the capi-

talist mode of production. In short, it is *not possible* to build a society that produces the kind of outcomes we desire with any regularity or stability *if* that society employs a capitalist economy. Notably, there are many things which are described in the Marxist analysis that the Novacom used to assess the failures of the old system which have both formal Marxist definitions and colloquial definitions, so it's important to get it right.

"Let's start with the definitions. Perhaps the most important of these particular definitions of words is that of *property.* The Marxist critique of capitalism distinguishes between two principal categories of property. These are *private property* and *personal property. Private property* is any property which is owned by a private citizen which is in principal *productive*. This includes factories, power systems, transportation systems, and even schools. *Personal property* is any property which is consumed *directly by* a private citizen. This includes their house, automobile, food, leisure equipment, and clothing. It is not *directly* productive, because it is instead *consumed*. This highlights an important distinction between *types of value* which they can explain better at the manufax, where such ideas of value are studied in much greater detail.

"I must also note that Marx made certain assumptions, in his early explanation of his analysis, to be used when analyzing capitalism. Chief among those assumptions is that everything sold in a market sells for its proper value. This includes paying a living wage. It is not guaranteed that such a thing would happen, but rather, the analysis shows that *even under perfect conditions*, the system is *fundamentally* prone to instability, stagnation, inequality, and even collapse. Understand?"

I said I did, at least so far.

"Good," said M'baga. "Now, according to the Marxist Ernest Mandel, capitalism is a socioeconomic system characterized by three fundamental pillars.

"First is the demand that firms make a profit. Firms are required to make a profit in order to provide for the financial expectations of their investors—and thus curry additional investment—and also to re-invest to out-compete their rival firms. Without profit, a firm under conditions of competition will eventually fail. Without competition, of

course, there is no need for profit, but under capitalism there would then be no reason not to extract *maximum* profits, either.

"Second is the need for the principal section of the population to *sell* its labor for a wage. This occurs when a person is not able to profit from the mere *ownership* of property. They must *sell* instead.

"Under capitalism, the vast majority of the population does not own anything which can be sold consistently except for their labor. When they labor, they are paid by the entity which buys its labor, but they are not paid *for* that labor. When a person is paid a *living* wage, they are paid enough that they can exchange that money for everything necessary for the daily reproduction of labor. So, when you sold your labor to your employer, she paid you enough money so that you could eat, and be warm and clothed, and be healthy. If she did not, and you could not secure funding from some other source, you would eventually become too ill to work. This *ability to work* is called your *labor-power*, as distinct from pure *labor* itself."

"But you *give them* the thing you made with your labor," I said. "When I worked in a machine shop, I put whatever I made on the rack for the customer to pick up."

"Exactly!" said M'baga. "When you as a laborer delivered your final product, the thing you delivered contained all of the labor that was put into it. So although the capitalist *paid for* your labor-power, what she *receives* is your *labor itself*, in the form of a product or service. In point of fact, it is the quantity of labor expressed in a commodity which broadly determines the value of that commodity. That is called the *labor theory of value*, and it is very important in planning production in the Novacom. They will go into more detail at the manufax.

"In participating in wage labor, what the capitalist has effectively done is executed *two* market transactions. First, you were paid for your labor-power. Then, the product of your labor was sold on the market. The positive difference in what the capitalist paid you and what the customer paid *them* is called *profit.* That profit comes from the *surplus-value* difference between the value of your labor and the value of your labor-*power*, and it is the means by which the capitalist can live without having to labor, as that profit is pocketed by the capitalist."

"Except what they pay in taxes," I said. "Or what they re-invest."

"True, *some* of that profit *might* be re-invested, either in the form of a direct investment by the capitalist or when the capitalist spends money for her own personal benefit, or as a result of a tax. But that is beside the point. The point is, the capitalist hasn't actually *done* anything—and yet, she is paid! She might *also* put her labor into the enterprise, for which of course she ought to be compensated, but the profits extracted *from you* do not go to you. They are not even put into a pool for your benefit, as they are in the Novacom. And of course, unlike here, you have no voice whatsoever in the use of that profit. In short, having done nothing to earn it, the capitalist takes some of *your* labor—in the form of money—and uses it for their own purposes. And worse—having produced something of use, you must *pay the capitalist* simply to *take home the thing that you have already made!*

"What has the capitalist done? Nothing, except to *own*. You have, in effect, worked not for yourself, but also on their behalf—and you pay *them* for the privilege! When you are paid a day's wages, there comes a point in the day when the value of what you have produced exactly equals the value of what you have been paid. At this point, if you were to stop working, there would be no profit to be made. That there is profit being made *means* that you first work for yourself, and then you are obliged to continue to work *for free*, and then later to compensate the capitalist to receive the congealed form of the labor you *already* sold to them! There is a word that means *obliged to labor for no compensation*, and that word is *slavery*—hence the concept of *wage slavery.*

"If you were first to spend several hours of your day constructing some item in the machine shop, and then spent several more hours building something for your employer to put in her house, you would be expected to be paid for your time in both contexts. But profit-making means that the second period of time is spent without compensation. It would be obvious in *that* context, but the use of *money*—not to mention a great deal of pro-capitalist propaganda—obscures this from you. And of course, even if you knew it, there would be nothing that you as a worker could do about it, as while you may possess the skills to *use* the equipment of manufacture—the means of production—you do not *own* them, and the capitalist will only allow your use of those resources if you agree to a contract! So much for *freedom*, eh? If you

protested, you could be replaced. If the political power of labor was sufficiently strong, the capitalists would simply invest in productivity improvements until it was weak again and profits could be increased.

"The requirement to make a profit, coupled with the wage system as the only means of getting money to make purchases, meant that there could be people who desperately needed goods which simply piled up in warehouses. Goods would be produced by firms seeking a profit, but a lack of ability on the part of the wage slave to purchase—never mind how necessary those goods were to the people who needed them but could not afford to pay—meant that they would simply sit and rot. World hunger, poor access to health care, homelessness…for tens of thousands of years these things were the product of a severe *lack of production*. Under capitalism, where production was abundant—especially in the early twenty-first century—these things were the product of a system of private property, where access to goods was regulated by money, and where access to money was regulated by capitalists.

"Capitalism could not distribute its abundance, because a capitalist would only part with her property if she could expect to make a profit with it. The government had no such limitations, but under capitalism government was only permitted to service the market, as to do otherwise was to admit the superiority of collective action. This state of affairs had political impacts as well, as a man whose children are dying of treatable illnesses while hospital beds lay empty and doctors' hands sit idle will burn the entire world to the ground."

"We had welfare programs, in my time," I said.

"Oh, some welfare programs existed, for sure. Under capitalism, whatever veneer of compassion hid its true purpose, welfare was nothing more than a means to prop up the economy or to get people to work. But the recurring dream of a world where productivity increases meant more leisure time and greater purchasing power for the consumer simply was not possible without the abolition of capitalism. Capitalism cannot allow welfare to any significant degree, or else it loses its ability to compel laborers to work. Capitalists used all sorts of morality plays to attempt to achieve this, but rest assured, their goal was profit."

M’baga smiled. "And now we come to the third pillar of capitalism, which is the need for firms to compete for market dominance, compelled by the demand to make profit.

"Let us consider two competing firms which are identical. One firm decides to out-compete its competitor, which it does by lowering the price of its product. Although it makes less profit per unit sold, it *overall* makes *more* profit on volume of sales. Capitalist firms seek to maximize the *mass* of profit, not the *rate* of profit of any individual product, so this is a rational act. This also explains the phenomenon of the *loss leader.*

"In any case, the other firm also wishes to out-compete its competitor. It lowers its prices *further* than the first firm, thus earning *even less profit* per unit sold, but *more* profit overall through volume of sales. This continues until the price of one unit of the product is exactly equal to its marginal cost of production—that is, it is equal to the marginal wage paid to all laborers in its production chain for the production of that unit, plus profits. In bourgeois economics, this is called *perfect competition*—and now no profit is being made at all! What a paradox, that lowering the rate of profit to make more profits leads to no profit whatsoever!"

He continued. "How, then, is a firm to continue to make a profit? There are two and only two ways, other than just having the government subsidize them directly, which hardly a free market makes. The first way is that a firm invests in labor-saving technologies. Productivity improvements *increase* the quantity of goods which can be made for the *same* input of labor—or, of course, decreases the quantity of labor necessary to make a given quantity of goods—which means that the price of the product can be lowered further before reaching perfect competition.

"The other way is by reducing the cost for a given level of production. The capitalist could introduce wage cuts, or fire some workers and give their workload to other workers. They could increase the length of the working-day in various nefarious ways, such as by demanding that workers do work on their off-hours, or by lobbying the government for raising the maximum work-hours, or the age of retirement, or any of a number of options.

"Alternately, they could move production to an area of lower labor costs, thus exporting jobs and forcing local workers to compete for wages against workers in entirely different parts of the world. This means that as production moves to less-productive countries so that the capitalist can pay the workers less, the rate of profit increases again. It opposes the tendency of the rate of profit to fall. But, of course, we are still assuming competition, so the cycle will just happen again. What this means is that profits keep falling, and investment in productive technologies slows down. Furthermore, even as productivity rises in industry, workers are ejected into distributive service work, which has a downward pressure on wages in *that* area, and so reduces the incentive to invest in productive machinery and techniques! It is a widespread phenomenon of *stagnation*, which is *produced by* increases in productivity! So much for capitalism freeing us all from drudgery, hmm?

"In Marxist terms, the constant cycle of competition, innovation, and stagnation is called the *tendency of the rate of profit to fall*. This tendency eventually produces economic sectors which have a very low return on investment. When this happens to a sufficiently large segment of the economy—either through this process or the collapse of a financial bubble or a natural disaster or widespread disease or any number of possible phenomena—rational investors will remove their money entirely from the market, to minimize losses.

"However, it gets even worse. Remember that workers are selling their labor for a wage. It is investment in the economy which purchases that labor, such as it does. Without investment, workers cannot purchase goods for their personal use. Without consumption, firms cannot generate revenue. Even if a firm is only indirectly involved in the production process, falling real demand will impact *them* as well. Moving production to another country is a rational act, here, but not a systemically viable one. It assumes that other firms will keep paying high wages so that *those* workers can buy the first firm's products, but those firms are themselves seeking inexpensive labor to increase their *own* profits!

"As the cycle of profit loss continues, and failing industries begin to destabilize the market, investors will be afraid to invest. As with profit-maximizing, where each firm looks out for its own needs and in

so doing erodes away profit, each capitalist investor would be waiting for the others to invest *first*, and therefore take the risk that their investment will be insufficient. So investment does not happen, at least not if investors are behaving rationally. This event is called a *recession*. As you can see, it is an inevitable part of capitalism. It is, in effect, a punishment for being *too productive*, because the more productivity increases, the lower the rate of profit in a competitive industry, and the less and less profit that will be made. It may go up temporarily, but it will inevitably come right back down again.

"In order to *secure* profits, firms will require a *monopoly position*. This could be done by colluding with their competitors to limit access to their particular product to certain areas, as was done with Internet Service Providers in your day. Firms might also merge with their competition, or seek exclusive government contracts, or take a temporary loss in order to steal workers or undercut prices. Once a monopoly position is established, there is no further incentive to innovate, or lower prices. We have exited the bounds of Marx's initial assumptions, and entered a form of capitalism which even common rhetoric in your day understood was *not good*.

"So all of this is to say that even *the best possible capitalism* is always trending towards *stagnation* through systemic pressures against industrialization and the creation of productive machinery and capital accumulation, and towards *recession* through the tendency of the rate of profit to fall through competition and the inability of insufficiently-paid workers to consume goods. Either a firm establishes a monopoly position, in which case the economic incentive for a firm to innovate dries up, or it remains competitive and the economy eventually destroys itself. All the while, there is produced a vast abundance of goods which is allowed to rot—or is actively destroyed—either because nobody can afford to purchase those goods or in order to keep prices artificially high. This is quite contrary to claims in your time as to the abundance, progress, and stability of the capitalist system, isn't it, Max?"

"It certainly is," I said. "They didn't teach us anything like this in civics classes."

"No, they wouldn't have," said M'baga. "But you cannot be too upset with them, I hope. They did not know. They themselves were not

taught Marx, not even the economists of your day. It isn't exactly intuitive, although anyone trained in simple systems theory will see these trends emerge as plain as day…if they have the thought and wherewithal to apply those techniques properly.

"In short, Max, capitalism is fundamentally incapable in the long term of providing ease, stability, efficient use of labor, or technological progress—and this is to say nothing of the effects of infinite growth on the environment! Regulations meant to ensure good things would come out of capitalism were undermined by the capitulation of politicians to profit-maximizing capitalists, through the need for candidates for office to raise funds for re-election, or for the demand of a market-based system to fund social programs through taxation—no matter that the social programs themselves are ultimately just compensation for the under-payment of the workers by the capitalists in the first place! Politically, the candidates themselves were often wealthy, simply because those were the only people with the time to run for office. Even if the election funding problem were solved, or if it were shown to be irrelevant, it is only the wealthy who can pay for think-tanks, lobbyists, and advertisements for their views over others'. Or even, as the case often was, to pay for schools, which often desperately needed funds as state funding for education was cut along with taxes on the rich. Why else do you imagine Marx was not discussed in most economics classrooms? Even if they believed his work to be laughable, one would imagine economists should be equipped with valid counter-arguments, yes?"

"I suppose you're right," I said. "My whole life I was taught that the bad capitalists were the exception, that it wasn't greed, but merely fair compensation for the capitalists' supposed genius, or their penchant for risk. But they simply…didn't do anything at all, did they? Not in their social roles as capitalists. They may *happen* to have been good administrators or people of particular intellect, but that meant nothing at all when their wealth was generated by the efforts of others."

M'baga nodded. "This is all, of course, regardless of the morality of the individual capitalists. Under the conditions of the market environment, these outcomes were inevitable. The government may step in from time to time to invest in research or buy out a failing company,

but the system itself remains unchanged in any meaningful sense. The problems I have described, even if supposedly solved, would simply re-appear if the proper fundamental elements of the system were not addressed. Even implementing the so-called *safety net* may raise the bar for those commodities which cannot otherwise be acquired, but it doesn't solve any of the fundamental contradictions and inequities of a system which allows those who do nothing to command the labors of those who do all of the work, and then to be paid handsomely for the privilege.

"And a political system which attempted to ameliorate this system's worst excesses even slightly would be undermined by lobbying and other political instruments of the capitalist class. Any capitalist system that, somehow, managed to avoid this situation would simply have been voted away by the people, so such a truly democratic system was, itself, antithetical to capitalism! Damned if it did and damned if it didn't. One of many reasons why the collapse of a capitalist system is inevitable."

M'baga took a deep breath and blew it out again, smiling. "I think this is a good time to ask if you have any questions."

I shook my head. "It seems quite straightforward. The fundamental elements of the capitalist system work together to ensure that innovation stagnates, abundance rots, and stability is made unstable. This is inevitable, and the only option a capitalist state had was to spend public money cleaning up the messes of that system. What the people wanted from their lives, society, and politics was irrelevant. Welfare only served the market, and our grandest visions were hijacked by capitalist greed."

M'baga beamed at me, and so did Jak.

I fidgeted a little under their gaze. I was a machine shop worker, but that did not make me stupid. Many was an engineer who designed something that could not, in practice, be made. Understanding the complex interplay of goal, design, and machine was my job as part of the productive process. Furthermore, I had grown up with dreams of my own, and watching the absurdly-wealthy spend my tax dollars to own something that had once been everyone's was a weight on my soul I had not yet shed. It was, in fact, only now, when I understood why the system I had been trapped within had failed me, that I had the

means to comprehend the black spot on my being that I had not really understood was there.

M'baga continued his lecture. "I have explained how the old system of capitalism failed to provide for us the fulfillment of our most sacred social and political values and goals. Now I will explain how the *Novacom* works, at least *structurally.* There are details of labor and distribution which are better explained by my colleagues at the local manufax.

"The Novacom operates according to a set of interdependent institutions, systems, and frameworks. It has been carefully designed so that, to the greatest extent we are able, any shortcoming of a particular institution is overcome by a strength from another institution. In this way, it is not possible to have implemented only *some* of the changes we made to the previously existing system, as to do so would be to expose the system to fundamental weaknesses. You might have been familiar with the concept of a separation of powers, and of course this still exists. But what are the powers of government, what constitutes that government, and to what degree have those powers been further separated…these are the important questions we grappled with when writing the Novacom Charter and communicating its underlying principles.

"But first, I must describe the guiding principles of the system that now exists, and only then can someone explain the institutions that arose out of those principles. Why am I not going to explain the structure of the economy, when I just spent all this time explaining the failures of capitalism? Because I want you to understand the very fundamental rules which underlie our non-capitalist system. Capitalism was and is a parasite on *any* system of government. In contrast, the system I am going to describe to you *implies* all of the things capitalism *promises*. Indeed, it *demands* them, because if it does not have them, it cannot function properly.

"But simply declaring yourself 'non-capitalist' is insufficient, as history has demonstrated in Soviet Russia and elsewhere. You must have the correct understanding of how a complex organization such as a country must be run, and the fundamental elements it requires in order to run in that way.

"The first and most important of these elements is *freedom*."

I blinked in surprise. "I must admit, that is certainly not what I expected you to say."

M'baga grinned at me, a glint in his eye. "What, you expected something like 'obedience'?"

I shrugged. "I suppose I don't know exactly what I expected. 'Freedom' was sort of a by-word for the…shall I say, *entrenched interests* of my time. It usually meant freedom for anybody but the poor."

"That will bring no objection from *me*, Miss Kustaja," said M'baga with a faux-formal flourish. "But nothing less than *maximal freedom* lies at the core of the Novacom philosophy, and we can prove it with *math!*

"The first thing to know about freedom is that there are two kinds of it. The first is *negative freedom*. This is freedom from restriction. You invoke a *negative* freedom when you do something which you are *allowed* to do, or at least, which nobody else is *allowed* to prevent you from doing.

"The second kind of freedom is *positive freedom*. You invoke a positive freedom when you do something which you are *enabled* to do. When you drive on a highway, you are *enabled* to travel at high speed on a smooth surface. When you play baseball, you are *enabled* to do so by the actions of everyone else on your team.

"Now, of course, these things are related to one another. In order to invoke a positive freedom, you must *give up* a *negative* freedom. So, if you wish to play on a baseball team, you must follow the rules of the sport. You may drive at high speed, but *only* on a highway. You have *given up* the freedom to do as you wish, and have become *restricted* by the rules.

"But, and this is *extremely* important, *that ratio need not be one-to-one*. That is, it is entirely possible that by agreeing to give up *some* freedoms, you are in fact enabled to invoke *many more freedoms than you give up*.

"Now obviously we consider some freedoms to be almost inviolable, but as they say, context is king. You have the right to be free from harm at the hand of another person…unless they need to give you cardiopulmonary resuscitation, which may break your rib cage. In that context, your right to be free from injury is superseded by someone else's right to be free from punishment for attempting to help you.

What is *consistent* is that your *viability as a system* is preserved, or even *increased*. After all, if this person did not act, you would die. And a broken rib cage, while painful without modern anesthetic, is generally considered preferable to death."

"I'm sure it's as intuitive as I imagine it to be," I said, "but what do you mean by my *viability as a system?*"

M'baga beamed again. "An excellent question. The Novacom uses as its guiding organizational framework something called the *viable system model of managerial cybernetics*, by a man named Stafford Beer. *Cybernetics* refers to *control of a system*. For our purposes, a system is *viable* if it is capable of maintaining stability in a particular environment—and in particular, *as the environment changes*. You, for example, are *far* more viable as an independent system today than you were a hundred years ago, because with your enhancements you can survive temperatures, atmospheric conditions, and physical stresses far beyond what once passed for human baseline."

"How does this connect to positive and negative freedom?" I asked.

"In cybernetics terms, a system can be described in terms of its *variety.* Variety is simply the number of *possible* states that a system can, or at least is allowed to, adopt. This is an extremely important concept to understand, because it underlies all of organization. When you speak of *freedom*, you are speaking of *variety*—the more freedom you have, the greater the number of possible states you, the system known as a human being, can adopt.

"The logical extension, therefore, of *pure negative freedom* is that every person is placed alone on their own island and left to fend for themselves. Only the laws of physics constrain you then—there is no society to get in your way. But that would be a very fragile existence indeed. Obviously, in collaborating, we *give up* some of that pure negative freedom in exchange for the benefits of working together. Those benefits are our *positive freedoms*. In cybernetics terms, giving up negative freedom is a *variety attenuator,* because we *reduce* the number of possible states of a system—in this case, a human being, or a group of them. But we *also* engage in *variety amplification*, whereby we *increase* the number of possible states of a system. This can happen *at the same time and in the same context*.

"As an example, take a plot of land which we want to use to grow food. Long ago all human beings were hunter-gatherers. This meant that our ability to gather food and to have shelter was dependent on whatever *happened* to exist in the world around us. Consequently, we were unable to stay in any one place for very long, because we would consume all of the food and fuel around us. The limitations on food limited the size of our communities.

"But with agriculture, we *attenuated* the variety of the land when we tilled the fields, planted seeds with proper spacing, erected fences and greenhouses to keep out wildlife and regulate temperature, used various techniques to make certain that the soil had the correct nutrients, and dug irrigation canals to ensure a steady supply of water. We also *amplified* our own variety by inventing tools, by doing things like building machines so that a single driver could harvest an entire field by themselves in a short period of time. Nowadays we even have machines which automatically prune weeds, check soil chemistry, and trim plants for better growth.

"And of course, those individuals operating the community's agricultural system are required to plant in accordance with the needs of the people, not whatever they happen to prefer, or what would give them some kind of personal power over others. Neither are they allowed to hoard food production for themselves, to be doled out in exchange for favors. In this way, the systems that *run* the system—that is, the people themselves—have their variety attenuated *in that context*. So, when we talk about increasing freedom and managing variety as being the same thing, and about managing variety and improving viability as being the same thing, this means that when we increase our freedom, we improve our viability…so long as we have a good definition of what it means to be free.

"I hope it is now clear that whether or not a person can or should have their freedoms restricted or amplified is not, itself, in question. Having restrictions *per se* is absolutely necessary to the operation of a viable system, and indeed of *all* viable systems separately or together. All we have room to discuss, then, is when, where, and by how much those restrictions and amplifications are to be implemented, and who it is that gets to decide those things. Our freedoms are improved by variety engineering, and variety engineering is necessary to improve sys-

temic viability. This gives us the fundamental principles necessary to operate a large, complex sociotechnical system, such as a modern country. Only then can we start talking about which economic structures and processes best embody those principles. Understand?"

I said that I did. "In my time every schoolchild was taught the notion of the *social contract*. We gave up a little freedom for a lot of benefit. Although, I suppose, we actually gave up some negative freedoms for a lot more positive freedoms...ideally."

"A trade-off between freedoms—well said!" said M'baga. "So, then, how *does* the Novacom decide when and where and by how much restrictions on behavior are to be done? The answer lies in a deeper investigation of the viable system model.

"The viable system model has five sub-systems, which together constitute a model of *any* viable system. A viable system both contains and is contained within a viable system, and one viable system is directly transformable onto any other viable system. For example, if your family unit is to be a viable system, then its members must be viable systems, and the communities in which those members operate must also be viable systems, and the transportation systems that connect those communities must also be viable systems, so on and so forth.

"I'm sure you're familiar with the household which is stressed by a poor work or educational environment for its members, or a poor economic environment, or any number of possible stressors. Take this up a level, and one's family unit is a sub-unit of the community. Up another level, and a community might be a neighborhood in a ward, which is a section of a city, which exists in a region, in a state, in a country, on a continent, on a planet, in a planetary system, all the way up. Likewise, families have members, which have organs, which have internal sections, which are made of cells, which have organelles, which themselves have structures. It goes all the way up and all the way down as well. This is known as *recursion*.

"Because of recursion, we cannot discuss all of the individual pieces of an entire system all at once, the same way you can't discuss the individual pieces of a *car* all at once except by reference to its *general behavior as a system*. To discuss things in any real detail, we have to define a *unit*, with the understanding that this unit contains identical

units within it, and is itself contained within identical units. Identical, that is, in terms of their fundamental organizational relationships. Each level of recursion may have a very different actual *form*. Remember also that these systems are *roles* that people play, and a single person or institution may have multiple roles in different systems, and a single role may have very many actual groups of people which act in that function.

"What do I mean by systems and roles? Consider a particular brain-teaser commonly used to illustrate a contradiction at the heart of naive set theory: a barber is a man who shaves every man who does not shave himself. Who shaves the barber? A barber cannot shave himself by definition, and if he does not shave himself then how is he shaved? The answer is obvious: sometimes he is a barber, and sometimes he is not. The initial problem is said to be *undecidable*, but cybernetics allows us to approach the same problem from multiple angles. It gives us a language by which we can describe multiple, complex, intersecting systems—a meta-language of systems. So where do we begin in this meta-language?

"The initial unit of analysis is called *System One*. It consists of an environment which is operated upon, a set of processes which operate on that environment, and a management structure which coordinates and monitors those processes. At the most basic level, this is your factory line, or your plot of farmland, or your family. To a city, its wards may be Systems One, and to the wards, its neighborhoods may be Systems One—all the way down and all the way up.

"We then have System Two, which manages oscillations between Systems One. It might be a scheduling system for a university, to prevent multiple classes from attempting to use the same classroom at the same time. It could be a production management system in a factory or foundry, to prevent excess inventory from piling up at a bottleneck. It might also be a newsletter which keeps everyone in the neighborhood informed of important goings-on, or an information system which alerts travelers to potential traffic and allows them to choose alternate transport, or a family meeting once a week, or a church bulletin. If it coordinates different Systems One to prevent conflict or oscillation, it’s probably a System Two.

"We have System Three, which is what you might think of as ‘the management’. It communicates with lower levels of recursion in two ways: the Command Channel and the Audit Channel. The Command Channel issues orders to *management units*—not processes themselves—in lower levels of recursion. The Audit Channel bypasses the management units and gathers information directly from the processes those units manage. When you hear people talk of measuring metrics to detect incipient instabilities in the cybernetic system, the Audit Channel is typically where it will happen. System Three is also where your dynamic planning system is. These are all things that you will learn about should you tour the manufax down by the river. Generally, we say that System Three is concerned with the present, managing lower levels of recursion in the day-to-day.

"System Four is concerned with looking into the future, and contains the cybernetic model of the organization itself. When new changes and policies are proposed and tested before implementation, this is where that happens. If there is some potential major change on the horizon, such as a new piece of legislation or a possible emergency, System Four is there to examine the issue and propose solutions ahead of time.

"System Five is our last system, and it serves as the sort of ‘heart and soul’ of the organization. This is where the guiding principles of the organization are maintained and instituted. In your time, Max, the United States President was a fairly powerless individual, at least in the Constitution-as-written. But what the President could *always* do is make a big speech talking about how great and wonderful the country was, and what it meant to be an American. That is a System Five role. It is also a System Five role to negotiate between Systems Four and Three, such as by making a big speech about some important issue that is being neglected, or by using veto powers.

"This is necessary, as due to the fact that an organization is usually quite complex at any given level of recursion, System Three tends to dominate. This is because, while the organization may be *concerned* with the future in some sense, it *operates* in the day-to-day. System Four tends to be ignored. It is therefore System Five’s job to manage between them—or, in cybernetic parlance, to *absorb their residual variety*, to make sure that the management metasystem of Three, Four,

and Five manages its variety such that it is capable of effectively managing the organization.

"And, to make matters better, all viable systems, as I said, contain and are embedded in viable systems. When I mentioned the processes of a System One, those are the various Systems One which are embedded in *that* System One, and the management system of that higher System One are its own Systems Three, Four, and Five, and the embedded Systems One of that higher System One are prevented from oscillating by its own System Two! The exact same structure is embedded in, and contains, itself! This is what I mean by *levels of recursion.* Make sense so far?"

"It's a lot to take in," I admitted.

"It will make more sense the more you experience the Novacom. This is only your first day, after all. The entire system works the same way everywhere, so you'll have plenty of examples to go on. For now, I'll just cover all the basics, and if you have any questions you can ask Jak, hm?"

I agreed that this sounded like a lovely idea indeed.

M'baga continued. "I have spoken very broadly about family units or cities, but understand that any viable system operates in precisely the same fashion. As I said, cybernetics gives different systems a common language, as any viable system can be mapped onto the same framework, and thereby onto any other viable system, even if the actual specific *forms* of those systems vary wildly.

"There is one more thing to understand about the viable system model, and appropriately it brings us back around to the fundamentals of cybernetics. It is called *Ashby's Law of Requisite Variety.* It states simply that in order to manage a system, the thing doing the managing must have *at least as much variety as the system it is managing*. If you wished to manage a light with three colors, such as a stoplight on a road, you must have a stoplight management system which can conceive of at least *four* states—red, yellow, green, and *off*. Plus, you might want any of the lights to blink or stay lit under certain conditions, so that's even more variety that the system has to have.

"This means that the higher up you go in a viable system, the greater variety a management system must have. At a low level, a small team of people may be able to handle all of the functions of a vi-

able system themselves. At the very highest level, the management system must be comprised of information collected from potentially *billions* of people. What is more, every communication channel which moves information back and forth between higher and lower levels of management must be capable of handling *all* of the variety of *all* of the channels below that point in the management structure. So while talking face-to-face may be acceptable in a small team, it is *effectively impossible* on any scale higher than, say, a small neighborhood—if even that.

"This all implies that in order to manage a *dynamic* environment, where the number of important states is not precisely known, that lower levels of recursion must have *as much variety at their disposal as possible* in order to manage potential issues that arise, *before* they become huge problems. If that is *still* not possible, then the higher levels of recursion must be brought into play, in order to deploy *their* variety. Therefore, the Command Channel I mentioned earlier that gives orders to and imposes regulations upon lower levels of recursion must be used *as little as possible*, in order to maximize available variety before any problem gets huge and takes up more and more resources from higher levels of recursion. The Command Channel must only be used to damp incipient instabilities. How do we know that, when the Command Channel is being used, it is being used properly? That is the role of the Novacom's judicial system, which I will leave to a later discussion with those better equipped to answer your questions.

"This all *demands* that government have the ability to act to manage itself and all of society. It *also* demands that a higher level of government *not* act *until* the lower levels of recursion have had the opportunity to correct the instability *first*—because otherwise it is overly attenuating the variety of the lower level of recursion.

"This means that a social system designed *cybernetically* is much more resistant to authoritarianism, if it is designed properly and much attention is paid to the correct operation of its principles. This is because, while a highly strictured organization will operate smoothly *under stable conditions*, it will inevitably *fail* when undergoing instability outside of its ability to deploy variety—variety limited to that deployable by the small number of dictators at the top—which is another way in which capitalism, by concentrating real material power in the

hands of a very few, destabilizes the system. A properly cybernetic system is *fundamentally more free* than any previously existing system *ever could have been*. It is, in fact, always striving towards *maximal freedom*, because the system requires enough freedom to be able to handle unforeseen possibilities, but not so much freedom that it loses stability as a system.

"In short, we have utterly overturned two important concepts that most people assumed were necessary to the operation of a free and prosperous society. The first is *sovereignty.* It is not necessary that any system be *sovereign* in the sense of having no obligation to higher levels of recursion, or even other systems at the same or lower levels of recursion. In the same way that it is ridiculous for an ore mining operation within a firm to be allowed to refuse to deliver ore to the smelting operations that require it, it is ridiculous for so-called *independent states* to be allowed to act at cross-purposes to the needs of the systems in which they are embedded—and just the same way that cancer cells cannot be allowed to operate against the *biological* system which created them.

"This was equally true of private businesses, of course, which only imagined themselves to be independent from the communities in which they were based. Remember that the demand for stability likewise demands a functional metasystem—Systems Three, Four, and Five. Under capitalism, the demands of profit-making forced the metasystem to give up its power to regulate the system for the benefit of the people, because exercising that power would undermine the ability of capital to extract maximum profit in the short term, which was its only goal. Privatization under capitalism, which was a significant means of attempting to resist the tendency of the rate of profit to fall by enclosing yet more of the commons, hollowed out the metasystem, leading directly even to daily instabilities, never mind long-term problems—and, given that the capitalist class absorbed far more command of resources than was necessary for their own survival and flourishing as systems, they acted precisely as cancer cells act, and with the same consequences for their host systems.

"This need to control greater and greater elements of the productive system, against the obvious needs of society, was why even those corporations strongly reliant on public funding spent so much effort

advertising their own so-called superiority over government. To do otherwise was to submit to the obvious, inescapable truth that sovereign actors are unstable ones at any significant speed or scale, whether they be businesses or governments. It is as though cancer waged an advertisement campaign touting the benefits of metastasis and the evils of chemotherapy! I'm sure you can imagine many examples of such selfish ideological propagandizing.

"The second concept that has been overturned is that *freedom is only freedom from interference*. In fact, interference can and does *increase* freedom. We just needed the proper definition of freedom. And, for that matter, of interference."

These were concepts I had never really considered in such depth, and I said as much.

"It's no surprise to hear that," said M'baga, "and certainly it does not reflect poorly on *you*. Freedom, sovereignty—these were words that had implications, not definitions. Politicians and businesspeople could hide behind these formless words without having to own up to their own complicity in the oppression of billions. That is why this lecture even exists, and why we spend so much time in our mandatory education systems teaching these principles. It's important that every generation understand how to maintain and improve the system which they both comprise and must respect.

"The previous explanation produces four important questions about variety management. Those are: when are restrictions and amplifications to be implemented, in what areas, by how much is behavior to be restricted and amplified, and who decides. The answer to the first question is that amplification is to be implemented when a system requires more variety to be viable, and attenuation of lower levels of recursion is to be implemented when a system threatens to deviate from viability. You reprimand your child when he plays with sharp objects, not because you're an authoritarian despot, but because you want to maximize his viability as a system, by keeping him from harm. But you don't restrict him so much that he becomes incapable of independent action, such as being able to cook his own food. So you *teach* him how to use a knife without hurting himself! Variety amplification *and* attenuation.

"The answer to the second question is that amplification and attenuation are to be implemented in those areas which will maximize the viability of the system, and in no other. You don't berate your child for being upset, because a healthy way of expressing emotions is necessary for a person to be maximally viable. You might berate him for throwing toys, however, because that can cause harm or damage—but you still teach him *healthy* ways of expressing his legitimate emotional states...because if you don't, they can't be acted upon in positive ways, and he loses viability as a system. You also don't hand a child the controls to your car, because giving someone a tool which they cannot be trusted to use responsibly threatens the viability of themselves and other people, and therefore, the system as a whole.

"The answer to the third question is that amplification is to be implemented as much as possible, and attenuation to be implemented as little as is necessary, in order that a system should have the requisite variety to be stable even under dynamic conditions. So, while we may limit the variety of individual people or groups in certain contexts, we *do* spend quite a lot of time and effort and resources on amplifying the variety of the *whole system*, such as by building habitats in space. That example is particularly important, as space exploration and construction both enhances systemic viability directly by minimizing the number of single points of failure, and increases systemic stability indirectly by giving our people an important project and a place to get away from the informal strictures of society, *without* threatening its necessary institutions.

"Finally, the answer to the fourth question is that…it depends."

I laughed in surprise, startling myself out of my close attention to M'baga's words. "It depends?"

M'baga smiled. "It depends. In the family unit, the family decides together…but only for those decisions which impact the entire family. The choice of an individual's life's passion is by and large to be decided by that individual, but of course context is important, as always. A city decides for the city…unless its problems stem from or cause variations *outside* of its jurisdiction.

"Now, as I said, higher levels of recursion need greater and greater variety in their channels in order to properly manage more and more lower levels of recursion, but this is limited by the ability of informa-

tion processing systems, primarily human beings, to, well, process information. It may be possible for a family, a neighborhood, even a ward of a city to discuss in detail every item that crops up. But much beyond that and it becomes very difficult for a system to handle that level of detail. For that, we have something called a *preference census*.

"In your day, Max, you had elected representatives. This was a *massive* variety attenuator. It replaced the information held by an entire community of people with the information held by one person. Sure, if they were doing their jobs properly, they had teams of assistants and experts to process information and keep them informed and educated. But still, this represents a lot of attenuation of variety.

"It is my unhappy duty to inform you that variety attenuation at higher levels of recursion is *still* required. We do this in two ways. The first is the *preference census*, which is simply a human- and computer-readable form which lists a number of programs, efforts, and principles which each citizen in an affected area marks with a score from positive to negative ten, zero inclusive. This allows the metasystem of the relevant level of recursion to develop a model of what people prefer, reject, or are indifferent to, and to what degree. So, for example, if you thought environmental protection was supremely important, you might score that with a positive ten. If you were indifferent to having greater variety in manufacturing, you could mark it zero. And if you believed that building more highways was utterly anathema to a well-functioning transportation system, then you could mark it with a negative ten. This is an attenuator of variety because there will be many opinions held by very small portions of the population which will not be listed on the census form. High survey participation—hence, *census*—provides high-resolution data of the needs of the population in question. The more respondents, the more their individual biases cancel out, and the actual priorities of our lives emerge. Those very few people with very divergent concerns will be mere statistical blips, and while they are usually allowed to address their personal concerns on their own recognizance, we need not prioritize such things at a community level.

"The census provides a general direction for a particular level of recursion, up to and including the entire Novacom out in space. The high number of data points ought to produce a picture of what is necessary in our society which is greater than that producible by even the

most intelligent single person—the wisdom of crowds, the variety of more than just a dictator or oligarchy or even a parliament. But the general preference censuses are only given every so often, usually once per year. How do we figure out the little details in the day-to-day? We cannot manage the variety of an entire population conversing in detailed meetings for every little thing—nothing would ever get done! This is where the *sortition assembly* comes into play, the second way in which we attenuate variety in democracy.

"A *sortition assembly* is a legislative body appointed by random lottery. It may have only one house in the case of regions with approximately equal population, or it may have two houses, providing both proportional and equal representation, to account for significant variations in population. This keeps us from having to redraw the American States every two years. The goal of a sortition assembly is to have a *statistically representative sample* of the region in question—representative by statistical significance, not by individual character or arbitrary demographic. The sortition assembly therefore, in addition to approving each year's preference census, attenuates variety simply because not everyone in a region will get to serve on that body at the same time. But, as I'm sure you can see, the attenuation of variety is *much* less than under representative democracy, and there is one more thing which ensures a high quantity of the public's wants and needs are injected into the system, which is the fact that any sortition assembly serves a two-year term.

"The first year a sortition body meets, it is empowered to create laws, provide information directly to experts in the merit-hired bureaucracy for the creation and implementation of the general preference census, to conduct impeachments with the assistance and advice of the judiciary, and to approve judicial appointees and what other few positions are still handled by appointment. They are restricted and empowered in their ability to do these things by the Novacom Charter, relevant laws, the advice and approval of the judiciary system, and the parliamentary rules under which the assembly operates.

"The second year, the same people are obliged to return to service, but this time they are not lawmakers. Indeed, they must *live under* the laws they had previously implemented, and of course they receive no special benefits package for having served." I raised an eyebrow at *of*

*course* and M'baga shared a grinning glance with Jak. "I will not explain *that* now, as it would be better explained by a tour of the manufax.

"No, the second year of service is spent in parliamentary rules-making. Whatever problems and frustrations those people encountered during their legislative sessions can be redressed here…but now those same individuals will hopefully be aware that they are not making *their own* rules. They are making rules that constrain those who would pass legislation *over them,* but only in a narrow parliamentary sense—this, too, is limited by the Charter, to prevent any sortition group from seizing more permanent political power. Rules of parliament, like all other rules and laws, must be approved by the Executive system and the Judiciary system, and are subject to the same conditions and review processes that underlie all other rule systems in the Novacom. You'll learn more about *that* if you visit the courthouse downtown.

"So constrained, this further separation of powers significantly reduces conflicts of interest, whereby the lawmakers make rules for themselves—a true *privilege*, or *private law.* After this second year of service, members are prevented from serving for at least two more years, depending on the population of the area in question. As it is a lottery, it is not possible to campaign for these important positions, and as each part of the parliamentary process is both separated and separately regulated it is not possible to enshrine oneself as a *career politician—"* M'baga sneered at the phrase. "—or worse. In fact, what few elections still occur are for positions of high influence but little actual power, and those elections are heavily regulated. The old American ideal of *separation of powers* is still alive and well in the Novacom, Max. We just went a little deeper into the problem, that's all.

"I mentioned a moment ago that the two-year term improves the incorporation of the public's preferences into the political process. This is because in addition to minimizing conflicts of interest, the term limitations mean that there is a high degree of *churn* between the legislatures and the public. When you tour the manufax, you will learn how resource distribution is planned, but suffice to say that the legislature has much less influence over the budget than it once did, although it does have some. We have carefully constructed our system, separated the powers of action and oversight, such that it is not possible for the

government to in any way abdicate its responsibilities, or for any portion of the government to grant its powers to any other portion of the government, or for *any* participant in government, sortition body or otherwise, to amass personal political power.

"Politics has become a process of collecting information and coming to conclusions about that information with experts. It is as transparent as it is currently possible to make it, and it is extremely difficult for an elite to form which rules over everyone else. The closest we have to such a thing is the set of experts which implement the plans, preferences, and laws, and *that* is a system so thoroughly bureaucratized, by which deviation from public obligation is so heavily regulated as to be punishable by imprisonment, that any such corruption is ferreted out and dispensed with very quickly indeed.

"How is this possible? Briefly, it is because bribery is impossible under our system of money, our systems of production and simulation are so capable as to make most any material desire easily attainable, and as I have said here power cannot be wielded unilaterally, either directly through the political system or indirectly through a system of private property and money. Is it impossible that corruption should occur? No. But there is nothing to gain. If a person is unhappy in their job, they can simply quit. Their material status will not be diminished, and cannot be expanded upon over others except by limited reward for great merit. If they wish to have power, they can have it only through service to the community, and the more power they might wield, the less widely it can be wielded, and with greater oversight and transparency. A power-hungry person would have greater authority running a neighborhood social club than a national government.

"In short, ours is a system with rules and no rulers. Put another way, we all rule together. We all decide, and what we decide is obliged to be done. You might call it a genuine dictatorship of the proletariat, although of course there is no class distinction in the Novacom.

"I said that I would explain how the system works, and so I have explained the principles upon which our system is predicated. The implications of these fundamental rules of proper systemic design are manyfold, but these few highlights should suffice to make my point. Unlike capitalism, the fundamental rules of which trended towards deprivation, instability, and inequality, the cybernetic system in operation

in the Novacom trends towards more freedom, consistent stability, and social, political, and material equity. It is inevitable. We have designed it that way."

M'baga smiled at the awed look on my face. "Any questions, Miss Kustaja?"

"I suppose…what happened? How did we get from there, to here?"

"The story of the transition from a capitalist system to our New Community is not particularly interesting, I'm afraid," said M'baga. "Mostly, it was a *lot* of meetings, coupled with periods of considerable stress as we fended off international capitalist interests after…well, it's probably best I just tell you about the last days of capitalism in the former United States.

"The Novacom began as a community collective, gathering together different small producers for mutual aid during a particularly nasty economic crisis about seventy-five years ago. Despite a brief resurgence of palliative programs and the promise of work for all, competition under these conditions of high wages and a strong labor market had pushed the productive machinery of the world to the point that it was possible largely to automate nearly every basic industry of civilization. Farming came to include machines that would plant and monitor and weed and even harvest food for humans to consume. Recipes for meat-like plant mixtures could satisfy the pickiest palates. Clothing could be spun from recycled plastics and plant fibers. Whole houses could be assembled by automated machine, with humans merely supplying materials and preparing certain tricky areas of land.

"The point is, the presence of advanced technology is not, was not, and has never been the problem, at least not by itself. Neither a cornucopia machine nor a mechanical mind is necessary for the providence of a good life for all, and the reaping of the benefits of that providence. The *problem* was that all of the things which we might use for our own liberation, all of the tools and techniques and properties, were ultimately *owned* by somebody—so although it became almost trivial to solve material problems at any level, private property made it impossible to *do* any of those things, at least not for anyone's benefit except the capitalists'. That is to say, of the set of things which were *possible* to do, the subset of things that were desirable to do was larger than the further subset of things that could make a profit. But, it is only the last

set which was politically viable, because of the constraints of the capitalist socioeconomic system—and due to the tendency of the rate of profit to fall, that set shrank further and further and further as time ground on. Why else would it be necessary to pay people a subsidy to farm, except that the labor-content of agriculture had dropped so far as to make farming insufficiently profitable without it?

"This, as an aside, is why all intellectual and productive property is held in common among all citizens of the Novacom. You retain attribution for your work, but you do not get to control what people *do* with it. There are no artificial restrictions on copying creative works, or modification, or adaptation. There are no patents, no copyrights, no barriers to innovation. There are trademarks, for the sake of truth in identification, but that is all. Nothing that might be useful or important, once submitted to the public, is allowed to be hoarded for personal benefit, lest the same phenomena arise once again.

"In any case, around the time the Novacom-that-would-be was forming, a handful of global crises had repatriated most manufacturing from the global supply chain that had been fashionable around the early twenty-first century. In addition, enhanced human laborers were becoming popular replacements for machinery. Like everything under capitalism, enhancement is expensive, and it keeps workers in debt to the capitalists who fund them. That is because it makes them less likely to strike or organize for collective action—just as high educational debt functioned in your time, Max."

"So how did that Novacom become…all this?" I said. "What happened, if capital was so strong?"

M'baga laid a finger aside his nose. "Tell me, what is the difference between when you owe someone a small debt, as opposed to a large debt?"

"A small debt puts you in their power," I said. "A large debt, representing a high risk to the lender's bottom line, puts them in yours."

"That is what happened," said M'baga. "In raising the productivity of their enhanced workforce to such heights, they inadvertently made them powerful. They could not be so easily replaced, neither by the unenhanced labor force, nor by machinery that could not do what they could do. It became the case that this allowed anti-capitalist movements like Novacom to magnify the effectiveness of their actions. The

few strikes that *did* occur were very effective…until they were beaten down. In response to the power of such efforts, the capitalists began pushing for government-subsidized enhancements in order to dilute the labor pool, and because government under capitalism is only capable of attempting to handle the worst failures of the system instead of directing the system to the benefit of the people as is done today, the government acquiesced.

"Somewhat luckily, before the capitalist system agreed to stomach the cost of enhancement, recession had already forced many enhanced people out of work. They came then to the attention of the various local Novacom chapters, which were at first no more than a tightly-connected network of community assistance programs, promising a 'New Community Way'. By the time the capitalist pushback began, the Novacom had become a networked, cooperative federation, individual producers connected across the country. Enhanced workers were building whole apartment blocks with materials taken from local scrapyards, city recycling centers, any place where the power of local community could however little overcome the power of the capitalists.

"Eventually, the power of the Novacom was too much to ignore, or even simply fight street battles against. The very surveillance systems the capitalist government was using to monitor the New Community were being used to monitor the movement of pro-capitalist forces. The Novacom was not perfect, and they suffered many unfortunate losses, but they had the edge—the ability to act effectively, for purpose over profit.

"In the end, the edge is what counted. Novacom took political power, first in the cities and counties, then in the states. Thirty-eight states elected supermajority Novacom legislatures, governors, and federal representatives. They filled the courts almost immediately. They imposed tolls and fees for using state highways and resources, which had to compete with the new Novacom systems that were free. Even the smaller, savvier capitalist firms began to contract with Novacom for services and protection just to get the temporary edge over their competitors. Of course, that meant signing property transfer agreements, which swelled the Novacom knowledge databases to highly competitive levels. If that seems unlikely, well, consider that capitalists so loved money that they readily agreed to such measures with poten-

tially belligerent governments in other countries. Doing so within a single country was almost too easy, by comparison. Some even joined the Novacom, at first just to get access to its research and technologies, but eventually becoming full-fledged integrated cybernetic systems in their own right. The ranks and resources of the Novacom movement grew and grew and grew until its own momentum made victory, if not quite inevitable, then at least much more difficult to prevent."

M'baga was really into his retelling, now, his face animated and his eyes bright. "Thirty-eight separate economies, networked together by a single overarching organization and regulated by significantly altered political systems that made capitulation to the capitalist class impossible. Whenever the federal government, at the behest of the capitalists and against democracy, attempted to intervene on interstate commerce grounds, the Novacom sealed off all the states, dropping all interstate activity. But the states were, and are, large, and rich with resources, and were no longer constrained by such things as *money.* They could act on their own, coordinated by information, by people walking right up to state borders if need be. It became impossible to undermine something that went all the way down to the very roots of the Earth, and of humanity. Every means of enacting change peacefully was taken, and the polling supported the Novacom more and more even as the fist tightened. Unfortunately, peace was not our decision to make. When the democratic system threatened the profits of capitalism, that system became a threat to the capitalists, and had to be dealt with.

"Capitalism removed its mask of patriotism, shook off the cloak of concern for humanity and for freedom, and began to attack in earnest. The capitalists of the mid-twenty-first century had developed their own orbital palaces, great spinning wheels and cylinders built by enhanced laborers condemned to live in the pits of those places while the rich lay in the grass and sun. They thought they were untouchable, so they did what they could to destroy the Novacom from above. They couldn't just destroy the surface, as that would destroy their economic base and the means of production. Even as industry and agriculture tried to find a foothold in space, their palaces were dependent on food and supplies from Earth, not to mention the money they so coveted, held in terrestrial banks.

"When it was discovered that these wealthy people, owing allegiance to none but their own stock portfolios, were funding terrorism both domestic and foreign, the Novacom swept the federal elections. Come that January, with the National Guards of thirty-eight states protecting the newly-elected Senators and Congresspersons and the new President and Vice-President, the Novacom immediately passed the New Community Charter.

"The Charter is a set of over a dozen amendments to the Constitution. It was immediately ratified by the Novacom states, simultaneously crippling political partisanship and revolutionizing the federalist system. On the executive side, the first thing the new Novacom President did was to order a nuclear strike against the capitalists' orbiting palaces. It would take several hours for the high-speed missiles to reach the stations near Luna, and in that time, the capitalists surrendered. We call it the Final Strike."

"And then what?" I said, rapt.

"We crushed the capitalist class in the United States under the weight of law, then we did the same thing in Canada, and Mexico, and Central America, and all the South American countries, and Japan and Australia and New Zealand, and now we're doing it to the rest of the world, too." M'baga smiled. "At the time, the United States had the most powerful military in the world, more powerful than anyone else's. As it turned out, it was more powerful even than that, and has grown only more so in the years since. Every attempt to stop the expansion of the Novacom has failed. It only goes as slow as it does because the new order of the world cannot be imposed from above. It must enable, must genuinely liberate, the people of the world. They are the ones that must build it, admittedly to our template. And they are, and when they do, the frontier expands a little further."

"Even into space," I said.

"Yes," said M'baga. "We can afford to do so, after all, when we don't believe that money is more real than matter."

I turned that over in my head for a moment. "Did it *have* to be so violent?"

M'baga looked a little morose at the question. "No. But it wasn't up to us. The changes had to be made. The people were suffering, the *planet* was suffering, and the capitalist system couldn't, nevermind

*wouldn't*, do anything to help. Indeed, it was the *cause* of those problems. But the kings resisted democracy, the plantation owners resisted emancipation, and the capitalists resisted liberation. They could have just walked away. They could have just accepted that the people were taking back what had been stolen from them, and lived as ordinary people. Some did, in fact. Some became great leaders of the Novacom in their own right, those who had real skills to share and weren't just *nouveau* nobility. But most were petty, and small, and stupid, and decided that they would rather face the wrath of the people than live merely regular lives." He shook his head. For all his revolutionary grandiloquence, I got the feeling that he was, if not *sad* really, then at least *disappointed*.

I changed the subject. "What of the other anti-capitalist movements?" I asked. "The Novacom was clearly the most successful, but it couldn't have been alone."

He perked up at *that* question. "Novacom, Max, was the only movement that cared about success over its own existence. Our cybernetic structure and strong democratic preference system made it very difficult to be otherwise. We were an automated world-changing machine, dedicated not to a particular strategy of opposition, but to immediate and positive change in the world. Overcoming opposition was only a part of that, not the *raison d'être* of our existence.

"Until the rise of the New Community, there was only feeble protest action for its own sake, and rioting that only reinforced the conditions that the rioters were ostensibly against. These were easily absorbed and directed by the capitalist state, which used them as fodder for clearing out small competitors and directing the political narrative. Holding signs and chanting became an end in and of itself, with the next step being capitulation to the token efforts of a political and economic ruling class that would make no fundamental changes whatsoever, but which allowed for the temporary defusing of political pressure for change.

"And then, of course, people would wonder why the same old thing kept happening again and again, not realizing that it was because nothing had changed that *had* to change, not from protesting and not from mere token efforts at welfare. Some hope was found in the labor unions, but of course the Iron Law of Institutions—whereby people in

power in an organization will prioritize the maintenance of that power over the success of the organization itself—meant that the leaders of those unions had power only insofar as they were able to negotiate conflict with capitalists. They had no material interest in the abolition of capitalism. So the capitalist system kept on imposing more and more on the population, piling on the public debt and reaping private profits from that free money.

"So you can see, Max, that Novacom was not merely the most successful of the anti-capitalist movements, it was, in truth, the only one. All the others were little more than social clubs for political contrarians. They did not exist to accomplish anything, but to socialize! So is it any wonder that even the few meaningful policies they espoused or even victories they accomplished did nothing or worse to correct the system that produced whatever had upset them in the first place? We, on the other hand, operated in the real world, with material and structural improvement our only goal. Most people who claimed to be agitators or organizers were really just people who had a particular political *identity*, which accumulated beliefs according to a kind of social pressure. If you have heard of the Abilene paradox, whereby everyone in a group does something none of them wants to do because each of them believes everyone else is in accord, it is similar to that. People espoused political positions and policy proposals, not because they began with a set of consistent principles and goals and constructed dynamic strategies to implement those goals—that is, policy proposals—but rather because they identified with and belonged to a kind of ‘club’ of like-minded people. It’s possible that, in these clubs, *nobody* actually *agreed* with the proposed policies, but that didn’t matter. Novacom recognized this and designed anti-groupthink systems which made goals explicit, measurable, and decomposable onto individuals. Cybernetics was an important part of that.

"And," he added as I opened my mouth to ask another question, "as much as I assure you I would *love* to talk your ear off about those early days, I am running quite low on time. So I think I will conclude the lecture here, let you two get some lunch. I’m sure Jak can fill you in on anything you need to know."

Jak touched my arm. "It *is* getting on lunchtime, if you wanted to stop by the food court to get something to eat."

I realized that I was indeed quite hungry. "I think that sounds lovely," I said. I thanked M'baga, who shook my hand warmly and told me someone would be in contact about my family.

Soon enough we arrived at the food court, a glassed-in space with tables and chairs. The room was full of people, all talking, but it was pleasantly quiet. I could see the sound emitters in the struts holding up the glass.

Jak led me over to a table and we sat down. Jak put her hands on the table, and I did so as well. I concentrated, and an image appeared in my actual vision—pumped into my occipital lobe, no doubt—of a vast and varied menu. At the very front of the display was a series of politically-themed dishes, given punny names such as "Old Dominion Dumplings" and "River City Ravioli". I chose the dumplings and a cup of iced tea. In the corner of my vision, a number counted down from one-thousand, though it did not go far.

"Ah," I said, and Jak looked up at me, one eyebrow quirked. "My weekly allocation dropped a little," I explained.

"Not on the clinic's resources out here, are we?" said Jak with a smile. She folded her hands in front of her, and I did the same. "That's why we invested so much of our personal and medical resource allocation into consumption, and why we put it near the James, for the water and sunlight. Really helps people come to grips. Tends to get them around the whole 'everything is basically free' phase before they spend all their allotment on toys."

"Speaking of allotment," I said, "I noticed that everywhere I go seems to be immaculately landscaped, even your father's clinic. In my day, that kind of work was done on the cheap by itinerant laborers, but since everyone in the Novacom gets access to resources just for being alive…"

"You're wondering who does the so-called 'dirty work'?" asked Jak.

"Yes," I said. "You've mentioned automated machinery many times, but I haven't seen anything like an automated gardener."

"We don't have fully automated robotics in the way you're thinking," said Jak. "Nearly all of our machines are designed for a particular purpose, although that purpose can be broader than it was in your time. For example, a manufax is typically stocked with a great many addi-

tive manufacturing devices, what people in your time called a three-dimensional printer. Each of these devices is much more sophisticated and precise than they used to be, but they still only do manufacturing. You couldn't take one and have it quarry rock. The same is true of our sewer and trash collection systems, which are monitored and maintained by robots each designed to do a handful of common tasks in their particular environments.

"But for complex work, we still have human labor involved. Maintaining and monitoring the machines, or doing simple repairs that aren't worth removing and replacing an entire pre-fabricated unit, for example. As it turns out, this kind of work is desirable for some people, and we have a lot of volunteers, especially for landscaping and other gardening-type work. Machinery acts as such a force multiplier —an amplifier, you see?—that it becomes possible for a small number of individuals to do the work of maintaining the public, and personal, green spaces for the whole city. Outside the cities, we have National Park Rangers and other officials of the Novacom Rewilding and Natural Maintenance Service, who do the same thing on a much larger scale."

"And if there's some job so unpleasant that you couldn't find anyone to do it? Or at least *enough* people?" I asked.

"Those jobs emerged early on as requiring the most investment in automation," said Jak. "When we began to provide people a comfortable income simply for being alive, we naturally expected that unpleasant jobs or those done in poor conditions would immediately face a shortage of labor, and those jobs which were desirable or inherently pleasant would see a glut of it. This is exactly what happened. We saw this most heavily in the creative arts, but also in teaching, engineering, and medicine. The result was that classroom sizes shrank, patients spent more time with their doctors, and the emerging automation and reconstruction programs got a significant boost in interested workers. But of course automation did not happen overnight, and someone still had to pick up the trash and clean up the sewers, and even though there were people who enjoyed that kind of labor, it had been severely under-automated, because of the state of the labor market before the passing of the Charter. Luckily, there is such a thing as the human ego."

"Luckily?" I asked. "Your father mentioned in his speech that selfishness had been harnessed for the greater good. Is that what you mean?"

"Indeed. It was possible even in your time to convince people to volunteer to fight and die for what they believed in, even if it was a lie spun by corporate interests. It was not nearly so difficult to convince people to collect trash or do waste management, especially once the innovative programs ramped up and began shaping the built environment to make such tasks easier to automate. The Garden Cities helped a lot with that kind of development even before the passing of the New Community Charter, so transitioning wasn't so difficult as it might have been. In the meantime, we had competitions for people to clean up the most trash, or who could volunteer for the most hours of unpleasant labor. Winners got their names in the national media programs, and of course you can't *buy* fame or status anymore. We've known what people *really* care about since Herzberg and Maslow in the mid-twentieth-century.

"People, you see, *cannot* be motivated by something like money, no matter how much they say otherwise, because money is not real. It is *representative* of real things, or at least socially-real things. For example, you can have someone who is motivated to work because they need the products of their work, or of the work of others, or they might want to work because it gives them social status, or power. Money, as you knew it, represented those things in your society, but they do not here. In your society, the acquisition of greater quantities of money was a social goal, but beyond a certain point, not a materially meaningful one. Money is a means of acquiring *things*, so it has diminishing marginal utility like any of the *things* for which it could be exchanged —the more of something you have, the less pleasure or use another one can give you. While we don't have money *per se* in the Novacom, we *do* have material goods, which obey the same rules. Nobody else is going to store or clean or maintain your possessions except *you*, so the more you have, the more time and resources you spend simply storing them, and the less pleasure you get out of them. In the Novacom, people tend to stabilize around a certain level of consumption. This is all to say that money's social function as motivation means very little when you strip away from it its *real* allure, which is power over others.

"As we have said, in our society we employ a universal income scheme. There were those who claimed that a fair and equal society should not imply equal payment. This is a contradiction. First, as you shall learn, we do not pay people in compensation for their labors, we pay them so that they might acquire those specific things which they need for their own particular lives. That is what money, such as it is, is *for*, whatever other social functions it once held. Second, to be against universal income is to be against fairness and equality, or even an egalitarian society *per se*. It is to say that those who engage in certain labors are more deserving, *better*, than those who do other labors. It is to have internalized the idea that intrinsic rewards can *substitute* for material acquisitions, even though our material perspective on existence explicitly states that it is material goods which enable our lives, including labor, to exist at all. It is the same mindset that once suggested that nobody is truly poor because they had something considered fancy, like a portable computer or a refrigerator. Never mind the real power of wealth: being robust against unpleasant surprises, or pursuing a fulfilling life on one's own terms, or freedom *per se*. That is not to say we all have perfectly equal needs, but those needs which might demand a certain unequal allocation of necessary resources—medical needs, for example—are provided for out of a common resource pool, by objective need determined by an impartial professional. This is not the same thing. The demand for unequal allocation of *disposable* income is just a facade, behind which hides the truly-held opinion that one's perceived lessers *deserve less*, all else being equal."

"Well, your father *did* say that we revivals might have a period of *accumulation inertia*. I suppose it isn't surprising, considering our perspective on *stuff*."

"Exactly. It is because revivals are new to this system, and usually have not yet developed out of a *scarcity* mindset. There was a time shortly after the rise to power of the early Novacom where people *would* consume more than they could manage themselves, but once it became clear that nobody was going to do the dirty work of caring for it on your behalf, and once it was obvious that the system which provided these things was here to stay, people quickly grew out of it."

I pondered all of that for a long moment. I was not sure I quite understood how a system could not use money *per se* when I had a points counter sitting in the corner of my vision even then, but I accepted it as just one more thing I would have to work hard to learn about. "You mentioned the Garden Cities," I said. "What are they?"

"During the rise of the early Novacom, once we had become a major political force in so many American states, it was decided that every state would need at least one major base of operations, a place to call our own and to do with what we would. These places became known as Garden Cities, and they were testbeds of Novacom philosophy and technology. I'll take you to one. The nearest one is only a few hours away by train."

"I'd like that," I said, and smiled.

Jak smiled back. "Good."

After lunch, we made our way back to the clinic as we had left it, by monorail. The afternoon was warm and humid, and I was grateful to be back in the air-conditioned confines of the Atamai Clinic.

Jak left me to my own devices for a while, as she needed to make final arrangements with the manufax to add us to the tour the next day, and I wanted to read more about what I had learned at the political center.

I was just getting into the meat of the details of the cybernetic planning system as described by Beer himself when Jak knocked on my door again.

"I took the liberty of adding a few more stops on our grand tour of the systems of the Novacom," she said when I had called on her to enter the room. She touched the screen on the wall and showed me the schedule she had devised. "Now that you know about the cybernetic model, you can look at the small-scale implementation and see how it connects to large-scale social institutions."

"A courthouse?" I said, peering at the display.

"Yes," said Jak. "I thought it would be useful to see how our laws, such as they are, are actually made and enforced. It's quite different from your time."

"And a trip to the local university, I see," I said. "Are universities constructed cybernetically, too?"

"Of course. Being public-facing institutions, they of course are collectively owned, by the whole of the people. Administratively, the local universities belong to our little regional administrative unit, but they're built up into networks of systems, like everything else."

"That's something I'm confused about," I said. "How are these different…call them *industries*. How are they organized in reality? Are all the schools part of one set of viable systems, and all the railroads another?"

"Sort of," said Jak. "It doesn't really work the same way you might be used to, with hierarchies. Instead, everything is embedded in the same gigantic system, like gears in a clock. No gear is 'above' another gear, they all work together in their own particular way. It may be convenient to say that the mainspring is part of this or that train of gears, but if one of them starts warping and thereby preventing the keeping of accurate time, it's still the responsibility of the watchmaker or jeweler to repair it. Likewise, while all of the schools, for example, *are* engaged in providing a particular and universal standard of education, the actual body responsible for managing its instabilities is arranged geographically, because…well, we're here, aren't we?"

"So there are multiple Systems Three for the universities, in each geographical region? I thought the entire system was integrated?"

"It is," said Jak. "It's not quite right to say there are multiple Systems Three for a single level of recursion, as System Three is a cybernetic function, not a person or a group of people *per se*. So the Richmond Node where we are has multiple…call them *sub-committees*, I suppose, although they are not really committees, but cybernetic management centers. These centers each monitor part of the various operations of the Richmond Node, from transportation to education to utility services like power and water. Together, they form the cohesion-maintenance and strategic planning systems of System Three at our level of recursion, along with the city legislature. They have channels that move through the various information systems of System Two, and they have formal and informal connections to Systems Four and Five. Those, in our case, are various forecasting bodies in Four, and the City preference and executive bodies of System Five. This is in addition, of course, to their connections to their counterparts in lower and higher levels of recursion.

"This cybernetic model is maintained going outwards: the city has its various functions as Systems One, all the different cities and counties are Systems One of Virginia, the various former states are Systems One of the American Novacom, the various Terran Novacom are Systems One of the whole planet, and the various interplanetary and orbital Novacom nodes are similarly arranged. And, as you can see with the recursive nature of the cybernetic model, the various management and process-oriented systems all interact with other such systems in a complex way, which is why we emphasize monitoring of metrics so much, and authority to act. It also means that every system is thoroughly democratic all the way from the bottom up, and insofar as it is regulated from the top-down, that too is built from an aggregate of preference models directly coupled to the people themselves. It’s not perfect, but it’s far superior to any previous system."

"So the city has its own preference model?" I asked.

"It’s more like, the preference model that governs the entire Novacom is built up out of, and can be decomposed into, smaller preference models," said Jak. "People fill out their yearly census for multiple levels of recursion at a time, as necessary. They might have very broad statements to score for the highest level of the Novacom-in-space, and they might have very particular statements to score for the city in which they live. The level of adherence to the preference model, the oscillations of the productive system around the optimal plan derived from the preference model and individual consumption habits, even the individual real-time response system from the nightly news broadcasts and information updates, all of these things are measured, their measurements explained, and the results displayed in public. Any person has the right to look into the data that drive the results, and any person with better information has the right to appeal for a correction —at least, to the limit of national security interests. And even those limits are themselves precisely delimited. You can see the power and necessity of the transparent system. Even the merit-hire bureaucracy, which coordinates and regulates the system and makes sure all of its preferences are as aligned as possible, is designed so that the preference system is enacted, and corruption is minimized."

"Sounds like a lot of work," I said. "Making sure all the preference models don’t contradict with one another, making sure resource alloca-

tion is maintained properly as you go down the levels of recursion… and people in *my* time didn't even want to vote once every few years. They really pay attention to this level of detail?"

"Well, besides a strong education in our Novacom values, and the legion of fastidious bureaucrats whose job it is to make sure it all gets done properly, there are two reasons it functions so well. The first is that we engage the expertise of graphic designers, psychological experts, human factors engineers, that sort of thing, in designing the display systems. Anyone can look at the charts and plots and, with a little explanation, immediately grasp the state of the world. They are not *directly* authorized to make decisions, yes, but it pays dividends come the next election cycle when our team managers and high-level System Five officials are elected."

"So you *do* still have elections?"

"Yes, somewhat. We do have a very few elections for our System Five officers, people whose job it is to manage the delicate balance between looking into the future and assigning resources to the present, but their power is quite limited, as they are bound at every level by a preference model derived from the whole of the affected people. Their ability to 'campaign' is restricted by law and the material basis of our society, and of course political parties are a thing of the past, but yes. It functions as both an attenuating mechanism of the whole society *and* a check on the power of the system. Not everyone votes, still, but geographical boundaries for whose preferences affect which area are drawn by uninterested bodies based on transparent data, so political bias is much more difficult to enact. You see how the same principles come out over and over again?"

"I do," I said. "And what was the other thing? That keeps the system working."

"Ah," said Jak. "The other thing is that it just *works*. The people decide what needs to be done, and the experts do it. Although the entire system is as transparent as we can reasonably make it, not everyone looks into it beyond the basics they are taught in school. As such, telling the government to do something, and then having it get done, simply cannot be ignored.

"Plus," she added, "we give awards to people who find the most inaccuracies. Keeps everything honest, lets the bureaucrats know the

people are watching. Citizens will get their name in the daily broadcast, and record-breakers get statues put in public spaces until their record is broken. People will do a lot for a little celebrity."

I thought of the cheap television gimmicks of my time. "I certainly am familiar with *that*."

"As you can see, human nature indeed has not changed one whit."

I agreed that this seemed so. "Ultimately, you have a system which is built upon near-total transparency, with strict limits on when and under what circumstances higher systems can impose upon lower ones, with measurement and incentive structures that naturally produce better and better outcomes?"

"That's right. And we did it by design, although you might be surprised to see just how much progress was made simply by removing barriers to that progress, such as *property* and *wage labor.* And of course, once the concept was out there, that our macro-level systems could be designed for human benefit, well, the natural question was, what about our micro-level systems? Technological breakthroughs like my father's became inevitable after that, which means the macro-level systems become even *less* burdened by the consequences of maintaining our poorly-optimized human bodies."

"That reminds me," I said. "You mentioned something about an *optimal plan?*"

"I did," said Jak, "and as much as I would like to explain it to you, I think the tour guide at the manufax tomorrow will do a much better job. Besides," she added, "it's getting on sunset. I wanted to show you the powersats."

At her revelation of the time—had I spent so long reading? I had not been interested in *politics* in *years*—my stomach growled, and Jak smiled. "And then dinner, perhaps?" she said.

I agreed, slipped my rubber-soled sandals on, and followed Jak out of the clinic, the back way, fronting the riverside. A few other attendant-revival pairs were standing on the grass with us, watching the sky. The sun was long-since setting in a cloudless sky, and the prismatic spray of sunlight coloring the horizon gave way above the treetops to the deepening black-blue of night. And there, strung across the sky like diamonds, brighter than the stars in the sharply-angled twilight, were what could only be the powersats.

That thing in my chest that had gone *twinge* the day before went tight again, and I found myself, very quietly, gasping back my emotions.

"Each one is nearly three kilometers across," said Jak. I had noticed she had a tendency to ramble on about things she found interesting or important, and the powersats were no exception. I also noticed that I liked when she rambled, so I said nothing to interrupt her.

"Their mirrors concentrate sunlight onto photovoltaic cells," she continued happily on, "and then the powersats beam the electricity to Earth in the form of microwaves. Don’t worry," she added, though I had not changed either in expression or silence, "the beams are tuned to be very diffuse. You could fly through one in an airplane and never notice. The energy is collected by mesh grids called *rectennae* that can be laid out anywhere with enough space, so there are oasis cities springing up in deserts where before it would have been basically impossible to provide enough power without long power lines or fuel trucks delivering fossil fuels. Technically, it’s less efficient than ground-based solar power using the same PV cells, but the powersats are in constant sunlight almost all year, so the absolute power generated is much greater, with less need to store it for orbital nighttime. Plus, the mirrors collect more energy than just the area of the PV cells themselves, so you get absolutely more energy up-front, too. Outside of general consumption, that power is also being used to drive the machinery that is re-greening desertified spaces, so they actually have a *negative* environmental cost. You can even grow plants underneath the rectennae, if you were so inclined, so no ground is truly lost. The Novacom has many nature preserves that double as power stations."

"Wow," I said, trying to keep the emotion out of my voice. "The technology of the future is advanced indeed."

Jak sighed. If she had noticed a tremble in my words, she said nothing about it. "Well, some of it is, for certain. The technology necessary to facilitate your revival didn’t exist until a handful of years ago, for example. But cybernetics, computerized central planning systems, even the powersats, they all existed decades before you were even born, at least in theory. They were never used, or where they were, they were used for the benefit of the ownership class, not the people." She took her gaze from the string of sky-diamonds and

looked at *me*, and I could not help but look back, drawn by the intensity of her gaze. "The reason I do this work, Max, is because it makes me so happy to know that I could help even just a few of the people like you, who were born into a chaotic and irrational world, make it to…well, paradise is far too strong. Ours is not a perfect world, that much is sure. But it is…"

"Better," I said, meeting her gaze as best I could. "So much *better.*"

"Yeah," said Jak, and a little of the professional tension went out of her shoulders. She smiled at me, a genuine smile that reached her eyes, and I had to resist the urge to reach out and take her hand in mine. "I suppose you would know, of course. I can only imagine what it was like."

The tension between *us* eased a little, and I glanced back at the sky, thinking. "It seemed to make a sort of sense at the time, I guess. On the other hand, what you and your father and Director M'baga seem to be telling me, this stuff…nobody ever talked about it. Things just *happened*, and justifications were built up after the fact. We all just sort of trusted that *somebody* knew what they were doing, had *some* kind of guideline. But they didn't, did they? They were just making it up as they went along, reflexively following some mythical 'common sense', or some avarice meant to fill in the void in their souls."

"They didn't know," said Jak. "As you said, nobody talked about it, and it was in the interests of the powerful that nobody talked about it. It wasn't out of malice, not usually. They just…didn't know how to think about the problem. Even the so-called experts were embedded in a system that did not permit thinking outside it, not if they wanted to keep their jobs. Scientific thinking was not taught to you as a schoolchild, right?"

I shook my head. "Just…hypothesis, experimentation, that sort of thing."

"But few learned statistics or the design of experiments or rhetoric or logic, and few of those who did developed any kind of intuition about it, and even among those their livelihoods depended on their not using it, not fully."

"I suppose not," I said. "And children learn all that, here?"

"Our school system starts later and ends earlier than yours did, and isn't based on regimented grades, but rather on skill development and

understanding. When we go to the university, they'll describe their educational methods to you."

I turned to her, and I did take her hands then—in both of mine, like a grateful student—and said, "I'll look forward to that."

We shared a smile…right up until my stomach growled again.

Jak laughed. "Right," she said, and we let go of one another's hands, with just a little disappointment on my part. "Dinner."

"Twenty-four-hour service is pretty great," I said as we headed back inside, out of the muggy summer air. "Better than some of the best hotels in my time."

"Robot cooks, Max, I tell you."

# CHAPTER 3

I awoke sweating.

The bed was still plush and cool, but I was positively drenched. The sheets were tangled around my legs. It was still dark outside, said the window across from the door. A quick check of the clock on my bedside table showed it was barely four in the morning.

I got out of bed and set about straightening the bedclothes. I had been dreaming, right? Like the old dreams of the test I had not studied for, dreamed years after graduation, that same sense of having been thrust back into an atavistic panic.

But it had not been algebra or English literature that had awoken me. It was the world of a month ago, my time. My last memories were of the hospital, but before that was just…my life.

I had simply dreamed that I had woken up and nothing had been different after all.

It had not been the first time the new world around me had felt too good to be true. I had rested well the night before, but that had not stopped the whole world from feeling a little sideways. At the time I had chalked it up to the sudden arrival of the future, and I had no reason to believe otherwise so far.

But still.

I watched TV for a while, old shows from my era, to calm my thoughts—maybe one day Jak could show me if my implants were capable of inducing unconsciousness at will—and when I felt my eyelids drooping I rolled over and went back to sleep, letting the television play softly in the background. If it was on TV, I figured, it was not real, and could not therefore hurt me.

After breakfast, Jak and I took the monorail south, down past the city proper and into the Port of Richmond, on the James. There, she told me, the city's manufax was located, nearby the shipping and passenger ports. I plied her with more questions, but she merely smiled and told me to be patient.

I had not held her hand since the night before, but I was terribly aware of it, resting on the monorail bench beside me. Surely my feelings were in chaos, being so new to the wonders of the future. I tried to put it out of my mind, with some success. Some.

The manufax was a gleaming glass-fronted building sitting astride the docks, arcing out over the River James. I caught glimpses of the blue-white gleam of solar panels, and nearby, spinning gently in the river breezes, vertically-oriented windmills. Distantly, I saw the churn of hydroelectric turbines, frothing the water as it flowed down a sluice.

"The manufax can be powered entirely by local sources," said Jak. "Helps maintain the city's material autonomy, in an emergency."

"I thought you weren't going to tell me anything before we got there," I said as the monorail pulled into the station beside the massive building.

"I get a little excited touring the manufax," she said. "Especially watching the faces of the new revivals."

I lifted one eyebrow in her direction, but she merely smiled and led the way down the skybridge and into the building proper, where the air conditioning swathed me like a soft cloak. A man was waiting for us, dressed in simple blue coveralls and a hard hat.

"Just two for the tour today?" said the man in coveralls, reaching out to shake Jak's hand.

"Just two, John," said Jak, smiling warmly.

"That isn't a problem, is it?" I said. "I can wait and come back later, if it is."

"No, no, certainly not. In fact, you'll have the run of the place, I dare say," said the man. "My name is John, by the way, John Allen. I'm the coordinating officer here at the Richmond Manufactory. My job is to make sure that the manufax is operating smoothly. I'm told you've already had the cybernetics lecture from Tom, yes?" He directed this last question at me, and I nodded. "I am part of the building-level System Three, making sure that all of the various operating units of the manufax are moving in concert with one another. My primary responsibility is interfacing with System Two, our scheduling and ordering system, on behalf of the material production lines. But the primary purpose of this tour is to show you how things are actually planned and built here in the Richmond Node, and likewise all across the Novacom. Please, put on this safety equipment, and follow me."

He led us past a wall of hard hats, safety goggles, and ear protectors, and when we had both adorned ourselves properly—no point in abusing the medical system's nigh-miraculous repair abilities when a

few pieces of plastic could easily attenuate variety for it—he led us through a set of double doors and onto a catwalk overlooking the main floor of the manufax. Nearly the entire building was made of glass, with thick partitions dividing areas of unlike machinery. Wide gaps opened in the floor below, showing freight elevators moving huge shipping containers into and out of waiting ships, sleek-hulled and triple-masted in dull aluminum and carbon fiber. Above us, cranes moved back and forth on tracks, moving equipment and other materials between parts of the building. Allen gave us the tour, and as he spoke, we moved along the central catwalk, overlooking the glass-ceilinged compartments. Tubes and pipes and belts snaked in neat rows all along the walls and up to the ceiling, where they disappeared.

"This is the manufax floor," said Allen, and while it was indeed noisy on the plant floor, his voice came through our ear protectors softly, but clear. "We have nearly everything here, from chemical production to home goods to clothing to construction panels. The processing of the system is strictly regulated, so that waste products from one process are used as inputs to another process. When a new product is approved for submission to the General Catalog, part of the submission and approval process involves the detailed planning of manufacture, so that as few new resource lines need to be added as possible. We also produce as much as we can in standardized parts, so that our additive manufacturing systems can better handle the demand."

"How is such a thing possible?" I asked. "The manufacturing chains must be immensely complex."

"I was told you were a machine shop worker in your day?" said Allen, and I nodded. "It’s true that the Novacom has a greater variety of goods than you knew even in your day, but much of that is down to basic customizable patterns. For example, the clothes you are wearing —" I was once again wearing the clinic jumpsuit, with my name and number stitched on the breast. "—were made here. Down there, actually." Allen pointed, and we all looked. He was indicating a massive machine, which was churning out fabric. Various pipes and tubes led from the back, and I followed the color-coded indicators until they disappeared into some or another compartment.

Allen continued. "Clothing is usually rated by material, shape, and thickness. So for a medium-tough jumpsuit, soft, number six size cate-

gory, we spin waste chemicals from other processes into threads, weave them into simple template shapes of the desired thickness—that's done by varying the way the threads are woven, of course—and finally unite those varying shapes into a single garment."

"But it fits perfectly," I said, tugging on my jumpsuit for emphasis. "Surely I can't have been so lucky as to fit your template precisely?"

"Not at all," said Allen, smiling. "In fact, your jumpsuit, and indeed all of your clothing if ordered from the Catalog, is merely *categorized* by size. It helps us more easily manage what kinds and quantities of materials need to flow through the manufax. Once the garment to be produced is entered into the system, the templates are taken in or let out as necessary, and the excess material is either donated to or added from storage, as is appropriate. Each garment is stamped with a digital tracking code, wrapped up, and delivered directly to its recipient. It's all built according to a general pattern with relatively minor customization. Not to mention it's all built to last. For example, we give all clothing a stain-resistant coating, to minimize impact on laundry systems. And the same is true of everything we build here. The better we build it, the easier it is for the rest of the system. So we try very hard to build it very well indeed."

"Even houses?" I said. "You mentioned construction panels."

"A house, indeed any building, depends on its uses. Ideally, you could break any structure down into a series of standard shapes, Bauhaus-style. We process everything here, from wood to steel to concrete. Most people find catalog houses to be more than suitable, but customization is easy, since we employ a variety of standard shapes and materials that can be arranged however you like for a highly personal piece of architecture. If you have very precise requirements, then we can dedicate a significant portion of our surplus throughput to making custom pieces, but of course the cost in points is higher since we can't automate nearly so much of it. The industrial machines then have to be custom-programmed for your specific run, not to mention the machines that clear the land and pour the foundation and assemble and decorate the building itself. Thankfully, there are *plenty* of people willing, even *eager,* to get time in doing things the old-fashioned way, so please don't feel any need to compromise. And because you can always eat and dress from the zero-points section of the Catalog, you'll

never need to decide between the home of your dreams and whether or not to eat."

"What else is made here as opposed to being shipped in from elsewhere?" I asked.

"We generally only ship in material from outside the area if we need raw resources that our recycling system cannot provide, or if there is an abundance of material in one area that can be added to our stores to free up resources somewhere else. Otherwise we try to make everything here in the Richmond Node as best we can, from clothing to medical tools to medications to recreational substances. It helps manage the variety load of the material transportation system. Having to transport things in from elsewhere means you *might* get a little bit of price fluctuation as transportation costs add into the labor content of the product, but it's more likely that any such additional cost would be made up from Basic Distribution."

"Could you explain that points accounting process for us?" said Jak, prompting.

"Certainly," said Allen. "Come this way."

He led us off of the catwalk and into a little room, where there was a large blank wall and a projector mounted on the ceiling. As it was much quieter here, we doffed our hearing protection, and Allen reached out with one hand and gestured. The projector lit up, and the wall behind him bloomed with symbols and shapes as he sketched and spoke.

"Accounting for unlike things in production requires a common substance," said Allen. "You learned about Marx, yes? Let's start with him.

"Contrary to what was once popular belief, Marx did *not* invent the labor theory of value. It was, in fact, rather a popular idea among economists of the time. But where did it come from? In order to understand, we must first begin with something called a *commodity.* This will be a bit of a simplified explanation, but it should suffice to illustrate the point.

"In Marxism, a commodity is just something put into the market for exchange. A shirt, a pair of shoes, a book…if it is both useful to someone and put up for exchange, it is a commodity. Something that is not useful to anyone, and so is not desirable for any reason, cannot be

a commodity even if someone offers it for sale. Likewise, something which might be universally desirable but which is not saleable, or at least not put up for sale, cannot be a commodity. The oxygen in the air you breathe was not commodified in your time, much as they might have liked to commodify it. But many things could be commodified, even in the abstract. Sex is an ancient example of a somewhat intangible commodity, for example.

"When a commodity is examined, Marxism understands it, not as a singular object *per se*, although it is that, but as an object beheld from multiple perspectives. If you are in the market for a new coat, then to you, what is important about the coat is its *use-value*. It has use to you, namely, to keep you warm and dry, or even simply to look attractive while you wear it, or to be given as a gift for the pleasure of a loved one. But to the seller, its use-value is only relevant insofar as it entices one to purchase it. From an economic perspective, all the seller *really* cares about is its *exchange-value*. Exchange-value is simply its value in whatever the item of exchange happens to be.

"Exchange is very important. When I bring my jacket to be exchanged, you could potentially bring any number of objects to exchange for it. My coat might be put against a bushel of apples, for example, or a stack of books. And under Marx's assumptions, all things exchanged in a market do so for equal values, which are expressed in particular quantities as might be specific to that object. So my one jacket might exchange for three bushels of your apples, or half a dozen woolen socks, or a turkey sandwich. But what determines this ratio of jacket-socks-apples-sandwich? For an exchange of equivalent value, it is possible to exchange half-a-dozen socks for three bushels of apples, if that is their rate of exchange. What common substance is maintained at the same quantity *between* these items?

"That substance is *labor.* If a price is, at its heart, a measure of how difficult something is to obtain—that is, how much of *something* must be expended in order to have access to it—then ultimately what constitutes a *real* price is a measure of how much *labor* goes into its acquisition or production.

"Remember how I just said that intangible things can be commodified? Under capitalism, *labor* is one such commodity, and as I'm sure you've heard, the *compulsion* to sell one's labor for a wage in order to

obtain the means of subsistence is the primary marker of the proletarian class. But a deceitful switch occurs, one which is elided by the phenomenon of ‘recompense’ once called a *wage*. The capitalist demands your labor for its use-value in constructing commodities to be sold, but compensates you only for your ability to return to work the next day—your labor-power—if *that*."

"This part I have heard," I said. "Thomas M’baga spoke of wage labor a bit in his own lecture."

"Then I shall not bore you with repeating it," said Allen. "Under capitalism, you are not directly paid the full value of your labor, because some of it goes to the capitalist in the form of profit. In our society, you are still not *directly* paid the full value of your labor, as some of that labor goes to provide services which benefit you either directly or indirectly, but ultimately that value *does* return to you, and you have significant influence over its use by the collective. Your labor, for example, may go into supplementing the consumption of an artist whose works you will never personally observe via a community arts grant, but the positive social effect from that level of freedom undoubtedly benefits you in ways you cannot grasp directly."

"I understand," I said. "So long as the benefit is shared by all, and every effort is made to provide the most pleasant conditions to those who desire a particular mode of work."

"Precisely," said Allen. "So, when a worker is paid for his labor under capitalism, he is paid in the *money commodity*. ‘Money’ is simply that commodity which has been determined by a particular society to stand as the common medium of exchange. It, too, exchanges in proportion to how difficult it is to acquire *for someone within the economy*. When the medium of exchange was *gold*, this was literally connected to its labor content, but fiat currencies are not infinitely obtainable by all who seek it. And, even with gold backing, the issuing of paper money was valuable only relative to the gold commodity. This doesn’t change just because you abandon the gold backing itself.

"And so, when you exchange some of your wage for other commodities which you desire for whatever reason, you are in fact exchanging a portion of your commodified labor, represented in money. Even though the *government* can obtain infinite quantities of money, *you* cannot, even under capitalism. And there are very good reasons

why the government should not print infinite quantities of the money-commodity.

"In the Novacom, however, we do not use money *per se*. If you go to a dispensary or vending machine or catalog and spend some of your points, you are not engaging in *exchange*, because the Novacom is not a market system, and points are *not* money. Your points do not circulate and cannot be hoarded. You are not trading anything with anyone. You have been allotted, each week, a certain quantity of society's resources, calculated in terms of labor-hours, set aside for your personal use, and you use up some of that allotment when you get something from the dispensary. If at the end of each week you have some left over, that becomes an additional buffer against potential shortages, and the next week you lose all the unspent points and obtain a full set of new points. Under capitalism, you *exchange* things. You give something to someone else, who now owns that thing, and in return, they give you something, which you then own. In the Novacom, you *obtain* things, for your own personal use or as a gift. Points also legally cannot be used to create productive systems above a certain capacity. If you try to use points to build a factory, you'll get a visit from the police. This is also true if you try to trade points for goods and use those goods as a black-market currency. As such, although it *seems* very much like money, in a particular and formal sense, it is not. We could assign everyone as many points as we wished, but that would not increase the actual purchasing power allotted to each citizen.

"Now remember that I said accounting needs a common substance, something that can be meaningfully compared between unlike things. Under capitalism, the common unit of accounting was *money*, but the common *substance* was labor. We do the same thing without the abstraction of the money commodity. Instead, we take careful note of how many hours of concrete, or specific and actual, human labor is required to produce all the goods ordered over a particular period of time, usually one year. What those goods are to be, when the labor is actually expended, is predicted by extremely detailed demand models, so it's not necessarily the case that all of these goods are produced *before* they are ordered. Your jumpsuit, for example, was not ordered until just a few weeks ago, when you were processed to be revived, but all of the fibers had in fact already been grown, harvested, processed,

and stored—where they weren't simply synthesized, that is. Regardless, once the prediction is made, we have two ways to allocate those goods.

"The first way is *Basic* Distribution. This refers to the allocation of resources to things which are for the direct or indirect benefit of *everybody.* Infrastructure is a form of Basic Distribution, as is the military. Blue-sky research or pure scientific research would also fall under Basic Distribution—anything requiring complex or expensive equipment not desirable or affordable by any single individual or group of researchers. In addition, Basic Distribution is used to provide the goods for the zero-points section of the General Catalog. So if you spend all your personal allocation of points on more worthy things, you can still eat, and be clothed, and have a place to live which is yours…provided you don't mind that the food, clothing, and housing is not at all fancy. The cost of the production of medical consumables is also provided from Basic. With the example of your jumpsuit, Max, while we didn't necessarily know that you'd be coming to us when the points for this year were calculated, *that* a particular quantity of clothing was *probably* going to be needed was predicted based on data collected in part from the Atamai Clinic's historical need for clothing, and the points for those resources are book-kept under the Clinic's Basic Distribution allocation—its social grant, if you will. And, of course, we have buffers built into the system just in case we have to manage, say, a refugee crisis, or a new entrant polity into the Novacom.

"The other way things are allocated is *Personal* Distribution. This is anything above Basic. For example, you have the right as a citizen to transportation, and so *most* transportation is free, and even comfortable. If you want a personal car, or an especially nice room aboard a train, or if you want to take a trip in a particularly inefficient or luxurious way, or even if you want to eat at a fancy restaurant or wear fancy clothing, all of *that* comes out of Personal Distribution. When you cross from one week to the next without using all of your points, the resources those unspent points represent are put into a pool for later use, which gives us a significant buffer in case our production estimates were off or demand for some good suddenly skyrockets. Sometimes these resources are literally stored in a warehouse for later use or recycling, but usually those points represent an anticipated labor ex-

penditure that was not, in fact, used. So when you're agonizing over that purchase at the end of the week, remember that every point you do not spend represents another moment of boredom for someone who showed up specifically to do that work. So please, do not hesitate…but also don't be surprised when you simply forget to spend. This way, we are usually over-committing resources, so nobody has to go without even if demand is particularly high. We do sometimes get it wrong, though, but we are very careful that we are never short of Basic goods. Under our system, nobody ever goes hungry, or homeless, or unclothed, but you might have to wait if, all of a sudden, some new gadget or bauble becomes inexplicably popular.

"Now, of course, we are *fabulously* productive here in the Novacom, so when I say something is fancy or luxurious, that does not *necessarily* mean that it is *expensive*. In our system, a thing is sold at-cost for the 'price' of its abstract, or average, labor content. The idea is not to charge for the number of labor-hours consumed in the production of that *specific* item, but rather, of the number of labor-hours *socially necessary* to produce that item. For some commodities, such as non-renewable resources, it may be necessary to price that commodity at the cost of *replacement*, rather than of extraction. This means nothing for renewable sources of energy, for which the price of extraction and the price of replacement are the same—namely, the cost of the machinery itself. But for fossil fuels and anything else that cannot be replaced except through the long march of time, it automatically means that renewable power generation, even if cumbersome to implement, is vastly preferred over the alternative.

"Because people are also incentivized to reduce their own labor-hours, and do not receive additional compensation for a high cost of their product, the incentive structure also supports our costing system. Of course, our manufaxes are in tight communication, so innovations which occur in one manufax become distributed across the entire manufacturing system, so the average and actual content of labor for a specific instance of a commodity are usually very close. One person can therefore produce thousands of pieces of clothing simply by maintaining and operating the machines that do the work. More people need to be brought in if you customize something beyond the template's ability to handle, which means it requires more labor, and therefore costs

more. But still, not necessarily very *much*."

"What if something is too expensive to pay for immediately?" I asked. "If you can't save for it, what do you do?"

"For that, we have many options, such as a payment plan. If you want to receive the item immediately, then you'll need to pay a small interest payment on top of the labor cost to offset the time-value of the labor done. This is because you are essentially borrowing labor from next week that is being spent this week, and therefore needs to be paid back. This locks you into a payment structure until the item is fully paid off or you transfer it to someone else, who then assumes obligation for the payments. Or you could even defer receipt of the item until you have fully paid for the resource allocation. If you decide you do not want the item, however, those points are lost, as the resources they represented have been set aside and processed already. In essence, you pay society for the materials' opportunity cost. The important thing to remember is that all of these options are geared towards good resource management and proper accounting, not profit, so there is no incentive for the institutions which design and manage these plans to maximize their take from you, but rather, to maximize their productivity. And, of course, as these payment plans don't represent *property*, they cannot by law be traded or used to generate profit or offset risk. You could give someone a house you paid for, but that transaction is recorded. You couldn't substitute those kinds of trades for an actual economy, that would be against the law, and very difficult to implement secretly besides.

"One more thing: keep in mind that productive labor produces something. Basic services become free *because* they are funded by Personal distribution for the workers and Basic distribution for the consumable materials, resources, and plant. If you are a medical doctor, for example, your services are free at the point of sale. The patient cannot pay you, and they cannot pay for the cost of their materials. So your labor is not *productive* per se, and depending on what you do may not count towards the general labor pool. In a sense, you are a total direct consumer of labor, even though by keeping people healthy you are, in practice, an *enabler* of labor. You can think of it like the military: ideally, it's a huge waste of time and money, because we should be at peace and therefore never need it. The same is true of medicine

and other such services. They are a necessary expense *because* things go wrong, and when they do, we need them there. So while the foundation of society is on producers, yes, we do not discount the very real material and social role played by these *distributors*, even though they may not themselves produce anything and their labor may not be counted for budgeting purposes. Retail store managers, for example, who run one of the interfaces between the consumer and the production system, are important, but are not themselves productive in the material sense. If they were to be counted, then we would have to budget for a specific allocation of *their* labor, which would mean the consumer would ultimately have to pay for it out of their pocket. That doesn't make sense under our system of genuinely free-as-in-speech labor. So, in practice, some people labor to support the work of other people, whose labor is important but not necessarily accounted for. This is one reason *why* we strive to increase productivity as quickly as possible, so that those whose labor is foundational to the system are not burdened overmuch, either by having to produce input goods to distributive services, or by having to rely on those services more than absolutely necessary. That way, it all balances out, and nobody is called upon either to produce overmuch or consume overmuch."

"Speaking of productivity increases, what happens to prices if productivity goes up?" I asked. "Things get cheaper because they contain less labor, but also, people have less allocation because the number of labor-hours put into a given production of goods drops?"

"Well-spotted!" He seemed delighted at my comment. "We represent increased purchasing power by lowering the cost of items, yes. One of the ways we accomplish this is by giving an allocation of labor directly, instead of as recompense for labor expended. This allows us to incentivize people to work to minimize their own labor-time instead of maximizing their personal receipt of resources—which directly benefits all of society, themselves included. For purchasing power, this isn't as big a concern as you might imagine, as human Personal needs are fairly stable. The typical person takes only so many fancy trips, eats but so many fancy meals, buys but so much fancy clothing. So, when our investment in improved productivity bears fruit, that productivity generally gets funneled into *Basic* Distribution production. Often we use it on large-scale projects, like the ongoing effort to incorporate

the whole world into the Novacom, or building things in space for the Outward Expansion. But those things themselves often massively improve productivity, such as when opening a new asteroid mine that makes acquiring mineral resources much less expensive. *Some* of that increased productivity is going to end up being spent on Personal Distribution production—depending on how the Preference Census goes, and within reason—but those prices are likely to be fairly stable over time. After all, the population is still growing, so increased production doesn't *necessarily* mean lower prices when we have more people who need products but who aren't incorporated into our labor system yet. That is, the *absolute quantity* of production might increase, balancing out productivity increases. In reality, production won't always increase exactly proportionally to a rise in productivity, so when individual workers and research institutions alike work to increase productivity, the result is usually that people enjoy more leisure time *and* lower prices. The system structurally incentivizes a better life for everyone, which capitalism was structurally unable to do.

"By generating top-level budgets from democratic preferences but specific production sets from *consumer* preferences, it allows us to avoid the democratic trap of infinite services for infinitesimal taxation. Because we decide how much labor to expend and how to distribute that labor as part of the same cybernetic democratic process, we cannot trick ourselves and spend money that we do not have, because every unit of our currency represents an actual quantity of real labor, whether or not it has yet been expended. Every budget is therefore necessarily balanced! The entire process of progressing to a total elimination of scarcity is thereby, itself, fully automatic.

"It is our desire as a society, and as an economic system, to head towards that which Buckminster Fuller called *ephemeralization*—or as he would put it, doing more and more with less and less until you can do everything with nothing. So yes, even though your individual points allocation goes down, our ability to produce more and more diverse things with the same labor input means that we can increase the complexity and variety of consumer goods in the zero-points section of the Catalog. Eventually, everything you could want, within limits to prevent hoarding-for-exchange, will be free for the taking—assuming what you want is not harmful to society, of course.

"Now as you can imagine, there is an interesting phenomenon at play here. As stated, when productivity increases, for a fixed set of produced goods, the number of hours that gets distributed goes down. If we simply gave those hours out as-is, people would see their incomes *decrease* as time went on. This is even though, strictly speaking, your ability to acquire goods goes *up* because of the increased flexibility of Basic Distribution's consumer goods allocation, or at least stays as it was as prices drop in tandem. Still, the phenomenon of loss is very sharp, much sharper than the feeling of gain. We decided we were obliged to manage this psychological phenomenon early on.

"What we do is this: every week, when we allocate to each individual person a particular number of points, we attach it to another number which never changes. That number is one-hundred-point-zero, and is the total *percent* of the hours available to each individual at the start of every week. This is where the one-thousand-points idea comes from, so each point is zero-point-one percent of the total number of hours you have been allocated every week. Now, we give every single adult citizen the exact same number of points every week, and the entire set of salable goods is sold by what is essentially a single monopoly—the Novacom itself—so we list our *prices* as a percent as well. We try, through various transportation subsidies, to make these prices consistent across all geographic areas, so as the number of hours needed to produce a certain product drops, its price still also drops, no matter where you are. There is a consequence of this, however, which is that this is only true if the price for a product drops faster—that is, the productivity of the process that produces that specific commodity, on average, rises faster—than the general rate of productivity increase. It is the *total* number of hours allocated to Personal Distribution which is divided to pay each citizen directly, so for a fixed set of goods that number drops as the *total* productivity rises. But if a *particular product's* number of labor-hours drops at a slower rate than the total number assigned to its category of distribution, then its price will *appear* to rise, relative to the number of hours distributed for Personal consumption, even though productivity is increasing. The *benefit* of this is that the resource allocation models assign *more* resources to researching how to improve the productivity of processes which produce goods which have rising prices, so the phenomenon is self-balancing over

time. We decided this was an acceptable trade-off. Of course, if you are interested in the actual number of hours your points represent, that information is freely available. It's just less psychologically shocking this way.

"So, our system *does* still use prices, even for Basic Distribution, but it represents what actually matters in production, namely labor."

"How is all this production actually *planned?*" I asked. "It seems like it could get very complicated. How do you manage all of these complex production processes for the *whole Novacom?*"

"For that, we need to talk about *harmony*," said Allen. "Now, this is the part of the tour where we get a little technical. I won't go into the deep details of our planning process, but I'll try to give you enough to work with so you can know what to look up on your own, if you so desire.

"This centralized calculation method was proposed over a century ago by a man named Paul Cockshott and his collaborators. It is designed to be run on what was antiquated equipment even in your day, Max, so it's hardly a feat to plan our much-simplified, if more expansive, production catalog.

"In order to plan our production, we take a basket of goods—everything we want to produce in a given period of time—linked to predictive engines fed by consumption data from all across the Novacom, and whatever data we can get out of the so-called 'Coalition of the Free', just in case it's relevant.

"Once we have this basket, we connect up large relational tables of inputs and outputs, like so." He tapped on the wall, and an honest-to-goodness *spreadsheet* drew itself on the wall in a rather fetching cross-hatching animation. I could see that each intersection of column and row displayed the productive relationship between any pair of discrete raw or intermediary goods—how much steel and electricity and water went into the production of each train car, and each computer, and each set of dishware, that sort of thing. "Obviously, we are more concerned with avoiding shortages than we are with avoiding surpluses, just like how we are psychologically more averse to loss than elated by gain. This is because while a surplus is *technically* inefficient, a shortage could be *practically* devastating. To manage this, we implement what is called a *harmony function*."

One of the many small plots floating around the display took center stage. It showed a simple set of x-y axes, with a curve shaped vaguely like an upside-down letter U, or perhaps a thumb and forefinger held in a broad L-shape, with the thumb pointed down and the forefinger pointing along the positive x-axis. Taking as the centerpoint the place where the plot crossed the x-axis, the curve dropped off sharply as it went negative, and rose slowly as it went positive.

"We define a harmony function for a given desired output plan for the economy," continued Allen. "The harmony function is defined as the difference in total proposed output for a single iteration of the calculation versus the overall desired output, divided by the desired output. If that difference is negative, you can see, we design the harmony function such that it drops off precipitously. If the difference is positive—a surplus production—the rise is likewise quite slow.

"Of course, as you have asked, how does this help us *actually* allocate resources? Well, first we use our input-output tables to determine the ratio of input and output goods for each of the products in our basket. Then we randomly propose some assignment of base resources for each input good, which propagates out to later products. Some industries are likely to be over-supplied with their necessary resources, and others are likely to be under-supplied.

"Now we can order each industry according to its calculated harmony, which lets us see which industries would be producing too much, if they used up all of our proposed allocation, and which too little to meet our needs. We then suppose each of these industries is able to give up resources they don't need into a common pool when they have too many, and accept resources they do need from that pool when they have too few. We reduce the output of the over-producers, and increase the output of the under-producers, until each industry's harmony score meets the harmony of the average for the whole production scheme when we began. Then, we re-calculate the average and start again if the new average is significantly different from the previous one. You can see that this is iterative, as the difference between one calculation of mean harmony and the next becomes smaller and smaller with successive calculations. There are things we can do to adjust the system so it favors increased output, instead of settling in whatever initial harmony is produced by the random allocation of re-

sources, but this is the general idea.

"This has the effect of balancing the productive needs of the entire operation, and it scales for any given set of demands—from our local manufax to the whole of the Novacom. Once this is done, we can then work out how much labor-time, in hours of human involvement, is necessary to produce the calculated quantity of goods at every point, which allows us to calculate, in effect, what the 'cost' is of those goods. The rest is just as I explained before, where we allocate these resources according to our models. Technologies such as this have been in use for over a century, and were even in use by capitalist firms to plan production. Such firms are centrally-planned systems, after all.

"Now," said Allen. "What *isn't* necessary to this system?"

I knew this one; it had come up in my reading. "Markets," I said.

"Correct," said Allen. "Many tried to argue that our central planning system was impossible *per se*, but of course the Church-Turing thesis puts the lie to that, because anything that can be done with thousands of individual Turing-style computers in individual firms can be done with a single, larger such device. Market systems, at *best*, did what I just described, with all of the problems of private ownership of the means of production that came along with it."

"So," I said, "since information is being shared between every productive system in the Novacom, and it is coupled to the needs both of society as a whole and the individual members of society, it becomes possible to manage production for everybody?"

"Correct again," said Allen. "It is, at *worst*, as effective as your familiar capitalist society. Sometimes there are waiting lists for new products, but never for Basic goods.

"Let's say that available housing in a particular area is scarce relative to anticipated future demand. Our systems will alert us to that long before it becomes a problem. Once that happens, we can choose which solution best corrects for this. Perhaps we construct another apartment building on an available lot. Perhaps we expand the transportation throughput between two cities, so that people can live in one and easily travel to another while more housing is being built. Perhaps an entire new Garden City must be built to handle anticipated demand for living space. The professional bureaucracy of the Novacom does the work, and if there is a decision to be made between equally-acceptable

options, it asks the relevant sortition assembly at the relevant level of recursion to make the decision. So you see, when we react to accurate models of the real world, instead of the ideological models trapped in our own heads, we can see solutions beyond the immediate. This is what it means to have a centrally planned democratic economy."

He bid us don our protective gear again and led us back onto the catwalk. Down at the far end of the massive space was a glass-walled room, through which we could see a handful of people poring over charts and displays, talking animatedly with one another.

"This is the manufax's central control room," said Allen. "As it is concerned with the day-to-day operation of the entire manufax, it is the System Three of the entire building. We have other Systems Three of course, which manage the day-to-day operation of different lines and sections within the manufax itself. And there are higher Systems Three, out in the Richmond Node, which coordinate the manufax, the agridome, freight transport, power systems, and every other functional system in the city. If that seems complicated, well, that's why we employ the skills and talents of some of the greatest information display designers in designing the displays and interfaces the managers here use to, well, manage things. We try to make it intuitive.

"And, of course, all of these data are available for public scrutiny and correction. The lines of code that run the computers here are also available for interested people to modify, to expand its functionality or fix bugs in the programming. The same thing happens in every control room in the city. This, then, is an example of the cybernetic system you learned about at the political center. It isn't just a model of a viable organization, it's a real place where people work every day."

"Agridome, huh?" I said.

"Where the city grows nearly all of its food," said Jak. "We can visit it later, if you'd like." I said I did, and Jak smiled and stared off into the middle distance, accessing her implants to make the arrangements.

While she did that, I regarded the people inside the room with some interest. "You called them *managers*," I said, and Allen nodded. "A good manager was a rare thing in my time. Most people had very little good to say about them."

"Once upon a time," Allen said, "people believed that management was part of the ruling class, and desired organizations with no hierarchy. But that lacks cybernetic validity—you can't have a single level of operation concerned with the entire scope of production, there's just too much variety to manage. But lumping management in with those who did no work and reaped all the benefit was merely a case of a lack of class consciousness. They were workers too, and if they had been convinced to work against their interests by the ruling class, well, there was nothing there to tell them differently. You reify what you encounter by agreeing to its terms, not necessarily its conclusions. If people believed that management was hostile *per se*, it would have no means by which to see itself as being anything *but* hostile—sort of a reverse Theory X, if you like.

"I tell you this to make it explicitly clear that even though the people in this room are people with authority to make decisions that affect the lives of other people, they are not a separate class any more than a teacher in a classroom is a separate class from her students. Our system fully reinforces the perception of managers as workers in a different sphere, as ultimately being *servants* of those over whom they technically have authority, and they are meant to use that authority to help those who are closer to the line. Does this make every manager perfect? Of course not. But we empower everyone to take a hand in creating a positive and supportive atmosphere in their organizations, and nothing does this more strongly than the material abundance and egalitarian distribution that is enabled by the network of manufactories all over the Novacom. Which, if nothing else, enables people to abandon organizational cultures that do not work for their personalities and find their own way in the world. When you cannot retain workers through threat of starvation—the loss of access to those commodities which *you have produced* already—the organization either changes itself or it gets replaced by a better one. If a manager values his position, he'll bloody well learn to do it properly.

"Note, of course, that none of these people *own* the manufax, except insofar as the entire Novacom is owned in its entirety by its population. The only thing they'll get out of working those in their teams too hard or in conditions that are too poor is a lot of empty seats at the next team meeting—and a poor review. It does them no good to be

abusive, since loyalty to the company is no longer the most important factor in who gets promoted. And, because we choose our metrics of organizational success very carefully—which, incidentally, is the cybernetic use of a *right to privacy*, to collect only that information which is strictly necessary for maximizing systemic viability—it is much more difficult to, say, game production numbers by abusing the workforce. It simply does not do. We might, for instance, measure production per unit turnover. If worker turnover is high, even a high production score simply won't show up.

"Choosing metrics is important, which is why we put so much care into the Preference Census, which enables us to identify what people care about so we can measure it properly. This is all the job of management, and we are *all* managers of *some* system, even if it's just ourselves."

Jak tapped me on the shoulder. "I've booked us a tour at the agridome for tomorrow," she said.

"So many tours," I said as Allen led us down a staircase and into a corridor not unlike an office space from my time: rough carpet, wooden doors with little windows in, glass-ended hallways with natural light and the view of the river. All right, perhaps somewhat nicer than a factory or office would be in my time. As it was much quieter there, we removed our ear protection.

"Stop me when you get bored of learning about our world," said Jak in my ear.

"You'll be leading me around for a while, then," I said.

"I won't complain if you don't," said Jak, and I again resisted the urge to take her hand.

Allen looked into the middle distance for a moment, a gesture that had become as familiar to me as someone checking their watch. "Well, I'm a little sorry to say that we have concluded the tour, as it usually stands. I typically have more people, usually younger students, so a lot of the schedule would be filled with questions. Since we have some time, is there anything in particular you wanted to see?"

I thought about it a moment, then pointed down through the floor to where the James River flowed beneath us. "I'd like to see the tall ships, if I may?"

"Certainly," said Allen. He led us back to the stairs and took us all the way down to the underside of the manufax, where a wide, caged-in walkway ran the length of the facility. From this height, we were about even with the midpoints of the cargo cranes lowering and raising containers into and out of the holds of ships.

"These are typical Novacom cargo vessels," said Allen. "As you can see, we have re-discovered the glory of the tall ship." He seemed a little proud of that, particularly.

"A fan of the Age of Sail, are we?" I asked, smiling.

"I may have read a ripping yarn or two in my day," he said. "In fact, I grew up on a ship like this. My father captains one."

"He owns a ship?" I said. That seemed strange, considering the nature of ownership in the Novacom. "They just let him go wherever he wants?"

"Mm, yes and no," said Allen, rocking one hand back and forth. "It's his ship, of course. He's responsible for it. He can sign up for this or that cargo run, or he may be directed to a certain passage by the Novacom Marine Directorate. He couldn't, for example, decide to engage in piracy against the Novacom, or divert his ship from a registered course for no good reason. If he's not on a run for the Novacom, he's bound to give way and assistance to ships which *are*. But we have considerable ship-building capacity even just at Newport News on the coast, so if he decided simply to sail his ship around the world for a lark, he could, using a human crew or an automated one as circumstances dictate. We would not miss the loss of the ship, at least in economic terms. So, you see, it's not the same as a train or manufax, which are not so flexible in their use and are much more necessary for the operation of the Novacom than any single ship. It therefore becomes possible to own such a ship yourself, at least in principle, so long as it does not cross the nebulous boundary line between personal property and private property."

"Tell me more about the way these ships operate," I said. "I can see they're square-rigged ships, although the way the masts seem to be designed suggests they're somewhat more advanced."

"Indeed," said Allen. "Our cargo ships are primarily wind-powered. Our agricultural capacity means that any food that would need to be shipped quickly or by a ship equipped with large powered refrigera-

tion systems is simply grown locally, in agridomes. Sometimes chemicals, especially medicines, might need to be moved from place to place, but in that event we have nuclear-powered ships, jet aircraft, and sometimes cargo rockets. Those, especially the nuclear-powered ships, are heavily restricted in their use to emergencies. Most of the nuclear ships are warships, of course, and most of those are submarines. We do have large surface ships like the aircraft carriers of your time, but they are dedicated floating bases, staging areas, hospitals, command centers —that sort of thing. If there is a disaster anywhere in the world, a nuclear Novacom ship can almost certainly be dispatched there."

"Jet aircraft?" I said. "Do we still use hydrocarbon fuels?"

"Certainly," said Allen. "They are not mined from the Earth, but synthesized, or brought down from space, usually as methane. Our rocket systems especially use methane, unless you're talking about one of the big fusion-powered ships of the Spaceguard or at the farthest edge of the Outward Expansion. And of course we have stored hydrogen systems, but those are not yet sufficiently efficient, or desirably safe, to put aboard weight-restricted vehicles such as some aircraft. But the aircraft themselves are designed to be very efficient, and we even have general aviation and hobbyist aircraft, which tend to be fully-electric."

"So which do your sailing ships use when the wind isn't blowing, or in an emergency?" I asked.

"Hydrogen cells," said Allen. "The ships are highly automated, so those relatively few people who prefer a life aboard ship all the year round can run our fleet of sailing ships on their own. Our nuclear ships, of course, can produce fresh water and hydrogen for ships that suffer losses or failures of their solar and wind and beamed power-generation systems, as sometimes happens. But yes, we do ship things via sail. And we have passenger cruisers that are rigged for sail, too, although those are usually slower to minimize hauling, for passenger comfort. Most *long-term* passenger ships or tourist ships, what you might have known as *cruise* ships, are powered by hydrogen systems."

"Tell her about the airships," said Jak, grinning.

"Your favorite, of course," said Allen, also smiling. "With the advent of significant space infrastructure, it became possible to mass-produce helium for use in terrestrial applications. A lot of it goes into

scientific instruments, some small portion into balloons for parties, but most of it goes into airships. If you wish, you can take an airship across the ocean, to Hawaii or Japan or Australia or nearly anywhere. Most of them are passenger-ships, but some ply cargo. Some even do air-pirate shows, for the delight of passenger ships. We build them very strong indeed, and lightweight, so modern airships can withstand or soar above most storm systems with minimal fuss. They can also land anywhere without a mooring mast, which makes them very useful for long-term exploration, or as a supply depot in areas that do not have much other access by vehicle, or for evacuation."

"I think I'd like to try an airship trip some time, Jak," I said. Opportunities to spend time with Jak were almost as enticing as the opportunity to experience more of the glorious future in which I found myself.

"Can do," said Jak with a smile.

Allen glanced at something in his vision we could not see, and said, "My apologies, ladies, but I'm due back in my usual spot in a few minutes. Please, let me see you to the door. I'm afraid we can't have people wandering around the manufax unaccompanied."

We said that we understood, and when Allen had left us at the door, Jak extended her arm to me, and automatically I put my hand in the crook of her elbow, and together we headed back towards the monorail.

"How does the manufax appeal to a machine shop worker of old?" said Jak.

"Fascinating," I said. "I never really got to see the whole system at once before. I was always on, well, a machine. I liked it, because the work was fairly varied and you could see the product being made in front of you, but sometimes it was as though things came in one side and went out the other, and I never got to see where they ended up."

"Precisely the reason we construct our systems as we do," said Jak. "The same problem you described is the phenomenon that prevented so many people from seeing beyond the end of their nose. We build systemic principles into everything we create, so the secret will never be obscured again."

We approached the monorail station just as a train pulled up, and Jak led us aboard.

"Sometimes I am struck by the stark difference between this time and my previous era," I said. "It’s one thing to learn the principles. It’s quite another to see them in action."

"You are handling it remarkably well," said Jak. "I can’t tell you how rarely I get this far into the curriculum. It’s…rather a joy."

She had mentioned, I reflected, her reason for shepherding revivals, to show us the new future that had been built for us, and everyone. "Glad to be of service," I told her, and the grin she sent my way reached all the way to her eyes.

# CHAPTER 4

The afternoon was warm and humid, and I was grateful to be back in the air-conditioned confines of the Atamai Clinic. The trip to the manufax had left me invigorated, and the thought of returning to my room to await Jak for dinner simply failed to capture my interest. I was interested in lunch, still, but it was a bit early yet, and I wanted to linger with my companion a little longer.

"Would it be all right if you showed me a little of the revival process?" I asked Jak. "I've been interested to see it."

"Of course," said Jak. "We can't show you others' revivals, of course, but I can probably show you a few who have elected to have theirs displayed to the public. We have taken great pains to record and encode all of the data from these processes, so they are constantly improving. Not that there is much room to improve, mind, but still."

She led me through the glass-roofed lobby and back towards the medical areas, where I had awoken just the other day. There were operating theaters, data processing rooms, and experimental labs, mostly closed to us. Jak and I finally fetched up at one of the data processing centers, a somewhat cramped room stuffed with electronic equipment, neatly arranged in racks. A young man sat there, though of course I could not tell his age just by looking.

"Max, this is Christopher," said Jak. "He runs the data visualization systems here at the clinic. His work is integral to teasing the smallest insights from the data we collect, and that other clinics and medical institutions collect around the Novacom. Chris, this is Max, my revival."

I liked the way she had said it—*my revival*—but I tried not to let it show on my face as Chris reached out his hand, and I took it. His grip was firm, but not crushing. "It's nice to meet you, Max," he said. "I'm a little surprised, though. Most revivals aren't interested in this kind of thing. A little too close to home, you know?"

"Max would like to see a revival record," said Jak.

"Ah, well, you've come to the right place," said Chris, turning to his little desk and placing his hands on the flat, featureless desktop. The screens in the room lit up, showing a familiar face—mine. It was older-looking, though, and washed-out, bloodless and blue-lipped.

"Don't worry," said Chris at the grimace on my face, "nobody looks good on ice. The vitrification can do strange things to the shape

of your face."

"No, it's just…" I stepped a little closer. "It's *me*."

"Yeah, privacy laws," he said, shrugging. "Usually the data don't care whose they are, but sometimes it'd be nice to—" He stopped as Jak put her hand on his shoulder for a moment. "Oh, right, sorry." He concentrated again, and the image changed, something more digitally-processed and abstracted. A little less *real*. "Better?"

"Yes, thank you," I said. "So…that's me, frozen."

"Technically, the term is *vitrified*," said Chris. "I hope they told you all about it when you signed up, but one never can tell when you're talking about businesses from before the Charter."

"Something about glass versus ice," I said, still staring at the digital rendition of my own body.

"Yeah," said Chris. "Ice expands, produces crystals that puncture cells and disrupt structures. Instead, you're loaded up with a vitrification solution that locks everything in place, but it only works at cryogenic temperatures, which is why you spent nearly a century head-down in a dewar of liquid nitrogen."

"So how did they…de-vitrify me?" I asked.

"Just look," he said. As he spoke, the images changed on the screen. "The first thing Doc does—that's Doctor Atamai, he oversees every revival personally, although he's not there for every stage—is prepare a bed for you. That's the thing you were lying on when you woke up. See, we have detailed scans of the molecular structure of your entire body, takes up a *lot* of data, let me tell you, so we concentrate accuracy in your brain and any *problem spots*, things that were wrong with you when you died that might have contributed. A liver, for the most part, is a liver." Jak lifted her arm again, so he hurried on. "Anyway, point being, the bed has powerful, precise electromagnets on the ends of its surgical arms, which it uses to guide folded DNA structures, each with a little antenna of ferromagnetic molecules. Then we bring you in, and bathe you in a warm solution of various chemicals, mostly salts, to warm you up and melt all the vitrification solution bit by bit, without messing with the chemical balance of your body too much or allowing damage to the fine structures of your brain."

I nodded, as what he described showed up on the monitor.

He went on. "Once your skin is penetrable, the machine injects the little folded DNA structures into your body and begins clearing out the vitrification solution, doing nanosurgeries, bringing in additional materials from the bath that are used to rebuild tissues and add cybernetic nodes, especially in the brain region. They also deliver nutrients directly to cells, inject repaired copies of your own DNA into your nuclei with custom viruses, that sort of thing. Eventually, the entire implant system begins to try to wake up your cells, restart electrical patterns in your heart and brain, start the synapses clicking again, you know? By this point, the repairs are all done, and the vitrification solution is fully melted, so the system drains it out of your body through ports in your skin that we later convert to subcutaneous interface nodes for your implants—that's why they're so predominant in your head and hands, you see. Once the machine detects that your autonomic nervous system has taken control of your heart and lungs and various bodily processes again, it cleans you up, puts a medical gown on you, and waits for you to wake up. This is how we do basically all medicine nowadays, by the way, minus the whole 'restarting your nervous system' part. If you have some problem, it can be repaired much more effectively and efficiently by just physically altering your body than trying to manage some complex chemical balance with medicine. That's a shotgun approach, hardly cybernetic.

"The human body, you see, is no different than any other machine. If your car breaks down at the side of the road, it goes from being a complex system of moving parts, electrical impulses, chemical reactions, and observable behaviors, to being merely a huge and messy collection of steel, rubber, copper, *et cetera*. The human body is the same. Death is no different than a mechanical breakdown. Nobody has ever died of 'old age', merely the failure of the repair mechanisms available at the time, both within and without their body. So too has nobody died of 'natural causes', as someone whose heart stops for a sufficiently long period of time is, or at least once was, considered dead, no matter if the cause was related to age or to having been stabbed by a murderer. If you manage to 'pause' a person, after they are no longer functional but before the information that makes up the structure of their bodies is lost, then you can with little trouble replace all of the malfunctioning parts of them, give them a fresh battery, and

start them up again, no different than a car. The problem arises in that the human body is not made of resilient stuff, but rather, clunky and barely-sufficient organic parts. Oh, they do pretty well all things considered—how many machines can reliably run for decades without needing to be shut down and repaired? But it is without question that a human organism with all of its faculties of self-defense and self-repair, but made out of much tougher stuff, would be significantly more viable as a system. That is our ultimate goal, here."

"So health is a *systemic* problem, then?" I asked.

"Of course. Not only is the human body a system in and of itself, it is embedded cybernetically in a myriad of other systems, with which it interacts. When, in your time, a medical professional gave you advice on how to behave, what to eat, that sort of thing, they were attempting to manage the internal stability of your body-as-a-system by attenuating its variety. As the thought goes, by limiting consumption in the form of diet and increasing activity in the form of exercise, you could make your system sufficiently robust as to avoid certain health outcomes. Ultimately, that was a form of shaping an adaptive system—again, your body—such that it would have the capacity to act in certain desirable ways. But of course, nobody ever lived forever just by eating right and exercising, so we had medicine and surgery which would attenuate and amplify the variety of your body. These days, we just extend that notion of amplification and attenuation *forward*, so people are *improved*. We are all now more capable and less prone to injury or illness than ever before. And yet, we have not lost any essential humanity in the process!"

"I can see how medicine is an attenuation of variety," I said, "but how is it an amplifier?"

"When you are inoculated against disease, you are amplifying the ability of your immune system to act," said Chris. "It’s the same with prescription glasses. Your eyes cannot see properly as they are, so they are equipped with special tools which *allow* them to see properly."

"So modern health care doesn’t work that way? No surgeries and medicines?"

"It does and it doesn’t," said Chris. "It does in that we still employ surgery, of course, or else you would still be on ice. But these surgeries are nanoscopic. They deal with the manipulation of large chunks of

molecules. For example, if you were to lose a limb in an accident, then we would use your own genetic material to pattern tiny cellular structures, which our nanosurgery techniques would put into place mechanically, which would form a new arm. It's not as ideal as an atomically-precise approach, where we would place specific *atoms*, but until we get that working, it's essentially just as good. If you have some fundamental problem in your DNA that changes the proper operation of one of the systems of your body, then we write custom viruses just for you that rewrite your DNA and correct that problem. We can in essence *manually* fix anything that's wrong with you, from lost body parts to full freeze-and-revival.

"We do still have chemical medicine, where the control your implants have over your immune system is insufficient and you need relief or medical care until you can be brought to a proper medical nanosurgery machine. And, finally, if all else fails, we do still have what you would recognize as a fairly standard hospital. It's one of the things we *way* overbuilt, on purpose, to have necessary capacity to handle sudden surges in patients."

"Do you really have that much hospital capacity?" I said. I was remembering my own life, before the freeze, when hospitals would send you home the moment you were well enough to travel, to free up the bed, and to make more money on patients.

"Yes," said Chris. "We have very good technology for managing health before it becomes a problem. Fundamentally, we don't know what the universe will throw at us. It could be that one of the explorers on the interplanetary frontier brings back something awful. If that's the case, we want to have the capacity to manage as many people as possible, and since illness isn't something we can manage on anything but the individual scale, we have *many* more beds, machines, vats of chemicals, medical equipment, all sorts of things, than we really expect to need, because if we do need them one day, they'll be there." He winked at me. "Worst case scenario, we put someone on ice until we can figure out how to fix them. Generally, we also enhance the human body to be more resistant to disease and injury, to manage the variety that enters the medical system in the first place."

A thought occurred to me. "Does…does anyone actually *die* anymore?" I said.

"Yes," said Chris, a little sadly. "By choice, or accident. Some people get bored with life, and freeze themselves voluntarily until something more interesting comes along. A very few people have some disease or complication that for whatever reason we cannot yet repair. Psychological maladies, for instance, are predominantly a matter of training and fine structures in the brain. If you have a genetic defect or some physical abnormality, those can be repaired, but when we give sight to the blind revivals, they still need help learning to see. One day we will understand enough to impart very fine details and skills directly into the human mind through alteration of brain structure, but that day is not yet here."

"Speaking of revivals again," I said, "how long does a revival typically take?"

"Depends on what's wrong with you in the first place, but the average time from initial decanting to full cognitive awakening is around four weeks. You took just under that, one of the faster revivals I've seen in a couple of years. The machines work all day and all night, they never stop, and they almost never make a mistake. That's how such a thing is possible at all. We had to wait until the data storage technology, and the fine electromagnetic technology, and the high-resolution imaging technology…well, until a lot of technology was ready before we could even *attempt* it." He sighed, almost wistfully. "Fun times. It's mostly just monitoring the machines these days, though."

"They *almost* never make a mistake?" I said.

"Well, your body is a big place, relatively speaking, and has a lot of redundancy," said Chris, taking his hands from the tabletop. The screens went blank again. "A few mistakes here and there are nothing your new immune system can't handle. Plus, they're *vastly* better than human surgeons."

"So what's next for this technology, once all the revivals are… well, revived?" I asked.

"Oh, the applications are endless," said Chris. "Right now we only re-freeze people who require it, or are willing to endure it, because the revival process is still pretty complex and long. But one day, we'll be able to induce suspension and perform revivals essentially at will, which will make long-term spaceflight extremely viable. We might even be able to suspend the body and leave the brain and mind active,

so people can live and work in a virtual space while their bodies are preserved or repaired or what have you, so they don't have to lose all that time." He looked to the side, a little dreamily, before coming back to himself with a start. "But first, of course, we need to get all the data we can from the revivals. They're our only real ethical source of scientific data on long-term cryonic storage, since the number of elective suspensions of the modern age is still pretty low."

"It sounds fascinating, Chris," I said. We had delayed lunch long enough, it seemed, if the sounds my stomach was making were any indication. "I would love it if you would keep me updated on any progress you make?"

"Of course," said Chris. "Frankly I'm glad somebody's taking an interest who isn't, no offense, an expert. It gets a little boring talking to people who already know everything I'm going to say, you know."

"I understand," I said, and I did. Sometimes it was nice to try and distill what you knew into terms that laypeople could understand. It was…refreshing.

"Let's go to lunch, you think?" said Jak. She put her hand at the small of my back, leading me out of the room.

After lunch we did more implant training, and by the time dinner rolled around I was able to interface with the lights and temperature systems of the room through the flat metal panels scattered around the walls. I had noticed them in my bedroom, but I had figured they were just hiding unused electrical plugs, as was common in my time. Apparently rooms in the future were designed with more forethought.

I fell asleep that night with a certain contentedness, flicking the lights on and off with the power of my mind, ensconced in the soft sheets and gentle weight of the blankets. Tomorrow would doubtless be as exciting as today had been, and I looked forward to what I had yet to learn.

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The world was consumed with the burn of ice. I tried to move but could not. The cold seeped into the depths of my being, seizing my heart, filling my lungs, until I was more ice than human. I tried to look down the length of my body, but my eyes had frozen over, the sound of ice cracking in my skull. I called out, voiceless, begging, but nobody came. Nobody was ever going to.

When I awoke, panting with the exertion of a breath I had not been able to draw in my dream, I reached out with my implants without thinking and turned the climate control system off. As it was still July, the room warmed almost immediately without the air conditioning pumping cold air over my bed.

The nightmares were getting worse. I turned the lamp beside my bed as bright as it would go and held my hands up to the light. There were the implant interfaces, spider-webbed across my palms, up to my fingertips. When Jak had finished training me on the use of my implants, these interfaces would help provide tactile feedback for things that were not, technically speaking, actually there—keyboards, controls for machinery, that sort of thing.

They were also unequivocal proof that I had been rescued from the ice after all. That my death had not, in fact, been the end of my life.

I did manage, after a hot shower and a couple of hours of old television, to fall asleep again. I kept the air conditioning *off.*

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The agridome was next. Instead of a dome, it was actually a campus of tall, cylindrical towers rising out of a great glass-fronted building and covered in what I could only describe as *leaves*.

"They’re sunlight collectors," said Jak when I asked, but would say no more on the subject.

Walking up to the main entrance of the agridome was different in many respects from the manufax, though they were both large glassed-in buildings. Where the manufax was, for all its architectural splendor, a fairly utilitarian building, it was obvious that great attention had been paid to the agridome campus’ landscaping. The path from the monorail station was winding, passing through trees that shaded us, near channels and creeks that cooled us, filled everywhere with flowers of various complementary shades and scents, and by the time we walked into the air-conditioned lobby of the main agridome building I had forgotten the muggy summer heat almost entirely.

A woman waited for us near the front desk, her pristine white lab coat covering dirt-streaked overalls. She wore sunglasses perched on the top of her head, her dark hair coming out in wisps over a dark forehead, and when she shook my hand I could feel the roughness of her palm.

"My favorite thing is watching new arrivals to the agridome come up the front path," she said by way of greeting.

"Max, this is Avani Chawla," said Jak. "She's the head agronomist here at the Richmond Agridome."

"It's lovely to meet you Max," said Chawla. "Jak has told me you're interested in our agricultural techniques?"

"Yes," I said. "But first, if you don't mind, why do you like watching us come up the path?"

"Because I designed it myself," she said, no small hint of pride on her face. "It's supposed to be refreshing. All of the flowers and trees and grasses out there were engineered *here*. They require almost no maintenance, they can't out-compete the local flora, and they bloom all year long."

"It's very impressive," I said. "I can say I was definitely refreshed."

"Then I've done my job," said Chawla, smiling brightly. "Come this way. We don't get many people for the tour, sadly, but that just means I can show you to all of my personal favorite spots."

She led us down a bright, sun-filled atrium corridor full of trees. The sound of birds and other forest creatures filtered out to me from nowhere, and I saw embedded in the frames holding up the glass more of those directional speakers.

"We can't *actually* bring these creatures into the building," said Chawla. "No telling what kind of mischief they would get up to. But we here at the 'dome like to feel connected to our environment, so we do the best we can."

"So these are all local species?" I said.

"Very astute," said Chawla. "Yes, all of these trees and plants and all of the sounds you hear were brought in from wild and re-wilded areas in and around the Richmond Node."

We emerged into the lobby of another building. Above us was a glass ceiling that enclosed the first three or four storeys of the main building, and through which I could see one of the tall towers stretching up far overhead.

"This is one of our agricultural towers," said Chawla. "We grow all of the food that the Richmond Node needs in these specialized buildings, and of course we produce extra for emergencies and balancing oscillations in the total plan. Every agridome in the Novacom produces

an abundance of consumable and decorative plant matter, and anything that isn't used before it goes bad is recycled into fertilizer, either for food production, assisting the rewilding program, or for shipment off-planet as organic material for *their* agridomes. And for baseball fields, come to think of it."

"Cybernetics, I see," I said. "All the way up and all the way down."

"Indeed," said Chawla.

She led us to the center of the building, where several glassed-in elevators stood at the circumference of the tower base, which took up much of the room. There were more people here, most dressed in coveralls and hard-hats, but some clustered in groups around this or that display, talking animatedly to one another.

"This is our central control room for this building," said Chawla. "We want to retain as much vertical space for our farms as we can, and it's most difficult to pipe sunlight into the ground floor, so we dedicated it to control spaces. We have a lot of elevators here, so that we can get up to the grow-floors quickly, and this central column is where all of the incoming resources and outgoing foodstuffs are sent to and from the cargo trucks and trains that run underground, beneath the entire complex."

She led us into one of the elevators, which took us straight up without any prompting or button-pushing from Chawla. I glanced at her face and saw that she had the same slightly distant look as everyone else did when checking something with their implants. I resolved to focus that night on mastering my own control over the devices embedded in my body.

We arrived at one of the upper floors of the building. Radiating out from the central column were rack after rack of metal shelves, each one filled with plants. The elevators opened out onto spaces between the racks, for us to walk through, and over our heads mechanical arms moved with expert precision, moving trays of plants between the shelves and into and out of the central column behind us.

Chawla walked backwards in front of us, gesturing to things as she spoke. "Here is where we grow your basic garden plants, things like lettuces and other leafy greens. Everything is tuned specifically to the best conditions for growing these plants, from the acidity of the growth medium to the frequency of the light we pump in from outside."

"Jak told me those large surfaces on the outside of the building were light collectors," I said.

"Yes," said Chawla. She led us out to the heavily-tinted window on the side of the building. One of the large solar collection panels was just outside, and from this close I could see that it was covered with hundreds of tiny mirrors, each one bristling with fiberoptic cables.

"These panels hold dozens of mirrors held in these metal frames," said Chawla. "They funnel sunlight into those fiberoptic cables. That sunlight is then filtered and tuned until it has the properties we want for particular plants, and then it is released onto the plants themselves. We can grow all year round in optimal conditions for growth."

"Couldn't you achieve the same thing with artificial lighting?" I asked.

"Yes," admitted Chawla, "And we certainly make use of it. But there's already plenty of incident light impacting the building. During the day, at least, and especially in the bright summer months, we minimize our impact on the power grid by just channeling the light directly. Besides," she added, "we kind of like it. Channeling raw sunlight to the whims of humanity…has a sort of ring to it, doesn't it?"

I thought about the stained-glass ceiling at the Atamai Clinic and agreed that it did.

"Now these," said Chawla, moving us back to the plants, "are simply lettuce, of course. However, even here, we maintain a high degree of biodiversity in our plants, to protect against losses from unforeseen factors."

"How much lag-time is there between planting and delivery?" I asked.

"We adhere to the central planning system, of course," said Chawla, "but to a significant extent, agriculture *drives* demand, instead of the other way around. It may be the case that some or another food becomes suddenly very popular, but even with our genetic engineering and environmental monitoring, there's only so much food we can grow but so quickly. And because food is so important, we focus first on maintaining a steady, nutritious food supply, before we can devote any resources at all to this or that 'fad' food."

"Avani is quite the traditionalist," said Jak.

Chawla rolled her eyes at Jak. I was beginning to understand that Jak was quite the figure in town—or at least, in areas like the manufax or the agridome. I supposed it stemmed from her role as tour-guide. Or perhaps she was simply good with people. Or both.

"Cloned mastodon meat is all well and good, Jak," said Chawla. "But sometimes all I want is a nice caprese salad, don't you?"

"Speaking of," I said. "How do you get cheese? I understand that a lot of your meat is vat-grown, but what about dairy?"

"Vat-grown as well, technically," said Chawla. "We have genetically engineered organisms that produce fats, proteins, all the good stuff that goes into milk, which we then process into various dairy products. We have a little restaurant on the top floor of the main building, and everything we serve there was grown here. We even provide most of the basic foodstuffs for the Atamai Clinic."

"Impressive," I said.

After touring the meat vats and the cocoa and fruit trees, the corn and grain levels and the beer brewery and the liquor distillery, and the racks and racks of quality-checked and bureaucratically-approved cannabis and coca and poppies, we eventually found ourselves sitting in the restaurant on the top floor. This, as it turned out, was one of the rotating restaurants I had heard about but never had gone to, delivering spectacular views of the agridome complex, the river and manufax not far away, and in the middle distance the city itself. I watched little dots of light flit across the sky, and realized they were airplanes and airships landing at the local airport.

Between us was a platter of various small dishes—all grown and processed at the 'dome, of course, as Chawla kept saying—and several bottles of very good wine, likewise from the agridome's on-site vineyard. Chawla was explaining the details of the rosé, right down to the specific mix of soil chemistry she herself had engineered, when Jak frowned.

"Sorry, I just got a schedule ping," she said. "I took the liberty of reserving us some time at a recreational center, Max, but if you wanted to stay I can just reschedule."

It was tempting, but not so tempting as a *recreational center*, where, Jak had told me, I would be able to test the full extent of my implants. "As much as I'd like to stay, I think I'd best go before I drink

any more of *Chateau Agridome*."

"I've far overrun my usual lunch break anyway," said Chawla, standing up. A robot came by to collect the dishes, bin the trash, and wipe down the table until it and the space surrounding it were as clean and neat as they had been before we had arrived.

"I'm terribly sorry," I said. I had not even considered *her* schedule.

"No, no," said Chawla, waving a hand. "It's *my* schedule, I can throw it out more or less any time I wish. The plants aren't going anywhere, and it isn't like I'm required to spend a certain number of hours here so long as my work gets done, given the *nature* of my job." She grinned at her pun, and it was Jak's turn to roll her eyes. Chawla took us back to the front door and bid us goodbye.

Jak and I walked down the pathway back to the monorail station, myself a little unsteadily, Jak solid as a rock with my hand on the crook of her elbow.

"I can show you how to clear that up," said Jak, grinning. "Inebriation is a choice these days, more so than ever. Addiction, too, come to mention it. It's all just fine structures in the brain."

I thought it over. What I *wanted* was the excuse to hang on Jak a little longer, but I could not think of a good reason why I should wait until the monorail station to sober up. "All right," I said, a little reluctantly.

Jak showed me how to reset my equilibrium, in the same manner that I made any selection in my implants—by thinking deliberately about them. I noticed that most of the options projected into my vision were grayed out. Jak explained that the implants could detect that I was under the influence, and would refuse to enact certain commands. Some of the disabled options included making purchases over a certain amount, accepting incoming connections except from emergency services, and disabling my locator readout. It would also prevent me from starting or steering any vehicle, or I could have my equilibrium reset automatically by the interface. I selected the "Realign" option, and instantly felt clearer in the head as my implants took over finding my balance, filtering my eyesight, and stimulating various parts of my brain and body to clear the effects of the alcohol. I stopped leaning on Jak, but I did not let go of her elbow, and she did not move or tense to suggest that she was bothered by that.

The monorail deposited us near the entrance to a large brick building in downtown Richmond. Signs for the major university there were all over the place, and Jak informed me that over the past couple of centuries the boundary between school and city had blurred considerably. The recreational center had been a gymnasium once, apparently, but as the whole population of the Novacom could be arbitrarily fit and healthy with minimal effort, the gymnasium had given way to the needs of the people. Jak logged us in at the front desk, and we passed through into the building proper.

Gone were the rows of machines and racks of weights I had been used to, back when I had been well enough to go to the gym. Instead, tall climbing walls reached up several stories, and in the corner I could see a row of indoor skydiving tubes, although they were much larger than they had been in my time. People crowded around a boxing ring, where a pair of women were fighting one another. There was even a whole parkour course, running around an upper floor, looking down on the rest through ceiling-high plastic panels.

Jak led me to a partitioned-off corner where stood rows of shiny capsules, like tanning beds. People were climbing into and out of them, excited looks on their faces.

"These are full-immersion capsules," said Jak. "While it’s perfectly possible to engage in full-spectrum immersive virtual reality in the comfort of one’s own home, some people prefer to do so here, where they can minimize external distractions."

"You can’t order one for yourself?" I asked.

"Certainly you can," said Jak, "but some people keep very sparse homes, or no permanent home at all. Some simply don’t care to have it around if they don’t use it much, and would rather spend the points and the floor space on something else."

"Variety absorption," I said, watching a group of people claim a cluster of capsules for themselves.

"Indeed," said Jak. She took us into the far corner, a little apart from the others, and helped me into the capsule. It was plush, with soft cushions that formed to my body. I could feel the rumble of water pumps for a moment, before the cushions warmed to my exact body temperature and I ceased to be able to feel them properly. As I reclined, the legs and back of the capsule bed rose up until my body had

lost any unnatural contortion. Jak lowered a headset over my ears and the sounds of the world faded away. It would be, it seemed, a total sensory deprivation system.

When Jak spoke, it came through the headset, and not the air between us—in fact, her lips did not even move. "I'll be right out here in case you need anything," she said in my ear. "For your privacy and protection, the capsule will be locked to everyone except me and the EMTs nearby, but even that's just in case of mechanical failure. You are in no danger."

"Don't worry," I said with my mouth, although I knew the words sounded clumsy since I could only hear them through the bones of my skull. "I'm not claustrophobic."

Jak smiled. "See you on the other side," she said, and lowered the shell of the capsule over me. A prompt appeared in my vision, a request for access from the pod, and I gave my permission. There was a deep *thunk* as the capsule locks engaged, and slowly all the lights that had flared up around the rim of the bed faded away, until I was left in total darkness.

Then, the sun rose.

I was standing in a grassy field, looking up at a sun that rose into a black sky. I could dimly see a bright star or two in the dawnlight, but they were strange, rotating slowly around the rising sun. It soon became too bright to look at, and I looked away, only to stare yet again: the sky overhead was not a sky at all, but a beautiful green city, broken cleanly by a huge multi-pane window that looked out into space.

"Welcome to *Valhalla*," said Jak, standing behind me. I turned around, and I could immediately tell that she was…different, somehow. Somewhat less substantial.

"I'm not as deep into the sim as you are," she said when I asked. "How do you like it?"

"This is…a space station?" I said. That little twist in my soul that had cropped up every time someone mentioned the Novacom-in-space shot up my spine, and I tasted something hot at the back of my throat. It felt like…like victory. Like having fallen in glorious battle and been, indeed, brought to the Hall of Odin.

"Earth-Orbital L-5 Station *Valhalla*," said Jak. She shrugged when I looked her way, eyes wide, at the name. "Don't look at me. Nobody

asked my opinion."

I did not have the words to tell her.

"Is it real?" I said instead, looking around, seized again by that nameless fear of *unreality.* I noticed suddenly that I was barefoot, and the grass under my feet felt more than real. It was the real of my childhood memories, so real that it could only be false.

"The station is real, yes," said Jak. "This of course is a simspace, although any people you see walking by are actually up there, on the station. They can't see you unless you drop into their augmented-reality layer, though."

"It feels *too* perfect," I said.

"That's real, too," said Jak, smiling. "It's an entirely engineered ecosystem. The grass is cut with *scissors*, although by robots, of course. *Valhalla* is the really particularly nice one. They're all nice, I should say, but the residents here take pride in their status as *first orbital*, so they really go all-out."

"How many orbitals are there?" I asked, turning slowly in place. In the distance, beyond the panes—was it *glass?*—I could see the Earth's moon, Luna, and beyond it, strings of lights, which I now understood were not electric lights, but reflections from the mirrors providing sunlight to the interior of the cylinders.

"Just over thirty," said Jak. "Around three hundred million people live in these orbitals. That's not much less than the population of the entire United States in your time."

I whistled, impressed. "And what keeps the air in? It can't be glass."

"Rotation, on some orbitals, but also spun diamond," said Jak. "We mine carboniferous asteroids with automated processing rigs and recombine the carbon into flat sheets. We have to add other layers for ultraviolet protection and micrometeoroid shielding and redundancy, and it's in panes in case one sheet tears and has to be replaced. It's worth it, though."

It certainly was. "Are they all like this?"

"Most are O'Neill cylinders, yeah, but there's a Bernal sphere or two out there. There are even a couple that are open-topped wheels. More for cultural nostalgia than anything else. The cylinder design ended up being…less controversial, shall we say."

"I can imagine." I reached down and dug my fingers into the soil, pulled up a handful of grass and held it to my face. It smelled clean, and earthy, and the little particles tickled my nose. "The fidelity is incredible."

"They did a lot of work on it, yeah," said Jak. "At the root, it's part of the sense libraries. You could download a scent, for example, and smell it whenever you wanted, or whenever you walked into a room, or for your own simspaces—like everything else, it's all part of the public domain. But *Valhalla* goes the extra mile and has embedded chemical sensors everywhere, sampling the air and transmitting it to anyone in the *veritas* layer—the one that's as close to being there as you can get without hopping on the orbital elevators."

"So…the space station is smelling itself," I said.

Jak laughed. "In a manner of speaking."

"And the particulate matter?" I rubbed my fingers, watching the dirt work its way into the folds of my fingerprints.

"Well, obviously, you didn't *actually* pick up anything from up there, but the layer remembers for a time, usually until you walk away or stop looking at it for a while. But the consistency of the soil is accurate, yes. Like I said, Valhallans pride themselves on their accuracy."

I brushed my hands off, and when I looked again they were as clean as ever. "Can I change the simspace?"

"Of course. It's your pod. I just loaded this one up because it tends to impress."

I concentrated the same as I did when engaging with my own implants, and a book appeared in front of me, looking much like a photo album.

"Nice interface," I said, leafing through the book as if it were really there, albeit hanging in midair.

"If you work a lot with simspaces, you'll eventually develop a kind of reflex for manipulating the layer, assuming you have permissions for it. Some people become very adept. But for beginners, the photo album works quite well."

I selected an image of a waterfall, and the world changed around us, rippling from one reality to the next like an old-fashioned flashback on TV. For a moment I felt very aware that I was in a confined space, with the world being generated around me, but the sensation was gone

as soon as the new space had fully loaded.

The air was warm and wet, the sound of falling water a constant, droning susurrous. Around me people sat on chairs and blankets and towels, sunning on the rocks surrounding the little pool at the bottom of the falls, or dipping their feet into the cool water. I was still barefoot, standing at the side of the pool, so I waded in a few steps. The water was deliciously cold, and I could feel the silt and sand at the bottom squishing between my toes.

"Where is this?" I said, climbing back up the few steps to where Jak was waiting. My feet were dry and clean the moment I stopped thinking about them.

"Nowhere," said Jak. "This is a fully synthetic public simspace maintained by the Brazilian Novacom, Rio de Janeiro Node. High-speed data link between here and there. And everywhere else in the Novacom, as it happens."

"Wow," I said. "I can really go anywhere, huh?"

"Well, not quite," said Jak. "Obviously there are secret spaces. You can designate one yourself. The military has plenty. It’s all the same level of encryption."

"That’s it?" I said.

"You also can’t go anywhere outside the Novacom, unfortunately. The undersea data cables had to be re-laid once the Novacom expanded across the Pacific, since the Coalition cut them on the Eurasian side. You’d have to physically go there, maybe as part of a diplomatic envoy, and connect using their systems, which aren’t as advanced as ours. But within the Novacom, any space you’re allowed to go, you can go. It’s not possible to go to one *involuntarily*, but even if someone figured out how to do it, it’s already illegal."

"You mentioned layers," I said. "What is a layer?"

"We’ve been staying in reality for the most part, so it hasn’t affected you yet," said Jak. "But a layer is just a virtual perceptual filter laid across your entire sensorium. You might go out in public and prefer that the normal street be, say, a fantasy kingdom, with fairies flying around. Or you might prefer to filter out certain sounds, or people who are annoying you."

"Seems dangerous," I said.

"The system keeps you aware of threats and obstacles, sometimes by just gently guiding you around them so you don't notice, sometimes by throwing up alerts and changing your layer on you. And of course we have professional police officers around to intervene and de-escalate if any problems arise."

"We've been on the real-world layer the whole time, right?"

"Yes. Everything you've seen and experienced up until you entered the pod has been real, except when you accessed your implant interfaces."

"But it's all been…beautiful, well-kept. Why expend resources on that when people can just use layers?"

"Some people use layers and path redirection and such to turn tiny little apartments into much larger spaces, yes," said Jak, "And you can imagine that a crowded arena or highway is much more pleasant in a more filtered layer. But *reality* is still very much valued, so we make it as comfortable and attractive as we can. Of course, cleaning and repair and landscaping robots make that task much simpler, and magnify the capabilities of people who enjoy that sort of thing."

I summoned the picture-book again. There were thousands of pictures—rivers of lava on Hawaii, blue-white glaciers in Alaska, serene redwood forests in California…

A thought struck me. "Are there *historical* simspaces?"

"Of course. Some are more fanciful than others, but there are so many enthusiastic historical—and ahistorical—simspace developers that you can have pretty much any arbitrary level of historical accuracy you want. They should be in the back of the book."

The book opened itself to the correct section before I could touch it. I could see what Jak had meant about developing a reflex. It was not long before I found what I was looking for.

The world rippled again, and the beauty of the waterfall was replaced by…

"Oh," said Jak. It was rare to see her surprised—usually *she* was surprising *me*—but I took little joy in it.

Before us was an apartment building, on a city street. For a look into the past, it was not *awful*. There was no graffiti on the walls, no garbage piling up on the street corner. There were even trees lining the street.

But the air was sooty, and thick in way I had not noticed when I had last been there in person. The light coming down between the buildings was harsh, with nothing much green or soft to gentle it. The streets were narrower than I remembered, too. Everything smelled strange, like the sewers were overflowing.

"Yeah," I said. "Home sweet home."

"This was your apartment building?" said Jak, standing a little closer to me.

I nodded. "I…suppose I just wanted a reminder of what I…escaped."

"It's quite nice," said Jak. "We might call it *rustic* today."

"That's just because there are no people here," I said. There were, actually, a few people—but they moved mechanically, eyes blank. When I had been there last in real life, the people had been walking mechanically and blank-eyed too, but they were still clearly *real*. These were…dolls. Constructs created by the simulation to lend it a certain verisimilitude.

"What was it really like?" asked Jak. "I've studied it, I've talked to other revivals, but you're the first one who's actually…showed it to me."

"It was mostly…boring," I said. "Go to work, do something boring, get paid, buy food, so you can go to work again. I actually got pretty lucky, since I liked my job every now and again. But even then, I wasn't working on anything *exciting*, really. I'd always wanted to be…well, we didn't have hardly anything like a space program, not anymore, just some rich kids sucking the taxpayer teat, wanted to turn Mars into their own little feudal kingdoms."

"Is it true that some of them wanted to bring back indentured servitude?"

I laughed, a little more harshly than I intended. "It is."

"And…everyone had their *own* automobile?" said Jak.

"Yep. Most people *had* to have one to get around."

"Even though you had public transit?"

"Some places did. Mostly they'd been torn down for highways, or neglected. Only poor people needed it, after all. Rarely you got people thinking of the public need, but it was always a surprise, or a coincidence. Mostly they tried to sell you something, but of course none of

us had enough money to buy, because they wouldn't pay us hardly anything. How else were they to make a profit?" I crossed my arms, stared up at the building that had once been my home. "I'm glad that world is dead. You didn't miss anything by being born into this future, Jak. At least in the Novacom, *finally* something *good* won. Hardly anything *good* ever won in my old world. And never for very long."

Jak said nothing as I walked up the front steps and towards the building proper. She did not move to follow me—not that I could sense, anyway—and yet she was there beside me when I turned to look for her. I took a deep breath, gripped the handle, and pushed open the door.

The building was tall and old, with a creaky old elevator and a front desk with the fake laminate stripping off. The light flickering from the old fluorescent bulbs overhead was the same, somehow *greasy*, and too blue—it washed out all the colors, making the drab interior even blander. Even the smell was the same.

"How did they get *this?*" I asked Jak.

"They probably didn't," she said. "The street and external view might have come from street scans from the time, but the interior would just be speculation unless they had some posted floor plan."

"Doubtful," I said, running my fingers over the railing on the staircase that wound around the central elevator.

"In that case, it's probably coming from your memories," said Jak.

"My memories?" I paused halfway up the first flight of stairs, but of course I didn't need to *wait* for Jak, so I kept climbing. There was no sensation of fatigue or even much exertion, but the feeling of ascending the stairs was painfully familiar nevertheless.

"You're manipulating this sublayer, Max," said Jak. "Not even I have any permissions here."

I turned that over in my head for a moment. I decided it was all right. There was not anything in the old building worth hiding from Jak.

We climbed in silence, cresting landing after landing, until we reached a familiar door—welcome mat, kitschy door-hanging, polished brass number-plate, the only shining thing in the building.

"How much of this is my memory and how much is my…impression of the place?" I asked.

"At a certain point, the distinction doesn't mean much," said Jak.

This was fair enough, and I said so. I reached out and pushed open the door to my apartment. It went easily.

It was as I had left it. Everything was in chaos. I was typically a fairly tidy person, but…

"Oh, right," I said. I had somehow forgotten.

In the corner of the tiny studio apartment was a hospital bed, fully mechanical. Arrayed around it were various machines. Nobody was in the bed, of course, but the view was familiar to me.

"I spent a long time here," I said, "after I got sick. Couldn't work, couldn't exercise, could hardly change the channel on TV. The government said I could keep the place until I was better. Rent payments were deferred, but of course I'd still have had to pay them *eventually.* I worried a lot that my life insurance would get seized by the landlord, instead of paying my preservation fee, but I guess they lost that particular battle."

It was only when I felt Jak's arms around my shoulders that I realized I was crying.

"I'm sorry," she said. "I've been treating it like a museum display this whole time, but it was your life, wasn't it?"

I turned around in her arms and hugged her back. My tears were soaking realistically into her shirt, and I wondered if I was going to short out any of the equipment strapped to my head.

"I keep feeling like this is a dream," I said. "Like I'm going to wake up and I'll be back there. Or in the hospital again, watching the doctors who can't do anything, watching my bills piling up and thinking maybe it would be better to die so I didn't have to spend the rest of my life in debt."

She hugged me tighter. "It's not a dream, Max. It isn't. And you'll get to wake up in this new world of ours every day for a very, very long time."

I pulled myself flush against her body and said nothing.

I was not aware that the simulation had vanished until Jak did as well, and the top shell of the VR pod opened up, revealing Jak herself, in the flesh. She helped me remove the sensory deprivation gear, and kept her hand on my shoulder as I sat up on the edge of the pod.

"Our time ran out," Jak said, her lips quirked in a little frown. "I can sign us up for more, if you'd like?"

I shook my head. "I think that's enough for now."

Jak nodded and led the way back out onto the street and towards the monorail station down the road. She kept tight hold of my hand the entire time back to the clinic, and when after dinner she escorted me back to my room, I stepped forward and hugged her again.

"Thank you again for this beautiful future," I said.

Jak hugged me back, one hand stroking my hair. "Every single day," she said again.

I fidgeted for a moment, then added, "And…don't feel bad for being interested in something, even if it is my nightmares."

Jak's smile slipped a little, and I tried to think of something to say to make it right again, but before I could, she had bid me goodnight and closed the door.

When she had gone, I lay back in the room's spacious bed, summoning shapes and colors and sounds and scents and textures to play with. On a whim, I stood up and turned on the television, watching the familiar scenes and sounds from my era's entertainment play across the screen, and I reflected that, if my nightmares had been necessary to create this dream of a tomorrow, then it was worth every second of it.

I turned off the screen, showered, and slept in my robe, a deep and dreamless sleep, except for the lingering feeling of Jak Atamai in my arms…and the sad look on her face as she left for the night.

# CHAPTER 5

I walked down the street, enmeshed in a throng of people. Then, with a thought, I was alone except for Jak beside me, strolling down a tree-lined boulevard. The gentle pressure of public alerts pressed on the edges of my senses, but they stayed away unless I deliberately focused on them, and when I did they swam into my vision in a shower of sparks, or assembled themselves out of lengths of brass, or just floated across my eyes in a simple scroll.

I banished the layers as far as I could without exiting the Overlay entirely, until there was nothing in my vision but unfiltered reality and the occasional warning message—motor vehicle nearby, sidewalk repair ahead, the average wait time for the monorail and my various alternate transportation options, that sort of thing. I admired the bracelet Jak had printed up for me on the clinic's local fabbers, a combination wireless network antenna and bi-mono-directional instruction interchange. The interchange aspect was responsible for ensuring that there was no direct connection between my implants and the public Overlay feeds—like two cameras looking into two television screens, the bracelet did all the talking and listening, passing messages back and forth between me and my digital environment. Any unsavory type attempting to gain access would find only a list of machine code showing my instructions to the public Overlay, and any instructions such a person might attempt to run on my implanted hardware would be rejected, the same way someone standing on a street-corner would be fundamentally unable to coerce me into walking into traffic just by shouting. Executable code ran on separate, independent systems, communicating only by the digital equivalent of semaphore, and neither the two shall meet. It took a little practice, but I had already become used to scanning the constant digital chatter from the interface with only part of my attention, waiting for changes for me to take notice of, like hearing my name distantly in a crowded room.

The Overlay was the primary way the citizens of the Novacom interfaced with immaterial things, outside of public presentations. Books and film and notes and news and all manner of other information, all available for free and without advertisement or copy-restriction. I could, if I wished, engage almost physically with anything I was viewing or hearing, manipulating it and creating new works from that fer-

tile material. I could customize how I interfaced with it all, as well. Some people preferred floating displays, some preferred realistically-tactile facsimiles of books or paper, and some even summoned impossible sources, like a fully-virtual orchestra to play music from an otherwise empty patch of land nearby. If someone were to send me a message, I could receive it as floating text, or a letter, or a singing telegram, or a messenger pigeon, or any of a library of user-created interfaces. Currently I was browsing the weather forecast, generated from highly advanced models and ubiquitous sensors embedded across the whole of the Novacom—not to mention the Earth-facing orbital observatories—modeled for me as a real-time globe of the Earth. It was complete with weather patterns that I could zoom in on, down to a nearly arbitrary level of detail, and scent packages that carried accurate smells of wet earth and salt spray. I summoned the daily newscast, and a virtual avatar of a woman with a severely short haircut—undoubtedly a real person, but with her words and mannerisms previously recorded and mapped onto a dynamic physical model—began to read me the news in the style of Walter Cronkite, reclining comfortably on the virtual depiction of Canada I had summoned for the weather. I could even have a virtual assistant manage my schedule and correspondence, either abstractly or in the style of a valet or personal secretary.

The software that ran the internal and external components of the Overlay, like all software and indeed all functional works published in the Novacom, was regulated by a strict set of protocols to ensure quality, truth in operation, and the freedoms of the users to understand and modify the code at any level. On top of that, legions of interested programmers were at work doing these important checks, licensed and validated, with transparent channels for direct publication to distribution lists and major journalistic outlets. It was a critical element of the highly computerized society that was the Novacom, and an element of absolute importance in making sure the cybernetic data systems that underpinned the whole civilization worked as advertised.

I was browsing the menu of options when I realized that I could summon taste and texture sensations if I wished, and I grinned a little at the possibilities. My reading had suggested that some people approached food as I might have approached medicine. Instead of eating

meals, they would consume regular rations of nutritionally- and calorically-balanced food bars off the Basic Distribution menu and derive whatever pleasures they wished regarding food consumption from the Overlay, where of course all so-called food was free. That allowed them to spend their points on other things without having to give up the tactile pleasure of food.

"Having a good time?" said Jak. She must have seen the look on my face.

"The Overlay is fun," I said.

We had departed the Atamai Clinic that morning just after a late, leisurely breakfast. Instead of eating in the middle of the room as had been our wont, we instead took a table by the wide window looking out over the James River, sitting on what was almost a loveseat. We were eating, so I could not hold Jak's hand—the need to be close to her was almost overwhelming, after what had transpired between us the previous day—but we had sat thigh-to-thigh, which was certainly enough. I was still hesitant to ascribe too much to Jak's opinion on the matter, but I enjoyed the contact nevertheless.

Instead of taking the monorail, Jak had turned us aside and led the way down a long and meandering path along the river, past little restaurants and gathering-spaces. Footbridges and pathways arced overhead, taking people from place to place as we headed upriver. It gave me time to play with the Overlay, which I found useful, if a little distracting.

"So what's on the schedule for today?" I said. "Although with this breeze off the water, I could happily stay just like this."

Jak smiled and walked a little closer to me. "You'll see when we get there."

"You do love your surprises, don't you?"

"It's as much for your sake as mine. I have so much to show you, if I just did what I wanted and told you all about it immediately, you would hardly get to enjoy it."

"I could happily listen to you talk all day," I said.

"You've certainly demonstrated the truth of that," said Jak, shrugging her shoulders a little.

"I mean it," I said. "I like listening to you talk about the things you love."

Jak bit her lip, but said nothing, and did not look at me. I felt a twinge of hurt pass through my chest, but that was unfair of me—our relationship was complicated enough as revival and attendant without making assumptions about what she did or did not know—so I tried my best to put it away, to dismiss it as I had the Overlay. It was not so easy, but the breeze was cool and the sun was warm, and I was walking with a special person in a special place, so it was not so difficult either.

After about twenty minutes or so of walking, we left most of the park-like area that surrounded the Atamai Clinic behind us, and emerged instead into a pleasant little wood. I could barely make out the Carillon in the distance, so we were not so far as the meandering path made it seem. I appreciated the thought in that—a nice long walk, but not so far from the rest of the city that help would be delayed if it was needed.

Jak turned down a part of the pathway that looked much less used than the rest, and much wider, as if it was meant primarily for machines and not people. I imagined trucks trundling down the road, and suddenly the spacing between the trees and the high arch of their canopies made much more sense.

"We don’t normally bring people here," said Jak as we continued down the path. Before us stood a low, squat building of rough concrete, topped with a simple spire of unadorned steel, atop of which was the symbol of the whole Novacom—the chevron and the orbital rings of the Solar System. "It’s not really off limits, but we don’t encourage people to come by and disturb the system, or put its contents at risk."

"What is it?" I said. We had arrived at a set of thick steel doors, heavy and clearly reinforced from within. There was a complex locking system in front of us, capped by a large round mechanism. It resembled nothing so much as something I might have seen in an old bank.

"This…this is a Vault," said Jak. She went up to the door and waved at something I could not see. The mechanism spun, and the door opened. "I wanted to show it to you, because…" She glanced back at me, and there was something in her eyes, not pity, but more like…apprehension? As though she feared my reaction.

I went up to her. "Because?"

Jak refused to meet my eyes, looking somewhere around my left shoulder instead. "Because you said you were afraid. That you would wake up and it would be gone. We were afraid of that, too, so we built these Vaults." She led the way into the building. "It's better if I just show you."

The heavy Vault door closed automatically behind us as we entered the cool, dark space beyond the entrance, which turned out to be a wide, spiraling staircase wrapping around a central freight elevator. Jak led me to the elevator—gratefully, after all that walking—and it took us down, far deeper than I thought could be excavated in Richmond.

"Normally the water table is too high to dig down this far, so it really isn't worth the effort," said Jak. "We made an exception in this case. It was too important to leave to the risks on the surface."

At the bottom of the shaft, the elevator doors opened onto a massive open space that I was sure must be a natural cave formation—but no, there were the tooling marks on the walls.

There was also a man, standing by the flaring mouth of the short tunnel that connected the freight elevator to the rest of the space. He was by far the oldest-looking man I had yet seen since my revival, with wisps of grey in his long hair, kept back in a tail, and a beard that reached down to his chest. He wore a suit, with no tie, and patches on the elbows.

"Max, this is Marcus Morello, the Vaultmaster for the Richmond Node. Thank you for meeting us on such short notice, Master Morello."

"No problem whatsoever, Miss Atamai," said Morello. "And this is her?"

To my intense confusion and surprise, Jak *blushed*, her tan skin growing darker in the bright, white-blue light of the Vault. "This is her. Max Kustaja."

I took his hand when he offered it. "I'm sorry to have caused any trouble, Master Morello," I said.

He, uniquely of all the people I had met so far, did not correct me on the use of his title. "As I said, it's really no trouble. This is my task, after all."

He began leading us into the massive, dark space beyond the entryway, and as we passed into it the lights above turned on with a sharp sound of heating elements and closing relays. The space was indeed massive, but most of it was empty. Mostly it contained what appeared at first glance to be refrigerators with doors made of glass, but I realized as we passed one that it was, in fact, a bookshelf, stuffed with books and rolled-up papers. Another held racks of glass plates, etched with something I could not quite make out through the smokey glass. A third held clear-sided cubes, in which were complex pieces of machinery.

"What is all this for?" I asked as we passed what appeared for all the world to be a combine harvester, straight out of my memories.

"In the event of a catastrophic disaster that renders the Novacom no longer viable, the Vault is here to allow the full and total reconstruction of the Novacom—all of its technologies, all of its techniques, everything it has learned—in the minimal possible time. Over there—" He indicated row after row of tall vats made of brushed steel. "—are our seed vaults, enough to feed the city for a decade while these machines—" He indicated the combine harvester and the rows of heavy equipment behind it. "—do all the construction and agricultural work. There's another room, behind this one, where we are preparing to have volunteers run in shifts to be cryonically frozen, to provide first-hand expertise in case of an emergency."

"That's part of why my father's clinic is so well-regarded around here, and has so much clout," said Jak. "That's what we're working on. Rapid, easily-reversible cryonics, like Chris told you about."

"Until then, we have the Masterium," said Morello. "These cases you see around us are deoxygenated storage units, holding paper books and blueprints in case the data network fails. Every single city, ocean-going habitat, and space colony has one of these. Smaller villages have only backup copies of books and papers and some seed."

I spied something off to one side, and I stopped to stare at it. It was a rocket engine, sealed behind more dark glass. Beyond it were rows and rows of storage units, each containing dozens of rifles.

"Yes, even that," said Morello, a little sadly. "It would be wonderful to be able to rebuild in peace, but if rebuild we must, it's likely that peace won't be much of an option. Especially once the Novacom starts

claiming territory again."

"I…see," I said. I glanced at Jak, but she was staring at her feet, hands in her dress' pockets. "So what happens if someone invents something necessary to the Novacom that isn't already here?"

Morello nodded. "We make thorough copies of the blueprints, make sure it has its place in the step-by-step knowledge-rebuilding instruction set we keep down here on real paper or carbon plate—" He indicated the racks of transparent plates that I had mistaken for glass but were actually *diamond*. "—and if necessary we haul a copy of some machine or component down here and seal it away."

"And…artwork?"

"We have only copies down here, I'm afraid," he said. "But at a certain point, it's the image, not the thing itself, that is important. We have copies of films, books, music, anything deemed culturally important enough to save."

"And who decides that?" I asked.

"Usually it's the Novacom Arts Council, which handles public artistic displays and the construction of monuments at every level. But sometimes a petition comes up and enough people sign it, and we dutifully bring a copy down here, and down to every Vault in the Novacom."

"You must constantly be bringing things in and out, then," I said.

Morello shrugged. "Not as often as I might like, to be honest. Usually we keep this entire chamber deoxygenated, until we have enough new content in one of these storage units to warrant shipping it down here, in which case we typically just use the elevator as an airlock and wheel it in manually."

I felt my eyes go wide. "So you reoxygenated the whole place, just for me?"

Morello smiled—not at me, but at Jak. "It sometimes pays, even today, to have friends in high places."

Jak blushed deeper and looked away.

We wandered around a little longer. Master Morello showed me the entire library of sealed bookcases, including a preserved copy of the Constitution, complete with Novacom Charter and a set of all the books necessary to re-learn its foundational principles. There was even a set of linguistic tools, in case the language changed and the books

needed to be translated. Rows and rows of scientific papers, instructional texts, educational plans—anything necessary to teach the future population exactly how to do a fast run-up from apocalypse to full cybernetic system in as little time as possible.

Eventually Jak touched my arm. "Not to cut the tour short, after I brought you all the way out here, but I did also make an appointment at the courthouse…but of course I can reschedule, if you'd like?"

"No, not on my account," I said. "I'll go where you do, Jak."

Jak smiled, and I followed her and Morello back to the elevator. The lights shut off noisily behind us.

We left Master Morello where the wide path leading down to the Vault met the regular footpath we had come down not much earlier—he went farther away from the Atamai Clinic, while we headed towards it and the nearest monorail station.

"So…what did you think?" asked Jak after several minutes of walking in a companionable, if slightly awkward, silence.

I was silent for a moment, gathering my thoughts, and I could feel Jak getting tenser beside me. "You do a lot for me," I said, finally. "I cannot tell you how appreciative I am."

I reached out and took her hand in mine, and I did not let it go, even when we boarded the monorail and had to find a seat. Jak, for her part, did not make any move to resist the touch, and it was she who threaded our fingers together as the monorail accelerated out of the station at Carytown.

The courthouse was downtown, a rather modern-looking building—with the glass frontage that seemed fairly typical of Novacom architecture, at least in Richmond—and not at all how I imagined a courthouse in an old capital city like Richmond might look.

"It's new," said Jak. "The older buildings are museums now. The actual judicial process is much simpler today."

We were escorted down bright hallways full of natural light to an old-fashioned wood-paneled office, with actual rows of books of law on the shelves, and a judge's robe on a stand in the corner. A woman met us there a few minutes later. She was tall, her hair piled atop her head, clad in a flowing robe-like dress in dark earth-tones, and she swept into the room like a hurricane.

"Hello dears, hello!" she said, setting a tray of *petits-fours* on the desk between us. She reached down behind the desk and retrieved a bottle of something bright yellow, which she cracked open with a fizzing hiss and poured into a trio of glasses she removed from a drawer. "Fizzy lemonade?"

It was still July outside, and coming inland from the river tended to turn the refreshing mist of the water into a somewhat oppressive humidity, so Jak and I accepted.

"I'm terribly sorry I'm late, my dears," said the woman, "but you know how it gets! Never a dull moment in the legal system." She laughed brightly at her statement, and I felt a smile tug on my lips.

"Judge Reiner, this is Max Kustaja, my revival," said Jak.

"You can call me Mary-Anne, dear," said Reiner. "Now, Jak, I spoke to your father this morning, yes?"

"So I'm told, Judge Reiner," said Jak, very much in the manner of someone speaking to a familiar teacher.

"Her father and I are old friends, dear," Reiner said to me. She turned back to Jak. "And your father, dear, he told me something *terribly interesting*, yes? He told me you were going to the Vault."

"Yes, I took Max there earlier," said Jak. I watched, fascinated, as the blush crept up her throat.

A grin spread across Reiner's lips. "Fascinating, yes, simply *absorbing*." She maintained her knowing look for a few seconds longer as Jak's ears turned a delicious shade of dusky-pink.

Then she turned to me. "I'm told you're taking the grand tour of the Novacom, dear."

"Yes ma'am," I said.

"Mary-Anne, please," said Reiner. "What have you done so far?"

I ticked the places off on my fingers. "We took the tour at the political center, then the manufax, then the agridome, and the rec center downtown, then the Vault."

"Dear me," said Reiner, looking terribly pleased with something. She gave Jak a side-eyed glance, then refocused back on me. "Seems like our Miss Atamai is…shall we say, quite willing to go the extra mile?"

"She has been extremely accommodating," I agreed.

"Has she told you about how the legal system works here?"

"Jak refuses to tell me anything," I said. "She says I wouldn't enjoy it as much."

"More like the time would pass too quickly, yes?" Jak was no longer looking at anything except her hands in her lap. It seemed like it would be quite the day for Jak, being kept off-balance so often. "Never mind, never mind," added Reiner, waving a hand. "I'm happy to explain. It's quite simple."

She pulled out some paper and a pen and began to draw, the now-familiar cybernetics diagram I had first encountered in the political center.

"A legal system is a means by which rules are made, verified, and enforced," said Reiner. "When we implement amplifiers and attenuators of variety, we are empowering and restricting people through rules. Some of these rules are simple. A person is allowed to use a particular tool in order to accomplish a particular job, and are restricted from using other tools to do that job. An example might be, in order to improve manufacturing, a new kind of chemical is approved for use. Or, in the other direction, a kind of chemical might be *banned* from use, in order to prevent pollution or other negative consequences. *Some* system of deciding who makes those rules, and how, is necessary.

"Rules-making of this kind is not restricted to mere technological systems. As you learned before, Max, humans are also cybernetic systems, and they are embedded in other cybernetic systems, *alongside* technology. So what do we do and how do we do it?

"The first thing to understand is that we have a police force for a reason. Much has been made about the necessity and role of the police, and it's understandable that a group of people who are legally empowered to deploy violence in the enforcement of the rules should be under significant public scrutiny. What is *not* up for debate is *whether* to have a mechanism of violent enforcement. It is, simply, the only actual way to enforce the rules. It is not a perfect system by any means, and people do get hurt—obviously. But there simply is no alternative, given that we live in a physical world. The threat of compromise of the viability of the human system is the only meaningful threat that, at the end of the day, enforces behavior in those most disconnected from social function, those who either do not see or do not care about the ben-

efits of adhering to the rules of the system at hand. Public shame is a plausible threat, and indeed performs many informal functions of behavioral adjustment, but all it takes is a few people who don't care about their reputation to destroy a system and the lives it supports.

"This does not mean that we should not take great care in the design and implementation of our rules-making and enforcement systems. Quite the opposite, they need to be designed with the *most* care, and monitored constantly. Because the police forces are so important to society, and because they are the singular locus of legitimate physical violence in the enforcement of the rules, we spend a significant quantity of resources on them. We need to make sure that only the appropriate kind of person becomes a police officer, which takes significant psychological medical efforts. We need to make sure they are properly monitored at all times, which takes significant organizational and technological resources. We need to make sure they are properly trained in the latest in situational awareness techniques, and the appropriate handling of dangerous situations.

"In order to compensate for this significant expenditure of resources, we need to deploy the police against only those situations where doing so would be of the most help. This means that even as we amplify the variety of the police with data-gathering techniques and the monitoring of public alert channels, we need to attenuate the variety of the environment in which the police operate. To that end, the simplest thing to do is to make fewer things illegal. In the Novacom, anything you do to yourself which does not affect other people is almost certainly legal. The consumption of so-called illicit substances is legal, in appropriate venues—but no private vehicle in the country will activate for someone it determines is under the influence. In this way, we attenuate significant variety. Nobody is arrested for smoking marijuana in the park, and nobody is pulled over for driving while intoxicated. We increased public transit and de-emphasized personal vehicle use, so there are many fewer routine traffic stops to go wrong. The police officers don't have to be so afraid for their lives, and the risk of escalation with the civilian population is decreased.

"We also made everyone rich," said Reiner, grinning. "People have diminishing marginal utility curves. The more of something you have, after a point, the less pleasure or use each additional unit of that thing

will bring you. This is as true of food as it is of houses. So we make sure that the people's possibility for individual material consumption is about twice as much as the average point of inflection in the marginal utility curve. What this means is, people are so well-off materially that even a reduction by *half* of their economic ability to consume won't meaningfully decrease their quality of life. Therefore, the people are not only invested politically in the system that provides for them and to which they contribute, but there's a significant decrease in the material incentive for crime.

"But of course, material things are only part of what is necessary for a happy life. People need fulfillment in other ways. What we do, then, is spend the additional material production, that which is far beyond the consumption needs of the people, on *purpose*. We have the Outward Expansion so the frontier-oriented have somewhere to go. We have the Rewilding so that those concerned with preserving the Earth have something to contribute to. We have eliminated intellectual property, outside of acknowledgment, so that those with an artistic bent can create and alter and contribute to the artistic complexity of the Novacom. Even those with less socially-acceptable interests can be useful. If you found yourself interested in computer hacking, then you can be deployed to test Novacom security systems, for example. Society has given us half a planet, and now it's working on giving us a dozen more, and dozens more stations, and hundreds of ships. Archaeological digs, oceanic explorations, extraterrestrial geological surveys—or even, fantastical architectural opportunities, artistic endeavors not possible before the advent of full-immersion virtual reality, and many major opportunities to serve the public. Anything you have inside you that needs to come out, that defines you as a person, has a valid, acceptable expression in our society. Whoever you are, the Novacom has a use for you. This makes people yet more invested politically, but also, gives them a sense of purpose.

"You see how crime is systemic? By providing for the material and psychological needs of the people, by allowing them to contribute in their own unique way however strange, we *vastly* reduce the rate of crime. That's what it *really* means to be tough on crime."

"So what if you *are* arrested?" I asked. "Crime sometimes occurs for strange reasons, doesn't it? Unexpected intersections of motive and

opportunity."

"Sadly, that is true," said Reiner. "In the Novacom, if you *are* arrested and convicted, you go to prison. These are not the shabby little prisons of your day, Max. Once upon a time, there was a perceived notion that you did not want to make prison life better than life outside prison, because that might incentivize crime. So they made prisons worse, because not only was that better for the bottom lines of the private prison companies, it neatly avoided having the general population wonder why their lives couldn't be made *better* instead! At least it wasn't so bad as *prison*, they might say to themselves, while their precious lives were sacrificed at the alter of *making rich people richer.*"

I suppressed a private little smile. The more I learned, the more the same things kept reappearing. It occurred to me that this was probably evidence in favor of truth, but it might just as well have been a prevailing cultural milieu. Probably for the best, either way.

Reiner continued. "Our prisons today are places people go to be reintroduced into society, if at all possible. They have recreational and productive areas so people can find a purpose in life, and their rooms are private, with private bathrooms and doors that lock. As it turns out, just being unable to go around the world as you please is sufficiently motivating, and ends up being a reasonable deterrent. A person imprisoned has the opportunity to contribute to society, find their own purpose, receive medical and psychological treatment that they might have avoided until then. Whatever is necessary for rehabilitation and release. If they refuse…" She glanced at Jak.

"If they refuse, we used to just let them sit there, watching the world go by," said Jak. "Now they're given a different choice. They can have their implants forcibly constrain their behavior until such time as they agree to rehabilitation, or they can elect to be cryonically preserved for a set period of time, with regular awakenings and review. It has the potential to vastly reduce the expenditure of prison resources, but we only just started offering it. It wasn't possible before my father's work bore fruit. In short, if they truly refuse to be remediated, we take their present away from them. At least they get to sleep through it."

I felt a twinge of something strange settle into my gut. *I* had been part of that particular project, however unconscious I had been at the

time. The idea of prisoners being put into cryonic suspension was like something out of an old film, but I supposed it made sense in a world that was trying to optimize resource expenditure *and* minimize human suffering. Besides, it seemed as though in order to get to that point, you would have to refuse every option to change available to you.

"Luckily," said Reiner, taking up the conversation again, "we haven't had to do that yet. But you see the point, I hope? The first thing we did was manage the variety of the system. The police have fewer things to care about because we made fewer things illegal. What few things remain illegal are heavily disincentivized by our egalitarian material system and the myriad opportunities people have for meaningful contribution. And those who do commit crimes anyway are given every resource to help them improve, or can choose not to and face the consequences.

"These are the principles which guide the enforcement of our rules. Now I will tell you the principles that guide the *making* of our rules.

"We take a scientific approach to legislation. Keep in mind, Max, that just as the same cybernetic rules of organization apply at every level, the mechanisms which we have developed to implement those rules *also* apply at every level. When I describe the process of formal political legislation, it *also* applies to, say, the running of the manufax. In your day, there was a perceived distinction. It was somehow okay for corporations to behave dictatorially, whereas governments at least had to *pretend* to be democratic. That is not the case, here. Everything operates according to the same rules, because there is no meaningful organizational distinction between the government and a workplace. A small production line at a manufax might have direct democracy, with everyone there participating in the rules-making, whereas a large state in the American Novacom might have a sortition body do the rules-making, but it all works the same way. We also teach these principles to people in the context of managing with one's own *family*, but that's not something we can meaningfully enforce, so we just hope for the best.

"First, when making a rule, the legislative body in question must justify that rule. They have to show that they are empowered to rule in that jurisdiction, that the rule they propose is one that can be proposed without running afoul of the restrictions on rules-making in the Charter

and Constitution. They must show explicitly the legal precepts upon which the rule is based. Now, this obviously can require a lot of research, which is where the formal legal system comes in. People like me assist rules-makers at every level by providing research services and helping to edit the language of the proposed rule. Obviously this gives us a lot of power, which is why we have a system of appointment and approval similar to that of judges in your time, Max. Come to mention it, the judges themselves are appointed and approved in the same way. A System Five elected official like a governor or president proposes an appointment, and that person is approved by a System Three legislative body. Point is, our power and influence over regulation is, itself, regulated.

"Second, there must be some explicit goal of the rule. There must be a stated metric by which to measure the success or failure of the rule, and there must be a reasonable time period over which to judge the rule's success or failure. This is usually one to five years, to prevent the rules-makers from passing laws which last, in effect, forever, without scrutiny. Often, we write rules to be, well, inside-out. For example, instead of writing a rule saying what is prohibited, we might write a rule saying what is *allowed*. A law against undue discrimination, instead of having to list every possible way in which discrimination may *not* happen, might instead list the conditions under which such 'discrimination' is *justified*—for merit, for safety, that sort of thing. This lets us propose *general* metrics, instead of having to be annoyingly specific.

"Third, the rule must have explicit provisions for its enforcement or realization. Do the police need special training or equipment? Do the workers need special tools or education? All of this must be worked out as much as possible. At a very high level, it might actually be quite vague. After all, there really isn't much point in the sortition assembly at the level of the American Novacom telling workers in a single line at the Richmond Manufax precisely how to do their jobs. It's more likely that the American Novacom would direct the various states' regulatory bodies to develop specific rules for their own subunits in order to implement a particular *broad* goal, and so on down to the level of the individual worker. The point is, there must be work done to make sure that the proposed rule even *can* be implemented. It

also cannot contradict other existing rules, which is something else that people like me do research to discover. Think of it like a preemptive judicial review. Obviously, the world is a complex place, and we can't always get it right before the law is implemented, but it *does* significantly reduce the number of lawsuits and other legal complications the judiciary has to deal with. So, for that matter, does our system of property, or lack thereof, minimize the number of interpersonal lawsuits. Can't hope to gain *money* when there is no such thing anymore. Grievances between citizens, or perhaps between the people and their organizations, are arbitrated in other ways, designed to address the real issue at hand, whatever it might be.

"Fourth, our laws *expire*. If the rule, once implemented, fails to produce the desired outcome within the time period, as judged by statistical analysis, then it is automatically repealed. It must be re-entered into the system from scratch, with a full public analysis all the way from the beginning. If the rule *does* succeed, it is automatically renewed—once. After that, it is only renewed following a successful analysis of its continued necessity. It's possible that the rule accomplished its goal, but keeping it on would only clutter up the books. As you can imagine, this kind of thing takes up most of our time, but the end result is a fairly tight, effective set of rules and regulations that are understandable and interpretable by even those citizens without a strong background in legal scholarship. It's the modern equivalent of Hammurabi writing the laws of the land in stone and displaying them in the marketplace for all to see. In essence, our laws function themselves as cybernetic entities, of a sort, in the sense that they are interacting elements which have clear survival criteria, and must be effective in a real way to be perpetuated indefinitely. No junk DNA here, or adaptations which no longer serve any real purpose. Ruthless pruning, that's what I say, more legislative and less horticultural."

"It all sounds…kind of tedious, actually," I said.

"Well, that's the beauty of it," said Reiner. "It's a scientific process, instead of an arbitrary, mysterious, and unfalsifiable political one. It requires research, argument, justification, and ultimately a form of peer review. And at the end of it, you end up with fewer, but better-tested and more effective, legal restrictions, trending towards only those minimally necessary."

"Ah," I said. "Freedom, again? Minimal necessary interference?"

"Very good," said Reiner. "I can see why Jak likes you."

Jak, who had been taking a sip of her lemonade, coughed, and set her glass on Reiner's desk lest she spill it. Her cheeks went reddish again. I pretended not to notice.

"For my part, these days I mostly spend my time lecturing students at the university up the street. Nowadays, after so long and with such affluence in our society, the system runs pretty smoothly. We've long ironed out most of the big rules, and truly egregious attempts at unnecessarily constricting the freedom of the population tend not to make it very far at all. When I'm not lecturing, I'm doing legal research and advising on proposed rules. It's quite a fascinating way of life, actually. I'm never bored."

"How do the people find it?" I asked. "In my time, the law was this cudgel wielded against anyone who couldn't negotiate it, which was usually poor people."

"Well, legal representation is of course free. Paying people doesn't make sense in our system, after all. We also make sure that people cannot make careers or reputations in certain ways. When you might be a prosecuting attorney one case and a defending attorney the next, you aren't so incentivized to game the system or agree to unduly biased rules. That isn't to say we don't *have* bias in the system—of course we do. It's just a bias towards the defense. We would rather bias the system *away* from punishment, considering the potential power of the government's monopoly on the preemptive or vindictive deployment of violence. We don't allow minimum sentencing because every situation is different, but there *are* restrictions on what sentences can be called for. No death penalty anywhere in the Novacom, because frankly there are better ways to spend our resources.

"And, of course, most people who are accused of a crime just submit a portion of their personal lifelog for judicial scrutiny. It's easy to prove your innocence when you can just literally show that you didn't do it. It can't legally be compelled from you, as it's intensely private, but it's there if you need it. Between that and the public feeds, it's pretty easy to see when someone has or has not actually done something they've been accused of doing."

I mulled *public feeds* over in my mind for a moment, then said, "What kinds of rules should I expect, when I'm released on my own recognizance?"

"Pretty much just what makes sense," said Reiner. "Don't hurt anyone who isn't trying to hurt you first, don't steal things or break things if it isn't an emergency, that sort of thing. Mostly you'd only have to be concerned if you wanted a license for something."

"A license? Like driving a car?"

"That, yes," said Reiner, "but also professional licensing. The Novacom mandates that certain public-facing professions be licensed by an appropriate industrial body. What that license *requires* is broadly delimited, but it can be rather tricky. For example, the term *journalist* is now protected, so you have to have a license to call yourself one. Not having one doesn't prevent you from publishing, and indeed most people who publish are not journalists, but it does mean that if you have a license in journalism, you are legally bound to follow certain rules regarding objectivity and truth when publishing *as* a journalist. Usually, a news organization will have one or two licensed journalists on their editorial staff. The point is just to make sure that, if you call yourself an arbiter of truth, you'd bloody well actually *be* one. Most people get their news from cranks on the Overlay, but that's their business. Obviously the government cannot prevent publication outside of the interests of national security, but even those sorts of things are pretty obvious. The purpose of a free press is to secure the power of the people against tyranny, but the press itself cannot therefore be allowed to be co-opted by a deeper tyranny—that of the elite, or of sensationalism. It must truly *be* free. Luckily, technology and our egalitarian material system allows anyone with an opinion to shout it from the bloody rooftops, but hey, that's democracy in action."

"In your opinion, and I won't hold you to it, does all that improve the quality of discourse?"

"Yes and no," said Reiner. "It's certainly better than it has been for centuries, but people still live in their little bubbles. Sometimes literally, with the Overlay. Still, I'd rather have it like this than how it used to be." She tilted her head and quirked her lips, as if trying to learn a secret. "Is it true that people would just accuse one another of things, and then they'd be fired?"

"It is," I said. "Some people had protection, mostly if you were rich or if you were in a government job, but most people could be fired for any reason, and an accusation was just bad press. Supposedly it ‘didn’t count’ because it wasn’t the government doing it, but the government enforced the privilege of employers to hire and fire at will, and of course the forced scarcity of the system of private property and labor exploitation that made work necessary in the first place, so it didn’t make any difference. The rich and powerful got away with whatever they wanted, and they kowtowed to the people who made the loudest accusations, but never in any meaningful way. The screamers thought, charitably, that they were making the world a better place, but they were just a convenient idiot for the capitalist class to hide their mass theft behind."

Reiner laughed. "You really have had the whole tour, haven’t you?"

"We saw Thomas M’baga first off," said Jak.

"That would do it. That old revolutionary, he took that position so he could spend all day ranting about the capitalists." Reiner sighed and leaned back in her chair. "Can’t say I blame him, really, but don’t tell him I told you. Or your father, Jak. He’d never let me live it down."

Jak mimed a zipper across her lips.

Reiner frowned and stared into the middle distance for a moment, then refocused back on us. "I’m sorry, my dears, but I’m afraid someone has suddenly scheduled a meeting. It seems that the Virginia Sortition Board is considering a measure to add a new item to the Virginia Preference Census this year, and they need someone to double-check the legal argument. The previous year’s lottery is supposed to handle these things, but alas, they are but human." She wrapped up the remainder of the *petits-fours* in a cloth napkin, pressed the bundle into my hands, and had her assistant in the front room of her offices lead us back to the front door.

"It’s interesting," said Jak as we walked down the wide, pedestrian-only street to the monorail station. A train glided by overhead, whisper-quiet on its many wide tires. Even the various decorations on the buildings seemed, I now noticed, to absorb and redirect the sound energy. In the former street median, as was common in the city, grew rows of wide, shady trees and bright, fragrant flowers.

"What is?" I asked.

"I suppose I never really noticed before how unreal the past is to most of us here in the Novacom," said Jak. "Even Judge Reiner, who is an expert in legal history, seemed a little surprised to learn that the past was really the way we've heard it was."

"I suppose I don't really know how the past is taught to you," I said.

"Mm," said Jak, rocking one hand back and forth, "nothing particularly…evocative. You can look up any historical fact published in any journal or book anywhere in the Novacom just by thinking about it and letting your implants collate data on your behalf. It makes historical education a little…redundant."

We reached the monorail station. Like most street-spanning monorail stations I had seen in the city, it was a sleek, swept-back thing, almost more aircraft than transit station. The legs of its arches terminated on either side of the street, so pedestrian and emergency traffic could pass underneath it. Signs and billboards described various shows and events happening in the city, everything from plays to ballets to public political meetings. For advertisements, they were surprisingly tasteful. Advertisements in my day were blaring, bright things, clashing on purpose so you would notice them. These were still noticeable, but they were almost subtle by comparison, smoothly transitioning from one to another on electronic displays.

"You can filter them out if you'd like," said Jak as we waited for the next train, noticing me looking. "It's one of the lower Overlay options."

"I kind of like them," I said. "Informative without being distracting or annoying."

"It's amazing what can happen when marketing psychology is used for good," said Jak. She lifted an eyebrow as the sign nearest us changed to show an advertisement for a play being held that evening, not far away. "Would you like to see a play, Max?"

"Sure," I said. "An example of modern Novacom culture?"

"Well, it seems to be a revival of an old classic from around the time of the signing of the Charter," said Jak. She reached out and touched the screen, and the animation froze, settling into the poster for the play in question. "Oh, it's an immersive tour."

"What's that?"

"It uses the Overlay to add depth to the sets and create more immersive effects, that sort of thing."

"That sounds wonderful," I said. At Jak's grin, I added, "And now we have another stop on our world tour, do we?"

"Well, I make no promises," said Jak, "but I just might be able to swing something kind of interesting."

"How terribly unusual for you, Jak," I said, "taking me somewhere *interesting* for a change." I smiled at her, to make sure she understood that I was only teasing, but she seemed not to need it, for her grin only grew sharper.

"I promise, at least, that you won't be bored," said Jak. "I can't say if it will be *interesting* per se." She noodled about in the Overlay for a moment. "There's a showing in an hour. Normally I would suggest we get lunch, but, well…" She gestured to the bundle that Judge Reiner had given me.

"No kidding," I said. "I can wait a few hours to eat, I think. Which is odd, because back…well, before, I could have eaten the entire plate and still been hungry."

"Some of that is the metabolic rebalancing we did when we revived you, and some might be your implants kicking in and speeding up your satiety response to maintain good blood chemistry, and *some* is your implants powering themselves on the sugar you've eaten," said Jak, "but a lot is probably just, well, if you were anything like the typical working-class person, you're no longer stressed and depressed all the time."

I pondered that as the train arrived and we found a seat in its cool, air-conditioned interior. "I think you're right," I said. "Was that part of the revival process, too?"

"Only somewhat. If you were suffering from a natural chemical deficiency, or if you lacked certain neural structures for empathy and a normal emotional range, then we corrected that. But by default, the implants don't alter your mood or anything. They can't, without your express permission, and frankly it's something of a taboo to go around grinning your head off at everything. A normal emotional response is considered healthy, including anger and sadness."

"So that, at least, is my own," I said. The monorail train accelerated smoothly up and out of the station, taking us back towards the college.

"You're referring to the way you're being tracked right now?" said Jak.

"It's a little bit creepy," I admitted. "The idea of a *public feed*."

"You *are* in public," said Jak. "The usefulness of public surveillance is too obvious, for the benefit of the people, to ignore. The rate of wrongful conviction, even for what offenses remain, is far below statistical chance. But it does put a lot of power in the hands of the people who manage that system, which is why we have bottom-up observation as well. It's called *sousveillance*. It's the watched who watch the watchmen, as it turns out. Oh, we have the occasional troublemaker, that's for sure, but blackmail doesn't work so well when nearly every human vice is legal, or if it can't be legalized directly, a substitute is made that allows for the expression of that urge in a safe, harmless way. Full-immersion virtual reality is useful like that. Or you can just have it corrected."

"So if you have a citizen who has a…socially unacceptable impulse…"

"Say we have someone who, for whatever reason, really delights in the idea of murder. There's not a good way for that person to contribute, in that fashion, to society. You might think that a soldier is a good role, but it's more important that a soldier follow the rules and look out for other soldiers than it is that they kill people. Murder is different than war. So, either we make it clear that the person in question can have their neurology restructured to dampen that impulse to normal levels, or we can give that person a virtual simulation of the act. It's harmless, and while a lot of people think it's creepy, it turns what would otherwise be a maladjusted person into a normal member of society, strange vices and all. Sometimes, like Judge Reiner mentioned, we *can* even get useful information out of it, such as how to design better public spaces to increase public safety."

"I see," I said.

"One more thing, since we're on the subject of law enforcement," said Jak. "If you are in a position where you might be responsible for responding to an order, especially in an area of public importance, you

are legally required to follow a legal order when given to you. Your valid options, if you disagree, are to quit if able, or to follow orders and lodge a formal complaint. Refusing to follow a legal order in a publicly-necessary context is grounds for legal punishment."

"Sounds kind of…ghastly," I said. "Although we had similar debates in our time, when the government ordered its employees to do horrible things."

"Well, all such orders are transparent," said Jak. "If you're an intelligence operative or a soldier, there are exceptions to how transparent you have to be in issuing orders, but the program in particular cannot be hidden. If there were to be surveillance of the public, for example, then the existence of that surveillance must be disclosed, even if *who* is being surveilled, and for *what* behaviors and *why*, are all secret. Generally, government intelligence operates *outside* of the Novacom, but there are exceptions. The borders are not so airtight as some in the Novacom might like, after all. Of course, there are checks in that system to prevent would-be tyrants from abusing it for their own ends, but certain sections remain secret. That's part of why the decriminalization efforts and the sousveillance system exist, because it becomes impossible for the state to coerce someone through lies, or threats, or pressure. You simply expose some portion of your personal log to legal scrutiny."

"Sort of the darker side of the Novacom," I said. "I can see how that might…appear…when seen from outside of the system."

Jak shrugged. "The reality of the world is, some people are always going to try to destroy what someone else has built, no matter how well the system is designed to see to their happiness. It is incumbent upon that system to see to its own defense, even from inside. You, for example, as a viable system, have an immune response. If one of your cells becomes cancerous, or is infected by an outside element, your immune system reacts to destroy it, or at least to isolate it. We, as a viable system of viable systems writ large, can hardly do, much less be *expected* to do, any less. The important thing is that the system does this *as little as is necessary*, and *trends* towards doing it *less and less*. The individual person is still a respected independent system, but that has political limits as well as natural ones. There's simply no getting around it—the alternative is far worse."

"So if you have nothing to hide, you have nothing to fear?"

"No," said Jak. "Your private life is your own, outside of a reasonable criminal investigation. Whether you want to make it easy on the system to exonerate you if you are accused of something is your business. But if you're in public, you don't really have a right to privacy, at least not in terms of the system being able to see where you are and what you are doing. It might not be able to record your conversation or your precise geo-location, but if you're walking down the street, it's going to know that you are, because here you are in public. The picture of the Novacom generated by the surveillance system is necessarily quite abstracted, but it's there for a reason, and most people are grateful for it. It's as transparent as we can make it without allowing the news media to generate scandal or outrage from decontextualized clips, and its goals and motives are justified in writing, but as much as we might want to, we cannot—and likely should not—tell everyone everything."

"I suppose I do understand," I said. "Still, it's…disconcerting."

"Like I said before, the scandal of some person picking their nose in public wore off a long time ago. And most things the old puritanical society would try to shame you for are now legal, or have legal alternatives. And of course, outside of that old devil politics that we have minimized as best we can, there's not much reason to attack one another for position or status. Certainly, if you were so attacked, you would not have a *material* impact, and outside of an actual crime no organization can legally dismiss you just because someone didn't like something you said one time ten years ago. Frankly, that all got very old back around when the Charter was written, when we had counter-revolutionaries coming out of the woodwork to accuse people of this or that stupid thing. But the cat was out of the bag by then.

"Bottom line is this: there's not much nowadays that people care about in terms of what other people do. Our educational and cultural systems are very thorough, and people generally understand that their freedoms are predicated upon the freedoms of others, and our legal framework supports this explicitly. You really have nothing to worry about in public, and in private your world is your own."

I did feel a little better. "Thank you, Jak." I frowned. "But is my personal log running? I'd hate to have a gap, if it's that important."

"It's on by default," said Jak. "Nobody can access it without your permission. The encryption goes so deep that it's perfectly unique to each person. It's almost…psychological. That being said, social engineering still works on our normal human minds, so be careful. But don't worry *too* much about it."

The monorail pulled into the next station, and Jak led me out of the train car and down to the street. Beside us on one side was a broad, tree-filled park—Monroe Park, my Overlay supplied—and down the street a bit was an ornate building, with onion domes and a wide marquee.

"The playhouse," said Jak. "Shall we?"

She offered her arm to me, and I looped my arm through hers, and together we walked into the cool, dark interior of the theater. She handed me something in the Overlay—an ornate, old-fashioned-looking movie ticket—and instantly a dashed line appeared in my vision, leading to a pair of seats around halfway down, outlined by augmented reality. I remembered that I had put Jak on my surface-level whitelist, allowing her to send me notes and tickets and such through the Overlay without asking my permission each time. It was quite convenient.

Above us rose tiers of balconies, and before us was a perfectly normal stage. As we sat down, Jak did something in the Overlay that I could not see, and a little robot on silent wheels rolled up to us, dispensed drinks for us, and rolled away.

Soon, the lights dimmed, and a prompt appeared in my vision. I glanced at Jak, who smiled and nodded, and I accepted the interface from the theater. The sight of the theater before me—and the audience—melted away, replaced by the stage, floating in blackness. Jak was beside me—I suspected it had something to do with the fact that we had tickets together—and together we watched as the darkness bloomed with light, until it formed the cloudy, hazy scatter of the Milky Way Galaxy.

As the actors appeared on stage in plumes of smoke, Jak's hand found mine, twined our fingers together, and squeezed.

It was a little difficult to concentrate on the play after that, but I managed somehow.

# CHAPTER 6

When we emerged, finally, from the theater, blinking against the sudden afternoon sunlight, we did not come out into the same calm, almost pastoral image of Monroe Park that we had left behind. Instead, there were people standing, marching in circles, holding signs and chanting.

"What is this?" I said.

Jak frowned and checked something in her Overlay. "Apparently there was a protest scheduled here for around this time. I'm sorry, I didn't notice."

"No, it's fine," I said. "In fact, could we get a little closer? I'd like to see what people in the future have to protest about. It seems like a pretty nice place, in my opinion."

"I think so, certainly," said Jak, "but of course we have our problems like any society. Most people don't really understand how bad it used to be." She shrugged a little, not looking at me. "Certainly I didn't, and I know more about the old days before the Novacom than most."

I squeezed her fingers in mine again, and we crossed over from the theater to the park proper. I could see the signs more clearly now that we were not looking at them through trees and between people.

"They're protesting…the war?" I said.

"They mean the anti-Coalition actions in Eurasia and Africa," said Jak. "Truly, it rarely comes to actual violence. Usually the Novacom only has to engage in actual combat when securing an area against opportunists after some natural or economic disaster, or when covering a retreat."

I studied the signs a little more. As I watched, a woman came up to us, with pure white hair and golden eyes framing a face a shade lighter than Jak's own. She was holding a stack of actual paper pamphlets, and she held one in our direction. I reached for it, but Jak stopped me, hand on my arm, and pulled a handkerchief out of her pocket.

"You don't need to worry about that," said the woman. "It isn't possible to do it without permission."

"There's still such a thing as a contact poison," said Jak, taking the pamphlet with the handkerchief.

I looked back and forth between them, astonished. "I don't understand," I said.

The woman rolled her eyes. "I've known her for *years*. She's just making fun of me. Jak here pretends to think I'm going to try and poison you, or try to hack your implants, because *she* is in support of wasting *precious resources* against people who will just collapse under their own weight anyway." She directed the latter part of the sentence at Jak, who had summoned a robotic trashcan and deposited the pamphlet *and* the handkerchief into it.

"The resource expenditure on the Globalization Initiative is hardly what we would call a waste of precious resources," said Jak. "The influx from the asteroid fields is more than sufficient to dedicate a small percentage to such an important task."

"The resource in question is *people*, you sociopath," said the woman. She turned back to me. "I'm Ai." She held out her hand. "I'm not going to poison you," she added.

I glanced at Jak, who sighed and said, "No, she isn't going to poison you. Certainly not with me watching."

I took her hand. My Overlay did not do anything to suggest that Ai was playing some trick, but then again, I was not *totally* sure it would.

"I suppose it's polite to introduce you," said Jak, frowning at Ai. "Max, this is Ai Kuroda. She and I disagree *strongly* on what constitutes proper foreign policy, but she *is* harmless. Ai, this is Max Kustaja. She's my revival."

"Yes, well, welcome to the future, I suppose," said Ai. "Jak has been telling you all about how the world needs the Novacom to intervene on their behalf, I suspect."

"Actually, she's hardly mentioned it," I said. "Mostly I've just been learning about how things work around here. It's very different from my time."

"So I'm told," said Ai. "Talked to Thomas M'baga, have you?"

"I have," I said.

"Of course you have," said Ai.

"I suppose I don't understand what it is you're protesting against," I said. "Is there a draft? Are people being coerced in some way into going overseas?"

"No, nothing like that," said Ai.

"Or is the marginal resource expenditure such a constraint on the system that some important project isn't being done?"

"Also no," said Ai, frowning.

I lifted my hands in a gesture of helplessness.

"The *problem*," said Ai, glaring at Jak, although I had been the one speaking, "is that I believe other people have a right to self-determination and the Atamais do not."

"As I have said so very often, we *do*," said Jak, "but we *don't* believe that self-determination is even *possible* under the capitalist system the Coalition uses."

"I believe in the Novacom system as much as anyone," said Ai, "but if indeed the people of other countries desire freedom of our kind, then it should be up to *them* to engage in it, and when they have taken power in their own countries, to join us willingly."

"We never coerce people to join us," said Jak. "We simply make the opportunity available."

"By spreading propaganda, and fomenting political dissonance," said Ai.

"It wouldn't be possible in the first place if the material and political conditions in those countries were not sufficient to support it," said Jak. "We would be nothing more than a bunch of cranks standing on street-corners. The fact that there *is* so much unrest in the Coalition is *proof* that the sentiment exists, but lacks the ability to express itself. And not *everything* pro-Novacom that happens in the Coalition is violent."

"The violence isn't the point," said Ai. She wasn't even looking at me by then. "The *point* is, we're there, in our ships, just over the horizon. They know we are. We even make an escape route available for people who want to immigrate. There's no reason to do more."

"It would be irresponsible of us to allow the Coalition to make meaningful overtures against us, militarily or otherwise," said Jak.

"Defending the Novacom doesn't mean infiltrating other sovereign nations and undermining their system of government," said Ai.

"They can hardly *be* sovereign under modern conditions," said Jak. "Independent sovereignty, political autonomy, it's a myth! The cybernetics won't allow it. The world is too small, too interdependent at the base of it, current political realities notwithstanding. Only individual

autonomy has any real meaning, and only then in a general cybernetic context. It's basic Hegelian deontology, the unity of individual desire and social benefit! The Coalition clearly *isn't* viable without our cooperation, so why give it?"

"It wouldn't be such a problem if the world were bigger, now would it?" said Ai.

"Surely you can't be suggesting we bring down the Blockade?" said Jak.

"Our refusal to render material aide only foments resentment," said Ai.

"Handing them resources for nothing would only prop up the exploitative system against its own contradictions," said Jak.

"So let them go out and get them on their own," said Ai. "Bottling them up—"

"Accelerates the inevitable," said Jak. "It would be unconscionable to give them a centimeter of space to let them push their problems onto future generations, and to keep them as a thorn in our side. Novacom *owns* outer space. Why should we give the Coalition so much as a *crumb* just for them to stick it in our eye?"

"I'm sorry," I said, and both women looked at me, identical expressions on their faces, as if surprised to remember I was even there. "What's the Blockade?"

"The Blockade," said Ai before Jak could even open her mouth, "is the network of military satellites orbiting the Earth that prevent anyone from going anywhere without the Novacom's say-so."

"It prevents all military maneuvers across borders, as well as all space launches except those sanctioned by us, yes," said Jak.

"So the Novacom is the only polity with space access?" I said.

"Yes," said Ai and Jak together. They looked at one another and frowned.

"It *also*," said Jak, still glaring at Ai, "prevents Coalition countries from moving against *one another*, as well as reducing our expenditure of *precious resources*."

"It's a gun pointed at the head of half the world," said Ai. "They have to trust in our benevolence."

"Better than the reverse," said Jak. "And besides, if you're so concerned about the Coalition coming to its senses on its own, the Block-

ade has to be a good thing, right? Keep them contained, keep them from fighting one another over scarcer and scarcer resources, until they join us peaceably."

"Scarcer and scarcer resources?" I asked. "Surely their technology isn't so backwards compared to ours?"

"They don't have access to the asteroid fields, they don't have access to the space solar power satellites," said Ai. "They're running on location-limited renewables, nuclear power, and *oil*, for crying out loud. We don't even let them mine the oceans."

"The 'oil' is mostly bio-petroleum," said Jak at my confused look in her direction. "But it does take up a sizable part of the output of their arable land, yes. Plus, the Sahara grows bigger every year. We could fix that, eventually, but first we want them to agree to join the Novacom."

"A high price for *food*," said Ai, arms crossed over her chest.

"Why should we be responsible for part of the planet over which we have no legal authority or jurisdiction?" said Jak. "It doesn't make sense. We can't be the good guys and the bad guys at the same time. Either join us or solve the problem yourself, I say, and they *can't* solve the problem without overthrowing the capitalist system. I don't see how that's our fault."

"We have the ships, we have the Underground, and, fine, we have half a million tonnes of paper leaflets," said Ai. "We don't need to go around giving succor to separatist movements *inside the borders of other countries*."

"You know as well as I do that they don't allow people to leave so easily," said Jak. "The alternative is we conquer them with force, which we can do, but even *I* would prefer that not happen, not when it doesn't have to."

"That's not the only alternative," said Ai, "it's just the only one you *want* to see."

"It's the only other one that achieves the goal," said Jak. "I don't care how *mean* it is, what we're doing right now is the *least bad* option without giving up the goal of a global humanity, *which is necessary* for the same reason that common ownership of the means of production is implied by the need for a functional metasystem. It's just cybernetics!"

"We could just leave them alone, and accomplish the same goal!" said Ai, throwing up her hands in exasperation. "And here we are again!"

"I fail to see how that unites all of humanity under a common banner, *or* protects the innocent in the Coalition from the selfishness of their oligarchs," said Jak, folding her own arms across her chest.

"The Earth is one small planet," said Ai. "In a few decades, we'll have at least as much carrying capacity off-planet as we do down here, not least of which is because of our high life expectancy and declining birthrates. We could easily just help them until that time."

"And what, cede ground forever?" said Jak. "Let them come after us into space? Or worse, feed them the scraps we deigned not to mine? Because we can already convert nearly the entire mass of an asteroid into useful material. Once we perfect industrial molecular assembly, there won't be a reason *except* kindness to leave them anything else—even *dust!* If they join us, they get all the benefits *now*, as well as the dignity of being able to achieve something genuinely, instead of merely whatever we *allow* them to achieve. There's no better option than trying to bring a speedy, *peaceful* end to the Coalition, *from within*."

"I disagree," said Ai.

"You *can't*," said Jak, with the air of someone saying something for the millionth time. "You have to have some better argument or evidence than I do. If we have the same assumptions and the same data, logic dictates we have the same conclusions."

"What is it exactly that the Novacom hopes to accomplish overseas?" I said to Jak.

"We are trying to provide aide to the people who wish to be free from the shackles of capitalism," said Jak.

"And what do *you* see the Novacom as doing overseas?" I said to Ai.

"Interfering with legitimate, and by all accounts *fair*, public discussion," said Ai. "Are the treaties not signed that allow dissenters to leave without interference?"

"And what good is a treaty when the people are subjected to propaganda and intimidation?" said Jak. "A person who is not fully informed cannot be said to have made a real decision."

"And they allow *our* information in, don't they?" said Ai.

"In the form of heavily-ridiculed tribalist nonsense," said Jak. "They're still talking *racial privilege* and *cultural autonomy* over there like it matters a jot!"

It seemed that the future had not yet overcome political…call it *discussion*. At least nobody was throwing punches.

"I think I'll just go get something to eat that isn't made entirely of sugar," I said. Jak nodded her understanding—she had my locator identifier, since she was my attendant—and I wandered over to a vending machine rooted in the pedestrian-only street that ringed Monroe Park.

It was a pleasant little machine, truth be told. Unlike the boxy, utilitarian vending machines of my youth, or even the garish ones that advertised some or another product, these were sleek plastic, varying in color and design. This one was decorated in the same style as the surrounding architecture. In fact, as I looked more closely, I saw that it was quite nearly a miniature of the theater we had just vacated, complete with onion domes. When I put my hand to the detector, an image appeared in my vision; it could have done so on a little screen built into the machine, but I preferred the interactive display in my Overlay. I made my selection—hot dog with mustard, french fries, cola—and watched the display in the corner of my vision count a tiny sliver of my week's allocation away into the aether. In a few moments, the top of the machine hinged open, and there under a biodegradable cover were a likewise biodegradable tray and cup, holding my food. The cola was ice-cold, and the food was piping hot, and not at all soggy from the steam. I wandered back to Jak and Ai, still arguing, as I ate.

At length, Ai was interrupted in her latest point by something in her Overlay, and she sighed. "The protest period has expired. Not that I haven't enjoyed our little *discussion*, Jak, but I'm obliged to help take down the banners." She eyed Jak for a moment, then held out her hand, and said, "You take care of yourself."

Jak took Ai's hand in hers and said, "You as well."

When Ai had gone, and Jak and I were on our way to the monorail station—by way of the vending machine for another hot dog; Jak had admired mine—I said to Jak, "You must be good friends."

Jak glanced at me, brow furrowed. "I suppose you could say that. I'm not sure we'd ever be able to get together without arguing about politics, though."

"Takes all kinds," I said.

Jak nodded thoughtfully, chewing. "And what about you?" she said. "Have any life-changing epiphanies about the international political policies of the future?"

I shrugged. "I'm still supremely thankful I ended up here instead of in the Coalition. And it seems that Ai is, also, although by different means."

"She is," agreed Jak. "I would never say she should leave, or anything. It's her country too. I just don't see the point in beating around the bush." She glanced at me again. "Sorry. I don't mean to try and foist my politics onto you. If you agree with Ai, it isn't going to bother me. It's not like I can't see her point."

"It *is* kind of interesting," I said. "It's not a very different discussion at all from what we might have had in my day."

"Context is king, as they say," said Jak. "The same actions under different contexts can engender very different responses. Besides, when you get right down to it, I don't *really* have a disagreement with Ai. We both think the rest of the world should join us in the Novacom. We just disagree on *how*. It's a perfectly valid discussion to have. And, maybe, we temper each other. Not too much or too little."

"In the end, how will it be decided?" I asked.

"In something like this, that's what our diplomatic corps and military advisors are for. Like your time, we leave foreign policy up to certain modes of decision-making. Some are deliberately concentrated in a single person, like with military maneuvers. Some are distributed among various levels. For example, if we were to decide to conquer the rest of the world and forcibly bring it under our rule, which not even *I* am advocating, we would have to poll the whole country. That's not the kind of thing we want to commit ourselves to without a lot of buy-in. That being said, minor military maneuvering, or a rapid response, doesn't require the same democratic machinery, although there are mechanisms in place at the Novacom level for limiting the abilities of the Novacom President to act. And, it must be said, only a simple majority is needed to commit ourselves to war. Product of the time it

was written, I suppose. The Novacom was nowhere near so established, and even though it was based in a powerful country, it was still one against the world. We didn't want to be…held up by mere sentiment."

She shrugged. "I suppose I come down on one side of the argument we had all those years ago, and Ai comes down on another. It's the way of the world. Doesn't mean we can't be friends, I guess."

It was a contemplative, but not uncomfortable, silence that brought us back to the Atamai Clinic. This time when Jak escorted me up to my room, after she had bid me good night, she hesitated at the door.

"I want you to know something," said Jak. Curious, I waited. Jak was outlined in light from the hallway, and it gave a serious cast to her shadowed face. "Taking a revival out to a play isn't something we attendants do very often. I've never done it before, or anything like it. It…it isn't considered unethical. It's not even necessarily taboo. But I, at least, have always felt that a certain distance between attendant and revival was appropriate, at least for a while."

I shrugged. "I don't mind. I'm not going to complain about it or anything, if that's what you're worried about."

Jak shook her head. "No, like I said, it's not a *bad* thing. We're *supposed* to be your first friend in this new world. But it *is* a brand new world for you out there, and there is a certain psychological tendency for people to stick to those who represent safety. I…I suppose I just don't want you to think I'm trying to take advantage of…I don't know, some unsettled psychological state, o-or overwhelm you with new things…or something."

"I don't feel particularly unsettled," I said. I moved closer to Jak and took her hand in mine. She did not resist, but neither did she look at me. "Or overwhelmed." I squeezed her fingers. "Jak, this new world you've shown me…I told you, it's like a dream I'm afraid I'll wake up from. And you're part of that dream." I stepped as near to her as I dared, our bodies so close that I could feel her warmth against my skin. "You're very special to me, Jak Atamai. You've made me feel more than welcome, you've made me feel *comfortable*, and I'm so grateful you became my attendant. And I would be more than willing, more than *happy*, to go anywhere with you."

She lifted her head, finally, to look at me, and we were so close together I could feel her breath on my cheeks.

Jak's gaze flickered across my face, my lips, and for a moment I thought she was going to kiss me.

"That's…good," said Jak. She stepped away, back into the hallway, and let her arm drop, her hand falling from mine. "Yes. Good. Um." She rubbed the back of her neck. "Anyway. Tomorrow. The usual time?"

I felt a little bereft at the distance between us, but it was no longer any kind of hurt. It was only time that was necessary, now, and time was something we, humanity, finally had enough of. "I'm looking forward to it," I said.

Jak just nodded, pointed down the hallway as if to say *I go this way now,* and stiffly walked away.

I closed the door behind her, feeling warm, and used my Overlay to tell the shower to start mixing water. In the past few days, I had come a great distance, not least through time. But watching the blush creep up Jak Atamai's neck all day had made me feel very much at home. For all that the world—and my own self—had changed and been changed, we were still, in the final analysis, human, and that was a source of such relief that I was asleep the instant my head hit the pillow.

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It was a strange sensation, strolling through an apartment that, technically speaking, was not actually *there*. Oh, it was *somewhere*, obviously, or else the Richmond Node Real Estate Distribution Authority would not be offering it to me. But still, it was strange, knowing that Jak and I were sitting in my room in the Atamai Clinic, studiously ignoring the real world in favor of this consensual hallucination. I understood then why the immersion pods were available at all, because if I allowed myself to think too strongly about the fact that I could feel, under my arms and back and legs, the smooth upholstery of one of the large, comfortable chairs in my room, the conflicting sensation of walking around an area that was, for all intents and purposes, *extremely real*, would give me whatever the holistic equivalent of vertigo happened to be.

"And this is the view I'll have?" I said, looking out the main window. I was idling through an apartment in one of the housing blocks that crowded pleasantly around one of the artificial lakes near the Clinic, with a fantastic view of the Carillon belltower, the river, and the woodland that blanketed the area in between. On the other side of the building, I knew, was an equally brilliant view of the Richmond urban zone, right up to the edge of the Central Virginia Rewilding Preserve, but having lived all my previous life in the arid desert of the American Southwest, I would rather gaze out at the river on a quiet summer's evening.

"It is," said Jak. There was no such thing as a real estate agent anymore, of course, as the automated systems that negotiated the ebb and flow of permanent and semi-permanent residents of the city of Richmond managed all of the available personal and professional estate needs—although there *were* those, like Jak was doing for me at that exact moment, who enjoyed helping people find residences that would suit their preferences. I could have downloaded the full dossier on the apartment myself and had the Clinic's embedded systems tell me the answer to every question, but frankly, it was more fun to let Jak do it. It gave us an excuse to be together, and that was something we took to with great relish.

It had been something of a subdued morning, in fact. Jak had returned to my room at the usual time, and taken me down to breakfast by the window as had become our fast custom, but there was no excitement about the day's schedule, mostly because there was not one to be had. The next stop on our grand tour of the Novacom's general systems structure, the local university, was of course available all day every day, but as it happened our would-be tour guide was out of town at a conference until the following day, so we had a day to ourselves. And a very important piece of news, courtesy of one Jak Atamai.

*"I have applied to be removed as your official medical attendant," she said without preamble, with the air of someone ripping off a bandage.*

*I went still, eyeing her in confusion. "Why?"*

*"Because I'm developing some very strong feelings for you that I'm terrified will compromise my effectiveness as a transitional aide," she said, without embarrassment or reservation. "I'm not a doctor, so*

*strictly speaking it's not an ethics question, but it could very quickly become…complex."*

*"So I'm going to have another attendant?" I said.*

*"Normally…yes," said Jak, wincing. "But…well, you've done extremely well at assimilating, and you haven't had any problems at all with your physical recovery, so with your permission…I'd like to get you out of here."*

*"You mean, leave the clinic?" I said.*

*Jak nodded. "We can get you an apartment, anywhere in the city you'd like. Or even a house, if you don't mind being on the outskirts a little. Or, you know, if you don't want to live around here, there's a superabundance of open housing out in the rest of the Novacom. Or… you could stay in the Clinic, at least for a while. I don't want to pressure you."*

*I turned this over in my mind for a long moment. "And if I do decide to move out…you'll still come by? To visit?"*

*Jak had her hands steepled on the table between us, tapping her fingertips together. "I'd hoped I could come by rather a lot, actually. The idea is I could spend as much time with you as we wanted, for whatever reasons we wished, without bringing undue scrutiny. Professionally speaking."*

*I felt a smile spread across my face. "Well then, in that case…I'd better pick an apartment close by, don't you think?"*

*Jak stared at me for a long moment, as if astonished at my answer. Then she grinned, a little desperately, squeezed her hands into fists as if unable fully to contain her emotions, and said, "Yes, I think that can be arranged."*

I shook myself out of my reminiscence and said to Jak, "What is the average monthly point-cost for this place?"

"Well the material design has a high thermal inertia, so it's going to be standard room temperature year-round with minimal imposition on the public resource bandwidth," said Jak, reading from a brochure in her fingers that was not actually there. "The building itself, right down to the glass and the sun-side thermocouples, is almost totally energy-sufficient for lighting and heating, so long as it's occupied. It's much less intensive than most places, barring any high-load energy uses. Depends mostly on how many showers you take, as it turns out. And it's

already built, so if you include a minor contribution of resources to the maintenance of the building, the monthly outlay is actually quite reasonable. This was a Basic Distribution project, not the desire of a specific group of co-habitants, so there's plenty of room—and your monthly outlay costs go *down* as global productivity improves. To put it in terms from your era, it would be sort of like if your rent actually *decreased* over time."

She turned the brochure around to show me, and instead of a page full of text and images I would have to decipher, it showed a list of calculations, assumptions, and possible variations on a typical energy profile for that complex, with my expected recurring expenditure in points outlined in big red numerals.

"That seems very doable," I said. "Although I do want an immersion pod in here, if I can."

The numbers shifted as I watched, and together Jak and I winced. "Well, still perfectly doable, but much more in line with a single private residence," said Jak. She flipped through the pamphlet some more. "Building committee meetings are on the first Monday evening, those aren't mandatory but I do recommend you go the first few times, and keep an eye on the newsletters. Most of your daily interactions with the Novacom's decision-making systems will be at the place you live, including filling out the yearly Preference Census."

"Understood," I said. "How does it work for single private homes?"

"Neighborhood associations," said Jak with a grimace.

"They're that bad? Even these days?" I said.

"Some things don't change," said Jak with a wry smile. "That's why I recommended an apartment. Much less nonsense about coordinating lawn decorations and architectural styles and *blah blah blah*." She waved her hand dismissively and went back to the pamphlet. "Heated pool's open all year, so that's nice."

I summoned the simspace's environmental control system and began flicking through the furniture catalog. While I could have a custom piece commissioned from one of the many furniture sculptors around the Novacom, it would be much less points-heavy to get something customized from a base model produced *en masse* down at the manufax. Jak had warned me against the temptation to spend too many

points. Although the productive capacity of the Novacom was such that even the food on the Basic line—the food that did not cost any points, as it was produced from resources set aside for situations where someone had run out of points or did not care to spend them on food—was plentiful and varied and getting more so every year, it was also rather straightforward, as it was all made by machine. Running out of points on your first out-of-one's-parents'-house apartment was something of a minor rite of passage, but one best avoided in any case.

When I had filled the various rooms of the apartment with decorations and furniture in the Mid-Century Revivalist style popular in the Novacom-at-large—not least because of its relative simplicity and concomitant ease of manufacture—I went and surveyed my handiwork from Jak's other side, so I could see her in the full context of the space. Watching Jak engrossed in something, limned in the light from the wide floor-to-ceiling sliding glass door that led out onto a broad balcony, surrounded by *my stuff*…

"I'll take it," I said immediately.

Jak looked up from her reading, glanced around the apartment, and smiled. "Very nice," she said. "Very modern."

"I was never able to afford anything like this before," I said. "You saw my place. It wasn't exactly…fancy. I want to wake up every day surrounded by the stuff of this new and beautiful future." I went up to Jak, took her hand in mine, and said, "And you, too, of course. I've grown accustomed to having breakfast with you."

I watched the blush creep up Jak's neck as she smiled at me. The simulation controls were very thorough for what was ultimately just an apartment walk-through.

"So uh…" I said when the moment had gone on long enough. "How do I…?"

"Oh!" said Jak. She plucked the brochure from where it hovered in space near our heads, flipped to the very back page—and there seemed to be many more pages than the thin volume would suggest—and held it out to me. It was a basic agreement of behavior, boilerplate—I had read a million of them in my time—already populated with my information. All I had to do was read through it all—it would not allow me to progress until I had actually *read it*, the system tracking the saccades of my eyes—and agree to it the same way I agreed to anything

that required authentication through my implants.

"I don't have to get approval from the rest of the building?" I asked.

"Nope, not for housing built on Basic," said Jak. "You actually have to screw up before they can kick you out, and that's what the personal log is there for, to help prevent fraudulent charges against you. Of course, it doesn't force anyone to be nice to you, but too many complaints of that sort of thing gets an audit, and if they fail on grounds of discrimination or bullying, they lose a lot of privileges. Like, for example, losing their reputation bonus in the regional real estate management assembly, which means they don't get as many new residents who can split the yearly maintenance costs, which means the building doesn't get that new coat of paint it might need, which further decreases the likelihood of new tenants…so on and so forth. Not good."

Sometimes the sheer complexity of the modern democratic system astounded me, but it would interface with me hardly more often than it had when I was alive the first time, and almost totally in areas that I actually cared about, that affected me directly, and that I could stand to deal with. Of course, there was always the threat of sortition, which would dedicate one first to a year's appointment to a statistically meaningful opinion-sharing body at some planning level, and another year's rule-mongering and up-bringing of the next year's body. There was also the looming presence of the next representative election, such as they still were, anti-partisan and heavily regulated—but those were quotidian, safe, no more than annoying and not likely to come up often.

"Basic doesn't pay for maintenance?"

"Nope. Not unless the tenants give the building back to the government, which means giving up all direct control over the building itself. See? We still have material incentives for good behavior, just none that leave people starving or homeless. Having *power* over your own life is, itself, a powerful incentive. If you want it, you'd better play nice."

"I see," I said. The Novacom's less shiny side, I supposed, but nothing egregious. Well within the standard idea of the social contract.

When I had signed and the system had acknowledged me as the new owner, I also confirmed the order of furniture and decorations,

and the new paint color for the accent wall, and the various plates and silverware and such—

"It's…astonishingly cheap," I said, watching the points-tracker in the corner of my vision tick down. We were most of the way through the week, of course, and I actually *could* afford to be a little loose with my resource allocation, but even so, I was amazed at how inexpensive things were. Still, it would take a couple of days for everything I had ordered to be assembled and brought in, and even with all of the advances in chemistry in the intervening century since my cryonic suspension, paint still did not yet dry instantly.

"It's amazing what you can do with standardized parts and a full recycling system," said Jak. "Did you know we *mandate* that all materials produced by the Novacom be recyclable wherever possible? We have almost nothing in the way of waste, and just you wait until the molecular assembler-disassemblers are *finally* up and running!"

I smiled at her enthusiasm, called up the simspace controller panel, and ended the simulation. The world dissolved, replaced by the room at the Atamai clinic I had once called my own, and would now soon be vacating.

"I'll need some clothing, I guess," I gestured down at the jumpsuit I had taken as my typical attire, cleaned and refreshed every night.

"If you like the clothing here, you can take it with you," said Jak, sitting across from me in an identical plush chair. "It's all sized for you, remember? We'd just recycle it otherwise."

"Maybe a few pieces," I said.

"Of course, you can just wear that until the temperature drops," said Jak, indicating my one-piece jumpsuit. "It's pretty common, now that high fashion is so universally accessible. Not much of a special status anymore, so wearing lots of different kinds of clothing is usually just done for the pleasure of it."

"God, I love the future," I said. "I *hated* wearing dresses. I always envied the men at weddings and parties, they could just wear the same simple thing."

"I'm rather fond of dresses, actually," said Jak. It seemed to be true, as she had mostly worn light summer dresses as we had gone around the city. I had a moment's mental image of Jak wearing something *decidedly* unprofessional.

"I could probably come to enjoy them," I said, feeling my face warm. It was Jak's turn to grin at me.

"There's something else," said Jak. "I was wondering if you would like to have dinner with us tonight?"

"Us?" I said.

Jak nodded. "Me and my family. My father's making chicken tandoori, and my mother's naan is buttery and light…" She got a dreamy look on her face, and sighed. "Only if you want, of course," she added. "My father asked about you, and he offered to cook…"

"He asked about me?" I said.

Jak cleared her throat and did not meet my eyes. "I may have… bragged. A little. About my rather precocious revival."

The thought of meeting Jak's parents, old-school a thing as it was, made me feel warm inside. "I'd love to," I said. As it was barely lunchtime, I said, "In the meantime…is there anything like what I would call *normal* shopping?"

"Oh, yes," said Jak. "Plenty of people like running stores and shops, managing customers, that sort of thing."

"Anything for clothing?" I said. "It might be fun to try something new."

Jak's face lit up more than it already was, which was quite a feat. "Oh, I have a few favorite places."

"I'd suspected you might," I said. "And afterwards…lunch? Maybe downtown?" I gestured vaguely in the direction of my points counter, still hovering in the corner of my vision. "I just bought an apartment and I'd like to celebrate. My treat?"

"I know a great place," said Jak. "It's been around for nearly two centuries. Their whole thing is *beer pairing*."

"I don't know much about beer," I confessed, and Jak's smile ratcheted up another notch.

"I was into it a lot when I was a teenager," she said as I led the way out of the room and into the hallway. "I even had a little brewery in our basement, you wouldn't *believe* the kinds of things you can get up to in beer-making…"

# CHAPTER 7

Clothes shopping, such as it still was in the Novacom, was a very different experience than I had been used to, even on the rare times I went with anything other than off-the-rack from the local discount store.

For one thing, there was no rack. There was hardly anything I would consider *recognizable* about the high-fashion boutique Jak brought us to in the frankly rather opulent shopping mall situated in a cozy parkland in downtown Richmond. The mall itself was a dream of Gruen by way of Fuller, rows of neat little downtown-style shops enclosed from the weather in a set of broad, tessellated transparent spheres overlapping one another until they covered the whole of the little street.

The place we entered had, as I have said, no rack, but neither did it have any other displays, except for a couple of mannequins wearing simple clothes of a bold, geometric design that caught my eye immediately. Inside, there was a little desk off to one side, where a man and a woman sat in conversation, which dried up immediately as Jak and I walked in. In the interior of the building proper, a handful of people were standing in front of triptych mirrors, examining something I could not make out from my angle at the front of the store.

"Hello!" The woman behind the desk stood up and came to greet Jak and I. "Welcome to *Deco*. My name is Deirdre. Is there anything I can help you with?"

"Just looking for some casual clothing for her," said Jak, gesturing to me.

Deirdre stroked her chin as she regarded me. "Any particular style, my dear?" she said.

I shrugged. "Pants?" I said.

The woman smiled. "Oh, we can do pants." She led us over to one of the mirrors, which at first reflected only me. As I watched, the mirror itself lit up with a computer interface, limned my reflection with colored lines, and separated my image out into a full three-dimensional representation of myself from multiple angles, which moved as I did. While I was still wearing my Atamai Clinic jumpsuit, my reflection wore only a simple white shirt and pants—no shoes, I noticed, and its toes flexed as mine did. I *was* wearing open-toed sandals, but I sus-

pected it would not have mattered.

"What about this?" said Deirdre, gesturing at something within her Overlay.

The reflection of me changed, from a simple white shirt and pants into a complex arrangement of strips of cloth, woven together such that they were attached only along the neck, belt, and ankles, and yet somehow covered everything that had already been covered. I turned and moved, and the image of me moved with me, gravity and air resistance modeled accurately as the cloth strips moved.

"Impressive," I said, "but maybe something more practical?"

Deirdre nodded, and the image of me changed again, this time into a shirt and pants of layered rigid polygons, linked at the corners and varying in size as they looped around the articulated parts of my arms and legs and waist.

"It was inspired by a finite element modeler," said Deirdre. "Draws the eye, but reveals nothing. And when you sit down in it, the parts under the pressure of your body lock together, so you aren't sliding around or having edges and corners dig into your skin."

It was, indeed, quite beautiful, shimmering with iridescent color like the feathers of a bird. "I do like it…but what about more daily wear?"

Deirdre gestured again, and the outfit flew off of my body and shrank into a small icon in the corner of the triptych, leaving my reflection back in the plain shirt and pants.

"How about this?" said Deirdre.

Now my reflection wore a loose blouse and pants, shirt cut high but with a cord of knotted fabric running across and around my torso, no real pattern emerging. As I watched myself move, I noticed my eye was being drawn continuously *away* from my body, to the edges. The pants, too, continued, fading into a deep black that hid motion as I moved.

"Urban camouflage!" said Deirdre. "Designed to help people's eyes slide right over you, but without actually forgetting you're there. Perfect for navigating crowds, especially for those of us with smaller statures."

I grinned. "I like it. It appeals to me."

"It looks good on you," said Jak, nodding approvingly.

We went through a few more outfits in the same style, before I finally settled on a selection of interchangeable pieces from the urban camouflage set. As these were highly customized designs, the transferred resource cost in points was higher since more labor was necessary to make them, but that was all right since I had points to spare. In addition, they would have to be sized and cut specifically for me, so I told the store's systems to have the clothing delivered to my new apartment when both would be ready in a few days.

Later, as Jak and I sat in a wooden booth beside a long bar, dipping fried potatoes in flavored mayonnaise and sipping beer, I plied Jak with questions about the experience.

"So how does one get permission to run an actual storefront?" I said.

"Same way you get permission to run a shop floor or an art studio, or even an apartment building," said Jak. "You, or a group of people, pool your points together and pay the upkeep and operating expenditure in resource terms. The Novacom apportions some quantity of resources for Basic Distribution which goes into making public spaces for art or shops or suchlike, and then its users are responsible for its upkeep. If there's a shortage of these public spaces, and the population thinks it's important enough, the local preference census will bear that out, and resources get apportioned accordingly every assignment period, usually a year. When we go to shop at the store, we pay the marginal resource cost for whatever we buy there. For certain things, it's like buying a house, where you pay a little more up-front to represent the resources that are being spent on you *today* that weren't supposed to be used for you until some point in the future. But that's only for the truly egregious expenses."

"What about places that make your item on-site?" I asked. "Like a restaurant or bakery. Surely they can't be required to wait until your specific order's resources arrive from the agridome or something?"

Jak shook her head. "No. They're just accounted for in terms of resources distributed and labor performed, just as anywhere else—all in terms of labor-hours, of course. Organizationally, it's all book-kept under the same auspices as the machine-kitchens that produce most of the prepared food in the Novacom. In effect, someone who wants to run a restaurant is employed by the Novacom to manufacture and dis-

tribute a finished product. There are all sorts of important standards that make sure nobody cheats the system to use these shops as little fiefdoms of private property, up to and including precisely-weighted plates and measurement systems. But the point is, even if it's not *strictly* as efficient as just having the machines do it all, what you buy with that inefficiency is *freedom*. People who enjoy doing this kind of thing now have the opportunity to do so, and that's worth the price of a little inefficiency. Plus, consumers like the ambience and experience of going out, instead of just having food mechanically delivered to wherever they are, as convenient and efficient as that is."

"Do shop owners have some kind of shop-owner's association, like at my apartment?" I asked.

"Yes and no," said Jak. "They do have democratic associations that help them make decisions together, but their ability to make decisions is constrained a little more heavily than in your case. You and they, similarly, can't decide to have the building demolished, for example. You would need permission from the local real-estate planning system. But you could decide to paint the building bright pink, perhaps. This being a more public space, they don't have that luxury. They need to keep within the particular aesthetic standards determined by the local governance node, not to mention universal safety standards and construction standards as part of System Two at various levels. In terms of home ownership, you would only have to deal with aesthetic panels or historical accuracy if you were living in, say, a historic district of some kind, or some area preserved for its specific aesthetic."

"There really is a great deal more control that we have over our lives, isn't there?" I said.

Jak nodded. "It's all cybernetic. Each individual person exists at the intersection of many different, sometimes overlapping, democratic institutions. It's designed so that the democratic element is just the same as going about one's own day, making decisions, talking to a relatively small number of people in your immediate environment, that sort of thing. It's no different than making decisions as a family unit. These various democratic microcosms add up to greater and more formal organizations at various levels of resolution. For example, there are multiple bodies that are part of System Three at a particular level of recursion, and a person may belong to multiple such bodies, such as

belonging to both the local school board as well as a neighborhood association. This is not to mention their roles in the Systems of higher and lower levels of recursion, such as serving on a political body for the state, as well as making decisions within the family.

"There are also systems and institutions which are concerned with making sure that new ideas get spread around, and those which are concerned with making sure that good talent knows that there are opportunities in areas that need their expertise, so that people can always find information on something new or exciting to do, or something where they might be able to make a visible contribution, whatever motivates them. Ultimately it all culminates at the top, where the large-scale movers and shakers of the Novacom congregate, and *they* are constrained most strongly of anyone. They are constrained by the rules laid down in the Constitution and the Charter, and by the transparent systems that link their actions to the will of the people as expressed by the General Preference Model, and by the rules and regulations that force people who wield a lot of power to justify their actions and submit them to public scrutiny and inquiry, as Judge Reiner said. These institutions have various names, but they all occupy some or another element of the viable system model that Thomas M'baga showed us."

"I was reading about Kolmogorov complexity," I said, "and it's quite amazing how the few and simple cybernetic rules can result in all of this amazing and personal complexity and freedom, while at the same time facilitating a controlled and stable system that can react so fluidly and easily to any disturbance."

"This is what you get when you design a society to operate according to objective laws and strong values," said Jak. "We don't, *can't*, hide the true workings of the system from people. No more alienation, no more apparent chaos that allows people to get rich and game the system for their own ends. A truly free, prosperous, abundant society, in ways that no previous system could ever have achieved, whatever their intentions. The rules of the system are designed such that the outcomes we want define the direction that our civilization goes. There are no guarantees, but a system that trends in a positive direction is better than one that does not, or *cannot*."

When the time came to leave, I was the one that paid for both of our meals. My point allocation was noticeably depleted after all the

spending I had done that day, but my dinner that night would be free, for me at least, and the new week was not far away.

Jak took me back to my room at the Clinic, where I changed clothes into something that, by my standards at least, was a little more presentable. Jak had assured me that anything was fine, that it was just a casual dinner, but for all my rapid acclimatization to the new culture and society in which I found myself, I was still a product of my upbringing, and sometimes propriety called for a little dressing up.

So it was I was dressed in loose pants and a simple blouse, pulled from the closetful of ready-made clothes I had been gifted when I awoke not so many days ago, when Jak led me out from the clinic, down one of the wide paths leading along the river a ways, and to the front door of a striking Mid-Century home that would have been perfectly expected in an upscale film production, never mind what was supposed to be the dwelling of a normal, if well-regarded, local family.

The house was all angles, with a boxy wing of stone-built rooms that opened out onto a courtyard I could just barely make out behind the building. On the other side was a sloped roof opening up onto a view of the river, enclosing a living/dining area in floor-to-ceiling glass, through which I could see a table set for four, and a bottle of wine chilling in a bucket of ice. Down by the glass was a sunken area, circular, lined with couches, with a table in the center bearing a vase with what seemed to be fresh flowers, although I was fairly certain the blue roses were a more recent development than *I* was.

Jak did not even ring a doorbell or knock, because as we approached, the door simply swung open for us. Jak took my hand in hers and pulled me in behind her. Apparently the house was keyed to recognize her and grant her access, or perhaps she had done something in the Overlay to which I was not directly privy.

"Hello?" she called as we walked in. "I’ve brought Max!"

Instantly, the elder Atamais were there, coming in from a tucked-away kitchen area and the bedroom wing behind us respectively. "The famous Max Kustaja!" said Jak’s father. He reached out and took my hand in both of his, pumping my arm enthusiastically. "I’ve heard such nice things about you, my dear! Do you like the future?"

His wife came up beside him, gently pulled her husband away from me, and likewise took my hand in both of hers, although she was

much more controlled about it. "Forgive my husband, he gets excited about these things. I'm Julie, and he's Mudrac. It's very nice to meet you. Please, sit down, have some wine. Dinner will be ready soon."

"Uh, yes, thank you," I said as Julie led me over to the sunken couches and went to uncork the wine, returning with a tray of glasses that she set on the table beside the roses. "These flowers are lovely."

"Thank you," said Julie. "I had them made special. They're genetically engineered to bloom in different colors."

I noticed she was wearing an elaborate *kimono,* or something very like it, patterned with multicolored roses. "I see they're something of a theme around here. Your outfit is very pretty."

"Thank you," said Julie. "My husband had it made for me, for my birthday. Japan is the most recent addition to the Novacom, so we're seeing something of a fashion renaissance in a Japanese direction."

"My mother is rather a follower of fashion," said Jak. "She once had to have the house expanded to hold all of her clothes."

"Don't exaggerate, sweetheart," said Julie. "I just had one of the *interior* walls moved. The footprint didn't change at all."

Jak rolled her eyes and lifted her eyebrows at me, and I giggled.

"You can call me *Mudrac*," said Mudrac, sitting down next to me. "You might say my name is Mud! Ha ha!" Jak sat down on my other side, raising a warning eyebrow at her father, who studiously ignored her. Julie sat down beside her husband and put her hand on his leg. He patted her hand, smiled, but turned back to me to see my response.

"Well, er, Mudrac," I said. "Thank you for…well, everything, I guess. I wouldn't be here if it weren't for you."

"Nonsense," said Mudrac. "You did the hard part! I've never died before, after all."

Strictly speaking, neither had I, but I had lived with the terror of it for so long that the absence of that terror was, itself, like euphoria. "Hopefully I was among the last," I said.

"Would that it were so," said Mudrac. "Alas. But we've made considerable strides in that direction, yes!" He selected a glass of wine from the tray on the table, but did not drink any of it. "So I understand my daughter has been giving you the *extended tour,* hm? I heard you went to the Vault."

"I did," I said. "And she has. She's been extremely accommodating."

"Nonsense," said Jak. "I live for it." She seemed to realize how her response was so very like her father's, as she cleared her throat and said, "We all do."

"Any questions so far?" said Mudrac.

"Many, *many* questions," said Jak behind me, and I threw a fake glare at her. She hid her smile behind a sip of wine.

"Yes, the whole world is so different," I said. "Jak and I were just talking today about how…responsive it is, how much control we have over our own lives."

"Yes!" said Mudrac. "Yes, exactly! That's why I developed the revival technique, me and my research team. Beyond just reviving the cryonically suspended, it has *vastly* streamlined and simplified the modification of the extant!"

"He means that it's now a lot easier to repair or change human bodies," said Jak. She drew one finger under the ridge of her purple-irised eyes, for emphasis.

"Yes, yes," said Mudrac. "The body is a cybernetic system, of course, and so it is responsive to concepts of cybernetic management. So instead of waiting for the body to fail, and then for we medical types to fix it, we *improve* the body, so it *doesn't* fail, or at least fails less often. It's *far* more resource-efficient, not to mention eudaimonic, to make the human body healthier by default, stronger, more resistant to injury, less susceptible to disease. It also means that our positive freedoms are increased. We can go places that would have killed us. We can eat food that would have made us unhealthy. We can survive conditions that were previously deadly, which let me tell you is fantastic for a spacefaring civilization. Design biology, design society, it's all the same! And it isn't like we just make everyone genetically identical, no! It's on an individual basis, to correct obvious quality-of-life flaws. Most of what we do with my work is mechanical anyway, less gene expression and more manual repair and rehabilitation. As goes the Novacom, so goes the individual, and vice-versa! Individuality *and* cohesion!"

While Jak and Julie smiled fondly at Mudrac's ebullience, I thought of my repaired hyperlordosis, and that reminded me of some-

thing Jak had said to me very early on. "One of the first things Jak said I could do is sign up for respirocyte training," I said.

"Respirocytes are a perfect example," said Mudrac. "They keep your blood oxygenated for *hours* without replenishing from the atmosphere, and they *vastly* improve the efficiency of gas exchange under normal conditions by sequestering carbon dioxide and allowing it to be expelled later, without cluttering up your bloodstream. They don't last forever, so they have to be replenished, but they're a major factor in our ability to explore the Solar System so easily. Once we get the pressure on Mars up, we'll be able to walk around without a suit *or* a regular breathing apparatus!"

"As soon as the areologists and xenobiologists are finished with the total surface survey, anyway," said Julie.

"What is an 'areologist'?" I asked.

"Like a geologist, but for Mars," said Julie.

"My mother is an astronomer," said Jak.

That explained a few things, such as Jak's fascination with the powersats.

"Of course," said Mudrac, "those cretins in the Coalition don't care about any of that. They just see they can breathe better, so they *sell* them to geriatrics to save on bottling oxygen! Moronic. And the people who defend them from the technical side! I can't believe it. Can't they see that it's not some fetishistic obsession with individuality, some kind of anarchistic capitalism, that is most compatible with human enhancement? That it's *our way*, of helping *everyone*, that is the most complete expression of directed evolution?"

"Dad…" said Jak.

"It's okay," I said. "I've become familiar with your family's, er, political reputation."

"And you came for dinner anyway!" said Mudrac. "She's a brave one, this."

"Don't I know it," muttered Jak, so only I could hear. I felt my cheeks warm up, and hid it behind a sip of wine.

"If you don't mind, Mudrac," I said, "I'd like to hear more about your political opinions. I'm not very familiar with the political aspects of the modern era."

Mudrac's smile could have powered the city all by itself, and behind him Julie rolled her eyes.

"You've done it now," said Jak.

"What do you want to know?" said Mudrac.

"Tell me more about the Coalition?" I said.

"The Coalition is just the name we give to the rest of the world, outside the Novacom," said Mudrac. "Well, they gave it to themselves, first. They see themselves as 'free', and us in the Novacom as subjects of some horrible oppressive government that sees everything we do and uses it against us. It's all propaganda, of course, but all propaganda has a kernel of truth in it, or else nobody would believe it at all. You need something that people can see, and then you provide an alternative explanation for it that suits your political agenda. Technically, we do that all the time, except in our case we work through the logic and encourage civil dissent."

"It's okay, because it's the truth?" I said.

Mudrac shrugged. "It *is* the truth. It's simple game theory, like the corporate advertisements of our past, and the Coalition's present. If one group advertises and the other doesn't, the advertising group's message gets out there. If they both advertise, they're like as not liable to cancel each other out. So we advertise."

"I've heard tell of *leaflets*," I said.

"Yes, even in areas where they still have an Internet. You've heard they severed the undersea cables on their side?"

"I have," I said.

"The whole Coalition's locked their Internet away from our Overlay, so we have to resort to paper. Doesn't matter much one way or the other, really, because their propaganda *does* contain *some* of the truth, and that truth resonates with people there. They see us as lazy, but somehow we're also such a terrible threat that the people of the Coalition had best give up all of their liberties and privileges to the rich, so they can be 'protected'. They see us as inhuman, while their leaders and wealthy elites hoard whatever technology they can reverse-engineer from observing *us*. They show us as slaves to the state, while they force their people to tear each other apart for *jobs*. They have this myth floating around there that taxation is theft, can you believe that? As if it's wrong to pay for the things that society produces for you!"

"That one's pretty familiar to me, yeah," I said. "It appeals to people who don't understand the massive disparity in wealth and power between the very richest and the rest."

Mudrac was nodding vigorously. "Yes! Taxation isn't theft, taxation is a *fee*. We have tax only insofar as the labor of the Novacom's people goes to benefit everyone, as a multiplier. *Profit* is theft, because you give nothing for it—the capitalist is compensated just for *owning* something, and that wealth is private! The Novacom compensates you for the burden of having been born into the world at all, and in return, what you produce is shared among everyone! New inventions, new artworks, stories and music…even if the original is kept by the producer or the original recipient, the *form* or *method* is shared among everyone, so people can have reproductions of famous artworks and recordings of the performances of plays and symphonies. Oh, we maintain attribution, of course, that just works for everyone, but the concept of *recompense* doesn't even make *sense* in our world! By providing all of the resources individuals need for their own lives, and keeping accurate track of the necessary resources that some or another public project such as health care actually *needs*, we make everything free *automatically!* It is literally nonsensical to attempt to pay me for my medical skills, for example. It simply doesn't have any function. You show up, I scan you and figure out treatment, which is usually automated inpatient nanosurgery, and into the medbox you go! What would I even spend a fee *on?*"

"How does collaborative art work, then?" I asked. "Like a film studio. Or a movie theater, for that matter."

"Just as the stores we saw today work," said Jak beside me. "Collaborative and regulated by an appropriate, democratically representative agency. The work itself, the film or the performance or what have you, is attributed to the group that created it, and all of the people who worked on it get credit. But distribution rights and licenses for derivative works and such don't mean anything here, since all such works are automatically entered into the public domain. But the upshot is, movie theaters are run by film buffs and theater fans, who can show anything they want. They work like anything else, with the upkeep costs coming either from a Basic Distribution arts fund, or a local donation, or the personal points pool of the people who work there, or

patrons in their ticket costs, or any combination of things."

"Seems like there's quite a bit of activity going on," I said, impressed. "You said the Coalition sees us as lazy?"

Mudrac snorted and drained the last of his wine before responding. "Because we don't spend all day every day slaving away for the enrichment of a few rich people, we're *lazy.* We don't want to disincentivize hard work, we want to *incentivize* labor reduction! Hard work, if we define it as work above the required labor contribution, outright messes with our efficiency metrics and potentially our resource distribution balancing. This is not to mention our resource availability forecasting, because if you mine out too much iron, you end up expending resources we weren't ready to expend, and now we have to expend *more* resources to store and protect the ore you dug up, and it just spirals out of control. Whereas labor *reduction* provides additional available labor in the form of untapped productive capacity. If everyone were working as hard as possible all the time, there would be no cushion for emergencies. The 'hard work' meme is just a leftover of the old Protestant ethic hijacked to serve the capitalist class! It allowed maximum extraction of value from the workers for no proportional additional expense, if any! It reduces people to their labor content *as people*. Just as those who complained only about income and wealth reduce people to a *capitalist* notion of value, instead of seeing beyond those constricting notions and creating a world where people labored for a purpose, where self-actualization was the measure of a human being!"

"Mudrac, I hope you understand that I mean very well when I say that I'm glad you weren't around in my time," I said. "I'm afraid you would have found it stifling."

"That's precisely why I was inspired to my line of work," he said. "To bring you lucky few survivors into the future we fought so hard for, so you can enjoy it, too."

I smiled and glanced at Jak, who was looking at her father with a mix of embarrassment and pride. "In my day, I was as likely to be told that I was lazy because I didn't work as hard as the older generations. Never mind that they were handed everything by *their* elders."

"Our explicit goal here, enshrined in the Novacom Charter, is to make tomorrow better than today, as quickly as we safely can. And we

can do it *without* overloading our variety constraints." He waved his empty wine glass as if to take in the entire house around us. "Take this place. Geometric, simple, made of easy-to-manufacture shapes. But I think it's the most beautiful house in the city."

"It's absolutely gorgeous, I agree," I said.

"Totally modular!" said Mudrac. "Any time we want to upgrade to a new appliance, or add a new wing or level, we can do it easy as that." He snapped his fingers. "None of this egregious expense of time and resources, building homes by hand, or any of the horrible ugly repetitive tract housing that used to plague the outskirts of our cities, and still bloats the landscapes of the rest of the world. In carefully managing the way we price and produce materials, we have given up nothing, and gained so much! For all those capitalist mongrels talk about *choice* and *freedom*, it is *we* who have the choice to live where and how we like, to have comfortable and luxurious homes, to have more than just the same horrible vinyl-and-brick garbage they churn out over *there*."

"I admit, I haven't seen an ugly house yet," I said.

"Wait until you see the Garden Cities," said Julie. "They make our little Richmond look like something you'd see done at scale in someone's model railroad."

"Speaking of the Coalition, though," I said. "I heard something about a national debate happening."

"We saw Ai Kuroda in the park today," said Jak.

Mudrac huffed. "Next thing you know they'll be talking about bringing the Blockade down. As if that's at all a rational decision."

"The Novacom must have the world's largest borders," I said. "How do you manage movement across them?"

"Border security is predominantly satellite-mediated," said Mudrac. "We did a lot of cleaning-up of space debris in the early days of the Outward Expansion, and so we had a lot of room for new observation systems. They watch the borders and alert officials if anyone attempts to cross outside of an authorized crossing area, and we can dispatch people very quickly. There are also seismic monitors, not that we have any land borders, but we do have large stretches of uninhabited wilderness, especially in the Canadian Novacom, where enterprising people from the Coalition might try tunneling in."

"And what do you do if you catch someone?" I said.

"Send them back," said Mudrac. "We have *considerable* assets in the Coalition, ready to bring people across into the Novacom if they want to join us. We also do thorough background checks where possible, and anyone who makes it through the many layers of investigation still has a flag in our databases that they came from elsewhere. It's illegal to single any such person out for investigation, and the transparent data coming out of our police and border control organizations helps us enforce that, but it still forms part of our anticipatory network. If there's a high concentration of immigrants, for example, as there is in many border zones, then our predictive networks naturally will point those regions out for increased presence of security groups just due to sheer statistical dominance. That doesn't mean we go around harassing anyone with an immigration flag, but it also doesn't mean we throw away potentially valuable data just because we want to be *nice*. Cybernetics, never mind national security, doesn't allow us to be nicer than is actually practical. In any case, that sort of discrimination would mean that anyone who wants to do us harm would just find someone without an immigration flag. It doesn't help us. And who is and isn't an immigrant, outside of their accent or individual behaviors, is privileged information. Only certain law enforcement personnel are even allowed to access the databases, and then only with significant scrutiny from above *and* below."

"What about groups *inside* the Novacom?" I asked. "In my day, there was a lot of talk about native peoples."

"The world does not belong to any specific group of people," said Mudrac. "That's capitalist ownership nonsense. Even *if* you subscribed to the belief that the first people to set foot on a place 'owned' that place, they themselves are only descendants of people who did all the work *before* they took up the mantle. And *their* descendants are as much immigrants as anyone who came in later—after all, *they* didn't do anything except be born in a certain place. And even *if* you subscribed to the belief that people who came here from elsewhere were somehow lesser than those who were here before, *their* children are exactly the same as the children of the people who came here first. So after a generation, we are all exactly the same as each other, in this sense, having all been born here through no fault or action of our own.

Saying ‘well, my ancestors were here before your ancestors’ is utterly pointless. It’s children bickering in the schoolyard. It only ever served as a distraction as capital bought up more and more of our lives. The question of how capital was distributed among the various arbitrary ‘demographics’ of the population was never important. It wouldn’t change the rules. It wasn’t ‘social justice’ in any sense of the phrase. It was, at *best*, revenge, and not a very good one at that. So the Novacom has absolutely zero plans to parcel itself up and give itself away to whoever cries hardest. That’s not a meaningful path into the future. That’s a descent into madness."

Julie sat up, looking at something in her Overlay, and said, "I believe dinner is ready, dears. If you’ll excuse me." She stood up and went to the kitchen, and it was then I noticed that the room was full of little smooth-hulled machines, cleaning surfaces and helping Julie remove something from an oven.

"I like your little robots," I said.

"Oh, yes," said Jak. "Domestic robots are quite common. You might not have noticed them at the Clinic, but they’re what made your bed and cleaned your room. They keep *everything* clean, not just the visible or high-traffic areas. We designed the building and its furnishings to include them, so we could reduce their complexity without compromising on effectiveness."

We sat at the table, the four of us, and ate what was the most delicious home-cooked food I had experienced in a long time.

"Are you an only child, Jak?" I asked, gesturing at the place setting. "I just realized I’ve never really asked."

"I am," said Jak. "It’s pretty common these days, especially since children can socialize through the Overlay."

"Children are allowed to have implants so young?" I asked.

"It’s…a debate," said Mudrac. "But the right of the parents has so far prevailed. Very few people are born without receiving implants by the time they’re ten years old. It can be done as an adult, of course, as you can attest. But it’s considered a pretty essential suite of tools these days. I’m glad my research into nanomedicine and molecular surgery has helped make that process so much less invasive than it once was."

"I agree," I said. I could feel the question on Jak’s parents’ lips, but as they were too polite to say anything, I said it instead. "I have a sis-

ter. Or at least, I did. I'm looking for her. See if she made it to the future with me."

"Tricky," said Julie. "The records are probably sealed."

"Yes, Thomas M'baga said they would try and contact whoever they could find." I played with my last scrap of *naan* bread, dipping it in the leftover sauce on my plate before scooping it into my mouth.

"It might be a little while," said Mudrac. "The records from your time are a little spotty. It might take some old-fashioned canvassing to find someone."

"They'd do that just for me?" I said.

Mudrac nodded. "There are tools that help, automated systems that can move through the Overlay and sift through data, but yes. There are plenty of genealogists who would love to make their cladistic maps of the Novacom more complete, if they can get permission. You without a history, and from so far back *in* history, from *before the Novacom*, would be a fairly enticing little historical data point."

"It's nice to be useful, I suppose," I said.

"Oh, we'll find a use for you, don't you worry," said Mudrac. "That's what the system is all about."

"For now, just focus on living," said Julie. "That's what's at the core of it all. You'll get bored eventually, and that's when you'll look for something to *do*, which in our world means *contribute to society*."

"Jak told me you were pretty dedicated to the ideals of the Novacom," I said to Mudrac.

"Wouldn't you be?" he returned.

"Sure, but I'm an immigrant to this time. You were born here. But still the revolutionary spirit?"

"My father's father's father founded the first hospital in the New Community, before the Charter," said Mudrac. "You could say it's in my blood, but I've *seen* my blood under a microscope, so I'll just say it's the family business." He glanced fondly at his daughter. "And there's so much more to be done, so many more people who need rescuing."

I stared at my plate. "Well…thank you. For rescuing *me*." Jak's arm was around my shoulder in an instant, and Mudrac and Julie politely looked away.

We retired back to the sunken couch, for a dessert of green tea ice cream. Jak sat to my one side, the elder Atamais to my other. I could feel Jak leaning against me, a casual intimacy that thrilled me. It was exhilarating how quickly things were moving in my life, in all its many aspects, and I tried my best to hide it from Jak's own parents, sitting *right there*.

"So what about new additions to the Novacom?" I asked. Hopefully the answer would be sufficiently involved as to provide a distraction for Mudrac and Julie from my connection with their only daughter. "Obviously they tend to become subsidiary units. Why not just divide everything up however is useful?"

"Typically, they already are," said Mudrac, "if they've been a successfully independent state for any length of time. And if they haven't been, we might do just that. But mostly it's just easier. People are used to seeing themselves as part of a particular whole, and from a cybernetic standpoint it doesn't make much difference. Perhaps, larger or more populous areas, depending on the context, might have a greater number of units of this or that organization or institution. There might be a northern and a southern division, for example. It's much easier to fit the cybernetics to the existing demarcations, which after all are really just conveniences, than to try and renegotiate entire borders. Plus, to really make best use of it, we'd have to do it every time we added a new region or polity to the Novacom. Maybe once the whole Earth is united in us we'll do a total reorg, but even then it's probably more bother than it's worth."

"What do you do with newcomer regions that are much less developed than the rest?" I asked.

"Same thing we do any time we want to expand the cybernetic system," said Mudrac. "We go in, survey what's needed, consult with the population—who after all are the ones who requested we come in at all—and create organizations and institutions and assign resources as necessary. Typically we let the Novacom-level diplomatic teams do that, in their various cybernetic incarnations. Ultimately, when we build up a new addition, the end result is that the Novacom is richer, stronger, more culturally complex, and overall *better* than it was before, than even the marginal addition of the new geography and population and resources would suggest!"

"In my time, to help another country, we would typically lend them a large sum of money, a debt which they would be expected, somehow, to service, even though the entire reason we're lending them money in the first place is that they have a lackluster economy."

"The debt system was, and in the Coalition at least still is, a way for rich nations to get more little pieces of paper at the expense of other nations' little pieces of paper," said Julie with a snort. "Jak has told us much about the history of your time, such as we know it, and frankly so much ado was made of mere *money* that it's a wonder anything got done at all."

"Mostly by sheer stubborn-headedness and good luck," I said.

"No kidding," said Mudrac. "The Coalition still uses money, of course, in the old sense. It's money which allowed people to become so staggeringly rich at all. Under feudalism, a lord's wealth was measured in acres and livestock and peasantry. If you were a lord of a region under feudalism, the productivity of your lands was the important thing. It was, in many ways, much more obvious when exploitation happened. You could literally go and see the product of human labor reserved for the lord, and compare it to that which was kept by the peasantry. But under capitalism, such as the Coalition has, it becomes possible, as productivity increases, to hoard *claims* on future production! It became possible, thereby, to enact your will upon the world simply by having legal control over production, via money. Money became a means by which your exploitation was hidden from you. Oh, certainly other forms of money existed even in the feudal era, as an accounting system of some abstract unit of equal measure is incredibly useful. Even our points system is sort of money-like. But our points cannot be traded, cannot be accumulated, do not circulate, and are *mathematically coded* to something meaningful in production, namely labor.

"It was not enough then that money should simply be redistributed, neither directly nor in-kind as in social democratic welfare systems that still persist in some places in the Coalition. Such money would eventually re-condense in the hands of the capitalists, who would use it to secure for themselves greater and greater sums of money. They could, and did, and do, make the argument to welfare-oriented systems that greater profits meant a bigger pie, and by a thousand cuts fell the

beast of state! Never letting on, of course, that as the pie grew, *their share of it* would grow greater and greater, until the system collapsed entire. Even now, the Coalition is only propped up by its constant building-up of military forces, in point of fact *aided* by our casual destruction of their stockpile!"

"Ai Kuroda did seem to suggest that the weight of the Coalition's contradictory capitalist system would force its collapse eventually," I said.

Mudrac nodded. "The reason, my dear Ms Kustaja, that I advocate for an aggressively global Novacom, is because by merely attempting to *contain* the Coalition, we play unwittingly into their own reinforcement. Sure, the collapse will come eventually, because they have such limited capacity for expansion. But simply burning away at the edges keeps the rest, if not healthy, than *healthier* than it would otherwise be."

"Like pruning a rosebush," said Julie, and Mudrac lovingly squeezed his wife's hand in his, ice cream dishes empty and forgotten beside them.

"One of the things we learn in our education is rational decision-making," said Jak. "We essentially have three things, which are goals, methods, and values. Our goals determine where we want to go, either in the short or the long term, and our methods determine how we get there. Our values are what determine what the goals are supporting, so if some better goal or method arises that better encapsulates our values, we can adjust accordingly. And we have ways of assigning numbers to these goals, by canvassing the population at least once a year. The goals themselves are derived from socially-defined values, expressed explicitly in law, and along with the methods are creations of experts, transparently operating to link goal, method, and value.

"That's why we write laws the way we do, up to and including the rules governing the resource distribution process, and the consequences of failing to uphold them. In the old days of the United States, the budget was a law, which subjected it to all of the problems of representative law-making of the time. This includes massive information attenuation, far too much, as well as wholly subjective ways of satisfying the preferences, not of the population, but of the *representatives*, which were often at odds with the preferences of the people. For ex-

ample, they might capitulate to capitalists with arguments about the tax code and the impact on taxable profits, which somehow never truly materialized as taxes.

"But the point is, the reason why we Atamais tend to have a public image as a family is because we believe that the data show what the best strategy is based on agreed-upon assumptions and open data sets that are so large and complete that the value of additional information is very small. That is to say, it's not likely, short of a major disruption in the international situation, that the transparently superior option should change. People like Ai Kuroda, at least in my opinion, tend to value what seems reflexively good over the less obviously pleasant option, but the option which is ultimately superior in terms of the satisfaction of our individual and collective values."

M'baga had mentioned something along those lines, something about one's political *identity* over their principles or values. I turned all that over in my head for a moment. "So what you're saying is, although it may be distasteful to wage direct interference with the Coalition, it's the option that ultimately satisfies explicit social values the best?"

"Well," said Julie, "in *my* opinion, our foreign policy doesn't go far enough. It's one thing to creep around the edges, throwing leaflets and spiriting away political dissidents, but like blowing up their military installations every couple of weeks, it just makes the problem last *longer.* It would be much more merciful to wage an overwhelming war, minimize fighting through sheer strength, and begin the slow process of assimilation from that point."

Mudrac rolled his eyes fondly at his wife, with the air of rehashing a long and oft-held conversation that had long lost any real bite or fire. "Whereas *I* believe that the process of assimilation will be *far* smoother—and less prone to building pockets of resentment that will only make assimilation that much more difficult—if we incentivize the people of the Coalition to turn on their masters themselves, and seize power which they can use to join us on their own. It would probably take about the same amount of time, and it would be a subtle process of twisting and twisting until the original shape is all but gone, as opposed to a sudden and shocking change that is as likely to put potential sympathizers against us for accusations of invasion and meddling."

"I see it isn't any more a settled issue within the Atamai household as it is outside of it," I said. "But to back up a moment, how *do* you handle potentially very different cultures when you add territory to the Novacom? Every new applicant must have a pretty different social structure, if not a material one."

Julie took the question. "Well so far at least, new entrants to the Novacom have been voluntary, so in a material sense and a values-sense, the transition is usually a technical problem of how to design and implement the cybernetic and mechanical systems that might need to be built. And all the rest of culture is food and dress and music and such, which is ultimately totally malleable. No culture survives contact with another culture, and it's not really the case that one culture just dominates another and totally wipes it out merely by contact—that's a deliberate and political act, which we do not engage in when we add new territories. Even when one culture changes significantly to conform to the material pressures of technological advancement, or because the other culture is seen by the changing culture as somehow superior—in which case, the culture that changes isn't exactly blameless in the degradation, such as it is, of their culture—it is still the case that the culture which is so heavily influenced will still retain important and specific elements of that culture."

She gestured to her own *kimono.* "Look at Japan during the Meiji Restoration. It was a *material* obligation, in order to compete in the then-dominant industrial capitalist mode of production, that Japan should change how it operated. Subsequent conflicts arose at least in part from the material conditions of a relatively small, resource-poor island nation which was attempting to operate in a world full of much larger, continental, resource-rich countries, especially the United States. After the second World War, Japanese culture changed significantly, reflecting the outsized influence of the United States, at least in part because of the outcome of the war and the occupation of the Japanese islands. But still, traditional Japanese culture, such as it was after a thousand years of exterior contact and change—the *kanji* they use is derived from Chinese characters, after all—remained omnipresent, and now that they have joined the Novacom, elements of what we identify as 'their' culture are spreading throughout our own, and one day there will be no distinction whatsoever."

There was that materialist conception of history again, inevitabilities born of material conditions and international rules-making. "In my day, there was a major campaign to isolate cultures from one another. They called it a fight against ‘cultural appropriation.’"

Mudrac snorted in derision. "‘Cultural appropriation’ is simply what occurs when cultures meet which had previously developed independently of one another. Elements of the cultures are exchanged, which is totally value-neutral. Banning the eating of food or wearing clothes that originated from some ‘other’ culture is just reifying the misperception of those peoples as somehow essentially different from one another. And things that are considered culturally important in one society can easily have originated in another. For example, the Japanese word for bread, *pan*, originates from Portuguese. Whatever wonderful dishes the Italian peoples might have created with the use of tomatoes is no more recent than the mass European exploration of North America, long after the supposed, fabled cultures of Europe are thought to have crystallized.

"It’s total bourgeois nonsense, *again*. It’s the replacement of community with abstract identity. It’s this idea that an idea can be *owned*. There’s no difference between a book being locked up behind intellectual property law, as still happens in the Coalition, and a mode of dress or a dish of food being locked up behind some abstract and arbitrary cultural ‘permission’. It’s the infection of our fundamental sense of community by the poisonous filth of capitalism!"

He had grown more and more agitated as he spoke, until his eyes practically glinted with fire.

"You can see why we’re somewhat *infamous* around here," said Jak. "My father has quite a bit of social cachet, being such a big name in the Richmond Node, and he’s not exactly afraid to use it."

"Civil, polite conflict churns the stagnant waters of society and keeps our civilization on its toes," said Mudrac, crossing his arms across his chest, lips quirked in a fond smile.

"He also reads too many novels," said Jak.

"So what would you say is the *Novacom’s* culture?" I asked. "I know that’s difficult to pin down, but what are some unique touchstones?"

Jak looked thoughtful for a moment. "What I was taught in school—and that can be a powerful way to reify a culture, obviously, what we teach our schoolchildren—is that the Novacom arose in the United States, not because the United States occupied some exceptional moral position in the world. Indeed, it was just responding to its material conditions as any other society did. Rather, it was because the Novacom was able to gain a lot of early ground in the middle parts of the country by appealing directly to a sort of unfulfilled promise. The *apparent* values of American society, nevermind what was actually happening, were important to many, many people, and once people began to understand that there was a difference between not having the same strategies and not having the same *values*, it became possible to expand the Novacom into the rest of the country in the first place. So in many ways, what we consider our values, what we teach explicitly to our children, are not so different to what you would probably have recognized in your time. The principle difference is, we actually have a system designed to, obviously and transparently, enact those values. It becomes impossible to hide *behind* professed values when doing something demonstrably against the spirit and intent of those values.

"So, for example, when Japan joined the Novacom a few years ago, our primary influence was cybernetic, along with some educational standardization, as well as the free and easy flow of people, goods, and ideas enabled by our post-scarcity orientation. The Japanese people got access to our resources, intellectual goods, and various cultural accumulations, and we got access to theirs. The intermixing is still in progress, but ultimately it will produce a better, stronger, and more dynamic society, full of more and more interesting things and interesting ideas, instead of the slow cultural calcification you saw in your time.

"I've read a lot about the culture of a century ago, Max, before the Novacom was even an idea. The rate of generation of cultural products that could be considered genuinely *new* had skyrocketed due to the democratization of creative tools enabled by the explosion of the Internet of your time, but the *money* being spent—the only real measure of resource allocation we have available—was far and away dedicated to the same old thing. There were endless re-configurations of existing 'intellectual properties'—" She said the phrase with some evident dis-

taste. "—while most anyone with a genuinely new idea, or at least a new and interesting interpretation of an old idea, ended up having to abandon it for lack of money. Advertisers would pull funding from anything that was too controversial, even though it's the controversial that really injects new life into a medium. In this way, culture began to appeal to baser and simpler commonalities between people, until *everybody* ended up bored with the same old crap day in and day out, stuff that was *acceptable* but just utterly *boring*. We don't do that here, because of our abundant material basis. That's why, culturally speaking, the addition of new cultures to the Novacom, and the exposure of our culture to new peoples, actually produces greater, more various, and more interesting cultural products than some bigoted view of 'isolation between cultures' would have.

"So, I suppose, to answer your question, our cultural values are of abundance, freedom, and cohesion, which are at the root of many so-called traditional values. *Abundance* implies, not 'hard work' in the old sense of laboring without pleasure, but rather, that everyone's contributions are accepted, distributed, and valued by society as a whole. At least, in the institutions and organizations and rules of the system, which unlike people's individual opinions are the only things we as a society can actually have any real influence over. *Freedom* implies that people can choose how to spend their time, and that such time is spent while healthy and capable, in the same sense of positive freedom that generates activity in medicine, and productivity, and transportation and all sorts of places. And finally *cohesion* implies a set of reasonable rules, which are designed to handle interactions between autonomous units, from interplanetary institutions right down to individual people. So hard work, family, freedom from interference, these values still exist in our society, and indeed are more important than ever before. We just have better ways of understanding what these things actually *mean*."

"There is *one* thing we do, culturally speaking, that really pisses off people in the Coalition," said Mudrac slyly. "It's whispered in the Coalition that because the vast majority of our population is cybernetically enhanced that ours is the land of the Antichrist…so we play Iron Maiden in our overseas embassies when our new diplomats arrive. They try to sue, since it's an English band, but we don't connect to

their legal system so it doesn't matter."

"Aren't there religious types in the Novacom as well?" I asked.

"There are," said Julie, "but we subscribe to the original Constitution's idea of religious freedom, namely, that if you want to save a religion, for God's sake don't make it compulsory. Voluntary adherents are much more likely to commit resources to supporting their religion of choice, which is why we treat religions like other community organizations. You can commit your own personal resources to it, but you aren't allowed to be productive on any significant scale without having to adhere to laws preventing private ownership of the means of production. Helps prevent the re-emergence of private property in the guise of religion, or anything else."

"Can you elaborate on something for me, Mudrac?" I asked.

"I would, clearly, love to," said Mudrac with a wide grin.

"When we first met, when I was first revived and you were giving the introductory speech, you talked about race being an unscientific thing, and when Jak and Ai Kuroda were talking the other day someone mentioned that the Coalition is still talking about race, implying that talking about race is a backwards idea. Could you tell me more about that? You're a medical professional, after all."

"Of course," said Mudrac. "Now, I've done a little study of my own on the culture of your time, Max, since so many of our revivals are from then. That is to say, I know a little about the term 'race' and how it was deployed.

"The first thing to understand is that there is no clear definition of what a race even *is*. It has long been understood that there is no scientific meaning to it. Genetics does not provide a statistically-significant means by which to distinguish between groups of people in a 'racial' way. There is no specific shade of skin which marks the boundary between one race and another. Culture is not racial, because anyone can adopt or reject any element of culture regardless of their physicality. In point of fact, race is like God. In order to answer the question of whether it exists, it must be defined precisely enough that a universe that contains it can be distinguished from a universe that does not. In the same way that this diminishes God, reduces God from a being of religious significance to a mundane element of the universe, so too is the idea of race diminished in that way, by being specified. Outside of

genetics, which has thus far refused to cooperate, any definition of race either demonstrates its fundamental absence or, being sufficiently vague, adopts the same transcendent social characteristic as God.

"In that way, the only thing that race *could possibly be* is *social*. It was, in fact, called a 'social construct' in your time. Now, of course, many things are constructed socially. Organizations are social constructs, even cybernetic ones. But an organization is a *formal* structure, with sufficiently clear boundaries and jurisdictions. It's why there was, and is, such a significant dedication of social resources to distinguishing precisely which organization could make which decisions about which things. We call this *property law.* It is a social artifice, yes, but a useful one.

"Race, on the other hand, has no clear boundaries, even in principle. It has no formal authority or mechanism of arbitration by which to distinguish people into one or another race. In fact, *not even the person themselves* is the authority on what race *they are*, except on those old census forms. You do not get to 'identify' yourself as a particular race. Race is constructed *around* us. We are *forced* to subscribe to it, even despite our own identities. You had to fill out many demographic forms, yes, Max?"

I nodded. "I did. For nearly anything I wanted to do."

"On those forms, you picked out which race you were from a list. If you chose 'wrongly' or wrote in something else, you could at best have your data excluded from assessment, or at worst be accused of some kind of *racial theft*. But what people did not understand was that it was that form which *determined* your race. How would you know, if races were real, that what you were was on that list? In other words, how would you know if you'd missed one, when listing the races? The content of that form changed over time. As an anthropological study in the *social perception* of race, it was perhaps somewhat interesting. But as an analysis of *actual humanity* it was completely scientifically flawed.

"Now of course, you can group people however you like. What color are their eyes, what is their handedness, do they or do they not possess an epicanthic fold of the upper eyelid…any arbitrary grouping. But that would not be a *race*, would it? As I said about God. Indeed, I can see in your face that this definition does not appeal to you."

I admitted that he was correct. "It doesn't quite *work*," I said. "Just because you have blue eyes, it doesn't mean anything except that your eyes are blue. Defining a shared characteristic as an entire species of human is just *stupid*."

"Exactly," said Mudrac. "But we are supposed to believe that your skin color tells us something *more?* Obviously, there are *some people* who believe so. We call those people 'racists.' Why, then, should we, when engaging politically, adopt the viewpoint, mindset, and rhetoric of *racists?*

"Obviously, that's not logically sound," added Mudrac. "Just because a racist says it doesn't mean it isn't true. Many a racist believes the sky is blue and the Earth spherical, of course. But that is not where we are in our analysis. We have no logical reason to believe in the existence of race, and suggesting it is a 'social construct' is simply acknowledging that it is a thing people believe *regardless* of whether or not it is true or even useful. That does not mean we ought to, ourselves, adopt those categories of thought.

"The problem was more than just a bad idea, however. Remember how I referred to the arbitrary nature of racial division? The racial identity of a person was contingent on the social construction of a *standardized form*. You were of a race because you were *seen to be* of that race, quite apart from any actuality of your being. And those races were *socially* and *temporally* contingent. And so, being a social and not a material construction, it became possible to subvert criticism itself to support the theory. If you were a person considered to be of race X who rejected the racial construction of your identity imposed upon you, you had simply internalized your racist experience, or you were brainwashed into rejecting your rightful racial heritage, whatever that means.

"*Anything* could point positively to the theory, which made it no better than religious claims, only without the obvious surface features of supernaturality. A claim where even contradictory pieces of evidence point in support of that claim is fundamentally nonfalsifiable, and therefore, cannot be discussed in the realm of science. This isn't some ideological claim, but rather it's a statement about being able to tell the difference between two possible versions of reality. If you look at all the evidence, and the version of reality where race is the defining

factor and the version of reality where it *isn't* look the same, then you cannot make any meaningful statements in support of your theory. But under the social construction of your era, Max, and today in the Coalition, if there was no evidence to support the theory, that was merely because race was a 'social construct' and therefore, somehow, exempt from scientific inquiry. Or, perhaps, scientific inquiry was, itself, racist! That's very convenient, isn't it?

"Our Marxist *materialist* conception of reality *does* allow for such distinctions as to make scientific inquiry possible, because it separates the world into a *base* of materiality and a *superstructure* of surface features and idealism, in the philosophical sense. For example, art is superstructural, but the *production* of art is basic. The oft-vaunted idea that 'representation matters' has absolutely nothing to do with the fundamental realities of suffering. It doesn't matter *at all* if you see people who look like you do in the cultural products of your society if you can't get enough food to eat, or enough medical care to be healthy.

"Hence, the materialist conception of reality makes it possible to distinguish between different states of the world as it *is*, because anything that exists merely in the mind but which has no meaningful material component is separated out. The material, and therefore measurable, elements become elevated to genuine scientific scrutiny, and any attempt to obscure the material behind the immaterial or merely perceptual is discarded up-front.

"This being the case, it necessarily means that racially-oriented politics of all kinds, quite apart from being a radical political project, or even an apolitical scientific inquiry, is in fact a *bourgeois* ideology! It is meant to *distract* from real, material change! This had real, material effects, by denying material benefit to certain people for arbitrary reasons, which in turn reproduced the ideological structures that resulted in that form of oppression in the first place! The distraction was self-perpetuating! For example, in the early-to-mid twentieth century, it was the Jewish who adopted 'white' names in order to blend in, and likewise in the early twenty-first century it became popular to seek any 'non-white' identity one could, for the same reason. These phenomena are *material*, but they produce—quite without any conscious direction—the original immaterial structures over and over again! When an economic decision is based on your perceived 'race', you rightly seek

any advantage you can, and you do so by understanding and, through action and rhetoric, perpetuating the very racialist illusions that produce the arbitrary lines across which discrimination is encouraged to act!

"Indeed, it should be noted that the arbitrary nature of ‘race’ produces its own reciprocal externalities. The falsity of racial perception created specific forms of a more general oppression, upon which those specific and arbitrary *forms* replaced the very material politics they were meant to obscure in the first place. A new politics arose, redistributive not of wealth but of scarcity, and then stood up and declared itself the outline of the problem, and the material reality merely ‘reductionist’. For example, there was once much talk of ‘blackness’ and ‘whiteness’. Calls were made to ‘end whiteness’ or to ‘dismantle whiteness’ as some kind of political end, or at least something perceived as a necessary attaché to an end. But whiteness is not absolute. It exists only as it is contrasted with what it is not. It therefore is impossible to dissolve a single group identity without dissolving *all* group identities. If you define one group by a particular factor, then by definition all of those individuals not in that group become defined by their lack of that factor.

"This brings us to the point of my little lecture here," said Mudrac with a grin. "This was part of the political discussion with Ai Kuroda, wasn’t it? So, then, having established that there is no reason to believe in race, and with the understanding that continuing to talk about race as a ‘social construct’ is simply to perpetuate an unscientific, racist belief, and to understand further that engaging along lines of so-called ‘racial justice’ merely obscures the actual material problems at hand and further reproduces that confusion, let us turn now to a discussion of why the politics of race—or any other identity—are *per se* unsuitable for an advanced social system such as ours. That is, why we must not engage in such arbitrary divisiveness *regardless* of where such divisions are drawn.

"A political system based on *division* cannot function. By division I mean the idea that each group of people, however they are conceived, should look out only for their own interests. Not only does this reproduce class struggle in miniature, but it also incentivizes people, in order to secure their own little fiefdoms of political and social authority,

to refine their identity further and further and further, until any group founded on a common complaint, however legitimate, disintegrates.

"There were attempts around this, at least rhetorically. Much talk was made of 'intersectionality', as though you could construct a material politics out of hundreds of immaterial ones, but this was just bourgeois individualism by another name. It reduced systemic failure to individual moral culpability, to prejudice or weakness or bias, as always occurred when society had no meaningful systemic perspective. In point of fact, it was another replacement of the basic with the superstructural. That kind of individualism elides the fact that the same *forces*, produced by the same *structure*, can have extremely specific *incarnations* in an individual person's life. Intersectionality correctly highlighted the fact that the *form* of one's oppression may change along arbitrarily-many axes, but it conveniently disguised the fact that the *content* of oppression was identical *between* all of those axes, or at least it was used that way. Namely, regardless of *why* or *how* you were oppressed, the *result* was the same: can't make a living, can't live where you want, can't join that organization, *et cetera*. The reason behind your specific individual experience was not as important, either in diagnosis or correction, as what it was you were being denied in the first place!

"What's more was the arbitrary nature of intersectional axes of oppression. For example, there was much talk about the *proportionality* of suffering. It was all right to have poverty, these people said—not in words, but by implication—so long as that poverty was *proportional* to demographics. Of course, demographics are arbitrary. We can choose to assess proportionality along any lines we wish, however best serves our own material interests. And furthermore, you could 'solve' proportionality issues by *adding* people to the group so affected. For example, if groups X and Y are affected by poverty, such that the rate of poverty among members of group Y is greater than their relative proportion of the population—and, therefore, that group X is *under*-represented—then you can 'improve' proportionality of poverty by *impoverishing* more members of group X, *without* helping even one single member of group Y! So proportionality in the first place was fundamentally flawed, a poor metric indeed, which has as a mathematically valid solution the increased harm of actual human beings. And yet

more than that, it was an implicit defense of capitalism. It was all right to have avoidable suffering, if that suffering was distributed quote-unquote *fairly* among any division of people you might care to name. We know from our analysis of capitalism, which you learned from Thomas and the others, that poverty is itself a product of a great unacknowledged theft.

"The reason why, politically and economically, race and other such personal identities are not relevant to real material justice, but class *is*, even though one could consider both of them to have been socially-constructed, is that if we wished to eliminate disproportionate poverty between so-called *races*, then literally nothing about capitalism would have to change—the theft, and its consequences, would be ongoing. Whereas, if we wished to eliminate disproportionate poverty between so-called *classes*, then suddenly *everything* about capitalism has to change! Discussions of proportionality, then, imply that justice is when everyone is stolen from proportionally, abused proportionally, steals and abuses proportionally. If that is justice, then I do indeed demand an unjust world!

"No, the only true justice is in a universalist politics. Abolishing poverty for *everyone* will disproportionately *benefit* those who were disproportionately *impoverished*—whatever your metric of proportionality! This not only solves the problem posed by the proportionalists, but solves all poverty for everyone, everywhere! This is without argument superior, both practically and politically. But capitalism could not allow this. It was not possible under capitalism to support universalist policies that would erode capitalist control over wealth and resources—and, thereby, people.

"I mentioned earlier that the government was a social construct, but it was *useful*. What, then was the use of race—of politics of identity in general? Indeed, it *was* useful, as a means of separating people against their own interests. Capitalism could not abide a universalist politics, because doing so would raise the inevitable question of what the purpose of capitalism was in the first place. So the groups advocating for a divisive, prejudiced politics were lauded by capitalism, sheltered and funded by the capitalists, because it is irrelevant to capitalism what the demographic makeup of the ruling class is, so long as there *is* one. If it eases political pressure to change the system, all the

better.

"That last note is very important. The capitalist class understood very well—and still does, in the Coalition—that theirs was the smaller class. They knew that any real unity among sub-groups within the proletarian class would destroy them, either legally or otherwise. Reading the news media of the time spoke of nothing but division—political parties, racial or sexual identities, geographic regions, religious adherents, you name it. This is despite the fact that the complaints of the people were largely similar, and the things they desired the collective—that is, the government—do on their behalf were also largely similar. But did anything get *done?* No! The argument fell to *who was standing in the way!* Cronyism, they said, despite the fact that capitalism *demanded* state action for the enforcement of property laws, the creation of markets, and the forcible protection of both. Political parties *pretended* to be the one who fought on your behalf against their hated enemy, who was the same as them. It became impossible for majority parties to act to improve the lives of their constituents, because of some reticent actor, or because the proposed policies were not racially or sexually specific enough.

"This was not because of incompetence on the part of the politicians or the wealthy. It was a fully intentional project of the capitalist state. Even those who were elected out of a genuine sense of wanting to improve the world would be co-opted through threats to election funding or party support. And in a pinch, a scandal could always be generated. Did you notice, Max, how despite there being a constant sense of people working to solve some nebulous problem, nothing ever *really* got better?"

Now that he mentioned it, part of the oppressive horror of my past life did seem to include a sense of laborious futility. The idea that society was heading *somewhere* was pervasive, because obviously there were problems that needed solving. And yet…nothing really seemed to improve. I said as much to Mudrac.

"So you see, then, how the personal fortunes and careers of the so-called 'elite' of society depended on the smooth functioning of a sociopathic, kleptomaniacal system, which they kept running despite its fundamental contradictions—at least, for a time—by separating the mass of people against itself. They could not *truly* resolve the contra-

dictions and failures of that system without destroying it, and they could not outright antagonize the population lest they be overthrown. Their only option was a kind of delay, by means of a politics of identity, by which they hoped to create chaos through which they could commit acts of mass theft. What they hoped to *do* with that theft, except exercise power for its own sake as Orwell said, I cannot guess. The idea of the perpetual boot stomping on a human face, of the acquisition and execution of power for power's sake, is a depressing thought, but probably an accurate one. If it is the nature of organizations to perpetuate themselves, at least let them do so by making the world perpetually *better.*

"I could go on. The policing of language, whining about what *color* of person gets to speak on behalf of others, the screaming opposition to universality—it's all the same thing. We observe and understand our situations through cultural products, including news media and protest action, and by that understanding we can be made to ignore the true reality of the world, so long as we are focused immovably on the flickering shadows cast upon the wall of the cave. Once we awoke and realized the world more closely for what it was, we could simply decide: what is our goal, and what is useful in service of that goal? Thus, we banished the politics of immaterial identity to the realm of sports loyalty, where it could be safely contained."

"Well, we've done religion and politics," said Jak, "so Mom, why don't you talk about what you're working on before we strike all three taboo dinner subjects? Or Dad starts talking about *baseball*."

Julie laughed. "I'm an astronomer, as was said, and specifically I manage one of the Earth-based data centers for the space-based SETI telescopes."

"SETI?" I said. "The Search for Extra-Terrestrial Intelligence?"

"That's right," said Julie. "Once, we only were able to scan a small part of the sky at a time, which vastly limited our ability to search for other civilizations. But now we have thousands of telescopes scattered all across the ecliptic, so we have a baseline billions of kilometers across. We can scan a huge volume of space pretty much constantly, and once we perfect self-replicating factories, we'll be able to start converting huge portions of extrasolar mass into transmitters, such as out in the Kuiper Belt or even the Oort Cloud. The only thing that's re-

ally limited that far out, compared to our rate of consumption, is electrical power, but now that we're refining fissiles from the asteroid belt, it's not so difficult as it once was. Certainly we aren't limited to a few probe launches per year."

"Have you found anything?" I said, trying not to sound *too* eager.

Julie sighed. "Not yet. But it's a big universe, and the astronomical data alone are invaluable for peering into the cosmos. We are constantly refining our models of cosmological evolution. Figuring out the algorithms that allow for a telescope which has transmitting components light-hours apart earned the science team a New Community Prize in Astronomy. It's sort of like our version of the Nobel," added Julie at my quizzical expression, "only there's no money in it, obviously. But the Nobel was never about money, it was always a piddling little amount. But to be an NCP laureate? You have to contribute quite a lot to the advancement of science."

"What other NCP prizes are there?" I asked.

"We have physics, biology, chemistry, medicine, literature, film, physical arts such as sculpture or painting, music, performing arts, economics, service which is used for diplomatic or political achievements, mathematics, engineering, and an additional 'special' category for whoever the committee thinks has done something that doesn't fit into the other categories but is otherwise extremely notable. Sometimes a laureate might be known for one thing, but win for another reason, such as an engineer who, rather than producing some new and important piece of engineering, and has instead produced something uniquely aesthetically pleasing, might win in engineering for that." Julie eyed her husband. "I have an inkling that we might have a new laureate in the Richmond Node sometime soon."

Mudrac waved a hand dismissively. "Oh, I don't think so. I didn't do anything nobody else has done."

"You put it all together in a way that nobody else has done, though," said Julie.

"It wasn't *just* me," said Mudrac.

"You led the team!" said Julie, rolling her eyes at her husband.

"Max," said Jak loudly, drawing the attention of her lightly bickering parents, "there's going to be a Rapids game tomorrow. Would you like to join us?"

"Now who's talking about *baseball?*" said Mudrac, with mock offense.

"Baseball?" I said. "I'd love to. I can't imagine what sports are like in this day and age."

"The players have to agree to stay to a specific baseline," said Mudrac. "But a lot of things are different *around* sports. For example, teams are like any other community organization, in that the teams are managed by their players and staff, who also manage their stadia. Although, like the shops and labs and studios of the Novacom, the physical buildings themselves are owned by the Novacom and supported by the users. It's all subject to regulation and licensing by appropriate institutions, of course. But yes, please, I'd love someone else to talk with about baseball."

"He'll talk your ear off," said Jak. "And speaking of talking ears off, I'm finding myself a bit tired after all that food and wine. Max, would you like an escort back to the Clinic before I turn in? You're welcome to stay, though."

"Well, if it isn't too much trouble," I said. "I wouldn't want to keep you."

"No, not at all," said Jak. She stood up, and I followed her.

We bid good night to the elder Atamais, and I walked arm-in-arm with Jak back along the well-lit path. The stars were out, and the lights of the city somehow did not flood the sky with light as I had expected.

"Street and path lighting is strictly regulated to minimize light pollution," said Jak. "Also, the city banned personal motorcars about ten years ago, so there are no bright headlights or anything, and street lamps are designed around pedestrian transport. And because of this, the pathways around the entire city are designed, along with police station distribution, to maximize safety and access to help. You're as safe here as you are in the lobby of the local precinct building, thanks to the camera and sensor suites in the trees and lampposts, and embedded in the ground and path itself." I could feel her tense up against my arm. "I'm sorry. I'm sure you've heard enough rambling from an Atamai for an evening."

"I could listen to you forever," I said, but if anything she got even more tense.

"That's…dangerous," she said. "What do we know about each other?"

"I know you're dedicated, and kind, and honest, and loyal," I said. "You've taken this position to help people like me. You put in far more effort than is actually required, or even *expected*. You've been totally up-front about yourself, and your responsibilities to yourself, and me, and your various communities. And everyone I've met who's heard about me before I've heard about *them* has said nothing but kind things about me. I don't need to know anything else."

"I know you're clever," said Jak, not looking at me as we walked. "And curious, and joyous. And I feel like I could tell you anything and I know it would be kept in confidence." She managed a shaky smile in my direction. "I haven't had an uncomfortable discussion with my supervisor yet, after all."

"I couldn't say a single bad word about you, Jak Atamai," I said. "Not that I'd ever have to."

"I suppose I've been in more positions of knowledge and authority since we met," said Jak. "But…I trust you. Even, and I mean no offense, if I haven't quite figured out why yet."

"We've got plenty of time to figure it out," I said. I leaned against her a little, letting her lead me as I tipped my head back and looked up at the stars.

When we arrived back at the Clinic, passed through the front doors and up to my room, she stopped me at the door.

"I saw you looking at the stars just now. And…" She took a deep breath. "You…you see what I see. Your values are my values. I can trust you with my true self. I can't tell you how rare that is, even now. I think that's how I know."

Without thinking, without effort, as though it were inevitable, I turned around to face Jak, stood up on my tiptoes, and kissed her, just lightly, on the mouth. As I pulled away, she blinked at me, lips working soundlessly.

I reached up and put my fingers into her hair, trailing down the back of her neck, and that seemed to break her out of whatever stupor my kiss had put her into, and she pulled me close against her, hand cupping the back of my head, and who kissed whom became, suddenly, quite irrelevant.

After a little while, we pulled apart, and I felt my heart pounding in my chest just as I felt the words *Please stay with me* on the tip of my tongue. But no, it was too soon for that, I could see it in her eyes, and I would rather go without for the moment than push too hard.

"I'll see you in the morning, I hope?" I said instead. And she nodded, loosened her hold on me, then dipped back down and kissed me, gently, once again.

"One for the road," she said. And then she was gone, and the door closed between us, and I could have floated across the room without my feet touching the ground. My dreams that night were full of wine, and Jak, and the sky.

# CHAPTER 8

The campus of the local university spread across most of the old downtown area of Richmond, from the central intercity train station up deep into the Fan district, completely encompassing Monroe Park and the theater where we had seen that remarkable play. Jak and I, after a late breakfast that was more moony looks and playing footsie under the table than it was a balanced and nutritious meal, took the monorail down to the heart of the campus. We strolled past the library and towards the old student center, long since renovated in the contemporary style that had been popular at its initial construction more than a hundred years earlier.

Jak led me to a reference desk near the main entrance, where a man stood, in casual clothing, leaning against the wall. He perked up as Jak and I walked over, and he came up to us, hand extended. "Hello!" he said as we shook hands. "I'm sorry to delay your grand tour, I had a conference in Australia yesterday."

"Oh, well," I said hesitantly, "aren't you exhausted from the time difference and the long trip?"

He smiled. "It's not such a long trip these days, with passenger suborbital spaceplanes. It's really the best way to travel quickly, since they're just powered by slush hydrogen we synthesize from the oceans. Quick, safe, and economical! And for the jet lag, there's always the handy-dandy neural lace!" He tapped his forehead for emphasis, and I understood that he meant our implants.

"Handy indeed," I said. "I'm Max Kustaja."

"Oh, forgive me," he said. "I'm Nicholas Freeman."

As he spoke his name, an image of him appeared in my Overlay, with some basic public information about him taken straight from the school's databases. I had looked that morning, but there was no such thing as a 'website' for the school. Instead, I got hypertextual crosslinks, indexes, and even references to the university in books. It seemed that most of the Overlay was like that, information that could be served up contextually instead of mediated through quasi-skeumorphic paeans to paper.

"It's nice to meet you, Doctor Freeman," I said. Freeman, said the Overlay, was director of the school's uppermost cybernetic metasystem recursion, chairperson of what in my day was the Board of

Trustees.

"Please, the pleasure is mine," said Freeman. "It's not every day, even around here, that I get to meet an honest-to-goodness temporal transplant!"

"I can tell you quite honestly, I'm very happy to be here," I said.

"Why don't you start at the top, Doctor Freeman?" said Jak.

"Of course." Freeman led us outside, to the courtyard abutting the student center. He indicated various buildings as he spoke.

"Our university here covers a little of everything, from physics to politics to law to engineering to art to medicine." By his indicating, some of the buildings were quite far away. Nearby, gliding silently above what was apparently once a street for motor vehicles but was now, like the rest of the main body of the city, fully pedestrianized, was a small train of vehicles set in a guided pathway, bearing the university's logo on its side. "We have a full-time contingent of students who stay in our dormitories, usually those studying a significant body of knowledge."

"You grant degrees here?" I said.

"Yes and no," he said. "Doctorates are still granted for formal research, although these days the equivalent Innovation Award fulfills most people's desire for formal recognition. Where the doctorate is a formal and traditional process of research and contribution, IAs are awarded by a multi-university research council for less formal contributions. In short, if you make some important discovery or produce some important and new invention, you get recognized. It's sort of an extension of the dissertation process. It's how I got my title—I invented part of the algorithm that connects together our far-flung radio antennae, out in space."

"I heard about that," I said. "I spoke with Julie Atamai yesterday, and she told me about her SETI work."

"Ah, yes," said Freeman. "The data the telescopes generate are, of course, freely accessible, as is every scientific article and publication produced in the Novacom—and whatever we can steal from the limited scientific work in the Coalition, if it's important. SETI's responsibility is to put together models of potential interest in the contacting of extraterrestrial life, although so far it's mostly been useful as a sort of reflective anthropological study, looking at interstellar-scale projec-

tions of human systems."

"And what about the other students who are here?" I asked. "They don't get degrees?"

"A degree lower than the doctorate level once held meaning, when it was a form of elite status signaling, or a useful check-box on a job application, but these days we take a more practical view. Most of the business of broadening the horizons of students is accomplished in the later years of mandatory schooling, which is usually from ten years to eighteen years of age, with some early workshops on reading and basic math and practical skills. Depends on the child, really.

"In mandatory schooling, students learn everything they need to live in the Novacom—practical things, theoretical things, tools of analysis and critical thinking, all with an eye towards individual learning and instilling a love of discovery and debate. So when a student comes here, seeking some specific kind of knowledge or set of skills, it's really more of a formal apprenticeship—learning the canon of their chosen field or fields, assembling a custom plan of study to really find their niche, even if it's very broad. When they've finished a particular milestone, as judged by their team of dedicated educational professionals, they receive a certificate to that effect. Something to prove they have some skill or understanding."

"This team, it's made of researchers?"

"Usually, no! Most researchers who just want to research are just… researchers. Education is done by educators, people who have understanding but want to teach more than research."

"Sounds like a lot of variety to manage," I said.

"It can be," Freeman admitted. "But that's sort of our job. We manage that variety by having a lot of people at our disposal, including part-time professionals from various other roles in society. Jak told me you've visited Judge Reiner? She contributes part of her time here, as educator and assistant. We also have laboratories, study areas, and counseling services."

"Can you show us some of the research you're looking at right now?" said Jak.

"Of course," said Freeman. "Let's start here, in the chemistry building." He led us under the peoplemover track and to a highly geometric brick building just across the way. Inside it felt…like a school,

with smooth floors and painted-cinder-block walls.

"Sorry for the, er, old-fashioned design," said Freeman. "It's traditional."

"No, no," I said. "It reminds me of my old college, way back when."

"Oh. In that case, you're welcome!" said Freeman with a grin.

As we passed various lab rooms, Freeman gave us a summary of the various projects happening within. "This is where we work on molecular analyses of new materials for use in long-term space-borne structures. And here we develop new biodegradable packaging systems. Down that hall is a lab working on spontaneous chemical synthesis for use in local medicinal fabrication, and over there is a biomedical lab working on ways to induce rapid tissue regeneration, so we can further reduce the impact on our medical systems."

"Some of these sound only sort of like chemistry," I said.

"It's all the same thing when you get to the bottom of it," said Freeman. "Aside from the obvious problems with imposing taxonomic classifications upon the real world, hyperspecialization in research is a capitalist game, born of publish-or-perish funding structures and unnecessarily limited government grants. We don't engage in publication fever in the Novacom, and we publish *far* more in the way of hypothesis-rejecting results than happened in your time—because the whole point is the rapid generation and falsification of ideas, so we can narrow down the solution space of actual, useful innovation as quickly as possible. None of it would be possible without our open intellectual property system, though. Too much competition between universities. Science is already a competition, to see who can do science better than the other guy and thereby gain recognition for a job well done. It would be silly to bring stupid metrics like money into it. Turns out bragging rights work way better."

"The whole *city* is like this, isn't it?" I asked Jak. "Thomas M'baga, your father…"

"We all play poker on the weekend," said Freeman. "All us tour guides."

"Seriously?" I asked.

"Indeed. It's a small city, really, and the Atamai Clinic means I give this tour with fair regularity. So the city put us all in a room, told

us to hash out a consistent message and an explanatory process, and didn't let us out until we were done. I got to lead the team," he added, a proud grin on his face.

"I'm impressed at their foresight," I said.

"That's how it goes here," said Freeman.

We took the peoplemover down to the engineering building, where Freeman showed us more ongoing research projects: macro-scale materials analysis; new sources of energy; improving the efficiency of space-based beamed power systems; creating semi-autonomous nanomachines to interface with our implants to keep us healthy, or change our bodies on-the-fly. They also were working on advanced manufacturing systems that promised to do more and more complex pieces of construction with fewer and fewer distinct types of material.

What was once a school of business a hundred years ago was now a school of cybernetic research, investigating and analyzing the various functions of the hundreds of distinct types of organization present in the Novacom, from high-level government institutions to local sports clubs. They also developed new algorithms for managing economic output, trying to shrink the minimum necessary surplus.

The school of public administration investigated organizational systems at a macro level, most pressingly how the totality of the Novacom broke down into distinct areas of activity, but also how systems functioned in the Coalition. Likewise, criminal justice researchers and legal scholars alike looked into the divergence of individual people from the general trajectory of the Novacom, how those impulses could be expressed in socially positive and individually healthy ways.

The school of biology was busy building models of germline expression in humans that had been the subject of genetic therapies. The school of medicine was trying to improve implant integration in injured or deeply ill children, as well as a whole team working with the Atamai Clinic on rapid suspension/revival technologies.

Even the schools of art were no exception to the rapid pace of innovation and the exchange of ideas, training new virtuosos and educating new creators, as well as working to make new infrastructure and architecture and even consumer products more aesthetically pleasing while simultaneously reducing their manufacturing complexity and resource consumption.

Again and again, what stood out to me was the overlap. These were *technically* distinct schools, some very different from one another, but they were all being deliberately guided—at least, according to Freeman—towards a singular understanding from which all other scientific models must, in fact, spring. It was no longer sufficient to put a divide between social and hard sciences—cybernetics had seen to the impossibility of *that*—but actually getting the various schools of thought to converge was a task that took some doing.

"So you can see," said Freeman as we returned to the central courtyard from which we had left on our tour of the university, "we are taking great strides in the practice of scientific integration, including requiring that anything going out for peer review be reviewed by people who are experts in distinctly different fields. This, along with a thorough education in the root process of scientific inquiry, allows us to correct for individual biases with a much higher rate of success. As a result, we have branches all over the Novacom, even in space, engaged in cyclical innovation, where tools are built that enable the next generation of tools to be built even faster and better. The goal is to reach a point where the development of new technologies, and the enhancement of our population, grow in concert, and so rapidly that the *pace itself* of improving life accelerates exponentially. Exponentiation atop exponentiation is a recipe for a technological explosion. The capabilities that puts into the hands of humanity, guided for the preservation of both the species and the natural environment by the values and processes embodied in the cybernetic hierarchy that gives our civilization its name, would be nothing short of miraculous."

I whistled, long and low. "Sounds very impressive, Doctor Freeman," I said.

"Well," said Freeman, shrugging, "that’s still in the future. And it’s important, of course, to live in the present moment, which we like to think is made much easier by the technologies we have already developed. But humanity is a future-oriented species, and I don’t see why that’s so bad, so long as we take the time to appreciate where we are, and how far we’ve come. For the first time in history, a system exists that actually manages all aspects of human society-making, respecting both the needs of the individual and the needs of the whole community, and we are very proud to be an important and integral part of that

process. We work for the betterment of all, even those not yet part of our New Community, and speaking personally it's bliss to be part of a system that not only allows, but desires, even *demands* that we do exactly that." He looked very proud of himself indeed.

"Is there anything the Novacom proscribes, research-wise?" I asked.

"Technically…no," he said. "Of course, there are very strong ethical standards in place, and a great deal of scrutiny when designing certain categories of experiments, but assuming no ethical violations, we study anything and everything. Of course, a significant portion of our biochemical research is related to the human body, life extension, reconstruction and recovery, that sort of thing, so it actually does come up quite a lot. Frankly, Max, people like you are a godsend. I cannot thank you enough for contributing to the body of biomedical science as you have."

"Oh, well, I just…didn't want to die," I said. "And I thought…it's better than the alternative, isn't it? Either you go into the ground and entropy dissolves you bit by bit, or you go into the ice and there's at least a *chance* you can come out again." I shivered thinking about it, and not from the idea of cryogenic temperatures.

Jak seemed to sense my inner turmoil. "Well, thank you very much for the tour, Doctor Freeman. If you'll excuse us, we have another engagement."

"Of course," said Freeman. "Please, contact me any time you like if you have questions. I might not be available in person, but the Overlay is more than convenient, I think you'll agree."

We left the university campus and took the monorail out to Boulevard, a wide street that once carried vehicle traffic laterally across the city but now formed part of Richmond's city-spanning park-like pathway system. Not far from the intercity rail line—and, yes, the surface-vehicle inter-regional highway that still snaked through the heart of the Virginia Novacom—was a glittering, glorious baseball stadium. Mudrac and Julie Atamai were waiting for us by the surface exit of the monorail station, and Mudrac immediately set about showing the stadium to me.

"There's been a stadium here for over a century," he was saying as we walked up the broad staircase that led up to the main concourse. "It

used to house various minor teams, but about ten years ago we applied to the League—that's the Novacom Baseball League—for our own top-tier team, and we got the Rapids!" He was grinning from ear to ear like an excited schoolchild, so I just let him bring me along in his wake.

I had been to various sports stadia before, of course, but typically they were crowded, full of long lines at food vendors and bathrooms, and people shoving past one another to get to their seats—here, there were dozens of vending machines, larger versions of the ones that studded the pedestrian streets in the rest of the city, decorated in various baseball-related ways: team logos, murals of various important events in the history of the sport, insignia of the various stakeholders in the stadium and the team, the city and the League and the stadium itself. Outside, it was starting to turn into a cool evening, but the field itself was flooded with light. This was not unusual. What was unusual, at least for me being so used to the sports fields of old, was the distinct lack of grandstand seating. There was some, of course, I suspected mostly for the sake of nostalgia, but the *vast* majority of the voluminous crowd that threaded easily through the stadium's wide vomitoria were headed for *boxes*.

The stadium was *filled* with boxes, short rows of plush seating set up a little ways from the access pathways. Behind each set of seating itself was a small, glassed-in room, with tables. As Mudrac led us up to our assigned box, I could see that there were openings in the narrower walls that dispensed food and drinks and even souvenirs, hats and blankets and little flags. One wall of the space was devoted to what in my day would have been a broadcast of the game, which was at that moment playing clips from earlier games. It was far more than camera angles, however—the display pulled at my Overlay, and at Mudrac's prompting I let it show me a fully immersive replay of a spectacular home run.

"See those little black dots?" said Mudrac as we settled into our seats. Jak had offered to bring the snacks, and I had been successfully captured by the enthusiasm of one Mudrac Atamai, so I could not assist her. "High-speed full-spectrum sensor boxes! Most of the attendance of any game is virtual, so we can build stadia with many fewer seats."

"So how do they manage limited seating?" I asked.

"The same way as a film or play," said Julie from Mudrac's other side. "First come, first served, with a very few choice seats reserved as a reward for community contributors. Of course, you *can* get season tickets for home games, but you have to pay the average marginal resource cost of maintenance for the number of seats you reserve *up front*."

"Behind home plate isn't that interesting anyway," said Mudrac. "Flattens everything out, in my opinion. Up here is the best view, isn't it?"

I had to admit that I had a great view of the entire ballpark. We were about halfway up, and the terraced arrangement of the boxes—and the rows inside them—meant that we did not have to crane our necks or try to peer past tall people in front of us.

The smell of roasted meat—undoubtedly grown in the vats at the agridome—made me salivate, and I turned to see Jak passing us a wide tray loaded down with every sports-park food I could name: hot dogs, french fries, popcorn, candy, drinks of various descriptions, even a hot salted pretzel with mustard.

"This is very generous!" I said.

"Don't worry about it," said Mudrac. He puffed out his chest a little. "I was instrumental in getting the Rapids here in the first place, so we get a lifetime snack pass!"

I laughed in delight—it was such a perfect thing to hear.

The game started exactly on time, with the home-team Rapids playing against the Hanshin Tigers from Japan, a team even I recognized.

"It's truly a World Series, isn't it?" I said.

"Well, this is just a normal interleague game," Mudrac replied. "But I've been excited for this matchup for months! Couldn't do it before Japan joined the Novacom."

As the game progressed, Mudrac did indeed keep up a running commentary, both of the game and of the state of sports in the Novacom. Baseball players—there were no separated leagues for different kinds of people, since physical fitness was elective—had to stay within human baseline, which was less a specific set of numbers and more a general statistical range, which was both much easier to achieve and

more exciting for the fans. They *were* allowed to enhance their bodies in terms of resistance to injury. It was common, for example, for pitchers to reinforce the ulnar collateral ligament in their arms, so they would not have to suffer tendon replacement or reconstruction. Likewise, their implants were reinforced with mechanical supports, so they would be less likely to suffer injury from cranial impacts. There was, as it turned out, a side league for augmented players, playing in special stadia that were, usually, much bigger than the one we were in at that time. Not because the augmented league was more popular—it was not—but because games where every at-bat was a kilometer-long home run got uninteresting pretty quickly. The least restrictive league on human augmentation was American-style gridiron football, although that was mostly for safety reasons.

The game itself was just as I remembered it, and I found myself drawn into the dramatic tension of every pitch and at-bat, and if the starting pitcher passed a hundred with a little too much ease, and if there were a few more dramatic leaps for a far-hit ball than was perhaps normal, it did not meaningfully decrease the narrative drama of the match.

Eventually the Rapids emerged victorious, and the Atamais and I returned to the monorail, leaving the robots to clean the box behind us and maintain the field itself. Jak had purchased for me a baseball cap in the green-and-orange-and-white of the Virginia Rapids, prominent James River-styled logo and all, and had accepted a game pennant in return.

Jak's parents left us at the Atamai Clinic, continuing on up the path to their own home. Jak led me back to my room for the very last time, kissed me goodnight at the door, and promised to meet me in the lobby the next morning. I spent the time between shower and sleep ordering a small duffel bag from the Clinic's stores and packing away my few possessions, including the robe to which I had become so dearly accustomed. I zipped the bag closed and put the baseball cap on top, where it would not be crushed.

The building that housed my apartment was actually three buildings springing out of a common lobby area, which opened onto a pedestrian street lined with restaurants and other public units. The three towers themselves were connected by a lovely glassed-in atrium,

full of trees and benches and the piped-in sounds of wildlife. The morning after the baseball game, Jak put her hands over my eyes as we exited the elevator and guided me awkwardly down the hallway.

She uncovered my eyes on the threshold of my apartment proper. The apartment itself was exactly as I had pictured it, with the furniture and decorations arrayed just so, and the accent wall painted with an inhuman exactitude made possible only by the machine assistants that helped to prepare and maintain the building and its various spaces. Even the tile backsplash behind the shiny new kitchen appliances had been scrubbed and polished. The bedroom had a wide, soft bed, already made with one of the sets of bedclothes I had picked out, and my closet and dresser were filled with the clothing I had ordered, including the custom outfits from the shop downtown. There was even a new toothbrush in a holder in the bathroom, which was large and airy enough to hold both a shower and a jet-lined tub for relaxing.

"It’s wonderful," I said, pushing open the sliding glass door out to the balcony and standing by the railing, feeling the breeze and watching the tops of the trees sway.

"I’m very glad you like it," said Jak. "And it’s been fascinating seeing you put it all together. You might be surprised how many people don’t bother with physical decoration at all. They just customize the public-facing layer of their local Overlay."

"Seems like showing off, to me," I said. "I like knowing that the apartment *really* looks like it does. It’s comforting to have a little space of my own, looking just as I left it, even when I’m not there. It’s a little like leaving my mark on the world."

Jak watched me speak, a little smile on her face, and I watched her in turn as the wind played with her hair.

Suddenly I realized that we were alone, in my own personal, private space, with our professional relationship altered into something *more*, something without the restrictions placed on us by our previous dynamic.

On that understanding, and my own impulse, I stepped into her personal space, slipped my arms around her waist, and kissed her. It was lovely looking up at her as I did, feeling myself occupying the volume defined by the curve of her head above mine, and I did not pull away even when the kiss ended.

Jak was looking down at me, a little flushed, but the wind was cool and the morning was bright so I leaned up and kissed her again, and she reciprocated in kind. We made full use of that soft, plush bed, a little hesitant, but with a mutually encouraging excitement that kept us occupied until far past our usual lunchtime.

Needless to say, we ordered in.

The next morning, I had the exceedingly pleasurable delight of waking up with a warm body in my bed, and especially the pleasure of knowing that the body contained a delightful mind.

I had taken the liberty of arranging myself across her before falling asleep, curled against her like a cat, and I was pleased to see that the arrangement had not shifted much during the night. As it happened, I was not the first of us to awake.

"Good morning," said Jak, and I became aware that she was stroking my hair with the tips of the fingers of one hand.

"It really is," I said, and Jak laughed, deep and rough with sleep.

"Not too quick for you, was it?" she asked, and I could see the deeper question lurking underneath.

"No," I said. "Why wait? I trust you, I feel strongly for you, and if you feel the same, then that’s enough for me."

Jak smiled, and I felt a little of the tension ease out of her body.

"And not for the other thing, either," I added, and I had yet another delight in store for me that morning: the sight of her blush continuing down over her chest. It was wonderful, in this new and beautiful future, to know that it had not one bit diminished our mutual humanity. Indeed, with the medical revolution that had taken place since my cryonic suspension, I was in body and mind everything I had ever wished to be—still myself, but my *best* self, no longer constrained by my physicality, no longer trapped in a body that was anything less than a perfect expression of my actual being. In short, I finally, *finally*, felt in body as I had in mind at my happiest moments, and the reciprocal elevation of my mood and attitude was beyond what I had ever expected. I was at last a whole person, content that I was partner with myself, not adversary—as I had been for decades, since long before the disease that had put me on ice.

I looked up at Jak and tried to put everything I felt, about myself and about her, on my face for her to see. Her eyes widened just a frac-

tion, and her fingers slipped against the skin of my face and neck and shoulder, and I tangled my legs with hers and pushed myself up until I loomed over her, until the only thing she could see was *me*.

We managed to make it out of bed for lunch that time, but it was a near thing.

"So what now?" I asked Jak as we lounged by the apartment complex's pool later that evening, Jak in a modest one-piece swimsuit, myself in a less modest classic two-piece. I chose it because I liked the freedom of my own beauty that my new body allowed me, but there was no point in showing off *too* much, as the only person I wanted to entice was Jak, and *she* was so easy it *almost* was not much fun.

Almost.

It was actually a fairly standard pool, equipped with everything from a casual swimming area to a real set of lap-lanes. Nearby was a large hot tub, positioned by the pool like the dot of an exclamation point. While Jak and I had made use of the entire area, largely for its intended purpose and only a little for a bit of harmless PDA, we had ended up on the plush lounge chairs that fronted the poolside, drinks and dinner in hand, watching the sun set behind the trees on the other side of the privacy fence.

"How do you mean?" said Jak.

"The tour," I said. "What's our next destination?"

"Well, to be honest, you've seen pretty much everything in the city," said Jak. "Everything else is just shades of the same fundamental rules."

"What about the Garden Cities?" I said.

Jak sipped at her drink thoughtfully. We had ordered kebabs for dinner, and she pulled a roasted pepper off of the end of a skewer with her teeth while she considered her answer. "I *do* have some vacation time coming up," she said.

"*Vacation time?*" I said, in disbelief. "There's still such a thing?"

"Well, no," said Jak. "Not unless you're in some special, important position, where you have to be available at known times, which doesn't apply to me. I just mean, I've recently completed an attendance with a new revival, so nobody is going to complain if I take some time off."

I reached out to where she sat beside me and stroked her hair away from her face. It was still damp with pool-water, but I was used to the chlorine scent so it did not bother me. "I'd love a guide," I said.

Just then, something intruded into the moment via my Overlay, but before I could get *too* upset at it, I actually parsed the words floating in my vision and sat up so abruptly I nearly spilled my drink.

"What is it?" asked Jak.

I reached out and brought the message closer to me, pulling at it until its entire contents were revealed to me at once. I read it closely, read it again, then flicked a copy at Jak—we had *long* since exchanged cryptographic keys to each others' message queues—for her to read it.

When she had, she refocused on me. "Oh."

"Yeah." I grinned, a little weakly. "Up for a trip? I've always wanted to go, after all."

Jak nodded. "Absolutely. I haven't been to the Moon in *years*."

# CHAPTER 9

Jak and I waited on the platform at the main intercity rail station in downtown Richmond late in the afternoon, not long after I had received the letter that urged us there. It was a strange trip, in many ways. For one thing, neither of us carried any luggage, not even an itinerary: our documents went with us, including measurements for our clothes. A set of expert systems had optimized our itinerary on our behalf, finding us available and luxurious accommodations in places across the continent and beyond, complete with tailored, if standard, clothing in every closet. One of those cities was Verdana in Colorado, the most recent Garden City yet completed and the current epitome of the Novacom's urban design principles.

Another reason for the strangeness of our trip was its destination: Luna, the Earth's most significant natural satellite, across the surface and depths of which sprawled a series of huge, interconnected cities. The standard interplanetary city design was based on the same principles as the Garden Cities, or so Jak told me, although in typical Jak fashion she refused to elaborate. That was all right with me, although I was sure to pout just for her benefit. I was happy to find things to look forward to doing with Jak, no matter what those things happened to be. All the better if it involved learning something new about my new home.

Finally, the mode of transport made our trip that much stranger. If it had been an emergency, it would have been preferable to take a supersonic jet down to the launch rails at Canaveral, ride a super-fast spaceplane up to one of the many transfer stations in Low Earth Orbit, and switch to a fast-flying transfer rocket out to another transfer station at the Earth-Moon L1 Lagrange Point to take a descent shuttle down to the lunar surface. It was by far the fastest way to go from Richmond to Armstrong Station on the surface of the Moon, taking a mere twenty hours.

But such a trip was very expensive in resource terms, reserved only for emergencies. Not even a medical emergency would be worth the expense, as the Moon was more than well-equipped with modern medical facilities, including cryonic suspension if the need should arise. Besides, the person we were to meet on Luna would not arrive for

nearly another two weeks.

No, we were taking the scenic route: high-speed train across the continent to California with a couple of overnight stops in Verdana, an airship out to Hawaii, and a luxury cruise down to the equatorial space elevator platforms. From there, it was a five-day ascent in a passenger capsule up to the habitat on the elevator's counterweight platform, then a slow ship out to the Moon, a ship that could just use the elevator's momentum to fling itself out into space, requiring no fuel at all. From there, the ship would arrive at a similar station above the Moon, where we would take another—much faster—elevator down to the surface, and thence on a maglev train to Aldrin City.

I fretted as we waited for the train station to allow us to proceed to the train itself, which we could not do until the entire train had been cleaned up and our room prepared. Although the train was, indeed, high-speed, it would take us several hours to reach Verdana, and as it was the beginning of the new week and we were the both of us a bit flush with points, we decided to splurge a bit and take the whole trip in especial comfort.

The entire reason for the trip, the message I had received a few nights before, weighed on my mind.

They had found my sister.

She was still on ice, as it turned out, and was not scheduled to be revived for over a year. But there *was* someone else, someone who had given me permission to have that knowledge at all: my sister's great-grandson.

The thought that there had been descendants of my siblings startled me, though of course I knew intellectually it was more than possible. Jak had assured me that *she* was not related to me, although a century down the line it was not likely that I would be very closely related to anyone who had not themselves been revived from my time, and weirdly that made me feel better.

I had immediately contacted my great-grand-nephew—I called him my *nephew* because it made conversation easier—on the Moon, but he was on business in the orbit of Venus, so instead we conversed through recorded videos, the light-lag being too far for reasonable conversation. He would be returning on a fast fusion burner within a week, and invited us to meet my family.

*Family.* The thought warmed and chilled me all at once. I had spent a lot of time with Jak and her family, who might one day be *my* family, but I was still new to the world. I knew, intellectually, that there was nothing to be done about our cultural and temporal separation, but that did not stop me from worrying over it.

Jak put one arm around me, and I stopped my fidgeting.

"It'll be fine," she said. "If I have to translate, I will, but it's not like they speak a different language. And you've seen how much is the same between your time and mine."

"I know," I said. "It's just…my nephew is *fifty.* He's older than I *ever* was."

"You saw what he looks like, though," said Jak.

"Still."

Jak saw that I would not be comforted, and instead sought to distract me. She was deep into explaining the history of the train station, and the rail system more broadly—the renovation of and addition to the existing rail system was one of the first things the nascent Novacom had embarked upon, even before the signing of the Novacom Charter—when the station pinged our Overlays and alerted us to the fact that the train was ready.

For a futuristic magnetic-levitation high-speed train running on clean electrical power beamed down from geostationary orbit, it was remarkably familiar. Except for the breaks between cars, it could have been all of one piece, sleek and white-and-blue, emblazoned with the logos of every organization and Novacom polity that had ever had a hand in the administration of the rail system. Jak said it was because everybody who worked on the trains wanted to see that their organization was represented, and everyone else needed to be able to see that it was *their* train as much as it was anyone's.

The head of the train was sleek and rounded, more airplane than surface vehicle. The markings on the front suggested windows, but Jak said that while there *was* a manual control interface there for emergencies, the entire train system was fully automated. In the event of a failure that demanded a human driver, it would usually just be easier to come to a halt and await rescue, and rout all the other traffic around the stopped train. But, typical of Novacom thinking without the pressure of marginal profit-making, it was better to have it and not need it

than the reverse.

The train cars were all almost identical from the outside, although as we boarded the train it was clear that they were distinguished internally by use and design. At the front, behind the electrical car that served as the engine of the whole train, were the production cars, the ones that prepared food and materials for the passengers. In my time, the kind and quantities of food available on the train were limited, both for practical reasons—frying food in oil was a bad idea on a train that could sometimes shake and rock—as well as for reasons of available funds, both on the part of the train service and its passengers. Instead, Jak told me, the same robotic cooks were available on the train as had been available at the clinic, meaning that the dining service was designed around their capabilities and, therefore, the spillage of hot oil was not a sufficient danger as to affect the menu. Resupplying at various stops along the way would keep their stores topped up as well, a massive supply-chain system that cascaded throughout the entire Novacom.

After the production cars were the dining and lounge areas, adorned with wide windows, the better to look at the surrounding countryside and cityscapes as the train flew by on its raised, maglev track, a giant elevated bridge that spanned the entire continent in all directions. Behind them were the passenger cars, with rooms below and short-term travelers above, still with the wide windows running the length of the double-decker train. And finally, bringing up what for this trip would be the rear of the train, was a second electrical car, sloped down identically to the front car to maintain aerodynamic efficiency.

As we settled into our room, sans luggage, I noticed how spacious it was. In my day, even the expensive private rooms were plasticky, more about being easy to clean than comfort. An upper bunk would fold away, and the lower would double as a bench seat. In the corner would stand a tiny shower/toilet combination. It was certainly more comfortable than all other classes of seat, and it was certainly a good compromise between high passenger throughput and passenger comfort, but it still smelled of compromise and utility above all else.

In contrast, our room on the lower deck of one of the passenger cars was, at least by train standards, downright luxurious. It had a full

double bed, with a narrow passage on each side for the occupants to access it. On the other end was a small two-person table against the inner wall, so both occupants could see out the window, if they wished, by turning the chairs to the side. Between the bed and table was the door to the corridor. Past the table was a tiny bathroom, but one that contained a *separate* toilet and shower. What really brought everything together, however, was the visual aesthetic of the space: clean lines drawing the eye out to the window and away from the relative confinement of the room. A pleasant breeze floated in through the cracked-open window pane, and I took a moment to watch the onboarding passengers milling about on the station platform.

In all, it was exactly in line with the rest of the general mien of the Novacom, both physically and politically: a smooth blending of aesthetics and engineering, a subtle obscuration of the highly standardized and utilitarian nature of Novacom production, with an elegant luxury that both highlighted the simplicity of the Novacom production-oriented aesthetic *and* ensnared the person experiencing that luxury directly in the moment of that experience. In short, it was so elegantly pretty you completely failed to notice that it was also efficient and easy to produce.

The Overlay was present here, too, of course. The entire rail system, Jak told me, was wired for high-speed access to the Novacom computer network, so if I wished I could remain as immersed in the Overlay as I liked—or I could dismiss it entirely and take advantage of the splendor of the train itself, and the trip. I aimed for a light touch with the Overlay, leaving it surrounding me enough to help me navigate and to alert me to any changes in the itinerary, or messages from my nephew or Jak.

Jak and I elected to watch the departure from the lounge two cars down, sipping on drinks delivered by the train's mechanized wait staff and watching the train's human crew making one last sweep of the platform, and querying their Overlays to check the guest list against those who had actually boarded the train. Soon enough, we were on our way, the train lifting up on a magnetic cushion after accelerating smoothly out of the station, with hardly a ripple in the surface of my martini.

The train quickly left the city behind, and I felt my heart rate accelerate a little—it was the first time I had been out of the city since I had woken up in the Atamai Clinic. In fact, as I had been an icicle when I had been brought there in the first place who knows how long ago, it was my first time seeing this part of the continent at all.

The city of Richmond lay very nearly at the foot of the wide mountain range that lined one side of Virginia, separating the wetter coast from the drier interior of the country. The maglev elevated bridge ran above a highway that cut through the mountains, diving through tunnels where the highway rose over the mountaintops but where the same grade would be too steep for the floating train. Very soon, the countryside rushing by was moving too quickly for my eyes to see comfortably, so I let the Overlay smooth it out for me until we emerged from the other side of the Appalachian mountains and the landscape began to spread out again.

"This is incredible," I said.

Jak smiled. "I'm glad you like it."

"Probably old hat for you, yeah?"

Jak shrugged. "I've taken the train a few times, yes. But one of the reasons I like being around you so much is that I can see the world anew through your eyes. You make things…fresh again."

I studied Jak for a long moment. "It occurs to me, not that it's important, that I don't actually know how old you are."

Jak laughed. "You win that contest, trust me."

"Oh, you know what I mean."

Jak sipped her drink thoughtfully. "*Technically*, Max, even without accounting for your suspension, you're *still* older than I am. I'm twenty-nine."

"A little young to be so jaded with the world, aren't you, Jak? Not that I have room to talk, considering when *I* come from."

"Well, my job keeps me in tune with things, so it's not so bad for me as it is for some," said Jak. "But the Novacom medical community has noted a certain…national ennui, especially among people of my generation."

"People aren't satisfied with their lives here?" I asked.

"It's not that people are unhappy, really," said Jak. "It's not really different than it ever has been. Anything that happened before you

were born is history, anything that happened when you were young is just the way things are, that sort of thing. People tend to get absorbed by the availability of information—you saw the immersion pods. When you can have anything you want at the tips of your fingers, a lot of people get frustrated with the little imperfections of the physical world."

"That sounds…awful," I said. "I'm glad there are still people who appreciate the physical world enough to keep it kept up for you and I."

"So am I," said Jak. "If I thought this world wasn't worth experiencing, I wouldn't do what I do."

"Well, I for one am grateful that you do," I said.

She leaned over and kissed the top of my head. "Me, too."

But I found myself disturbed by the idea that the people of this time period were ungrateful for, or at least unaware of, what they had. I could think of nothing to do with the thought, though, so I filed it away for later. My thinking on the matter wrote itself into a text note in the corner of my vision, read straight from the ideation-oriented speech center of my brain, and with a thought vanished into my personal storage space.

The trip to Colorado did not last especially long, as trips go, but Jak and I retired to our room just after the penultimate stop, when the train went nonstop between St. Louis and Verdana. With nobody to look in on us from the outside, we made ourselves comfortable on the bed—so to speak—and then in the shower, and took a late dinner in our bathrobes, hot food delivered straight to our room by a trolley system that ran over the hallway across the full length of the train. The train itself was due in Verdana early in the morning, so our best option was to sleep a little in our private room and then sleep some more in our hotel in the city center.

With the lights down low and the rolling darkness of the deep wilderness between cities speeding by outside, and not a little wine, I was perfectly content to sit there next to Jak all night and watch the sun come up, but more practical minds prevailed. Plus, Jak promised to be the big spoon all night long, so I could hardly turn her down.

It had been a few weeks since I had awoken on that table in the Atamai Clinic, and I was on the way to a place I had never imagined I could ever go, in the arms of a person I had never imagined I would

ever meet, in a manner and style I had never imagined could exist. As I drifted off to sleep in Jak's arms, I wondered, with no little excitement, what would await me in the future.

I awoke the next morning in our hotel room in Verdana. Jak had roused me briefly for our disembarking the train, which we had done at a dedicated inter-regional maglev station in the center of the local Garden City cluster. From there we took a short-range maglev train up to Verdana itself, and from the city's central transit hub we took an elevator up to our room in the gigantic hotel that occupied the center of the city. I had mostly drowsed on Jak's shoulder the entire time, so I had to review my personal log to see what the trip had been like.

The inter-regional maglev station had been like something out of an old cartoon, elevated above the uneven terrain on long, curved supports, cantilevering out over a lake black with midnight, lit by the stars and the warm glow of the station itself. The train had passed completely into a glass box of multiple platforms, and upon disembarking we had passed through a lobby area beneath the platforms and boarded the short-range train to Verdana. The trip up to the city was mostly just blackness, with the lights of the various urban centers dimly visible on the horizon. The city of Verdana itself was an unintelligible blur of light and motion, and then it was up the elevator and into our plush hotel room. The rest I could figure out on my own.

Jak was still asleep, unusually, so I watched her sleep for a little while as I waited for the calendar function in her Overlay to wake her. I amused myself by drawing shapes on the flat expanse of her stomach. We had not had the energy to make love again before falling asleep, so Jak and I were dressed in standard hotel-issue pajamas—tailored appropriately, of course.

It was not long before Jak awoke, more from her implants and internal sense of time than my particular ministrations. I had learned early on, to my dismay, that Jak Atamai was decidedly *not* ticklish. She had learned that I, on the other hand, was *ludicrously* ticklish, and I feared I had come out the worse in that particular exchange.

*Or,* I mused as I watched her stretch, remembering the aftermath of that particular discovery, *perhaps it had been more of a mutually beneficial exchange after all.*

We breakfasted in the dining area of the Verdana Central Accommodation, which was urban planner-speak for the giant hotel and conference center that made up the very center of each Garden City. Its job was to house visitors and new arrivals, to help buffer the flow of people into and out of the city while new housing was being built. The building was constructed above the transit hub we had passed through early that morning, and as I looked out of the window I could see the radials moving in and out of the city center, above-ground transports very much like the peoplemover back at the university in Richmond.

I was deep into the city's Visitor's Guide at that point, making comments as Jak watched me, amused, hold a spoonful of cereal near my head for at least eight straight minutes without even attempting to eat it.

"'The radials connect the outer agricultural ring with the intermediary low-density housing districts, through the high-density housing districts, and further still into the Activity ring and the Transit Hub,'" I read.

"You'll spoil yourself," warned Jak.

"I couldn't possibly," I said back, grinning with teeth.

After breakfast, Jak took me down to the main lobby of the building, just below the overhead maglev line that had brought us in not so many hours ago. The room—for as gigantic as it was, it was indeed a single open space—was every bit the Modernist masterpiece the brochure had said it was, with tall glass windows looking out over the park-like city center. Jak waved at a woman standing by the elevator, who came over to us. She was tall, taller than Jak, and very thin.

"Hello," she said, extending a hand to me. "My name is Selene, and I'm from the Moon."

I blinked at her, taking her hand in mine. "I'm Max, and I'm from Nevada," I said.

Selene grinned. "I know. At least, I know you're Max. Jak—"

"Has told you about me?" I grinned up at Jak. "She does that."

"She does not lie," said Jak with a shrug.

"I thought I would get it out of the way," said Selene. "Even for people from this time, an unaltered Lunarian is something of a novelty. Most people either have their parents correct for the low gravity, or have their physical structure corrected for later in life. I simply took

the reinforcements and kept the rest."

"I am, indeed, completely fascinated by that," I said.

"She is, knowing her," said Jak, "but I'm afraid we're here on other business?"

"Of course," said Selene. "Well first of all, welcome to my city. I'm the Chief Implementation Officer of the Verdana Node of the Colorado Garden City Administration. It was my job to lead the team that developed and implemented the next generation of cybernetically-organized anthropocentric habitat. That is, we built a city designed for people, instead of profit."

"Oh, you *do* know Jak," I said. "This far out I was afraid we wouldn't be getting the anti-capitalism angle."

Selene laughed, and I liked her a little bit more. I was a little too comfortable with Jak, it seemed, as my sense of humor was slipping out even in the presence of relative strangers, but this Selene took it for what it was.

"The Atamais are somewhat famous even here," said Selene. "You aren't the first revival to come this way, although I'm sad to say we get precious few of them indeed. It made very big news when the first cryonic suspension was reversed a few years ago, and—no offense, Jak—Doctor Atamai definitely capitalized on his…shall we call it *fame?*"

"Fame will do," said Jak.

"Shall we?" said Selene.

"Lead on," said Jak.

Selene took us around the lobby, first, which was a massive space that contained, not just the central elevator system for the entire tower complex, but the hub for the electrically-powered transit systems that met at this, the center of the city. The maglev system I knew, but I was fascinated by the radials. Overhead guideways lanced out from the central column, piercing the walls in even intervals, guiding long trains of cars in and out of the building. At the central terminus, the cars curled around a curved track, trading new and old passengers just outside of the wide windows that separated the concourse on which the entire radial terminal complex sat from the main platform of the two high-speed maglev tracks that themselves arced around the central elevator axis.

Indeed, *curves* were the fashion, it seemed. Everything I saw looked like a cross between an old-fashioned real estate catalog from long before even my youth and an excerpt from the concept art from a mid-century cartoon show. The main exceptions to this were the directional markers, inlaid in metal along the floor of the huge space, giving Verdana a literal centerpoint from which all distances in the city were calculated.

"Verdana's public structures, at least, are particularly influenced by the Mid-Century Modern, Art Deco, and Populuxe architectural movements," said Selene, pointing out the angled cantilevers that held up the radial termini, and the sweeping overhead sunshades that shadowed the platforms from the sun streaming in through the wide ring of skylights overhead. "That was my particular contribution. The perks of being the boss."

The lobby, contrary to the rest of my experience with the Novacom, contained little in the way of social venues. There were a few little eateries, mostly fast breakfast and coffee places, the kind of place you might sit and read the news before starting on your day. There were, of course, wide floor-to-ceiling windows showing an expansive view of the greenery outside, along with the many pedestrian pathways curving through and around the lush vegetation. But most of the actual usable space of the huge, open building was purely practical: here was an information center for those who did not wish to use their implants to query the city's Overlay; there was a desk for some or another function of the city's government. And there were physical displays everywhere for all manner of information: transportation timetables, local and non-local weather, important news bulletins and advertisements for upcoming cultural events.

"So even though everyone in the Novacom is equipped with implants, you have all of these physical displays?" I asked.

"The city has to operate despite the individual preferences of the population with regard to access to information," said Selene.

"Variety management," I said.

"Yes, indeed," said Selene.

She took us up to the radial terminal and we boarded one of the trains. Ahead of us was another train, and I craned my neck to look as yet another train pulled in behind us.

"You’re never more than half a minute from the next radial train," said Selene.

As we passed over each part of the city, Selene commented on it.

"Here we have the central common area," said Selene. Below us was a park-like area of winding paths through arrangements of flowers and trees and water features spreading outwards from the central dome-like lobby area we had just visited; there was even a wide, gently undulating *river* that disappeared around the curve of the city. People sat on benches by the water and ate breakfast under shady trees. Some people were retrieving food from vending machines, but others were walking down the pathways with their meals, no doubt taken from elsewhere in the city or brought from home. "It’s basically a big park, a place for all of the various sections of the city to mingle, since it’s the central hub of the transit system. They also mingle with the transient population staying in the central accommodation center, travelers and tourists and such. It keeps the city’s culture from getting too isolated, and keeps people in touch with one another physically. Also, this is where a lot of the city’s recreation is, from public pools to sports parks to churches—yes, we have those, more than you might be used to, in fact—and school buildings."

We passed through the central common area and into a more developed, but still highly landscaped, part of the city. This time, the train slowed to a stop in another elevated station, and Selene continued speaking as the passengers exited and entered the train.

"This is the Activity Ring," said Selene. "This is where most of what you might think of as the workplaces of the city are situated. Laboratories, theaters, playhouses, studios and offices, you’ll find all of them here, in their own landscaped settings. We believe that there is no need to sacrifice beauty for density, not when clever landscaping and path design can highlight individual buildings without having acres of unused space around and between them. And, of course, no personal vehicles on the surface this far in, so no need for parking… not above ground, at least."

Indeed, as the train pulled out of the station and continued on its way outward along the city radial, I could see that there was a surprising density of elegant, unique buildings spread out in an arc as they followed the curve of the circular city. I caught a glimpse of people

coming out of a low building, almost like a curved seashell, set off slightly from the pathway that the rest of the people were taking from the radial station.

"That's one of the circular stations for this ring," said Selene. "This far out, the city is big enough that getting from any two points on the ring can be a little slow, so every ring from here on out has a circular that has two tracks, each with trains going in one direction. That way, no matter which way you want to go, there's always a train waiting for you. It's underground, but then again, one part of a ring is pretty similar to another, so there isn't as much concern about appreciating the city as there is with the radials."

We passed into another area of the city, and another station. We were high enough up that I could see the pattern the urban design made as it repeated around the curve of the city.

"This is the high-density ring," said Selene. "For this ring, each radial station is in the center of a cluster of high-density buildings, which form a nearly unbroken string all the way around the city, although their heights and spacing are restricted between radials to prevent the feeling of the interior and exterior parts of the city being walled-off from one another. Notice how we don't have just a monolithic wall of buildings, but rather, we have arranged them into sort of micro-streets, both to improve the aesthetic and make the city seem more natural and less uniform. Also, it helps to increase density, which allows us to add little gardens and parks to break up the monotony of construction and connect the city's green spaces together. The outer part of the ring is apartment buildings, whereas the inner part contains restaurants, clubs, galleries, shops and shopping malls, bowling alleys—basically, anything that caters to a more specific niche than one of the more general-purpose buildings further in."

"So as the city goes out and things become spread farther apart, the specificity of each building increases?" I asked.

"Precisely!" said Selene, clearly delighted.

The train accelerated out of the station again, and we passed through the high-density ring. Almost immediately, the landscape became flatter and more spread out again.

"This is the first of the low-density suburban rings," said Selene, and indeed I could see that the area was densely patterned with single

homes of various architectural styles, set in dense, lush foliage, with winding waterways sculpting shimmering waterfronts for each lot. "The landscaping here allows each home to coexist with potentially very different other such buildings while still being contextually separate from one another. It helps manage variety and reduce democratic overhead—in short, no need for neighborhood busybodies telling you how to coordinate your lawn ornamentation. It cuts down on noise pollution, too. And of course, all of our pathing and lighting is designed both for public safety and for a minimum of light pollution. It's not exactly a Class One dark sky, but it's much less blinding than even some of our renovated old cities."

Here, too, we pulled into an elevated radial station, although this one was smaller, with much less in the way of additional amenities and decoration beyond the base architecture of the building itself.

"And there's a circular below us here, as well?" I asked.

"Of course," said Selene. "If you wanted to get between two points on this ring, it makes much more sense to take a circular than to have to go into the center of the city and take another radial out again. It's one of the ways we manage traffic through the entire transportation network."

I noticed something else about the landscape below us. "Do some of these homes have garages? For individual cars?"

"Yes," said Selene. "They have their own separate road system, see? Grade-separated from the pedestrian pathways. There are underground ramps that connect to the highway system between the cities and eventually from the city cluster to the rest of the continent. The people in the high-density ring have access to parking garages with underground highway access as well, but only emergency vehicles are allowed on the surface inside of the low-density ring, which is why our delivery network is underground and automated. We don't want to prevent people who enjoy car culture—or aviation culture or marine culture, for that matter—from having their own vehicles, we just want to design a safe, high-throughput transportation network that works for everybody and minimizes pedestrian-vehicle interactions. And of course you can see the continuation of the city's internal canal network, which is aesthetically pleasing, helpful for temperature regulation, *and* is useful for pleasurecraft and transportation of goods and

people—not to mention irrigation of the green spaces and the agridomes. If you were to look at a map of the region, you would see that we have connected all of the artificial waterways together between cities, so they form a single interconnected whole that both expands the apparent borders of the city if you wanted to sail between or out of the cities, and helps manage transportation variety. Also, it means that anyone who wants it can have waterfront property. We just created more waterfront! This isn't even to mention the contribution such a project allows us to make to the rewilding and environmental management efforts. Also, you can see that the city's green spaces extend out here, through the high-density zone, and connect up to the lawns and water features in this area as well. The overall effect is intended to be that the city appears to blend with the natural elements without isolating sections of the city from one another, even if almost every geographical feature is technically artificial."

"I've heard a great deal about the environmental and rewilding efforts of the Novacom," I said as the train accelerated out of the station, "but here I see that there's as much suburbia as there is density."

"Of course," said Selene. "There's nothing wrong with the desire to own one's own home in one's own space, where you don't have to deal with building committees like in the old cities, or living in a set and unalterable volume of space as in an apartment…although I can't help you if you have eccentric neighbors. That's what the landscaping is for. The issue is that there was so much profit and political manipulation to be had in having people buy their own homes, that there was no consideration for how to do that in an ecological and cybernetically-manageable way, never mind an aesthetically pleasing one."

The train pulled into another station, and I took a moment to glance around. Each station so far had sported many wide windows, the better for passengers to see the city, and this station was no exception. However, instead of houses or apartment complexes, there was row upon row of familiar-looking glass-fronted towers, covered in what appeared for all the world to be large, spreading *leaves*.

"These are agridomes," I said in realization.

"They are indeed," said Selene. "Just as in the old cities, the Garden Cities produce an abundance of food, so there's always a surplus. We make everything here, which is why the agridomes have the outer-

most ring, so we have the most space for the widest variety of foodstuffs."

I squinted down at the landscaping beneath us. "And a golf course."

Selene shrugged. "And a golf course. With such proximity to agricultural tools, and being the only place with enough extra room for landscaping, it was the best place to put it. Don't ask me, the people voted on it when the city was being designed."

This last station was a curved terminal, like the station at the core of the city, so as the train continued on, we found ourselves heading back down to the core of the city again.

"So," said Selene, "how do you like Verdana?"

"It's wonderful," I said. "I can see the cybernetic implications everywhere I look."

"That's on purpose," said Selene. "The distance between the radials is greater out here than at any point more central, but the population living between them is the same for these radial stops as for all the others. Ideal for people who want the convenience of city life without sacrificing the serenity and space of rural or suburban living. Of course, the resources expended in the maintenance of this ring mean that the recurring resource expenditure of these homes is higher, although certainly not unaffordably so—or else we wouldn't even build them!

"Cybernetically speaking, it's a win-win, because while we in this manner successfully manage people's individual preferences, thereby maximizing their freedom, at the same time we keep the load on the transportation network, emergency services, and resource distribution systems to an expected, manageable level. We designed the city so that approximately the same number of people would live in each ring, and therefore, would be using the city's transportation network at about the same rate consistently as you go outwards. That means we never have late or overcrowded trains. When we balance with the agricultural needs of the population, the electrical power needs, and the other material resource needs, we end up with an optimization problem that can be solved across the entire city—and further, out to the whole Novacom!

"For the high-density housing, the city builds it and the people populate and manage it. For the low-density housing, the city builds

lots, with power and water and sewer and garbage allotments, and the people build their own houses on that land. If you want a larger house, move outwards and get a larger lot on the larger curve. Makes infrastructure planning much simpler, manages variety automatically, and thereby allows people to have whatever living arrangement makes them happy. Plus, it helps us manage emergency services like police. It becomes possible for a more intimate, knowledgeable policing to take place, thereby avoiding the problems of population dehumanization that can occur when the police become overwhelmed trying to handle too many people with too much variety."

"Very impressive," I said.

"That's the idea," said Selene. "It's called the Spherical City System. It allows for the most people and material to be contained within the least space—which is why the symbol of the Novacom Garden City Administration is the chevron and the sphere. Obviously, the layout is circular when viewed from above, so in terms of infrastructure we can design cities around repeating segments, in a Frescoian sense. But the individual buildings, so long as they fit within their infrastructural envelope, can do pretty much whatever they want, so we don't lack for architectural variety, or interesting uses of space. As you get closer into the center of the city, it gets both taller with the central accommodation center, and deeper as you go down to the cargo reception and manufacturing centers below the city's core.

"Also, shorter buildings like houses are built to exceedingly high standards, so that no matter what weather or event occurs, they'll be as safe as we can make them. Taller buildings extend at least as far down into the ground as they do above it, mostly to contain interconnected emergency shelters and underground services, but also to make them very stable under nearly any condition. This is all on top, of course, of the energy-efficient building designs and the distributed solar and wind energy systems—so damage to one part of the city does not inhibit the function of other parts of the city. This all includes the ring of agricultural towers, of course, so our precious food supply is never threatened by the weather. Public buildings and underground maintenance spaces are built modularly, so they can be easily upgraded and expanded, and so we can quickly make repairs by swapping out modules instead of having to make specific fixes with a high labor content. And we can do

all of this because we understand the real accounting of things, and thereby are not controlled by profit or silly notions of excessive cost. We work to a goal of comfort, capability, and safety.

"You see, historically, the problem of city planning had always been capitalism, or something like it. Two thousand years ago, when things were slow, the urban population was served more or less as well by the ramshackle cities of the time as their ancestors and descendants had been and would be. In your age, emphasis was on the natural development of urban spaces, the so-called democratic ideal of city-building. But it is clear that this mode of urban design does not except by happenstance conform to the cybernetic laws undergirding any kind of system, even cities. Always the urban planners of old were obsessed with what was affordable, with the income levels of the potential riders and citizens, how much ticket revenue was possible even though those who most needed public transit and urban housing were those with the least money, that sort of thing. This is not to mention the implicit and explicit constraints of operating under the pressures of the private ownership of the means of production.

"Due to increasing populations, not to mention environmental concerns, cities in your time desperately had to densify, becoming oriented around human needs and the capacity of the local environment—and yet there was more sprawl than ever! Lowering taxes incentivized businesses to move to the area, ostensibly to increase tax revenue on volume, but infrastructure scaled with additional use! This meant that the same forces which caused the tendency of the rate of *profit* to fall would also cause a tendency in the scale of *budget* to fall—a race to the bottom! It is no coincidence that public infrastructure and other projects of great importance and scale were easiest to implement when the power of capital was at its nadir, in the decades after World War II.

"And even if a city *was* interested in good urban design, doing so meant rigidly restricting what kinds of buildings could be built where, and the idea of good zoning had already soured for most due to misapplication and a tendency to promote sprawl over density. You see, even if a city wished to restrict its construction, it would often have to compete for budgetary resources with other localities around them. This meant that any time the city wished to prevent construction on some parcel of land, it would ultimately have to compete with whatever

body in the region cared *least* about such things. That would, more often than not, incentivize cities into ceding development to the highest bidder, and therefore, arranging public infrastructure spending around servicing such capitalist institutions. It *had* to do this, because in an age of declining public budgets along with declining taxes on the very wealthy, land use taxes were one of the few ways local governments could raise money. And while it was true that land is the one thing that can't be shipped overseas, it was also true that the previously existing single-occupancy vehicle system of private motorcars had already enabled people to drive at least a little out of their way. All in all, the incentive structure around land use heavily favored sprawl and car-centric development. It became *systemically* almost impossible to do anything other than pave, pave, pave!

"Therefore, truly designing a city for human needs, a genuine habitat for humanity like those of other creatures, required the doing-away of artificial constraints in favor of actual, practical ones, and designing an economic system which supported efficient and democratic planning. Now that we have our post-scarcity-oriented system, nobody has to care about what is affordable in terms of *money* anymore, merely what can be built, and where, and for what purpose. Our Garden Cities are designed around the optimal use of resources and the smoothest movement of people. Those are objective. Everything else is aesthetic, and particular to the needs of the actual inhabitants. So the Garden Cities are arranged with minimal interference—as with all cybernetics.

"Therefore, unsurprisingly, they follow particular patterns: the central region of the city is communal space, laboratories and cargo shipping and intercity transportation, dining and theaters and schools, what modes of shopping still exist, and sports arenas. Moving outward, we get our first, high-density apartment zones, which are controlled only for safety, footprint, and population—aesthetics, design, on-site amenities, those are up to those who collaborate on the construction of the building, even though they often need resources made available from our Basic Distribution pool. These areas are connected to the city center by public transit lines, usually above-street guideways as they are easy to build over pedestrian and emergency vehicle lanes, and can be run efficiently and quietly. Also, having open and visible public transit means that the act of being transported through the city becomes in-

separable from how people interact with and enjoy the city, so we *have* to make it a pleasant and enjoyable experience, both to ride and to view.

"Moving radially outward from the city center, as the space between radial transit lines widens and new branches might fork off, we reduce the population density until the edge of the city is reached, which is a barrier defined by the capacity of the various material and transportation systems in and between the cities. That way, no single transit line or resource distribution network or delivery system is ever overwhelmed by population. This means that, yes, cities can reject new potential inhabitants for lack of space, but as the movement of people across and between geographic regions is closely tracked, resources are delivered for the construction of new cities such that we keep ahead of oscillations in the demand for living space. It's all based on the exact same cybernetic laws as everything else, and outside of those few immutable restrictions, the aesthetic and particular desires of the populations of the cities are left up to the people. It is not pure anarchistic freedom, no, but it fully embodies the dialectical relationship between positive and negative freedoms as described in the objective laws of the viable system model. As such, it is perfectly and deliberately compatible with the rest of the Novacom, and functions in concert with it all. Everything is geared towards fulfilling the needs and desires of the whole of the people, towards a self-actualized society, of which material needs including urban design are a fundamental element."

"Quite the speech," I said.

Selene actually flushed a little. "Just…point of pride for the modern urban planner is how we enable the physical embodiment of the rules of our society. It's impossible to ignore the complexity *and* stability allowed by the simple laws of cybernetics when you literally live among their monuments."

The train returned to the central terminal and we exited, but we did not leave the platform. I glanced at Jak for an explanation, but she merely smirked at me and said nothing.

An intercity train came by on the maglev track, and we boarded it. As with last time I had ridden this particular train, its rolling stock—such as it was—had nothing except short-term passenger accommoda-

tion, outward-facing seats and small tables that offered beautiful views out of the windows. As the train accelerated out of the station, I noticed we peeled away from the main line and arced out away from the city proper. I could see Verdana in its entirety from the outside, and in full daylight, and it was spectacular indeed, sloping up from the relatively flatter wilderness outside the city to the tall, towering hotel and conference space that made up the main transient buffer of the city proper.

"So uh…" I glanced at Selene and Jak. "Where are we going?"

"This is the short-range intercity train for this city cluster, the same one we took last night from the high-speed station," said Jak. "It's paid for out of the region's Basic Distribution, so it's free to use. It links the cities together, to the inter-regional train station, and to the local airport and river harbor. And it also goes…" She glanced at Selene.

"It goes *there*," said Selene, pointing. The train was completing a recurve, still going back away from the city, and in so doing revealed to us another developed area, this time very much unlike a city.

"It's…an amusement park?" I said.

"Better," said Jak. "It's the largest amusement park in the world. The local cluster of Garden Cities had a vote, and agreed to dedicate local resources to Basic Distribution for a decade if the Novacom would build the park along with the new city of Verdana. It will be the site of the Charter Anniversary parade later next week, for the official celebration of the founding of the New Community."

As we drew closer, I could see that the claim of world's largest was surely no false braggadocio, as the train passed through the park's outer border and headed deep to the central axis. I was beginning to sense a pattern.

"Don't tell me," I said as the train pulled into the station. "The park is designed cybernetically, too?"

"It certainly is," said Selene. "See?" She pointed, and I became aware of more radial lines, overhead peoplemovers that arced out into the park's various sections.

"Is there a circular, too?" I asked as we left the train and headed down the stairs to the park's central concourse.

"Yes, but not as underground trains," said Selene. She pointed again, and I could see sky-trams, stylized steam trains, and even peo-

ple traveling in self-righting spheres through clear pneumatic tubes.

"It’s even more interesting than you might think," said Jak. "Since we attenuate the physical variety of the population in medical terms through the application of human-enhancing technologies, it changes the design envelope for thrill rides and roller coasters." She pointed at a roller coaster rising above the distant treeline, and I noticed a series of exceedingly tight loops and corkscrews in rapid succession. "In your time, people wouldn’t be able to ride such a thing without risking injury, but we, and now you, are made of hardier stuff—by design!"

I gazed at the roller coaster with a longing I had not felt outside of standing too close to Jak Atamai. "In my day, I used to love roller coasters. Then I grew up, and my back went out, and then I got sick…"

Jak put her arm around me and held me close against her side. "You wanna ride it?" she asked with a sly grin.

"I really, really do," I said.

It had just struck mid-morning when we arrived at the park. We sampled every kind of park food, from familiar staples like funnel cakes and cotton candy to new creations in the modern style. We rode roller coasters I could not have imagined in my time, including some that used a public Overlay layer to play with setting and perception, flying us through space or the clouds, or diving us deep under the ocean. Thrill rides were much the same, only more interactive, with one particularly notable ride involving me and Selene chasing Jak through a fantastical forest, ourselves being chased by gigantic dragons.

When we got tired or overwhelmed, we relaxed in the water park, floating gently down a looping river that wound around the entire perimeter of the gigantic park, and watching people taking long and elaborate water slides down into huge swimming pools—or surfing in wave pools, or lounging by artificial beaches, or any of a dozen other such pastimes. Although none of us had brought swimwear, Jak had ordered some spun up for us on the park’s productive systems when we had entered the park that morning. While sunscreen was not *technically* required, as any damage to our bodies could be healed easily with modern medical technology, it was more convenient—not to mention a significant attenuator to the medical system—to apply it, at the very least to avoid having to tell my implants to ignore pain, or to

have to be careful about damaged skin before it could be healed. Besides, I got Jak to apply the sunscreen to my back, so it had secondary advantages as well.

We ate lunch in an amphitheater modeled after ancient Rome, one of a dozen different themed areas, lingering through a handful of brief shows, performances, and concerts. We had dinner in an even larger stadium, watching an Overlay-enhanced circus of acrobatics and feats of daring, then went for drinks at the edge of the giant freshwater lake that dominated the park and connected together all of the internal water features of the various Garden Cities in the region, watching the sun set. There was even a massive faire, full of interesting things that inventors and scientists from various parts of the Novacom were presenting to a fascinated public, myself included. Everything was there, from articles of clothing that changed form slowly over time, to new forms of interactive media, to portable camping habitats that unfolded from compact trailers into elaborate, modern structures—complete with solar and wind power systems and atmospheric water collectors and purifiers. There were booths and panels covering every topic, from art and culture to technology and scientific works, a perpetual convention of anything anyone could possibly be interested in.

In short, there was everything at the park, every form of entertainment and amusement and thrill, from an airstrip offering aerial balletics and skydiving to themed restaurants where gladiators and medieval knights did battle to displays and distractions to tempt all sorts. And the landscaping was impeccable, filled with elegant floral arrangements and charming pathways of a standard unequaled by the greatest park designers of my time. All of it with not a scrap of kitsch or grift or aggravation anywhere to be seen, although there were carnival games aplenty, genuine tests of skill and old-fashioned, if good-natured, cheats alike. It was every happy summer afternoon I had ever experienced, rolled into a single place and dressed to the nines.

Finally, we relaxed on a gigantic Ferris wheel, our enclosed gondola keeping us cooled and fed and watered, robotic pods ferrying drinks and food up to us along the wheel's long arms. The wheel itself was designed to showcase a unique view of the park's fireworks show that arced out over the central lake, accompanying music pumped with careful subtlety into the pods themselves, laser lights tracing patterns

in the water and on various fountains and kinetic sculptures that rose up out of the lake. The entire thing crescendoed to a sudden crashing climax, ending exactly at the stroke of midnight, which is when we all decided, as a unit, to go home, or at least to the nearest thing to it.

We took the local passenger train back to the central transit hub in the Garden City of Verdana, bid goodbye to Selene, and took a glass elevator up to our room. The elevator was on the outside of the great tower, and so I could see the whole city spreading out around us as we rose up, and the amusement park in the distance, glittering with decorative lamps and aircraft warning lights.

After Jak and I had showered and changed into fresh sleepclothes, curled against one another in our big, soft hotel bed, the lights dimming lower and lower as we fell asleep, I hugged her close and said, "This has been the best day of my entire life."

Jak squeezed me back, kissed the top of my head, and said, "Just you wait."

# CHAPTER 10

Jak and I took breakfast the next morning out in the communal green space that filled the center of the city, watching the sun rise over the distant mountains and filling the city's central tower with sparkling peach-colored light. It was cool, up in the mountains as we were, but not so cool that the spray from the fountains in every water feature was not welcome.

When we had finished, we took the radial into the transit hub and boarded our train to the inter-regional maglev station. The trip back, in the daylight, was spectacular, with stunning views of the mountains rising up out of the morning fog in the far distance. When we exited the train at the maglev station and ascended through its various levels, I noticed that the theming of the station was not, as I had puzzled over upon first seeing it, that of some rigidly geometric shape inserted acontextually into the environment, but rather it was a full mountain resort-style architectural masterpiece, for all that it was essentially just a train station. The glass walls were roofed over by elegant steel rafters holding up a peaked faux-timber roof. The predominant color scheme was dark earth tones, and with the windows it all drew the eye out into the surrounding mountainscape, or down to the artificial lake that allowed boats to dock at the maglev station. It had the overall effect of dissolving the barriers between artificial and natural, and the elevated nature of the platform minimized the footprint on the surrounding land itself.

"This is astonishingly well-thought-out for what is, after all, a train station," I said.

"Who wants an ugly train station, or one that doesn't fit the context?" said Jak. "This is what is possible when everyone has a stake, and a voice, and a passion to pursue. No matter how small or silly it may seem, we have a place for you, and your contribution matters, even if all you want to do is decorate train stations."

We had no luggage, so settling into our reserved sleeping cabin aboard the train—though we would not be sleeping, not as far out west as we already were—was no different than it had been in Richmond. Jak told me that had we decided to bring luggage with us for whatever reason, the hotel and train systems were in such strong communication that the machines in our room would have cleaned, packed, and transported our luggage all the way here to our cabin on our behalf.

The high-speed maglev line did not climb steadily into the cleft of the nearest mountain pass as I had expected, but rather bored straight through the Rockies in a tunnel that spanned the entire width of the mountain range. While the shorter tunnels we had taken in our trip so far were just dark moments in our high-speed transit of the countryside, the Trans-Rockian Tunnel was illuminated from within with vivid and animated murals, projected on video screens arcing all the way over the dual maglev track, never once being interrupted for the entire length of the tunnel. The murals were themed, showing iconic vistas from the surrounding countryside, transitioning smoothly to visions of trains moving along lunar mountain ranges, and again to the slopes of Olympus Mons on Mars. Each transition was broken up by the illusory passing-through of an old-fashioned steam train tunnel. The overall effect was one of suspension of disbelief, and I felt a little more like the rest of the Novacom-in-space was just like home.

Jak smiled and toyed with a few strands of my hair. "Just one of the ways the Novacom Arts Council keeps us all connected, one single gigantic cultural system. Makes sure that the whole Novacom stays in lockstep, maintains a total cohesion no matter how far-flung."

"Where is the Novacom capital as a whole?" I asked.

"The Moon, Mare Serenitatis," said Jak. "Or at least, that's where the highest metasystemic recursion of the whole Novacom is headquartered, currently. If we manage to make it to other star systems, it might move again, but that's enough of a distant problem that we tend not to worry much about it."

So the whole grand interplanetary polity converged ultimately at the Sea of Serenity. That made sense, given the ideal cybernetic state of an informed, rational calm.

Jak nodded when I told her my observation. "Yes, it's very appropriate, although frankly I always thought it was a little on-the-nose. The capital of the American Novacom is the District of Columbia, by the way, just like the metasystem of the Virginia Novacom is headquartered in the Richmond Node. There wasn't any reason to change, as we added new territory, since it's what people were used to and one place was as good as another. Didn't have to build any new government offices, which is always a plus."

"Why do we call the cities 'Nodes'?" I asked.

"It’s just a synecdoche," said Jak. "Strictly speaking, the ‘Node’ moniker refers to the cybernetic institutions that manage the city, which is collocated with, but technically separate from, the city itself. But just like people sometimes referred to the whole federal government of old as ‘Washington’, we refer to the city in the same way."

Jak looked at me sideways suddenly, a sly smile on her face. "Incidentally, wanna know where the headquarters of the whole interplanetary Novacom’s military is?"

"Where?" I asked.

"Oceanus Procellarum," said Jak. "The Ocean of Storms."

We exited the tunnel on the other side of the Rockies, and from there it was not long at all before we were slowing down for our approach to Los Angeles…or at least, what I was told was Los Angeles. I had been to LA before, of course, growing up on the west end of the old United States. This was not the city I had grown up with.

Gone was the sprawling, awful capital of west-coast suburbia. Gone were the acres of asphalt and tract housing spilling across the desert. In their place was a tight, gleaming city on the coast, the suburban grid long gone back to desert like a bride pulling up her train.

"Los Angeles was the site of the first major rewilding program," said Jak as we left the train at Union Station and made our way up to the monorail station built next door. The city from the elevated monorail platform was still towering, rising far above us in gleaming skyscrapers of every description. Union Station itself was its same historic combination of Art Deco, Streamline Moderne, and Mission Revival, but the monorail station was pure Populuxe. In contrast, the skyscrapers covered the spectrum from Art Deco through International and all the way to new, weird Neofuturist designs I had never seen before, winding organic-style columns bearing the weight of the tower proper and allowing the actual habitable area inside to take strange shapes, neither rectilinear nor columnar but somewhere in-between.

The monorail train was as frequent and punctual as it had been in Richmond, and we boarded it on the lateral platform heading out to the coastline. Jak kept up her typical commentary as we went along. "You’ll find that a lot of the major cities keep their most historic landmarks, and some whole historical districts, but there was something of a zeal for renovation in the early decades of the Novacom, after the

signing of the Charter. Los Angeles kept most of its historically interesting buildings, restored to the height of their importance, and tore up the rest. Most of what you see here are residences for people who used to live out in the desert. I'm sure you were familiar with Los Angeles' infamous traffic?"

I said that I was, or at least, had once been.

"It's easier to see from the air, of course, but there is much less in the way of highways here. There's still the old Interstate system, of course, but it terminates in a transit hub on the edge of the city, at the other end of this monorail line. We're taking the newer above-ground transit system, since the underground system is mostly used by residents who, ah, take their residency seriously."

I nodded, and said, "How do you learn all this stuff wherever we go?"

She tapped her forehead. "A combination of data downloads and long-distance interviews with experts. This kind of organizing is what I do, outside my medical capacity. I live for it. It's one of the reasons why I decided to help guide revivals at all."

The monorail deposited us at LAX, right outside the famous Theme Building. Jak told me how it had become an important and functional part of the airport again. "Jet travel, especially international jet travel, dropped severely after the installation of the intercontinental high-speed maglev system, not to mention the closing of the borders overseas. By the time we had significant overseas transit again, it was more popular to use airships—which can take off and land anywhere, and don't need runways or even taxiways—or passenger liners and cruisers. So, the city decided to tear down the newer terminals and restore the Theme Building to its old position as a hub for airship transit terminals and limited jet access. The airport is much smaller than it once was, but in its way, not less busy. Less hectic, perhaps."

We waited up in the passenger lounge, watching the few passenger jets moving across the wide, flat taxiways and runways still in use, and the much more common airships dropping straight down onto designated landing zones, and rising up from ascent pads.

"There we are," said Jak, pointing to an airship that had been sitting on the curtain for a while and now seemed to be ready to depart. I read the words printed on the side of the flattened envelope: *Hawaii*

*Express Air Travel*.

"How are airships managed?" I asked as we joined the light throng of people heading down the ramp to the tarmac outside. The sun was higher, now, and the heat rising from the apron was starting to make me sweat, so I was grateful as we entered into the cool, air-conditioned interior of the frankly mammoth air vehicle. It was perhaps the largest single artificial thing I had ever seen that was not a building or a bridge, and even then it was sort of close. It was longer than a cruise ship, and twice as wide, and I could see tall windows along two of its decks about a third of the way up. On its underside were huge air vents, and its flanks were studded with ducted fans and control surfaces.

"They're managed cybernetically," said Jak. "Each airship constitutes its own level of recursion, of course, and is large enough and complex enough to warrant an entire common-ownership system, much like the larger cargo sailing-ships."

We were met at the top of the passenger access ramp by a pleasant woman wearing a full three-piece suit, who welcomed us aboard the airship, the NAS *Cloudwalker.* The ship's Overlay led us to our room, a compact—if still luxurious—suite, much like one would see on a cruise ship, only the balcony was enclosed by the lower of the glass windows that ran along most of the length of the vessel. After getting settled there, we took lunch in the lounge area a deck up. The airship, Jak told me, was much more like traditional airliners, with the food mostly pre-prepared on the ground. Luckily, Novacom preservation and re-preparation technology was sufficient to render the difference between fresh and frozen foods indistinguishable to all but the snobbiest palates. Instead, the mechanical systems that occupied the lowest deck of the airship would prepare our food and drink and bring it up to us through a central distribution system.

While we ate at one of the many comfortable tables and watched the airport through the high windows, I browsed the *Cloudwalker*'s onboard database. The ship was powered predominantly by solar power, compact wind turbines, and high-capacity batteries. It got most of its transit power from just riding the winds back and forth, more southerly or more northerly depending on its direction. It could also take power from short-range beamed transmission stations along the path, in the

case of doldrums or poor weather. The stations were themselves powered by the powersats orbiting the Earth, and by local solar, tidal, geothermal (especially closer to the Hawaiian archipelago), and wind power systems. In their cargo configuration, airships of the same class as *Cloudwalker* would forgo the lounge and stateroom builds—and the windows—and would instead fill the space with standardized cargo modules that could be loaded and unloaded by machine. It floated mostly by helium in the gasbags above us, but also through active propulsion from the air vents beneath our feet, and through lift generated by the aerodynamic shape of the airship itself.

In no time, the airship was being pulled into place on the ascent platform, built into the tarmac specifically to allow for vertical thrust without scattering debris or dust. There was a sharp whine and a shuddering rumble throughout the airship, then *Cloudwalker* rose into the air, higher and higher until the city spread out before us. The airship, floating serenely in the null-space where the fixed-wing heavier-than-air planes would not be flying, then crossed over the runways and headed out over the beach. Once we were out to sea, the airship rose majestically to cloud-height and we settled into our long cruise to Hawaii. The captain came over the intercom, and we practiced the evacuation process if the ship should have to make a water landing. There we would await rescue by one of the hundreds of Novacom ships dedicated to that purpose, and to securing the travelways overseas.

The trip was relaxing in a way I could not easily describe. It was smoother than air travel usually was, smoother than an oceangoing ship, and smoother even than the maglev had been. There was a deep humming of the ship's electric motors, which rather than feeling oppressive or annoying was relaxing, almost massage-like. The ship itself, for being so large, had a relatively small usable internal volume, so we spent most our time on the lounge deck taking meals with the other passengers, or on our private balcony—which of course accommodated meals and drinks as fit our whim—or in the room itself, lazily enjoying the gentle motion of the airship as the wind took it along. There was nothing in the sense of live entertainment (except that which we piped in through the Overlay), nor were there onboard swimming pools. It was, pure and simple, a relaxing trip over the

ocean.

Hawaii was upon us in just a couple of days, and we settled, not on a hard tarmac as we had lifted off from in Los Angeles, but on the water, where robotic tugs slotted us neatly into place against a floating dock. The dock itself was as grand an architectural accomplishment as anything I had seen, all open space and water and gorgeous views. On a longer or even more leisurely trip, we might have stayed in the archipelago a few days—and indeed, the view of Honolulu in the distance was very tempting, and I was eager to see how it had been transformed in the intervening century since my time—but instead we went directly onto a passenger liner bound southward for the space elevator, where air vehicles were not allowed in order to prevent collisions with the tether.

This, at least, was exceedingly familiar, at least for the ship's exterior: over a dozen decks rising to an open-topped lounge area. Boarding the ship up its gangway revealed, not the kitschy aquatic-themed interior I had expected, but an elegant open area under a huge glass dome, paneled with wood and Art Deco patterns. Instead of photographers trying to entice us to spend too much money on a souvenir, there was a hotel-style desk for those who preferred such things. Instead of crowded pathways there were open promenades, and as we walked through the entry deck on our way to the elevators nearest our room I saw there was nothing like a store or shop, and neither were there places for gambling. Instead, the ship followed an open-centered pattern of specialty restaurants, lounge areas, and performance spaces, funneling people away from one another to keep the pathways clear, and back together again after, in a natural flow of humanity. Medical centers belowdecks could cure most ailments with their on-board scanning and manipulation systems, and anything more severe or traumatic would trigger the use of the onboard cryonic suspension systems and an emergency call to the Novacom Civilian Maritime Authority.

Our rooms were compact as befit a ship at sea, but were hardly without luxury, having a central area that led straight to a balcony past a little dinner table and kitchenette—not to mention the bog-standard dispensary dumbwaiter that led down to the production systems at the bottom of the ship. The central corridor split off into a bathroom better than the one I had in my apartment, with a rainwater shower on the in-

terior side by the toilet, and a full jet-equipped bath up against the exterior window leading out to the balcony. The other side of the corridor opened onto a bedroom with closets—we would just be ordering from the onboard stores as per usual, of course—and a king-sized bed.

After the safety briefing, Jak and I toured the rest of the ship, starting with the double-decker luxury restaurant in the stern where robotic wait staff dressed in adorable inhuman tuxedos brought food and drink to tables designed for privacy and views of the sea. At the bow was the nicest stage area I had ever seen, with tiers of seats rising up multiple decks. We took dinner on the uppermost deck, at the stern of the ship, where an outdoor restaurant let the pleasant island breeze warm our skin and spirits, a glass-shielded candle casting a low-flickering light over my fish and Jak's…whatever future food she preferred in an oceanic context. She persuaded me to try a taste, and I found it an intriguing mix of flavors that never quite coalesced into anything familiar but evoked strongly the sense of *island*, something light and savory and tropical. During dessert, the ship pulled away from the floating dock under its own power, causing the smaller ships and the airships to bob in the sea. The ship's Overlay told us that it was powered by hydrogen cells, which allowed for more space belowdecks without the now-ancient diesel generators.

When watching the stars and the powersats come out—and, very distantly, the grand space platform at the top of the space elevators arcing across the night sky like a glittering crown—had exhausted its majesty for the moment, we caught a comedy show in the intimate club setting below the main stage. Afterwards, happy and pleasantly exhausted from our long day, we showered together and retired to bed.

Well, almost to bed, anyway.

The next day we did it all again, sampling the ship's many options for dining and entertainment, and the day after that we did it all *again*. The ship was limited, but Jak at least was insatiable, eager—even a little desperate—to show me everything she could. I extracted from her the reason behind her excitability, which was that she was the only one in her family and friend-groups who enjoyed going places just for the journey, and going there in person. Having someone else along who enjoyed the real world was something of a rarity for her, and given that I was sort of by definition an old-fashioned creature of habit, I was

more than happy to oblige her.

There were some passengers who lived aboard the ship full-time, in private apartments at the bow. We chatted with a few of them at lunch, joining groups at the communal tables set aside for that purpose while we had robotic waiters bring us plate after plate of food and drink from the dispensary outlets set into the interior spaces where kitchens and staff passages might have been on ships of my time. It seemed that most ships did not ply the same paths all the time—the collective group that managed the ship would get bored doing the same thing over and over again. Ships of a certain tonnage or function were too important to the process of travel, not to mention too large and too resource-intensive to construct and maintain and supply, to be allowed for personal ownership except on retirement from service, and were therefore owned by the Novacom directly. However, they *were* collectively managed, and those who ran the ships also lived aboard them, and consequently living aboardship was a good way to travel the world—at least, the parts of the world open to Novacom ships docking there.

After several days of constant travel, we finally approached the base of the elevator. We had been able to see the very narrow carbon-nanotube tethers stretching up to the sky since our departure from Hawaii, but to see them tower over us, the tallest buildings on the planet that there would *ever* be, was something else entirely.

The ship had to wait in queue, and Jak and I relaxed in the jet tub with some wine and a joint that Jak had ordered from the ship's on-board stores and watched the elevator cars climbing up and down the gargantuan, infinitely delicate, endlessly strong spun-carbon tethers that linked the free-floating oceanic platforms to the counterweight station in orbit. When it was our ship's turn to dock with the gigantic platform that housed the base of the tether, we made our way down an enclosed gangway and into a bustling hub of activity. Smaller ferries came and went, moving people and cargo between the tethers, or out to ships not yet allowed to dock but still needing to move people and things around.

The hub area itself was a massive torus, curving around the outer circumference of the platform, glass ceiling arcing overhead and showing a fantastic, intimidating view of the platform's tether. People sat at

restaurants and lounge areas, waiting to be called up to the elevator car that would take them to space. Others milled about, inquiring at ticket desks or consulting the platform's Overlay layer. I dipped into the Overlay briefly, just out of curiosity, and saw the public layer was full of information, bright neon letters and arrows pointing the way to this or that area for those who refused to look around for the physical signage. Back in the real world, news tickers and huge informational displays gave the assembled masses updates on events on Earth and in space, and weather both terrestrial and interplanetary.

Jak and I found our gate and spent the time watching the flotilla of cargo and passenger ships bob gently in the ocean outside. When they called for us to board, we went into the center of the platform and took an escalator up to the top of the platform itself, and I could finally see the tether from up close.

It was a black slice taken out of the blue ocean sky, rising sickeningly above me, seeming to curve away over my head until I was stumbling backwards into Jak from trying to look at it. Each tether was actually dozens of individual strands tens of thousands of kilometers long, terminating in a complex set of high-capacity tensioners and shock absorbers. Each cluster of cables was capable of handling a single massive elevator car, so each tether itself could handle up to four cars at once. Each car was the size of a small apartment building, rounded in every facet like a medicinal capsule. The Overlay rattled off an explanation in my ear as Jak and I found our private berth—little more than a couple of bunks, a tiny bathroom, and a hatch for the onboard dispensary, but it *was* a space elevator—and I learned that the rising and falling of the cars was carefully timed, as the tensile strength of the space elevator would effectively be hauling our little capsule into orbit, deforming the shape of the tether as the capsule rose. At the top of the tether was a broad space platform, kilometers long, containing the ends of each tether in its own set of tensioners and shock absorbers, the mass of the station on the other end of the geostationary central pivot pulling the tether taut as the Earth spun it out into space. From there, it would be a simple matter of boarding our transit ship and simply letting go at the right time for the tether to fling *us* out towards the Moon.

The elevator car took quite a while to fill, as every trip was a precious opportunity to haul more and more of the population and capacity of the Earth into space, so although we had arrived at lunchtime and boarded the car not long after, it was nearly sunset before the alarm system began to blare its warning, the heavy pistons at the base of the tether shoved us from below to overcome our inertia, and the elevator car began to move under its own power. The movement of the tether through the planet's magnetic field generated electricity, which was used to power everything from the cars to the platforms on either end to the hydrogen cracking plants at the base that refueled the waiting ships. There were no windows in the capsule, but everywhere were high-definition wall screens that were of such high quality that the distinction between wall and window was meaningless. Incidentally, the sensation of watching the Earth fall away, of watching the sunset start reversing, slowly at first but faster and faster as the elevator car built up speed, was more than can be put into words. It bears experiencing for its own sake.

The trip up the elevator took five days, which Jak assured me was a substantial velocity given that we were traveling tens of thousands of kilometers basically by pulling really hard, and at one point we passed another car heading the other way. Each tether was comprised of several individual elevator cable bundles spaced apart at the ocean surface, so as we approached the upper end it was clear that the tethers were fanning out so as to maintain verticality with the surface of the Earth far below us.

The capsule passed briefly through a small platform at geostationary orbit, where Jak told me that some of the other capsules would stop, to release construction workers and cargo, and new satellites. At that height, transfers were mostly in service of the powersats, but also for scientific and communications reasons. Apparently, ships coming back from deep space would dock *here*, for the sake of a far easier docking experience, and be ferried out to the counterweight station on dedicated climbers to be re-released out into space. As such, ships allowed to approach the tether for docking were limited in size, and it was only the docks at the Earth-Moon Lagrange points—or the various space colonies—that would service the gigantic interplanetary ships, or the rescue ships that would have to come pick us up if we had to

abandon ship on an interplanetary trajectory.

As we ascended the tether, the feeling of gravity pulling us towards the center of the Earth faded away, until our weight was exactly countered by our centrifugal force, pulling away from the surface. At that point, the elevator car rotated around its climbing apparatus, until the Earth hung far over our heads. As we continued on, our weight began to return to us, and as we reached the counterweight station I had managed to become comfortable enough walking around in the strange gravity to ignore it entirely.

The counterweight station was nothing like the utilitarian space station I had imagined, mostly from pictures of the International Space Station I had seen growing up. As we exited the capsule and filed out into the broad, upward-curving—from our perspective—station interior, I pulled on Jak's arm and said, "Say, are there still space stations in low orbit?"

"There are, for tourists and for low-orbit operations, but we try not to put anything where it might hit one of the tethers. We had to do a *lot* of orbital clean-up before we could build these things, by the way, so it's a lot easier to track things now than before. Still, better safe than sorry. Losing one of these could be…well, pretty bad. On the other hand, it would be better to snap the tether down low, so the counterweight station can pull it up, or even so the whole thing just gets flung out into space entirely. The alternative is wrapping the tethers around the whole planet, which isn't a great outcome."

"Seems like a lot of risk to take," I said.

"Well, the odds are that the tether snaps low, so it's not so risky. Besides, it's the only way we could evacuate the Novacom into space if we had to. It's also why we're building *more* tethers along the equator."

"Evacuate the Novacom?" I said in surprise.

Jak shrugged. "It's the next big project, outside of our dealings with the Coalition. Just in case."

"We have those kind of resources at our disposal?"

"The biggest problem is physically housing everyone," said Jak. "So we're focusing on habitat construction and supply chains. It's coming along, but we haven't had the capability to do it until recently. The tethers are only about a decade old."

"What did we do before that, to get into space?" I asked.

"Rockets, mostly," said Jak. "There was a fad for laser-powered vehicles for a while, but it was easier just to synthesize rocket fuel from ocean water once the distributed terrestrial renewable power network was built."

We had made it from the relatively crowded gate area, down a series of sloping ramps, and finally to the base of the wide counterweight station structure itself—or at least, the habitable areas. There were absolutely no windows, of course, except—said Jak—in the main control centers, for redundancy. But the screens that made up the walls were more than up to the task, and the view of the Earth above us was breathtaking. I could even see the Milky Way in the shadow of the counterweight station.

While the station had layover accommodations, we would be leaving almost immediately. We made our way down to the lower docks—which were technically *farther* from the Earth—where a gleaming honest-to-goodness *spaceship* glinted in the station's lamps as we watched it through the wall screens. It was a large ship, by my standards, mostly superstructure, with large engine bells mounted conspicuously on the aft end. Most of the visible parts of the ship were blocky, angular cargo and passenger pods, and at the bow was an insectlike bridge, all faceted viewports and sensor platforms.

We took a short spiral staircase down a docking tube into the ship proper, where the captain and staff greeted us and showed us to our compact, utilitarian—but nicely decorated—staterooms, less roomy even than the space elevator's rooms had been but with, admittedly, all of the necessary accoutrements. We were to take meals in the tiny galley, and there were onboard systems usable in the case of a medical emergency—up to and including cryonic suspension, siphoning cryogenic nitrogen from the ship's auxiliary systems—but for the most part we would be expected to stay in our rooms or in the little lounge area, relieving any claustrophobia via the Overlay.

It was perhaps the greatest experience of my life up to that point.

The ship did not *launch* so much as it *let go*, and after a short safety briefing showing us where the inflatable rescue balls were and what areas of the ship were accessible by people, there was little more than a shuddering *thunk* throughout the ship, and we were away. Jak

and I watched the counterweight station rise away from us—as we were flung away from *it*—much faster than I expected, and then it was little more than suffering through the excitement of the three days' trip to the Moon. I would end up spending most of my time watching the Moon get closer and closer. Once I asked Jak why I could not see any surface installations, if the Moon was so heavily populated, and she told me it was for two reasons. The first was that it was more practical to bury the cities under the lunar surface, and that what surface construction could be found would be too small to see from so far away. The second reason was that the people who built the lunar cities did not want to spoil the view of the Earth's celestial partner, and except for a few surface transport lines, solar panels, and scientific stations, lunar development was mostly kept underground.

Being that far out upon our launch, we were actually *too* energetic to make a simple rendezvous with the Moon, so it fell to our ship to correct its course and capture into a high lunar orbit before spiraling down and docking with the L1 station at top of the lunar tethers. Had we missed our approach, or had to abandon ship, it would be up to the rescue fusion burners to come and pick us up from a solar orbit before our oxygen ran out. This was why every rescue sphere was equipped with respirocytes, to keep us oxygenated—if still miserable and cold on solar power—until rescue arrived.

That was not to be our fate, though, as our ship expertly pulled into a berth at the Earth-Moon L1 station, where automated systems began to pull cargo containers from the ship's superstructure. For our part, we met a descending capsule and took it the rest of the way down to the surface, a *much* faster trip than had been our ascent from the surface of the Earth, by virtue of the distance—about sixty percent as long, not to mention we were starting from further down—and the fact that the sturdier materials allowed by the lower gravity also allowed for greater acceleration.

I was used to the casual luxury of the Novacom by then, so it was not the plush chairs or elegant interior decoration that captured my attention at the base of the elevator. No, it was the view of the lunar surface. These were not wall-screens, but instead were meter-thick multi-redundant panes of *diamond*, smelted and spun out of asteroidal carbon.

The building that served as the reception point of our particular lunar elevator tether was merely the tip of the sub-surface iceberg that was the sprawling underground city of Moonfall, but the landscape outside of the single arc of wide outside-facing windows had been deliberately kept clear of surface installations, and was instead an undisturbed, unbroken expanse of pure magnificent desolation.

I had spent my whole life looking up at the Moon. I knew intellectually that walking on it would get pretty dull eventually, unless you were interested in billion-year-old rocks. But being there was still something else entirely. Something I had no words to describe.

I watched it in stunned silence for a long while, my brain trying and failing to find any kind of familiar reference point in the strange shadows and strange landmarks, until Jak touched my arm, and it was time to take the surface train down to Aldrin City.

For rail transport on the lunar surface, it was actually more convenient—to achieve high speeds without risking being flung too high—to have a maglev train, where the train itself was supported from multiple directions. In a dizzying realization of mental reorientation, I envisioned us hanging from the lunar surface, far above the Earth, and had to shake myself out of it as Jak and I settled into our seats and the train began to move.

I became aware that I was terribly nervous, and not because I had done something that *nobody* from my time had done, nobody born fewer than fifty years before me anyway, and made it to the *actual Moon*. No, this was a familiar case of the nerves, distinctly quotidian.

I was about to meet my family for the first time in a hundred years, and I was afraid they might not like me.

Jak knew better than to try and convince me of what, after all, was not in any way a rational or intellectual fear. Instead, she pointed out surface features and selenological facts, distracting me where she could not console me. I was deeply, intimately grateful to her in that moment, and I thanked whoever was out there to listen that she had become my companion—and more.

The train passed over a landscape no less alien for my having seen it above me in the night sky for my entire life, until eventually it dove gently into a tunnel in the lunar regolith. We traveled through the tunnel for a few minutes, the view through the tiny portholes lit only by

the regular rhythmic flashing of overhead maintenance lights, until suddenly we were descending into Aldrin City itself.

The city was as far from a dark cave under the lunar surface as it was probably possible to be without actually being on Earth: the sky was a combination of pumped-in light from the sun (during the two-week-long lunar day) and an immense array of high-efficiency lights (for color, and for the two-week-long lunar night). The walls were the same, showing a pastoral horizon with clouds that floated in from the distance and across the ceiling. The city itself was intensely familiar, and after a moment I realized that it was laid out along similar lines to the Garden City of Verdana: a tall central tower spanned the distance from floor to ceiling, and I could see that at every radial station stop another tower rose up to support the ceiling; grass and *water* filled the spaces between residences and shops and laboratories and restaurants; the train we were on was even heading straight for the central tower, albeit up near the ceiling instead of down near the floor. The train ran in an enclosed tube, such that when we finally exited the train it was through a set of pressurized tunnels that extended out through the vacuum.

And there, on the platform, was my family.

# CHAPTER 11

My nephew, Mark, was there on the platform, with his husband George and their two children, Melissa and Olive. The girls were genetically their fathers' children, a mix of donated DNA, cleaned up and edited to correct for the ravages of age, gestated in an artificial womb under perfect conditions, monitored constantly for any problems. By all accounts and appearances, they were perfectly normal and healthy.

We saw each other at the same time, our names and relationships highlighted in our private, family-and-Jak-only Overlay layer, and Mark disengaged from his husband and children and came over to embrace me, firm and strong. He was taller than me, and half again as old—biologically speaking—but looked no older than I was. His hair and beard were red—that would be my sister Elizabeth, who had inherited our mother's red hair—and he wore of all things slacks and a red knit sweater.

"Do you like it?" he said, gesturing down at himself. "George picked it out for me. Said it would be, uh, pleasantly anachronistic."

"It really is," I said. "Thank you. I'm flattered you would go to the trouble."

"It's no trouble at all," he said. "Certainly not compared to what you just went through! How was the trip? It's been decades since I was on Earth."

He led us over to where his family waited and made introductions. George was a large, dark-skinned man with a completely shaved head, wearing a jumpsuit not dissimilar to my own typical attire, marked with the symbol of the Lunar Novacom. He was a minor administrator on the city's psychological relief team, the ones that scheduled weather events and designed sunsets. If anything, his hug was stronger and firmer than his husband's, and he actually lifted me up off the ground, although in the lunar gravity *I* could probably have lifted *him*.

"It's wonderful to meet you both," I said.

"The pleasure is ours," said George. "I can't tell you how excited Mark was to hear from you. He's been waiting for one of you to wake up for *years*."

"I just went in first, is all," I said. I turned to Jak. "In fact, this woman *was* my attendant, Jak Atamai."

"Emphasis on ‘was’," said Jak. Mark was willing to stop at a shaken hand, but George just opened his arms and raised his eyebrows expectantly until Jak stepped into an embrace of her own.

"George is a hugger," said Mark. "And these are our daughters, Melissa and Olive."

The girls, no older than ten, looked exactly like a perfect blend of their fathers, only distinctly female, with skin the color of coffee-with-milk and dark hair shot through with vibrant red streaks. They were wearing what seemed to be their best clothes, and they curtsied in unison.

"It’s nice to meet you," they chorused.

"They insisted on dressing up," said George. In a stage whisper, he said to me, "They’re trying to get us to take you for ice cream after you get settled in."

I smiled down at the children. "Ice cream sounds lovely," I said. "But I wouldn’t mind a chance to sit somewhere that isn’t moving for a few minutes."

"Of course," said Mark. He let his children lead the way to the elevators that covered the far exterior wall of the building, glassed-in so we could see all the way to the artificial horizon at the edge of the city. There were heavy bars of polished metal on the floor, and Mark showed me how to hook my feet into them.

"The elevator accelerates faster than lunar gravity," said Mark, "so unless you want to hang out near the ceiling for a minute, this is probably better."

When the elevator was full and its passengers hooked in properly, it descended, and the city rose up to meet us. I could see radials lancing out away from the city center, passing through the tall support towers at each station—Mark told me that they were mostly residential—and looping back around out at the far edge where the city’s agriculture stood, just like in Verdana. *Unlike* Verdana, however, I could see people high up on the radial station towers, edging out onto balconies, and leaping from them into open air.

I gasped, but one by one each jumper unfolded large wings from their backs and began to soar in wide, graceful arcs, looping around and around the tower until they floated gently to a running stop on a wide strip of parkland grass.

"Oh, the lunar gravity," I said, a little breathlessly, and Mark and George grinned at me.

"The Moon's most popular pastime," said George. "Flying."

"I definitely want to try that," I said. I turned to Jak, but she was already passing me a copy of a reservation in the Overlay. I accepted it with a grateful smile, and she found my hand and squeezed my fingers in hers.

The rest of the trip out to Mark and George Kustaja's house in the nearer suburban ring was exactly like our trip through Verdana except in every way that it was not. There was water, and trees, and grass, and a familiar layout of infrastructure, but the architecture was *wild*, looping and cantilevered in ways not possible on Earth due to the difference in gravity. There were fountains that sprayed water in impossible shapes, wobbly spheres of liquid hanging strangely in the low gravity. There were even people flying around in little compressed-air jetpacks. It was all just so *strange*.

"I'm going to need a minute to get used to all this," I said as our radial train car pulled into the station nearest the Kustaja household.

"Stay as long as you like," said George.

"We have plenty of room," said Mark. And indeed they did: the house that greeted us sprawled across one of the slightly larger lots on the outer curve of the first suburban ring, sweeping bone-white mooncrete, Googie as hell, with trees and yards and—

"A swimming pool on the *Moon*," I said. "I'm…incredibly impressed. Aren't resources scarce?"

"They were, once," said George. "But with the self-replicating automated asteroid and comet factories, our access to usable resources grows more rapidly every day, including water. Once we reach the Kuiper Belt and the supply chain orbits start filling in, we'll be *drowning* in the stuff."

Olive and Melissa, as one, rolled their eyes at their dad's joke.

"It's good for rocket fuel and portable electrical power," said Mark.

"And water balloons," said George.

We made our way up the front path and inside the sprawling lunar mansion. The interior of the house was everything I had come to expect from Novacom architecture and more, with sight lines that radi-

ated out from the doorway into every wing of the home, some open—like the living and dining areas—and some cozier and close in, like the wing for the guest bedrooms.

The interior decoration was decidedly eclectic, spanning the spectrum from variously aboriginal to glaringly modern. George said that they had such different tastes that finding a middle ground was impossible, so they just threw it all together based on what seemed more or less complementary—including the prominent, if compact, crucifix hanging on the wall. I told them it was perfect, because it was.

George and Mark went into the kitchen to fix snacks and drinks for Jak and I, and we waited on the couch in the main living room. Melissa and Olive came and stood in front of us, hands nervously playing with their dresses.

"Can you tell us what Earth is like?" said Olive suddenly.

I blinked at them. "You've never been?"

"Papa and Daddy tell us we'll go some day soon, but they're usually pretty busy," said Melissa.

"I've always wanted to come here," I said. "Nobody lived here when I was a kid. I always wanted to be one of the ones who came here and didn't have to go back."

The girls scrunched up their faces in shocked confusion. "But why?" said Olive. "It's so *boring* here!"

I laughed, and glanced at Jak. "All right. What do you want to know?"

When George and Mark came back with platters of food and drink, Jak and I each held one of the girls on our laps, braiding their hair and telling them about our trip across North America.

As I regaled my relatives with a description of our train cabin's views of the Great Plains, I felt a little pressure in my chest ease, an anxiety I had not really understood or appreciated that was now gone.

For all the years, for all the distance, for all the *change*, this was still my family.

I was more than grateful, and I sent Jak a message in our shared, private Overlay, a picture of the two little girls on our laps from my perspective, with an attached message: *Thank you.*

She winked and sent one back to me, an image of me in the elevator, watching with rapture the people jump from the high tower and

spread their wings to catch the air, and the message she had attached said simply, *The pleasure is all mine.*

"So tell me about yourselves," I said later that night when the children had gone to bed. Jak and I were sitting at the kitchen table while Mark and George did the dishes. It was such a familiar, domestic thing in an age of home robotics that I found it actually relaxed me, for all that it was happening in a mansion on the Moon. Their pet cat, Lemon, was lying on the table while Jak and I lavished her with attention. Mark and George, so they had told us upon our introduction to the animal, had adopted her from a shelter. Veterinary medicine was much the same as human medicine, Jak had informed me, and so Lemon was pushing twenty-five and still as healthy as a young cat.

"I suppose there isn't that much to tell," said Mark, passing a freshly-rinsed glass to George for him to dry. "I'm an environmental engineer for the Outward Expansion, which is why we live up here on Luna. George and I met in VR, actually. We both play full-immersion games."

"So you moved here from somewhere else?" I said. "The light-lag must make playing online games together difficult otherwise."

"I'm originally from Montana," said Mark. "I was born there, but the family oral history is we moved there from out west, so that makes sense considering where you grew up."

"I'm from the Honduran Novacom," said George, racking the final plate into the cupboard. They had claimed to find the act of doing the dishes to be something fun and low-stakes to do together, a moment of bonding. "Grew up there, met Mark, moved out here after we got married."

"And what do you do?" said Jak as Mark and George sat down across from us at the table. "How do you spend your time?"

"Landscaping!" said George. "My job on the psych team is creating physical spaces to help soothe any potential distress caused by suddenly remembering that the entire city is encased in a gigantic cave under half a kilometer of lunar material."

I raised an eyebrow, and George chuckled. "That's why the house is built as it is. Keeps the mind thinking *open spaces*. We can manage psychological crises like claustrophobia with implants, of course, but doing so when it isn't strictly necessary is generally considered taboo."

"And your children are comfortable here?" I asked.

"Well, as comfortable as any kid confined to a small town is," said Mark. "They'll be teenagers soon enough, and then I'll have to send them down to Earth or something, let them get all their energy out. Nobody ever wants to just stay where their parents live, do they?"

"I'm about as far away from where my parents lived as it's possible to be without leaving the Earth's gravitational sphere of influence," I said.

Mark shrugged. "Fair enough."

"What's it like raising *children* in this kind of…environment?" I asked. "I don't mean Luna per se, but…well, do they have implants? Do they access the Overlay? I have heard it's something of a debate among parents."

"Sure," said George. "Why wouldn't they have implants or Overlay access?"

"In my day, we had little computers we carried around in our pockets," I said. "Giving them to children was controversial. Some people thought it might harm them."

"I can't speak for the effects of such a thing in your time, Max," said Mark, "but if our kids didn't have the Overlay, it would be worse for them *and* us."

"How so?" I asked.

"You've learned something about cybernetics?" asked George.

I said that I had, trading a smile with Jak.

"Cybernetics is recursive," said George. "It's the same all the way up and all the way down, and we each inhabit multiple, overlapping cybernetic Systems One that interact with one another in strange ways. This is why we have both to design our systems as best we can *and* keep an eye on those designs to make sure they *keep* working, hence our concept of judicial review. One of the places this is most apparent is in the family unit."

Mark took it up, then. "The same way that the Novacom has formal organizations with cybernetic filters and variety management structures, so does our family. We want to make sure we have *cohesion*, that all the members of our family are safe, that we can all be healthy together and make good decisions as a unit. But we also want to make sure that everyone, young and old—" He winked at his hus-

band, who rolled his eyes good-naturedly. "—has maximum *variety*, the opportunity to explore the full possibilities of what it means to be, well, who they are. If we tried to force our daughters into particular ways of behaving, outside of the minimum necessary to being safe and healthy, then they would just find their own ways of expressing their true selves, either through rebellion or just through abject misery. The family is an organization which has as its sole and singular goal the self-actualization of all of its members. Through cybernetics, as I'm sure you've noticed, we extend that notion of total self-actualization to the entire Novacom, but nevertheless, it all starts here."

"We want our kids to be happy," said George, "so we give them as much freedom as they need, but not so much that it endangers them, or runs them afoul of the law—which is exactly how the rest of the Novacom works. It's all about managing their variety."

"We can do that by laying down explicit rules," said Mark, "although if we do that, they're *much* more effective if our daughters understand the reasoning behind those rules, and the consequences for violating them. Just like when the Novacom collaborates with some or another workplace when establishing metrics and monitoring channels. But we can also manage their variety by instilling good values in them, so when they go out and encounter situations we hadn't explicitly prepared them for, they can still make the best decisions they can. Attenuators and amplifiers, even here."

"And how does the Overlay facilitate this?" I asked.

"It allows them creative freedom in a way that doesn't harm them," said George. "And if they want to run around out in the physical world, it allows us to communicate with them. And, at least until they're adults, we can even find out where they are, and give them part of our weekly resource allocation for errands, or for learning good purchasing skills."

"That sounds…well, quite wonderful," I said. My own parents had been great, as parents go, and their approach to parenting was not dissimilar from the cybernetic approach. But still, having it all laid out, having the entirety of a civilization built along the same lines, so that society was familial, but not paternalistic…it was something very different. It was a simple system, easily understandable from any particular level of recursion, and seeing that truth everywhere I went made

the world feel comprehensible, compact, human-sized, even though it was anything *but*. I was *in space*, after all.

"Of course, it couldn't be done *at all* if it weren't for the abundant material system it's all built upon," said Mark. "It means that George and I can integrate the various parts of our lives. We can take time off for important events, since our schedules are flexible and shared between all of us, and our lives are not ruled by *maximizing* something, but rather by *optimizing* something. Any gain in efficiency in any part of *the whole system* means more time and material and *life* for *every one of us*, individually, because the benefits of that efficiency are shared and not hoarded by a wealthy few. That means, the more we work to improve the mechanism of our labor, not only does the whole Novacom benefit as an organization, but also, our individual lives benefit, both in the time we have available and the increased material abundance to which we have access, as things decrease in price, or move from Personal to Basic Distribution."

"Everywhere I go, people sing the praises," I said. "It makes sense for Jak, her family is…involved."

Jak shrugged, accepting the statement as fact.

"But you hardly know *us*, is that right?" said Mark.

"I suppose I just don't quite understand why I'm hearing it from you, too," I said.

"Well, we grew up with it," said George. "Honduras was integrated into the Novacom before I was born, only a quarter-century after the Charter was signed. Part of it is probably just cultural immersion, part of it is reinforcement against the external presence of the Coalition… but a system that works is obviously working, even if people don't quite understand *why*. Certainly people can see that a failing system is failing, even if they likewise don't have the words or concepts to describe exactly how."

"Plus," Mark added, fixing Jak with a particular look, squinting at her with a smile on his face, "we've heard of *Mudrac Atamai*."

"Here, Jak?" I said, facing her with an incredulity that was only somewhat exaggerated. "Even on the bloody *Moon?*"

Jak shrugged again. "What can I say?" she said. "My father is *very vocal*."

"He has *vids*," said George, failing to keep the grin off his own face.

"What are vids?" I asked. "Videos?"

"Hmm, like advertisements, or public announcements," said Jak. "You go to the center of any of the Garden Cities and you'll see a lot of public vids for informative purposes. Sometimes they're for weather events, or for public productions, but a lot of the time they're public service announcements."

"I hear the jingle a *lot*," said George. "My office is in the city center, near the first ring of radial stations."

"'Remember, kids!'" Mark quoted, locking eyes with George. "'If you ever meet someone from the Coalition, what do you do?'"

"'Brag!'" said Mark and George together. Their laughter filled the home's open spaces, and even Jak was grinning.

When the laughter had subsided and Mark had begun to yawn—he had only that morning returned from helping the Venusian aerostat project work on their closed-loop environmental systems—we all rose from the table and bid one another good night.

"Oh, one more thing," said Mark, pausing a few steps up the staircase leading to the upper floor where the permanent bedrooms were. The guest suite was on the ground floor, so Jak and I paused and looked up at him. "In a couple of days, there's going to be a big…well, sort of a party, celebrating the anniversary of the signing of the Charter. There's going to be a lot of bigwigs there, and George and I are invited as members of the local government. We could definitely extend an invite to you both, too, as our guests, if you'd like. The house can watch the kids." He tapped his temple, which I understood to mean that he was referring to the Overlay and the house's embedded machines.

I glanced at Jak, who winked at me and nodded, just slightly.

"We'd love to," I said.

"I'll have the invitations drawn up," said Mark. "Well then, good night, although the city's ceiling shows a real-time view of the sky above the surface if you wanted a real show."

He followed George up the stairs, and Jak and I retired to the guest suite.

When we had showered and dressed, and were ensconced in the warm, soft blankets of the suite's large guest bed, I draped myself across Jak's body and nuzzled my head up under her chin.

"Thank you again for coming with me," I said.

"Don't thank me yet," said Jak. "We're going flying tomorrow."

I grinned against her collarbone. "I'll thank you as often as I please."

"Oh you will, will you?" said Jak. She was silent for a moment, then tapped me on the back of the head. "Turn around."

I did, half-rolling off of her until I could look up at the ceiling. Only it was not the ceiling anymore—Jak had changed our shared Overlay layer, making the whole house transparent until it seemed as though she and I were lying in a bed that was standing in the middle of the tree-lined clearing that the house usually would occupy. The city was just barely visible over the trees, glinting and glowing softly through the leaves and branches, but the real treat was overhead.

The Earth hung there, part-full, showing the terminator bisecting the North American continent. On the night half, lights glittered in unfamiliar patterns, cities that in my day were amorphous blobs of light shown in satellite photos became clearer, more structured, spiderwebbing in intricate patterns. The Novacom laid bare, striking out, lacelike, from Canada and Alaska all the way down into the very tip of South America.

"It's incredible," I said. "It feels…unreal."

Jak pinched my bottom, and I yelped.

"Real enough?" she said.

"You'll pay for that!" I said, grinning sharply at her.

She was shrouded in darkness, lit only by the illusion of Earthlight streaming down upon us, but I could still see the white of her teeth glittering in the night as she smiled. She kissed me on the tip of my nose and said only, "Promise?"

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The city stretched out far around us in all directions, and while I knew intellectually that the horizon was artificial, that the city was ultimately *bounded*, it still *felt* as though I was standing at the top of the world, a whole planet falling away around me.

It was, in a word, breathtaking.

"Don’t worry," the instructor was saying. "If you forget everything and seize up, the fabric alone is enough to slow your fall. And in the worst case, we have state-of-the-art medical facilities just a short ride away." She pointed towards the center of the city. "Do you remember the flight plan?"

"Straight out, bank left, don’t go more than thirty degrees," I said.

"And don’t hit the tower. We have nets and pads, but it still hurts like hell." She clapped me on the back and nudged me forward onto the balcony, which had no railing on the outermost end.

"You ready?" said Jak beside me. She was dressed as I was: helmet and pads, goggles to protect against the rush of air, a semi-rigid frame holding tightly-packed airbags to protect against crashes—and a pair of flowing, almost diaphanous, honest-to-goodness *wings*. The helmet was locked into bearings and dampers on the frame, to prevent injury to the neck, although standard medical protocol was to reinforce the joints and vertebrae of all Novacom citizens.

"No," I said. "But let’s do it anyway."

Jak and I counted to three, and I leaped from the balcony, Jak right behind me but far enough back so we would not collide. I fell for a heart-stopping moment of deliberate hesitation—had to build up speed first—then the training protocols in my Overlay kicked in and spread my wings in measured time, so they would not snap and tear the frame apart. The air filled the fabric, and I felt myself grow heavy again, as heavy as I was on Earth, and the ground began to go away from me.

Unbidden, I whooped in nervous relief as I pulled up and away from the tower, and behind and above me I heard Jak do the same.

I made a few careful turns, testing, then I reached out and hooked my arms into the grips on the interior part of the semi-rigid wing assembly. I pumped them down and up again, and the gearing of the wing rig flapped the wings for me using a combination of my own muscle power and compact electrical actuators. I gained a little height and settled in for a nice, easy glide.

Which, of course, is when Jak plummeted past me, arms tight against her sides and wings folded, only to snap them out again and pull a full loop up and around me, before settling into a glide just past the tips of my wings.

"You are a crazy person!" I shouted over the sound of the wind.

*You love me,* she sent back over the Overlay, smug tone matching the smug grin on her face. She seemed to realize what she had said, because she blinked behind her goggles and sent over, *Well, uh, unless—*

*I do,* I sent to her. "I do love you, Jak Atamai!" I shouted aloud. *But if we don't get down from here in one piece it'll be a short love affair.*

Jak's laughter echoed off of the ceiling high above.

*I love you too, Max,* she sent back, then she curled up into a ball and fell away, only to snap out into a full glide again and rocket over the treetops, spinning loose leaves and flower petals in her wake.

I managed to complete my slow spiral around the tower with little more interruption from my resident daredevil, and then we did it a second time.

When we returned to the Kustaja residence, Olive and Melissa were there, back from their mandatory schooling and playing in the house's public Overlay layer. They were assembling impossible block castles in their living room, some spiraling Escherian dream rendered in realistic painted wood.

"Oh, I've heard about this," said Jak as we walked in. The tower had public shower facilities, so we were clean, and our clothes had been recycled and new ones fresh-ordered from the nearby manufax. "It's about intuition in abstract space. An increasing number of people are living off the Earth, so developing an intuition about orientation outside of an obvious gravity vector is considered a priority in the Novacom these days, educationally speaking. The benefits of a highly educated and professional system of standards-writers."

We sat on the couch and watched the girls build their structure, trying to guess at the rules of the game, until the children grew amusingly frustrated and tried to explain it to us. At that point we devolved into sillier and sillier guesses until the block game had been forgotten and instead become a game of tag, with Melissa and Olive chasing Jak and I around and around until we were all exhausted.

Mark and George returned home to find us baking cookies and mixing lemonade in their kitchen. When the girls had been fed and watered and sent off into the neighborhood to play with their friends—homework, such as it once was, being a thing decidedly of the past—

we sat with Mark and George and sipped lemonade and talked about our day.

"So I have some questions," I said.

"I thought you might," said Mark. "Ask away."

"You're an environmental engineer, right?" I asked.

"I am," said Mark.

"So the Novacom rewilding…does that extend into space?"

Mark shook his head. "No, the rewilding is about life on Earth. There's no life in space that we are aware of, and if there was, it would have to be sufficiently advanced before we cared much about it."

"Why's that?" I asked.

"Because there's a limit to how much the human race can care about microorganisms on other planets," he said. "For one thing, we are obliged scientifically to go down and study them. That doesn't mean we don't make use of the living space and opportunities available for us. We typically do strong scientific surveys before allowing the development of any area, part of which is studying the locality for signs of life. We haven't found anything yet."

"Not even on Mars?" I asked.

He shrugged. "Some people are still investigating the deep underground caves, but we haven't found much more than potential fossils…maybe."

"Hmm," I said. I was not sure I agreed with that approach, but I could not really think of a good argumentative tack, so I changed the subject. "And what about the Earth? We were terribly concerned about climate change in my day."

"It's not that we aren't concerned," said Mark, "it's that it isn't a political issue the way it was in your time."

"How do you mean?"

"The fact or fiction of climate change is a scientific matter," said Mark. "Whether it is or is not happening, and the manner in which it may or may not be happening, is relevant to politics only insofar as it shapes the path of certain policies—but even then, that's overreaching. We simply do not know enough. The system is too complex. All we can do is minimize our impact and build systems and structures robust enough to handle any problems that do arise, whatever they are."

"That's…certainly less proactive than people were in my time," I said.

"I don't see it that way," said Mark. "The climate *will* change, whatever humans do or have done. Attempting to prevent that just introduces major problems we are not able, even with our technology, to predict or account for. Insisting that it is the climate that should be managed and not our own human institutions and constructions is to make the excuse to keep the status quo fundamentally as it is, and not to challenge existing systems that produced the problem in the first place."

"So what *does* science say? What's the consensus these days?"

Mark shook his head. "That's not how science works. People often spoke of consensus, but consensus is a red herring, and establishing it is dependent significantly on selection of respondents, those who respond, and the way they are asked the question. The complexities and nuances of the situation, and its historical connection to the vulgar economics of the past, do not help. There was once consensus on the luminiferous aether, and before that on phlogiston, and before that on heliocentrism, and before that on the shape of the Earth. I'm sure you can see how the dominant politicoeconomic ideologies of the time might have had a preferred outcome, or at least an interest in fomenting disagreement on pointless issues such as consensus. Consensus is irrelevant to truth, and the more sophisticated our understanding of the universe, the more difficult becomes establishing consensus on something so large and complex as maintaining a precise planetary environment. The test of validity of any specific model of the climate, or of anything, is not consensus, but reproducibility, and even today we have many incomplete and only somewhat usefully reproducible models of the climate, despite all of our scientific exploration. Attempting to regulate an entire climate to a very specific end on such poor information is hubris."

"It's hubris to want the government to manage the climate?" I said.

"The problem is in *managing the climate*," said Mark. "The climate isn't manageable. It's a system that's so complex and interconnected that it's effectively impossible to manage it without potentially causing problems that are much worse. We could, for example, seed the atmosphere with aerosols to mitigate the amount of sunlight reaching the

Earth's surface, but they would disperse in time, which would cause a much larger shock to the system the effects of which we couldn't reasonably expect to predict. We could build huge mirrors in space to reflect light out, or put particulate matter in the ice caps to increase their albedo, but these are huge, often irreversible projects that require such high precision to implement safely that we might as well not even try.

"But there is one thing we can do that is politically defensible *regardless* of the truth or fiction of climate change, and which is guaranteed to have the best positive impact with the least negative impact."

"Rewilding and cybernetic efficiency," I said.

"Exactly. Minimizing our human impact on the environment and scrapping the unused, inefficient, or aesthetically displeasing parts of our previous built environment, along with reforestation and species reintroduction. This approach has three important benefits. First is that, as I said, it is politically defensible. Even the most hardline anthropocentrists can't defend the notion that we should be wasteful when we don't have to be, or that we shouldn't progress towards total ephemeralization. The second is that the system will balance itself, there's no point in our trying to balance for it—our internal high-level System Four model of the Novacom-Environment interaction is just far too incomplete. Whether a species survives depends on its ability to successfully fulfill its niche, and minimizing our impact on that niche minimizes how much the climatological system needs to account for us. And the third is that we get the benefit of clean air and water, and beautiful scenery, and all the advantages of unspoiled wilderness, all *without* running the risk of catastrophic interference in a system that many worry we have already interfered with too much."

"And if you're wrong?"

"Well, we probably can't be more wrong by engaging with systems we already know to be functional—by eliminating industrial and individual emissions, re-planting trees and grasses, and eliminating poor agricultural practices across much of the world—than we could by trying to interfere directly. And if it happens that for whatever reason, in our control or outside of it, that our civilization should face some climatological catastrophe…well, we can handle it. Suggesting that a warmer climate is fundamentally threatening to our species is pretty much indefensible, especially with modern technologies of controlled

vertical farming. It only took the will to act according to a desired outcome, not some nigh-religious economic model of profit. We built inland, we built in space, we built the means by which to ameliorate the worst consequences as best we could. There's only so much that can be done. The past is what it turned out to be.

"But," he added, leaning back in his chair and spreading his hands, "it hasn't happened *yet*. And without going to war, we can't just *make* the Coalition adopt our policies, so there's a lot that, even if it *did* happen, is out of our control. And if climate change might end the lives of a billion people, it won't be in the Novacom specifically for our efforts, and our going to war to seize control of the Coalition by force would probably end up killing at least as many. So we do what we can. Luckily, we kind of *do* have a second planet to escape to." He spread his hands, indicating the city we were in.

"I'm not sure I find that totally reassuring," I said.

"I understand," said Mark. "I don't either. But it's the least bad thing we can do. Sometimes we don't get good choices, even if it looks like we do."

I accepted that, if a mite begrudgingly.

"What about Mars?" I said. "Aren't we changing its atmosphere?"

"Once Mars has a real climate to speak of, we won't attempt to manage *it* any more than that of the Earth. It will have its vagaries and emergent properties and we will build our cities accordingly. There's nothing else we *can* do."

I was not entirely sure this satisfied me, but eventually it was time for dinner so I put it out of my mind.

After dinner, Jak and I spent some time picking out something nice to wear for the *soiree* the next evening, sent our selections and our measurements to the local manufax, and settled in for sleep.

I was tempted to make good on the day's progress with Jak, but it was my nephew's house, and I felt a little strange about making love in what was, technically, their bed. So I just cuddled up against her instead and tried to go to sleep.

That was when a prompt appeared in my Overlay—an invitation to a private room, double-encrypted and local, run ad-hoc between my implants and Jak's, and borrowing anonymized processing power from the house's embedded systems.

I glanced up at Jak's face to find her looking down at me, expressionless, studying me. I accepted the invitation and laid down next to Jak again, finding that in-between place where I could ignore my real body and focus solely on the induced sensations streaming between Jak and I. In the real world, I spared a little attention to find her hand and twine her fingers with mine until the interface nodes on our palms were pressed together, solidifying the wireless link into a physical one.

Jak was waiting in the virtual room when I appeared. The room was one that I knew immediately did not exist, as there were no aerostat cities floating in the upper atmosphere of Saturn—yet—and certainly would not be so high up if there were. Space, black and clear, hung above us and around us, and arcing brilliantly overhead were Saturn's glorious rings. The room itself was a gigantic faceted diamond, wisps of Saturninan cloudstuff curling around its sharp angles.

Jak herself stood nude in the center of the room, watching me. I realized I had spawned into the room without clothes, and I felt a moment's *frisson* of embarrassment, for while I had been naked in Jak's presence before, it had always been intimate, close-in, either of utility or of romance. I had never just stood there, nothing around us, open to the view of anyone who might walk by, nevermind that such a thing was impossible in the simulation space.

Jak walked up to me, touched my face with the tips of her fingers, tilted my head back so she could stroke the lines of my throat. I swallowed, my mouth watering suddenly, and felt the peristalsis ripple pass under the light pressure of her touch.

She smiled, let her fingertips drop further, and the last coherent thought I had for some time was a fervent prayer of thanks to a God I had never been close with that I was alive to experience this impossible moment.

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The party, held in a conference hall in the city center, was in full swing by the time the four of us arrived, but as it was a casual sort of affair—despite the promise of high society—nobody looked at us twice. I noticed a few people in classic G-man suits, men and women alike, and Jak assured me that there were many more in the crowd, dressed casually. I asked her why anyone important would come to one of these, if

there was that amount of concern, and she just said that the Novacom worked very hard to prevent those with authority from segregating themselves from the rest of the population. Appearance at such events —even *mingling* with the mass of people—was therefore legally mandated.

Jak wore a dress, something loose and comfortable in the colors of the Novacom, with the white element of Novacom vexillology as a shawl across her shoulders and elbows and the brass-blue-red elements spiraling down her body in a sinuous weave. I had elected to go with the standard suit-and-tails, with a four-color tie complementing Jak's dress. Mark and George were in matching three-piece suits and vests, with bowties in red and blue that mirrored one another.

In aggregate, we appeared quite the cohort, so Jak and I let Mark and George take us around and introduce us to their various colleagues.

"This is Melvin," said George, and I shook the hand of a tall, broad-shouldered man with a red beard wearing a kilt with an unfamiliar plaid to its weave. "He works in power systems."

"I help balance the powersat load for the Earth-Moon system," said Melvin.

"I've seen the wonderful things we have done with the powersat grid, so I thank you for your service," I said.

"Well, that's why we do it," said Melvin. "Say, is it true you're a cryonic revival?"

I smiled. "It is. How did you know?"

"It's a small town," said Melvin. "And Mark here may have been a *bit* excited to meet you."

Mark shrugged. "I regret nothing."

"Not that I'm complaining, but why do you ask?" I said.

"Well I've grown up hearing things about the Coalition, and how we used to be like them in the past," said Melvin. "Is it true what they say? That you had people fighting against the implementation of solar energy because it would upset the monetary system at the time? I asked a professor of mine once why the Coalition doesn't rely more on terrestrial solar power systems, and that was the response I got."

"It's true that people in my time were interested in putting solar panels on their homes and other places," I said. "I think the argument

the opposition used is that it would reduce the payments people made to the public utilities, which still had to maintain the utility lines for baseload power, or cloudy days, or buying back power from private homes."

"Why did they not simply take the money from the solar panel sales? As a tax? Or tax the money paid back to homeowners in power generation?"

"Well, at the time I wouldn't have had an answer for you," I said, glancing at Jak, who raised an eyebrow in my direction. "But I've spent some time in the Novacom now, and I'm fairly certain now that the reason that they didn't generate alternatives that would allow them both to maintain the power grid *and* introduce clean, distributed solar power probably has something to do with capitalism."

"Oil profits, as I hear it," said Jak. "Various investments in fossil energy that would sour if there was an abundance of clean energy."

"So it *is* true," said Melvin. "The first powersats were sent up not long after I was born, you see. I remember watching the launches. First the powersats, then we could use their energy to power electromagnetic launchers for more powersats, *then* they sent machines to build them in space from asteroids…" He smiled and clasped his hands together in excitement. "Oh, I can remember it so clearly. From that day, I wanted to work on them."

"Do you get down to GEO often?" asked Jak.

"Oh yes, every month," said Melvin. "It's more convenient to live here on Luna and take a shuttle down to the Earth-based tethers than try and negotiate in the queue to come up so often."

"Why not live in one of the Lagrange colonies?" I asked.

"I like seeing sky above me, even if it's fake." Melvin made a face. "Looking up and seeing other people looking up at *me* is just a little weird, that's all. Plus, it's always space-black outside, and woe be unto your vestibular system if you end up pointed at the Earth and see it spinning out there, ugh."

Eventually we were joined by another of Mark and George's friends, a woman named Sam, who worked on the Farside telescope array.

"It's one of the most highly-developed surface installations on Luna," said Sam, no small hint of pride in her voice. "It spans almost

the whole of Farside, and the mass of the Moon itself blocks the radio emissions from Earth. We also have a no-transmit zone in place, so interplanetary communications get routed around our observation cone as much as possible. We get a nearly perfectly quiet observation space for a massive swathe of sky, all without the light-lag of the distributed array!"

"Find anything interesting?" I asked. "Jak's mother does SETI processing, but she says they haven't found anything yet."

"Nothing like that," Sam admitted. "But the scientific discoveries are just starting to really come in! We have some very promising data on the internal mechanisms of quasars that we think might have interesting implications in high-energy physics, and who knows what cool shit will come from *that?* Some people are talking compact antimatter generation for starships, or room-temperature superconductors, but I'm just interested in the *resolution* we're getting!"

We met several other people doing research on the Moon, who were at the party because *technically* they were operating in the interplanetary equivalent of a national park—and, thereby, were direct employees of what was colloquially known as the government, instead of being a semi-separate self-managed academic or R&D group. It was more like the relationship the manufaxes had with the formal institutions of government, or like what the powersat crews had, than something like a boutique or a restaurant or even a ship, which enjoyed a much less formal—but still cybernetic—interaction with the engines of governance.

The last person we mingled with would prove to change my life at least as much as anyone had up until then, except perhaps Mudrac Atamai himself.

"Hello," he said. He spoke in a thick Russian accent, and his hand gripping mine was dry, and his grasp strong but not overpowering. "My name is Vasily Belyakov."

"Vasily Mikhailovich is the Coalition Ambassador to the Lunar Novacom," said George. "And he is perhaps the Solar System's greatest sport. Nobody can take a joke or a jab like he can."

I understood suddenly what the hidden security was for.

"I am honored by your esteem, George," he said warmly. "But it is easy when I have received such hospitality."

"If I may, Ambassador," I said. "I, too, am a visitor to this place. Would it be possible to get your perspective? I have only had the Novacom's opinion about itself so far."

"Ah, you are Kustaja, yes?" said Belyakov. "I have heard of you. Word travels quickly in a small town. You are the revival? From the twenty-first century?"

"I am," I said.

"Please, let us sit." He directed Jak and I and Mark and George to a ring of comfortable armchairs. Belyakov pulled a small device from his pocket and touched it, and a machine wandered over from its typical patrol through the guests, bearing a tray of drinks and another of food. Belyakov took both trays and put them on the low table between us. "Drinks and food between friends makes the talk flow faster, yes?"

I agreed that it did, and we toasted together.

"*Vashe zdorov'ye*," said Belyakov. I did my best to approximate the sounds he had made, and to down my drink in one throw as he did. The others, I noticed, merely sipped theirs, but it was I that Belyakov was looking at, all seriousness, when we put our glasses back on the table.

"What do you wish to know?" he said. He had taken the seat beside mine, with Jak on my other side and my nephew and his husband across from us.

"The Novacom views the Coalition as…I'm not sure *enemies* is the correct word, but…"

Belyakov nodded. "I understand. Rivals, perhaps, though not so evenly matched as all that." He gestured at the room around us, as if to include the whole of the Novacom-in-space.

"How does the Coalition view the Novacom?" I asked.

"It is no secret," said Belyakov. "The Novacom is a threat. We are not so foolish as to provoke it, but neither can we exist with it. It is… erosion. My job is not to defy your Novacom or to incite it. My job is to make the erosion *subtle*, slow if possible, but tolerable if not."

"I must admit I'm surprised to hear you say that aloud," I said.

Belyakov shrugged. "Why pretend?"

I smiled at his lack of equivocation or false praise. "Do you see a difference between what you do, who you represent, and what the Coalition *is*?" I asked.

"You are asking if the government and the people are in accord," said Belyakov. It was not a question, but Belyakov answered it anyway. "No, no, you are asking who really rules in the Coalition."

"I…suppose that I am," I said.

"In Russia, since the Tsar all those centuries ago, *someone* has ruled. The Tsar, the Party, and then the corporations…the Coalition is no different. Someone always rules. Only in the Novacom is it different."

"Is it really?" I said.

Belyakov snorted a laugh. "In the Novacom, *nothing* rules. *Power itself* rules. There is no face. In the Coalition, you know who rules, even if nobody admits it. Here, there simply *is* rule. It is Orwell gone good, yes? The system that simply *does*. Anarchy in the truest sense."

"I think the Novacom would say the same about capitalism," I said. "Autonomous, inhuman, omnivorous."

"*Da,*" said Belyakov. "But at least, there is a place for anger to go, a head for the guillotine. What happens here, when the system begins to strangle itself? Who goes against the wall when there *is* no wall?"

"I suppose the Novacom would suggest that to be impossible," I said. "If there was such pressure, it would reveal itself in the political surveys, and things would change. The rules don't just forbid such a strangulation from being done, they make it impossible to develop in the first place."

"And yet people are the same, yes?" said Belyakov. "You have your politics, such as it is, but the truth is always visible, even if there are no words for it."

I tapped my fingertips together, thinking. "Perhaps," I said. "But then again…if a better way arises, it will become so obvious that it will be implemented directly. It can't be hidden. It would emerge in the way that smaller or larger levels of recursion adapted to changing circumstances, and those methods and data would be captured by the self-reflection of the cybernetic system itself. Like you said, the truth is always visible."

Belyakov shrugged. "It is as you say."

"But surely you understand that perfection is the enemy of progress, right?" I asked. "Just because the Novacom might be imperfect doesn't mean that it isn't better, that it isn't designed to *get* better."

Belyakov studied me for a long moment, then said, "It might be better, now, if you tell me about *you*, Max Kustaja. I think there is need for *mutual* understanding."

"All right," I said. "I was born in Nevada around thirteen decades ago. My parents were middle-class, so I did all right, but the economy was bad *again* so I ended up working a trade. It was pretty good, actually, good money at least, but I was competing with people who had been dumped out of engineering firms and had been replaced by machines in other forms of work, so it was still a struggle. I got…sick, let's say. Then I died, and had my body and brain cryonically frozen. Then I ended up here."

"I believe that is what happened, yes," said Belyakov, "but I do not believe that is *you*. Who are *you*, Max Kustaja?"

I looked at Belyakov, a man born decades after I had been, and by far the oldest-looking man in the room. A man whose ostensible purpose was to defend and promote the interests of the Coalition, the last bastion of capitalism waging a losing war against an interplanetary communist state but which nevertheless controlled most of the Earth's land and population. And here he was, on the Moon, trading gentle barbs with someone who knew nothing of his life or of the world, or politics…

But there was one thing I *did* know, and that was the complex topography of the human soul under suffering.

So I told him.

I told him about the days, months, *years* of despair, of watching the world get worse and worse and knowing nothing of how to fix it, knowing little even of how to *survive*, of working oneself as far and as hard as one could just to stay in place and *failing*.

And yet worse, knowing that, *somehow*, it *could* be better, that there *was* more to the world, that the so-called *new normal* was not normal, did not have to *be* normal, was not something we *had* to accept as normal…but then, what could be done? Even mass political action did nothing. Protests did nothing. Riots did nothing. Voting *certainly* did nothing.

I had died before finding out the answer, only to awaken in a time when it had been answered for me, and had *been* answered for almost a century since my death, such as it was. Thomas M'baga had told me,

all those weeks ago, had said in a few sentences that it had been violent, uncertain, that it had been a titanic struggle against the forces of elitism and greed and sheer stupid humanity—a struggle that I had simply slept through, only to be welcomed with open arms by a society that neither knew me nor, I thought, needed me. The biggest fear as I had succumbed to the disease, and thence to the arms of the cryonic response team and ultimately to the ice itself, had not been that no cure could be found for my condition or my suspension, but rather, that a cure would be easy, and that society would dismiss me as mere historical garbage, or would revive me out of an automatic sense of obligation, with no concern for the person I had been or could have been or could be in their new future.

Instead, I had awoken in a world that cared about me for myself, as a human being with inherent worth and dignity, that tried in every sense to support and fulfill me, not out of some superhuman kindness, but out of simple humanity. We were not required to emulate the godhead, not required to become like the Christ that had so dominated my religious childhood and the politics of my adulthood. We simply had to take the best aspects of ourselves, the love and the compassion and the sympathetic possibilities that were wired into our very brains, and *use them*, not suborn them to the rapacious needs of the false idol of capitalism.

The relief I felt waking up every day in the new future, the sheer terror of the possibility of the loss of that world—a fear that had exposed Jak and I to one another so intimately that we were now permanently intertwined, however our relationship would evolve—I did what I could to communicate it all to this man, this stranger, this momentary personification of the opposition, this philosophical plenipotentiary of the Coalition of the Free.

And when I was finished, I realized that a hush had fallen across the room, and that all eyes were upon me, and that Jak's hand was clenched tight in my own.

I was aware of them, but I was looking only at Vasily Mikhailovich Belyakov, at his eyes which were locked with mine. He had said nothing while I spoke, and when I had finished he said nothing again, for a long, long moment.

Then he leaned back in his chair, and said only, "I see." He brought his hand to his face, his thumb under his chin and his fingers over his mouth, and regarded me closely. "I think I do, anyway."

"I, er…" I said, standing. Belyakov rose with me, as did Jak. "Well. Thank you, uh, Ambassador, for your time. I'm sorry to have taken up so much of your evening."

"Not at all, not at all," he said. He reached out and grasped my hand in both of his. "You have given me much to think about, Max Kustaja. I will not forget it soon."

Jak and I left through the silence, waving away Mark and George's offer to accompany us home. No reason to entertain us, we said. We could check on the girls, we said.

We elected to walk out to the first suburban ring where the house was, Jak holding her elegant but impractical shoes in one hand and my own hand in the other while we walked along the wide boulevard underneath the elevated radial line, I on the mooncrete pathway, Jak on the soft grass median.

"That was some speech," said Jak.

I blushed and covered my face with my free hand. "I didn't mean to go into such detail," I said.

"I think it was the right thing to do," said Jak.

I peeked at her from between my fingers, to find her watching me thoughtfully as we ambled slowly down the path, the city's artificial sky and horizon showing a beautiful, impossible sunset just deepening into a star-speckled night. But I felt no apprehension; the city was safe, and Jak was here, and my Overlay was on alert. There was no reason to be afraid any longer.

"You do?" I said. I dropped my hand from my face.

Jak nodded. "I do. In fact, I think you should do it again."

"*Again?*" I said, aghast. "I'm mortified I did it *once!*"

"There are a lot of revivals, Max, you know that," said Jak. "But none of them have ever faced down a Coalition ambassador to the lunar Novacom—the *capital* of the whole thing, you'll recall, although not *here*. Vasily Belyakov is a good man, well-respected, but he is a Coalition *hardliner.* He'd have to be, to be sent *here*."

"I didn't know," I said. "I guess I thought he was just some minor diplomat."

"The Coalition and the Novacom *have* no minor diplomats, Max, not in our positions. He was right when he talked about erosion. Neither of us can live alongside the other, and we are water to their rock. It is inevitable that we should win, and that's how we conduct our diplomatic relations. We can afford to be civil, because we *are* better than them, in every way and at every endeavor, and *they know it*. They can't *help* but know it." She pulled me to a stop, tugged on my hand until I turned to face her, up on the grassy median with her. "The people in the Coalition live like you did, Max. What you went through is not uncommon there. But it's one thing to see it as numbers, statistics. It's quite another to hear the personal story of soul-sick suffering from someone who *survived* it, who came to a better place from it. It's a story we can't ignore as humans, and you told him that story. I've seen recordings of diplomatic summits where Vasily Belyakov employed every tactic in the book to stand toe-to-toe with people he knew his side would ultimately lose against, where if he was lucky he would live long enough to see his still-youthful opponents string their banners across the cities of Russia. And I have never heard of him reacting to anyone as he did to you tonight.

"People like him are too aloof, too separated, Max," said Jak. "They're aware, but with their minds, not with their *souls*. You hit him right here." She put her hand on my chest, over my heart. "What you have to say is important, and I think you should say it as loud as you can, to everyone who can hear you. The Coalition are not the only ones who need to know how good it is in the Novacom."

I watched her as the sun finally set, as the stars came out fully, as the fireworks celebrating the anniversary signing of the Novacom Charter—mere images on the walls and ceiling with the sound of explosions emitted from hidden speakers, but somehow no less real for it—bloomed and blossomed in the sky and in Jak's eyes.

Jak just smiled at me, kissed me on the forehead, and started walking again, leading me back towards the Kustaja house as if we had never stopped.

Later, having showered and changed into more comfortable clothes, watching old films from *my* era in the Overlay with Olive and Melissa, I found myself pondering what Jak had said.

I could continue on my tour of the Novacom, learn more and more about the way my new home functioned, see sights I could never have imagined. Indeed, I probably would do exactly that. Eventually, though, I had to be a person again, instead of merely a receptacle of new knowledge and experiences. That meant *doing* something, adding to the canon and complexity of humanity.

And now I had the opportunity to do that.

At least, until I found something more exciting to do.

# EPILOGUE

*"Please do not be alarmed. You have been in suspension for many years. A servicemember will arrive shortly to assist you."*

It was the same calm, artificial, female voice that had greeted me in my first moments in the Novacom over a year previous, and its familiarity made me smile. Jak was sitting next to me in the examination room, although it was another attendant who would be taking responsibility for the successful integration of the person on the bed before us into the society of the Novacom, at least in the first weeks. Jak was there for moral support, never mind that I just liked having her around more generally.

On the bed lay Elizabeth, my older sister, looking younger than I remembered in her rejuvenated body and paper medical gown.

"Where…?" She blinked against the light.

The door opened, and the assigned attendant walked in, another young-looking woman with very pale skin and brightly silver hair. She spoke gently to my sister, getting her upright and checking her body's responses to having been healed so thoroughly.

When the attendant stepped away to prepare a space for Elizabeth to change out of her gown, my sister finally spotted us sitting nearby. She blinked in confusion, frowned, and tried to get out of her chair. "Max?"

I helped her up, kept her steady while she learned to stand again. "It's me, Lizzy. I'm here."

"You…you made it?" she said. Her eyes filled with tears, and I staggered a little under her weight as she wrapped me up in a hug.

"I made it," I said. "And more. Your great-grandson and his husband are waiting for you outside the Clinic. And this is Jak, my wife."

Elizabeth wiped her eyes with one arm and nodded at Jak, who was standing politely to one side. "It's nice to meet you, Jak."

"The pleasure is mine, I assure you," said Jak.

"We are all more than happy to have you here, Elizabeth," said the other attendant. "We have some clothes for you, then a brief orientation lecture, and then maybe we get you some food?"

Elizabeth nodded, went behind the privacy screen to change, and emerged after a few minutes in a very familiar-looking jumpsuit.

"So," she said as we exited the little room. "What's the future like?"

I glanced at Jak and smiled. She was looking back at me, her usual gentle smile on her face. "More than I can say," I said.

"You'll find out soon enough," said Jak.

"Go on," I said, gesturing at where Elizabeth's attendant was waiting to take her down the hall to the little lecture room where I had first seen Mudrac Atamai tell me the future was at my fingertips. "I'll see you when you're done."

Elizabeth nodded, and we watched her head down the hallway. As the sounds of Mudrac's usual lecture floated down towards us, Jak and I turned and went the other way, out into the lobby with the stained-glass dome, out to the benches by the fountain where Mark and George waited.

"How is she?" said Mark.

"She's fine, near as we can tell," I said. "It's going to be a lot of fun telling her all about this place."

"Now you see why I do what I do," said Jak. She was still an attendant at her father's clinic, though she had moved to a supervisory position in order to spend more time with me once my schedule had filled up with the lecture circuit. It was more effective to deliver my story *in person* to the various conferences, conventions, and small-town lecture halls that asked to hear it. Jak could do her job supervising and training new attendants and helping them design better and more effective integration programs just as well through the Overlay, so it ended up that she joined me on my trip across the Novacom—and beyond.

"How was Moscow?" said George. Jak and I had been there wrapping up an international visit when we had received the news of Elizabeth making her way through the final stages of cryonic revival, and had booked a ticket on the next hypersonic transport back to the Novacom, from Tokyo to Los Angeles and then across the continent to Richmond. The slowest part had been the train ride across Russia.

"Pretty good, all things considered," I said. "I'm not sure I made much progress, but it was more of a punctuation mark for Vasily's defection announcement anyway."

"I'm surprised he made it back," said Jak. Vasily had been on the HST with us, playing with his new Novacom-standard implant set.

I smiled at the memory. "Because of the potential for political interference, or because of the bad jokes he kept making with the flight attendants?"

"Is ‘yes’ a suitable answer?"

I laughed and leaned against Jak. The fountains behind us still cooled the air, but it was getting on autumn again, and the water would be shut off to make way for the Clinic’s yearly decoration contest. I resolved just to enjoy the moment, now that we had all but abolished the fear of time—the only manner in which one really could enjoy a moment. I had mused to Jak once, shortly after our marriage, that the characteristic atmosphere of the Novacom was in how the urgency of human experience had merged with the serenity of good health and abundance, until the whole world had developed the air of a pleasant summer thunderstorm, all rage and violence expressed as soft rain and a gentle, cooling breeze.

Jak had said it was more like a bird floating on the water, calm on top and mad as all hell underneath, but I thought my metaphor was better.

"Excited?" I said to Mark, as I interlaced my fingers with Jak’s.

"Sure," said Mark.

"He’s more than excited," said George. "You know how he gets. Chattered the whole way from Luna. Nearly stuffed him into a rescue ball and had the Spaceguard bring him in."

"But you didn’t, did you?" said Mark. "So what does that say about *you*, my love?"

George put one arm around his husband’s shoulders and kissed him on the top of his head. "You’re lucky I love you, you gigantic brat."

Mark patted his husband’s bicep good-naturedly.

I leaned against Jak and listened to the hiss of the fountains, and saw the white of the clouds and the blue of the sky and the green of the trees, and somewhere behind us was the hum of the monorail and the soft sounds of the people walking along the path, and far overhead were the day-muted stars of the geostationary powersats ringing the Earth, and beyond them was the Novacom-in-space as the human race pushed outwards and onwards, and I thought that, just maybe, *this* dream would last long enough, be *real* enough, to be worthy of itself.

I closed my eyes and thought of tomorrow, and of today.

I had, indeed, come home to a place that I never had been to before, having found there everything that could have been, and already was.

—(Not Yet) The End

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  5. *Atlas Shrugged* by Ayn Rand
  6. *Walkaway* by Cory Doctorow
  7. *The First Immortal* by James Halperin
  8. *Utopia* by Thomas More
  9. *Tomorrowland* (the film)
- *The Wisdom of Crowds* by James Surowiecki
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# About the Author

Joshua Brock is a writer, educator, Dudeist minister, and former NASA contractor (you may have seen his work on the Space Launch System). He lives in Virginia with his cat.

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