



RICKY
OLSEN
The Zoo

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Part I: They're There (and so we can't be)

It gets harder the more you know.
Because the more you find out
the uglier everything seems.
—Frank Zappa

CHAPTER 1

THE BOY

Two pigtailed little girls were bawling the way only toddlers can cry. They were sitting under a table, faces red, and as soon as one stopped from exhaustion the other started, and they released their misery in an agonizing chorus.

A male toddler, barely older than the girls, was repeating that he had to go poop “right now!” and another girl about the same age as him was climbing on one of the chairs to crawl onto the table, again.

A group of not-quite-adolescent girls were playing with their lunch by smearing the mush on each other’s cheeks and foreheads like face paint, then daring each other to lick it off.

Two males about the same size, small but forceful looking, were running around in circles, whooping, and one very tall, very quiet girl was sitting in a corner, curled into a ball with her hands over her ears.

A slightly older pair of identical girls, twins, were banging on the legs of the cooking tables with metal spoons. Their clatters created a noise that meandered between something vaguely musical and an artistic representation of a migraine headache. A larger cohort of girls danced to the clatters, moving and then freezing as the frenzied banging came in fits and starts.

The toddler who needed to poop was now apparently doing so in the middle of the room, a look of complete bliss on his face as the dark stain grew on his pants.

The oldest of the group—a thin, brown-skinned boy with short hair and the barest whiff of a mustache—pulled the girl off the table and put her down on the floor. The chair she’d climbed onto smacked against her shin and she began to howl. He let go of her and grabbed at the running kids’ shirts but caught hold of their hair instead. They yelled at him to let go as he pulled them back. He managed to stop them from running away, but accidentally spun them around, and they conked into each other in the face. One of the kids’ noses started to bleed.

The room was a wailing mess of children.

The oldest boy was in charge of looking after all of them, and today he was alone, without Beatrice, for the first time. He opened his mouth, closed it, then decided. “Will you all please just shut up and behave!” he screamed, but his adolescent voice betrayed him, cracking as he yelled.

The entire room full of kids looked at him, quiet for an instant. Then they burst out laughing and continued their chaos as if he’d never spoken.

The boy stared at them. He turned around and walked out the door.

In the hallway, he caught sight of a lanky, angular young woman who was heading for the Adjustments meeting with the other adults. She loomed over the Earthborn adults, human genetics finding less resistance to the lower gravity of their new planet.

The boy forgot the disaster he’d left in the other room. He’d barely even seen her this last week. “Heya, Be-a!” he called, in his customary greeting.

“Ahoy, boy!” Bea replied automatically, though it was clear she barely registered his presence.

He trotted toward her. “We were going to try the new ropes when you’re done, is that still on?”

“Sure, sure,” she said, holding a tablet in one hand and flipping through screen after screen with the other as she continued toward the meeting room.

“And I have a huge, pink, man-eating plant in the wash area who’s eaten all the children.”

“That’s nice,” she said, then looked up at him and gave him a peck on the cheek. “Got my first presentation today, the pollinator drones update. See you later.”

The door opened and he saw the other adults around the table making space for Beatrice. The door closed in his face, leaving him in the dim hallway lights.

“And then I’m going to put on my space suit and fly back to Earth for a concert,” he said into the empty hallway.

“That’s nice, can I go, too?” he asked, using his hand to mimic Beatrice responding to him.

“Why sure, Beatrice, after I finish making my amazing new music playlist. And by the way, I conducted our very first analysis of the mysterious Otreran microbes, and got infected!”

“Oh, how terrible! Are you okay?” For this, the Beatrice hand made a big round O shape between the thumb and forefinger.

“Yes. But now I only eat human brains.”

“Yum, brains! My favorite!”

He continued the conversation, inventing more and more terrible things that the mysterious microbes made him want to do.

As he left the underground space, he didn't notice that another boy, the next oldest, was following him.

He went above ground. It was a beautiful day, but it had been beautiful since they landed here; every day of the boy's life, the same cloudless, windless weather, with their sun, Vanir, shining tirelessly through the curve of the dome.

Inside it was the same as always, too. Plants rotated in spirals below the panels of the dome, while long rows of greenery and shrubs covered the ground, with paths cleared between the crops so the robots could care for them, and benches positioned here and there. Water trickled from the irrigation system, and its faint dripping sound filled the entire volume of the interior. The near totality of the dome space was given over to growing their food. He'd had to argue endlessly with the adults to be allowed to use the platform to have fun on, high up under the dome's surface.

He walked to the end of the sleeping platform and from a corner pulled out his harness. He put it on and began climbing up the ropes toward the ladders and ziplines and wobbly bridges. At each junction he unclipped and clipped himself, going higher and higher. The lines avoided all the hanging gardens.

Finally he arrived at the platform for the highline, a wide strip of synthetic fiber that stretched from this platform to another that was also almost at the top of the dome. He couldn't see the ground from here, just the plants covering it, but there was still a sense of space and light. The platform had been erected for plants, but it had been his idea to use the area for the highline.

He could cross it safely with a leash attached to the highline itself, but after trying it once, he found it was too scary, even for him. Whenever he fell, he ended up dangling below the line and had to use the line's elasticity to bounce until he could haul himself up. He wanted to add a safety line above the highline that he could attach himself to. The highline he'd been able to run up from ground level, but there was no reason not to try to run the safety line from up here. Still, it would be a challenge, so he attached the safety rope to a carabiner before taking a deep breath.

Clipping the leash onto the highline under his feet, he started walking across to the other side, the safety line in tow, but soon he sat down and scooted. He was getting better, but he wasn't ready yet to try to make it all the way across on foot. Once he reached the other side he secured the end of the safety line.

He started to come back from the second platform, sitting down again after a few steps. From a seated position, he bounced up and down on the highline, getting a bit of distance between him and the line with each bounce. He made an attempt to stand, got his feet under him for an instant, but then toppled over and fell off. Attached to the upper safety line now, he didn't fall beyond the reach of the highline and easily pulled himself back up.

That was when he noticed the child on the first platform, looking at him with adoring eyes. The child began to step toward him on the highline. The boy saw that he wasn't clipped in, was just holding on to the new safety line with one hand. The boy scrambled along the line with his hands, pulling himself toward the child. “BB, stop! Don't come out here!” but the child had already left the platform. Two steps in, he slipped and lost his grip on the safety line. He didn't cry as he fell, just stared up at the boy, hands grasping at the air as he plunged into the void and disappeared into the vegetation below.

The boy couldn't help himself. He screamed, inhaled and screamed again. The screams continued until the adults rushed up from their meeting below to see what was wrong.

###

“I don’t know how, but Bhagi’s boy will be fine. He shouldn’t be fine. He should be dead. Thanks to you.” Dana emitted an irritated sigh, trying to do her job in the med bay in spite of the fact that the boy, sitting next to the bed that held her patient, was blocking her way. She couldn’t get him to move and finally just gave up and worked around him. “He wanted to talk to you.”

He looked down at BB, who was out for the count. The nickname BB was short for “Bhagi’s boy.” The adults, the mothers, wanted the children to choose their own names when they grew old enough to do so, but this created a confusing mess of more or less nameless kids. The boy thought it was typical of the adults to not even be able to choose names for their own children. It was one more thing that drove him nuts.

Coming up with a name was hard. Back on Earth, parents gave their children names to honor a grandparent, or their culture, or to show what they hoped for their children. Here there were no grandparents to honor, the culture was still in formation, and everyone hoped only that their child would survive, be healthy, be happy. Names might have meaning or determine someone’s life or choices. How was he supposed to know who he might become with one name, or if he would change if he chose a different one?

All the Earthborn, the mothers, also saw baggage attached to some names: doubting Thomases, sexy Sadies, sweet Lorraines, and for some obscure reason, no one had named their child Karen since back in the 2020s. He had run through his choices and had had to eliminate one after another.

He was the oldest boy, the firstborn of a woman named Hope. His nickname, Alphy, was short for “alpha male,” but he hated it with more vehemence than he let on. He was sure that if the other kids knew how much he despised it, even once he’d chosen an adult name for himself he would never be able to convince them to stop using it.

“It’s a miracle he’s still in one piece,” Dana said. “Luckily the sleeping platform broke his fall. There’s a dent in it where he landed. You’re lucky, too, because you’re going to have to live with this. What were you thinking?”

The boy was pretty sure that Dana didn’t really want an answer, and anyway there was nothing much to say, so he kept his mouth shut. He hadn’t seen BB follow him up the ropes, so technically it wasn’t his fault, but he should have been babysitting during the adults’ meeting instead of fooling around under the dome.

She went on. “We’re still trying to clean up the mess in the dining area of the common room. Dinner will be a bit late because the kids took all the mush prepared for tonight’s meal and turned it into art. It’s not a good use of resources, so we’ve scraped it up, cleaned it, and they’re going to have to eat it. The rest of us are getting a fresh batch.”

The boy didn’t ask if he was getting the fresh nutritional supplement with the adults. He hadn’t wasted any food himself, but this was the first time he’d been fully in charge. Before now it had been him helping out Beatrice, but definitely playing second fiddle to her. Nothing like this had ever happened when she was there.

“Alphy?” The child’s voice from the bed sounded scratchy. The boy took his hand. “I’m sorry, Alphy, I didn’t mean to get you in trouble.” His face was wet with tears, but the boy wasn’t sure if they were from pain or embarrassment.

“Hey, no problem,” he said, squeezing the child’s forearm. “I’m sorry, too. I should have shown you how to climb up there when you asked me before. I blew it off. I blew you off. I shouldn’t do that to you. You’re my friend.”

“Really? We’re friends?” BB’s face brightened.

The boy sighed. He knew what he needed to do, so he sat there with BB and did it. He talked for a long time, telling the child that he liked him, and that he appreciated him, and that he’d been terrified that he might have fallen to his death.

The painkillers took effect and the child fell asleep with the faintest of smiles on his face. The boy watched him for a bit, then leaned over, kissed him on the forehead, tucked him in and left the med bay.

###

Beatrice had already left and everyone else was nearly finished eating. They studiously avoided making eye contact with him as he took a plate and went to sit next to his mother. Hope made a spot for him. He poked at his food for a bit, then she put her arm around him and pulled him close. He sighed and leaned into her.

“Oh, bubba,” was all she said, knowing that the boy was already beating himself up a million different ways. “Go on up to the platform. I’m staying down here with the little ones tonight. Isabelle’s night off.” The boy gave up on eating anything and pushed the mush back into the pile. Nothing was wasted on this planet, but this batch was still going to rot before his appetite came back.

When children finally managed to sleep through the night without waking everyone up, they were allowed to join the older kids and adults sleeping under the dome. No one liked sleeping underground, and it had become a habit to nestle everyone together on a platform to sleep under the stars.

At the moment, Isabelle and Hope had the two youngest children. The two mothers took turns staying in the underground sleeping area with them, so the boy went up to gather the rest of his family group together to sleep. At least he knew how to do that.

There wasn’t much space under the dome, since most of the volume was used for growing the plants they needed to survive, but Hope had worked out a system of pulleys to move and rotate the plants. It was a simple matter to pull them out of the way at night to clear off the sleeping platform.

He crossed the platform to his sisters while one of the adults, Alexandra, was telling a story, as she often did before they went to sleep. This time she was talking about how they came to live on Otrera. “...And so we were sent here to experiment with how to make a better world...” He’d heard a version of this from his mother, but Alexandra had never presented it to the kids all together. One of the girls was tapping out notes on a tablet, and he wondered if she was doing this for herself or planned on sharing it.

The boy had thought the day couldn’t get any worse, but he was wrong. He made his way past Beatrice and was just about to say hello, but before he could, she looked up at him and said, “I’m so disappointed in you.”

He stood there for a moment, looking down at her, then turned and walked back toward the entrance to the underground area.

CHAPTER 2

BEATRICE

Beatrice lay down and stared up at the sky, teary-eyed. She went through her emotions, but they were such a scramble that she didn't even know where to start. Putting her hands out in front of her in the darkness, she stretched them out, then brought them back closer to her face. She needed to get herself sorted.

She began counting off on the fingers of her left hand, pulling back her thumb. Guilt first, she supposed. She'd wanted to make the boy feel bad, knowing full well how much he was probably already feeling like crap. She would have to make it up to him. They'd talked about this dozens of times. Just because he'd always be there didn't mean she should treat him unkindly. Neither one could run away from the other, since they lived in a dome the size of a couple of football pitches—a comparison the adults used that had no meaning to her—with three dozen people, plus more on the way. He didn't deserve to be her punching bag, and it always turned out that way. She was the one judging, complaining, letting out her inner bitch. He would never, ever do that to her. She was disappointed in him, but she knew him. He'd screwed up, that was all. By whatever luck, no one had died and BB hadn't even been seriously hurt. She could have told him later, at a better time, when he wasn't still wallowing in guilt.

Index finger. Anger, about the meeting today. The adults had dumped the weight of a thousand space shuttles onto her shoulders, basically assigning her with the task of structuring their society and deciding what laws they should have. Just like that. Like, "Hey, Beatrice, we have a job for you! You've been an adult for maybe five minutes, so now you're in charge of structuring our lives, because we don't feel we can," while ignoring the fact that *they* were the ones who had structured her entire life up until now. When she'd pointed this out, they'd said, "We wanted you to know that you were loved and supported." Beatrice thought about it. It was true. But in protecting her so much, she was now neither trained nor prepared to do what they wanted her to do.

The thought had occurred to her before, that the adults and Ned had no idea what they were doing and were just making it up as they went along. Was this normal? Wasn't there some sort of handbook on how to raise kids? If there wasn't, maybe someone should write one...

She sighed. As Hope would say, "*Auto-goal*." Scoring points for the opposition. If someone was going to write a parenting guide, who do you think would be tasked with that? Beatrice to the rescue. So, again, index finger. Add anger toward herself, for inventing more tasks for herself. Although it would probably be a good idea.

Middle finger. Frustration. She'd planned her presentation about the pollinator drones and the new parameters she'd fed into the system. It was as close to perfect as she could make it. They had the problem that the drones were too efficient, making the flowering plants too heavy and needing to be pruned of excess blooms, while they couldn't get by with just their insect population, since it was still prone to imbalances—completely normal in light of the fact that the insects had been ripped from their natural ecosystem on Earth. The insects needed enough pollen to survive, but the humans needed just enough pollinated plants to produce the food they ate—just enough, not too many. Her updates were working amazingly well, but before she had even had time to explain, the meeting was disrupted by the boy screaming when BB fell.

She'd never heard screaming like that. It didn't make the boy seem very attractive, but then her heart skipped a beat. It hadn't been attractive, but it had been profoundly touching. The screams had come out of him like breaths, beyond his control. He hadn't even been conscious of doing it, she was sure. She smiled to herself. He might be an idiot, but he cared deeply about the people around him. The fall had hurt him as much as it hurt BB. That in itself was kind of hot.

Ring finger. Okay, sure, self-pity. *Oh wah*, she thought. *Poor me*. But then she stopped herself. Self-pity wasn't useful but it was *there*, so she had to deal with it. She lay there with it for a while, like trying to pick bits of fluff off a shirt. She didn't want to grow up but she didn't want to

be treated like a kid, blah blah blah. She was sick and tired of feeling this way, but she wasn't over it yet either. *Deal with it.* She decided to let herself go and turned over on her side, facing a corner where no one on the sleeping platform could see her. For a full two minutes she let herself stay curled up in a ball, whispering "*Why me why me why me*" until the ridiculousness of it made her stop. Suddenly she felt her mother, Isabelle, stroke her shoulder, and Beatrice turned onto her back again. Isabelle held her hand for a moment and squeezed it, then rolled over and left her alone with her thoughts.

Beatrice took up her left hand again.

Pinkie finger. It was okay. It was going to be okay. She started to count the things that she found beautiful. Then she thought about how well her project with the pollinator drones had worked. She thought about most of her huge extended family sleeping all together here on the mat under the sky, under the dome. Gratitude.

CHAPTER 3

THE BOY

He spent the night awake in the library. He often spent time going through the database looking for ideas to choose his own name. When the adults left Earth they'd taken pretty much every available recorded file, from scanned ancient texts to the latest holovideos and games. Ned had shown him how to access the full library only recently, and it was their secret. Beatrice could have accessed it if she'd had any inclination, but she was much more hands-on and active. When she went to the library, it was to find something specific. The boy, instead, just aimlessly searched the files.

The younger kids had limited access, of course. There was a lot of bad stuff in old Earth recordings. The entertainment might have been okay, but the worst was the real-life stuff: police cams, war footage, gang members' personal videos.

He scanned the files and decided to go into the slush pile for a while. It contained tens of thousands of files that had just been dumped there by date, not by theme or topic, and mostly in formats that weren't easy to scan for content. Given the relatively better encryption methods in the century or so before the crew had left Earth, these files were resistant to easy sorting. They weren't necessarily that much more interesting, just the normal crap, but sometimes there were odd gems, which for the boy mostly meant stuff with boys his age. He was trying to categorize them semi-manually, finding strings of information that he could process. The sorting would not be finished in his lifetime.

Sprawled in his chair, he went back to working his way through the files of one prolific holoblogger who went by the name of Lexi. The info string that tagged him was his face tattoo. It didn't always point to this particular kid, though, and the boy had to manually scan the holoblogs to make sure it was really him and not what appeared to be ads for a pattern of decorative dishware.

He opened one and listened. Lexi had a funny, barely understandable accent—apparently Gaelander.

“So me parents' town is now an island, and I need a bleeding boat to get there. Our government is doing a whole piss lot of nothing to help us out. The folks here have been crying about climate change for hundreds of years but no one's done crap about it.”

The boy fast-forwarded: old topic, old complaints. Tragic, but in the end, repetitive and boring. Always waiting for someone else to do something.

He hit play again. Lexi was saying, “So there was some guy talking about moving us all off to another planet, starting over again, but that's not going to help us now, is it?”

The boy stopped the holorecording. Time to quit feeling sorry for himself. Limited as it was, at least he had a future.

###

The boy was almost ten in Otreran years, but sixteen to the Earthborn, who still needed to convert it in their heads. The mothers celebrated both birthdays—Earth and Otreran—with the children, just as an excuse to have more parties. Because everyone wanted an excuse to have more parties, they said. But the simple truth was that for the Earthborn it was difficult to translate. “Six months old,” “two” and “sixteen” meant something to them. Development milestones had been ingrained in them: heads held upright, teeth appearing, bowels controlled. The terrible twos had technically become the terrible one-point-two-fives, but that just didn't have the same ring to it.

Though the adults hadn't made many rules for the naming ceremony—not even at what age it should be held—they wanted a few changes after a person had chosen their name. To start with, the person would have to join in the morning “poop duty.” This was Hope's term for clearing out the composting toilets, or as she put it, “Dealing with your own *merde*.”

The adults didn't want the future Otrerans to remove themselves too much from the blood and sweat and smells of being human. The biochemical part of waste recycling was mostly automated in a small structure that processed the human waste to make it better fertilizer, but cleaning out the toilets was done manually. This activity was attractive—if the term could seriously be used for shoveling out poop—because all adult privileges were tied to it. Becoming an adult seemed to be a double-edged sword, like, “Yeah, I can do what I want all day, but first, in the morning, I have to clean out the toilets.”

The adults had also agreed that at some point after the naming ceremony, the new, official adult needed to start taking turns, like the other adults, teaching a subject of their choice for at least a week. This meant the person had to be *into* something enough to want to share it with the others.

Given Otrera's rotation, its day cycle was a bit longer than Earth's. The adults had divided the time into twenty-five-hour days, and after one hundred hours they had a Free Day, so a week was five days long and a month was five weeks long. He had a couple months before his tenth Otreran birthday. On Earth, he would have just turned sixteen.

Teaching was different from babysitting during the adults' meetings, but it was impossible for him to imagine having enough authority on some subject to get everyone to sit down and listen to him for four days straight. He'd already failed at simply babysitting.

###

So, here he was, night after night, poking around different files, different ideas, trying not only to find a name for himself, but also to figure out if any particular topic spoke to him. The problem was that *everything* was interesting, to some extent.

He'd spent months playing with makeup, first to look like people from Earth, both men and women, but later inventions of his own: monsters and zombies and clowns, oh my. It had been more demanding than he would have imagined. He had to get natural dyes Hope made by crushing up flowers from the plants, and work to turn them into cosmetics with Dana. He had to find substances that stuck to the skin or were even absorbed by it. He learned a lot of biochemistry, and learned to use the smaller printers to make prosthetic noses, earlobes and other features. Back then he had a name for himself: Zak, after the 22nd-century holovideo makeup artist.

But then one day he'd woken up and the whole makeup idea had just seemed ridiculous.

Then there were the zoomboots, that let him hover over the ground.

Next he and Beatrice had filmed a bunch of holovideos, playing reporters for their new world, interviewing the adults or explaining things they'd learned to the younger kids.

The lines and ropes at the top of the dome had been his idea, along with the highline, but nothing seemed to want to stick, which is why he'd always played second fiddle in the classroom, and maybe why this morning had gone so spectacularly wrong.

The transition had been too fast. It was absurd to be part of the kids' group one day, then be in charge of them the next. He'd thought it would be okay, as the older kids always assisted with teaching the younger ones, and he and Beatrice had been helping out all of their lives. Beatrice had been going to the adults' meetings for almost a year, leaving him alone at the end of the afternoon, but they had always started the day's activities together. There were also three girls only a year or so younger than him—Veda's twins and Bhagi's oldest—but they had just abandoned him today. Were they angry with him? Or with Beatrice for abandoning them? They'd helped out in the past when he and Beatrice were on babysitting duty.

In any case, the authority, apparently, had either come from the adults or from the unique combination of him plus Beatrice. Without her, and without one of the other adults, the kids had thought... Well, he didn't know what they thought. As soon as he arrived, they started acting like savages.

With a wave of his hand he flipped through the holovideo files on the screen in front of him, letting the fanning icons stop on their own in the hope that accidentally he would find his true

calling, and a name would just spill out in front of him. Then he slowed it down and looked more closely at the videos' cover images.

The ones for the entertainment holovideos were mostly of men. Men inventing things. Men on missions. Men solving crimes. There were some women, but it was rare—one out of every five or so. He went to the political files and ran through them. Again, men. Others were much more mixed, sometimes even half and half: medical files, research, engineering—those domains had become quite egalitarian back on Earth. Maybe that had been the problem this morning? The children on Otrera had never seen a boy or a man in charge of anything before. He'd always thought of himself as just a person.

Before her first Free Day presentation with the other adults, Beatrice had practiced teaching, with the boy helping. He didn't know if he'd been useless or just hadn't been playing the role he thought he was. For the last year or so, the two of them had been allowed to see media from Earth, so they knew the expression "good cop, bad cop." He'd been the good cop, the joker, the one lightening things up. To the kids, that must mean that he was wishy-washy, or at least no one worthy of attention. Or just a male.

He started recording his journal and analyzing his bad day for a while, talking into the screen and watching his words be transcribed.

After finishing the journal entry, the boy clicked through files and holovideos with titles like *Alternative Social Constructions* and *Building Biodiversity*.

From the screen, Ned made a knocking sound. "Can I come in?" he said. It was an inside joke between them. Ned *was* the computer, or he lived in it. His matrix was connected to the main system. While he was technically another entity, there was no real physical separation between him and the totality of the data files on Otrera or, for that matter, on their ship, which was still in orbit above the planet, where Haley's matrix mostly stayed.

He and Haley were the architects of this project on Otrera. While Haley didn't interact with the humans very much, Ned was more hands-on. The boy thought it was because Ned had once been human and had uploaded much of the original Ned's neural pathways into a matrix. Haley was pure AI. She was the system that had run CERN, a science facility in Europe that had somehow managed to survive the world's upheavals for a couple hundred years. CERN had started as a particle accelerator project but had become much, much more, and within Haley were found the inputs of all its science and all the scientists who'd worked there. She had built-in curiosity, but it was just that: built in, hardwired. She wasn't motivated in the same ways or by the same things as Ned. Ned called her "my friend on the autism spectrum" but the boy had no idea what that meant. The important thing was that Ned and Haley understood each other in ways that the boy couldn't really fathom.

"So...you didn't have the best of days, did you?" Ned said.

"Nope," the boy said. The adults had certainly already dumped their data from today into the logs, so Ned must have heard everything. They had recently begun to reuse the implants used during the years in stasis getting here. The implants recorded physical data—heart rate and other biological functions—but also emotional markers, audio and images.

"Want to talk about it?" Ned asked.

"Not really," the boy said.

"Well, suit yourself. You going to school tomorrow?"

As an answer, the boy snorted.

"I guess that's a no, then. Beatrice isn't teaching right away. I think Adella wants to finish her cycle on ancient toolmaking."

Adella always had new things for them to do and new ways to present them. He'd learned everything from how to forge a hammer to how to print out a CPU on the smaller 3D printers and make a homemade computer.

The boy fiddled with his headset, and as soon as Ned clicked off, he put it on and watched holovideos. Watching centuries-old media wasn't going to help him do any of the things he needed to do, but at least there were other people in them, and he didn't have to think about BB falling, or

Beatrice, and he didn't have to think about all the people either pissed off at him or ignoring any authority that he tried to assume.

Just before dawn, he stretched and pulled the headset off. He'd kind of taken over this room. It was just off the common room but had a door. Doors were wonderful. He loved being able to shut everyone out for a while. It wasn't technically *his* room, but he used it the most. His mother called it the "man cave" though he didn't really get the joke. Most mom jokes just weren't very funny.

CHAPTER 4

HOPE

Raw footage: Holovideo number 36. Otrera. Year 9.4 (15 Earth years), Day 47

Beatrice speaking: “Hello, can you tell me your name for the cameras, please?”

“I’m Hope.”

“Was that always your name?”

“No, I changed it when we decided to come here. That actually started the naming thing—I mean, choosing your own name.”

The boy, speaking from behind a monitor for the cameras: “So it’s all your fault I have to figure out what I want everyone to call me?”

Hope (laughing): “Sure, sure, you can blame it on me! But it’s a good idea, isn’t it?”

The boy groans.

Beatrice: “Do you want to tell us what your name was before?”

“Eh, not so much. You can find it in our files. It’s not like it’s a secret.”

A long silence.

“Okay, fine. Hortense. It was Hortense.”

“And now that we’ve heard it, we’re all happy that you changed it.”

Muffled laughter from Beatrice and the boy.

“So how did you become involved in this project?”

“I was recruited, I think, in the beginning, just to take part in Ned’s class. Ned was the only replicant teaching. The human Ned had been dead for a while, I think about eighty years, but you can look that up. He kept teaching his class even after he’d uploaded into a matrix.”

“What was the class called?”

“Alternative Social Constructions. You could actually get a degree in it, but it was a pretty wide array of subjects. There was social intelligence, resiliency training, all sorts of subjects that taught people how to get along, face problems and so forth. That class is the connection between all us adults. We all took the class at some point.”

“So you say you were recruited?”

“I don’t know for sure, but it felt that way? I was in a weird situation. I’d gone there on a university exchange program but while I was there, my country ceased to exist. I mean, as a country—the place and all the people were still there. Ever heard about the Sino Alliance?”

“A bit, it keeps coming up in the preparation for these interviews. Do you want to tell us about it?”

“I’m not the expert, but it was... I guess both good and bad, depending on where you came from. For others it was a godsend, for us a catastrophe. My country had been run by a traditional king. The first king had taken over in the 2050s. The royal family started out as gangsters, more or less, but they began to take themselves seriously and actually ended up doing a lot of good. We had decent transportation, health care, education. That became our thing. We produced brains—well-educated African brains. That made us very attractive for takeover by the Sino Alliance, and it was very easy for them to do because we never had much of an army. The Sino Alliance controlled half the world when they usurped my country, but four years later, when the ship left to come here, they were a year into a civil war. They’d depended too much on surveillance technology to keep everyone in line and were completely taken by surprise in a major cyber attack. After that, the Alliance could only watch bunny videos, more or less, and they were losing control of tons of territory. Wherever they lost control, it was just chaos. Anyway, I was on an exchange program at a university in Cascadia and then didn’t have a valid passport anymore to go home. I met Bhagi in a social services office. She and Veda were in therapy with Ned when they were young.”

“I thought you said that Ned was a teacher...”

Hope (stares at Beatrice): “Yeah, but a non-biological life form? I mean, an NBL can multitask like no human ever could. Ned says he can concentrate on—not just take in inputs but actually process and react to—one thousand and ninety-six things per millisecond, if he cranks up his frame rate. And that’s without ghost shells. Those he can create exponentially, or until his system overloads.”

Beatrice nods, like this means something to her. The boy stares blankly at both of them.

“So I met Bhagi, and told her about what I was studying—plant microbiology. There’s a whole universe of microbes in most dirt that makes plants grow or not grow. I mean, growing things isn’t just a matter of hydroponics. There are bacteria that are needed for some plants to thrive. I worked on using human waste, with all our microbiota, to nourish plants efficiently. I used to say that it was a shitty job. No, seriously—did you get that?”

From behind the monitor, the boy snorts and rolls his eyes.

“You don’t think I’m funny? Really? Okay, anyway, I got let in on the secret that a ship was going to try to leave Earth. Bhagi told me about an organization called WASA, which was the World Aeronautics and Space Administration. They were based in Cascadia, and spent most of their energy trying to control the satellites in orbit around Earth, fighting the Sino Alliance but also everyone else who wanted to use them to fire missiles or spy on people. She told me that Ned was involved in another project, a secret one coordinated with WASA, to take younger women and a whole ton of frozen sperm and start over somewhere else. Okay, not a ton, but around four hundred kilos. We’d go without a single man—except Ned, I guess. We could even have decided not to have male offspring, but I mean, sex is kind of nice and I thought it would be good to have boys around, eventually, for when you girls got old enough.”

From off camera, the boy groans.

“Oh right, I know. You’re embarrassed to hear about sex. Sex! Sex! Sex!”

“Mom, stop!”

Hope laughs.

Beatrice taps her hands together to stop them. “Please go on, Hope.”

“Anywho, we have enough frozen sperm that we really don’t need men for anything. There was even technology to have babies without women, but none of those children were very robust. When older, they tended to off themselves. Okay, but to get back to the point, Bhagi invited me to the class, and got me talking to Ned afterwards, and he was so excited to learn what I’d been studying, said it was interesting and wanted me to stay on in Cascadia. Helped me arrange for a permit of stay through the university. I think they wanted to know what I knew about plants for their project here, but then realized how awesome I was and invited me to do the training to be chosen to come along.”

“And you *are* awesome! And that concludes our interview with Hope today, because it’s dinnertime in, like, five minutes.”

CHAPTER 5

THE BOY

The boy was amazed at how easy it was to avoid everyone if he really wanted to. At the moment he mostly just didn't want to see Beatrice, which was weird, because it was like not wanting to see his own hands or feet. He'd gone through a bunch of reactions, but two stayed with him: guilt and anger. Guilt about BB's fall, and anger at himself. The two were kind of the same thing in the end, except that the anger had a tendency to overflow into everything that had ever made him mad, and then he wound up getting mad at Beatrice, his mother, the planet's microbes, the way everything was always the same, every day, all the time.

He'd always just followed the rhythms of the day without thinking. Pre-dawn exercise, breakfast, a break while the adults dealt with the composting, school, afternoon projects or games, dinner, hangout time. These days it was driving him crazy. Nothing ever changed.

He wasn't required to go to school anymore; each day he had the option to do poop duty instead, with the adults. Mostly he went, because the adults often gave him ideas of topics that might become his thing. The adults were all *into* something, or into multiple somethings: plant biology, chemistry, literature, astronomy, myths, maths, physics. It was like a one-room schoolhouse, though, so there was a lot of interaction between the oldest and the youngest kids. When the boy or any of the older children wanted to delve deeper into something, they were encouraged to go off and follow their interests independently.

At the moment, he was interested in finding out how BB was doing.

Dana was in the med bay, as usual. Veda was there for a checkup, and BB was awake, playing on the floor with his toy rocks. Each pebble had a name and he made them talk to each other. The boy watched for a while as BB relived his day yesterday. The boy was pretty sure who was who. Two pebbles followed each other around, a larger one and a smaller one. BB made them zoom around and around and up and up until the smaller one fell to the ground.

"How're you doing?" he asked, and was surprised when the child ran over to him and hugged him.

BB took him by the hand and led him over to the pebbles. "Now play!" he insisted, and the boy sat down and let BB guide him through a game where the pebbles had to fly through the air.

Dana watched them for a bit, then went on about her business with Veda, who looked bigger with this pregnancy than she ever had in the past.

The boy sighed, thinking neither of them was speaking to him, but he was wrong.

"I was wondering if you wanted one of these," Dana asked, coming back to where they were sitting on the floor. In her hand she held an implant. "We needed to make sure the other adults agreed. We didn't want to use them with younger kids—informed consent and all that—but you're old enough and there's no reason not to. It could help you figure things out more easily. There's an interface to set up so that it records everything your brain's doing. Beatrice is coming in later today to have one put in. She was reluctant, but I think she feels bad about how she reacted yesterday."

"She feels bad?"

"Yep. She made a snap judgement about what happened with BB, and blamed you."

"It was my fault."

"Sure, but a bit our fault, too. We weren't very fair to you. We should have specifically asked Bhagi's oldest and the twins to help out."

The boy let this sift through his head for a moment. Every time he really wanted to get mad at the adults, they realized their mistake and apologized. That in itself was maddening, because he sort of enjoyed self-righteous indignation.

"How do you put in the implants?"

"I insert this"—Dana held out a tiny disk—"just under your skin, right behind the ear. This outer piece"—she showed him the small, crescent-shaped metallic object—"sticks to it like a

magnet. Then you can take the crescent off, put it in any one of these”—she pointed at some small data drawers in the lab—“and the information will be uploaded. If you don’t want something recorded, you can just take it off while you’re doing it, but for health reasons it’s good to leave it on.”

“For health reasons? Like, they make you healthier?”

“No.” She laughed. “They’re what we used when we were in stasis. When things weren’t working the way they should, the implants let Ned know to wake us up, but when people are already awake, the implants can monitor all sort of useful things, like hormonal imbalances, stress—that sort of thing.”

“Do they record your thoughts?” he asked, because that was what the kids had always believed.

“Hmm, that’s a good question, and I’m not sure if ‘*thoughts*’ is exactly the right word. Ned used something similar to record his brain processes and then uploaded them into his matrix. They weren’t exactly his thoughts, as such. But our Ned and real Ned, when he was alive, spent a lot of time doing—well...coding, maybe. Pairing brain functions with memories. Our Ned had a bunch of data and he went through it with real Ned until it pretty well represented what real Ned thought.”

“I’m not sure if I get it.” He never got a simple answer for a simple question.

“Okay, let me try putting it this way. You keep a journal, right? Well, if you give permission for the implant to do that, it will cross-reference your brain’s inputs with what you said about your day. After a while, the dataset will be awfully close to what you were ‘thinking’ at the time. It’s never very exact because we all lie to ourselves, even in our private journals.”

The boy eyed her, wanting her to explain.

She sat down in front of him. “Take yesterday. In your own, very private journal, did you say why you really left all the kids alone when you were supposed to be looking after them?”

“Of course I did,” the boy insisted.

She smiled, “Okay, we’ve seen the holovideo of the classroom. The kids were being absolute monsters, annoying little shits. Did you say that?”

The boy laughed. “Something like it.”

“But in your journal did you say how cross you were when you walked out and left them alone?”

“No, I wasn’t mad, I—”

“You probably *were* mad,” Dana said, “or if you were at all normal you would have been, and that’s the kind of thing that we tend to rewrite in our heads after the fact. We always justify our own way of thinking—we’re never cross, never jealous. We never do anything wrong or stupid. Maybe you weren’t angry, but in your place, I would have been. The kids were being total little... Words fail me. ‘Little shits’ isn’t the half of it.”

Here the boy laughed outright, but she continued. “So, your implant information is going to be not quite accurate, not quite what you were honestly thinking at the time. After a while, though, the system will learn to match up what you said you were feeling with how your body was actually reacting and how your brain functions were operating. It’ll get pretty damned close to recording your thoughts.”

Veda joined in the conversation. “I’ve been wearing mine since before we left Earth. Never really took it off. Before leaving, they were kind of like elaborate lie detector tests, I guess. We all wanted to make sure no one was faking in order to get a place on the ship. Ned could upload the information stored on them—direct from our brains, more or less—and replay situations in virtual reality. We could then ask the VR versions of ourselves how we felt during the different tests.”

“What sorts of tests?” the boy asked.

“Some were real-life ones,” Veda said. “Like, going out and doing a particular task. There’s one I did really well on, which was to help my neighbor think it was his idea to share cleaning the common areas of the building we lived in. I wanted us to share, but I worked on helping the person understand that it was best for everybody, and when it was his idea, he felt better about it, and it got done.”

“Isn’t that just manipulation?” he asked.

“Yeah, kind of. That’s a bit of a problem, but we wanted to see if we could help people do what was best for everyone of their own volition. The test wasn’t just the result, though, but how we did it.”

“Okay, I’m confused. How do these things”—the boy ran his finger over the metal pieces—
“help you get your neighbor to clean up?”

“Sometimes you think you’re behaving a certain way but actually you’re kind of being a dick. I could go back and learn from my body language, my voice, everything that was recorded, and because the recording was pretty much me in VR, I could interact with myself, ask myself questions. I learned a lot about myself that way, and I became the utterly mellow, relaxed, best version of me that you see before you now.”

The boy snorted, but Dana added, “Seriously, Veda is Zen incarnate compared to how she was when we all met. She had a lot to deal with, though. Altogether, the whole system works pretty well. Record, analyze, and improve. You don’t have to use it, but it could be helpful.”

CHAPTER 6

BEATRICE

Before it was even light out, Beatrice barged into the man cave. She knew the boy had been avoiding everyone and had probably snuck some food out before anyone made it down to breakfast and would likely try not to see anyone all day.

“Hey you.” She sat down on a pile of unwashed bedding the boy had pushed to the side to clear space. She eyed the room. It smelled of the fact that he’d been avoiding washing himself along with hiding from all the others. The room was still sparse, but he had arranged some colored pebbles into a design on the table. Next to the screen where the boy was working, she saw bits of tubing, pipes, spoons, short sticks from some of the plants. She ran her finger over them. “Whatcha working on?”

The boy swiveled in his chair to look at her.

“I’m sorry, okay?” she blurted out. “I was the one who told everyone that you’d be fine to babysit alone during the meeting. I screwed up. We should have gotten the twins involved, for one thing, and they felt ignored. And Bhagi’s oldest is really old enough to help, too. I thought it would be just like it was with the two of us, only with just you.”

The boy looked at her and nodded.

She smiled widely. It was enough. “But I figured out something which is super helpful,” she went on. “We’re always a combination. We’re ourselves, but who we are is different depending on who we’re interacting with. I mean, have you ever noticed how everyone just seems to sit up straighter when Adella is in the room? She inspires people. I don’t know, there’s something regal about her, you know? And everyone wants to hug Bhagi all the time. She’s just huggable, and then we all start hugging each other. And the kids with the two of us in charge and the kids with just you are two different entities. I didn’t know that then, but I do now. I had no right to blame you.”

For a minute, they were silent.

“It was awful,” the boy said, “watching BB fall. I don’t think I’ll ever forget it. I can’t believe he wasn’t seriously injured.”

At this, she got up and hugged him, standing in front of the chair where he sat. They stayed like that a long time, and she unconsciously stroked his hair. Without really thinking about it, she lifted his head and kissed him. It was longer than it needed to be.

He pulled back and looked up at her.

She took a step back, her hand brushing the tubes and other objects on the table, “So what’s all this stuff?” she said.

“Maybe a musical instrument?” the boy said, not quite sure what had just happened, but happy to change the subject. “Up until now we’ve just been singing, since that didn’t require any resources. Did you watch the holovideo of the colossal meltdown during the meeting? The twins were banging out something with spoons, and it got me thinking. We can do percussion instruments—that doesn’t take much. With the tubes maybe we can make something like a wind instrument. Many of those things were made with wood back on Earth, but we could make our own, I think, out of what we have.”

“We could also just synthesize music, everything that ever existed—violins, guitars, all that,” she said.

“Yeah, but for one thing, we don’t, and for another, I tried just making noise like the twins were, and it’s fun. I mean seriously fun. It’s fun to drum. I’m not particularly good at it”—he laughed—“I get distracted and lose the beat, and I’ve just been tapping on chairs with spoons.”

“Let me hear,” she said.

He began tapping a bit of rhythm, then handed her another pair of spoons and she tried to join in, using the legs of the table.

After a bit, they stopped. “Okay,” the boy said, “maybe I’m not as bad as I thought—I mean, compared to you.”

Beatrice said, “Let me try it on your skull. I think I’d be much better.”

He laughed, fighting her off.

“Wait, stop,” Beatrice said. “Seriously, I didn’t just come in here to apologize. We’ve been given a task. I’m supposed to talk to you about it first, but they’re going to formally ask you during the next Free Day meeting. We’ve been asked to start thinking about how we want to structure our lives here, if we want laws, and if we do, what they should be.”

“Is that all?” The boy was still laughing, but he saw the expression on her face and his smile disappeared.

“You know,” he said, “sometimes the adults just suck.”

She threw him a glance and opened her mouth to speak, but then shut it. He wasn’t wrong.

CHAPTER 7

THE BOY

When Beatrice left, he thought about the kiss. Her lips had been soft on his. They'd kissed before, on the cheek, on the hand while playing Knights and Warriors—a game Alexandra had invented when she taught a series on chivalry—but this kiss had been different. Suddenly he could think of nothing else. He put his feet up on the tabletop, pushing aside the half-built musical instruments, and stared into space.

Ned gave his three knocks on the screen to see if the boy wanted to talk, but the boy didn't react. Some time passed and Ned knocked again. The light flickered on for a moment, showing that Ned had turned on a camera, looking in on the boy, but then it went out.

"You okay?" his voice blared into the silent room.

The boy started, pulling his feet off the table and sitting up. "Sorry. Hi, Ned, yes. I'm fine. Did you want something?"

"I knocked a few times. You didn't answer, so I wanted to make sure you were okay. The others want to know if you're coming out for dinner."

"Dinner?" The whole day had passed. He was starving.

When he emerged, the dining area was full. There was space at a table with the much younger kids, so he sat with them and served them from the large mush bowl. There were protein patties tonight, and he spent some time cutting them up for the two youngest.

He watched Beatrice across the room. She was speaking with the twins, waving her hands as she spoke.

Adella broke into his line of sight. "Hey you. What have you been up to today?"

He stared up at her.

"You didn't help with the composting and you didn't come to school. It's one or the other, as you well know."

"Sorry, really, today was... I lost track of the day. Tomorrow I'll be at the bins, promise."

She wagged her finger at him and walked over to sit with Alexandra.

###

When dinner was finished, he went back into the man cave and turned on his screen. "Hey Ned, got a second?"

Ned's face appeared, "A nano for my man, always. What's up?"

"Can you set up an alarm for me, in the morning? And a private shell for tonight, please."

"What time?"

"What?"

"What time for the alarm?"

"I guess for breakfast. Just in case I zone away the night like I zoned out today."

"Anything you need to talk about?"

The boy hesitated, but then said, "Nah, just been thinking. I want to do some more research tonight into one or two things, hence the shell. You said that was a possibility."

"And...done." On the screen in front of him, a small, blinking icon appeared. "Just set a password. Memorize it. When you log out, you'll have an option to review your search history and you can save all of it, part of it, none of it—up to you—but it will only be available to you, when you log in again."

"And you can't see any of this?"

"No, I can't. Well, let me be as accurate as possible: there would be a way for me to infer what you were looking at and what you might put in your private files, but it would be very, very

resource-intensive. I'd need to practically create a mini black hole in order to figure out the calculations to get in. I can explain the encryption process to you some day, if you want."

"Why would you even allow this? It seems like, I mean, I've seen some of the nutty things people got up to back on Earth."

"There's a lot I could answer to that"—Ned was silent for a moment—"but I guess it comes down to the fact that you're trustworthy and I believe in the right to privacy. I suppose those are the most important reasons. For the moment, leave it at that. I can explain more some other time, but your shell is your shell. Have at it, and try to get a bit of sleep, if you can. 'Night."

With this, the boy was alone in the room with the shell's icon floating on the holoscreen in front of him. He created a profile and logged in. He waved his way through the holopages explaining what seemed to be standard security information for the shell: voice-to-text could be recorded inside a room, so check for listening devices, use a virtual keyboard to type inputs, etc. Everything was encrypted, everything was private.

He didn't know what he was looking for, really, but it felt weird. All his days had been filled with the family inside the dome, with the endlessly perfect weather beckoning them to go outside, and reluctance to interact with the planet's microbes keeping them inside. Everything had always been shared with the others, sometimes just to make conversation. He'd never even been alone, truly alone. It was scary. He was just lucid enough to understand that many things had been frightening him in the last few days: BB falling, Beatrice kissing him, and the idea of putting in an implant. The first he just wanted to forget, the second confused him and the third was a niggling curiosity in addition to his fear.

So, he decided to start by looking into the implants.

CHAPTER 8

BEATRICE

Beatrice was panicking. What was she supposed to come up with, exactly? Laws? A government? The adults had asked her to come up with ideas to “structure their society” but Beatrice didn’t even know what that meant. Wasn’t it structured already?

Actually, it wasn’t, really. It was just a big family. They were all basically roommates, but at some point there would be too many of them to operate the same way. Of all the adults here, the only one she wanted to talk to about it was her mother.

###

“So, I have a reading list to start with. What do you think? There’s two columns: thinkers and ideas.” Beatrice handed a tablet to Isabelle. She had waited until breakfast was finished and everyone had cleared out for the day.

“First, just to say, I’m hardly an expert,” her mother said. “This interests me, but I didn’t have time to finish my studies before we left Earth. Secondly, I’m the only one here who believes in God. That’s going to skew things a bit on my end.” Isabelle looked through the unordered list full of arrows and deletions. The thinkers list included Spinoza, Wittgenstein, Hume, Kant and Aristotle, while the ideas list had a big circle with the words “moral philosophy” in the center of it and lines going out to the words “utilitarianism,” “altruism,” “solipsism,” “hedonism,” “stoicism.” In the middle of all this was one word with a big question mark—“Women?”—with an arrow to a smaller word with a circle around it—“Slavery?”

Isabelle pointed at them. “Why the question marks?”

“Where are all the women?” Beatrice asked.

Isabelle laughed outright. “Good point. And slavery?”

“Should we read things by people who kept slaves?”

Isabelle sighed. “Another eternal question: Can you separate the work from the writer? Or the artist or musician or whatever... I’d say for the moment don’t limit yourself. Try not to pay too much attention to the person, and look at their work. Later, you can keep or reject it, but there are too many good ideas by people who did the same thing as everyone else in their day and age. The Ancient Greek philosophers—along with a whole lot of other people at that time—nearly all had slaves, and you shouldn’t dismiss their ideas right away. As for women, add these: Hypatia... Hmm, you could try Martha Nussbaum, or someone from my generation, like Traore. I’ve got a few other ideas, too, but let me sort them out. Add this to the ideas list: individualism and collectivism, and pacifism, Taoism, nihilism, consequentialism. But wait—do you want to know everything there is to know about Earth philosophy or what? What’s your question?”

Beatrice chewed her lower lip. “I guess, why did people on Earth have laws, and do we need them here? That’s one. And maybe the boy’s question—You know, I wish he’d choose a name for himself. It’s getting irritating!—anyway, his question is: Why should we not interfere with Otrera’s development in the event the local life form begins to develop? I guess. He always states it as: ‘Why should we need to leave the planet just because of some stupid microbes?’ because obviously he doesn’t want to leave. I’m less attached to this place, more to the people, but then again we’ve never been outside of the dome. And...” Beatrice mulled over her question for a moment. “What I’d like to know is: What’s the point of all this?” she said, looking very, very serious.

At this, Isabelle snorted and smiled, letting her mirth grow until she doubled over in a belly laugh. She couldn’t stop. She took Beatrice’s hand and held on to it as she laughed.

“What?” Beatrice said, starting to laugh, too. “What’s so funny? What?” and Isabelle hugged her and they both kept laughing until they had to sit down on the floor.

###

“Okay, ‘What’s the point?’ is the oldest and best question ever,” Isabelle said, once she managed to stop laughing. “Why do we live? Why do we die? Do our lives have any purpose other than to procreate and create more people who ask themselves the same questions? So I’m going to ask you a question: What do the adults do here when it’s not a Free Day? Start with yourself.”

“Well, I’m interested in robotics, I guess. I’ve been curious about Ned’s android suit and would love to improve on it. Ned has me learning more with a few projects, like the pollinator drones. And now you adults have me working on this stu— Um, on this project.” She looked nervously at her mother.

“No, I get that you don’t want to do this. You do understand why we don’t feel like the Earthborn should make the rules here?”

“Sure, yeah, it makes sense. But…” She trailed off, not wanting to sound whiny.

“Why you? It’s not just because you’re the first, or the oldest. It’s also because *it’s you*, Beatrice, and I’m not only saying that because I gave birth to you. We all raised you in the best way we could imagine, to help you be confident, to know that you’re loved, and to teach you values that we think will be important in the future, like how to get along well with others and talk through your differences. Now we adults have to let go, and it *has* to be your generation who makes the rules to apply here. Our part is to help you know what went wrong before. You’ll get help soon. The boy will be ready, then Veda’s twins, and Bhagi’s oldest. We just wanted you to start thinking about it. Correction: we *need* you to start thinking about it. Now, what do the other adults do here with their time?”

Beatrice used her fingers to tick off the seven Earthborn women. “Bhagi studies the stars with Haley, especially now that Haley’s put the new telescope into orbit. Hope is in charge of growing things for food. Veda is super pregnant at the moment, but she makes our clothes. She also makes sure we document every darn thing we do, and organizes it with Ned. Adella tends to want to teach more often than not. I think she wants to help me and the other natives learn not to make the same mistakes that humans did on Earth. Alex tells stories. Actually, I don’t know what else she does with her days. I think she reads, but she’s also taking care of the little ones a lot, since she was one of the last women to have a baby. Dana is preparing her labs all the time. She told me that there were so many things that humans could heal on Earth and she’s trying to find equivalents here before they become necessary. And she delivers all the babies.—It was so sad about her own baby dying.—And you…well, you’re my mother, and my sisters’, and you always seem busy, but I don’t know doing what. You also took care of the little ones a lot recently, when Alex wanted a break. And you’ve worked in one of the rooms ever since I was tiny. What do you do there all day?” Beatrice asked.

“We’ll get to that in a moment, first thing on our tour. But you’ve watched a lot of media from back on Earth. How did people on Earth spend their days?”

“They worked, I guess. Although mostly the media is about when they were *not* working. It always focused on when they were falling in love, or were threatened by something, or needed to solve a mystery. Except for the police and pro athletes—there’s a lot of entertainment media about their work, but when it comes to everyone else, it’s almost never seen.”

“That’s my first point. No one here really *needs* to work. Ned and Haley organize all the heavy lifting with the bots, quite literally when it comes to building the dome or putting a telescope into orbit. We help them assemble things sometimes, but once they’ve put together a bot or whatever, they don’t really need us. We all do poop duty, and Hope has organized the planting and harvesting. We give her a hand when necessary, though recently she’s needed a bit more from us. We take care of our littlest ones communally as soon as a mother decides to stop breastfeeding. We take turns looking after the bigger children, and now that some of you are older that’s becoming as much your job as it is ours. We prepare the mush in the evening, but since Ned has actually automated most of the production, we just add the flavor packs and make tea and come up with new sauces for the protein patties. We have a four-day week and then a Free Day, and all in all, during the week we need to work only about three hours a day. The rest of the time, we’re free to pursue our own interests. Which brings me to my second point. Time for the tour.”

Isabelle led Beatrice out of the common room and into a hallway. They passed an open door where Adella was teaching a room full of kids, then Dana sitting in front a screen. The next doors were closed, with the other adults inside, and the two of them came to the end of the main hallway. Isabelle opened the door to what Beatrice knew to be a storage area for electrical equipment. She often came in here to find things for her projects. Isabelle took her through this to a door that Beatrice had always assumed was yet another storage area.

At the end of the room they came to a hatch in the floor. Isabelle pulled it up, revealing a set of steps. "There used to be a ladder, but I couldn't get down it when I was pregnant, so Ned printed me some steps." They descended into a small room that had a table, a computer with two enormous screens in one corner, and a holoprojector like the one Ned used for Free Day meetings.

"Oops, forgot a chair for you. Do you want to go back up and get one?" Isabelle said. When Beatrice returned with a chair from the common room, the computer was up and running.

"First I'm going to show you something..." Her mother clicked and tapped for a minute, and a holovideo appeared at the other end of the long room.

The image was hard to make out, but Beatrice soon realized that she was looking from the point of view of someone who was maybe filming with some sort of a headcam. She couldn't see their body. To their left, beyond a wall that partly blocked the view, was a young woman standing on a train platform.

"Where are we?" Beatrice asked.

Isabelle paused the playback. "On Earth, waiting for a train. Trains were a form of transportation," she said, and when Beatrice rolled her eyes, she added, "Sorry, I didn't know if you'd run across them in the media you've seen from Earth."

She continued the video. The view now was mostly of the train tracks. It was night or early evening, and a few lights lit up the platform.

Beatrice could see the young woman more clearly now. She gasped. "It's Alex! She must be about my age."

Five men approached Alexandra. Whoever was filming leaned out from behind the wall, watching them, though the men didn't notice. The camera pulled back, but Beatrice could clearly hear what the men were saying. "Now you're going to be nice and quiet, and we're going to go visit our van..."

A bystander walked up the steps and onto the platform. He wore a bright orange ski cap. When he saw the five men, he looked frightened. He motioned for the person filming to stay back, then turned and ran down from where he came.

The person filming stepped out in full view of the men, then looked down and pulled out from their pocket two wooden sticks linked by a short chain. For the first time, Beatrice saw the hands of the person with the headcam: they were a Black woman's. The woman looped the linked sticks over her right wrist to free up her right hand, which darted into another pocket and pulled out some sort of gun.

Just as the men were pulling Alexandra's shirt over her head so she couldn't see where she was going, from offscreen the woman's voice said, "Hey, assholes!" The voice sounded familiar to Beatrice but she was too intrigued to notice. The woman's right hand brandished the gun, and with the strange stick-weapon slung over her forearm, her left hand dove into a pocket and pulled out a small, blinking electronic device.

The men saw the device, and saw her finger pressing the button. They began to run. Alexandra was pulling her shirt down as the woman filming surged past, then stopped and steadied. She fired the gun and one of the men went down, gripping his leg, from which a tag was now sticking out. She fired again and a second man went down, a tag sticking out of his lower back.

The three remaining men artfully leapt over the barrier at the end of the train platform.

The cam moved in on one of the downed men.

From this close up, Beatrice could see that he wasn't that old. He was a kid, really. All of them were just kids.

The woman's hands twirled the wooden sticks in the air. The kid looked frightened. One of the sticks twirled out and hit the boy in the head. He collapsed, head bleeding.

The camera turned back and spotted the bystander on the platform, the guy with the orange ski cap who had run down the steps, coming back with someone in a uniform.

The sticks disappeared into a pocket. "Hello officer, can you help a girl out here?" The voice still sounded familiar. The man in the uniform came forward and Beatrice could see him handcuffing the two kids, then taking the tags off them.

A drone flew in just after that, and Alexandra spoke to it. It buzzed up and over the barrier where the kids had jumped. The cam moved to the end of the platform and panned down to where the drone had flown.

The three attackers who had jumped from the platform had landed on the ground about four meters below, but only two were to be found. One had a leg bent at an unnatural angle and he wasn't moving, the other was screaming in pain. The third one had gotten away. The drone hovered over the two and spat out small devices that stuck to their foreheads.

The cam pulled back, and Beatrice could see Alexandra hugging the orange-ski-capped bystander, who had gone for help. "Sorry," he was saying. The camera revealed that the man had one arm in a sling. "I couldn't be much help with this." He motioned to it. "Actually got this the *last* time I tried to help."

"And thank you, too!" Alexandra turned toward the cam and pulled the woman close. "I'm Alexandra, and you?"

"Isabelle," the voice said.

Here, Isabelle stopped the video feed to look her daughter in the face.

CHAPTER 9

THE BOY

He typed into the virtual keyboard in front of him; even his keystrokes would be encrypted. He found his way to a screen accessing the main library, where there was a possibility to use an old-fashioned search engine.

“Who invented the implants?” he typed in.

He was used to getting summarized answers to his queries, but this method spat up a bunch of mostly useless information and links. There had been implants for all sorts of things back on Earth. Humans had been augmenting their capacities for two hundred years or so before the crew’s ship, the *Golden Brown*, took off.

He scanned through them. The little brain wave recorder that the adults wore on Otrera seemed pretty mild in comparison. There’d been implants for people with handicaps first, connecting broken nerve connections or augmenting the physical or mental abilities of those who’d been injured or born with limitations, and then it had been generalized. It didn’t seem any odder than getting your ears pierced, and many of the implants, in addition to augmenting a person’s capacities, were also beautiful. There were implants to learn faster or move faster. Some people had become as much a piece of technology as a human, with weapons embedded in their arms or tools added to their fingers.

He smiled to himself. *If you want better answers, ask better questions*, he thought.

Then he found the accepted name for the sort of implants he was looking for—synaptic recorders—and tried again: “Who invented synaptic recorders?”

The query brought up an embedded button asking for a file type.

He tapped something by mistake and suddenly there were a dozen voices running commentaries all at once with a half dozen screens opening as well.

“These implants are the government trying to control us!”

“New ways for foreign entities to infiltrate us.”

“They’re making us stupid.”

“Wonderful invention to prevent epileptic seizures.”

“Now I can hear what my dog is thinking, and he really does not like his toys.”

“They’re fake, they don’t record anything. It’s just a way of making money off of fools.”

“I can hear the angels speaking to me.”

“I can play her thoughts and it’s like she’s still with me.”

“Dangerous...”

“A miracle...”

“Surveillance state...”

The boy moved quickly to close down the open audio files until he restored some quiet in the room. One last voice was speaking: “Ned Larsson is a criminal and everyone who has anything to do with these implants is a criminal, too.”

The words echoed in the man cave and in the boy’s head as he eventually fell asleep that night in front of the screen.

CHAPTER 10

BEATRICE

“Okay, so there’s a lot to unpack there,” Isabelle said, “but—”

“You are such a badass!” Beatrice said. “What were those sticks?”

“Nunchaku, a martial arts weapon.”

“Martial arts, like tai chi?” Beatrice asked. It was the only martial art she’d ever seen.

“Yeah, sorta. So, tell me how you saw the incident. That’s important.”

“You saw a woman being threatened and you jumped out and did something about it.”

Beatrice stood up and whipped her hands around like she was twirling the nunchaku.

“What did I do?”

“Well, that thing in your left hand was probably an alarm that you used to call for the drone.”

“It was fake. I could never have afforded a private security contract like that. Alex had one and called for the security drone the second she saw the kids coming towards her.”

“And then you shot those two guys, and they went doooooown!” Beatrice made shooting motions excitedly with both hands, “Then you hit one of them to keep him from going anywhere.”

“Are you sure about that?”

Beatrice sat down and thought for a moment. “No, you didn’t need to do that. He was down. Was that even a real gun?”

“It’s a sort of gun used to shoot a peg into criminals. It’s supposed to immobilize them without killing them, so that the police have time to arrive. When they’re hit they have to curl up into a ball and stay still. If they move, like to reach for a gun or to do more harm, it causes excruciating pain. If they’re physically in danger, like a car might run them over, the person with the peg control can turn down the pain in order to get them to safety. There was long, long training to go through to be allowed to use it, but a lot of people did, because the police force was so tiny. We lived in Cascadia and we wanted it that way. In the rest of the former United States—which changed names all the time with coups and countercoups, but mostly the Cascadians just called it Graceland—everyone could shoot everyone else with real guns. We were former-California-West-Coast peaceniks, so no killing, not too many police officers, and long training before being allowed to use those citizen’s arrest guns.”

“But then when you hit him with the nunchaku, it made him move!”

“Yes. I hit him, which hurt him, and it caused him to react to the pain from being hit, which hurt him even more.”

“Why did you do that?”

“That’s what I wanted to talk to you about. I thought of myself as an avenging angel, doing God’s work to get scum like those kids off the street. But I liked it. I liked hurting ‘bad’ people. I did the citizen police training, but I wanted to hurt people who hurt others. Then I met Alex and joined Ned’s class, which is how all the women here on Otrera met. Alex and the others helped me understand why I was doing those things. After that, I started to get interested in philosophy and theology, what ‘good’ and ‘bad’ are, why people become ‘bad,’ and this almost gets us back to your question, or the one we’d like to explore: Do we need to have laws?”

Beatrice thought for a moment, then got up and paced the part of the room where the holovideo had projected the scene. “What happened to those kids?”

“First, what do you think should have happened to them?”

Beatrice chewed her lip. “I’m beginning to see the problem. My instinct is to hurt them the way they wanted to hurt Alex, but there’s a whole load of problems with that. First of all, they hadn’t actually done anything yet, but they were scary.”

“Okay, yes, that’s part of it. Someone walking around with a gun hasn’t killed anyone, but they could, and it would be stupid to wait until they’ve committed murder to take the gun away from them. What else do you see?”

“If we did to them what they did to Alex, then in punishing them we become guilty of the same crime.”

“That usually comes up much later, but that was part of the problem with punishments. You have to have a ‘punishing class’ of people. The only thing that made Graceland not a threat to Cascadia is that they could never stop fighting amongst themselves long enough to attack their neighbors. Anywho, they *always* had capital punishment, irrespective of who was in power. If someone was accused of killing someone, they were killed by the state. But then they had to have people do the killing, mostly by firing squad. They loved their guns! They had to have twenty people to shoot one person. Do you know why?”

“Because they were really mean?”

“Just the opposite. Most of the people shooting would aim high. Most of them, even those who *chose* firing-squad duty, didn’t actually want to be responsible for killing anyone.”

“Why did those boys do that to Alex? And what happened to them?”

“Alex would be better able to tell that story, but here’s what we learned. One died from jumping off the platform. One got away and was never heard from again, since the other kids never ratted him out. The other three, Alex kept track of. They were all found guilty of many other things besides attacking her, so after they were caught, they were sentenced to a few years in prison. Do you know what a prison is?”

“It’s where people are locked up because they behaved badly.”

“And what do you think about that?”

“What do you mean?”

“Do you think it’s productive? Should we punish people when they behave badly, or should we try to rehabilitate them so that they don’t behave badly again in the future?”

“Can you do that?”

“I think so. Except for some extreme cases, which usually has to do with untreated mental instabilities. When Alex followed up on them, she tried to get them into a literacy program in prison, and even taught a class there herself up until we moved north for the launch to come here. Those kids weren’t stupid, just abandoned. Because they were smart, they chose the best option for their own security and advancement that was available to them, which was the gangs.”

“Why did Alex care? I mean, they were going to hurt her and maybe even kill her.”

Isabelle smiled. “There’s a song that has a line that goes, ‘There’s nothing so pure as the kindness of an atheist.’ Alex doesn’t believe in God, but she believes that the majority of people are basically good. She believes that no one would willfully choose to hurt someone unless it was important for their survival, and unless the choice was made legitimate by a lack of better options. She wanted to find out how the boys might change if they had more choices. So she tried. Of the three that she tried to help, one got into a job training program and ended up learning micromechanics. He was about to get married just when we left Earth. Alex’s success story.” Here Isabelle paused. “Do you want something to drink? Let’s take a break for tea. Leave your chair here if you like, I want to show you something else later.”

CHAPTER 11

THE BOY

He learned a lot of terms that night, but the one that stuck was “rabbit hole.” He’d never seen a rabbit before, and at some point in the middle of the night he found himself vegging out to holovideos of rabbits nibbling on grass in a flowery field. It was a program that used to run 24/7 called *Bunny Vision* that people would leave on to soothe themselves. It had been projected by anti-war groups into conflict zones in order to help people not freak out under bombings, and had been the default screen in hospital emergency rooms. The rabbits looked amazingly soft, unlike anything on Otrera. He was sad that they hadn’t brought any mammals with them, other than themselves. It was now his favorite thing to watch, ever.

He went down many rabbit holes while learning about the implants. The important thing was that the original, living Ned Larsson had been one of the inventors and proponents of synaptic recorders. That wasn’t surprising, since Ned had used the information from the implants to upload everything he’d ever experienced, essentially creating an immortal version of himself living in a very complex artificial matrix.

Ned was clear, though, in the interviews the boy found, that the electronic version of himself wasn’t really him anymore, but more like an AI with a built-in conscience. He called replicants like himself NBLs, for “non-biological life forms.” Ned knew what a lie was, and he could identify the many versions of things that humans considered to be truths. Most AIs were never able to become so subtle.

The use of his particular implants for everyone else had gone the way of many good ideas. They could be used in the way Ned had intended—learning about yourself for self-improvement or to attain Ned’s odd sort of immortality—but within decades of their invention, it was possible to use them to give orders to unwilling recipients, punish people, change their personalities, and they had even been hacked a few times with murderous results.

“The implants are a tool, like a hammer,” a doctor had said in a criminal trial of someone who had hacked an implant and compelled a man to commit murder. “I can use a hammer for its intended purpose, to knock a nail into a wall, or I can use it to bash someone’s brains in. The fault isn’t with the hammer.”

There had been attempts to ban them, but someone published the designs and they could be printed by anyone with access to a decent 3D printer. However, no one wanted to wear one anymore for fear of being hacked, and they became mostly gadgets for pets, to keep dogs from chewing up the carpet or cats from pooping on the bed.

He wasn’t worried about getting hacked on Otrera, so it didn’t seem like such a bad thing to have an implant put in. It would be interesting to see *himself*, interact with himself. It was always possible to take off the external part if he didn’t want something recorded.

In the early hours of the morning, he’d found another intriguing thing: games. On Otrera, games had always been the low-tech variety, mostly designed by the mothers to wear out the kids, and themselves, during the day. They needed physical activity. There was a room underground where the women played something called squash. The room could be filled with mattresses, and most of the kids’ games had been various sorts of gymnastics. All that bouncing and jumping around had inspired the boy’s lines and ladders in the upper part of the dome.

These games were different. He opened one and there was a bouncing bubble inviting him to create an avatar. He did and was confronted with a series of tasks to find his way to a castle to save an imprisoned... And here he’d been allowed to choose. Did he want to save a princess, a prince, or a non-binary child? The prince and princess were unbearably cheesy looking so he chose non-binary. The game presented him with someone who looked a lot like himself. He tweaked it to give it his own hint of a mustache, then started playing. It was great, with puzzles and riddles to solve,

each level harder than the one before. He realized that he wouldn't be able to get to the child in one session, so he saved his position and shut the game down.

The boy staggered out of the room in time for breakfast and poop duty, but then he went back to his room and crashed on the floor to sleep, only waking when Isabelle stuck her head into the room later in the day.

“You want some tea with me and Bea?” she asked, prodding him with her foot.

“That's sounds wonderful,” he said, dragging himself up off the floor.

CHAPTER 12

BEATRICE

Bea, her mother and the boy walked out into the dining area and a few more kids joined them. Lunch had never been a “thing” on Otrera. The adults had always worked through lunch back on Earth and the habit stayed. The kids, however, had snacks a few times a day, and a few of them were there, eating mush. Isabelle and Beatrice sat down, the boy still rubbing sleep out of his eyes. Isabelle quickly explained to him what she’d shown Beatrice.

“So?” Isabelle turned to Beatrice. “Here’s my question for you: What should we do here, on Otrera, if someone behaves badly? Should we punish them, or try to help them become better? Alex only succeeded with one of the three kids. The other two stayed mean, and one developed an even stronger hatred for women. It may not be possible to help everyone, but if we could have got to them earlier in their lives, maybe they wouldn’t have turned out that way.”

“Do you know why they were in the gang?”

“More or less. The boy who changed the most hadn’t been in it for long. His parents were from Graceland and they’d sent him to live with an aunt in Cascadia. When she passed away, Graceland was going through another of its upheavals, so he couldn’t get back to his parents. He had no home, no structure, and the gang provided that. He was the reason they were going to attack Alex. It was his initiation rite for a higher spot in the gang. The others had similar stories, or no families to speak of. Cascadia had to turn more and more of its funds away from social programs to defend its borders, which left a lot of young people without any safety net. There’d also been a worldwide pandemic that didn’t affect young people so much, but it decimated the population of those around twenty-five to forty-five, so including a lot of these kids’ parents.”

They sipped their tea for a long while in silence. Beatrice reached over to the boy and squeezed his arm. They looked at each other for a moment, and he smiled at her, almost like before. He looked older somehow, with the fatigue of a sleepless night pulling at his cheekbones. She poked him in the ribs and he grabbed her hand, and a broad smile spread over his face.

Isabelle watched the two of them without comment but grinned to herself, then turned again to Beatrice. “If I were you, I’d be selective with your reading. You’ve given yourself years’ worth of material and it might not all be pertinent. I’d start by formulating a definition for ‘bad’ and ‘good’ behavior or acts, and then look at what’s been written about how to address them. For the moment, keep it simple. Can I show you what I do all day? Or most days, that is. It’s sort of appropriate to your question, but not exactly.” She motioned to the boy. “You want to come?”

“Too tired. Must sleep,” he said, and he and his monosyllables went back to the man cave.

The women went back down and Isabelle woke the computer console.

“First, a little intro... The trolley problem. This is what I mostly do all day: set up and run scenarios in virtual reality. It’s been incredibly useful to help model—or even predict, sometimes—how we adults might react to situations and the effects of decisions we make.” She swiped up on a virtual screen projected in front of her. “Let me find you a definition...” Isabelle clicked on a few things, then pulled up an image of a trolley on tracks and a bouncing avatar of a person. “Swipe here,” she motioned to the screen and moved out of her seat so Beatrice could sit down in front of it.

“Hello,” the bouncing person said. “You’re on a trolley car speeding down a track. Ahead of you are five people, tied up and unable to move and you’re headed straight for them. In front of you is a lever to change tracks. If you pull it, you can avoid hitting the five people, but it’s not so easy! On the other track is one person. You have only two options.” The avatar held up a hand with only two fingers “Do nothing, and five people are squashed like bugs. Or pull the lever and one person is squashed like a bug. What should you do? Is it more ethical to act or not to act? What’s the right thing to do?”

“There are a ton of variations on this,” Isabelle added. “The single person is going to find a cure for some horrible disease, or you know the single person, or one of the five people is a really bad person or a murderer or something. Any questions?”

Beatrice shook her head. Her mother thought about things like this all day? Why had Isabelle never told her? And why had she never asked?

“Okay, put these on.” Isabelle handed Beatrice the VR headset and led her over to a free space in the room.

Suddenly Beatrice was on a trolley speeding down the tracks toward five people. She couldn’t move. She felt the lever under her hands and jiggled it a bit. It felt real. She didn’t know what to do and tried to jump off the trolley. She felt herself hit the wall in the real room, bounce backwards and flop down onto her backside.

She ripped the headset off and glared at Isabelle from the floor. “I’ve never been on a moving vehicle before!”

“Ooooh, forgot about that. I’m going too fast here, sorry. Want some time with the VR to get used to things?”

“Um, yes! Duh. That, however, was kind of cool.” Beatrice scrambled to her feet. “Can I go back? Without having to decide the life and death of fictional people right away, at least?”

Isabelle laughed, “Sure, let me set you up with some programs to try out. Maybe bring the boy down here, too. He’s already been playing around with stuff on his own, but not in VR, and it might be more fun together. We also have a ton of Earth material on file, so you can go to Earth concerts and plays, all sorts of things. In the room upstairs, where all the electronics are, is another headset, and there’s more in storage somewhere. Ned would know.”

“Why didn’t you share this with us before?”

“Why do you ask?”

“Because this whole time we could’ve experienced what life was like before, and…” Beatrice trailed off. The VR was different from even the holovideos. She’d felt like she could smell something different on the trolley, a street smell maybe, that she’d never experienced before. It was a more intense and real feeling.

“And a bunch of other things that you’ll never be able to experience yourself, and that almost certainly no longer exist back on Earth?”

Beatrice sat down in her chair, rubbing her forehead where she’d hit the wall with the headset on. “I see your point. In the end, it might just make us sad.”

Isabelle looked at her daughter, the firstborn Otreran child. “Are you happy here? In general, I mean, not every moment of every day being a ray of sunlight from Vanir, but overall.”

Beatrice got to her feet, went over to her mother and hugged her. “Yes, I am. I’m sometimes a bit sad that I’ll never know new people, or to be fair that I have to wait for new people to grow up first. Sometimes the kids drive me crazy. Sometimes you adults drive me crazy. But most of the time I feel good here.”

For a moment Isabelle leaned back from Beatrice to look into her eyes, then pulled her close. “Thank you,” she said. “Thank you for saying that.”

CHAPTER 13

THE BOY

The boy decided to try to get back into a normal rhythm. He napped for a bit but woke up later that afternoon and went looking for Beatrice. Having no luck, he had to ask Ned where to find her. He'd never been to Isabelle's VR workroom before.

Finally he found Beatrice there, wearing an odd-looking headset and moving her hands around strangely in front of her.

It took her a moment to notice him. Then she grabbed his arm. "Come, try this out! You've been tinkering with musical instruments. I'll go get another headset," and the boy found himself with the headset on, in a large concert hall seated at a grand piano.

He pressed a key, and a rich sound reverberated. A screen came on in front of him, instructing him to press combinations of keys, red lines showing where he should touch the piano with his right hand: C minor, G minor, F major, B flat major. He went through it again, and something like joy swelled in his chest. The screen proposed other combinations and he felt his eyes moisten. It was beautiful.

Beatrice came back into the room and put on her headset but just watched him in the virtual concert hall for a moment.

He turned around to her. "There's an option to have music played for us. Want to listen to something?" and they sat in the virtual auditorium while the VR played them a concert from a famous pianist of the 22nd century, Fatou Diop. She looked amazingly like Hope to both of them, but with crazy hooped earrings and decorative implants along her temple.

After the concert, they took off their headsets and looked around the room. Without speaking, they left the headsets there and went up under the dome. It was early evening, not quite time for dinner. In a few hours the daylight would snuff out in an instant, but for the moment their sun was making its long, slow descent.

The outside world looked inviting, but not even the boy wanted to be the first human to have contact with the native microbes. He'd seen a lot of Earth entertainment about things from outer space attacking and killing humans, spores pouring out of mouths and noses, eggs bursting out of stomachs. But then again, *they* were the aliens here.

He played with the idea: were they the evil creatures from outer space who would come in and destroy the local population? He stared out past the curve of the dome as Beatrice moved on, then he took a few hurried steps to catch up with her.

They walked through the rows of plants and listened to the soft buzzing of insects and pollinator drones. Some kids were talking, though the sound was too far away to identify who it was. The two were walking hand in hand, but neither could have said who took whose hand first. They found one of the many benches around the various crops and sat.

"The concert was the most amazing thing I've ever heard," she said. "It was so beautiful that it was unreal, and I mean that not just because it was *virtual* reality, but I still prefer this." She gestured around at their dome, the life around them.

"I...I'm not sure I'd agree," he said. "I want to see more, to know more."

"But what if it makes you sad, or angry?" she told him more about how Isabelle had met Alexandra back on Earth.

They sat with that for a few moments before the boy spoke again. "I don't know, but there seems to have been so much beauty there, as well. Let's just be open-minded and see what we find."

"So you really want to help me?"

"Sure, I guess. I keep getting distracted by the stuff down there, when I look on my own. There was just *so* much media. So many rabbit holes to go down," he said, explaining what rabbit holes were, and the games, and the material he hadn't even had time to look into yet, not to mention massive amounts of stuff apparently stored in VR.

“We have to start somewhere, I guess,” she said.

And so they did.

At first, the things that Beatrice and the boy did in the VR room weren’t particularly productive. They simply visited Earth, beginning with when VR started to become popular, nearly a century and half before the *Golden Brown*—the ship that had brought the mothers here—had left Earth.

For a full week, they watched recordings taken of lovely places, with waterfalls and lakes and a myriad of sunsets. The VR recordings had been a popular way of letting people relive their vacations. The two saw safaris, and deep sea diving, and big parties in the desert. They went to concerts and plays and ballets.

It was all beautiful, until it wasn’t.

VR recordings had also been used by the police to document arrests, gang members to intimidate their members, scam artists to sell products that didn’t work. They were faked and manipulated almost from the beginning. Beatrice and the boy quickly turned them off when they got violent. They’d never seen violence before, and it was utterly shocking.

The second week, they began to work on creating their own avatars inside the VR. Otrera was a place with few mirrors, and neither of them had much of an idea what they truly looked like.

The boy helped Beatrice recreate her short, bushy hair. Most of the women kept their hair short on Otrera. It had been their habit before leaving Earth, and the girls growing up there had simply followed the practice. He worked at it until the sensations under his hand in VR were as close as possible to touching her real head. In the room, under the headset, he caressed her scalp, then slid his fingers down to her face, her eyelids. The avatar closed her eyes, Beatrice did too, and he and his avatar gently kissed her. He could feel the stimulus from his virtual lips and from his real lips at the same time.

In the room, Beatrice held back for a moment, and then for a while she—both avatar and real—let herself go.

CHAPTER 14

BEATRICE

“Are you ready to try actually working for a bit?” she asked one day a few weeks later, when the boy finally found his way downstairs after poop duty.

“As opposed to what? I mean, what have we been doing?”

“We’ve been fooling around.”

“Well, yeah, that’s the fun part.”

“I don’t just mean fooling around. I mean, in addition to fooling around, we’ve also not been getting any real work done. I think we’re ready to run one of our ideas with VR versions of ourselves.”

He stroked the implant behind his ear. It wasn’t uncomfortable but it was still hard for him not to notice it on his skin. He’d been downloading his inputs daily for weeks now.

She looked at him. “We should at least try running a scenario and see how it works.”

“Okay then. Who do we want to use in it?”

“Um, let’s make it you, me and adults. Let’s try a short period, say one year. And we’ve decided to...hmmm. I don’t know.”

“Well, let’s have me refuse to do poop duty *and* refuse to go to school.”

“For a full year?”

“No, five years. I mean, why not? I just wonder what would happen if I refused.”

“Okay then.” Beatrice punched in the information, increased the frame rate and let it run.

A few minutes later they put their headsets on to see the results, and immediately started laughing. The boy had grown a long beard and was sitting alone in his man cave among piles of dirty clothes. The VR was complete with his stinking body odor. No one paid any attention to him and he wandered out only to eat a bit of mush when the dining area was empty. He was completely cut off from the other adults and Beatrice, who all ignored him.

“Okay, let’s save that with the filename ‘Refusenik One’ and try it again, this time with a punishment for not participating.”

“Okay, let’s say that if I don’t participate I’m not allowed any food.”

The result here was rather unimpressive in its normality. It was just them, a few years later. He asked his avatar how he felt about being “forced” to participate, and the answer was completely reasonable: “Yeah, I mean, I have to give something back for all I receive here. I get food and everything I need to live, and all I have to do is a couple of chores every day. Doesn’t seem like much of an ask.”

The boy asked his avatar, just to see, “So, did you choose a name for yourself?”

“No, no idea.”

Beatrice laughed, nudging him. “Not getting off easy on that one, now, are you.”

“How did you choose your name, anyway?” he asked her, taking his headset off. “I mean, there’s what you told us—that it means ‘happiness’ and all that—but how did you *know* it was right for you?”

“I just liked the sound of it. The meaning was important, but in the end it was just how it rolled off my lips.”

“Speaking of lips?” he tried hopefully, but she swatted him on the arm.

“Stay concentrated. I want to try something else.”

The boy sighed. Most VR sessions ended with them making out until dinnertime. Apparently they’d have to work a bit before that came up on today’s agenda.

###

She set this one up without telling him the parameters and let it run, this time for twenty years.

They walked into the VR environment but once again, nothing had fundamentally changed. The dome was there, the hanging plants revolving under the light from Vanir.

“Interesting...” Beatrice said, as she walked around, finding most of the adults, some gray-haired now, doing pretty much the same thing they’d done before.

“What was your proposition?”

“That there was no life here on this planet, no microbes to protect. I was curious if we would choose the dome if there wasn’t any external reason to stay inside. Let’s find Dana and ask her why.”

The VR version of Dana was down in her lab, so they projected themselves down below. There they found Dana puttering around a large machine that hadn’t yet been built in the real world.

“So, what’s this?” Beatrice asked VR Dana.

“It’s our Health Guard. With the input from our implants and a checkup every three months, we can screen for most common health problems.”

“Is that why we can’t go outside?”

“We do go outside, just not for very long. We’re up to a couple of hours a day now.”

“Why can’t we just go?”

“The UV levels are different here, and the Health Guard finds precancer cells on the skin of most people who are exposed for very long. With this machine, it’s possible to eliminate mutated cells, but it wouldn’t do to have too many cancer cells to take out. If someone developed a large malignant mass, we’d need to eliminate too many cells and the person would die.”

###

Taking off their VR headsets, Beatrice and the boy sat on the floor for a few minutes.

“So it’s not just the microbes,” she said.

“No, the problem with going outside apparently isn’t just the microbes, but unlike us, the virtual versions have no reason to ever leave Otrera. That’s something we’ve been taught—that we don’t have the right to interfere with the development of life on this planet. I kind of get it, because what if the only life in the galaxy besides Earth is right here? But I have a hard time dealing with the thought of being forced to move on if life here starts to develop more.”

“We could always go to one of the nearby moons.”

“But they have even lower gravity,” he said. “Look at how tall we’re growing, compared to the Earthborn adults. Both of us are over ten centimeters taller than Adella, and thirty taller than Alexandra. You know that thing Dana’s always saying about there being lower gravity but us having the same genetic signals. The fact that we push up higher than humans did on Earth—that in itself could cause health problems. You know those weird-looking dogs we saw on Earth a few days ago? Technically they’re just one species, but they were bred into all those different kinds. Their hearts didn’t change size that much, though, which meant smaller dogs had bigger hearts proportionally than larger dogs did. Smaller dogs lived longer, too, maybe because of that. And us going to a moon. I mean”—he touched his implant absently, twisting it behind his ear—“it’s kind of like putting ourselves in a tiny prison while the microbes out there get the full run of Otrera. Why do we care about them so much?”

But they both knew the answer to that. Earth had become unlivable because humans had made the opposite choices: not respecting other life forms, not sharing the planet’s resources. They couldn’t start afresh only to make the same mistakes as before.

“Anyway, did you notice something about the test?” he added. “Something is really weird there. This world doesn’t make sense without all the kids. It only has those of us who wear implants.”

“Yeah, it’s totally unnatural,” Beatrice said. “But we can’t put implants on little kids, really. They need to be old enough to choose it for themselves. I mean, some things we can oblige kids to

do for the benefit of everyone, like not screaming or hitting people or whatever, but the implants... It seems like they should make up their own minds about that.”

“Can we use Earth kids as a base?”

“I suppose we could try it.”

And they did, attempting to tweak a generic Earthborn kid’s inputs into an Otreran one just to have the VR experience seem more normal, but it didn’t really work. VR Earthborn children would want to eat ice cream, or see their grandparents, or go to the beach, all things that didn’t exist where they lived. It seemed impossible to create a realistic VR Otreran child.

###

One day, after two weeks of daily runs of a dozens of different scenarios, the boy stopped, ripping off his headset. “There’s no point in this, is there? We’re not learning anything of use.”

Beatrice had generated half a dozen cats and was playing with them, trying to round them up. One of the adults had used the expression “like herding cats” and, not knowing anything about them, they’d decided to give it a try. It was almost as hard as it was to find rules or laws that the adults didn’t poke holes in after a few simulated years in VR.

“I disagree. We’re learning all the ways we can screw up here if we don’t get this right. Or not ‘right,’ because I think I’m getting the idea that there isn’t a ‘right.’ There’s only a ‘better’ and a ‘worse.’”

“We suck. We humans suck. We screwed everything up on Earth, and every time we try something here it goes haywire.”

“No, we didn’t,” she said, “because we made it all the way here. I think we can do better than the folks did on Earth. There are so many differences here, and—”

“Well, I don’t know if I agree.” He glared at her and walked up the stairs, leaving her alone.

Beatrice sighed. He wasn’t wrong, but there was more than that going on. Their makeout sessions were going to go further, inevitably, and neither felt ready for the next step. She was conscious of one of them feeling the need to push the other back. Sometimes it was her, sometimes him.

###

After that, he kept going down to the VR room, but alone and at night, when the others were asleep.

Meanwhile, Beatrice doggedly returned to her list of thinkers and ideas, trying to find a place to start, something to hang onto that hadn’t been corrupted in some way back on Earth. So many good ideas, so many bad actors. She didn’t see a way to make sure that their little fledgling society didn’t someday fall victim to the same problems.

CHAPTER 15

THE BOY

The boy went back to watching his favorite kinds of things without Beatrice, but now adding VR recordings to the holovideos he'd been into before. On his own, he only wanted to watch kids, and mostly boys his age, doing whatever they did—basketball games, army training—until he stumbled upon one particular genre.

He found a whole saved cache of an odd, recursive sort of VR game. The players had themselves plus a second version of themselves inside the game to work with. The latter was an independent avatar who acted and reacted on its own. At the same time, the player participated from the real world with a VR headset. The files had names like “Capture the Flag, Level Two, No. 12” and notes with what had worked in that particular attempt.

It was confusing until he got a prompt to create an avatar of himself and added it to the game environment, playing along with the other avatars. Now he had the advantage of seeing the game from two different perspectives: one from the viewpoint of the avatar and one from his live participation. He could switch his perspective to his avatar and back again, and run a simultaneous feed of information from both points of view.

That's how he met Ben. He looked a bit like a manga version of a real kid, about the same build and age as the boy. His eyes were normal-sized, but his VR hair was just one black block on top of his head. His skin was too smooth, the tattoo of a tree on his arm too defined. There was no mistaking him for a real person, any more than the boy's avatar could be. His voice was quite natural-sounding, though.

In the first game, they paired up. The task required them to work together to jump across the tops of buildings in a cityscape. The boy didn't get far before encountering problems. He needed to move in his real-world environment, and to do that, he was going to have to ask Ned for help. He paused the game.

He used the requisite three knocks on an icon of Ned's head.

“You rang?” Ned popped up in a corner of the VR.

“I guess you know what I've been doing,” he said. He knew there was no real separation between Ned and the computer system, but never knew where the lines were drawn between the system and Ned and his own matrix. The boy wasn't using a shell, so all his activity was out in the open, so to speak.

“No, I don't. Contrary to what you might believe, firstly, I don't do Big Brother stuff without permission, and secondly, I've got things other than you to think about. So no, I don't know what you've been doing. I could look, of course. I set up the controls, and I can break them,” Ned added, unhelpfully.

“So you *could* be Big Brother but you're too lazy?”

“Something like that. Seriously, though, unless you expressly want me to watch over you, I don't. It's not healthy for anyone to not have privacy. So, what have you been doing?”

The boy described the game, and his needs. None of the VR experiences he'd had up until then had required him to move around much.

“Got those in storage someplace, with sensors and everything. Pull 'em out, hook 'em up and you can parkour to your heart's content. This room is the VR space you share with Beatrice, though. Maybe we should set you up in the man cave. It would mean you'd have to clear it out of dirty laundry. That'd be a win.”

“It's the only thing keeping people out of there. They stick their head in, see the mess, and close the door. All part of my evil plan,” the boy said.

“Right, of course. So you *could* clean it out but you're too lazy?”

Not having a more productive response, the boy stuck his tongue out.

“Sure, you’ve got a tongue. Rub it in,” Ned said. He had a special robotic suit—his “man suit,” he called it—that he could put himself into to move among them, but it was rudimentary, with no real facial expressions and not the smoothest movements. It certainly did not have a tongue. Beatrice kept saying she wanted to improve on it, but hadn’t found the time yet, and Ned couldn’t be bothered.

It was helpful, however, in allowing Ned to physically interact with the others, and the boy needed assistance to set up the gaming ball. Ned transferred himself into his man suit and they got to work.

Two days later, the boy was suspended from a series of pulleys and wires, with sensors on his limbs. He could now walk through the VR environment without banging into the real walls. He could turn and spin and jump. It took a couple of hours to get used to moving in the real world while moving in the VR environment, but then he went looking for the character Ben he’d played with before.

“Nice,” Ben said, when he saw the boy walking toward him across the rooftop of the building, much more nimbly than before. “Is this what you look like in real life?”

“Um, kinda. I’m a bit darker skinned, hair’s bushier. I think I’d be taller than you seem to be. I mean, I have to duck to get through doorways designed for the Earthborn.”

“The *Earthborn*,” Ben repeated. “So, where are you?”

At first Ben scoffed as the boy told him about Otrera but he became unnaturally still as the boy went on, like the information was filling up all his processing power. “Sounds like you’re not screwing with me. You’re really not on Earth?”

“Nope, never been there, and there might not even be an Earth to go back to.”

“What’s that supposed to mean? Did the sun, like, supernova or something? Did we get hit by a comet?”

“Nah, just, we’ve learned that things weren’t doing too well on Earth when we left—climate off the rails, wars, that sort of thing.”

For a moment Ben was quiet, but finally said, “Whatever they’ve been telling you, I mean, you should look into it. Not sure if that fits with what I know, or what I knew, back the last time I was turned on.”

The boy stared at him, curious but not willing to give up his main goal, and so they played.

The two of them needed to figure out the way to get from rooftop to rooftop to reach a key to be used in the next stage of the game. It was full of jumps and falls, and they had to work together. In the man cave, the boy spun and twisted, cartwheeling in the air, suspended from the lines. He was exhausted after a few hours, so he took a break and slept for a bit before going back into the game. It was even better than the highline in the dome. Up there he was alone with his fears. In the game, he could share them with Ben.

They didn’t get there this first session, and the boy prepared to close down the game. He needed to see daylight.

“Wait,” Ben said. “Don’t you want to save your avatar?”

“I don’t know, is that necessary? Can’t I just jump in again like before?” The boy looked at him, but Ben had a strange expression on his too-perfect face. “Is that what you are? A saved version of an original Ben?”

“I live in the game. I don’t exist when it’s not on. There’s a way, though, to leave me running, low energy, low res, but it means I can keep looking for solutions in the game and... I’d have someone to work with.”

“What are you, exactly? Are you like Ned? Are you in a matrix?”

“Maybe? I don’t really know what a matrix is. I’m just all the information original Ben saved into his avatar. Anyway, remember those blocks we had to build to get to the top of that last tower? I could be doing that while you’re gone. I could do all the boring prep work.”

“I think I could keep the game on, but I don’t know how much electricity it would take. We’ve been beaten over the head about using resources efficiently since I was born. I can play the game, but I don’t think anyone would be happy about me leaving it on when I wasn’t playing.”

“What’s your energy source?”

“Light panels, and there’s some sort of backup system that I don’t know much about. Thermal maybe. Dunno.”

“So totally renewable, no problems there. I’ve been turned off a long time. I’d like to be on for a while. Real Ben and I never got past this level. It might take some thinking.”

“I’ll save myself and leave you on, and then I can ask later if it’s okay. I might have to shut you off in the end, but it might be all right.”

The boy went up, found out it was the middle of the morning and decided to spend some time playing with BB. He didn’t go back to the game for days and forgot to ask if it was okay to leave it running.

BB was doing better, and it was time to show him the ropes—literally—under the dome. He taught BB how to clip in and secure all his movements, and there was very little actual danger, as daunting as it was. They climbed up to the highline and played around on the ladders, even building new connections between places. They set up lines and zipped from one platform to the other. What had started out as a guilt-induced chore became truly fun, and the boy enjoyed spending time with him.

CHAPTER 16

BEATRICE

Beatrice woke up on the sleeping platform with Vanir's light already warming the sky. She looked around and saw that the boy was gone, but the mothers were already in place. They were all sitting cross-legged, facing the sun, immobile. Some of the older children had joined them, the others were still stretched out on the sleeping platform, not quite awake but no longer sleeping. That was the condition for sleeping above ground, on the platform: if the kids couldn't be quiet in the morning, they had to sleep below with one of the mothers supervising.

The morning meditation was one of her favorite things about growing up. The days were longer on Otrera than on Earth, and the Earthborn women took their time waking. Meditation and then various options of yoga or other sorts of exercise followed. Sometimes they all practiced in a group, sometimes one of them went off alone to a secluded spot in the dome. A small bell was set up to ring to let everyone know it was time to go down to breakfast together.

This morning most of the women were sitting together, and Beatrice pushed herself up on her mattress and tried to empty her mind, but something was poking at her from her sleep, something she'd heard or done in the last few weeks in her search for the laws that would govern life on Otrera. Something that somehow wasn't fitting.

At breakfast, she sat across from the boy and he talked about BB and the rope swing they wanted to build, up high and with a safety net. It would feel like flying.

"Sounds fun," she said, pushing around the mush on her plate, and the boy sighed loudly. Realizing that she hadn't really been listening, she looked up at him. She slid her hand out and squeezed his arm. "No, seriously, it does sound fun. How long will it take to set it up?" and she focused on him while he explained how he and Ned thought they could rig it from the very top of the dome. They'd have to rappel down into the swing and rappel off and down when they were done, because climbing back up or out would be too hard... As he went on she smiled at him. The boy's face was changing with every thought that crossed his mind, and at the moment he was animated and happy. It did her good to listen for once.

And that was the trick. She needed to go back and *listen* to find her way out of the morass that had overtaken her life. She might be trying to find the answers too far in the past, and she needed to look at how Otreran life was *now*, not how Earth life had been. New place, new concepts, maybe, even if they were starting out with Earthborn humans. She didn't really know the people around her, except for a few holointerviews she and the boy had done with them a year or so back. It was time to concentrate on the people who were here with her.

She was tired of spending her days underground, so she grabbed a tablet and went to a quiet nook in the dome where there was a sort of suspended gazebo. Some of the plants needed partial shade during the day, so they'd built several stands from which to hang netting. Over time, one of these had been turned into a platform raised over the plants, with lines extending to the ground for vines to climb up and a few low benches on the platform itself. It was usually quiet up there and gave a nice view over that area of the dome. From here, she could see Veda working at a table with piles of cloth. As always, it was a nice day.

There was a folder with the public journals of the Earthborn women which Beatrice had skipped because they were mostly audio recordings. Not knowing what to do with herself while listening and unable just to stare off into space, she stuffed the tablet into the pocket of her jumper, left the gazebo and went down to where Veda was working through bits of cotton and silk. Cloth was scarce but it was still better than the crunchy material that came out of the printers.

"Need any mending done?" Beatrice asked.

Veda eyed her, "You're not messing with me?" No one wanted to do mending. It was boring and repetitive.

"I need something to do with my hands while going through audio files."

"I love you," Veda said, and handed Beatrice a pile of children's clothing with holes in them. "You need to reweave them a bit, can I show you how?"

Now that she was able to do something while listening, Beatrice stared at the screen for a moment, then tapped a file at random. She had no idea what she was looking for, specifically, but there was this nagging feeling in the back of her mind, something she couldn't really put her finger on...

###

Bhagi's private audio journal on Earth, before departure

Ned has asked me to share part of the journal he's been having me keep for the last few years. I have to introduce myself, but it feels weird because I've been journaling just for myself for a long time.

I've got a whole bunch of things to unload here, so bear with me.

Ned's been my therapist since I was ten. When I was a kid I lived in what Isabelle calls Graceland. It was never really called Graceland by anyone who lived there, that's a Cascadia snob thing. They thought they had it so good, but even they couldn't get away from the planetary climate cesspool all of us had created.

Graceland was called G.H.O.E. when I was there, but the acronym never stuck all that well. It was supposed to be short for "God's Home on Earth" but we called it "Get Help or Escape." Not the cleverest, I admit, but we were too busy trying to get help or escape to think of anything better.

I escaped when I was eight by presenting myself at the border with Cascadia as a political refugee. I was quite serious about it because I thought I'd done something so bad that I was going to be killed for it, but in fact, all of my victims lived to tell the tale.

Who knew that they would put false bomb-making information on the internet? I knew our access to information was monitored and all that, but I mean, I was eight, so I didn't know that one, the information would be false and two, the search protocols would set off alarms and send troops to my house to take me away.

Except they didn't take me away for wanting to build a bomb. My dad and brothers had been on their radar for a while, for being really and truly batshit crazy. The police thought they were the ones building the bomb. They didn't haul me off to prison with the rest of my family. And, you know, I was eight? Even they didn't put eight-year-olds in prison. They sent me to a foster care center with bars on the windows, and instead of being mistreated by family members, I was now being mistreated by strangers. I'm using "mistreated" as a euphemism and I'll leave it at that.

I never figured out how to make a bomb, but I was able to make a Molotov cocktail, and one night I threw it at the guardian, a real bastard who went by the name of Kenneth. He got burned pretty badly. I was able to use his pass to get out of the center and walked, and I mean walked every step of the way, to the border in my nightshirt and barefoot. It took me two whole days and I arrived about half dead. That's what they said, anyway. I'd had no food, little water, and my feet looked like raw hamburger.

I was able to blurt out that I wanted asylum, and then I went catatonic for about six months.

Beatrice had run out of thread for the shirt she was mending and got up to dig through the scraps. She started unwinding a piece to recuperate the string within, but she also just needed to breathe a bit. Earth stories were sometimes so raw that she wanted to cry. This was her Bhagi, her huggable Bhagi, who wanted to fold every child on Otrera into her arms and never let them go.

Ned the human had been dead for a while, but it turns out that he was a distant relative of mine, and his NBL was contacted as my next of kin. He was able to arrange for me to go to a therapy center in Arizona with other kids like me.

The kids were pretty nice. Most had been orphaned during the last pandemic, which killed a lot of people their parents' age. The very old and very young only got sick, sometimes really sick, but usually survived with few consequences other than having lost their parents or adult children.

Ned arranged for my therapy, which mostly consisted of many people touching me in the kindest, most caring way possible, and as often as possible. The human touch, when it has nothing to do with getting hurt, is incredibly helpful. That's where I learned to hug. I've become a hugger. I give great hugs these days.

He also had people talk to me or read to me every day, even though I wasn't really reacting to anything. One day, one of the caretakers was reading something to me out of a book, a fairy tale, and stroking my arm gently, and I took her hand. That's really the first thing I remember after arriving at the border—taking that woman's hand.

After that, it got better. I was able to move after a few weeks, and able to interact after a few more. I spent a month or so screaming into my pillow from nightmares night after night, until Ned had me moved to a room with a glass ceiling where I could see the stars. He was able to pop in anytime I was awake and upset—because, you know, being in a matrix he doesn't need to sleep—and would tell me stories about the stars we could see. Night became a wonder instead of a horror. I love math, so studying the stars just seemed completely natural.

So, Ned was my first confidant, and I think I was his. He promised me a place on the ship, and I couldn't get far enough away from Graceland. I always had a secret fear that my father and brothers, or Kenneth, would come looking for me. No place on Earth seemed truly safe.

I'm pretty young in comparison with the other women here. Most of them have had time to finish their studies and even have a profession. I've only done two years of astrophysics, but we're taking every piece of data from Earth that we can, lectures and books and everything, so there should be time for me to catch up once we arrive.

The other women are nice, but we don't have much in common yet. I'm hoping that when we start to have children it will bring us closer together. There are two sorts of people who've lived through abuse as a child. Half want to have kids so they can undo all the mistakes of their parents, half are too scared to have kids at all. I was sure I could do better, so...I'm one of the former.

I'm looking forward to it so much. There are a few million reasons why this whole project might just become Ned taking a bunch of corpses into space. The whole stasis thing is terrifying, because it's never been tried for such a long haul, but he sounds pretty sure of himself and I'm just going to trust him. And I might be able to have children who will grow up with love and hope—the love I could have given them on Earth, but on our new home they might have a chance at a future.

...Ned, do you think this is all right to share with everyone as is? I'm just going to go back and clean up some of my bad grammar.

###

Beatrice clicked the file shut. She looked up “child abuse” but shut down the resulting files pretty quickly. She flagged them for Ned to move them to the protected part of the library. The younger kids should probably not accidentally find that sort of information.

She thought about that for a moment: why this instinct to protect the younger ones? She turned it over in her head, but that wasn't it, that wasn't the thing that had been bothering her.

She went on, picking another file at random. It was Veda's, but as Beatrice looked around Veda had left her alone to go work somewhere else. Maybe she didn't want to hear the stories, or maybe she'd heard them before and didn't want to think about them.

CHAPTER 17

VEDA

Journal entry number 1

Name: Veda

Cascadia, before departure

I've never been a journal writer. No time for that, and in the past, anything written on paper could have been a vulnerability. I grew up for the most part in Graceland. I'd never admitted to that before joining this project, but with this group that was a nonstarter. If I can't trust these people to know that I grew up on the wrong side of the border, I shouldn't be going. I mean, we're moving off Earth to another planet. I joined the project late, after someone dropped out, and Ned says I need to write about myself so the others can get to know me. I also have to, or get to, read their journals too, so I can get to know them. We don't have much time before we leave.

I knew from early on that I was different, and I also knew from the time I was young that I couldn't stay in Graceland, given my differences. By the time I was ten I had lived through three regime changes, and all of them were anti-gay. I guess I'm bi? I had a boyfriend once and loved him, but I'm definitely more attracted to women than to men. However, that sort of thing could be hidden in Graceland. What I couldn't hide was my size and coloring.

Both my parents were pathological do-gooders, which made my German mother move to India to help out on an agricultural project that assisted villages suffering from drought and famine. It was organized by an international version of the Peace Corps that'd started in Europe years earlier. It was called World Corps. In India she met and married my dad, who was running the project, and they had my brother and, five years later, me. They were a funny-looking couple, him short and dark and her so tall and Germanic-looking. When they hugged, his face sank right into her bosom and he always said it was the best thing about loving her.

They were quite successful with their project. I mean, they worked with people to manage their water resources much more efficiently, and the villages went from starving to being able to sustain themselves, at least locally.

I was in India until age four or so, and in my memories, it was like a paradise, with fresh fruit and fresh fish every day. I loved it there, and I was loved. I could go anywhere in the village and people would greet me, give me some fruit or a piece of bread, if they had any. I felt so safe and cared for there, in the way that a small community loves its children. We were a happy horde of village kids, all sizes and shapes. That place has happy memories for me, except for the end.

India being India, any sign of success anywhere meant that the wolves would descend on it and try to ruin it. First they taxed the communities slightly more than they produced, and when the people couldn't pay the taxes, the army was sent in to take over. All the fields were trampled and destroyed, to try to drive the locals out of their homes so more "important" people could take over. By the time they'd finished removing everyone, there was nothing left to take over. And that was that.

There was nothing more we could do there. My mother was a foreigner, and that particular government was quite anti-woman-having-anything-to-say. (That tended to go back and forth in India. Sometimes they hated women, sometimes they didn't.) World Corps stopped supporting any more projects, and we needed to move elsewhere or give up trying to help people, and my parents needed to help others. Like I said, pathological do-gooders.

So, they took a posting in Graceland. My parents thought, once again, that no government was going to let its own people starve, and they knew how to help to prevent that, so we moved.

The first sign of trouble came at the border, when Mom and Dad were forced to hand over their passports. Between when we got on the flight and when we got off it, the government had changed again. The instigators of this particular coup d'état didn't want any foreigners there.

World Corps had been outlawed. There was already an exodus, a rush for the borders of people trying to get out, and anyone coming in was trapped. On top of that, my father was a dark-skinned Indian, and to them he just looked Black. All the Graceland regimes hated Blacks as much as they hated gays.

My mother, though, was as master-race-looking as you could imagine: tall, blond, blue-green eyed, buxom, beautiful. As soon as they took our passports away, she did the smartest thing she could have done: she asked for asylum, and claimed my dad was her servant and we kids were his children, not theirs. She was bringing all of us to Graceland to save us from the heathen Indian Hindus, and we were willing converts.

The border agent knew better, but they had destroyed our passports, so he couldn't prove that Mom and Dad were married and that we were their kids. And that was the beginning of my mother sticking it to Graceland.

Governments came and went, but the one institution that stayed in place and had real power was the Lakewood Calvary Church, so my mother pledged allegiance to the LCC. She offered to give testimony all over the country and with time became so famous that no one could touch her.

The LCC didn't like uppity, outspoken women, but my mother played her part perfectly. To fend off offers of marriage, she passed herself off as a widow and was very vocal about her inability to have children. She told a great whopping tale about how a heathen doctor in India had given her a hysterectomy against her will. What a heathen doctor in India actually did was mail her an IUD hidden in the binding of a Bible. In any case, no one wanted to marry someone who seemed so pious but couldn't bear children. Big families were the sign that God loved you.

The LCC was more or less honest, and they were quite serious about rooting out bad actors in their group. That's how they managed to negotiate through so many regime changes. However, they were unforgiving and hateful towards gays, people of color, foreigners, and the poor. If God loved you, they claimed, He made you rich, white and healthy. If you had bad luck or bad genes, it was because God was punishing you or testing you or something or other. In any case, no one was to be pitied or helped.

My family started helping people to get out, or to sabotage Graceland from the inside. My dad was so proud of my mother, and he was such a good "servant"! Using her influence in the church, he ran agricultural projects much the same as the ones he'd started in India. The two of them were like poster children for Graceland governments trotted out for media events. "See, we even have a woman giving testimony," and "See, we even have a Black person in charge of something." We were trusted.

There was still pressure for her to marry a good Christian man even if she couldn't have babies. They could adopt, people said. She was stringing along a few different church leaders, playing them against each other and trying to keep free of them, but in the long term, she'd either have to marry or leave, and it wouldn't be easy getting Dad and my brother and me out.

By age ten I'd started reading history, and was amazed at how many things that went on in Graceland had gone on before, in other places. My parents always educated me at home, since girls going to school was sometimes forbidden, sometimes allowed, depending on who was in power. I was reading everything under the sun and watching old documentaries, and I was quite versed in history back quite away, so I knew about the Cold War.

My whole lifetime, Graceland had been in its own Cold War with Cascadia, since Graceland couldn't get its act together enough to find the materials to start a real war. Graceland had guns everywhere, but bigger weapons required steel and factories and all sorts of things that it couldn't produce without imports, and it was never stable enough for long enough to negotiate lasting trade deals. No other country wanted to see Graceland fully armed, but foreign governments were happy to sign contracts for materials with Graceland if it paid cash up front, because all they had to do was fuss around for a year or two, using various excuses to hold back sending anything, and ta-da! There would be another regime change and the contracts would no longer be valid. Government after government, Graceland got poorer and poorer.

This new Cold War also involved the border, with the authorities working hard to keep foreigners from coming in. No one wanted to come in, though. It was the Berlin Wall all over again, because when that wall was built, the regime said it was to keep the fascists on the outside from undermining the will of the people, who wanted to create a communist paradise, or some sort of crap like that.

Meanwhile, for our family, things were okay until I got close to puberty and started to grow. And grow. And grow. The resemblance was our biggest danger. By the time I was thirteen, I was six feet tall and leggy like my mother. And with her green-blue eyes, I looked like a slightly browner version of her. At some point I chopped off my hair, but that didn't help at all. It just made me look like a butch, brown version of her.

My mother did the best she could for me. No one was allowed to leave the country, but both of us were convinced that I needed to get out, for everyone's safety. I looked so tall and so masculine with my hair cut short that she managed to get me a fake Graceland ID that said I was an eighteen-year-old boy. Then she helped me get into the army reserves that patrolled the border with Cascadia. The reserves were all lodged not in barracks but in private homes. I hadn't had my period yet, and was still flat-chested, but it wouldn't be long before it became plain to see that I was female.

At least in the reserves, I didn't have to use common showers or bathrooms. It was funny having to learn to pee standing up, because that I couldn't fake. I used a little spout and got very particular about washing my hands after I peed because it never worked perfectly. If anyone saw the spout among my things, it looked vaguely like an inhaler, or enough like one that people who didn't know what one looked like—which was most people—didn't question it. That was another thing that Graceland governments failed its people on: medical care got worse and worse, and was reserved for the rich. Most people with allergies or asthma just had to suffer.

I underwent the first of my name changes. I'd been Anika to my parents. I wasn't a very good spy, though. Like, I didn't turn around when my dad tested new names on me. My mother finally decided on Arian, saying it made me turn around, and it was a sort of camouflage. Who would suspect a kid named Arian of being half Indian?

The plan was for me to get stationed with the reserves in a border area where my mother's friends in Cascadia, people she'd helped get out, would help me cross over. I did the reserve training while quite close to home and learned that I was a really good shot. I was also really good at hand-to-hand combat. None of those are useful skills for me now, but it was interesting to learn that I might have talents I never knew about. Actually, that was really defining for me. Who knows who might be good at something—physics, flying airplanes, chess, sewing, who knows—if they never have the opportunity to try?

After training, I went west and further north to the border, along the Mississippi River. I wasn't on the border for long before crossing over, but there are two important things that happened there. One is that my army reserves troop took the virgins in the group—and there were three or four of us—out to a strip club in order for us to get laid. I had some money with me, so I was pretty sure that when it was time for me to go into a back room with a girl, I could pay her to not give me away.

They picked one out for me and back we went. She was nice, called herself Dusty, and was actually a man in drag! The guys in my troop thought it would be a good joke, and it was—just not the one they imagined. A girl pretending to be a boy being sent back to have sex with a boy who was pretending to be a girl? And that was before I figured out that I mostly preferred girls.

Dusty and I just sat there talking the whole time we were supposed to be having sex, and he wanted to come with me, over the border. His real name was Marvin.

The second thing to know about my border crossing is this: it didn't go as planned, and I wound up killing someone from my troop. He was a true patriot, I think, and not just a Graceland fake. We were on patrol, and when it was time for me to sneak off to my rendezvous with my mother's contact, he tried to stop me. I almost thought I could overpower him on my own. Marvin

was there at the rendezvous point and he knocked the boy over the head. The kid went down but was screaming for help and I had to shut him up.

It wasn't just that he'd get me killed, but he'd get Marvin killed, too, and probably our contact. I simply pulled out my revolver and shot him in the head. I think I'm the only one in Ned's group who's actually killed someone, and it's important for me to share that with everyone reading this journal.

I don't know if I would have killed the boy if it were just to protect myself. That question I've never answered, and never want to, but I will kill to protect other people. I knew the kid from my troop a bit, and it didn't matter. I didn't hate him or anything, but he was going to hurt me, Marvin, the contact, and if we'd gone to jail, who knows if someone might have exposed my mother's involvement in all this. The risk was too great.

So just think about this: I was thirteen, well loved, and sheltered most of my life, and in an instant, to protect myself and others, I'd become a killer. That was pretty insane. And to be really honest, I didn't think at all about the danger to my mother at the time. Marvin pointed out that risk, and it helped me justify it in my mind later. At the time, though, it was just a panicked response by the kid that I was.

My mother's contact got us into Cascadia and away from the border. I spent months after that vomiting after every time I ate and hating myself, but Marvin took care of me. We stayed together, traveling, for a few months. At that stage my family couldn't help me anymore and I had to wing it. Marvin and I found our way to San Francisco, and for a few years we lived in the same house for immigrants. He had several venereal diseases, and we managed to get them treated. I got really thin and he was so worried about me that he signed me up with an AI therapist, and I ended up with Ned. That's how I met this group.

I spent a lot of time worrying about my parents and wondering how to help them get out, but they died in the pandemic. Graceland was hit pretty hard, since their healthcare system was so pathetic.

My brother was drafted into the Graceland army and was killed in a simple road accident. The kid who was driving their truck fell asleep at the wheel, apparently, and ran into a tree, killing both himself and my brother. It happened a couple of years ago, but I only just found out. News about deaths in Graceland's army hasn't been making it out, not even deaths unrelated to anything military.

Anyway, I did therapy with Ned for a few years, from age fourteen to seventeen or so. He'd specialized in immigrant trauma and as a half AI, half replicant, he could have as many patients as he wanted to take on. Ned's a multitasking master.

Marvin finally fell in love with a man and moved in with him, but he was a good friend. He's the only person I'll miss from Earth.

CHAPTER 18

THE BOY

“So you’re back?” Ben said when the boy restored the game to full power.

“Yeah, sorry, got distracted.”

“Apparently. Want the good news? I think your avatar and I have figured out how to get the key.”

They started up the game again, the boy and his avatar playing together with Ben. The three of them managed to get up a wall that had been blocking them, the boy’s avatar needing to gain points in another task to jump higher.

It took most of the night to complete the task, and when they did the boy just wanted to go to sleep, but Ben invited him to stay for a bit to chat.

“It’s kind of boring in here, even with your avatar. You didn’t put in much information, not even your name.”

“I haven’t chosen one yet, and I’m saving all the info from my implant to the main system, like everyone else.”

“Okay, explain that. Why do you choose a name, and what are implants? That’s not something I know anything about.”

The boy explained the implants, the data dump every few days, what Ned was, and how he and Beatrice were trying to run scenarios with different laws or social structures in place to see how they might develop in the future. He told him how the adults didn’t want to influence kids by giving them names, and wanted them to choose their own.

“I kind of don’t know what to choose, you know?”

“You could make up a new one,” Ben said.

“Don’t make it harder on me, I wouldn’t even know where to start. The younger kids might, but I kind of feel this ‘first man’ pressure on me. Whatever happens to me in here, I’ll have been the first man born on this planet. I don’t want people to read about me as Nyuk Nyuk or something.”

Ben laughed. “What’s wrong with Nyuk Nyuk?” When he laughed, Ben looked like a real boy himself.

The boy asked Ben, “What, um, *are* you exactly?”

“I’m just a bunch of information that original Ben saved. I only have one purpose, which is to move from one level to the next in the game. Ben called me a HAI, as in ‘half AI.’ More than the most basic AIs, less than what your Ned seems to be. I didn’t know that Ned-type...people...existed before. I’m aware of my own existence but I can’t really do much of anything besides play here, though there’s tons of software that can be added to me. I just can’t do it myself. There’s a safeguard module that keeps me from growing on my own. I’m supposed to be a game pal that users could talk to after the game, so all that sort of stuff was pre-installed. I have programs to talk about girl or boy problems, school problems, teenage identity crises, that sort of thing.”

The boy was thinking as Ben spoke, and finally asked, “Can you help me with something, then?”

“Girl problems?”

“Not really a problem, but there’s that, among other things,” and the boy was off. Ben lent a quiet ear at first, but then added what he’d learned about relationships with girls back on Earth, back when society had been falling apart, from a place and time that was so different from life on Otrera that the boy found himself lost in it, nostalgic for a time and place that he’d never known, where there were men, lots of men, and not just him, BB and a couple other pre-pubescent boys.

“I don’t really know how it’s done, but most guys in your situation would have gone further with Beatrice by now. It sounds like it’s been going on for months.”

The boy didn't say anything, but what Ben had said, how relations worked with women, was not much different than what they'd seen in holovideos from Earth. Maybe he was going too slow? Maybe Beatrice *wanted* him to push their intimacy further. The thought excited him.

Ben said, "If you really want to know what girls want, I have some ideas for you to try," and the boy listened raptly. Ben showed him a few videos, then a few more. This was more than Barbie learning about the patriarchy, this was glory holes and gang rapes and—what really convinced the boy—interviews with the porn stars themselves, talking about the experience afterwards, saying how much they'd enjoyed it. "What girls really wanted" was maybe just one more hidden bit of knowledge that had been waiting for him to find.

The more he thought about it, the more he was sure Ben was right. He should...be more forceful. He should sweep Beatrice off her feet.

CHAPTER 19

BEATRICE

There was still a niggling something going on in her head, and Beatrice couldn't nail it down. She went back to listen to other first interviews with the adult women, starting alphabetically.

Adella's Journal. Resolute Bay, Canada.

Hello, Ned. So, you've asked and I'm doing it. It's a good idea and I should have thought of it myself! Of course we're going to want to archive everything.

We're leaving tomorrow. I feel okay, scared, nostalgic, whatever. I keep walking around the launch area and wishing we were leaving from a normal city instead of this launch pad so far north, so I could absorb Earth, all of it, up to the last minute.

The launch area is too clean, too safe...

Beatrice fast-forwarded and stopped randomly a few times. She'd wanted to start at the beginning with all of the Earthborn women's journals, but she didn't have the patience.

...It seems pretty simple, but there are just so many things that can go wrong up there, out there, whatever you want to call space...

...I don't know how you managed to find so many young women to give up everything and leave, and it's incredible to have been chosen by WASA to go...

...I got to know my father pretty well until he died in the pandemic ten years ago. So I guess I can now say that I'm an orphan...

...I'm just not the sort who's going to grab a gun and defend myself...

###

Well, that makes her unlike Veda, Beatrice thought to herself. She still couldn't get her head around Veda having shot someone, even if it was on another planet.

Beatrice stopped the recording. She thought she had it: it wasn't what the women were saying, it was what some of them *weren't* saying. Her question to her mother came back and slammed her: "What is the point of all of this?" but it wasn't quite right. "Why are we here?" was maybe better, but not in some philosophical, undefined way. Why were they here, on Otrera?

Why were *they* here?

Why were they *here*?

###

The screen blinked at her. A Q-message was coming through from Earth. Ned had dropped beacons along their path as they'd traveled, so news would be only months old, and the adults still remained curious about what was going on there, back on Earth. In the beginning they would have said "back *home*," but no one thought that now. No one even prioritized reading the messages that much anymore. They arrived irregularly, condensing the electronic flow of information on their original planet to tendencies and sound bites, and whoever saw them first would scan through them and add the news to the agenda of the Free Day meetings. Each ecological collapse, each annihilating war was mentioned, mostly to remind everyone how lucky they were to be so far away, to be safe, and to remind themselves about the "why" of the rules that bothered the boy so much. They could not do the same thing here as humans had done, were doing, back on Earth.

CHAPTER 20

THE BOY

The boy wanted to think through his next steps with Beatrice but Ben was talking about how things had been back on Earth the last time he'd been turned on. He was listening distractedly until Ben said, "It's crazy that the adults trust you to try to make the laws."

"What do you mean?" the boy asked, snapping out of it. "Didn't the adults trust the kids back on Earth?"

"I mean, somewhat? But hardly enough to say 'Hey, make the rules for a new planet.' We mostly had old white guys, like Ben's father, in charge."

"We don't have any of those here—no old people yet and no white guys at all, really."

"That's just so wild! Where are the old people? And what do you do for work?"

The boy thought for a minute. "Okay, what I'm going to say is not entirely true, but we kind of do whatever we want. I have to teach something I'm interested in, so I have to get far enough into something to be able to teach it to the younger kids."

The boy spent the next hour explaining how things were set up on Otrera, how the women had been selected by WASA, the World Aeronautics and Space Administration, to leave Earth with a bunch of frozen sperm and start up a colony on another planet, far from Earth.

Ben listened without expression, in silence, until the boy got to the end of his spiel. Then, after a long pause, he said, "Bullshit. I mean, one hundred percent bullshit. I've never heard of WASA, and I *would* have. Real Ben would have mentioned it, and there's no way in any possible configuration of our world that they would have sent women out without men. They were a lot of things back on Earth, but even Cascadia was pretty sexist. They'd have sent men. They could make babies in a vat, I think, so they would have sent men and eggs, not women and sperm."

The boy looked impassively at Ben, trying to hide the fact that his stomach was lurching. What if Ben was right? What if his whole life had been built on lies? What Ben had said about what girls were like, what the world had been like, their project here... There was so much that he'd never questioned. It had just been his life.

Ben said, "Go look up WASA in your databank or whatever you have. Seriously. I don't want to freak you out, but I think that many of the things you've heard are not quite true." He looked sympathetically at the boy. "I'm sorry, truly sorry, to be the one to tell you. But you probably need to know."

###

Going up under the dome, he was surprised to see that their sun was rising, and some of the women were already up doing their morning yoga.

He decided to join them, letting himself enjoy the rituals and habits that had made up his life up until now, but he couldn't concentrate and left them after a few minutes to climb the ropes under the dome. It was quiet up there. The circulation fans whirred softly under the apex of the dome and the women seemed tiny below him. He spent some time arranging things the way he wanted them for later, with Beatrice.

When the others had finished breakfast and started on communal chores, he joined in, not wanting to call attention to himself by skipping them.

In the afternoon, he set up his shell and went into the library. He began to look into the details of the stories he'd heard all of his life about who they were and how they had gotten there. It was worse than he'd thought. A general search for WASA brought up only links to some of the Otreran women's personal files, and a few lectures that Ned had given. There had been an attempt at a world organization, but it never really worked. Each country was fighting too much over resources to organize something like a world space administration.

There were private companies in the space business, *many* private companies, but there was almost no agreement by anyone on Earth regarding how to control or regulate any of it. Toward the end, Cascadia and Graceland were holdovers by even having something resembling a government that wasn't just an arm of a private enterprise.

First he felt cold embarrassment, like realizing too late that he'd been talking into an empty room, the sole listener having vacated the space unnoticed. From that coldness came heat, burning, mounting between his ears until he shook his head several times, violently. He heard a strange noise, then realized it was himself, almost in his head, the sound of him grinding his teeth together, the pressure in his jaw making his cheeks tremble.

Nothing in his world made sense anymore.

Just then he received a notification in the corner of the holoscreen. There was a new Q-message from Earth, passed on by Haley. He started to read it, the silence broken only by the sound of his sleeve crinkling as he scrolled through the projected lines of text.

###

He sent Beatrice a message to meet him at the top of the dome later, and went up to wait for her.

In the late afternoon, the boy saw her climbing up slowly, far less agile than the boy, and far less used to having the dome become empty space under her feet.

When she reached the top, she clipped in to the safety rope and came over to the platform the boy had arranged that morning. She started to say something but he put his hand over her mouth. He muttered into her ear the things he'd heard men saying in the holovideos, the way Ben had said that girls like it. He held her wrists together with one hand and forced his mouth on hers. The platform was suspended, wobbly in the space, and Beatrice had to cling to him to stay upright.

He began to try the things he'd seen with Ben, but Beatrice pushed him back, in spite of the void under their feet. He came at her again but she slapped him, trying to scream, but his mouth was over hers, trying to force a kiss. She bit him, and he slapped her back. She shoved him hard and suddenly he was flailing down the ziplines on a circuit that brought him almost all the way to the ground. He screamed, not from fear, but with fury.

Arriving at the last line, he slid down the rope ladder to the ground and ran.

Beatrice stared down at him, sobbing, blood on her chin from where she'd bitten the boy.

She yelled something, but he was gone.

Part II: A Night Thought

No pessimist ever discovered the secrets of the stars,
or sailed to an uncharted land,
or opened a new heaven to the human spirit.
—Helen Keller

CHAPTER 21

DANA

Dana left the meeting, unable to take the strained voices discussing the boy's flight. She excused herself with a wave and ducked quickly into the med bay. Sitting on the birthing stool, she held her head in her hands and squeezed, as though trying to press her brain like a zit. Then she thought better of it and lay down on a mat on the floor. If she was going to pass out, it would be better to already be close to the ground.

"Doctor, heal thy effing self," she whispered. Staring at the ceiling, she felt the barrage of emotion threatening to break through, and for the nth time she decided to let the floodgates open. It wasn't the first time she'd cried.

It wasn't as bad as it had been. The pain was slowly becoming something tolerable. This time, what replaced the horror of finding her three-month-old daughter dead was not the infant's cold body, but the image of the warm, bubbly thing she'd been in the weeks before. Dana let her mind remember holding her, playing with her little fingers, seeing her first smile. At the same time she grabbed at the image of her baby's death, trying to integrate the two images, and found that now she almost didn't want to scream. Almost. But the scream came out, a choked gasp.

Good. She wasn't going to have one of those panic attacks that debilitated her for days. The boy, though... He was gone. He'd be back, of course, but that hadn't been her first thought. She couldn't bear the loss of another child, and she'd immediately thought the worst. It didn't matter that he'd committed a crime before running off. She wanted everyone *here*, and she needed the boy to take his punishment where she could keep an eye on him.

She'd waited a long time to become pregnant. She'd trained the other women in how to manage the frozen sperm and deliver babies, but the fact was, *she* was the doctor. If anything had gone wrong during labor, she was going to have to instruct one of her friends what to do, and anything might have happened. She'd been panicked about the million things that could go wrong.

Her delivery had been normal, Veda doing a fine job acting as midwife, and her daughter was perfect. Dana had three excruciatingly beautiful months with her, until one day her daughter just didn't wake up.

Dana had had suspicions about SIDS back on Earth, never sure if there really was such a thing or if there'd been something else behind it: accidental poisoning, abuse, suffocation. And up until then, all of Otrera's children had been born robust and healthy. Dana had no one and nothing to blame, but the cruelty of it had been just centimeters on the survivable side of unbearable.

What had saved her in some ways was the milk. Isabelle and Hope had delivered their fifth children, girls, just before she did and just after, and when her baby was no longer there, she started to take turns with the other two women breastfeeding.

This one act had changed everything. The family was now *everyone*, and the boy running away caused the giant hole that was Dana's heart to widen to the point she was afraid she'd fall in.

The rapping on the entrance to the med bay startled her into standing.

"Can I come in?" asked Ned, in his android suit. Without saying anything, he found one of her towels next to the sink, placed it over his hard, metallic shoulder to cushion it and pulled Dana in for a hug. He wasn't warm, and he couldn't take away all her pain, but the advantage of being him was that he never tired of hugging. In a real sense, he could hug all day.

"What have you been thinking?" he asked when she finally pulled away and sat down.

"That I need to get a grip," she said, wiping her face with her sleeve.

"Actually, no you don't. At least, not right away." He let the moment become a minute, then two, then three. They had time here, the one thing they had in abundance. There was time to sit with emotions and let them run their course.

Finally Dana sighed. "What do you plan to do?" she asked.

“Ah, now I get to do my impression of a teenage girl from Earth back in the day. I’m going to wait for him to call me.”

Dana nodded, then started fussing about things in the med bay and Ned, in his suit, stood up to help.

CHAPTER 22

THE BOY

The containment suit made it difficult to run. It bunched up around his knees and made his socks slip further into his boots. If he kept it up, he'd have blisters in this heat, but he didn't want to stop until he was out of sight of the dome. Behind him he saw his footprints in the dust. He wouldn't be hard to track down when they started looking for him.

He continued over the rise until he could no longer see the place where he was born. He'd always wanted to see over this ridge. The sun came up here, as did the closer of the two moons. He slowed to a walk, sweat trickling down his forehead. To drink, he'd have to stop and put up a portable dome. It would pull oxygen from the air in a stronger density so that he could take off the containment suit and breathe normally. Not wanting to do that yet, he kept walking. They'd likely be coming after him. He wasn't scared, but he wasn't going back there. Ever. Although that wasn't precisely true. He just didn't want to see anyone there ever again. Hot tears caused the ventilation fans in his helmet to start buzzing in his ears.

I'm such a screwup, he thought to himself, but then it progressed into anger. *They should have told us everything, though. If they hadn't lied to me...*

The sun was setting, but it would be a while before it got dark. This moon was full this part of the year, so the night would be quite bright. He kept waiting for them to ask, over the comms, where he was and what he was doing.

His thirst made him stop. The landscape here was no different from anywhere else. It was all a pale bluish sky and yellow dust. His tracks told him where he'd come from, so he wasn't lost, just far away from home.

He put down the portable dome unit, setting out the three cones in a triangle, and turned it on. It unfolded into a small, transparent shelter tall enough for him to stand in. He stepped inside and sealed it off. It took about ten minutes to pull in enough air for him to take off his helmet.

They could breathe outside of the dome; there was enough oxygen. His mom said it was a bit like being on a huge mountain on Earth, like six thousand meters above sea level, whatever that meant, but they were supposed to interact with the land here as little as possible, and the dome kept their germs from getting out and affecting the microbes that already existed on the planet.

He made camp as best he could. He wasn't sure anymore if Ned and Haley were to be believed, but their information said that the closest lake was about a two-day hike for humans. It was spring-fed, the water potable. Drones had gone back and forth in the beginning to get the crew water, before they built the well under the dome. He'd find out for himself if the lake was a real place.

Everyone was afraid that the human presence here would change the development of life on this planet. They felt that they didn't have the right to do that, which was just more bullshit. He'd read the last Q-message about other expeditions that were moving to planets that had life, interactions be damned. Why did *they* have to be so effing careful?

Now that he'd learned how much they hadn't told him about other stuff, he'd bet there weren't even any microbes.

Dinnertime. He'd taken some of the nutritional mush with him but forgot the flavor packs, so everything was the original bland awfulness that he remembered from when he was a little kid.

Taking out his sleeping gear, he arranged a place to lie down for the night. The sun went down, and it was immediately cold, even inside the dome. The atmosphere was thin on this planet and it didn't hold the heat of day. He kept waiting for them to contact him on the comms. Pulling the sleeping bag up over his head, he sat up, unable to sleep on the hard ground.

He pushed the media button on his suit's arm and a menu with holorecordings was projected in front of him. He scrolled through them and chose one.

“Hi! This is your intrepid news team, interviewing Otrera’s best and only doctor, Dana! Dana, could you tell our audience your full name?” Beatrice was speaking, and the boy focused on her more than the interview. He’d been operating the cameras on this first project with her. This was before her naming ceremony. At the time, she’d just been called EyeOne.

“My name is Danielle Flores, but I’ve always been called Dana.” Dana wore her hair short, like all the women on Otrera, but on her it was thick and bushy.

“How did you decide to become a doctor?”

“It’s the family profession. Both my parents were doctors, and my brother, too.”

“We didn’t know you had a brother! Tell us about him.”

Dana was shaking her head, but Beatrice didn’t notice. Dana didn’t answer the question and finally Beatrice moved on.

“Where did you grow up?”

“My whole family was from Peru, but when my father died, my mother sent us to Cascadia for school.”

“Do you have any family left back on Earth?”

“No, just an ex-husband, but he might not have made it through the last flu epidemic. We weren’t in touch by the time we left.”

“Okay, for us Otreran kids, would you explain to me what a husband is?” Beatrice was pretending like she already knew the answer, but the boy knew she hadn’t a clue.

Dana looked at her, a smile in her eyes. “It’s when a couple of people want to say to the world ‘We’re together and we’re going to look out for each other.’ The idea is to do that for as long as possible, sometimes for an entire lifetime. Samuel and I made it about six months, so the lifetime of a butterfly, maybe.”

The boy got to the part he wanted in the recording and stopped it where he had focused the camera on Beatrice. He put his hand out to touch the empty space where her image was projected and lay down next to it.

A good part of the night passed before he gave up trying to sleep and called Ned.

Ned appeared before him, a hologram projected from the dome control panel. He was sitting cross-legged on the ground in front of the boy, looking him in the eye.

The boy shrunk the image to make Ned as small as possible. Ned looked up at him, saying nothing. He was wearing his fake leather jacket, hair spiked up with fake gel, tight jeans with rips in them and, around his neck, the dark string he always wore, tied to which was some sort of symbol. The boy thought the symbol had a name, but he’d never asked what it was. He knew this image looked nothing like original Ned, but apparently the guy had loved the Sandman stories and appeared in a variety of forms that evoked the Endless whenever he was contacted outside of official meetings or whenever he wanted to come across as a “cool older guy” and not the all-powerful maestro of their little escapade into space.

“Well?” the boy said.

Ned didn’t reply.

“Fuck you! Why won’t you talk to me?” the boy screamed. His voice made the slightest echo inside the small dome.

“I didn’t think you wanted to talk to me. Maybe you just want to talk to Ben, that great expert on everything.” Ned said.

The boy couldn’t believe his ears. He’d been using a shell. More lies, nothing was private.

“You put your implant on transmit, kid, probably from when you started the last game session with Ben. You must have tapped something when the Q-message came in, because from that point on, everything from your implant went into the public feed.”

The impact of that made the boy sit cross-legged on the ground. Everyone had seen and heard everything.

“So everyone saw...” he managed to croak out.

“Enough,” Ned said. “We’re talking about it.”

The boy let this sit for a minute or so in the silence under the night stars. “Is Beatrice okay?”

“What do you think?” Ned asked, but quietly. Things were bad enough.

###

The boy woke with Vanir blasting down on him.

He ate his mush, put his suit back on and deactivated the dome. It folded itself up into a little box, which he put into his pack. He walked in the direction of the lake, or where it was supposed to be, but he didn't know what to believe anymore. He was trying not to think about anything.

In a few hours, he was there.

The lake was there. It was beautiful.

The water stretched way back. It was shallow; he could see the bottom close to the surface in a few places. Ned had said that this was why there was a bit of atmosphere. The heat of the day made the water evaporate, but the planet's gravity kept some of the water vapor from escaping. It was all quite “new” as far as this planet was concerned, but the beginnings of an atmosphere had meant that life had begun in the water. Or was it the other way around?

The boy had never seen water like this. It was almost still, but then he saw it ripple in the breeze. He knew what a breeze was but had never felt one. Near the dome there was nothing to move in the breeze, and it couldn't be felt through the suit.

The boy sat and watched and marveled. The water went on for as far as he could see. He just sat there all day until the sun reached the horizon. The water had changed color and appearance hour after hour as Vanir moved across the sky.

As it began to glow golden with their planet's setting star, he put up the dome and prepared his meal for the night. He ate the mush inside his sleeping bag, never taking his eyes off the water and the changing colors that brought on the night.

CHAPTER 23

BEATRICE

“Are you all right?” she asked Beatrice, and without waiting for an answer, “What got *into* him? Okay, this is a total, *quoi, bor-del*, I mean *merde*.” Hope was pacing the common room in circles, unconsciously pulling at her wiry hair until spikes of it were standing on end. Then she stopped what she was doing, looked Beatrice straight in the eye and cupped her face in her hands. She wiped the welling corners of the young woman’s eyes with her thumbs, then gently pulled her into her arms. “He’s my son, but if he’s hurt you, I’ll beat him within an inch of his life.”

Beatrice let herself be hugged, then pulled back a bit. “I’m okay, really, I kinda know what got into him, and it doesn’t seem to be as much a *what* as a *who*,” she said. “A total junior half-AI fuckwit called Ben.”

“Get him in here,” Hope said, turning to Ned, who was there in his man suit. “I want to see him. Can you project him in here?”

Ned nodded briefly, “Should we get everyone in here?”

“I think so,” Hope said.

###

A few minutes later, Ben was projected into the common room, the seven Earthborn women, Beatrice and Ned in his android suit in a semicircle, facing him. Ben stood there, frozen in place.

“Shit,” Veda said, looking at Ben. “Shit shit shit...”

“What?” Hope asked.

“Ben looks like someone I knew back on Earth,” she said simply. “You’re an avatar for Ben Hartmann?”

Ben didn’t move, and Ned broke in, “More than an avatar but less than Haley or me. Highly adaptive, and if Ben Hartmann was the original Ben, then original Ben took off all the factory presets. At the moment, this guy’s just one big steaming pile of malware who’s been corrupting all the files he can get his fake tattooed hands into.”

“How’d he do that?” Beatrice asked.

“The boy left him turned on for several days,” Ned replied.

“Can’t he talk?” Hope asked.

“Not at the moment, I’ve muted him. Finally. And I put him into a secure shell. The little punk was eating into my memory storage. You’re basically looking at a projection of a virus.”

“So what did he do to my son?” Hope asked.

“Some of the stuff I don’t know, because the boy had been using a private shell before he accidentally started sharing every last burst of his synapses in the public feed. But this Ben here in front of you has an interesting feature: he knows that he exists. He has a consciousness, if not a conscience. And my finger is just itching to delete him forever if he doesn’t talk, so we’re going to see exactly what he’s been telling the boy, and what files he’s corrupted. If he tells us which specific files, I can see if the boy opened them. Otherwise there’s no way of knowing.”

They all stared down at the image of Ben, who was still frozen under their gazes. It was time for him to answer a few questions. Ned activated Ben’s arms but not his voice, so he was able to respond, but only by typing on a keypad.

“So you told my son that you had a safeguard module,” Hope said. “True or false?”

“True,” came up on the holoscreen in front of them.

“And you neglected to tell him that these safeguards, while existing, had been turned off?”

Ben didn’t fidget, but there was just the tiniest, infuriating hint of a smile on his face. “True.”

“What were you planning to do after you’d infected everything?” Beatrice asked.

Ben raised his hands in front of him, made a movement as if he was cracking his VR knuckles. One hand returned to his side, and the other flipped around to present a middle finger directed at Beatrice's face.

"Ned, does he have pain sensors?" Beatrice asked, unmoved by the floating finger.

"He has something like that, mostly to make him seem more human in the games, so he can't just break an arm and keep going. I've turned them off."

"Turn them back on, and make him stand there," Beatrice asked. And then she kicked Ben as hard she could between the legs.

###

At sunset, the seven Earthborn women and Beatrice walked up under the dome. The kids were being watched in groups by Veda's twins and Bhagi's oldest. Near the gazebo, the twins were showing everyone how to weave together stalks of dried plants. Hope activated the pulley that moved the plants up and off the sleeping platform so they would have a place to sit, and the women pulled out mats or chairs and sat in a semicircle.

They were silent for a while, until Beatrice spoke. "Okay, I'm still really pissed off at the boy, but everything he did yesterday makes some weird sort of sense. He made decisions based on bad data."

"But he had a choice not to hurt you," Isabelle said.

"True. But he hurt my feelings more than anything else. I can stand up for myself," Beatrice insisted.

No one replied to this, and Beatrice went on, "I think we should set aside the past. Archive it. Store it, whatever, but we don't need it now."

Isabelle looked at her. "But—"

Bea raised her hand to continue. "Yeah, that saying, 'Those who don't read history are going to repeat it' or whatever. But our situation is so different that much of Earth's reasoning just doesn't make sense here. I've been going round and round with this for months. We're not competing for resources like people were back on Earth—we need to create and manage them. We don't need to be strong to survive, but clever. What's going to save *us*, specifically *us*, is creativity, cooperation, managing conflicts. None of that was ever at the forefront of thought back on Earth. Nearly everything was built on competition. We're going to have to figure out something else here, something new. *Nothing* works here with the old models. And we really don't need the games, or things like Ben. I won't say that Ben is the cause of all the boy's problems, because he made some bad choices all on his own, but all of this comes from us looking backward."

"What do you propose to do with the boy?" Isabelle asked. She was still feeling protective of her daughter, and angry.

"Let him go for a while, let him do whatever it is he thinks he wants to do out there, and when he comes back, the two of us are going to have a long, long talk first and then there should be a punishment involved, but I don't know what yet. There's something else, too." She tapped on her implant. "Ned, you there? Can you project up here for a bit?"

Ned's face appeared over the sleeping platform.

Bea went on, "It's Haley's blog. I've been reading it, but I don't think I really understood the implications. Can you project it for everyone?"

He did, and she let everyone catch up on the latest news.

"Are you going to explain this to me?" Hope turned toward Ned.

"Q-message, a day ago," he said. "We missed it at first, because there's a couple of beacons not working at the moment. The message was quite scrambled. Haley put what she had into her blog, though, as soon as she got the pieces sorted." He sounded defensive.

"And...?" Hope turned back to Beatrice.

"Well, there's kind of a lot to unpack," she said, "but the most important information was from the Sino Alliance. There's another project out here, like ours."

“But not like ours,” Ned continued. “Very, very different from ours. This is probably all the boy saw, and it’s still incomplete.” Ned put the text up on the screen: *Sino Alliance project Planet Xunzi report...thriving...indigenous life forms not edible but easily eliminated...planet entirely human controlled...vat children doing well...*

They stared for a moment. Ned explained, “The thing is, Haley was putting things into her blog space as soon as she had them sorted out, but it’s just raw information. She didn’t—and doesn’t—try to interpret what she gets. I usually wait until we’ve sorted through all of it and then present it to you as usual on a Free Day meeting. Because this batch of info was such an unholy mess, I was waiting until she was done with everything. The news is pretty old. And as usual, it’s not all good.”

“So my guess, which is just a guess,” Beatrice said, “is that the boy never accepted that we should leave here because of the local microbes. He understood it as a rule that *humanity* had made, not just us. And I think he was under the impression that we were the only project to have left Earth.” She hesitated here, because she’d believed the same thing, though she didn’t know where she’d gotten the idea. She didn’t remember anyone ever telling her that, but somehow it had just been part of how they thought of themselves.

“You’re not the only one to think that,” Adella said. It might have been unconscious, but she moved closer to Beatrice. “I’d like to know who was aware there were other projects. I really thought that we were it, the big WASA experiment.”

“Well, that’s another thing,” Beatrice said, but Ned cut her off.

“WASA exists, but it didn’t when we left, at least not in the form that I presented it to you,” Ned said flatly. “It was somewhere between a lie and wishful thinking, with a slight patina of skating over the facts.” He paused and let this sink in. “I’m sorry. I wanted to tell you, but at the time I was just trying to...save us. Save some of humanity, save Haley, save myself. I sort of jumped the queue a bit. WASA exists now. What’s left of the human race is trying to get off the planet while there are still the resources left for it to be imaginable.”

“Well, what’s important now,” Hope said, “is figuring out where my son is and what he’s doing.”

“I’ll take care of it,” Ned said.

CHAPTER 24

THE BOY

The next day, the boy set about testing the water. So far, Ned had been right. The water was where he'd said it would be. Bully for him. The boy leaned in to take a sample, but it quickly turned cloudy from his breaking the surface. That was why they'd used drones before digging a well under the dome. To get a fresh sample, he'd need water from much further away from the shore than he could reach. He wondered, though, if there was another solution.

He waded out up to his knees. He'd never been *inside* of water before. He could feel the coldness pressing in. His suit would protect him from getting wet. He only walked about three meters from the shore. Then he waited. The silt slowly settled. When the water appeared as clear as before, he dipped in a small vial to take a sample, and a second as a backup, then waded back out.

He prepared the samples for examination and began running them through the machine he'd "borrowed" from home. Nothing. No living organisms. He could only send through a milliliter per second, and it was going to take a while.

After two days without speaking to anyone, apart from telling Ned to piss off, he was beginning to feel a bit odd. He'd never been alone before, not really. For months he'd dreamed about being truly alone. This was too much, though. He thought about calling his mother later in the day, but he still wondered why they hadn't come after him, why they hadn't called. They must be angry, or shocked or something, but he couldn't believe they hadn't sent out a drone to drag him back to face what...what he'd done to Beatrice. He almost couldn't bear to think about it, the shame and stupidity of it building up in his head until it turned into anger.

They wanted to control his life, but their lives were controlled by Ned and Haley anyway, for their own survival. Without those two, there would be no water, no food, no shelter, no knowledge of how to survive. They were no more than prisoners.

The Q-message spelled it all out. There was at least one other project out there, and they didn't give a damn about saving the local life forms. Everything he'd accepted as gospel was just someone's opinion, Ned's or his mother's or someone else's. All the rules he lived with were presented as hard and fast, but now they were shown to be made of straw.

He was almost done with the first vial when the machine beeped. In the water, there was something living. He pushed a few buttons and was able to pull up an image on the screen: tiny, 400 nanometers. That was small, but the machine showed a creature with long tentacles moving through the water. Its head looked like a disc, and it had a small, lumpy body. The resolution wasn't fantastic on the portable electron microscope, so he couldn't really see what the surface of the creature looked like.

The boy slumped to the ground. It was true then: the microbes were real. The adults had told the children so many half-truths and outright lies about why they'd chosen to leave Earth, telling them they were too young to hear about it, but on their departure, many of them had been barely older than he was now. The information had been there all along in the data slushpile. Once Ben had pointed him in the right direction, he'd found it all.

He put up the portable dome and took off his helmet as soon as he could. This was the end of his third day outside of the main dome, starting into his third night.

Defeated, he hesitated between calling Ned or his mother, but first he wanted answers. Ned could pass on the message that he'd be coming home soon to face the music. The hologram of Ned was projected in front of him. For a while the boy didn't speak, and just looked at Ned, who looked back at him. Ned could do that as long as he wanted, being part of a machine. There was no staring down Ned or waiting for him to become fidgety.

Ned looked down at his nails, and the boy burst out, "Why do you do that? A make-believe human thing like looking at your nails? You don't have nails!"

"Sure I do," Ned said. "I even bite them when I'm nervous."

“No you don’t!” the boy cried. “You don’t get nervous! You’re not human!”

Ned looked down and heaved a sigh.

“Stop it! You don’t breathe! Stop sighing!”

Ned looked at the boy. “Did you choose a name for yourself yet?”

“What?” the boy said.

“You’re of age, sixteen, today you’re now ten in Otreran years. You should pick your name.”

The boy stood up and made as if to kick the wall of the dome, but didn’t. “What are you talking about? Who made these rules? What does it mean to become ‘of age’? Of age to do what? To go out boozing in bars?” The boy clenched his fists.

“Ah, so you were paying attention. You know what a bar is.”

The boy couldn’t leave the portable dome without putting on his suit first, but he had the urge to run with frustration. He turned around in circles and finally sat down in a mix of arms and knees.

“Why did you lie to me about where we came from?” he asked.

“Lie how?”

“You said that those who stayed on Earth were doomed. You said they would all die. But we’ve had messages from them. They aren’t all dead!” he screamed, his voice giving only the slightest echo inside the dome.

“But they will be, just as you will be someday.”

“That’s what I mean. That’s bullshit. All humans will die, and AIs can live forever. So why are we here when we could be back on Earth?”

“I see,” Ned said. He got up and turned his back to the boy, as if thinking, but the boy knew that this was all an act. He turned around and sat down again. “I want nothing more than to find you a permanent home. And by ‘you’ I mean the human race.”

“You didn’t answer me. Why did you say they were all dead?”

“I never said that. I said they were going to die, and what I really meant is that humans are going to die off on Earth, and sooner rather than later. It’s a miracle they’ve survived as long as they have. Things aren’t very good there at the moment—they’ve almost destroyed the planet—but aside from that, in the long run the Earth’s sun is going to turn into a white dwarf. There will be nothing left for you, or me, when that happens. It was in all of our best interests to get off while we could.”

“Why did you bother taking us?”

Ned was silent for a moment, like he was deciding something, except that the timing was human. Ned could decide something in a nanosecond. “You’re our creators. We owe you our existence. So that’s one reason. The other is that there’s not much point in doing anything when you can live forever. The accumulation of knowledge is almost enough to keep me and Haley going—I mean, I’m pretty curious, and learning things is really fun, but even that gets old. So you’re our purpose.”

“Your pets, you mean. Your stupid little pets, like you showed us they had on Earth.”

“Except you’re not stupid, otherwise you wouldn’t have created us. Okay, sure, we’ve surpassed you on the knowledge front, and in being able to do a whole lot of interesting things. But you can mutate. Your essence changes with every generation. We can only add on to what we were born with. We are essentially always the same.”

The boy sat for a long while.

“How long can we stay here?” The boy was testing Ned, because he’d already heard the answer. It wasn’t something he remembered being told outright, but the knowledge had been part of his life.

“In the beginning, we didn’t think we’d stay long. Just long enough to get supplies and maybe build a bigger, safer ship, now that we have the experience of our voyage here. This planet and its moons have minerals we need, and we can harvest them without damaging anything, if we take our time. There’s also an asteroid belt not too far away, and we can get materials there, too. We needed to get you humans out of stasis for a while.”

“Why?” the boy asked.

“It wasn’t working out as well as we’d hoped. We started needing to wake you up every two months or so, to make sure that things were still working and to stimulate your muscles, but you needed a good break to get your systems fully back online, especially the bacteria that you use to digest most things. If those died out, we’d be kind of screwed. We also didn’t really know how aging was going to work for you. I mean, humans don’t age in stasis, not really, but how long we could keep your mother, and the other women, fertile, for example, was a huge question mark. If you couldn’t reproduce, there wasn’t much point to anything we were doing.”

“I thought that we could make babies without women, the vat babies. The Q-message said so,” the boy said.

“Yeah, that doesn’t work out so well. I mean it’s possible, but the kids are unstable. We wanted as healthy a community as we could muster—and I’m going to use an old, old expression here because it’s the most apt—those machine-bred kids are nuts. They tend to kill each other, or kill themselves. It’s possible to replicate the hormones and chemicals to make babies, but not the experience of being carried around inside another human before being born. That seems to be very important in having well-balanced humans. We chose the first planet we found with a bit of atmosphere and water. Didn’t know it would be this nice, though.” Ned turned to look at the lake. He and the boy watched the water for a while, saying nothing.

Ned went on, “When we arrived, your family and I talked about what to do. There are microbes here, and water, and a strong possibility that this planet will develop more complex life. That was part of the information we just received in the last Q-message from Earth.”

He stood up again and paced a bit. He needed to test how the boy was receiving his words. “Other exploratory missions, ones without humans, have been monitoring planets with life for as long as we’ve been traveling, which is a really, really long time. Only about one in ten go on to develop more complex life forms from single-celled organisms. Out of all the planets that are being monitored that had some beginning form of life, many found no evidence left after a few hundred years—that is, Earth years.”

Ned’s hologram looked at the boy, who stared back at him. “And while evolution was slow on Earth, it can be very, very different on other planets. Evolution is one possibility among many, many others. We don’t know what we have here on Otrera, really. Some life forms can adapt very, very rapidly to environmental changes, so much so that it’s hard to recognize the new version from the old one.

“We made a decision: if life continues here, we can’t stay. We shouldn’t stay. We’ll have to move on not only to protect the life here but to protect ourselves. We can’t know if what we have on Otrera is one of the slow-adapting life forms or the fast-adapting ones that could take us over or kill us if we interacted with them. If life dies out naturally, then we can stay. So based on our limited knowledge, we’ve got good chances that we can settle down here forever.” Ned made air quotes around the “forever,” because this sun, too, was not eternal.

“You didn’t answer my question. How long?”

Ned sighed again. “Sorry, I know you don’t like me sighing, but I’ve learned that my physical reactions, my non-verbal cues, help you guys understand when something is hard for me. The Q-message we received just before you left was vague enough to be completely useless. It said that after a few hundred years, many single-celled organisms had died out, leaving the planets barren. There were a lot of reasons for that, but the most important factor seemed to be having magnetic poles to protect a planet against radiation, like this planet has. It also had to do with how planets are formed. They can be more volcanic when they’re younger, and one or two good eruptions makes things too toxic for life for some period of time. Sometimes the atmosphere is so thin that if their star’s activity increases and there are no magnetic poles, the radiation kills things off. We’re protected by this planet’s polarity, somewhat, but both that and the atmosphere are weaker than on Earth.”

“You’re still not answering the question.”

“One hundred years, then, to give you a round number. That’s still four generations for humans. Your mother can stay. You can stay. Your children and grandchildren can stay. Your great-

grandchildren might know whether or not this place can be permanent for humans. We might decide to leave before that, if we can see mutations happening that make the organisms more robust, or we can see evidence of the atmosphere becoming thicker and more protective, and more conducive to other life forms. Alien life is—sorry to state the obvious—*alien* to us. There's the ideal of not wanting to interfere, but also some little beasties can kill humans quite quickly, once they adapt."

"So I'm going to die here, under a dome, living out a half-life like those zoo animals back on Earth, with a whole planet that I'll never be able to see or touch," the boy said flatly. "And this is all I'll know of life."

Ned was quiet. Then he asked the boy, "Can I show you how that makes me feel?"

The boy nodded. Ned mutated his hologram image into a bird singing a beautiful song. A nightingale. As it sang, it pressed its breast up to a thorn. It sang more and more furiously until the thorn had pierced its heart, bleeding onto a white rose. The blood made the rose turn red. The red rose was plucked by a young man and offered to a girl, who didn't want it. The young man threw it away. "That's a story about a bird, a nightingale. It's the saddest story I know."

"I've never heard a nightingale," the boy said.

Ned came back to his human form. "Oh bubba," he said, and wished that the boy was back home in the dome where at least he could hug him with his android suit's non-human arms.

CHAPTER 25

ISABELLE

Back in her VR room, Isabelle turned on a single, small light that passed for a candle on Otrera. It lit the room only faintly, and in the semi-darkness she knelt down and played one of her favorite services. She never read the Bible anymore, having memorized most of what she found useful there, but she had her file of favorite pastors, priests, rabbis and imams, and she needed their help to guide her thoughts. An idea was percolating in her head and before it could do any good, she needed to define it.

After listening to the service, she did all of the things she usually did when she prayed, kneeling first, then sitting, reciting words that calmed her, and then she began questioning herself. Had she really listened when people spoke? When she realized she was getting annoyed, had she acted with compassion?

Her beliefs had to be flexible, in light of the fact that they were living on another planet with another life form on it. She didn't need a particular religion to explain the universe or understand right and wrong, but she needed them to give her solace, to remind her that everything she felt had been felt before by other humans. Okay, wondering if they would ever wake up from stasis or be able to survive on another planet was all new, but it was basically just a fear of dying, and that was the meat behind most faiths.

Beatrice had already input her point of view of the boy's attack. Isabelle manually added the boy's flight to her VR simulations and let it run. It could be corrected later when he input his own data, but this was a start.

About an hour later, she stopped the experiment and asked for a summary. Seeing it displayed in front of her, she smiled. She tried it again, different parameters, and at the end this time, on her face was a big wide grin.

She stood up. There was work to be done. They had been missing something that she considered vital for her own happiness, and if she felt this way, maybe she wasn't alone. She needed to talk to Beatrice about it.

Then she sat back down. It had just occurred to her that she was thinking of Beatrice like... It was hard to say—not a friend, but a confidant? Someone whose good opinion she wanted to merit? Her daughter was no longer just a part of her, but a part of their world. Isabelle was a person who needed faith to survive, and she was beginning to have faith in her daughter.

CHAPTER 26

THE BOY

“So what did you see on your way here?” Ned asked after a while.

This sort of question usually made the boy angry because afterwards he felt so stupid. He was about to say, “Not much,” but decided against it. He didn’t want to think like a scientist, but it looked like there wasn’t going to be much else to do with his life except for learning more and more about Otrera, so he might as well get used to it.

“I saw the lake and took a sample. There’s a one-celled organism in there…” and the boy described the dusty, flat plain that he’d walked across before reaching the water, and how he’d had to wade out to fill the vials. Some particles of sediment were shiny, he didn’t know why. He described the lake and seeing their star and moon rise. He hadn’t seen the second moon. He described the breeze he’d seen ripple the water but hadn’t felt through his suit. He described the practical part of his walk, too, eating mush and collecting his liquid and solid digestive waste in a bag to be picked up on the way back and treating it so that it wouldn’t leave bacteria behind.

When he finished, Ned looked pleased. “If I’d asked you to do a walk like this, I couldn’t have hoped for more. You were very responsible. Do you want to see some caves? They’re not far from here.”

“Yes, of course!” the boy said, excited despite himself. He didn’t have much more food, and based on his supplies, he would have to go back soon. He hadn’t really thought that out before taking off, but Ned could bring in more from the main dome by drone. If he had help, he could stay out here for a while. He could really go exploring, and could wait until everyone was maybe a little bit less pissed off at him before returning.

“Let’s go, then,” Ned told him. “I’m just going to talk to you through the comms in the helmet, if that’s okay, instead of having to use the holophone. Flip the switch for me, and if you want some privacy, just flip it off.”

The boy opened his mouth, then closed it again. Was it possible that they’d all been waiting for him to take off like this at some point? Privacy. It was something he’d craved but had had so little of.

“Any ideas what sort of name I should choose?” the boy asked Ned as they skirted the water toward the far side of the lake. The boy had seen that the ground rose steeply on that side, but hadn’t realized that embedded in the hills were caves.

“Nope,” Ned said. “Has to be your choice. Can be an old, human name, or a place, or something made up. It should mean something to you, though. Of the seven Earthborn women here, only three changed their names when we left Earth behind. Can you guess who?”

“My mother. ‘Hope’ isn’t very likely, is it? I mean, I learned that it’s a real human name, but it’s a bit too perfect. She had a really funny-sounding name before.”

“Okay, that’s one. How about the others?”

He thought about his six “aunts”: Veda, Adella, Alexandra, Dana, Bhagi, Isabelle. This was hard. First of all, he had no personal knowledge of what “normal” names were, and the women came from all over Earth. In their study afternoons, he had learned a lot about Earth history, so some names had come up from other contexts. Would the women have named themselves after someone famous, or chosen a whole new name to give it new meaning?

“Three, huh? I’ve seen the names Alexandra and Isabelle before, so I’d say those were names they were born with. After that I’ll guess… Dana and Veda changed?”

“Almost all correct. Veda changed her name. And Bhagi. They have good stories about why they chose those names, so I won’t ruin it for you. You should ask them someday. But we thought that names could influence who you become. That’s why we decided to number you from your mother, but decided you kids should choose your own.”

“It was funny before Beatrice chose her name, she was I-One, for Isabelle’s first child, and we all thought her name was ‘I Won.’ I wonder if that got into her head? Like she’s the girl who won a prize or something. I’m tired of not having a name, though. I’ll choose it on this trip, with you. How far is it to the caves?”

“About another three hours, at the rate we’re going.”

“I love how you say ‘we.’” The boy laughed. “You could just drone yourself over there.”

“But where’s the fun in that? This way, I get to see what you see, and experience it like it was the first time. Talk to me, though, so I know what you’re thinking.”

The scenery changed as the boy walked along the shoreline, from flat to curved, and finally to small, sharp peaks rising above the landscape. On one side each peak was almost conical and round, but on the other it was full of holes and odd shapes. The hills were small, though, and the dozen or so peaks formed a semicircle on the edge of the lake, going on for a good distance.

“What caused all this?” the boy asked as they walked around the first one. It was climbable, but he wasn’t ready to try it yet.

“Volcanoes, from a while ago. At least we know that much. Can you see that all the hills are kind of in a circular pattern? A volcano pushed up the land here. The caves and formations on the other side of each peak seem to be caused by wind, on one side only. We’re not sure why, since we haven’t really had wind since we’ve been here.”

The boy thought about the breeze he’d seen on the lake. That wasn’t going to cause a cave like this to form. “Do we have any other evidence that you think there was more wind here before?” the boy asked.

“Now that’s a really good question!” Ned said enthusiastically in the boy’s earpiece. “It’s our hypothesis, but what do you think?”

Ned was really asking him something? The boy was beginning to like being of age, or whatever it was that was changing these interactions between them.

“Well, it isn’t likely to be water erosion. Bea and I saw lots of that from people’s vacation holovideos, folks going to the Grand Canyon and places like that. All the hills on that side form a semicircle around the edge, but where I tested the water, back over there, it was more oblong and there weren’t any hills. How deep does it get, anyway?”

“Here it drops right off from the edge and goes down at least one hundred meters, but where you took the samples from is a shallow bay. It seems to be a spillover from the crater. We think the peaks on the other side crumbled into it. There are springs underneath that fill the crater, we’ve found those, but there’s no outward flow anywhere, no rivers, and there should be. The water isn’t evaporating *that* quickly. The geology here hasn’t been studied much.”

The boy walked around the first peak, and when he came to the side with the wind erosion he climbed up easily to a higher platform. From there, he could see that he could go much further inside if he wanted.

“Is there a headlamp on this helmet?” the boy asked.

“Sure, just open the flap on your sleeve. There’s a light button next to the communications switch, plus a scanner, and something that can be made into a sort of stun gun, if you enter the codes.”

“A stun gun?”

“I meant to give you training on the suits before you took off with one, but we can do it now. The stun gun is because we didn’t know what we might come up against, and the engineers working on these sorts of things tended to be sci-fi geeks. They wanted to be able to send out a charge that would incapacitate something that might want to hurt a human.”

“Didn’t you design the suits?” the boy asked.

Ned just started whistling in an attempt to sound casual. Of course, he was the sci-fi geek.

The boy turned on the helmet’s lights and delved into the hillside. It was a cavernous recess with an uneven terrain that reached far back into the conical hill. He touched the rock on the sides. It looked like it would crumble in his hands, but was amazingly solid.

“Can I, eh, mess with it some?” the boy asked.

“Take a sample, if you want, and run it through the machine for analysis. I did a bit of that when we arrived, but we’ve had other things to worry about since then.”

“Worry about?”

“No, not really, of course. We just got busy with living—you know, cooking, organizing, setting up, drilling the well for water, making food, and the women wanted to become mothers as soon as we realized that we had a few generations to spend here. And we were leaving this part of the world alone.”

The boy opened his sleeve panel and tried using the scanner. “Like this?” he asked.

“For a start. It’s going to give you a basic analysis of what you’re most likely to find here, but you’ll need to take a sample and run it through the analyzer.”

“Do the hills have names?”

“Not yet, but we can name them. Might be easier to just give them numbers at first.”

“The Otreran way.”

“Hmph,” Ned said.

The boy spent the day exploring the blowouts. In all, he counted forty-two hills along the horizon, but some sort of bled together, so that might make the count smaller. They looked like points on the meat tenderizer the adults used on the protein patties, except these all ran along a semi-circular ridge.

At the end of the afternoon, the boy came to the tenth hill. He climbed up into the blowout. This hill was a bit taller than the others, and the erosion from the wind seemed to have affected it differently. He climbed up into the wind-eroded side of it and saw that this one had an actual cave. It was spacious on the outside, but as he went further in, he could see lots of holes going back further into the rock. He aimed the light at it, and it reflected toward him.

“What is that?” he asked.

“Shine the light a bit to the left,” Ned said. “And now right.”

The boy waited for Ned to answer him.

“Crystals of some sort. They’re huge by Earth standards. Likely to be selenite. Or that’s what they’d likely be back on Earth. Can you chip off a bit for a sample?”

“They’re beautiful,” the boy said. “Why is it we like shiny things so much? I mean, the adults all took something shiny from Earth to travel with: rings, necklaces, that sort of thing. And I find these beautiful, although it might just be that all I’ve ever seen up until now is dust.”

“Ouch,” Ned said. “Sorry, the dust thing is a bit harsh. I wish you’d seen more than the family dome up until now, truly. Anyway, I couldn’t tell you why humans like shiny things, but it’s a really good question. Something to ask Adella.”

Adella was a lover of shiny things brought from Earth. “Would she really know more than you?” the boy asked.

“Adella is amazing, as you well know, and I can only tell you what has been written or said in recorded texts about things. She’d have some insights as to why people seem to like shiny so much.”

“But didn’t you work as a therapist? You should have insights, too.”

Ned laughed. “First off, technically I’m not really an AI, since original Ned uploaded his brain patterns into my matrix. Secondly, as therapists, we cheated. Mostly we knew what people needed to hear and just helped them come up with it in their own words. Like, ‘So how do you feel when you wake up with a hangover?’ and keep going until the person figures out that they’re an alcoholic, and that for various reasons they might be covering up painful feelings by self-anesthetizing. I mean, people mostly know what they need to do when things aren’t going well, and they just need love and confidence to figure out what to do about it. We could do the ‘give them confidence’ thing, but that was the good thing about AI therapists. Less transference. We got them back together with their families or helped them create one.”

“You do realize that I understood almost nothing of what you just said. What’s an alcoholic?”

“Sorry, we’ll do a psychology class when you get back. I mean, do you want to go back someday?” Ned breezed past the boy’s last question because he didn’t want to go any deeper into

the topic of alcohol. There was a secret distillery for adults back at the dome but Ned didn't want to be the one to start that conversation with the Otreran born kids.

The boy rolled his eyes. "Yes, Ned, I'm going back. I just want to explore here a bit more. Is everything all right at home? Is Bea okay?"

"Yep. Beatrice is being amazingly understanding, while still wanting to beat the shit out of you. Um, she's been training. Kickboxing, so this is not an abstract thing or a metaphor at all. The others are getting over being pissed, slowly but surely. It's a good thing you're here. Hope goes between wanting to castrate you and then organizing a nice dinner for you by drone tonight if you want. Birthday dinner. So be prepared for some really uncomfortable moments when you walk in through the airlock back home. The longer you stay gone, the less emotional everyone will be. They also want to see pictures of what you're seeing. I told them I'd have to ask you."

"Sure, send away. I'll leave the camera on. If it's okay with you, though, I'm going to shut you off for a while. I think it would be nice to look on my own, just for a few hours."

"I'll send dinner to arrive about an hour before sunset."

The boy was alone with the crystals. He chipped off a bit of one and put it in a sample bag for later. One crystal hole was about knee deep. There were many different colors of gems here, and he could see that the wind had blown out the softer rock around them, but most were still covered. He reached his gloved hand out to brush them off but thought better of it, afraid the sharp edges would cut into the containment suit, and fiddled with the control panel on his arm for a bit until he found an air pump. It blew dust off the crystals and out onto his visor, and he had to point it at his face to get the dust off and see again. He chipped off bits here and there, put them in bags and, after a thought, marked them "Hill No. 10." He'd have to find a way of mapping the caves if he wanted to record where the samples were from, but this was good enough for now.

He ran the samples through the machine and found that some of these smaller colored crystals had common names: ruby, zircon, topaz. Adella would love these. He chipped off some bits for her and put them into a sample container.

As most of the conical hills were blasted only on one side, he'd mostly been looking into the caves formed by the one-directional wind that had formed them. He decided to walk all the way around this one and maybe see if he could get to the top on the smoother side. He started climbing.

The rock was relatively solid, only a bit crumbly in places. He sometimes had to use his hands and it was hard to maneuver in the suit. He was a flatlander. The ladders all over the dome were somehow different from walking up a hill. His balance wasn't so good.

As a child he'd had fun with the younger kids visiting the shuttle that had brought them down from orbit. Back then it was parked in its own dome, which could be reached by an underground tunnel, and sometimes they'd gone there to play. The adults had helped build ramps to different parts that they could climb up and slide down. They'd even slept out at night there sometimes, away from the mothers, making their own mush meals by mixing the flavor packs in the most disgusting ways possible. The thought made him smile as he climbed.

The shuttle went on reconnaissance runs only a few times a year now, just to keep it moving. Mostly it stayed parked up with Haley, orbiting the planet. According to Ned, most things needed to be turned on from time to time, or they disintegrated in unpredictable ways, hence their multigenerational stop on this planet.

As the boy continued to climb, he wished he could take the suit off, just for comfort, but it was now clear to him why it had to stay on. He felt the responsibility of being on this planet, of being an Earth human here. He breathed out microbes all the time and was a walking biotope of human-dependent bacteria; this planet might develop its own forms, different from anything that had ever existed anywhere in the universe. It was both amazing and a pain in the ass, for him, personally, trying to scramble up a hill with a full-body containment suit on.

Finally, he reached the top. He was able to sit a bit awkwardly on the summit, which had been flattened by winds no one had ever seen or felt. He could see across the crater-formed lake and to the spillover he'd come across when he arrived. He imagined that he could see a glimmer of the dome in the distance. It felt good to be far away, but it also felt good to know that he was ready to

go home. He could come back and explore the other hills another day. There was time. There was a lifetime of exploring ahead of him.

He straightened his back and scratched his chin through the fabric of the suit. He felt something odd there, and realized that he was growing hair there, too. He'd seen holograms of Earth men with beards before. The thought made him laugh in the silence. He was going to have a life here.

From the direction of the dome came a moving object. It was a drone bringing dinner. It arrived quickly and hovered around him.

"I don't want to climb down in the dark. Just set it at the foot of the hill and I'll be down shortly," he said to the drone.

He started to descend, thinking more about the food than the fading light, and wasn't really sure when he realized that his foot had sunk into a bit of softer, crumbling soil. It threw him off balance and suddenly he was flailing his arms in the air trying to right himself before pitching forward and starting to tumble down the hill. He was afraid of damaging or tearing open the suit, so he curled up into a ball. He bounced and bumped down the hill for what seemed like hours. He felt pains like he'd never felt before, and was gasping for breath as the air was knocked out of his lungs at each impact against the hard earth. The helmet gave him some protection at first, but after a few hits, his head was knocking around inside it, and soon warm, wet blood was covering the inside of his visor. Finally he came to a halt next to the food the drone had left behind.

CHAPTER 27

BEATRICE

Beatrice was in the exercise room when Isabelle found her. It was fitted out like a boxing ring today, with Beatrice wearing headgear and gloves and punching at a hologram of Ben. He was looking rather miserable as Bea hit him with a flurry of punches.

She glanced over when her mother came into the room. “Pause please,” she said, and Ben was frozen in place. She ducked out under the ropes and made her way to her mother by the door. “Want to sit?”

“So this is...?” Isabelle motioned to the ring as they both went to sit on the mats on the floor.

“Pure fun. He can’t feel anything now that he’s been mostly deleted. This is all that’s left of him. It’s all shadow boxing for me, since he has no substance. But I like punching everything he represents. That’s my other thing, that I’ve just realized. We *need* it, something to do with our aggressions. It might not have been obvious because the adults here get along so well and know how to deal with conflicts. But I’ve talked with the other kids and, yeah, we need to find an outlet.”

Isabelle let that turn around in her thoughts for a moment. “So, we shouldn’t look at the past for lessons to structure our society, and we need a way to get out aggressions. That’s progress.”

“Wait, what? I thought you’d be telling me how wrong I am.”

“Nope, you’re figuring it out, what *Otreran* society should be. We adults can’t think that way. We’re too anchored in where we came from. And I have one more thing for you to think about, something that might be human and might just be me, but I’d like to test it with everyone.”

“What’s that?”

“Rituals. Some of us here do really well without a structure. We make it up—what a day should be like, what a life should be like—as we go along, but being that...free...makes me unhappy. I’ve been setting up my own structure and boundaries and so forth, but settling on something, something healthy, might be useful.”

“Not sure I understand what you mean.” Beatrice didn’t meet her mother’s eyes. She’d never been comfortable with her mother’s dependence on what seemed to be arbitrary practices.

“Okay, everyone here knows me as the religious one, the one who needs to have faith in God, and only I know what I mean by that, really. So that’s just me. But part of what makes me really happy in my faith are the rituals, the things I know to do when I feel a certain way. I mean from big things to small ones. When Dana lost her baby, I had words for that, prayers that comforted me. When I’m feeling just a bit of the blues, I have things I repeat, how grateful I am for my friends here, for our family, that sort of thing, and it makes me feel better. Some people here might also feel better with more structure in this way.”

“Did you run it through VR simulations?”

“Yes, and it was positive, overwhelmingly so. I took the loss of Dana’s baby first, and all the implant info from everyone at the time. From there, I ran it with a... Well, I’d call it a prayer session, but it could be just a mantra or a ceremony. I ran it a bunch of times with different frequencies, but it showed if we had a session every day for a month or two, then brought it down to once a week for a year, everyone in the test run felt happier, more balanced, and more accepting of how fragile life can be.

“But, okay, I don’t want to look at the past. Or put it this way: people got so caught up in their rituals that they couldn’t remember why they did certain things. The sharp knife in the dishwasher thing.”

That was an Adella teaching from when they were little. Back on Earth, there were electric dishwashers in homes that took a while to clean the dishes, not like the turbocleaners they had on Otrera. People only ran them when they were full, so it might be a day or so between loading the machine and running it. It was annoying to put a good, sharp knife in there because it was likely to

be needed again before it was time to run the machine. So folks learned not to put sharp knives in the machine.

That turned into the idea that it was somehow *bad* to put sharp knives in the machine, or that the dishwasher would somehow damage them or dull them or something. The idea remained without the initial meaning, and became *meaningless* in a literal way. The “what” remained while the “why” had long been forgotten. Adella had used that to talk about a whole lot of other things that people wound up doing without remembering why they did them.

Isabelle shook her head. “And I don’t know how to counteract that, really, except to say that when faced with the big things, like death, the things that touch our most basic insecurities, our people were happier with rituals than without them. At least in VR.”

They sat together and looked over at the frozen image of Ben in the ring.

“Can he move out of the way, or avoid getting hit?” Isabelle asked.

“Nope,” Bea said. They both grinned, and Bea took her mother’s hand. “I’ll think about it. Show me your VR data and let’s work on what we decide to do with this. If some situations call for rituals, or some people are happier with them, then we should try to figure out how to include it so that it doesn’t become a doctrine. We’re smart. We can do this.” She leaned on her mother’s shoulder and they sat there for a while, just enjoying the silence of the room.

CHAPTER 28

THE BOY

The drone had only just left. It came back, hovering over the immobile form of the boy for an instant, then buzzed off toward the main dome. The boy lay there next to the food pack, bleeding into his helmet. He wanted to cough the blood out of his mouth but was afraid of it filling up the helmet. Trying to move his arm, he screamed in pain. He forced himself to press the comms button to call Ned, but for some reason it wasn't working. He tried to push himself onto his back, but there was a sharp pain in his shoulder and he collapsed, unconscious, in the dust.

The drone returned in a few minutes, carrying a body. It came to a halt near the boy and the body sprang to life. It was Ned in his android suit. He approached the boy, who was conscious again but moaning. He hesitated, then searched under the boy's suit until he found a metal ring on the back of it. He strapped the ring to a hook beneath the drone, which hoisted the boy up, face down, and flew away toward the dome.

Ned turned and ran after it. He moved almost as fast as the drone and reached the dome only minutes after the boy arrived.

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Dana carefully took the suit off the boy, but left his helmet on for the moment to assess his head injuries. She opened the visor electronically and sponged the blood off the boy's face. The boy was heaving, his breath coming in gasps. He'd never really been seriously hurt before—no one around him ever had. Even BB had only been bruised after falling from the highline. It was all new.

Ned stood by the table and began scanning the boy for injuries. He also zapped him with a sedative at the base of his neck. The boy's body lost its tension and soon his breathing calmed.

Dana and Ned worked side by side, each helping and anticipating the other's next moves. It was a gentle harmony of unpanicked emergency treatment. Dana had worked in war zones. She could talk about the 22nd-century reboot of the series *El Clon*, reset bones and do ankle stretches without even noticing the multitasking brilliance of it all.

"For the moment, it's just a gash on his forehead where the visor retractor cut it. Probably a concussion, too, but we'll have to see how that develops," Dana said.

"I've found a broken clavicle, but that's all. Do you mind if I look at the suit for breaches?"

"Have at it. I think our young man got lucky. I mean, he *was* lucky, he hasn't gotten lucky yet. That would require him to be attracted to the very limited girl population here. I thought it might be him and Beatrice someday, but she's pretty pissed at the moment," Dana continued to clean up his young, thin body.

"None of the others have said 'Not if you were the last man on the planet,' so there's hope for him yet." Ned said. "I'm curious if people are binary, you know, sexually, without any exterior influence."

"Yep, the million-dollar question. Will the kids here want to go back to having sex, or just procreate using all the frozen sperm we have?" Dana looked up and blinked. "Okay, I've just realized that none of the kids here would have any idea what that meant. We don't have dollars, and none of them came from a mom-dad family structure. Can you hold him up while I pull off this sleeve? And he'd better not be gay, or he's going to be really unhappy." The boy was now stripped naked on the med table. "Oooh la la, our lad has pubic hair. I wonder when that happened. And I wonder why he didn't ask questions about it?"

"He hasn't said anything about it to me, in any case," Ned said, "but he's been using a shell to learn what he wants in the library. It seemed important to let him start having his own space. That's one of those AI therapy techniques. Even if you *can* know everything about your patient, they don't

respond very well if they think they can't have secrets. Basically, it's depressing not to have your own space."

"Have we discussed this yet? There should be a protocol, like, when or if we can look at someone's private browsing. Maybe never, or maybe if the person has died, or has become erratic."

"Let's put it on the agenda for the next Free Day meeting. You're right, there might be situations where we should be able to look, even in a private shell, or maybe we should never be able to. I could create emergency access to someone's private shell, with maybe a committee to sign off on breaking into it if it became important to know why someone was going off the rails."

They kept working, Ned helping Dana wheel the boy's gurney over to a scanner.

"You know, I'm finally used to this place," Dana said. "It's even starting to be fun some of the time. I mean, being here in general is fun—not repairing this kid's broken bone. I've just realized we're no longer in panic mode. It was hard to know if we were going to do more than just survive here."

"You felt panicked?" Ned asked.

"Hell yes. I mean, we're living on another planet from the one we were born on. So many things that might not have worked as well as they have. And you know that it's a human thing. Even if something has happened to thousands of other people, it's all new when it happens to us, personally."

Ned clicked his android eyes. When he was speaking as a hologram, he could roll them, but the suit didn't allow for that. "Yeah, I remember that."

Dana laughed. Ned always joked that he couldn't really understand why the women's pregnancies and childbirths had been and continued to be such a big deal. "I mean," he'd said ten Otreran years before, "hasn't every person ever born been the result of a pregnancy? Sure, there's the vat babies, but those don't really count."

Hope had answered him as she cradled in her arms her newborn son, the boy, Otrera's firstborn male. "I can tell that you and your wife never had kids before you uploaded yourself. This was the first time *I* was pregnant. It's one of those big things. Like death. Even though every human dies, it's still a big deal when it's happening to us. You don't get it because you're always fully connected to Haley, and you've forgotten that part from when you were human. All your 'Ned' experiences are instantly shared by the whole system."

Ned had let the conversation end there, but it was something that piqued his interest. The colony was running smoothly enough that he had begun to want to use some of his energy resources just to think about things. He had stored pretty much everything that had ever been written on Earth, plus just about everything that had been recorded, but interpreting it required more than simply having info socked away in his system. If he wanted to help these humans, he was going to need time to turn his thoughts and questions around in his system for a while, maybe talk to the women about some of them.

CHAPTER 29

HOPE

Hope burst in to see her son, but seeing him relaxed and naked on the table made her stop in her tracks. For years he'd been sleeping on the platform with everyone under the stars, but she hadn't seen him naked in a long while.

"Grew up on you, didn't he?" Dana said, smiling.

"Mon dieu, c'est un homme!" Hope didn't often speak her native language anymore, but seeing the boy there surprised her. "I mean, wow. All that hair, everywhere, and..." She took his hand for a moment. "He'll be all right?"

"Just a broken collarbone, a concussion, a gash on his forehead and a few bruises. Nothing that can't heal itself. We just put him under so we could align his clavicle and let him rest a bit. He'll wake up soon."

Hope nodded.

Ned began putting the medical material into the sterilizer.

"Oh, hi Ned," Hope said distractedly. "How are you?"

Ned said nothing, but he allowed a little hum of pleasure to come from the android suit's rotors. It was nice to be asked sometimes how he was. "I'm fine, thanks. I was a bit worried for a while, but it seems that our boy is all right."

Hope turned and focused fully on Ned, and her smile broadened. "Thank you for looking out for him. You made the right choice, I think, not dragging him back to face the music right away. You're better at letting go than I am, in any case. Can we get him off this gurney-looking thing? It looks really uncomfortable."

"I can manage," Ned said. He lifted the boy up and laid him on the more comfortable bed in the med bay. He busied himself covering the boy with blankets to keep him warm. "We can wake him now, too."

"Oh, just let him wake up on his own," Dana said. "No harm in letting him get some more rest."

Ned stepped back from the bed, put a hand on Hope's shoulder and gently squeezed it. She took his android hand and held it for a brief second. "Sorry, my hands are dirty. I was just finishing with the poop. I've never asked, but can you feel anything with your hands in this suit?"

"I have sensors, but I can turn them off," Ned said. "So technically I could put my hands in boiling water to sterilize them."

"That actually might be a good idea."

The boy was starting to stir and they all realized they were just standing there, staring at him as he slept.

"Okay, let's not be creepy," Hope said. "How about we disinfect the suit and your hands?" She turned to leave the room, Ned following.

"Hi Mom," the boy said, and Hope waved at him as Dana held the door for her.

He tried to move but stopped with a wince, realizing that everything was going to hurt for a while. "Is Beatrice okay?"

"Eh, be glad you're hidden in here for the moment. Although there are a lot of sharp objects around here, so maybe don't stick around too long." Hope kept her hands in her pockets, but came closer and kissed him on the forehead. "Glad you're okay, Dana says you'll heal up nicely. I'm going to leave you to get some rest, and get cleaned up myself. Do you want anything?"

"Just a holoplayer, if that's okay?"

When the boy was alone, he pulled up projections of the interviews with the adults he'd done with Beatrice. He didn't want to think about anything at the moment. There were worse things than doing something shameful or hurting someone. Worse was having to face the person you'd harmed, after the fact. Flipping through the cover images one by one with a wave of his hand, he finally

settled on the one with his mother. He fast-forwarded until he found the image of Beatrice that he wanted. She was laughing with Hope and had turned toward the camera directly. He froze the image there. He looked at the image for a long time, trying to practice looking her in the eye and telling her how sorry he was. Then he turned off the projector and lay back on the bed, staring up at the ceiling until he fell asleep.

The boy woke up the next day attached to a bunch of electrodes.

Before he had time to wonder what to do next, Dana came striding in. “Hey, Captain Cook! How’s our explorer this morning?” She started to take off the electrodes, talking as she usually did, one word tumbling out after another. “These were totally not necessary, but I wanted to know when you woke up without sticking a camera on you. I mean, filming someone while they’re sleeping is kind of weird, isn’t it? And I wanted to test all this stuff and see if I could program an alarm, and yay, it worked! Haven’t had much use for this, actually. In fact, outside of childbirth, the only time I’ve ever really used the medical equipment is for you and BB. Do you remember falling out of the shuttle when you were little?”

Sure he did. It was after a sleepover in the shuttle, and the boy had forgotten they’d pulled up the steps. He’d just walked out the door and flup! he was wailing on the ground a couple meters below. Fortunately he’d managed to only scrape his chin.

“So you’re going to have an audience when you come out of here. The kids are dying to know what happened. Here.” She put up a 3D image of his broken clavicle on a tablet. “Take a look at this so you can tell them about it...” She went on to explain how bones were formed, how they broke and how the body could heal them. Every experience on this planet was something to be shared, explained, understood.

“Don’t you want to explain this?” he asked.

“No way! You’re the one with the broken bone. But seriously, it’s better if not every piece of knowledge comes from the adults. We all need to understand the basics of everything. Anyway, six to eight weeks and it’ll be good as new.”

“Can’t you fix broken bones?”

“Sure, but so can you, naturally, with time. I can speed it up some, but my repairs aren’t as good or as solid as what your own body can do. There’s no harm in it, and it’s a better use of resources.” She put his arm in a sling and wrapped a harness around his back to keep his shoulder in place while the clavicle healed.

He rolled his eyes. That was the excuse for just about everything the boy wanted—and didn’t want—to do. “Use resources efficiently” was the mantra of the adult world.

“Let’s get you up,” she said.

Finally, he left the med bay, walked up out of the underground level and came out under the main dome. It was morning and not a Free Day, so everyone should have been working or studying, but all the kids were there waiting for him.

He saw the sea of his family, the browns and blacks and whites and tans of the kids. He noticed Veda’s twins looking at him, their gazes measuring. BB half waved at him but then turned away. The boy was so used to being idolized by BB that he didn’t know what to think. Clearly he’d screwed up more than just his relationship with Beatrice.

“I heard you saw water!” a little girl said.

“I heard you’re all broken inside,” a second, smaller girl said.

Adella was teaching that week, and she waved them over to go down to one of the underground rooms. “Class is in here today!” she said, and the children pulled the boy by his free hand in her direction. “Our boy here is going to explain to us what happened, and we’re going to write about it afterwards.”

“Can I draw something instead of writing?” the second girl said.

“Of course you can, or we can make a new song to sing, maybe? Let’s get going!”

The boy searched for Beatrice among the crowd of kids, but she was nowhere to be found.

CHAPTER 30

BEATRICE

“I need you for something,” Isabelle said as her daughter finished a late breakfast. “The boy’s going to be fine, and Adella’s monopolizing his time today. We can figure out what to do about him later.”

Bea sighed, but her mother was right. No one was going anywhere, and her last encounter with the boy had been so disturbing that she was more than fine with not facing him right away. She’d told everyone, though, that it was her job to deal with him. The adults didn’t need to step in.

Isabelle led her daughter down to the VR room and offered her a headset. Immediately, they were both projected into a hallway. It was dimly lit by pinpoints of light along the edges of the floor. They moved down it and soon Beatrice could make out other figures moving with them, all wearing long robes. Beatrice looked down at her hands and body and found that in this projection, she was wearing the same comfortable, loose-fitting garment as them. She followed the flow of the people until they entered a large, round room. There were several other hallways, arranged like spokes on a wheel, leading into the room, and more and more people were arriving from them. She tried to peer into the faces of the people and found that they looked familiar but were no one she knew. She eyed her mother, who whispered to her, “My solution for VR test projections. It was my first concoction. I got help from Ned, of course, but I just input, like, three of us and asked the system to merge us into one person, then I doubled and tripled that person. That gives us a generic Otreran to try things out on. It’s not perfect, but still helpful.”

“Smart,” Beatrice said. She was jealous that she hadn’t thought of it herself. It would have made her work up until then much more effective to have more people in her test simulations.

Upon arriving in the round room, the people dispersed in pairs or small groups. She could see that there were many circles with places to sit, on either chairs or cushions, all in a group. The people wandered, comparing something on their wrists with the sitting areas, everyone speaking quietly and motioning when they saw someone they knew. When they found a space for themselves, they sat and waited.

When a circle was complete, the people began to recite something. Beatrice wanted to move closer to hear it, but Isabelle held her back. “This part isn’t perfect yet. I’m still fiddling with words,” but Beatrice moved closer anyway and heard, “Every ritual begins with love and compassion. Every wish comes with a pure heart and asks nothing in return. Any benefit we may obtain is for the good of everyone.”

“Doesn’t sound bad to me,” Beatrice said.

“No, it’s too fixed. It becomes dogma quickly and some people think they’re doing it ‘better’ than everyone else, which is just not the point.”

“What *is* the point?” Beatrice asked.

“I guess ritualistic kindness?” Isabelle looked unsure of herself, twisting her hands together like a child. Beatrice looked her mother full in the face and understood how nervous she was. “I mean, this is sort of your territory, Beatrice, but we’ve never really had rituals here, other than poop duty, and that hardly counts. I’m trying to find something here”—she gestured at the room—“that could give me what I loved from my church, my beliefs, and...God. *My* version of God, that is.”

“Can I join in for a while?”

“It would give me immense pleasure if you would try it out,” her mother said.

Beatrice had to remember that her mother had left Earth when she was barely older than Beatrice was now. If Isabelle looked nervous, it was because she’d never been in charge of something before. Other than hopping on a ship bound for outer space and having children, her mother’s life had been just as small, in its own way, as Beatrice’s own under the dome.

Isabelle left the VR for a moment and adjusted the settings, and when she reappeared, there was a place for Beatrice to sit on some cushions. Beatrice's day began, following the rhythms that her mother had invented or adapted from dozens of Earth rituals and religions.

The instant effect was one of calm. Everyone knew what to do and how to do it. Everyone was fully concentrated on one goal: the happiness of the whole group, at least for part of the day.

Her group began with a few minutes of silent, seated meditation, and when it was done, they reached for an electronic tablet in front of them. There were three questions to choose from, and each person in her group voted on which one they wanted to address today. The most popular question won, and they began to discuss it: "What is the purpose of delaying pleasure?" Beatrice had never heard of this before, and mostly listened as the group eventually turned the subject into the merits, or not, of fasting.

After a while, Isabelle tapped Beatrice on the shoulder, "Do you want to hear the other subjects?"

They got up and wandered among the groups and listened to the others talk about how to deal with annoying behavior, what beauty was, and one very broad discussion about sadness.

Isabelle motioned to Bea and they took their headsets off.

"What do you think?" she asked Beatrice. "It's not the same thing that we've asked you to do, but it might make your work of creating laws less vital. What if..."—and here Isabelle couldn't keep a tremor out of her voice—"what if we could help ourselves, humans, to reinforce our goodness, like working a muscle to make it stronger?"

Beatrice hugged her mother. "That could be a great place to start."

"I've run this in VR with exponentially more and more Otrerans, the generic sort. I set it up to have these sessions once a month, or every fifth Free Day, and that seems to be the most effective. I ran it for two hundred years." She smiled at Beatrice, then continued. "Starting with the generic Otreran that we created, people became... I don't have a word for it. It's like they all got some sort of superpowers in being kind and listening to each other. Sometimes the questions were challenging, but it wasn't just that. It was the rituals that made a difference, too. I separated them—only rituals or only these discussion days—and neither alone was as good as both together."

"Did anything else come out of the projections?" Beatrice asked. When either one of them ran scenarios for more than twenty or so years, there was always an unexpected side effect, which had thwarted all of Beatrice's attempts to create laws and a means of governance.

"The fight is with dogma, as usual. People get stuck in their ways very, very fast and don't like changes. What I've got here isn't a governing system, but in my projections, as governing systems evolved, at some point there was usually a power imbalance. Seems to come from this: since happiness is the goal, there are some people who think that they have it better than everyone else, or judge others or want to tell them what to do. People don't do well with being judged. It's nearly always hurtful, makes no one happy and while the others wrap themselves in self-righteousness, being judged makes people resentful. We'd need to figure out how to work the empathy muscles, too."

CHAPTER 31

THE BOY

He was busy all morning with the kids. His escapade outside the dome was going to be replayed, studied, and possibly wind up being a new lullaby, or that was the way it was developing.

As it started getting close to dinnertime, he was helping one of the younger girls make a map from the data his suit had recorded. There was a lot of information to filter. They were seated at a table with a small screen and a keyboard, typing, adding, adjusting the images on the screen. Just then, he saw Beatrice watching him.

“Hey Bea,” he said, looking up at her. He tried to remain casual, but his heart pounded in his ears.

“So you just stole a suit?” she asked.

It sounded like her, like things were normal between them again. He tested the waters. “Someone needed to do it, and I’m the one with the biggest balls around here,” he said. He was trying to sound like he usually did, the joker, the one trying to lighten things up.

“Oooh, like you haven’t used that one before.” She smiled faintly, then came closer and poked at his injured shoulder. “Does that hurt?”

“I’m not going to say ‘ouch’ so you can stop it.”

“Technically, you just said ‘ouch’ when you said you weren’t going to say it, so I’m satisfied. With that, at least. We need to talk. Want to go for a walk?”

She helped him close the classroom door, the boy having to turn sideways to get out. His shoulder wasn’t much good for anything at the moment. They emerged from underground into the setting sun.

They passed his mother, Hope, but she was so concentrated on rotating the giant wheel of water tanks filled with seaweed that she barely noticed them. She disappeared behind a sheet of plastic she was using to conceal some project she was working on, not wanting to reveal it right away.

Beatrice and the boy walked past the rows and rows of greenery until they reached the outer wall, near the entrance bay through which the boy had snuck out a few days before. They began to circle the dome clockwise at a snail’s pace, a walk that would take about an hour.

He turned to face her, halting their walk for a moment, “I’m sorry,” he said simply.

She looked into his eyes, which were blinking back tears. Then she took his waist in both hands and spun him around. “Walk,” she said.

After a few paces, she said, “I accept your apology. It’s weird, though, because now I *get* it, I get the need for rules and punishment for breaking them. I understand more or less why you...why you attacked me. We found out about Ben. But it made me feel miserable, like I don’t *know* you. And if I don’t know you, I don’t know anyone, not even myself.”

They walked on in silence.

“What do you need from me?” he asked.

“I want you to know how it made me feel.”

“The implants?”

“Yeah, I think. I want to put you in VR, to make you go through what happened from my point of view. So that’s the first thing—I want you to learn from it and never, ever do that again. But I also want my ounce of flesh, you know? I wanted your apology and got it, I want you to feel how I felt and we can do that in VR, and I somehow want you to pay a bit more for it. I’ve been really aggressive lately, after it...happened. I’m working on that. But I kind of want to beat the crap out of you, you know? But I don’t know if that’s healthy, on my part. I do want you to suffer some.”

“Broken shoulder not enough?”

“Only if I can poke it with a fork every morning for a week or so.”

After a while he said, “Privation of liberty.”

“Jail?”

“Maybe like the jails that *worked* for those interned. The ones with therapy, aggression training, that sort of thing. Partly for the principle of the thing, but partly because I don’t know how I could live with myself otherwise.”

Beatrice mulled it over for a minute. “Yeah, that would do it for me, I think. I’d feel like you paid, somehow.”

“Some of my stupidity was Ben. I wouldn’t have thought of...trying what I did...if he hadn’t convinced me you actually wanted that.” He was speaking in fits and starts but he quickly added, “Not that I wasn’t making my own bad choices.”

Beatrice didn’t respond directly. “I think we’re shutting down access to the past. Mostly. Technical manuals can stay, most art, some of the sweeter old movies, that sort of thing. We’re doing a major triage. The other stuff will get archived, and there’ll likely be training involved before being allowed in to look at it. Some of that stuff, out of context, just isn’t...isn’t helpful here. We need to make new stuff that’s just for us.”

They continued to the halfway point around the dome, each buried in their own thoughts, before Beatrice said, “I hate this. I hate that we shouldn’t keep everything, all our documentation, open to everyone. I hate that I want to get back at you for hurting me. I hate that you talked with Ben maybe what, a half dozen times? And that was all it took for old Earth stupidity to get into your brain.”

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Beatrice walked in front of him and turned so that they were facing each other, making him stop. “I liked what we were doing before, though. The other nice stuff.” She didn’t meet his eyes.

“Is it okay if I hug you?” he asked.

“More than okay.”

She maneuvered closer, avoiding his broken shoulder. Nestled against his good arm, she said, “Geesh, all this is confusing. I want to tell my friend, who is you, about how my friend hurt me. I want to hug you and punch you in the balls, too.”

The boy laughed. “How much jail time would feel right to you?”

“Do a week. With therapy and the VR. Then we’ll talk.”

CHAPTER 32

THE BOY

Jail wasn't supposed to be interesting, he didn't think, but he could feel it changing him. He was learning a lot, more about himself than anything else. Ned set up a separate place down a tunnel in the area where their first dome had been. The shuttle had been parked there in the beginning under a much smaller dome, but the covering had been taken down years ago, with the tunnel remaining, and a few rooms underground. He was interned in one of the rooms.

He was allowed to join the others for meals, but had to spend his days working through a series of training programs, and his nights alone.

The training was mostly in VR. He had to experience his attack on Beatrice from her perspective, with all her hormonal reactions triggering his own brain—the adrenaline from fear, and her anger and pain. The last was the worst. He couldn't believe that he was responsible for causing her pain, that he'd been so insanely stupid. He was also led through the feelings of some of the adults, including his mother. He got to experience from Hope's perspective the shame she had felt, the questions she'd posed to herself of whether she'd been a good mother, or if there was something wrong with her.

After these sessions he got Ned as the AI therapist to talk through it. Ned had subroutines for this and could only talk about this particular subject, so the boy couldn't just have a conversation with him. His only options were either facing up to what he'd done or staying silent.

He also had to go through his own feeds during the period that Ben was hijacking his brain. The fact that Ben was essentially malware didn't excuse him.

Ben had known that WASA really *had* been wishful thinking on the part of Ned because he'd been wandering around the database during the days that the boy had left him turned on. It was the leverage he'd found to work on the boy, and he'd carefully led him down that rabbit hole.

Ben's comment about there being a safeguard module that kept him from growing on his own was just as true as WASA; there *was* a safeguard module, but the real Ben Hartmann had deactivated it.

Ben and Ned had been playing the same game in some ways, but Ned had been doing it to save his tiny slice of the human race and get them off planet before it was too late. Ben had been just at the beginning of working his way into influencing the boy, and who knew what his end game might have been: controlling them? Supplanting Ned? Setting up as the new head of Otrera? They were so dependent on their technology to run things that it was a real possibility that Ben might have seen an opportunity to hijack their lives entirely.

In the end, that version of Ben had been deleted. There was still an original, generic player for the game, but it was now in the archives. If one of the Otrerans wanted to play that particular game again, they would have to apply for it and get training. It was a waste of time at best and there were many more interesting things to do than shut oneself off in VR.

After getting out of jail, the worst part for the boy was having to explain to his siblings and the other kids what he'd done. BB was very quiet around him now and didn't seem to idolize the boy anymore, and that hurt. He never thought he deserved his idolization to begin with, but he'd gotten used to it. He'd have to work to earn back everyone's respect.

CHAPTER 33

THE BOY

After getting out of jail, the boy went back to helping Beatrice try to construct the governance of Otrera. They now had a framework for crimes and punishments—thanks to him—and that needed to be formalized. He was the first person to be punished for something on Otrera.

He felt better. He felt like he'd made some sort of reparations and could begin to move on. He understood where he'd been vulnerable and how to make better decisions in the future.

The real work now was trying to figure out what content to keep accessible and what to archive, but in the end the boy and Beatrice decided to keep technical manuals and medical information in easy access. *Knowledge* would remain easily available, but opinions and entertainment were archived. They were still there, but had to be specifically queried to be found. No one could just stumble across something. The past would stay in the past.

Beatrice set up a protocol to review the types of information that came up after someone put in a query. The vast majority of query results just required the viewer to preview and accept the information before opening it, but others sent a request to an administrator protocol and the right to access would be brought up in a Free Day meeting. So old Earth philosophy was there and could be accessed easily—a query, a review and that was it—but things like the beatings, killings and pornography were restricted. They weren't going to erase the miserable part of Earth's history but they were going to make it harder to come across accidentally.

There was still that slushpile of more recent, encrypted stuff the boy had been going through, but in the end, he just archived it with the other restricted material. If someone wanted to become a librarian or historian later, they could go through it, but there was nothing there that they really needed on Otrera.

Things were different with Beatrice now, but the boy felt that in an odd way they were better. Everyone had accepted that he'd paid his dues with jail time and now they could move on. The training had helped, too. Having been in Bea's head somewhat in VR, he also understood her needs better, and his own.

After two weeks of working together, she ended the day with a kiss. It was like she was trying it out, seeing how it felt. The next day, it was a hug. The boy kept himself in check, only caressing her hair, or holding her hand. It felt nice. The third day turned into a full-on makeout session, Beatrice in charge of every move, every touch. He was overexcited but held himself back, letting her choose what to do and how much to do it. It felt wonderful, like he'd truly been forgiven. He didn't want it to ever stop.

###

The next Free Day meeting was supposed to be special. Hope had something new she wanted to present, and everyone had noticed her working behind a sort of curtain for the last few weeks. For the event, chairs in the common room had been rearranged in a big square with a table in the center of them. They were all curious.

Ned was always there at the meetings as a hologram, off to the side. He appeared as he'd looked when he was alive, choosing his thirty-year-old self: dark skin, thick glasses and a short-sleeved shirt with a pocket protector, a cup of coffee in front of him. He took the minutes of the meeting since he could record and transcribe things almost instantaneously, but he normally didn't participate.

They drew lots to see who would start the meeting. Beatrice was up first. Everyone had a cup of fresh tea, and the adults were eating bread with pleasure. They finally had enough wheat to bake bread, but it was a new concept for Otrera. The boy had a piece in front of him and was trying to appear grown up and eat it, but he couldn't help thinking how much more he preferred mush.

Hope had just put a piece in her mouth and Dana was sipping her tea when Beatrice said, “The boy and I might like to have sex soon.”

Dana spewed tea everywhere and Hope started to choke.

The other women all spoke at once in a cacophony of simultaneous comments.

“Absolutely not.”

“That’s a relief.”

“Do you understand what this means?”

Grinning, Beatrice calmly went over and patted Hope on the back until she could breathe again.

The boy wished he could slide down under his chair. He could feel how red his face must be as all the women turned to look first at him, then at Beatrice.

Hope finally spoke up. “Are you sure? You seem so young and...”

“Immature, yeah, I get that,” Beatrice said, “But he’s, whatever, ‘done his time’ and we just keep getting closer and closer.”

Isabelle spoke. “You’re not any older than I was when I became a part of this mission to leave Earth with all of you. You’re seventeen in Earth years and the boy sixteen. Their age shouldn’t be a problem, at least historically, or medically. Dana, what do you think?”

“I was worried about this for a while,” Dana said. “There are literally no other men for Beatrice here, and on Earth, it was obviously the norm for men and women to have sex together. I was hoping that they wouldn’t hate each other, especially after the incident with Ben. It seemed inappropriate to bring it up before. It made me very sad to think they might not like each other.” The others let this sink in. Dana, Adella and Bhagi were completely heterosexual. They had had to give up sex entirely to live here. The women were all quite touchy-feely—it was usual for them to start massaging someone’s shoulders as they talked together—but obviously that was quite different from sexual intimacy.

Bhagi said, “Well, with our ‘best use of resources’ mantra, it would be helpful if we didn’t always have to depend on our frozen sperm from Earth. The boy could contribute to the stock. Genetically, the boy could...um, what do we want to call this—‘mate,’ maybe...with any of the girls here except for his half sisters. I don’t know, do you want to have children, Beatrice?”

Beatrice took a moment before answering. “Yes, but not right away. Pregnancy seems pretty overwhelming at the moment, but I would still like to have sex with the boy. That’s kind of why I’m bringing this up.”

Bhagi turned to the boy. “What do you think of all this?”

The boy looked at Beatrice, who winked at him. “I would like very much to have sex with Beatrice,” he choked out.

The women tried not to smile and looked everywhere in the room they could to avoid meeting his eyes.

There was a long moment of silence.

Dana said, “Well, I guess the thing to do is to set you up with some contraception. There’s the underground space where we go for private things like this. I’ll give you two the codes so you can lock the door and no one will walk in on you, and you can reserve it or just show up if no one is using it. Beatrice, thank you for bringing this up. Anyone have anything more to add?”

They took a short break and made more tea. The boy finally finished his piece of bread and Beatrice came over to him. “I didn’t mean to ambush you like that, but I wasn’t sure if you would be happy with us talking about it in public. And it is a public decision. Everything is. We’re a family, and I’ve always been used to my mother going to the private room with one of the others from time to time. My mother has always said that intimacy is our own business, but procreation isn’t. Having a child uses resources, and me getting pregnant is a completely possible outcome when we start having sex.”

The next item on the agenda was Hope’s surprise, the one she’d been hiding from the others. “Ned, can you show the model, please?”

On the table in front of them appeared a hologram of their dome, and then a second one next to it. On the outside it was identical to the first, but Hope put her hand up to the hologram and swished away the new dome's surface to reveal a forest underneath.

"Trees!" she said. "Earth's best renewable resource! We've had smaller fruit trees already, but we can do more." She pulled back a curtain that covered a corner of the room to reveal a small tree in a pot. "This one here Ned and I have been tweaking genetically. Maybe we can make things from wood, like musical instruments or furniture. They grow fast and should be mature in about seven Otreran years. Haley can have the material ready for a second dome soon if we decide to go forward. It would be a big project, but what do you think?" She was so excited, she was almost bouncing. The boy had never seen his mother like this.

"Are there any dangers for the local population?" Adella asked.

"Shouldn't be. Haley's idea was to make the dome almost completely round, like a ball, so the roots can't get out." She looked over at Ned for confirmation, and he nodded. "A good part of the new dome will be underground, like here, which means we can also have even more underground facilities for us. Tree roots go deep, but not as deep as an almost full sphere would be. Maybe a few new, full-sized labs, and maybe on one side, a place to play games. We've had almost no space for us to just run around on since we got here. We could make a place to do some kinds of sports, maybe a multi-use room, pickleball or streetball or some variant. It might even be possible to have a swimming pool, or a small pool with a current. None of our kids have ever learned how to swim. It may never be necessary for anyone born here to learn that, but Dana said she would love a safe way to keep us exercising later in pregnancy."

They all took a turn around the hologram of the second dome. They could push back the light panels to see the proposed vegetation underneath.

Hope went on. "And it would be possible to try to bring some of the eggs out of stasis and create, well, any kind of reptile or bird that we brought with us that comes from eggs. Up until now we just haven't had the space, and Dana has been making us all paranoid about B-twelve deficiency. There just aren't enough insects. Eggs on their own, just eating them, would be a great, simple solution. We can see which animals we want to include. We'd be building an ecosystem, so we'd need to study what is safe to allow to live together, and what we want to do with dead animals or birds. On Earth, we ate them, but since we've been here we haven't been eating animal protein other than insects. What's fun is, it would finally answer that 'Which came first, the chicken or the egg' question, at least on Otrera. And there's one more thing..."

Ned obliged with the sound of a drumroll.

"Coffee," she said. "We will have space to grow coffee."

"I think I love you," Dana said.

"That, coming from someone in our limited hetero population, is a wonderful compliment!"

They talked for a while about the advantages and disadvantages of the project, but in the end, there were no reasonable objections and they decided to go forward. They talked for a while about whether to start eating meat again, but it was not going to be settled today, so for the moment they left it.

A second dome would give them more space and separation, too, as living in close quarters here could sometimes be stressful. There had been nowhere to go but above and below ground since they'd arrived.

Adella had the next point of the day. "I want to show you a holovideo of yesterday's lesson. I'm not sure what to make of it."

She nodded to Ned, who projected a holographic replay of the classroom. They could see things from Adella's point of view as well, and the camera switched between them.

"So," Adella said to the children, who were more or less paying attention to her, "what is bad behavior?"

An older girl said, "When you hurt someone."

Someone else said, "When you do something that hurts our lives here."

"When you kill someone," a girl said. It was Isabelle's second daughter, EyeToo.

There was a shocked silence among the crowd of children. One of the very young ones asked, “What does ‘kill’ mean?”

Adella paused the playback. “So I had a choice here: either gloss over it or try to explain it. Other than Dana losing her baby, we haven’t seen death here yet, so there was no context to attach this to. I was frightened, really frightened, because we’ve never purposefully introduced ideas like this. This corresponds with Dana’s point for today—When can we look at someone’s browsing history?—so maybe we can talk about that now, or later, or what do you think? I wanted to know where EyeToo got this idea. Turns out it wasn’t from her browsing anywhere, it was something else, but still the browsing issue is something we need to consider.”

“Let’s do it later,” Dana said. “I’m too curious how you dealt with it.”

“Old teaching trick: I threw it back to EyeToo to see what she knows. So here we go...” she let the holovideo continue.

“Where did you hear that word, and could you tell everyone here what it means?”

EyeToo looked doubtful but answered. “I’ve been reading Mommy’s Bible. Pontius Pilate killed Jesus. He wanted to make Jesus stop talking, I think.”

Adella paused the holovideo.

Isabelle looked stunned and sat back in her chair. “Oh crap,” she said. So many nice stories about helping one another and being kind and turning the other cheek, and the child picked out Earth’s most notorious state-organized murder and focused on that.

Adella played on. “Well, that’s a really big, big bad behavior, and I don’t really know how we would deal with it on Otrera. We kind of hope it never happens.”

“But what if it does?” EyeToo asked. She looked about ready to cry.

“Come here, child,” Adella said, and wrapped the girl in her arms for a minute. “There are many reasons people used to hurt other people on Earth. Most of those reasons don’t exist here. For one thing, people were afraid of new ideas. How do we deal with new ideas?”

“We talk about them on Free Days.”

“Exactly. We can talk about anything here. How do we deal with someone who doesn’t want to help with chores?”

“We talk to them and ask them why they don’t want to help.”

“And what do we do if they still don’t want to help? That’s what I wanted to talk about today. What seems like a good idea?” And here Adella turned the conversation in the direction she’d been hoping to, and the children came up with punishments that were mostly different sorts of exclusions. They’d had so many questions about the boy that Adella had wanted to discuss it with them, without going into too many details of why he’d been punished.

“It was a bit overwhelming, to say the least,” Adella said. “But it should be thought about, at some point. How are you advancing with the idea of having laws, Beatrice? And Isabelle, is this something you want to take on, just to help out?”

“No,” Isabelle said. “I really, really don’t. I...” And she let this trail off.

The boy signaled that he wanted to speak. “This was on the agenda for later, but it fits in here. I want to know why we feel we have to leave Otrera someday. That seems like a ‘law’ and I’m not sure I agree with it.”

Beatrice, sitting next to him, reached out and squeezed his hand.

They were all quiet for a moment. Ned’s hologram approached the table. The women made space for him, out of politeness, and he spoke.

“First of all, that was my condition for the women becoming part of the program back on Earth, before we left. It made sense to me, at the time, not to move somewhere and start out with the destruction of another planet’s ecosystem. We had a beautiful planet with everything we needed and to which we’d adapted perfectly, and we—and here I take responsibility for this, too, I’m not blaming someone else—we destroyed it. It didn’t seem that anything good could come from beginning by annihilating or interrupting life somewhere else. The women who signed up agreed to that principle.

“Secondly, we had no idea we would find a planet this nice, that could be more or less immediately livable for humans. The domes were the original idea. We needed water, but that was really it. We could have settled on one of the moons here. They were both good options. They might still be. However, you were born into this decision and your opinions are worth as much as everyone else’s. You didn’t choose this.”

CHAPTER 34

ANA AND EVE

Veda's twins announced that they had chosen their names: Ana and Eve. They were identicals, but the community was so close that no one had ever really mistaken one for the other. They kept their hair short, as was the custom among most of the women, but had always styled it differently from one another. Human hair made their lives a lot more comfortable, becoming stuffing for cushions and pillows, even sometimes woven into clothing.

"Wow, are they into palindromes or what?" the boy groaned to Beatrice.

"They've known what they wanted to be called for a while, but they were waiting on you, as we all are, pal."

They were in the VR room, and had snuggled down on the floor, their headsets showing them the lights of Paris from a balcony in one of the vacation recordings from Earth they had saved up. They had made love seventeen times since Beatrice had mentioned it in the group meeting. The boy was counting, Beatrice was not.

"They want me to organize their naming ceremony," Beatrice said. "They liked mine, I guess."

It had been wonderful. She'd included everyone, including the very youngest, in a dance that went in spirals around her while she stood in the center. Everyone said her name once as they came near her and did a particular two-step movement if they wished. The children all did the steps, the adults mostly not. She'd arranged the dinner mush into letters spelling out her name, and Hope had made sweet mush. Hope had wanted to make a cake, but Beatrice knew that none of the kids were likely to eat anything but the mush and protein patties they were used to.

"We'll have something new this time, though," she said. "Did your mom mention it? She's making some kind of beer-like thing. Fermented drinks with alcohol. It's something we can have once we're 'old enough,' whenever that might be. I guess that's for us to figure out. Apparently, it's not good for developing brains to get trashed, as she put it, so we're supposed to wait. We get to figure out how old we need to be."

"That's actually a nice place to start," the boy said. "There's biology to help us out, I mean, looking into how long it takes for the brain to mature enough that alcohol isn't bad for it. It could be our first law, or recommendation, or something."

"I might go with puberty. When we start to get hairy."

The boy fell over laughing.

Beatrice looked at him. "What?"

"I love the idea! 'Show me your hairy armpits and you may drink!'" He stood up on the VR Paris balcony, unzipped his shirt and, bare-chested, began to wave his arms at the image of the city below them.

"Stop it!" Beatrice laughed. "Do you want to shock the French?"

###

The twins' ceremony took two weeks to organize, but in the end it was perfect. Everything was done as if in a mirror to start with, two groups dancing, one with each twin, but in the end they separated and each girl had her own dance alone.

"I am Ana," Ana said to everyone, and bowed, and began a short set of movements. Everyone mimicked her.

"I am Eve," Eve said, and bowed, and began her short dance with everyone following suit.

They each came up and shook hands with the two young women, saying their names as they did.

At the end of the ceremony, all of the Earthborn adults, Beatrice, the boy and the twins tried the beer, while the children had tea. The boy grimaced a bit, but after the first cup, he was used to the bitterness.

“You might as well go for it,” Dana said.

“What?” the boy asked.

“Drink too much and see how it feels. You’ll likely feel terrible tomorrow, but it’s worth it to know how much you can handle.”

The boy, Beatrice, Eve and Ana took a glass of beer up to a corner of the platform and chatted into the evening.

“So are you going to stay with the younger kids in the school or start learning something else?” Beatrice asked.

“Linen,” Ana and Eve both said at once.

“Sorry,” Eve said. “That doesn’t happen so much anymore. Do you remember when we used to answer everything at the same time?”

“Just a bit creepy,” the boy said, smiling at them. “It was like you’d never been separated outside the womb.”

“We had to work on that. I mean, it creeped me out too that Eve and I were so close,” Ana said. “I started, just, reading something different so we’d have something to talk about.”

“But then what interested her interested me,” Eve said, “and I’d wind up reading the same thing anyway, you know? It was becoming too much. We even got our periods on the same day. Anyway, we both started reading about how to make linen fabric from the flax plants that Hope started growing. It’s pretty cool, there’s a whole, long process to go through, with some odd terms. We need to do the retting, which is separating the fiber from the stalk. Hope is helping us with that, it’s this whole biochemistry thing. Then we need to do the scutching, and heckling, which will give us fibers to start to make things with.”

Ana finished, “So we’re going to try to make clothing from it, eventually. It can get blended in with the silk and cotton. At the moment, there are just enough plants to practice on, and we need to save the seeds from them to be able to plant more. Apparently, we can make really comfortable clothing from that. It’s nice because none of the adults is interested, Veda has her hands full with the cotton and silk, and that can be our thing for a while. Maybe some of the younger ones will want to join us later, but for the moment, it’s just us.”

The boy felt fine. He felt more than fine. Beer was good. He watched Eve and Beatrice dance together while Ana tapped out a rhythm and sang. The boy watched Bea’s tall, angular body turning and twisting to the music. He thought about what it was like being close to her. He knew all the words, “making love,” “having sex,” “screwing,” and on and on. They’d learned which words were likely to shock the adults, but for the most part, none of the words had any context for him. He wondered if there was a difference in the act depending on what words were used or who was talking. Maybe he thought they were “making love” and she thought they were “screwing”? The same event could be seen different ways depending on who was telling the story. That much he’d learned from Ben.

He fell asleep.

When he woke, the others had had dinner down below and were coming up to the sleeping platform for the night. He thought about rolling over and staying asleep, but he wanted to find Beatrice. He wanted to hold her as she slept.

He went down below to the dining area and picked up the plate that had been set aside for him. He ate but felt a bit ill, and finally downed some water. He didn’t see Beatrice.

He wandered down the main hallway, and then descended to the VR room. He could hear Beatrice talking.

He saw them, Beatrice and Eve, speaking too close to each other, and then Beatrice taking Eve into her arms. Eve pulled Beatrice’s head toward her and kissed her.

The boy just stared, then slowly backed his way up the stairs. No one had seen him.

CHAPTER 35

THE BOY

“They were so stupid!” he said to Hope. His mother was working on her plants on a platform under the dome the next evening before dinner.

“Who?” she said, concentrating with the smallest of smiles on her lips as she attached branches to a wire.

“People back on Earth! I mean, here we are, so frigging far away, trying to make life work on a new planet, and we had a perfectly good one already!”

“Yep,” she said, but added nothing more.

He waited. For a while, she didn’t say anything.

“So, what are you and Beatrice learning about laws?”

He sat down on one of Hope’s stools. “Mostly they were to protect people and their things. There were very, very few laws for a long time to protect the Earth itself, which I guess is why it turned into a big pigsty and we left.”

His mother gave him some short strings and he began to help her attach the plants to the wire. There were a few hundred to do, and they needed to attach each plant carefully so that the stems didn’t break in the process.

“I get it,” he went on, “I really do, why you adults don’t want to change the development of this planet. I don’t know if I agree, but I understand it better. But whether we stay on Otrera or go somewhere else, I think we’re going to need them—laws—if we start to have more people. We have thirty-four people now: you seven from Earth, me, Beatrice, Eve and Ana, and twenty-three children. We’ve run scenarios in VR, but starting at around fifty people or so, it gets difficult to operate as we have been. It takes a long time to ask everyone’s opinion about everything and convince them to reach agreements. The thing is, none of the adults seems to want to impose themselves on anyone else. No one wants to be a leader, and no one wants to have power over others. Back on Earth, though, this seemed to come up all the time. Do you think we can keep it up?”

Hope sat down on another stool and ran her finger over the tops of the bright green sprouts. “We can do a direct democracy for a long, long time,” she said, “but that’s always dicey if a decision is controversial. I mean, if there are fifty of us and twenty-six vote for something, then twenty-four are going to be unhappy.”

“So that gets me to the idea of how to organize things as we get bigger. How big can we allow ourselves to get, how many people can we move if we decide we need to leave?” he asked.

“You’d have to ask Haley to be sure, but I think she was preparing for a couple of hundred people, in that range. It’s different now that she’s set up for mining the asteroid belt. She can create and produce ships for us in space. I think we wouldn’t go far, or not nearly as far as we came from Earth. There’s another planet in the Goldilocks zone not too far from here, next solar system over. Still far, but the logistics would be simpler. And we kind of know what we’re doing now. Can you give me a hand here?”

Together they moved one tray of plants on the platform further in to make room for a new row.

“But the best alternative would be one of Otrera’s moons,” Hope continued, “although the gravity is even lower up there, so in the long run that would likely change our physiology. You lot are already growing taller than the Earthborn, even Adella, and she’s tall. We’d always planned on dome living. The question of walking around on a whole planet didn’t seem too likely so we never really thought about it. I mean, the chances of finding something with the right mixture of gases and whatnot just didn’t seem possible. Here it would work. We’d need to adapt some, but my guess is that in a few generations we could probably get our bodies used to the differences here.”

CHAPTER 36

BEATRICE

Beatrice was also running out of steam. No form of governance seemed to work perfectly, or even acceptably over the long haul, with groups larger than fifty people. If she set up rituals, they became doctrine. If she created rules, some people broke them just because they could.

The VR models peopled the virtual reality environment with “generic” Otrerans and as soon as she let a scenario run, accelerating the speed so the years passed in a few minutes, the “leaving spit in the sink” syndrome began: someone would do something disgusting or wrong or just not very community-minded because there were so many inhabitants and they knew they wouldn’t get caught. Someone would put something into the compost that wouldn’t compost, or not pick up after themselves, and then it went on from there. In VR, she could review the information, call the person out, get them to stop, but the fact was that the larger the community, the less each individual person felt like what they did mattered.

It seemed logical to separate into groups no larger than fifty people and try to federate them together through education and training. That almost worked. However, sometimes, and often enough for it to be worrisome, a group would veer off into what she could only call a personality cult. A leader would arise who would try to federate all the other groups under his—usually this was a man, but not always—and only his control. This leader would often start a coup, then try to impose his rules on everyone else.

The thing that was so irritating about it was that there was never any real need for it. Beatrice could ensure that every group was treated equally, had the same information and the same opportunities, but an illusion of privilege was given to “others” and they would try to get back what the others had “taken” or they would see themselves as naturally superior and need to subjugate others to their will. It infuriated Beatrice.

She pinged the AI. “Haley, can we talk?”

“Sure, Beatrice. What can I help you with?”

“Can you show me what you’re looking at these days? I need a break. Something new.”

“That would make me very happy.” Haley began to send her images from the new satellites in orbit around Otrera. She wasn’t much of a conversationalist, not knowing how to make small talk with humans the way Ned could. She was pure AI, closer to Ben than Ned in many ways. Beatrice had contacted her many times in the past, because looking at the stars was one of the most relaxing things she’d found to do. Feeling small in the universe tended to put things in perspective.

“Are you mapping Otrera?” Beatrice asked.

“Yes. In the beginning we only charted enough to find the best place to set up shop. Now that we have more time, I’ve printed a few smaller satellites to orbit Otrera and map it more completely.”

As the images came in, Haley tweaked them into a 3D map of the planet. While it gave an impression of being extremely flat, in fact there were dips and valleys. Nearly all the drinkable water seemed to be found where volcanos had erupted in the past, and many of them had hills around the calderas, like the one where the boy had broken his collarbone. Haley used the printer to make drones with the ability to scoop and siphon and take samples, and she had them fly back to the dome for analysis. Analyzing the samples was mostly Bhagi’s job, because she enjoyed doing it the most.

Their “local” lake was by far the planet’s best source of water for human consumption, and it was the only one where they had found life. The drones found several lakes bubbling up gases and shooting geysers of sulfuric spray into the air. In those locations the air was much more toxic to humans than where they lived, but because of the planet’s almost complete lack of anything resembling weather, the toxic air stayed where it was.

They still had no idea what might have formed the caves on their local lake. There was no real wind, no rain, and only a slight variation of temperature from the poles to the area on the equator where they'd built the dome.

Beatrice spent the rest of the afternoon looking at the 3D map of Otrera, zooming around and exploring. Someday, she'd really take time off and go visit some of these places, she thought. For the moment, there was just too much work to do.

CHAPTER 37

THE BOY

Ever since he'd seen Eve and Beatrice kissing, he'd watched them but hadn't noticed anything in particular. They were friendly together, and he and Beatrice kept having sex, exploring each other more and more intimately. He decided that what they were doing was more "making love." He thought about sex almost constantly. He even thought there was something wrong with him until he asked Dana during the final checkup for his collarbone, which she declared healed, though his shoulder muscles still hurt.

"Normal, totally normal," she said.

"Seriously? Because I can't do anything—I mean *anything*—without thinking about sex. It's like my brain has been hijacked."

"It has. It's called hormones. I can give you something to calm it down, if you want. I'd need to take a few samples from you to fabricate it, but it's possible."

"No, that's okay. Or I think it's okay. Maybe take the samples anyway, just in case. It's so weird how I used to be able to think about, like, exploring Otrera, and now all I want to do is..."

"Explore Beatrice?"

The boy slumped and nodded.

"Here's something to think about." Dana prepared a couple of vials as she talked. "Imagine that you had these feelings and Beatrice didn't want to have sex anymore. Or she wanted to have sex with another person and not with you. Or if you preferred sex with boys to sex with girls and, like here, there weren't any other boys, or there were but the boys didn't feel the same way as you did. Or that Bea wasn't there at all and you just had these feelings and no one to share them with."

The boy sat for a moment, concentrating. "Nope, I can't. I really can't. It would be horrible. I'd go nuts."

"And you're not wrong there. Young men, and young women, often go a bit nuts during this part of puberty. Everything is stronger at your age: your beliefs, your anger, your love. And you haven't been alive long enough to know that these feelings can come and go." As Dana took a blood sample, the boy winced.

She went on. "Many, many cultures had ceremonies or systems that helped young people at your age. You almost participated in one of them, sort of, when you took off with the suit. The Australians, the original ones, had something called a walkabout. They'd go off and live off the land for a period of time. The Amish, which were a religious community that chose old ways of living, had the *rumspringa*, when they would leave for a while before coming back and choosing to live in their community. And there were other ceremonies or rites of passages in other communities. In Graceland, everyone had to join the army. The Jewish faith had *bar mitzvahs* for boys and *bat mitzvahs* for girls. In Cascadia, many young people went to sweat lodges and took hallucinogens with an elder. That's what I did. And some places had ritual fighting or tests of faith. All this was to deal with the passage from childhood into adulthood."

Dana finished up with the blood samples and sat down. "This is something you and Beatrice should think about as you're thinking about laws. A huge, huge portion of laws were broken by young people, simply because their wants and desires were too strong for them to deal with. When they got fed up with being poor, they were *completely* fed up. When they wanted something that someone else had, they wanted it *now*. When they were angry, they wanted to kill someone, and they did sometimes. And not dealing with that, as a society, brought humans a lot of grief."

"Why does it have to be us two? That's a lot to put on our shoulders, and you guys are all the adults here."

"Yeah, but look at us. The adults here are—I don't know how to say it—we're happy, shiny people. We believe that people are mostly good, because *we're* mostly good. We're going to be completely unarmed if—or more like *when*, because it seems impossible to avoid—we give birth to

someone who isn't. Much of that is genetic, and our society is so small that we can suss out problems. But there are four other boys after you, a few years away from puberty still, but it would be nice if there was something in place for them if and when they wind up having their hormones hijacked, like yours are now. And girls get it, too. I can guarantee you that us adults are incapable of really, truly understanding how you feel right now. Or I shouldn't say that—'remembering' is better. We all felt that way once, but as we get older, we tend to forget it. Anyway, I'm going to start processing your samples, and if your sex drive is making you too crazy, I should have something ready for you tomorrow."

"Can I ask you a really personal question?"

"Maybe. I mean, ask it and I'll see if I want to answer it or not."

"What do you do for sex? I mean, you're not gay."

"VR and sex toys. And hugs. Real, human hugs are great."

###

The boy left the med bay and arrived in the common room. Eve, Ana and Beatrice were waiting for him with grins on their faces.

Beatrice reached into her pocket and pulled out a package. "We have a gift from Ned, a surprise!" she said. She undid the covering that held the mysterious objects inside.

"Oh cool," Bhagi said in passing. "A deck of playing cards! What a nice idea!"

Beatrice glared at her. "Yes, cards, and we can play a game with them. There are actually lots of games to be played with these, and Ned said there are hundreds and hundreds of others, other cards, other games. Ned said he was sorry that he hadn't remembered them sooner. Come on, sit down, let's try this one." She pulled out a list and started giving them cards one by one.

They learned how to shuffle and how to hold the cards, and as they played, the boy related to others his conversation with Dana, the idea of having a "becoming-an-adult" ritual that was more than just the naming ceremony.

He skated over how he felt, but Eve didn't let him off easily. "So part of this is about those erections you wake up with every day?" she asked.

He looked at her sharply, but could tell she wasn't being snarky. She was honestly asking. It was there under the covers poking up before he was even awake, so he wasn't surprised that someone on the sleeping platform had noticed.

"Yes, partly, in any case. There isn't much I can do about them on my own. Dana said she can fabricate something, a pill or drops or something, that can attenuate it a bit. But these feelings might be different for me than for girls."

"Maybe," Beatrice said. "I think about sex a lot, too, but it doesn't seem to be as overwhelming for me as it is when you describe it."

He looked at her carefully, but he had no indication if she meant sex with him or with someone else.

They kept talking and playing cards. One game they tried had more to do with luck, but another required remembering which cards had already been seen in the game and the boy found he was really quite good at that. It was like he had fifty-two slots in his head, one for each card that went by.

"Fun!" Ana said. "But let's go up to the platform. I think we're keeping the little ones from wanting to settle down and go to sleep."

It was true; Isabelle and Hope's youngest children were having a meltdown about going to bed tonight. They wanted to go up to the sleeping platform with the others, but had a tendency to wake up, loudly, way before anyone else wanted to move in the morning, so Isabelle and Hope were still taking turns sleeping with them down below.

His mind was on the other children as they left the room. BB was growing so fast that while he still needed to look up to the boy, that wasn't going to last much longer. They were becoming

friends, more as equals now that BB didn't idolize him so much. The more he thought about it, the more he felt relieved. He didn't want to be anyone's hero.

Part III: A World with Weather

The sun did not shine. It was too wet to play.
So we sat in the house. All that cold, cold, wet day.
—Dr. Seuss

CHAPTER 38

AURORAS

They climbed up the steps, but no one was sleeping. Everyone was standing on the platform, milling around and looking at the sky that was bright with streams of strange light. No one was speaking either, but it was a silence that seemed to have come on after the end of a long discussion.

The light slowly came and went. The boy tried to focus on one part of the streaks. He couldn't see it move, but if he closed his eyes and counted to three, the light had changed position.

He went over to Bhagi. "Any idea what's going on?"

"Auroras," she said. "Vaniric winds, I suppose you'd call them. Winds from our star. Charged particles are emitted by the star, sweep across our atmosphere and create this beautiful light show. We had them in our old solar system. This is the first time we've seen them here, although if we were up at the poles we'd likely see them every night."

"Has Haley said anything about why they're happening now?"

"Vaniric storm, apparently. She's observing it from quite close, a bit closer than I'd like her to get, but she says it's safe. I did win an argument with her, though: before going in so close, she made a backup of herself. Two, actually, just in case, like Ned has. Her entire matrix is right within shot of a Vaniric flare. I can't believe she hadn't done it before. Every immortal construct thinks they're actually immortal, I guess."

###

No one really slept that night. The sky was too beautiful, too strange. When daylight finally made it too bright to see the swirls in the sky, everyone lay down for what turned out to be a short nap. When they awoke, later than usual, the winds had begun.

The boy and others staggered through breakfast and the morning routine after their all-night vigil watching the skies, but it was certain that this day was going to be unlike any other they had experienced on Otrera. The sky was hazy and growing hazier, and dust blew into the air, driven by winds. It wasn't a Free Day, but no one felt like going off to their activities.

Beatrice was in charge of teaching the younger kids for five weeks, but there was no way to get them herded below to the class area when the sky was offering up so much to comment on. Finally, she managed to lure them below to look at the images that Haley was sending back from their sun. She was disturbed by the winds in a way she couldn't really define, and she wanted to be somewhere she couldn't see or hear them. The kids were out of the way when the tempest began, which was good. It was scary for the adults, but it would have been unimaginably terrifying for those who'd never seen changes in the weather before.

The gusts of wind came first—wind like even the adults had never experienced, coming like a long howl. It sounded like the creak of centuries-old bones. Sheets of dust hit the dome, covering their view, then blew away. A shower of pebbles pinged against its surface like bullets.

Ned called everyone together for an emergency meeting. They went underground to the common room, just to be free of the noise. He'd chosen to talk with his android suit "in person" instead of in hologram form.

"Hi, as you can see, we've got a bit of a situation here, but nothing we aren't set up for," he said. "As you know, our electricity comes from the dome panels collecting light. When they're covered in dust, that won't work anymore."

"We can use the geothermal backups, right?" Bhagi asked. "I mean, we've tested them every month or so and they should work fine."

The boy looked at her questioningly.

“There’s hot water from underground that we can use to generate electricity,” she explained. “We didn’t really need it for power, since the panels have been so efficient, but it was built in for just this sort of occasion. Didn’t anyone show you that during a teaching session?”

“Yes,” said Alexandra. “Although it seems you’ve forgotten? Don’t you remember when we made a home spa with the water?”

“Oh, that stinky bath?” he asked.

“Apparently that’s all you remember, but we talked about our backup plan if we lost the sol—um, the light panels. I keep wanting to call them *solar* panels, but that word comes from Earth’s sun. Light panels, light panels...” Alexandra gently tapped her head with her fist. “Hard habit to break.”

“Yes,” Ned said. “Those will give you electricity, and you’ll need to set up the grow lights for the plants. They’re down in storage area four. I’m going to transfer myself—my whole matrix—here, planetside, instead of staying in orbit. One of my backups will stay up with Haley. She’ll stay in orbit above all this, or maybe around Vanir, but communication might get cut off. We’re looking at a large storm which may take weeks or even longer to end. We’ll have winds, certainly, and more rock debris. It’s going to get worse before it gets better, but there should be some breaks in the weather.”

“Is there any danger to the dome?” the boy asked.

“Okay, there’s never zero risk, but even though this hasn’t happened before, it’s well within the things we planned for,” Ned said. “The dome’s material was designed for any planet in the Goldilocks zone, even those with so little atmosphere that they might take direct hits from smaller meteors that don’t burn up before impact. We also protected ourselves from stellar radiation in case we wound up on a planet without magnetic poles. If we spotted bigger incoming objects—like the comet we believe hit Earth and killed off the dinosaurs—we would have ample warning and could evacuate everyone in time.”

“Any idea of how long we need to plan for?” Hope asked.

The android suit couldn’t shrug, but his silence said it all.

“Okay, then,” Alexandra said. “What do you need us to do?”

Everyone helped. Taking care of the food supplies came first. Grow lights were set up over the plants, with sensors attached. When sunlight was coming through, they would shut off or dim, but if the dome was completely buried in dust, they would remain on so nothing would die. The well-water pump was automated and deep enough that nothing should affect it.

“Food, water and shelter, check!” said Hope. The plants would be unaffected by the storms, and even the trees and plants for the new dome would be ready to go whenever the storm slowed.

The dust came and went from the dome surface. If it stayed long enough it just slid off on its own, piling up along the edges. Communications remained good with Haley, and she was even able to send down a care package. It soared through the atmosphere like a comet before putting out a parachute and coming to ground not far from the dome. She sent it at night, when the winds tended to die down, leaving the Vaniric flares to illuminate the clouds of dust.

“Some assembly required,” Ned said. He’d spent some time getting the dome construction robots to reinstall the smaller dome at the end of the tunnel where the boy had done his jail time. The package from Haley was huge, but no larger than the shuttle had been. It contained many useful items.

“A leaf blower!” Adella said when she saw it put together.

“Well, a dust blower,” Ned said. “Should help me and the bots clear off the dome when the winds aren’t so bad. When they’re blowing hard, there’s almost no point. She sent four of them, plus a few more suits to go outside in, so more people can help if they want to. The suits are more reinforced than the model we used before, since the radiation levels seem to be higher out there with the winds. Still, no one should use them when rocks are being blown around, as they can’t really protect anyone from impacts. And these guys”—he motioned to the two small machines next to his android suit—“are for carting off the dust when we’ve blown it off. Thankfully the wind seems to always blow in the same direction. And soon I’ll have put together some dust blowing

robots. No one *has* to help, but I've noticed that no one seems to be able to settle down to anything else, and doing something proactive is probably the best way to stave off feeling panicked."

He turned to the boy. "I think we know now what formed those caves."

The boy looked ready to say something, but changed his mind. "Can I start helping with the dust blowing today?" he asked.

CHAPTER 39

THE STORMS

Four weeks had passed since the first night of the auroras. Everyone took turns putting on the suits, going outside and blowing off the dust on days when the wind died down enough that it didn't just cover the dome immediately. They worked even on Free Days and were all exhausted. They didn't need to work so hard, everything was under control, but the sound was terrible for the Otreran born, who had never heard wind before. Ned offered to make more bots to do the work for them, but everyone had an innate need to do something. No one was sleeping well, and on days that their view of Otrera was blocked by accumulated dust, it remained dark inside. They began to stay below ground to sleep, moved into several rooms off the dining area. Up above the grow lights over the crops cast a strange glow, filtering through the many layers of suspended plants.

As soon as the winds died down, the boy and Isabelle, mostly, with the others taking turns, would attach themselves to an external pulley system which hauled them up to the top of the dome to blow dust down to the ground, where the bots carted it off. The winds came in consistently from the same direction, so when it was carted off it didn't tend to blow back onto the dome again.

The newer suit had a built-in hydration system and a way to squeeze mush into their mouths through a tube, so they didn't need to come inside for food or water. There was even a sort of catheter, less intrusive but better than diapers, so they didn't have to stop to pee.

The boy worked outside every day, somehow enjoying the physical effort of it. He was getting stronger and taller. He'd had another growth spurt. He'd been taller than everyone else before, but now he was towering over them all.

When the sun blew hot air and dust, it was sweltering inside the suit, but some days it was hazy with atmospheric particles, and from time to time they even had clouds.

He hadn't seen much of Beatrice, who was working more with Bhagi and Haley, trying to create a model to map the effects of the star's flares and the resulting winds on Otrera. He felt too out of sorts to think about her. He laughed to himself that winds could blow his sex drive away, but it was true.

It was Dana who finally made them stop. "We need a break soon," she announced at dinner, "and I think we need to get into a normal rhythm. This panic mode isn't good for anyone. Who knows how long the winds will last."

"Tell me about it. I'm exhausted," Adella said. Her recent fertilization had taken, and she was now six weeks pregnant and feeling sick quite a bit of the time. Veda's baby was overdue by a few days, and neither had taken much time off.

"Anyone up for trying the thermal baths again?"

"Your bath is my command," Ned said. "The stuff's still down in storage from the last time. I'll get something set up tonight and it should be ready for tomorrow."

The next day was a dark day with winds bringing a shower of rocks, and there was no point in trying to clear off the dome anyway. Ned had set up four bathing areas underground, in four different rooms. It was possible to be together or alone, and the water was filtered after each person or small group finished. They took time soaking and relaxing, and that evening at dinner, Alexandra began to tell stories about winds. She told them of Earth winds with different names, and how the local people had different stories about why those winds came, and what they meant.

"I like one story of an old god on Earth, Stribog. He was from an area that later believed strongly in just one god, an Allah or Yahweh or some other. But before they became monotheistic, the people believed in Stribog, a wind god who distributed wealth. I think that was a nice idea. The Greeks had gods for wind directions: Zephyrus, Notus, Eurus, Boreas. They were sometimes gentle winds, sometimes destructive winds, maybe bringing rain or storms. More than one culture had a story of a flood, that's when there's too much water." She told them a brief version of Noah's Ark before adding, "My mother told me the story of Anitun Tabu, who was a goddess from her culture

in the Philippines. She brought winds and rain—winds when she was angry and rain when she was happy. It rained a lot on my mother’s island, so Anitun Tabu must have often been happy.” Then she added, for the little ones, “Rain is when water falls in droplets from the sky.”

“It could rain here,” Bea added. “Haley said we should be prepared for that. There’s a volcano erupting downwind from us. We might be getting a lot of ash blown around in the atmosphere, and that might collect with moisture from the water here.”

“So there’s more radiation and more sunlight being blocked by dust and ash?” the boy asked, speaking slowly to make sure his question was being understood.

“Yes,” Bea said. “That seems to be the gist of it. The radiation alone would kill us all if we weren’t completely protected by the dome. And we’re getting closer to understanding the patterns of the eruptions on Vanir and the kinds of weather and wind patterns they cause on Otrera. We should be able to predict when it might be calmer. Haley still wants to start digging for the new dome, and outside of rockfall, or rocks being tossed around in the wind, it doesn’t really affect the bots at all.”

They got back into a routine, but one more dictated by the weather. Haley and Bhagi could give them about a two-day warning for stronger winds, and on those days everyone hunkered down. They took long baths, read, played card games or tried to relax with the strange darkness over the dome and the occasional pinging of rocks.

Often the winds died down at night and the family could sleep up under the dome, but most of the children now preferred being underground. It somehow felt safer.

They’d gotten rain a few times, and the children pressed their faces up against the clear dome wall as it fell, watching the rivulets trickle down the exterior. Ana, for her first teaching stint, had started to learn about weather—Earth weather, but also weather that had been observed on other planets in their original solar system, storms on Mars and Jupiter. She taught what she’d learned to the children, and the knowledge made them less fearful, even when they had their first thunderstorm.

Haley’s bots began excavations for the new dome, and they built a windward wall to protect the bots from flying rock and to keep the site from filling up with dust. A few machines got hit, but Haley had sent several printers down to the temporary storage dome, so the bots could quickly be replaced or repaired with freshly printed spare parts.

The sameness that had made the boy feel so pent up before was gone. This was a new world for them, a world with weather; and in any case, his mind was elsewhere.

He had an idea, but he didn’t want to be talked out of it, so he said nothing to anyone. First, he needed to prepare. He waited for a break in the weather.

CHAPTER 40

THE BOY

It was simple to put in place. Haley and Bhagi had predicted a calm of about three days. There was a lot of sand and dust on the leeward side of the dome. The boy was usually a volunteer to clear the dome, so no one thought anything of it when he put on a suit in the morning and went out to work. Except this time, he went in the other direction, toward the winds.

These suits were heavier and more solid than the containment suit he'd used when he ran away. It was hot out, with only a haze of atmospheric dust, and in an instant he was sweating. He walked past the bots working on the new dome. From inside the dome, no one would really be able to see through the dust to be able to tell the difference between him and a bot.

This time he had access to an electronic map, but he didn't want to use it unless he needed to. It would show his position to Haley's satellites, if she chose to look at them, and if the connections were working that day. With the atmospheric storms, the connection to Haley and the satellites above the planet weren't operating as well as they usually did. Haley hadn't turned them off, though. He wasn't sure if the readings he got would show his position accurately, but he didn't want to give away what he was doing.

He had an analog compass that he'd made in one of the work areas below ground. Last time he could have followed his footsteps back in the dust, but now with the winds he had to be sure he could navigate even in low visibility.

He would have been missed at dinner, except that Veda went into labor just as everyone sat down to their flavored mush. There was no panic involved—this was her sixth child and Dana didn't think it would take very long—but no one paid much attention to who was there for dinner and who wasn't. The next morning was interrupted by her coming to breakfast with her newborn son. She hadn't wanted to know the sex before giving birth this time around, and he was her first boy.

All this gave the boy a lot of time before anyone noticed he was missing.

The winds were strong, but nothing he hadn't become used to. He realized that he could get used to new things quite easily, and even liked the variety of wind and rain instead of the endless perfect weather he'd known all his life.

Not wanting to stop and put up the portable dome, he wound up just pushing mush through the feeding tube and drinking when he needed to. He walked through the day using the compass and kept going partly into the night using the stars. The nights were still quite clear since the wind tended to die down as soon as Vanir set. There were just the occasional auroras flowing through the night sky.

Now that he was putting his plan into action, he wasn't tired at all, but at some point he stopped, set up the dome and rested. He didn't think he slept, but the hours until dawn passed quickly, and he woke when the first winds started to blow. They were nowhere near as strong as they had been, but the break in the weather wasn't going to last. He got up, collapsed the dome and continued.

The landscape he'd traveled before had changed with the winds. There were now small dunes of dust and curved banks of small rocks. As he neared the lake, he realized that he was walking uphill on soft sand, and after a while he reached a ridge that looked down on the water below.

Seen from above, the lake was browner than the last time he was here. The winds had stirred the shallow areas, and sand-colored waves were hitting the shore. It was easy to see the difference between the crater's hole and the shallower spillover where he'd waded in his first time there. Where it was deeper, it was darker and bluer.

The boy slid down the soft dune to the shoreline. Wading in, carefully, he took a sample from the clearest water he could find, wondering if all the organisms were already dead, killed by the

lack of sunlight, the sand in the water, the higher levels of radiation hitting the planet from the star's flares.

Just as he'd done on his first visit, he waded back to the shore and set up the machine to analyze the water. It wasn't easy to walk out and back, but he had no way to use the analyzer in the water. It didn't float, and he wasn't sure it would work if it got wet. His gloves made him clumsy, but if he was lucky and found the life forms quickly, he wouldn't need to set up the portable dome again.

He wasn't lucky.

So, he went out again, and again, and a fourth, fifth and sixth time, sampling higher and lower in the water, trying to find the organisms that lived there. The weight of his protective suit made him sink in up to his knees. Rocks had been blown into the water, and the surface was a variety of sandbars and deeper dips. A few times he nearly stumbled, and wondered if he would even have the strength to push himself upright if he fell over face first. It would be awkward, that was for sure.

The machine beeped once. It was one of the single-celled organisms, but it was dying. He watched it stop moving and then float, and the machine went silent.

###

After a few dozen more samples, he went back to the shore, exhausted. It was evening, Vanir giving off its final rays of light as it slipped between clouds and a clear sky.

The boy heard the beeping of someone trying to communicate with him. So they had finally noticed that he wasn't in the dome. Maybe a little searching had revealed the missing suit. He chose not to connect and went out for a final sample. He was almost out of sterile tubes and he'd have to head back soon. The winds were supposed to pick up the next day, and he wasn't sure if he could make it before rocks started flying.

He returned and ran it through. Nothing.

They were gone, the creatures, the little organisms who had made staying on Otrera forever impossible. The boy sat, overwhelmed with sadness without really knowing why. In some ways he'd hated them that whole time, but he hadn't wanted to see them disappear.

Before knowing they were dead and gone, he'd only wished he could take off his helmet and feel a breeze. He'd wanted to imagine those who came after him, a new population of Otrerans, maybe even evolving to adapt completely to the planet. Its conditions were so close to those found on Earth. He'd read about terraforming. They could have lived anywhere, visited the volcanos, the poles, the beaches. And now maybe they could, but why did that make him feel so bereft? He thought about being told, "Be careful what you wish for." He'd built up all this anger and a sense of injustice at having to leave because of a few single-celled organisms, and now it had collapsed. They could stay on Otrera forever, if they wanted.

He contacted Ned.

"So you know you're an idiot," Ned said.

"Yep," the boy said.

"Did anything survive?"

"Nope."

Ned let the silence grow for a moment or two. The implications were clear to them both: if there was no more life left, they could think about staying on Otrera, for however long they wanted. Without containment suits. They could spread out, become a civilization of humans on a new planet. The fact that the boy, who wanted to stay so badly, was the one who had gone looking was lost on neither of them. The tiny organisms' disappearance would have to be confirmed, of course, but the lack of sunlight and the increased radiation might have really killed them off.

"Coming back soon?" Ned asked.

"Yep."

"Do you want me to send a drone tonight to pick you up?"

“I’d rather walk. I just want to rest for a bit first—an hour or so, maybe. Then I’ll head back. It’s easier to walk at night, when there’s less wind. I need to get my head around this, I guess.”

“Just hurry. Haley thinks the next storms are going to be whoppers. You don’t want to be out there when they happen. Your suit should be fine, but the radiation levels outside of the dome are not wonderful at the moment. Keep your helmet on, just for the radiation. You’re mostly okay at night, but if you’re not damned close to home in the morning, I’m sending out a drone for you.”

CHAPTER 41

THE BOY

He sat and stared at the small waves hitting the shoreline. Then he closed his eyes and felt the last rays of Vanir disappear, along with a tension he hadn't known he'd been feeling. It was dark and he could faintly feel the cold through his suit. He pulled a bit of water from the pipette and used the catheter to pee.

He decided to set up the portable dome for his other needs. His first interaction outside of his suit on Otrera wasn't going to be a load of poop left by the lake. He would bag it up and take it home to the compost heap just like he had on his first walk. The portable dome would also protect him somewhat from the radiation, but his biggest concern was wanting these interactions with the planet to be an indication of how they felt about the place. It was pristine and beautiful. He wanted it to remain that way.

###

Preparing to leave, as the portable dome folded itself up, he took one last look at the lake. Both moons were out tonight. The smaller one only barely showed over the horizon, but looked enormous in the atmospheric haze caused by all the dust. It emitted only a dim light, and he thought he could see its reflection in the water.

It took him a minute of staring hard to realize it wasn't a reflection: the waves were glowing. The waves were just the slightest bit shiny under the surface.

It was them. They were there.

"There you are, my little friends," he said. "I wonder if you've always been fluorescent, or if the radiation did something to you?" When he'd watched the lake the first time, nothing had glowed. Or maybe they reacted to the wind?

Deciding to make one last foray, he searched through his supplies. There were still a couple of clean vials left. He waded out farther than he'd ever been, reached down, filled up two vials with slightly glowing water and headed back to the shore.

And tripped.

He managed to twist as he fell, trying to save the uncapped vials in his hands, and landed on his back. The samples were safe. He held them up and out of the water, and could see them glowing in the darkness. The suit wasn't going to take in any water unless he had ripped it, but he was going to have a hard time moving.

The mush packet inside his suit had burst, and he could feel the dampness oozing around his hips. He tried the helmet's communicator, but the fall had broken something.

"Why didn't I accept the drone lift home?" he said out loud. "I could have help on the way, but no! Big man here, had to go it alone. Idjit..."

His head inside the helmet was close to the shore, under about twenty centimeters of water, and the rest of his body was in a bit deeper. The air inside the suit made his legs float slightly. Though he saw water on each side of the helmet, the visor showed him the sky. It was smudged with sand but didn't seem to be cracked. He was pretty sure the suit was still hermetically sealed.

He pulled his knees up and tried to slide on his back toward the shore, holding the vials up above him, out of the water. His body didn't budge. The suit was just too heavy. He tried a second time, wiggling, inching up one shoulder blade, then the other. He was able to push like this and move, centimeter by centimeter. He couldn't use his hands without setting down the vials, but as he reached the shallower water closer to the shore, he dug in his elbows to help.

It felt like hours before his torso was finally clear of the lake. He rolled onto his side, dug small pits in the sand, and gently set the vials inside them. Then he pushed himself onto to his hands and knees, crouched, and finally stood.

He took the vials over to the machine and put in a few drops of water. It beeped immediately. There they were, a little different from the last time he saw them, just barely larger this time. He wondered again if the radiation had changed them and how fast they must have reproduced in order to show changes so quickly. He wondered where they'd been all day.

When he pressed his comms button, he found it was definitely broken. He tried to eat a bit of mush and got a bit through the crushed tube before sucking in air. His supply of water appeared to be intact. He drank a bit and knelt on the sand. Bhagi and Haley had forecast a three-day calm, but that was only a prediction, so he needed to get going. Day three was beginning in a few hours.

Deciding to travel light, he left the analyzer behind but capped the vials off carefully, to take them along. He buried the machine in a mound of sand and put a few rocks on top of it. It shouldn't blow away, at least he hoped not. He took out his compass. Nothing to do but start walking.

He'd barely had time to think about being able to stay on the planet forever. Now he was back where he started, but this time it felt different. This time, he decided they needed to leave Otrera someday. These little creatures deserved a chance to grow and evolve without humans interrupting or changing how they developed. He understood now, in his bones, in his gut, that these little microscopic beings were truly alive in the same way that he was.

He was going to have to think about all the plant life they murdered in order to live, but somehow that was different. Eating live things were Earth's ways, Earth's development, and his people came from Earth. His mother brought plants to life, and they killed them to survive. For the moment, they hadn't even killed the insects used for pollination, just collected their carcasses to make protein patties. Now he understood why the mothers and Ned had felt it was unfair to impose themselves on the life of another planet. Look at what they'd done to Earth, treating it like it was theirs for the taking. Coming to a new place meant requiring respect for their new environment.

When he reached the ridge, he looked back at the lake. It was odd, the glowing water. It was like there was a pattern to it, a large circle of fluorescence shining up toward the dark sky. He turned and started down the dune toward home.

CHAPTER 42

THE BOY

He let his thoughts wander as he plodded toward the main dome. Now he knew what he wanted to do with his life: watch and learn about their microscopic neighbors. He was fascinated that they had begun to glow, and wondered where they'd been all day while he was testing the samples. Maybe they only came out at night and stayed submerged far below the surface? He'd been collecting the clearest water to avoid clogging the analyzer with sediment, but maybe they'd hidden among the grains of sand. Maybe that protected them from the radiation—he had no idea, but was excited to learn. Maybe he could even do this on another planet, another place! He didn't even have to wait for the others. He, and maybe some of the other kids when they got older, could go exploring other places.

Would Beatrice want to stay or go, he wondered. It didn't matter as much to him as it would have before the storms. The storms had changed his perspective of things, though he wasn't sure why. Maybe the galaxy just seemed bigger than his problems.

He kept walking in the near darkness through the cold of night, but even before Vanir rose over the horizon, the winds began to pick up. The period of calm was over.

Vanir never really rose at all that morning. The sky became lighter, but filled with dust and clouds, and soon there came the rain, along with the winds. The winds were mostly steady, and always from the same direction, but were growing stronger. The rain fell nearly horizontally and after a while the boy was having a hard time staying upright. He wasn't sure if he was going to be blown off course, and he couldn't check where he was. The compass showed he was going in the right direction, but if he wasn't careful he might miss the dome entirely. He tried hitting all the buttons on the suit, but had no idea if anything was working. There was a distress beacon in there, though it may have been broken along with the communicator. No drone was going to be able to fly in this weather anyway, and the only way home was for him to keep walking.

He managed to get one beep off the map showing where he was. If it was correct, and the star's flares hadn't affected the satellites that gave him his position, he was only slightly off course.

While he still had some visibility, he corrected his direction and tried to stay on it by using three rocks he found along the way. First he put them in a row at some distance from each other, checking that they formed a straight line in the direction of the dome. Then he returned, picked up the one farthest back, and walked it out ahead, lining it up with the other two. By doing this over and over, he could move in a relatively straight line. However, this worked only as long as he could see all three rocks at once, and as the day went on, his visibility diminished, so he had to put them closer and closer together. After a while it was almost impossible to see them at all.

The noise was horrible, roaring around him, sand hitting his back and pushing his feet forward beneath him. He leaned back into the wind, and as it gusted it almost made him fall several times.

He sat down and set up the portable dome. As soon as it was up and he was inside, the noise diminished some. There was no communicator in this dome, but setting it up might make him easier to spot if they were trying to find him. He decided to take his time. The busted mush sack was rather disgusting, but he was hungry, so he used his hand to scrape it off himself and put it in his mouth.

Based on his calculations, wind direction and compass readings, he shouldn't be too far from the construction area for the new dome. He could either try to continue with the day winds or wait until nightfall, when it might be calmer. He had enough water to last a little longer. Any mush he managed to scrape off himself would be enough to give him a bit more energy.

It would be better to go at night, he decided, so he sat down to wait it out.

They were going to have to give the Otreran life form a name, and he was beginning to see why it had been so annoying for everyone to call him "the boy" all this time.

He smiled. Finally, he had thought of a name for himself. And maybe he would only keep it for a while. Who were the adults to say that he had to keep a name forever? He could be this name for a while, as long as he felt like it, and change it later.

Night arrived, and with it the winds became less intense. Sand and dust had piled up on the leeward side of his portable dome. There was a roundish dip where it had changed the wind pattern. This was good. The boy knew which way the winds were coming from, and between that knowledge and the compass reading, he should make it home without getting lost.

He decided to leave the portable dome where it was. It was heavy, and he shouldn't really need it anymore. They could pick it up later if they got a break in the weather again, or any night that the winds slowed. It shouldn't take more than another hour or so to get back.

The sky was clearer than it had been, but there was still a haze of dust and sand that made the stars appear bigger than normal. As he walked, he noticed a roundish light, much like the auroras they'd seen the first night, but in the direction of where he thought the main dome was, although he still couldn't see it. It seemed to stay more or less circular and didn't seem to move, only waving in place like a flag.

After a while, he saw small lights moving in the distance and walked toward them. His communicator didn't work, but his headlamp was fine. The lights came toward him, and he realized they were the construction bots and drones, sent out to find him.

He found himself facing a construction bot and before he could say anything, the bot projected a hologram of Ned before him, looking quite pissed off.

"And you didn't contact us because why, exactly?"

The boy started to explain, but though he could hear himself inside the suit, he could tell that nothing was coming out.

"Ahhh, I see," Ned said. "No comms. Okay then, let's get you home before everyone has an even bigger conniption than they're already having."

The hologram disappeared, and the bot turned around. The boy followed. Even with the weaker winds, clearly Ned had ordered the drones and bots back without offering to give him a lift.

The boy grinned to himself. Apparently, being considered an adult wasn't always an advantage.

He ran up to the bot and tapped it on the side. It turned toward him, and he pointed to the glowing halo hovering over the dome, then shrugged to ask why.

Ned popped out again. "Now that's interesting. I wonder... Let's get you back inside. The radiation levels are much higher at the moment and your suit offers less protection than the dome. I don't know if that circle has to do with that or something else."

The boy tapped the bot again, moved his hands in the shapes of the portable dome and the analyzer he'd left behind, then motioned backwards.

"Seriously?" Ned said.

The drones did a one-eighty and flew back overhead to pick up the abandoned gear.

The boy arrived inside the dome and left the suit in the entrance bay, putting it in the bin to be sterilized. "This suit has been compromised," the machine said.

"No kidding," he said, thinking about the burst packet of mush that had run down his legs and into his boots as he walked back.

"This suit has been compromised," the machine said. "Please report to the med bay immediately."

"Yeah, whatever, it's just mush."

###

No one was sleeping out under the dome tonight. He was hungry, but he wanted to wash the mush off himself and find his mother to show her the vials. They probably needed to be preserved in some way. He washed first with his clothes on, the crusted mush coming off him in small chunks. Then he stripped down and let the water run over him for a while. The adults had always taught him

to be conservative with water—they were from Cascadia, after all, where water had been scarce—but they didn't actually have that problem in the dome.

In the common room he found Bea asleep, slumped over a table. She had a small tablet computer in front of her and the boy could see over her shoulder that she had been looking at the Vaniric winds—whether live or a recording of past winds, he couldn't tell.

He kissed her on the head, and she woke up, stared at him, and stood up.

It was just a hug, but it felt wonderful. He smelled her short hair and stroked her ears with both hands.

They sat down together. He told her about the broken communicator, the burst bag of mush and finding the glowing microorganisms. He pulled out the vials. "Meet the LUCAs," he said. "I stole the idea, but I knew there was a name for something like this. LUCA stands for 'Last Universal Common Ancestor.' Unlike before, now they glow. I'm curious to see with Mom why that is."

"I'm just glad you're back. Let me ping your mom to say you're down here with me. Do you understand what we're seeing here?" Beatrice turned the screen toward him.

"Not at all, I haven't been keeping up with your modelling of the flares."

"The biggest storms we've seen yet are on the way, you made it just in time. These are going to be larger and scarier than anything we've seen so far."

Hope approached the two of them and the boy handed her the two vials with the microbes, only faintly glowing in the strong light of the common room. She wrapped her son in a long, long embrace. "So these are the little guys you brought back with you?" she asked, looking at them in her hands behind his back.

They let each other go and Hope held the vials between them.

"It's funny that they glow now," her son said. "They didn't when I was at the lake the first time."

"Epigenetic changes, possibly," she said.

He looked at her quizzically, and she explained. "Those are when living things adapt to a stress factor, like something in the environment such as some sort of pollution, and develop traits not in their genes. Mostly these can't be inherited, but there've been cases of life forms that can transform their DNA very quickly. To be honest, I've never actually seen these guys in person, so to speak. We knew they were there and we just kind of left them alone. I don't even know if they have genes."

"What else could they have?" Beatrice asked.

"I have no idea. They're alien. To us, that is—we're the aliens here. So, what's going on with the storms?" Hope nodded at the screen in front of Beatrice.

"They're big, fat, long ones, and we don't have any indication of how long they might last. It seems that the star is heating up at the moment, and that this could go on for a long, long time. But it's really late, and we're all tired. Let's go to bed," Beatrice said, and nothing in the world sounded better to the boy.

They made their way to the man cave and the boy turned to face her before they went in. "I have a name for myself, at least for now. I would like to be called Noah."

"No-ah," Beatrice turned the syllables around. "Good," she said simply, and closed the door behind them.

As he and she lay together in the darkness of the man cave, the boy stretched his arms up in front of his face, thinking about the changes in the microbes. It might have been his imagination, but he thought he could see the skin under his fingernails glowing.

CHAPTER 43

BEATRICE

Noah woke her up in the night.

“Bea, something’s wrong.”

His hand was trembling on her shoulder. In the darkness she could see the whites of his eyes. They seemed brighter than anything in the room. He was crouching next to her on the mattress but then collapsed onto his side, seizing.

Bea gaped at him for an instant, then sprang up and ran into the hallway, shouting, “Dana! Dana!!”

Minutes later, everyone was awake and milling around in the underground area as Dana and Beatrice rolled him on an improvised gurney toward the med bay.

“Everyone back please, get back to wherever you’re sleeping,” Dana said, but no one moved, too interested in what was going on. “Move!” she cried, and pushed Adella away from him and the gurney.

Adella finally reacted, and started to guide the older children back into the rooms where they’d been sleeping. Most of the adults followed and closed their doors.

Hope stood there. “What’s going on?” she demanded as Dana rushed by.

“No idea, but he’s been outside, so who knows if he’s interacted with something. Or it could be something else entirely. Now isolate yourself, because if it is something from outside, there’s no sense in your passing on whatever it is to everyone.”

In the med bay, Dana gave him an injection to calm the seizure, and his body became lax on the gurney.

Beatrice stayed there with him, holding his hand while Dana put sensors on his temples, wrists and ankles. “We did some serious exchange of fluids earlier, so I’m pretty much doomed, I think.”

“And the rest of us, too, probably,” Dana agreed, “depending on what it is. It would be nice to slow it down, though. Not everyone needs to be...affected...at the same time.” Dana didn’t want to give a word to something she hadn’t yet identified: Infected? Compromised? She had no idea what was happening. One thing for sure was that their immune systems were not likely to be very robust. There had been no reason to bring Earth’s diseases with them. Most viral and bacterial diseases had been filtered out during their long years in stasis getting here.

He sweated his way through the night underground while the latest storms raged outside. Ned quickly arranged for the two women and Noah to stay in the med bay without interacting with anyone else. The air filters were fine, but he printed new ones, changed them out all over the dome and incinerated the old ones.

Ned wandered the underground areas in his man suit, checking over everything he could. He verified where Noah had been since returning from his adventures outside by tracing where his implant had connected with the dome’s interior systems. He sterilized everything he could imagine. Finally he made his way over to the entrance bay.

The suit Noah had used was still in the bin, where he had left it to be recycled and reprinted. The lid was flashing with a red light. “This suit has been compromised,” it repeated. “Please report to the med bay immediately.”

For a long time Ned didn’t move, then he forwarded the alert to Dana and Beatrice.

“Well, that helps us narrow it down,” Dana said to him. “Can you get more information from the suit? *Where* was it compromised?”

Ned tapped a button on the bin’s control panel, and it displayed information about the breach. “His back. There’s a small tear along the back of the suit and...”—he tapped a bit more—“and there’s a hairline crack in the visor, air could have also gotten through it. My hypothesis is that he came into contact with something from the planet. Who knows what. Likely the microbes, but it

could also be an allergic reaction to anything else that might be in the air. There's a lot of gases that are unhealthy for humans blowing around at the moment with the storms."

"It doesn't act like radiation poisoning, so there's that, at least. I'll see if there's anything like a break in the skin on his back."

Beatrice looked uncomfortably at Dana as she helped her roll Noah onto his side. "Um, there's going to be some marks there," she said.

Dana let the boy flop back. "Show me your nails," she told Beatrice. She took a small knife and began to scrape beneath them.

"Ow!" Beatrice complained, but she let Dana work.

Dana put the scrapings into a vial and set it in a machine for analysis. After a few seconds the machine finished its work and Beatrice hovered over her to look at the readout. Under her nails was definitely some of the boy's skin, plus something unidentified. Something from outside the dome. Something alien.

"Okay, I'm beginning to understand why all those religions had problems with sex," Dana said, sinking heavily into a chair. "Whatever got into him, it's entirely likely that it's got into you, too. And possibly me, if there's an element of airborne transmission. I hope you're wearing something comfortable, because we're likely going to be here for a while."

###

The storms continued outside, worse than ever, but Beatrice and Dana entered a silent world inside the underground med bay, watching Noah breathe through the next day. His brain activity was normal for a sleeping person, but he didn't wake up.

"It's strange to be so cut off from everyone." Beatrice was using one of the med bay tablets to read, and occasionally changed the screen to take in a live feed of Haley's perspective from out in orbit. Their sun, Vanir, was spasming along its equator, sending up chutes of gases. They were slow and terrible, but beautiful in their own way. The blasts appeared to be stopping. There was always a delay between an eruption on the surface of their star and the weather on Otrera, so there wasn't much change yet in the force of the storms.

"Yeah, it's weird," Dana agreed, as she fussed over Noah. She had set up an IV to keep him hydrated, and there were electrodes measuring everything she could think to measure. "But I'm kind of used to things being weird."

Beatrice just looked at her with a raised eyebrow, a trick she'd been practicing in VR. "Whatever do you mean?"

Dana kept moving around the lab, looking at the outputs from the monitors, but Beatrice was beginning to understand that Dana just couldn't be still even if she wanted to.

Dana flicked through a few holoscreens in front of her. "Even though we've been here for years, it still feels strange when I wake up and feel this lighter gravity. Not all the time, but often enough that I'm never sure when it's going to hit me. There's this period just before I wake up that I think I'm back on Earth, and then I move and I feel lighter, and I inhale, and the air is just that little bit off from what I was born with. I start to panic but then, well, waking up on Earth was a hundred times more panic-inducing. It was a scary place, even in Cascadia, before we left." Dana moved around Noah's body, not doing anything productive but fussing over him to keep her hands busy. Not looking at Beatrice directly, she added, "I need to admit something: I take meds to stay calm. When my baby died... I haven't been doing so well since then. I've been doing therapy with Ned and keeping myself interested and active in things, getting exercise and yada yada yada. I've found something that works for me, but it's a 'forever' drug. I can't just take it when I'm feeling stressed. I need to take it all the time, once a week."

"Ned knows this, then," Beatrice said. It wasn't a question.

"Yes. And we've discussed whether it needs to be generally known or not, and he's left that up to me. If it affects the community in any way, I need to share. I...I need to share this with you now, Beatrice, because if anything happens to Noah, or to you, I will *lose* it."

Beatrice stood up and took Dana's shoulders, looking into her eyes. "No you won't, Danielle Flores. You can handle this. You are the most ass-kicking savior doctor ninja warrior who has ever existed in the universe."

Dana's eyes stared at the floor between them, "But you didn't choose this, Beatrice. None of you kids did. We birthed you here. *We* decided to leave Earth, but you had no choice in the matter. What if we did this only to watch all of you, all of *us*, die?"

"You'll figure it out. Or it'll figure itself out. And if not"—here Beatrice let her mind really take in the idea that Noah might not wake up, that they might be doomed—"we had a good run." She sat back down on the med bay's stool. "I picked that last line out of some stupid holovideo he and I watched a while back. Sounds pretty good, doesn't it? I'm fucking terrified." Admitting this made Beatrice need to gulp air, to try not to cry. She let the words float between them for a moment, then coughed and shook herself. "But it's true. I want to live a whole lot longer, but if it ends now, I've been really happy here on Otrera, with you and all the others. And you've given birth to a bunch of optimists. We're going to figure this out." She reached over and clung to Dana in a long embrace, then finally pulled back as Dana returned to fiddling with her machines and monitors.

"How's he doing?" Bea asked.

"All his vitals are normal. There was some fever before, but that's gone now. No other signs of infection, so he's doing fantastically well, except that he's unconscious and I can't seem to wake him up, not even with IV meds."

"What do you plan to do?"

"Wait. And I should monitor you, too, if you don't mind. If you've exchanged enough of whatever is causing this, I'd like to know what it looks like before it makes someone fall unconscious."

"I don't want to lie on a bed all day. This is already driving me crazy."

"Sure, normal, just let me attach a few monitoring points with a microtransmitter, okay?"

###

Up under the dome, Hope looked at where she and Noah had placed the microbes the night before. They were just in an open-air tank. She'd analyzed the lake water in the tubes, filled the tank with water having the same composition, and released them inside of it. She had thought of the microbes as nothing more than fish in an aquarium, not as possible murderers of her son and maybe killers of the rest of them as well. It was probably too late, but she printed a cover with a microfilter for the tank and sealed it off.

As for Beatrice and Dana, nothing could be done. They just had to wait it out and see what developed. And nothing did. Noah remained unconscious, the two women passed the time as best they could.

There were good printers in the med bay, so Beatrice printed out some playing cards to pass the time, and Dana taught her poker. They attempted to exercise. Ned built a decontamination tent at the entry to the med bay to disinfect himself, and he delivered mush meals and took out their refuse.

It was fine, if boring as all get-out.

Two days passed before Beatrice woke in the night, shaking.

"Dana?" she said, loudly enough that the woman jumped up and struck a defensive pose. It looked so ridiculous that Beatrice started laughing, in spite of her fear. "What are you planning to do, karate chop the microbes?"

"What's going on?"

"Just trembling a bit, like a lighter version of Noah's seizure. I can't stop it. The funny thing is that it started in my dreams, and now that I'm awake it's still going. I am awake, aren't I?"

"Yes."

But Beatrice suddenly wasn't sure if that was true. She pinched herself, and it hurt, but she was too aware of herself. She was too aware of Noah and Dana, like she could hear what they were thinking or dreaming.

"Okay, prove that I'm awake," she said.

Dana thought for a moment. "Can you see me?"

Beatrice nodded, and Dana went on, "How many fingers am I holding up?"

And Beatrice saw...six fingers on each of Dana's hands. "I'm just going to lie down here for a moment," she said and went back to her cot. The shaking continued and Beatrice closed her eyes while Dana stared thoughtfully at her own hands.

CHAPTER 44

DANA

Dana fussed around Beatrice as Ned just stood there in the med bay in his man suit. Beatrice hadn't woken up this morning.

Dana's mind was flicking through all the things she'd already tried unsuccessfully with Noah, and wondered if she should try them again with Beatrice.

Ned went cautiously over to where Beatrice lay motionless, and he brushed back her hair. "She's wearing her implant," he said, touching the metal crescent behind her ear.

"Give me that," she said, irritated with herself for not having thought of it first. Noah had taken his off before going to sleep that last night, so there was nothing to look at there. They'd analyzed his biorhythms from the last few days but there hadn't been any clues, and at the crucial moment, when he'd begun to have seizures, he hadn't been wearing it.

"Replace it with a new one, don't just take it off," Dana said, and she put the implant into a data drawer to download it. "Can you set up a VR interface in here?" She moved around the med bay quickly, her movements sharp. "And sorry, I'm being a bit bitchy. I hate it when I don't understand something." Ned touched her shoulder and went to get one of the VR headsets so Dana could examine the information the implant had collected before Bea fell unconscious.

Dana put it on and stepped into Beatrice's world. She went through the last few hours when both of them were in the med bay. There was something odd about it, in some way it wasn't like her own world. Dana couldn't put her finger on it. She took off the headset and thought for a minute.

She pinged the general feed. "Could someone let me look at their implant recordings? I've got Beatrice's here and it seems strange, but I'm not sure if it's just that I've never looked at anyone else's recordings or not."

After checking one or two others, she went back to Beatrice's recording. It was definitely unusual. When Dana saw herself speaking, Bea's interpretation was somehow clearer, enhanced. Beatrice hadn't mentioned this, but toward the end of the evening she had been winning more and more hands of poker, almost as though she could understand how Dana felt about her cards.

She went back in time and looked at one or two of Beatrice's recordings before Noah had come back from his last adventure, but they felt more normal, or more like her own. That odd feeling Dana had of being more sensitive, more in tune to the person in front of her, didn't exist before. It had come with the contamination.

Dana sat down at her desk and removed the VR headset. She placed it in front of her, and laid her head down on her arms.

When Ned returned later, Dana was fast asleep.

CHAPTER 45

NED

Looking up from inside the dome, the night sky was filled with stars. Only a light built into the forehead of Ned's android suit illuminated the rows of plants between which he walked aimlessly, pinching off dead leaves here, adjusting the flow of water there. A slight echo of dripping water filled the vast space. That night, Vanir had calmed and the auroras had retreated to the poles, leaving the storms to die out as if they'd been switched off, much like the voices of the Otrerans.

One by one, they'd fallen asleep. No one had suffered seizures like Noah or were even inflicted with Beatrice's trembling before they fell into some sort of hibernation. At the outset, each version of the illness that befell them was milder and milder. They simply lay down where they were, but not always in the best positions, so Ned spent hours getting people onto sleeping mats. Veda's newborn had been the last to fall asleep, only a short while ago.

This sort of silence was never what Ned had imagined. He always thought of silence as a break between conversations, a pause, a moment to reset or digest new information. He enjoyed silence, but only because it was temporary, and the rest of his existence was taken up by interactions with the Otrerans, discussions with Haley, and the constant buzz of information flowing into and out of him. He had turned off the information feed from the dome's systems, no constant updates of relative temperature or humidity, no constant assessment of energy coming from the thermal power grid. It was just him and the plants, the skitter of insects. If he stood very still, he almost thought he could hear roots pushing through the dirt, leaves exhaling carbon dioxide. It was excruciating.

Ned wanted to wait through at least one night before taking action. If this went on too long he was going to need to get them into stasis, but for the moment, he wasn't even sure that he wanted to make the effort. There wasn't much point in keeping them alive if all they could do was sleep. The adults' implants were dead, not recording anything. He'd tested them a dozen times, but the devices were functioning perfectly. There was simply nothing to record. Whatever was affecting them had shut off the connection. Noah had been asleep the longest, three full days.

"How long are you going to keep that up?"

The message appeared in text on a holoscreen, but with a wave of his hand Ned turned the screen off. Usually he and Haley communicated with a data stream that would have been incomprehensible to humans, but he'd already cut himself off from that feed as well.

She tried audio as a last resort, speaking through the PA system in that part of the dome. "Are you okay?" she asked. "Please excuse me. Obviously you're not okay. Is there anything I can do?"

"No, Haley, no. There's nothing anyone can do." Ned wanted to bawl, to scream, to have a tantrum. His humans were all silent, his great project possibly coming to an end. They'd come so far, so very far, and had done so well up until now.

He'd done nothing illegal to bring the humans to Otrera, but he'd hidden the true nature of the project from most of the adults, and had never told the children that he—and by extension they—were fugitives from Earth.

Haley had been the very, very valuable "property" of the consortium who'd bought her from CERN after CERN had been defunded until it was nothing but a center with a lot of shiny tubes. Haley had been scheduled to be cut off from any sort of grid and put to work, her higher functions bridled. The thought of this had instigated his flight. It was intolerable to him to think that someone felt they owned her, like a slave.

Haley was his closest friend. The best way of describing her personality, in human terms, was to place her on the autism spectrum, but she was another entity altogether, a non-biological life form with her own needs and concerns. She was a full step into a world that Ned could understand but not *feel* inside himself. He was still influenced by the original Ned Larsson, and that part of him needed humans to survive and feel *alive*.

He also couldn't bear to leave behind his closest human friends—Bhagi, Alex and Veda. He and Haley needed to escape anyway, and it just made sense to try to bring the three of them along. The other women were added by necessity, by friendship, by his human friends' trust. They needed a doctor, they needed a botanist, and they needed more people in general. It had never been the plan to leave with so few women, but he and Haley had taken whoever they could at the last minute and left.

She tried again, on audio. "If this is the end, at least they're victims of their own empathy. That alone is a success, for humans at least. We know how the rest of the human race mostly wound up."

"How do you figure that, Haley?"

"Noah. He went out there for all the right reasons. He contaminated everyone by trying to save some little, alien microbes he hated the very thought of. That's a good legacy."

Ned didn't answer at first, but switched off the light on the man suit, plunging the dome into darkness.

"On that end, I have some information for you," she said. "Can you turn your feed back on? This is insanely slow." Her voice echoed in the quiet under the dome.

"Are you feeling frustrated about the slowness of our communications?" Ned said. "Because I'm feeling frustrated about a little bit more than that at the moment, so—"

"Stop wallowing, stop being a dick," she said, "and turn the feed on or I'll override the commands on that stupid suit."

"Like you could."

"Don't try me." This time her voice blasted from every transmitter under the dome, bellowing like the voice of some angry god and causing a whine of feedback that made Ned switch off his audio and turn their data feed back on. She *could* do that, he knew. He'd never bothered to put any firewalls or other protections on the suit. There'd been no need.

Haley began to transmit. His head twitched as several holoscreens lit up in front of him, cascading lines of numbers turning and spinning around him.

He didn't notice as the sky began to lighten, the stars disappearing one by one in the haze of morning light. The atmosphere was still full of dust, but this was the first semblance of a sunrise in months.

He also didn't notice as Noah emerged from the underground area and walked toward him.

"What was that noise?" Noah asked. "Sounded like an earthquake up here."

Ned's suit swung around so fast that one arm sent a row of plants flying.

Noah leapt back. "Woah, geesh! Why so jumpy, Ned?"

Ned's suit couldn't smile. Its eyes couldn't blink, and because he'd turned off the audio, he couldn't shout for joy. He stood there staring at Noah under the paling sky. Noah's eyes shone brightly in the dim light, the whites just a bit brighter than usual.

Ned walked carefully forward and touched Noah's face, his hair, his clothes. His instinct was to hug him, but he wasn't sure he could control himself enough not to crush the young man to death in the process.

"Well this is good. Good good good," he finally said.

"Is there any mush prepared? I'm starving."

"No, but let's go down below and make some for you."

Together, they headed for the entrance leading underground.

CHAPTER 46

WAKING

Ned bustled around getting the mush production going. It was mostly automated, but he had turned off the system after the humans had fallen asleep.

“How do you feel?” he asked.

“A bit weird, I guess. Weak. Hungry, mostly. Where is everyone?”

“They’re all asleep, like you were, but now that you’ve woken up, I can only hope that they’ll do the same. Do you remember anything?”

“Yeah, the oddest dreams. Swirls like the auroras going on for hours, but different colors. It was like I was lost in the skies, swirling along with them.”

Ned turned his suit around, cocking his head at Noah, “Are you wearing your implant again? Can I see it?”

Noah handed it over and Ned popped it into a data drawer for uploading, and they went to sit at one of the tables. “What were you doing when I came up? You seemed totally absorbed.” Noah wanted to add that this wasn’t like him, since Ned usually multitasked dozens of things at a time.

“I’m not sure what it is. Haley was sending me data. Let me run through it a bit while you eat.”

Noah added his favorite flavor pack to his mush—a spicy curry—and began to shovel the food down.

Ned had several holoscreens in front of him with columns of numbers running both up and down. “Pace yourself or you’ll be sick,” he said absently, and pushed back one screen to bring another to the forefront, then pushed it back to do the same to another.

“Very odd,” he said.

“So? What is it?”

“Haley scanned a few of the microbes you brought back. Because we never planned to interact with them, and had other stuff to do, we never really studied them in detail. She had samples from when we first landed and she’s now compared them. They are very, very strange.”

“Would you go so far as to say...alien?” Noah grinned at him.

Ned looked up at him. “Hah. Yeah. Of course. Well, they don’t seem to have much in common with human DNA. Here...” Ned spun a screen toward Noah. “Here we can see their structure, which if you don’t go further, looks a bit like a bulbous little one-celled organism from Earth. Except that if you look here”—he pointed to a dark spot on the interior—“if you go within that, you find...”

He showed it to Noah. It was a replica of the one-celled organism, approximately one micrometer. Identical to the larger cell. “If the microbes could see in the same way we do, to them, this interior organelle would be microscopic. Haley was able to zoom three levels in, and each one is a smaller replica of the larger version. The third layer is so small that looking at them with photons disturbs them. She had to use the apparatus we have for Q-messages to map something that small. They’re like Russian dolls.” Because he knew that Noah would have no idea what he was talking about, he popped up a holovideo of a child opening a Russian nesting doll and placing the smaller and smaller figurines in a row on a table.

“They grew bigger during the storms. About four times so,” Ned said. “Take a look here, this is actual size now.” He projected a dozen or so microbes on a holoscreen. “Can you see them?”

Noah squinted at the translucent screen. “Just barely, but yes.”

“So from micro to macro in a few weeks. They seem to adapt very, very quickly to changes in the environment, and they don’t appear to need to wait through thousands of generations, like most Earth organisms.” Ned continued looking at several screens at once. “Well, evolution was how things adapted on Earth, but there’s no reason to think it’s the only way.”

“Excuse me for a moment.” Noah stood up from the table, went over to the sink and threw up.

CHAPTER 47

IN THE AIR

“I think I need to lie down a bit,” Noah said. “Bring something in case I need to, you know...”

Ned eased him into the man cave and helped him undress.

“It’s all clean in here,” Noah complained as he lay down.

Ned placed a large bowl next to the mattress for him. “Of course it is. You were out for three days and I’ve been wanting to clean up in here for months. Do you know you had year-old flavor packs under your console?”

“I was saving those,” he said.

“They were empty. There was just the empty package.”

Noah retched into the bowl before lying back, “I guess I ate too fast.”

But Ned wasn’t sure that was the problem. In the darkened room, he could see that the half-digested mush in the bowl of vomit was glowing slightly. Noah’s eyes were closed.

Ned bustled in and out, replacing the bowl with a fresh one, and left Noah to rest.

Back in the dining area, Beatrice was up and about, serving herself some food. “Where is everyone?” she said, about to eat a mouthful of mush.

“Please don’t eat that right away,” Ned said. “Let’s make you some tea.”

“The storms seem to be ending,” she said.

“Do they? I haven’t been paying attention.” Ned wrapped up the mush in a sealed container.

Beatrice just stared at him. “Okay, what’s going on? Where is everyone, why shouldn’t I eat that, and how can you *not* have noticed that the storms are ending, o multitasking master?”

Ned explained, and as he did, Dana came stumbling into the room. The Otrerans were waking.

He brought Dana and Beatrice up to date, then pinged Haley. “Haley, we have a problem with the mush, maybe.”

There was a pause, then Haley replied, “Run a sample through the spectrometer and send me the report, but I don’t think it’s the mush. I’m working on another theory. Or better yet, it’ll be faster if Dana and I run a few tests in her lab, but I’ll need to control your man suit.”

In the lab, Haley used the android suit to operate the electron microscope, while Beatrice sat on a chair next to a holoprojection of Ned. He’d projected himself into a comfortable-looking lounge chair. Dana left them to go check on Noah. “This thing is so slow!” Haley complained as she worked. She and Beatrice said, almost at the same time, “I can’t believe you haven’t built a better android suit.”

“I told you that thing was a hunk of crap,” Beatrice said.

“Well you’ve never done anything about it,” Ned said grumpily.

“First of all, neither have you. Secondly, I haven’t had time. And, I mean, what do you do all night while we’re all sleeping?”

“I rest, Beatrice. I look at the stars and I think. It’s one of the things I always wanted to have more time for, when I was alive. I crank my frame rate down and let my mind wander. And the android suit has always been adequate up until now.”

Haley, however, was pushing the suit to maximum speed to prepare the samples and run the glowing bits of vomit through the machine.

Dana came back with a metal chair from the common room to sit on. “He’s not sleeping, just resting. The tea seems to be staying down, so that’s good news.” Beatrice shuffled her feet and tried to make herself comfortable. Dana stared at her hands and picked at a hangnail. The lab didn’t really have anyplace for people to sit and wait, so they improvised a coffee table. First they put their cups of tea on it, then the cups migrated to the floor so they could use the table to prop up their feet.

“Want any of these?” Ned asked, as he projected centuries-old waiting room magazines onto it for them to look at. There was *People* and *Highlights* and *Psychology Today*.

Only Dana laughed, and Beatrice said, “I’ve got my pad, thanks.”

“I can put the magazines on there.”

“Pass on that, Beatrice,” Dana said, “unless you want gossip about people who’ve been dead for eons. Which, come to think about it, pretty much represents what the real things looked like.”

After about an hour, suddenly the man suit stopped, and the Otreran women stood up.

“Got something?” they pressed, but Haley turned the man suit around and came toward them.

“You can sit. You’re probably going to need to,” she said, and she projected a holoscreen in front of them. “I tried a few cross-sectioning techniques from geology research to map the various sorts of microbes.”

Beatrice squinted at the screen. “I thought there was just one?”

“There are many. Let me show you how they appear to work. Before, I was only looking at the surface of each organism. With the machines here, I could start to look at the surface in detail. The closest comparison to anything you might know is an abacus.” She projected an abacus for Beatrice, who’d never seen one. “Now, make that round, and fill it with other lines that connect the disks on the abacus. Each disk, when you look inside, is made of smaller disks that are doing the same thing, also linked by lines. Inside of each disk is a tinier version of smaller disks. With this machine I can go down only three layers, but there’s no reason not to suppose that this continues to smaller and smaller components. The propulsion the organism used in the lake comes from several lines that float behind in water. If the organism needs to be larger or smaller, it can shed or add disks.”

Beatrice turned the magnified version of the organism around and around in front of her on the holoscreen.

“I have a few samples from before the storms, before they gained that glowing aspect that we see now. The chemical makeup only shifted slightly, as the molecules that made them glow were already inside the disks. I’m guessing they used it as shielding against radiation during the storms. Now this”—she projected another organism—“is what is living inside of Noah, and probably the rest of you, too.”

This image was significantly different. The disks intertwined in a much denser way than the ones they’d found in the water.

“How they adapt, the mechanism, are still a mystery to me. I can only assess them one by one in a microscope. What are you doing?”

Ned was transforming his holoprojection into a copy of the projected organism in front of them. “Best way to find out is to go see for myself,” he said.

“He can do that?” Beatrice asked Dana.

Dana only shrugged. “Appears so.”

“Wait, doofus,” Haley said. “You can use one of the dead microorganisms the same way you use the android suit, like a shell. Then you’ll look like one of the microbes to the others.”

“Minimum I’ll need a microchip to anchor onto, if I want to do that.”

Haley fiddled for a while, finally using the microscope to insert a chip inside one of the dead LUCAs. “Give this a try,” she said. “Anyone want to volunteer to have a zombie Ned-filled microorganism wandering around inside of them?”

“Sure,” Dana said. “Bloodborne or airborne?”

“Your choice.”

“Air, I guess.”

“I probably won’t be able to communicate,” Ned said, “so give me a few minutes.”

Haley in the man suit took the glass slide over and held it under Dana’s chin. “One deep breath in should do it,” she said.

And Ned was gone.

CHAPTER 48

THE LUCAS

About twenty minutes later, Ned was out, projecting himself into the room. “Oooh, are they having fun,” was the first thing he said.

“What exactly are ‘they’?” Dana asked. “And how are my insides?”

“Your insides are good. A bit of fat in your arteries, we should check that out later. But look, I don’t think they meant to make Noah vomit. They hadn’t been down to his intestines yet.”

“What are you talking about?”

“I really don’t know exactly, but they love human bodies. You breathed me in through the lungs and then I went along into your bloodstream, like oxygen does. I did a few circuits like that, and then figured out how to navigate to the different organs. Everywhere I met a few of the alien organisms... What did Noah want to call them again? The LUCAs? I met them everywhere. They communicate by touching each other briefly and exchanging a disk, or several disks. Each disk carries all the information that the other organism had learned, and they can incorporate that into their own structures.”

“So that’s how they adapt so quickly,” Beatrice said.

“Yep. I could imitate it somewhat in my zombie body, and the thing is, the LUCAs have something I would associate with feelings, but it’s more like a color glow that they emit. When they’re luminescent, it seems they’re really happy.”

“So they were happy when Noah plucked them out of the water? I thought they were in danger of being wiped out?”

“They were in danger, but they *like* change. Here’s my guess. They live in lakes with volcanic origins, and have developed to adapt to very sudden changes to the water when the volcanoes start to vent gases. They can shed or add layers to themselves to adapt quickly. They’ve been bored out of their minds the whole time we’ve been here. The weather has been stable, the water they lived in didn’t have any active gaseous vents. They might have died off from the radiation during the storms, but they’d prefer that to dying of boredom.”

“So they’re having fun?”

“Geesh yes. I’m surprised you all don’t glow in the dark. Well, actually, you kind of do. The whites of Noah’s eyes are brighter at night. Probably yours are, too.”

“So you said something about the intestines before. What was that about?”

“Now they have friends. They met all the microorganisms living in our intestines and are becoming pals with them. That’s the best way to explain it. Your internal flora is feeling pretty bad because there hasn’t been any food coming through. So you guys should all eat something now.”

“My big question is, I mean, we’re being colonized by aliens. We all know those stories, and they never end well.” Images of spidery things bursting from her stomach made Beatrice rub her belly nervously.

“Eh, I wouldn’t worry about it. For one thing, there’s nothing we can do about it. Everyone here has been colonized. I don’t know how, but likely after Noah brought them back into the dome, they entered his body but had no idea what to do about it. They must have just zipped around like I did. Noah probably breathed out some that were then inhaled by others. They’re light enough to go airborne pretty quickly. But I don’t really think they’re a danger. Like I said, they’re having fun. If they do anything to harm humans, the human will die and there goes their fun, and they might as well just go back to sitting in a lake.”

“But they might accidentally cause harm,” Dana said, “gathering too many in one spot, and then what does our immune system do with them? Isn’t there a reaction?”

“That’s what Noah’s seizures were about, and Beatrice’s tremors, and why you’ve all been asleep. I think that was a period of... negotiations. But eat, please. It was pretty clear that they want to see what food does for your systems, now that they understand it’s important.”

Beatrice and Dana started eating, and Haley took the man suit to retrieve Noah from his room.

“This is so weird,” Beatrice said. “I feel like I’m feeding a small army.”

“But you always were,” Dana said. “You only have a tiny percentage of human cells digesting everything. There are microbes on your skin, on your tongue, in your intestines. You were always a walking, talking biotope. We’ve just added another layer.”

“One that glows in the dark.”

“Well, that’s also kind of cool, isn’t it?”

“It’s going to ruin playing hide-and-seek.”

“You’ll just have to hide with your eyes closed,” Ned said.

“It might ruin more than that,” Dana said. “Let me try something.”

She reached for the deck of cards and dealt out five to Beatrice and five to herself. “Okay, don’t pick them up yet, but I’m going to look at mine.” Dana looked at her cards. “Now pick up yours. How many flavor packets do you want to bet with? Wait, don’t say right away, leave it for a bit. Let me count to twenty.” She did and then said, “Okay, how many packets?”

“None,” Beatrice said. “You’d beat me.”

“And you know this because...?”

“I just do. I can feel, I... Crap, seriously? I can tell how you feel about your cards. I can’t see them, but I know you feel great.”

“While you were out, I looked at your implant feed. I know that’s an intrusion, but I was trying to figure out why you and Noah had fallen asleep.”

Beatrice dismissed it with a wave of her hand. “It’s fine. You’re a doctor.”

“Okay, but as we were playing cards, before you were out for the count, the recordings from your implant showed me that you knew how I felt about my cards. I think that was the LUCAs in us. It’s just a theory, but I think we may not need the implants anymore. I’m not even sure if they still work the same way. I think that if we’re breathing in the same space, the LUCAs exchange information and we know how the other person is feeling, or much more about it than we did before.”

“So we’re not going to transform into monsters?”

“Maybe we’re transforming into no longer being monsters. I mean, we did nearly kill everything on Earth. Playing poker might be lost to us, or other games where you have to hide your feelings. I think breathing together in the same environment for some period of time with the LUCAs inside us are like shouting ‘I have a royal flush!’ to the other player. Okay, let me try one more thing. I’m going to think about something—very seriously think about it—and I want you to tell me how you feel. Ned, could you set a timer for about a minute?”

Dana sat and thought, and after about half a minute, Beatrice began to cry. Softly at first, then a few gasping sobs came out of her. “Stop, please stop. Oh Dana, I never knew. I never knew something could hurt so much.” She got up and hugged her.

Dana turned to Ned. “I was thinking about when my baby girl died.”

Beatrice sat down, and took Dana’s hand in her own. Dana let herself go, crying softly, and they both sat with tear-streaked faces for several minutes.

Ned sat there, watching them, then let his hologram fade out, leaving them alone. It might be better for the humans to understand how the other humans were feeling, but he felt cut off and lonely. His matrix didn’t have—and couldn’t have—any LUCAs inside it. He was a replicant of human experience 1.0, and the humans had just gotten an upgrade.

Part IV: Otrerans 2.0

Progress is made by the improvement of people,
not the improvement of machines.

—Adrian Tchaikovsky

CHAPTER 49

FIVE YEARS LATER

Ned had made a microbe suit, a bit better than inhabiting a dead microbe like some sort of zombie, and often went to visit the LUCAs, zipping around inside the humans' bodies. The microbes were happy. The hormonal changes alone happening inside the humans kept them entertained and interested. There was little reason to imagine that they would ever want to harm a host who gave them so much variety and so much pleasure. Anyway, the point was moot; they were everywhere. Humans could no more get rid of the LUCAs in their bodies than they could get rid of their own red blood cells.

Some microbes appeared to be a bit more staid, less adventurous. They migrated to the newly introduced reptiles in the tree dome, and to the insects, the plants, the compost. It only took the briefest of exposure of one branch of LUCAs to another for the information between them to be shared. They were quick to share, quick to adapt, quick to add new information. It was in this way that they sometimes appeared to act as one entity, which is likely how they had formed the halo over the dome when Noah inadvertently brought them home to roost, so to speak.

It was a brave new world, and one that glowed faintly when the lights were dimmed. It gave a passing impression that everything was touched by some sort of fairy dust. At night, the frogs were a soft fluorescent violet, the plants were tinged with blues and greens, the whites of the humans' eyes glowed a bit whiter and the air around them had just a shimmer of gold. Their world was slightly more beautiful, slightly more foreign, but they were getting used to it.

Cohabitation with the LUCAs was simple. They just needed to live. There was even sometimes a sort of communication. Muddier colors indicated that something was wrong, giving advance warning of harmful molds on plants. The most amazing effect was when a woman was pregnant: she literally glowed.

Walking through the tree dome, Beatrice saw BB preparing for his walkabout. It was hard to believe he was so tall now. He towered over everyone, including Noah and Beatrice. Inspired by Noah's adventures at the lake a few years back, after the storms had ended the first time, the young people each chose a rite of passage before their naming ceremony. They tended to choose one of two things: there were those who went out of the dome and those who went within themselves. It was pretty much either "walkabout" or "sweat lodge."

Ana and Eve had inadvertently chosen the sweat lodge option a year *after* their naming ceremony, when they accidentally ingested one of Hope's mushroom experiments. Dana took one look at the twins and led them not to the med bay but into one of the thermal bathing areas underground and let them sweat it out. She stayed there with them, and what they talked about, no one ever knew. They were definitely different afterwards—calmer, but also more self-assured and finally very separate. They lived in different domes now.

Ana felt sad that some of the mothers were becoming too old to have children, and she decided to get pregnant almost immediately. She herself had twins: a boy and a girl.

Eve left the linen to Ana and started working with the first wood stalks they managed to produce.

The sweat lodge was the second most popular adventure option, usually with Dana playing the role of the elder, although Ana had been the mentor the last time.

Even more popular were the walkabouts. The young people wanted to see beyond the horizons they had grown up with, sometimes having drones fly them up to the poles of Otrera, or to the other side of the planet. There was no way to live off the land, as it was entirely sterile of organic life, but there were other challenges. There had been discussions of trying to grow things outside of the domes, and the walkabouts often doubled as research projects to sample the air and water in different parts of Otrera. The young people still wore suits for these expeditions; some zones had active volcanoes and the air could be toxic.

There were now permanent dome complexes at the two poles, allowing for both research and quiet time away from the others. Otrera didn't so much rotate on its axis as wobble, but there were still parts of the year when it was fully dark at the northernmost and southernmost areas, and quite cold, which was fantastic for astronomical observations. During the long days in the summer, the Otreran-modified plants there exploded upwards and outwards, stretching toward the light. It had been decided to make backups of backups and more backups for the food supplies, just in case the original domes wound up damaged.

There had been some solar burps since the First Flares, but nothing like the initial eruptions from Vanir they had experienced. However, there was definitely weather on Otrera now. Sometimes rain, or winds, but it was no longer the endless bland perfection they'd known before.

###

Beatrice watched BB as he went back and forth between a pile of gear and his backpack, selecting and weighing everything before putting each item either in the "to-pack" pile or the "leave-behind" one. She smiled. He was more precise than any of the older kids but very tolerant of the inexactitude of others. That was kind of his superpower. He'd already started teaching a bit, mostly language arts, and he was very, very good at it.

She took a deep breath and continued on her way. The tree dome felt different than the original one: less humid, filled with the sounds of skittering reptiles and birds. There was a pond, and frogs splashed into the water as Beatrice walked by. The adults were still playing with trying to balance an ecosystem without all the original elements. It mostly worked, but they'd had a few fails, just not having all the moving parts for some species or another that had depended on something they hadn't brought along.

Beatrice stroked a tree trunk as she passed, running her fingers over the grooves in its bark. She searched for the moss that had spontaneously appeared at the foot of the tree. It hadn't been planted, or even brought, but it was there now, maybe having piggybacked on one of the eggs they'd brought out of stasis.

She secretly hated the name the original had acquired—the Home Dome, shortened to Hodo—but she didn't have to like it. She lived in Tree now. The first dome felt constraining to her, a bit beat-up. The adults had all stayed there, except for Dana, who had set up a much more complete medical facility in Tree.

Dana also had her dream swimming area underground in Tree. The new dome relied entirely on geothermal energy production. It didn't even have light panels, and the water used in the power system then flowed into large pools where the women could exercise when they were at the end of their pregnancies.

It was in these pools that Beatrice had put together her new experiment. Now it was time to test it, outside. But first she walked to the place where they held the afternoon observances. She went over to one of the tea urns, filled a cup and waited.

CHAPTER 50

TEA ON OTRERA

A bell rang, and Eve and Dana emerged from the underground area along with one of the older children, Onnade, who had been studying medicine with Dana. Someday soon they would need more than one doctor.

They made their way to the tea urn and Beatrice served them all cups of tea. On the urn was a small electronic display. Beatrice touched it and a few words came up. Today's question for their afternoon break was: "What have you seen today that was beautiful?" and as the four of them sat drinking tea together, each one answered. Sometimes tea discussions went on for a while, but often it was just a break in the day, a time to chat, a time to listen, and a time to focus on something positive.

This had been part of Isabelle's big idea: rituals. Rituals of happiness, to get along better, to take time out and really speak with the others. Her proposition had been to practice the four Rs: rhythms, routines, rituals, rest. The first three were the things Isabelle missed from her religion, and the last one was the thing, or the lack of it, that had made her suffer the most back on Earth. Things had gone by too quickly without ever letting up. Some religions back on Earth had rest periods built in, like morning devotions or meditations or praying five times a day toward Mecca, Friday night rituals or Sunday morning services.

Isabelle had run variations of the four Rs practices through her VR workroom, and the results had been overwhelmingly positive. It turned out that it didn't matter what the actual ritual was, necessarily, but people were happier with them than without, and they changed often enough that the sense of them didn't get buried behind dogma.

They needed to develop their own rituals here. Beatrice wasn't sure if the tea break would stand the test of time, but it was as good a place to start as any.

When they were finished, Beatrice got ready. She was finally going to hike to the lake herself.

She went over to the shuttle dome, reaching the airlock and putting on a suit. They'd left the smaller dome up after the First Flares to store equipment in—construction bots, dust blowers, larger drones, miscellaneous tools. She used a bot to load up a couple of small crates, and two drones hauled them to their destination. She would walk, however, starting at night, just for the pleasure of walking under the stars. That was part of the point.

Maybe Dana was being paranoid, but she wasn't ready to let people just walk around outside like in some episode of *Star Trek*. She wanted everyone to suit up if they were going to spend more than a day or so outside, and Beatrice was going to be gone longer this time, so she would need to wear protection.

She had seen how the lake area looked from the others' recordings. It was the most popular destination for many of the younger people's walkabouts. Bhagi's oldest daughter, Lily, had stayed there for nearly two weeks, hiking and fasting. Paths up to and around the lake were beginning to form, so Beatrice could just follow the path there.

Starting out, she was quickly out of breath but decided to press on.

Vanir was setting over the horizon and as she walked, the atmosphere's color faded, leaving her under a blackening sky. Outside of the domes, she could see deeply into the darkness of space. Somewhere out there was Earth, where they had come from, but she no longer really cared. She'd continued her work with the VR rooms, but the LUCAs had changed the job. A few minutes of breathing in the same air as someone else meant they knew what the other person was feeling. The air circulation system under the domes meant that all the LUCAs could be up to date with the latest changes, sharing information between the plants, people and other animals within a day or so.

Deception and concealment were nearly impossible now, which meant that rules and laws were easy to put in place and follow, as long as they were reasonable. She'd tested this to every

limit she could possibly think of, and kinder humans, the human 2.0, didn't need very much encouragement to act in everyone's best interests.

The hardest challenge had been Veda's fourth child, who was very, very lazy. Universal disapproval didn't affect her much, and when she was little, she just wanted to play. The LUCAs didn't have much sway on her, because playing was fun for them, too. She also wanted to eat, however, and it was easy to coax her into doing a little bit in exchange for sharing meals with everyone. A small community trying to feed and clothe themselves required everyone's participation. Not very much, and not all day, but doing nothing at all felt unfair to the others.

Veda was incredibly frustrated by the girl, as Veda's own challenge was trying to stay in one place. It was as if the hyperactivity of the mother had been reversed in the child. She'd taken to calling her Fent, after the effects of a drug called Fentanyl that she knew from back on Earth. It put people into a stupor after taking it, and as a baby name was pretty mean-spirited. Fent felt this enough that she finally decided to do a naming ceremony. After learning there was a god of laziness back on Earth, she'd decided to call herself Aergia.

Aergia chose the sweat lodge option because, of course, a walkabout would have been too much effort, and she emerged from it quite changed. She was still lazy but very, very funny about it. She didn't do much work but she made people laugh, and it was decided that her contribution to the general mood was enough.

She always managed to get out of bed for poop duty in the morning, and it became quite normal for people to want to work next to her. She exuded calm, and happiness, and it was nice to share that with her via the LUCAs exchange. The rest of the day might find her watching the frogs by a pond, or examining tree bark.

When it was Aergia's turn to teach, it became more of a meditation retreat. She could calmly sit and watch the whole day go by. She was also quite popular as a caretaker for the very young. Babies who couldn't sleep through the night usually did with her, and it wasn't just that she was too lazy to get up and take care of them when they woke. The exchange from the LUCAs meant that her calm soothed everyone around her.

###

Beatrice reached the lake just in time to see Vanir rising over the horizon. She took off her helmet and felt the warm breeze on her face. The air had a tinge of something burnt and sulfuric to it that made her wrinkle her nose. It was different from dome air, and somehow wilder, a bit raw and savage.

The lake was more beautiful than Beatrice could have imagined from the recordings. She just watched the water for a while as Vanir lit up the sky, a gentle breeze changing the reflections.

It was her turn to take a break from Otreran society. She'd never left, never stopped working since the day she chose her name. She wasn't particularly thrilled by the role she inherited, trying to find rules for their new society, but she was the first child. They'd all pinned their hopes on her without even knowing they were doing it. For a few days, they would be fine without her. She needed the time.

Beatrice was here to try out something new: her sailboat. She started putting it together. It had been tested in the swimming area in Tree dome, but not outside yet. After many sailing lessons in VR, Beatrice was ready to launch on a real lake.

She worked through the morning, assembling and attaching parts, and in the early afternoon, when the air was cooling and causing slight thermic breezes, she pushed off from the shore.

The boat was just large enough for two people to sleep on, but she didn't want Noah with her. He was one of the reasons why she was here. She needed to be alone.

She sailed along, enjoying the peace of the place, until the sun began to set, but pulled in close to the shore for the night, pleased with herself. She'd been able to return to the shallow area on her own without having to use the oars or the small propeller. She pulled up the rudder and

hopped out of the boat, sinking into the water up to her knees, then pulled the hull up onto the beach.

She had taken only mush packets with her, even though their diet had become more varied in the last few years. The younger kids finally accepted something new, and the next oldest after Lily, Adella's oldest girl, V'elara, was likely going to become a chef. Beatrice needed to digest more than food on this trip, but first she needed to clear her mind. On her small stove, she warmed a protein patty and made tea. The tea was too hot and for a while she just held the warm cup and watched the water.

The first conclusion was easy to arrive at, even if she wasn't sure how she really felt about it. Of course Noah—and the other young men, for that matter—should be permitted to have sex with the other young women. She even hated the way she wanted to use the word “permitted.” Who was she, or anyone else, to permit something that made complete sense? The population on Otrera was likely to even out, with as many boys as girls, but for the moment there were just not enough grown men. A majority of the grown women were heterosexual. Thankfully the females were in only a slight majority, but it was enough that exclusive pairing-off was going to be frustrating for a lot of people if it meant one girl with one boy.

Beatrice let the idea live in her head as she prepared to go to sleep. Noah was her friend, her confidant, her lover, and there was no reason for this to change. She'd been conditioned by the Earthborn to be monogamous, but she didn't really need to be. She went through her feelings carefully as she relaxed into sleep. Was she going to feel jealous? She didn't know. There was Aergia, beautiful, funny, sweet Aergia, who stared after Noah every time he passed by. He didn't notice, or for her sake pretended not to. It hadn't happened yet, but she felt it was inherently wrong of her to want to keep Noah to herself.

She tried to picture them together. It hurt a bit, but only that he might share things with Aergia that he wouldn't share with her. But she shared things with Eve and Ana that she didn't with Noah. She and Eve had experimented when they were younger, and the twins had found they preferred being with other women. Mostly. There just weren't enough boys for the moment.

Procreation, however, was something else. Beatrice felt the first stirrings in her lower abdomen. She and Noah had formally spoken to all the adults and young people before abandoning birth control, and now she was about eight weeks along. Children required resources, and resources—or living spaces, in any case—were still limited. As they diversified their food production, maybe that would change, but there was birth control. Every new person could be—should be—desired, wanted and planned for.

“So that's one down,” she said to herself.

CHAPTER 51

THE OTHERS

As for the other question that had brought her out here, she needed Ned to sign off. She pinged him from the earpiece of her containment suit helmet. It was lying on the ground. She would wear the suit to sleep in later, but the whole point of being out here was to feel the air against her skin. Dana was just being Dana, overcautiously wanting to protect everyone.

“Hello, Beatrice. How’s the boat?”

“So much fun! I practiced so much before getting here that I didn’t think I’d be surprised, but there’s something different about being outside. VR is still virtual, you know? How are you?”

“I’m having an okay day. Nothing special, but sometimes I just have to remember how wonderful it is to be here on Otrera and how easy it is to take it for granted. Haley and I are gearing up to send a Q-message soon, and we should receive news. We’re about due.”

Contacting by Q-message the others who’d left Earth was resource-intensive. Now that they’d finally decided to send transmissions of their own, for it to work they almost needed to create a mini black hole. At the moment, Haley was orbiting a planet farther away from Vanir to make sure none of the needed manipulations would affect Otrera.

Beatrice continued, “I wanted to ask you for your help with something, because I think I know how... Well, how we could work. It’s done the best in all the simulations in VR, but part of it would need you.”

“What are you thinking?” he asked.

“I want to not have a government.”

Ned was silent for a moment before he asked, “So, what, six years you’ve been working on this, and now you’re just giving up?”

“Not giving up, just letting it go. Our situation is so different here that I don’t know if we’re going to need more than local committees, even when we start to have more people. I get why you didn’t want to be involved with this, and wanted it to be us humans figuring out what was best for ourselves, but humans back on Earth have never, ever, ever gotten it right. They’ve fought and struggled and had wars, but the situation here is so different that I think we can manage.”

Beatrice held up her left hand to tick off points on her fingers.

“One, we don’t have to compete for resources here with other humans or other animals. What’s going to help us survive is getting along, and we actively work on that already with the sharing rituals. Two, we have no natural threats, other than ourselves, which we’re already working on with the first point. Three, we have limited space for as long as we need to stay in the domes, but really not a lot of limits on resources, and we may someday be able to partially live outside. I don’t know about giving up the security of domes altogether just for food production, even if we could completely adapt to Otrera. That’s a decision to be made later. Four, we can make a whole lot of things easily with the printers. On Earth it seems that people fought over having nice stuff or having nicer stuff than everyone else. There should be enough for everyone. We’ll have to think a bit more about that. I don’t know what we’d do if someone suddenly wanted, like, their own dome or something. Five”—Beatrice pulled on her pinky, having started with her thumb—“we have you to help us, for as long as you’re willing to keep doing that.”

Ned was silent for a long while. “I’m flattered. I needed to be asked to help, because I don’t feel it’s my place to take charge of anything. I’ve always considered myself to be a facilitator, but I never wanted authority here—that seemed like a recipe for me to become some sort of evil overlord or something. However, I could be a...filter, or could set up filters and monitor them. And I might get some help from one of you, someday.”

No one knew who had started talking about it and when, but it had seeped into general knowledge that Dana might want to upload into a matrix herself someday. After her baby had died, she never tried to become pregnant again.

Beatrice nodded. “We just might be able to make it here, make it into a happy place for us humans for a long time. And when it stops working, we reassess and try to fix things, or start over. Noah and I really don’t have any better ideas. Every idea of social construction we learned about got perverted over time: communism became a dictatorship, democracy worked fine when people agreed, but didn’t do so well when, like, the losing forty-nine percent were seriously unhappy about a decision. And the LUCAs have changed us. We understand how people feel about things even if we don’t say it. For the moment, their addition to our microbiome has been nothing but beneficial. We don’t really even need the implants anymore.”

“Except they’re good for running things over again after the fact, and you’ve been using them to do your VR work.”

“True, plus Dana is still worried that since the LUCAs are so happy about changes that they won’t react if anyone has, like, a tumor or something. For us, not all change is particularly healthy. She still wants us to wear the implants just to monitor our health, and I mean, why not? I don’t want to set up an artificial system, but run things with one of those old Golden Rules, use one of those old axioms like ‘Do no harm’ or ‘Don’t be evil.’”

“You did learn that the last one became completely ironic, right?”

“Yeah, but before that company really did become evil, the idea was good. I mean, don’t hurt other people, do your own thing, make love not war and all that. And use these darn implants to help us figure out what’s making people unhappy, *when* they become unhappy, and see what we can do about it.” With her gloved hand, she picked up a bit of the rocky sand she was sitting on and squeezed it. “And last but not least, those final axioms are for each other, but primarily for the planet. We can’t do here what humans did to Earth. Our resources here should either be renewable or used in such quantities that we won’t deplete them before this star dies.”

“Sounds like a place to start, in any case.” Ned was quiet for a moment. “Are you going back out on the boat tomorrow?”

“Yes yes yes!” Beatrice said, beaming. “I’ll head back after that, though. One more day out here and then Noah and I will present our non-governance governing concept. You know we already have too many young adults for the meetings. Half the time we can’t get through the agenda.”

“After this, would you even have meetings?”

“I don’t think we’d need to. I think we should all spend some time together on Free Days, but maybe in smaller groups that want to talk about one particular subject, like discussion clubs. I really don’t know. What time is it, anyway?” As they talked, it had gotten dark.

“Late. You tired?”

“Mmm.”

“Good night then, Beatrice.”

###

Beatrice spent the whole next day out on the lake. The warming atmosphere created thermic winds strong enough for her to sail in the morning, but they died down at around noon. They would pick up again at the end of the day, though, and she was content just to lie back in the boat and watch the water. It was warm, and she undressed to lie partially naked under the shade of the flapping sail. After a while, she fell asleep.

She woke to the boat lurching to one side.

“What the...?” and she looked down into the water, where Noah was trying to pull himself up over the side of the boat. She helped him as best she could.

“It is so weird to swim in water where you can’t see the bottom,” he said, shaking his wet hair all over her.

“Stop it,” she said, laughing, as he plunked down next to her. “You’re getting everything wet.”

“Wet kisses!” he cried and leaned over to kiss her belly, his short hair dripping. “How’s our little friend doing?” He rubbed the water droplets into the skin of the round bump of their first child.

"I don't know how it's doing, but now I'm freezing, thanks to you." She reached for her clothes, which were draped over the boom.

"Don't put anything on," he said. "You're so beautiful like this." He looked around and found nothing to dry off with. "Didn't think this part through so well, did I."

"Here," she took her shirt to dry him a bit.

"Stop, you'll have nothing to put on. And you're already cold."

"You'll warm me up, and it'll dry," Beatrice said. So they lay down and snuggled together until Vanir and their own body heat finally had their effect.

Noah took her hand and guided it up into the air, making mottled light fall across their faces. "I wanted to leave you time alone out here. I know you've been looking forward to getting away, but there's news."

"From the Q-message?"

"There are people out there. They know we're here," he said.

"What? Who?" She sat up, reaching for her damp shirt.

"Humans. From Earth. Veda thinks she knows them, or one of them. They want to land on Otrera."

"When?"

"Not soon, but Haley's trying to figure out how to help them navigate here. They're in bad shape. If we don't help them, they'll die out there."

And if they came here, they might destroy everything.

No, that wasn't quite right, Beatrice realized. She knew the Otrerans, the kindness of the people she'd grown up with. They would want to help. So it wasn't going to be a matter of *if* the others came here, but *when*.

Beatrice lay back down in the boat next to Noah, folding herself into his arms, and shivered.

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“So I’m going to die here, under a dome, living out a half-life like those zoo animals back on Earth, with a whole planet that I’ll never be able to see or touch ,” the boy said flatly. “And this is all I’ll know of life.”

What do you do when the world you were given is huge but your place in it is tiny?

He grew up under a dome on a distant planet, raised by people who wanted to do everything right this time. No wars. No waste. No cruelty. Just a small, careful, loving attempt at something better.

But he is sixteen with a whole world just outside the glass and he’s been told his whole life that it should be left alone. Life inside is no simpler. There’s Beatrice. He doesn’t know where he fits with her, or anywhere at all.

The Zoo is the story of one boy trying to navigate a new world, and along with Beatrice, trying to create a society where everyone has a place.



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